
INSTALLATION
INFORMATION

MicroVAX 3100 Model 30

Installation Information

Order Number: EK-A0520-IN.001

October 1991

This manual describes how to install and test the MicroVAX 3100 Model 30.

Revision Information: This is a new manual.

Digital Equipment Corporation
Maynard, Massachusetts

October 1991

The postpaid Reader's Comments forms at the end of this document request your critical evaluation to assist in preparing future documentation.

This document was prepared using VAX DOCUMENT, Version 2.0.

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Preface

This manual describes how to install and test the MicroVAX™ 3100 Model 30. It also refers to information on connecting the system to a network, connecting external options to the system, and booting the operating system.

Audience

This manual is intended for anyone who wants to install the MicroVAX 3100 Model 30. It is written for both experienced and inexperienced users.

Structure of This Manual

This manual contains one chapter. Each section heading is a step in the installation procedure and is indicated by the word *step* and a numeral. Substeps in the procedure are indicated by a numeral.

Additional Information

See the *MicroVAX 3100 Model 30 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.
Note	A note contains information that is of special importance to the user.

1

Installation Procedure

This chapter shows you, step by step, how to install the MicroVAX 3100 Model 30.

Step 1: Choosing a Suitable Location

Follow these guidelines when choosing where to place the system unit:

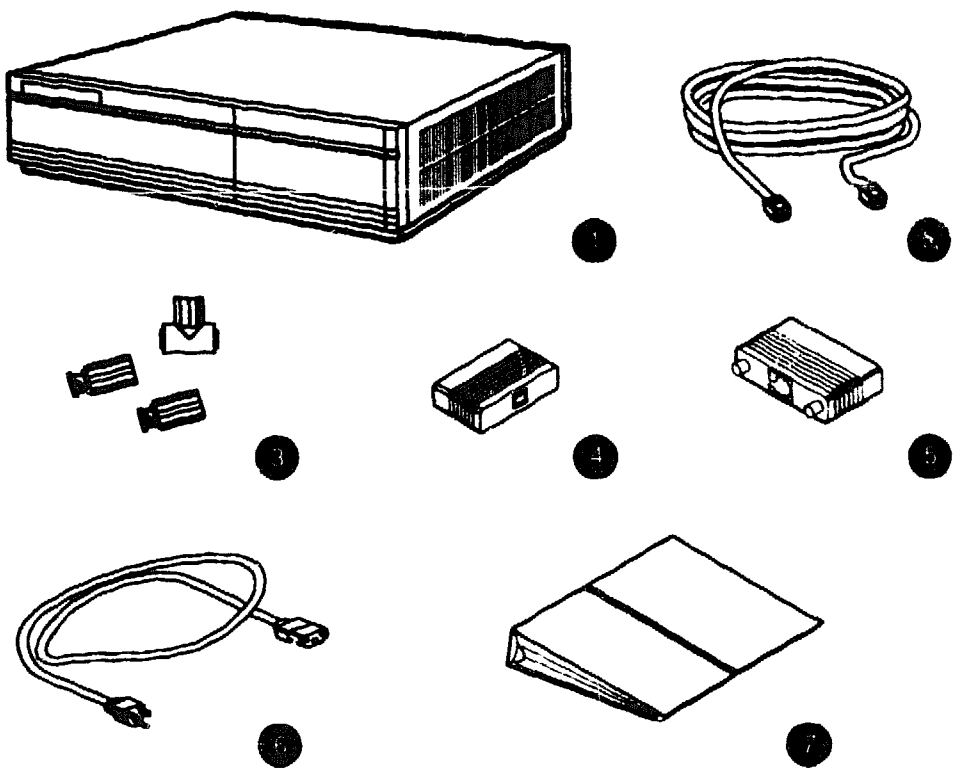
- Place the system unit where the room temperature is between 10°C and 40°C (50°F and 104°F) and the humidity is between 10% and 90%.
- Place the system unit at least 1 metre (3 feet) from heaters, photocopying machines, or other operating equipment.
- Place the system unit in a well-ventilated location.
- Place the system unit on a work surface, which is raised above the floor.
- Keep the air vents on either side of the system unit clear.
- Do not expose the system unit to direct sunlight or abrasive particles.

Note

The console terminal is not supplied with the system. If you do not have a Digital Equipment Corporation terminal, order one from your Digital™ Sales representative.

Step 2: Unpacking the System and Identifying the Parts

1. Unpack the system.
2. Make sure that you have all the parts listed on the packing slip. The following loose-piece accessory kit is shipped with all basic systems. If you do not have all the parts listed, contact your Digital Sales representative.



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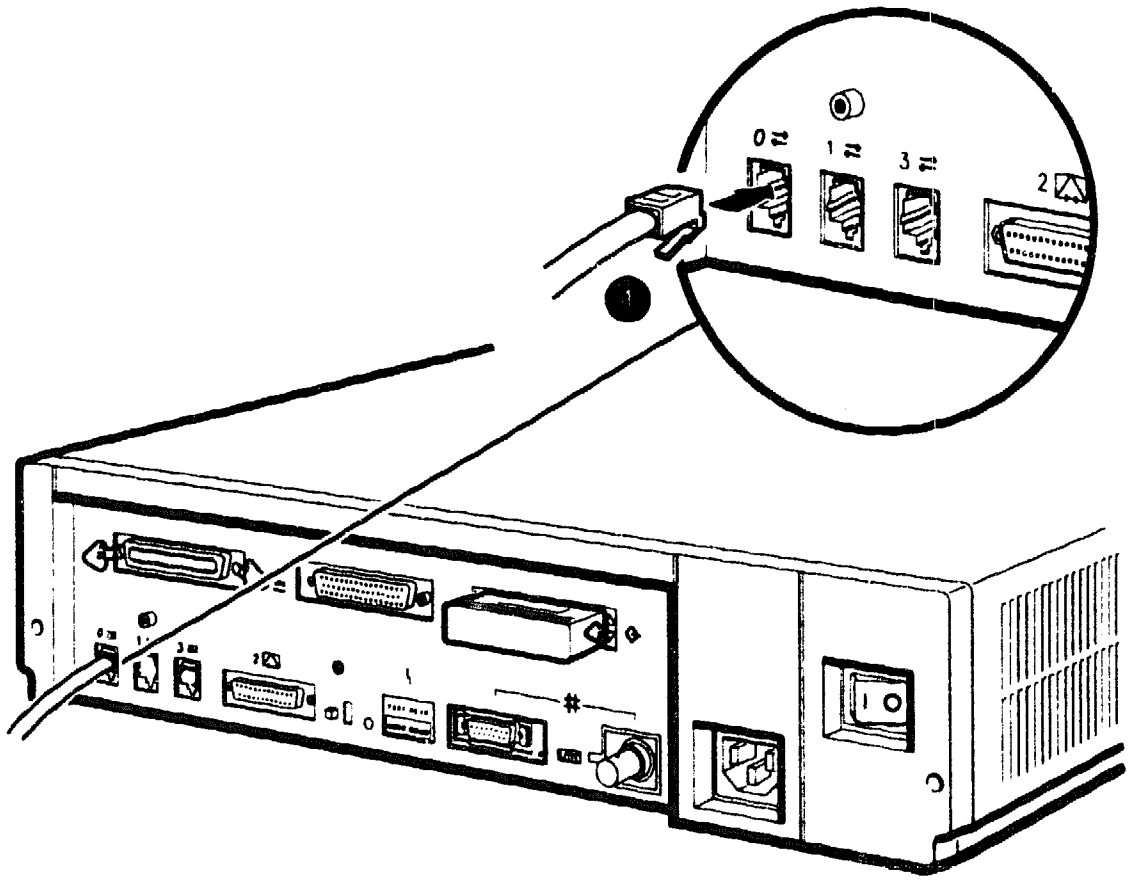
- ❶ System Unit
- ❷ DEC423 Terminal Cable (BC16E-25)
- ❸ One ThinWire™ Ethernet T-Connector (H8223) and Two Terminators (H8225)
- ❹ Standard Ethernet Loopback Connector (12-22196-01)
- ❺ RS232 to DEC423 Adapter (H8575-A)
- ❻ Power Cord
- ❼ Documentation and Software Licenses

Step 3: Connecting the Console Terminal

1. Connect one end of the terminal cable to modified modular jack (MMJ) port 0.
2. Connect the other end of the terminal cable to a DEC423 (MMJ) communications port on the console terminal. If your terminal has only RS232 ports, use the RS232 to DEC423 adapter (H8575-A) to provide an MMJ port on the terminal.



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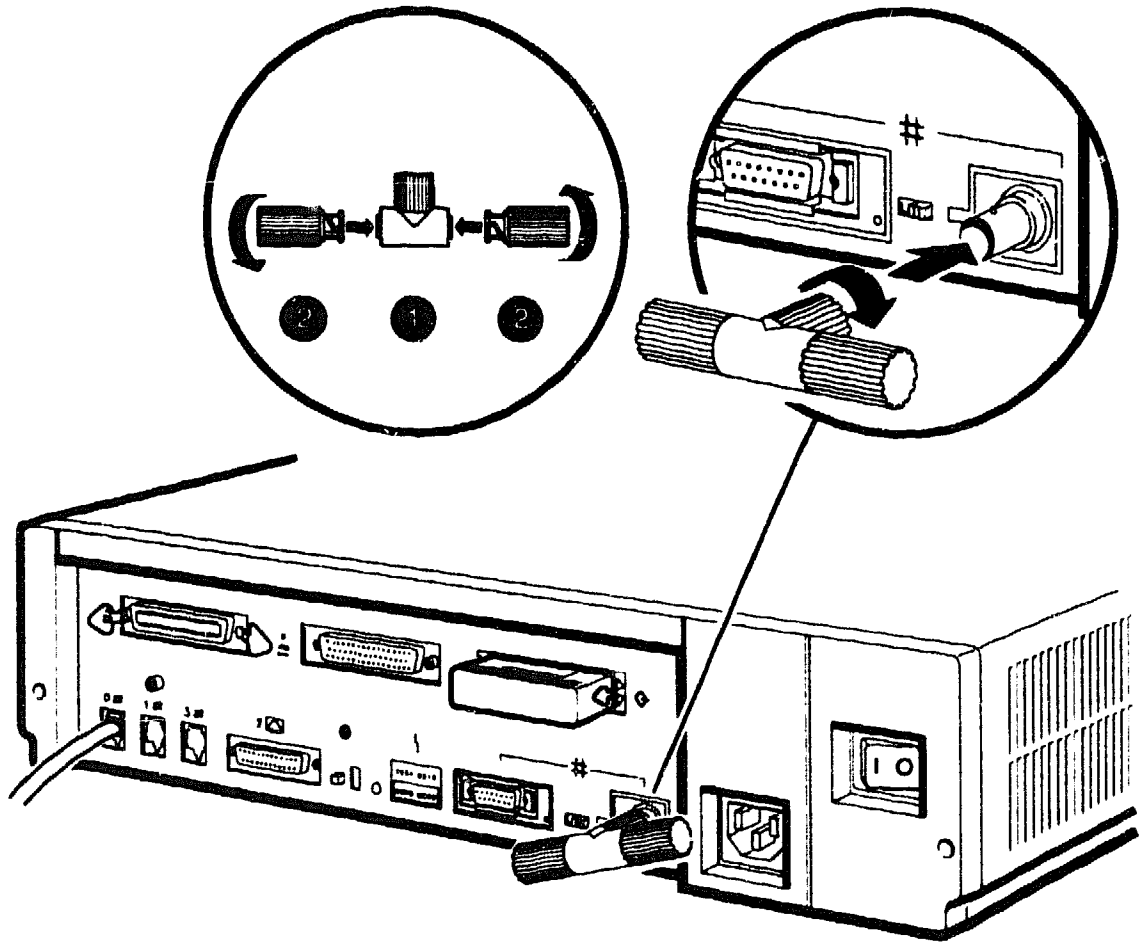
❶ Terminal Cable

Step 4: Connecting the ThinWire Terminator

1. Assemble the T-connector and the two terminators to form a ThinWire terminator.
2. Connect the ThinWire terminator to the system unit.



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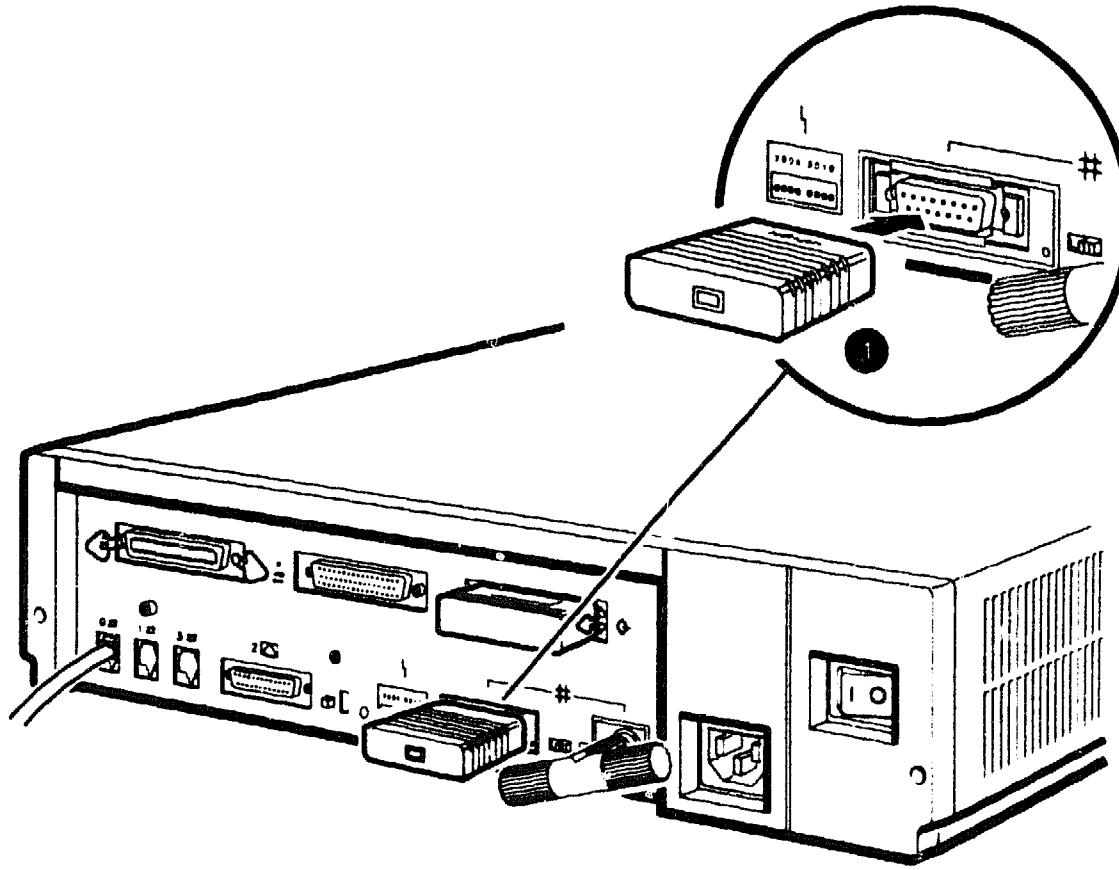
❶ T-Connector

❷ Terminator

Step 5: Connecting the Standard Ethernet Loopback Connector

Connect the standard Ethernet loopback connector (12-22196-01) to the system unit.



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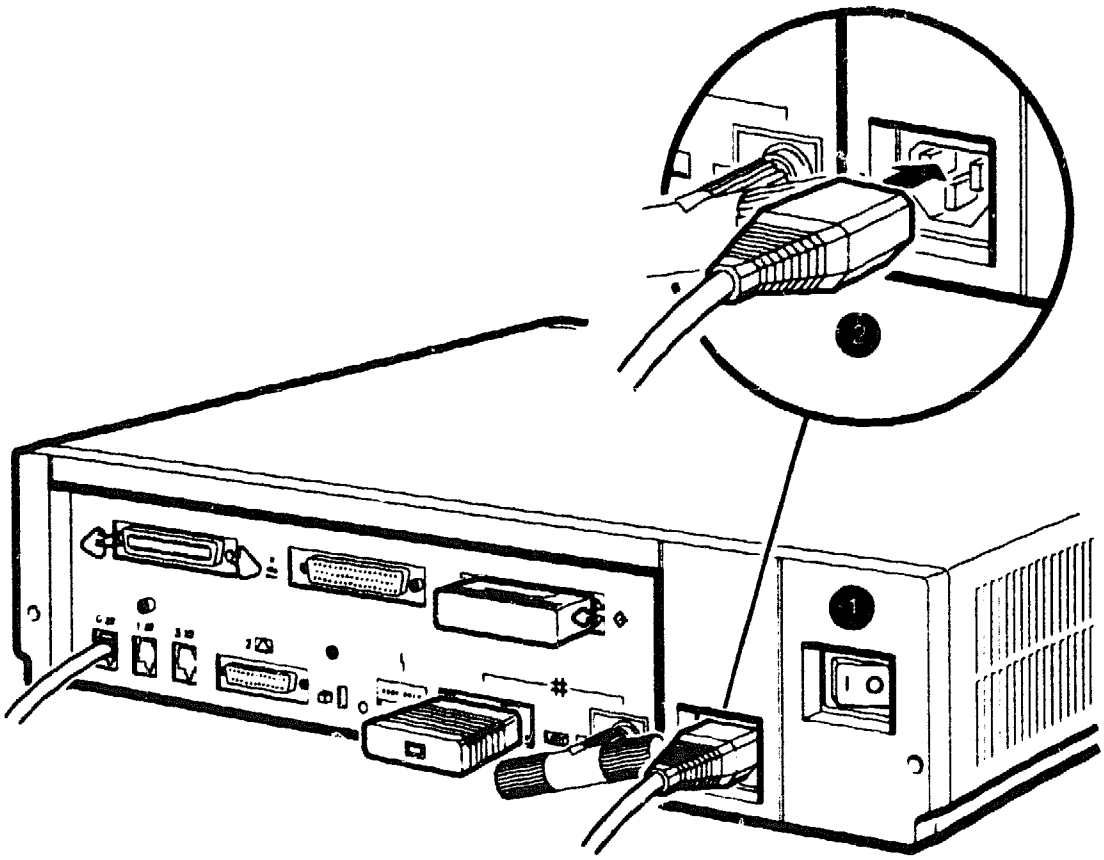
❶ Standard Ethernet Loopback Connector (12-22196-01)

Step 6: Connecting the Power Cord

1. Ensure that the on/off switch is in the off (O) position.
2. Connect the power cord to the system unit.
3. Connect the other end of the power cord to an isolated, grounded circuit.



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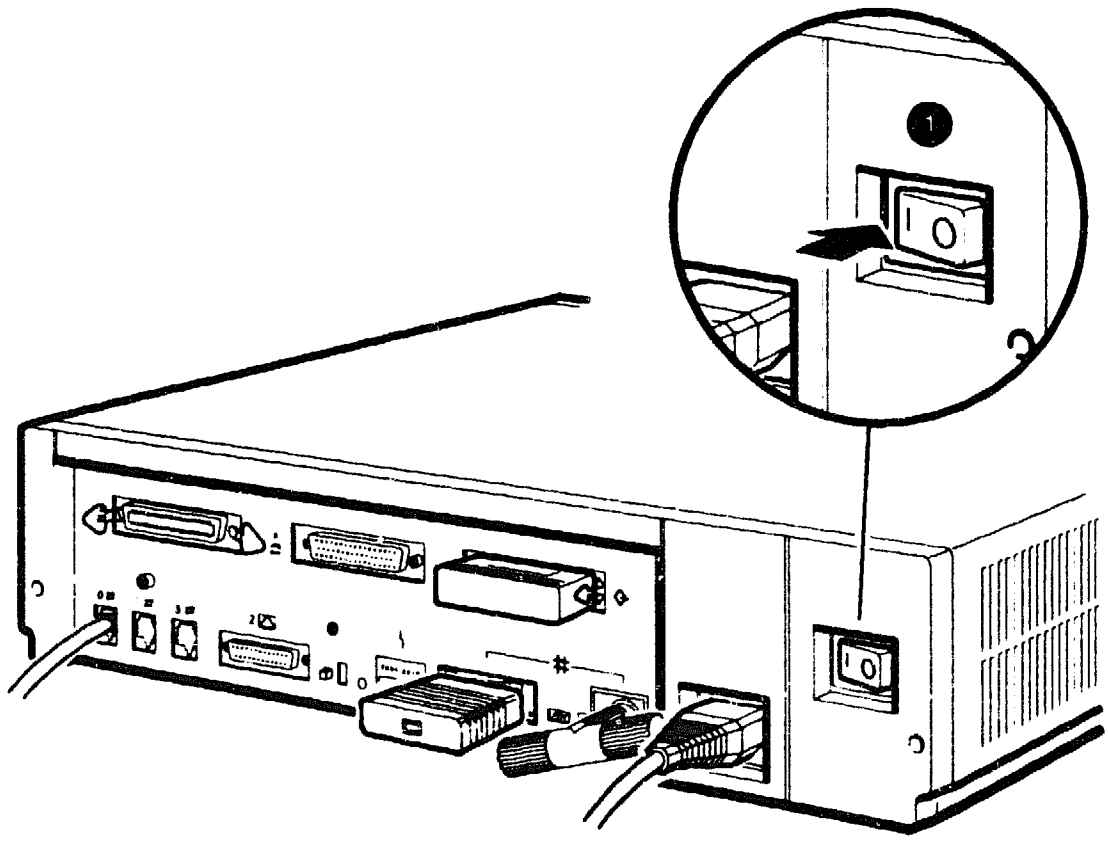
1. On/Off Switch
2. Power Cord

Step 7: Turning on the Console Terminal and System Unit

1. Turn on the console terminal. Wait until it completes its power-up test. (See the terminal documentation for more information.)
2. Check the terminal settings. See the *MicroVAX 3100 Model 30 Operator Information* manual for the list of correct settings.
3. Turn on the system unit by setting the on/off switch to the on (|) position.



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❶ On/Off Switch

Step 8: Checking the Power-Up Test Results

The power-up test can take several minutes to complete, depending on the number of installed options and on which default settings you use.

1. If the power-up test results on the screen are similar to the results in Figure 1–1, the system has passed the power-up test. Go to step 9.
2. If the power-up test results on the screen are not similar to the results in Figure 1–1, the system has not passed the power-up test. Go to substep 3.

Figure 1–1 Successful Power-Up Test Screen

❶ Central Processing Unit (CPU) Name (KA45) and Firmware Version Number (V1.0).

❷ Ethernet Hardware Address.

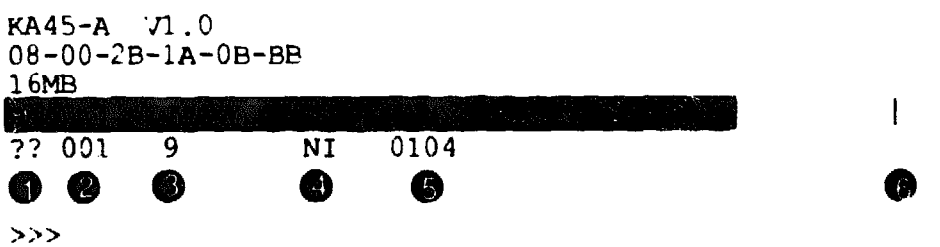
❸ Memory Size.

❹ Status Bar—The completion mark (|) indicates the full extent of the status bar. When the status bar reaches the completion mark, the power-up test is complete. On some terminals, the status bars are displayed as a line of number signs (#).

❺ Console Prompt.

3. Write down the error reports. Figure 1–2 shows an example of an error report.
4. Set the on/off switch to the off (O) position.
5. Make sure that all the connections you made in step 3, step 4, step 5, and step 6 are correct.
6. Set the on/off switch to the on (|) position.
7. If an error report is still displayed, see the *MicroVAX 3100 Model 30 Troubleshooting and Diagnostic Information* manual.

Figure 1–2 Unsuccessful Power-Up Test Screen with an Error Report



1. Error Type—Double question marks (??) indicate a hard error, that is, a fatal error that prevents the system from booting. A single question mark (?) indicates a soft error, that is, a nonfatal error that does not prevent the system from booting.
2. Field Replaceable Unit (FRU).
3. Device Number.
4. Device Mnemonic.
5. Error Message.
6. Completion Mark—The completion mark (|) indicates the full extent of the status bar when the power-up test is successful.

Note

Step 9 and step 10 are optional. However, step 11 is mandatory.

Step 9: Connecting the System to a Network

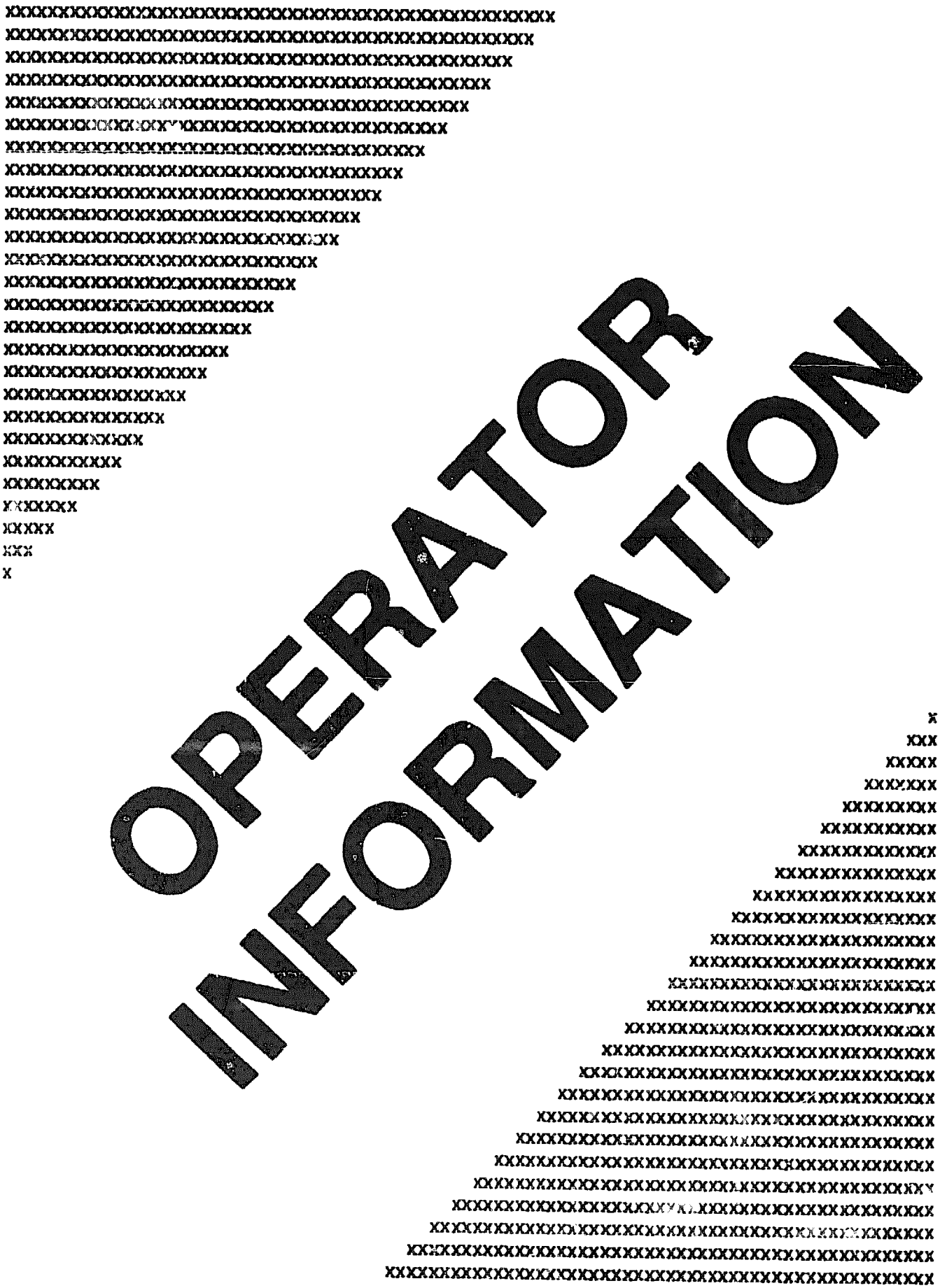
If you want to connect the system to a network, see the *MicroVAX 3100 Model 30 Operator Information* manual.

Step 10: Connecting External Options to the System

If you want to connect external options to the system, see the *MicroVAX 3100 Model 30 Operator Information* manual.

Step 11: Booting the Operating System

The system is supplied with factory installed software (FIS) on the system disk. Boot the operating system following the procedures in the *VMS™ Factory Installed Software User Guide*.


OPERATOR
INFORMATION

MicroVAX 3100 Model 30

Operator Information

Order Number: EK-A0521-UG.001

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Preface

This manual describes how to operate the MicroVAX™ 3100 Model 30. It also contains information on using software storage devices, connecting the system to a network, and connecting hardware options to the system.

Audience

This manual is intended for anyone using a MicroVAX 3100 Model 30. It is written for both experienced and inexperienced users.

Structure of This Manual

This manual is divided into four chapters, two appendixes, a glossary, and an index:

- Chapter 1 describes the Model 30 system unit.
- Chapter 2 describes how to use the software storage and loading devices that are internal to the system.
- Chapter 3 describes how to connect the system to a network.
- Chapter 4 describes how to connect hardware options to the system.
- Appendix A gives the list of associated and related documents.
- Appendix B describes how to handle and care for removable software storage media.
- The glossary defines some of the technical terms used in this manual.

Additional Information

See Appendix A 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.
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.
italic type	Italic type emphasizes important information, indicates variables, and indicates complete titles of manuals.
nn nnn.nnn nn	A space character separates digits in numerals with 5 or more digits. For example, *10 000* equals *ten thousand*.
n.nn	A period in numerals signals the decimal point indicator. For example, *1.75* equals *one and three-fourths*.
UPPERCASE	Words in uppercase indicate a command.
n	A lowercase italic *n* indicates the generic use of a number. For example, 19*nn* indicates a 4-digit number in which the last 2 digits are unknown.
Note	A note contains information of special importance to the reader.
Caution	A caution contains information to prevent damage to the equipment.
Warning	A warning contains information to prevent personal injury.

1

MicroVAX 3100 Model 30 Hardware

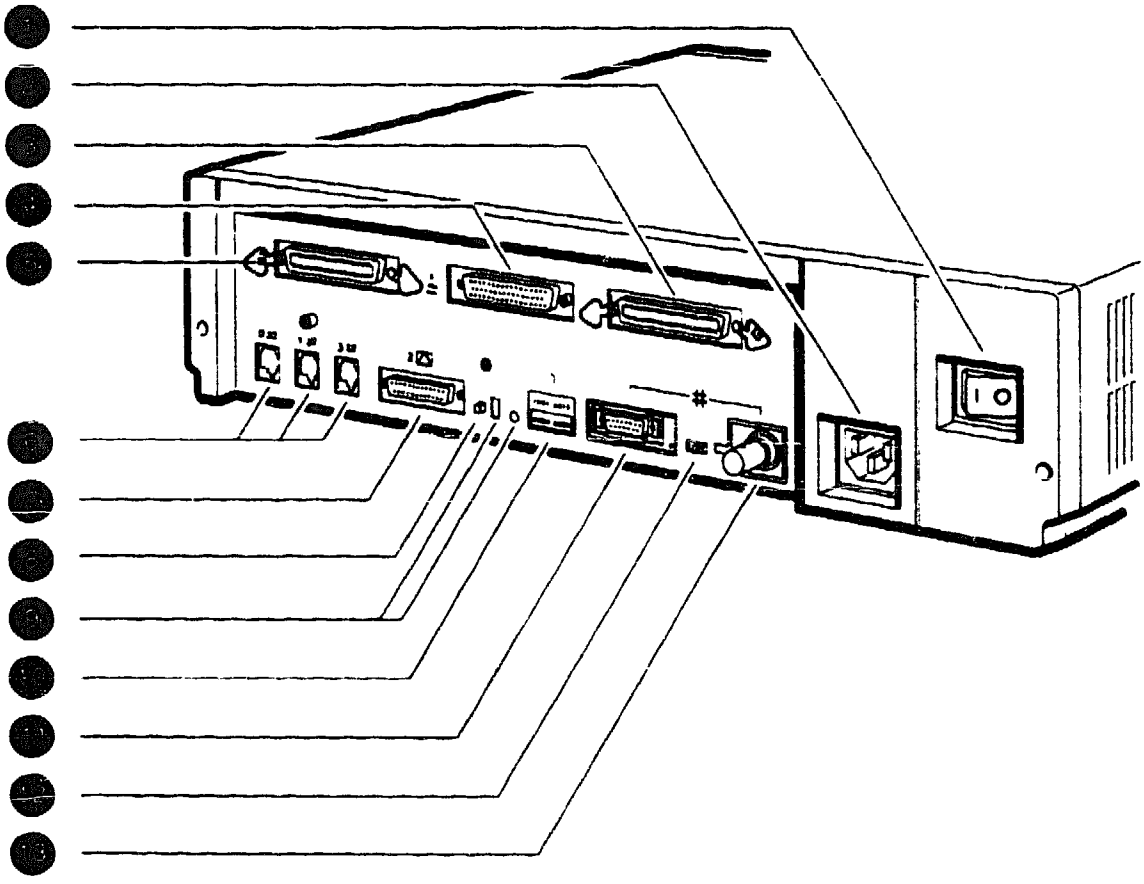
This chapter describes the MicroVAX 3100 Model 30 system unit. It describes the following:

- The system unit for the Model 30
- System unit icons
- Terminal settings

1.1 System Unit Description

Figure 1–1 shows the Model 30 ports, controls, and light emitting diodes (LEDs).

Figure 1–1 Model 30 Ports, Controls, and LEDs



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- On/Off Switch—This switch turns the system unit on or off. To turn the system on, set the on/off switch to the on (|) position. To turn the system off, set the on/off switch to the off (O) position.
- System ac Power—This is the port through which power from the power source reaches the system unit.
- SCSI Port—This is the port to which external small computer system interface (SCSI) storage devices connect to the system unit. The SCSI terminator is installed in this port when it is shipped.
- Optional Synchronous Communications Port 0—This is the port to which you can connect the devices or options that use synchronous communications.

- Optional Asynchronous Communications Port A—This is the port to which you can connect the devices or options that use asynchronous communications.
- Modified Modular Jack (MMJ) Ports 0, 1, and 3—These are the ports to which you can connect the console terminal, user terminal, printer or other devices that use asynchronous DEC423 data-line-only ports to the system unit.
- Asynchronous Modem Control Port (Port 2)—This is the port at which you can connect a modem, terminal, printer, or other devices that use EIA-232 ports to the system unit.
- Halt Button—This button halts the system and returns it from the operating system to console mode.
- Break/Enable Switch and LED—When the break/enable switch is in the up position, MMJ port 3 becomes the console port and you can halt the system by pressing the break key on the console terminal keyboard. When the break/enable switch is in the up position, the LED is on. When the break /enable switch is in the down position, MMJ port 0 becomes the console port and the LED is off.
- Diagnostic LEDs—The diagnostic LEDs (status LED display) indicate system and test status, and error conditions.
- Standard Ethernet Port—This is the port to which standard Ethernet connects to the system unit.
- Network Select Switch—This switch selects either ThinWire™ or standard Ethernet connection.

  The system uses standard Ethernet when the network select switch is in the left-hand position. The system uses ThinWire Ethernet when the network select switch is in the right-hand position.
- ThinWire Ethernet Port—This is the port to which ThinWire Ethernet connects to the system unit

1.2 Terminal Settings

Terminals must have the following settings to communicate with the system unit:

Table 1–1 Terminal Settings

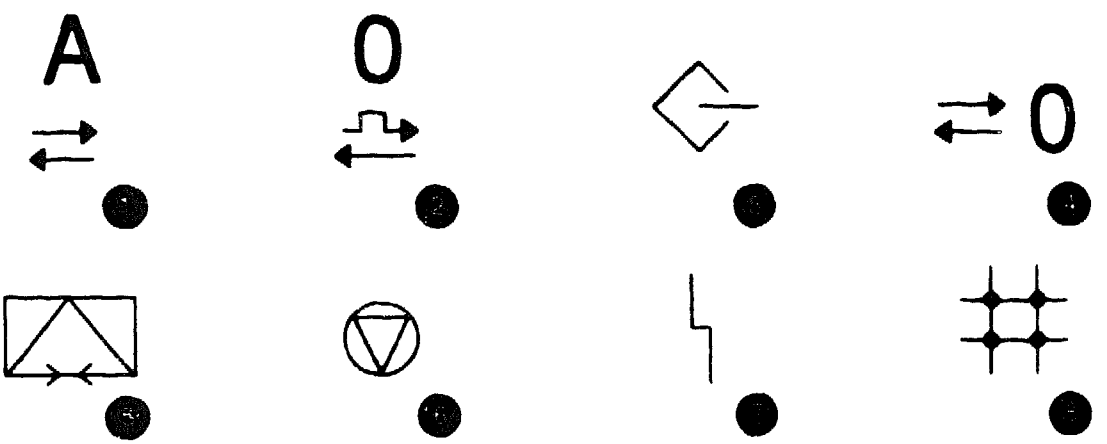
Feature	Setting
Terminal mode	VT*nnn*-7bit
Transmit speed	9600 baud
Receive speed	receive = transmit
Character format	8 bits, no parity
Stop bits	1
Comm1 port	DEC-423 (data-leads-only)

See the terminal documentation for more information on setting up the terminal.

1.3 System Unit Icons

Figure 1–2 shows the system unit icons.

Figure 1–2 System Unit Icons



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1. This icon indicates optional asynchronous communications port A.
2. This icon indicates optional synchronous communications port 0.
3. This icon identifies the SCSI port.
4. This icon identifies a DEC423 MMJ port 0. Similar icons indicate MMJ ports 1 and 3.
5. This icon identifies the asynchronous modem control port (port 2).
6. This icon identifies the halt button.
7. This icon identifies the status LED display.
8. This icon identifies the standard Ethernet port, the network select switch, and the ThinWire Ethernet port.

2

Internal System Devices

This chapter describes how to access and operate the internal devices that are options of the system. The system can contain the following optional devices:

- TZ30 tape drive
- TZK10 quarter-inch cartridge (QIC) tape drive
- RX26 diskette drive

This chapter also gives information on the following:

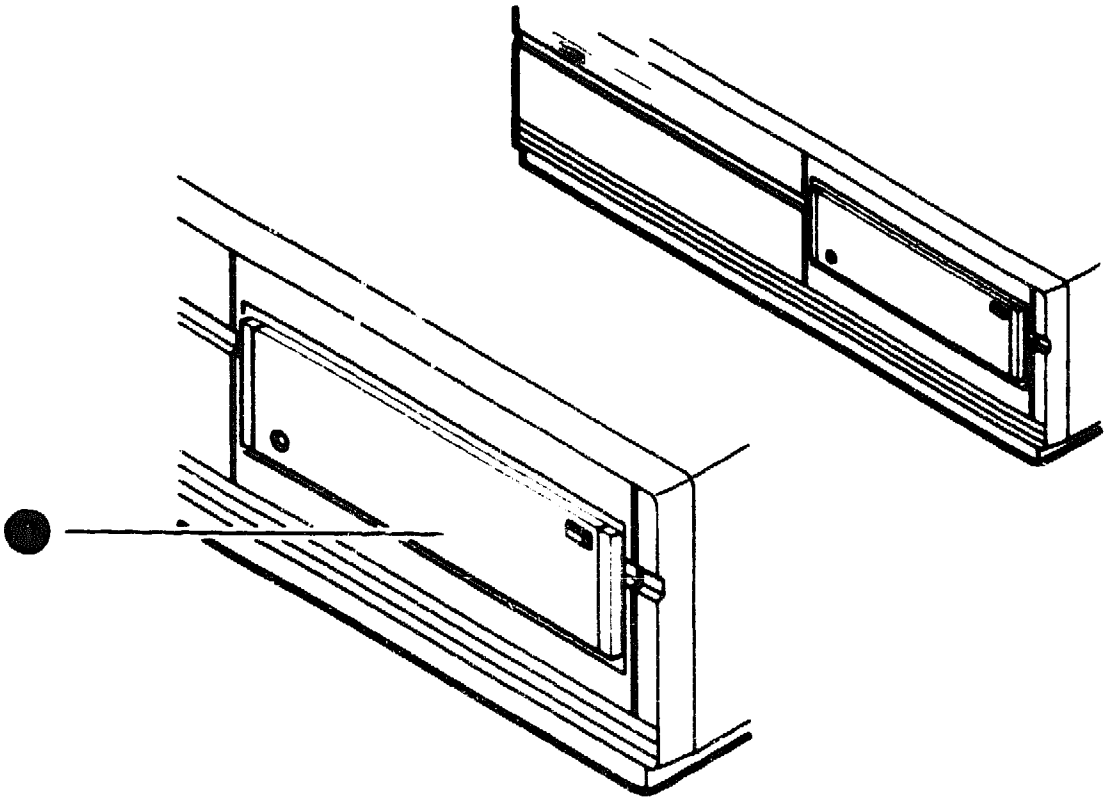
- Cleaning device drive heads
- System disk

Note

Appendix B contains information on the care and handling of the media types for each of the removable media devices. It also gives information on setting the write-protect switches on the diskettes and tapes.

2.1 Accessing the Removable Media System Devices

On Model 30 systems, the removable media devices are located at the front of the system unit.



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● Removable Media Device (TZK10)

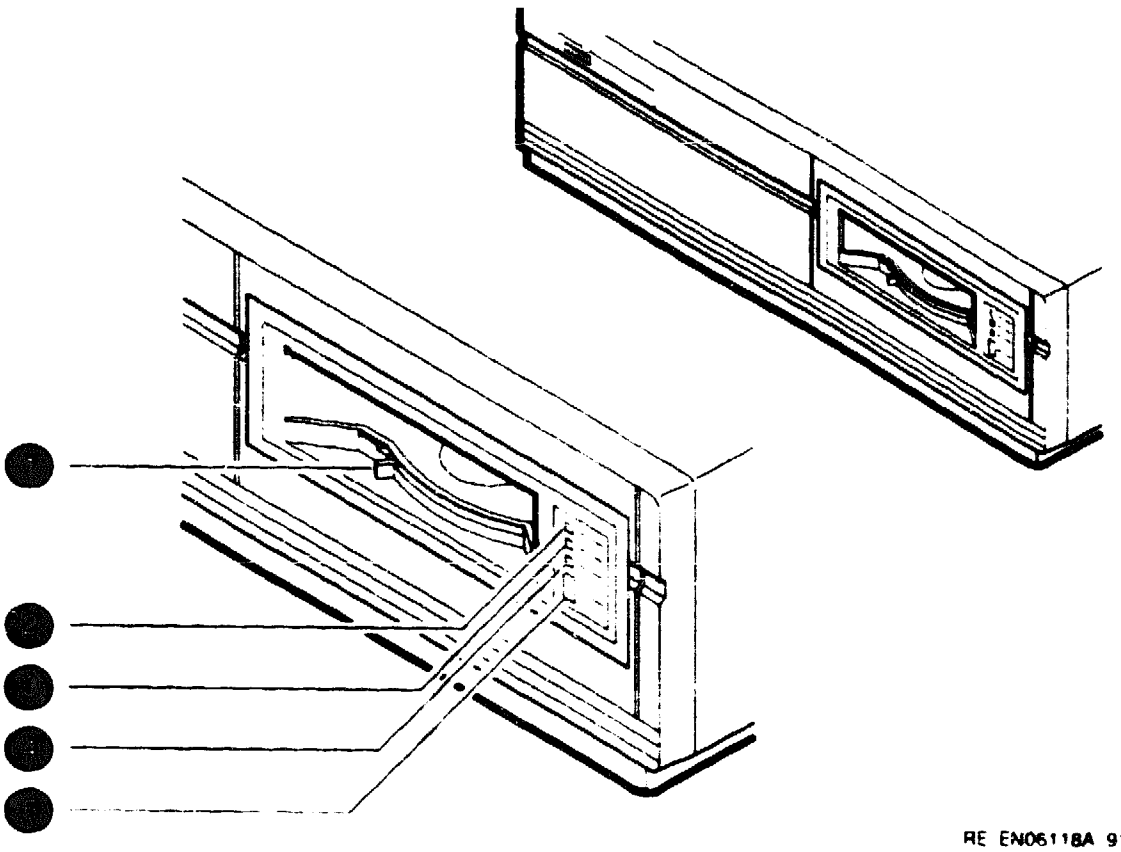
2.2 TZ30 Tape Drive

The TZ30 uses CompacTape™ or CompacTape II cartridges that contain magnetic tape on a single reel. When you insert the tape cartridge into the drive and load it, the tape is automatically threaded onto a take-up reel inside the drive.

2.2.1 TZ30 Controls and LEDs

Figure 2–1 shows the location of the controls and LEDs on the TZ30 tape drive. Table 2–1 explains the functions of the TZ30 controls. Table 2–2 explains the functions of the TZ30 LEDs and beeper.

Figure 2–1 TZ30 Tape Drive Controls and LEDs



- Operate Lever
- Write-Protect LED (Red)
- Tape-in-Use LED (Yellow)
- Operate-Lever LED (Green)
- Unload Button

Table 2–1 TZ30 Controls

Control	Function
Unload button	The unload button rewinds and disengages the tape from the take-up reel inside the TZ30. The tape must be completely rewound and unloaded into the tape cartridge before you can remove the tape cartridge from the drive. The tape is fully unloaded when the operate lever LED is on.
Operate lever[1]	Use the operate lever to lock or unlock a tape cartridge. To insert a tape cartridge, the operate lever must be in the unlock position. Once you insert a tape cartridge and the green LED is on, move the operate lever to the lock position. To eject the tape cartridge from the drive, (only when the green LED is on or flashing, and after the beeper sounds momentarily), move the operate lever to the unlock position.

[1]When using the operate lever, slide it completely to the lock or unlock position before beginning the next operation.

Table 2–2 TZ30 LEDs

LED	State	Condition
Operate-lever LED	On	Safe to use the operate lever.
	Off	Do not use the operate lever.
	Flashing	The drive has detected a tape cartridge or calibration error.
Tape-in-use LED	Flashing	Tape in use.
	On	Tape loaded and ready to use.
Write-protect LED	On	Tape is write-protected.
	Off	Tape is write-enabled.
All three LEDs	On	The power-up diagnostic test is in progress.
All three LEDs	Flashing	Drive fault.
Beeper	One beep	The TZ30 beeps once when you turn on the system unit.
	Two beeps	Indicate that the tape is unloaded and you can remove it from the drive.

2.2.2 Inserting and Using a Tape Cartridge

To insert a tape cartridge, follow these steps:

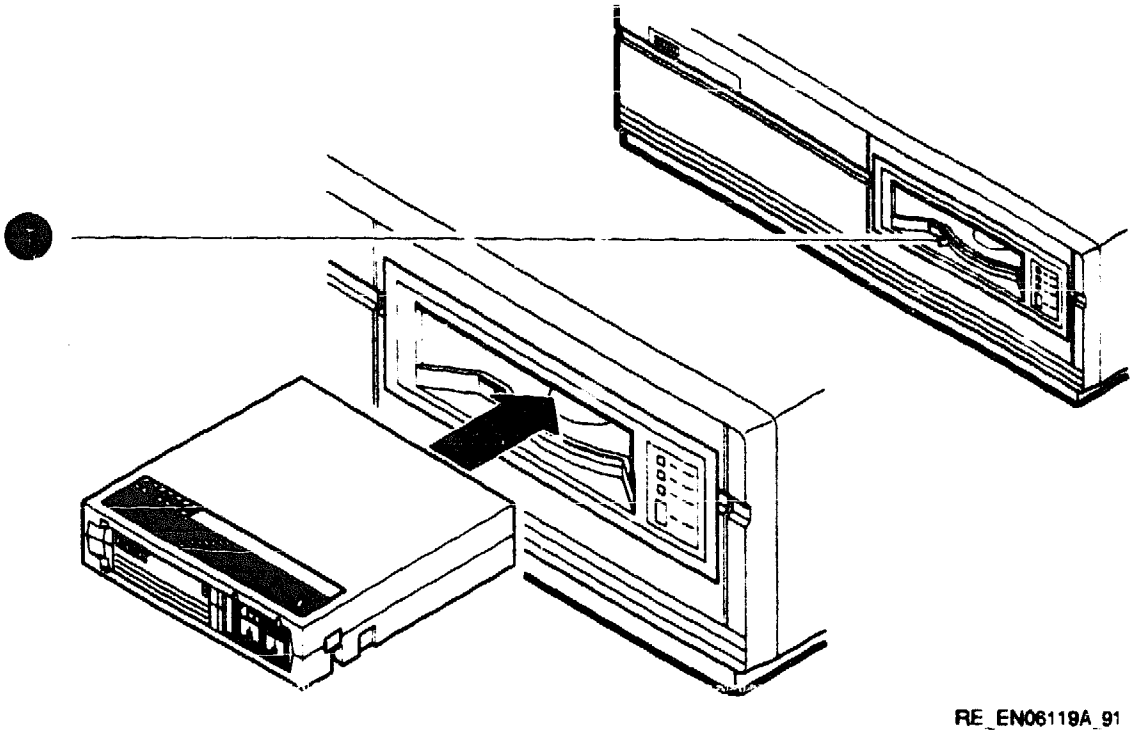
1. Slide the operate lever to the unlock position.
2. Insert the tape cartridge following these rules:
   - If you insert the tape cartridge more than half-way into the drive, you must insert the tape cartridge fully.
   - If you want to use another tape cartridge, insert the tape cartridge fully, unload the tape cartridge, and then remove it.
   - If you cannot insert the tape cartridge into the TZ30, move the operate lever to the lock position. Then move the operate lever to the unlock position and reinsert the tape cartridge.
   - Do not push the tape cartridge into the TZ30 while moving the operate lever between the lock and unlock positions. If you do so, the TZ30 interprets this action as an insertion of the tape cartridge.

   The green LED turns on.
3. Move the operate lever to the lock position to lock the tape cartridge in the drive.

   The green LED turns off, and the yellow LED starts to flash, indicating that the tape is loading. When you load the tape and it is ready for use, the yellow LED stays on. When the yellow LED stays on and the green LED stays off, the tape is ready to use.

See the *MicroVAX 3100 Model 30 Troubleshooting and Diagnostic Information* manual if errors occur while you are using the TZ30 tape drive.

Figure 2–2 Inserting a Tape Cartridge



❶ Operate Lever

2.2.3 Removing a Tape Cartridge from the Drive

To remove a tape cartridge, follow these steps:

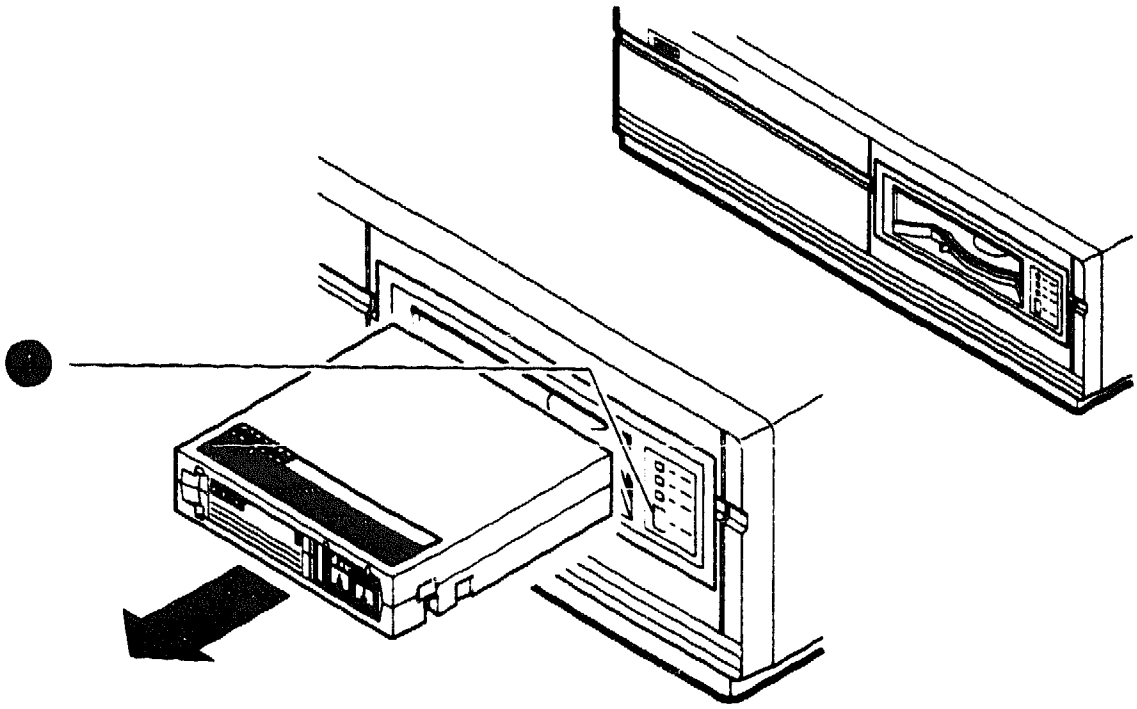
Caution

- The tape must fully rewind before you can remove the tape cartridge from the tape drive.
- Remove the tape cartridge from the drive before setting the on/off switch on the system unit to the off (O) position.

1. Press the unload button (see Figure 2–3) or enter the appropriate system software command.

   The yellow LED flashes as the tape rewinds. Once the tape rewinds completely, the beeper sounds twice and the green LED turns on.
2. Move the operate lever to the unlock position.
3. Remove the tape cartridge from the tape drive after it ejects.

Figure 2–3 Removing a Tape Cartridge



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● Unload Button

2.3 TZK10 QIC Tape Drive

The TZK10 QIC tape drive is a quarter-inch cartridge, streaming tape drive. You can use it for archival, data storage and retrieval, and data collection purposes.

2.3.1 TZK10 Controls and LEDs

The TZK10 QIC tape drive has one dual-color LED (green and amber) and an eject button. Figure 2–4 shows the positions of the LED and the eject button. Table 2–3 lists the functions of the LED and the eject button.

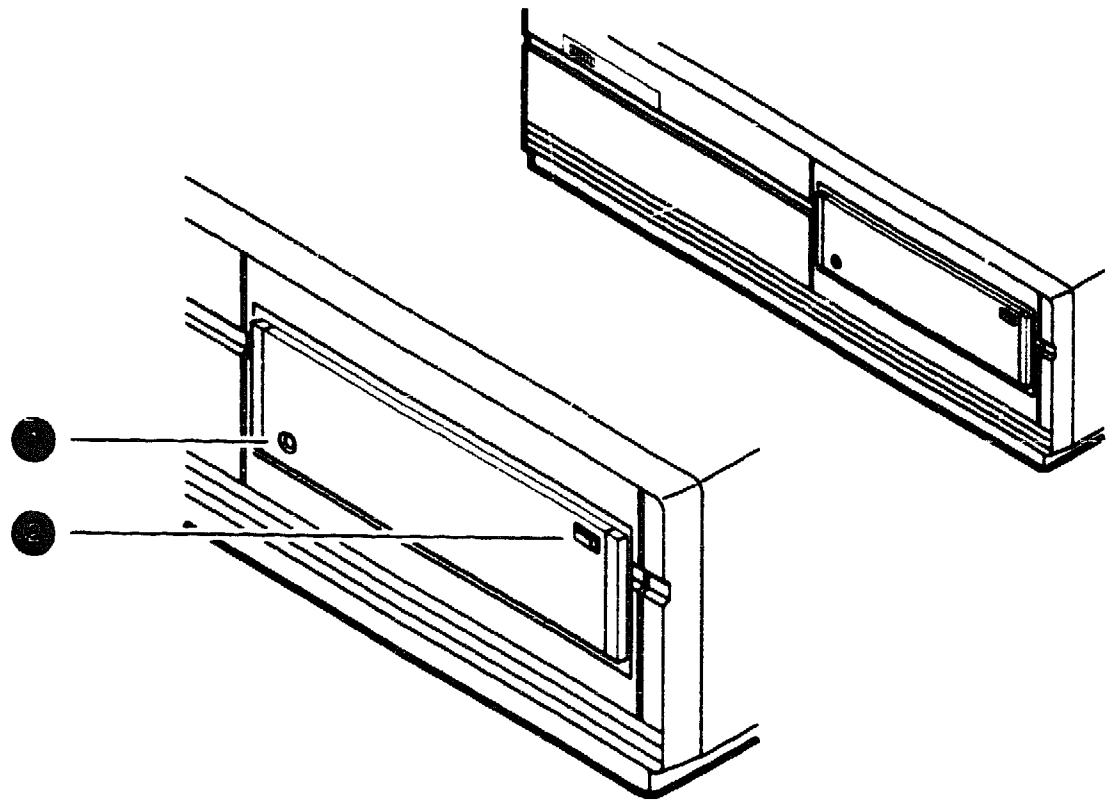
Table 2–3 TZK10 Eject Button and LED Functions

Item	State	Function
Eject button		Unlocks the door and partially ejects the QIC tape from the drive.
LED	Off	Tape is not present or the tape is present, but it has been dismounted by the software.
	Stays green	Tape is loaded.
	Flashes green	Tape is in motion.
	Stays amber	A fault has occurred.

2.3.2 QIC Tape

You can use several types of QIC tape with the TZK10 QIC tape drive. Appendix B lists the types of tape that you can use. It also includes information on the care and handling of these tapes.

Figure 2–4 TZK10 Eject Button and LED



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1. Dual-Color LED
2. Eject Button

2.3.3 Inserting a QIC Tape into the TZK10

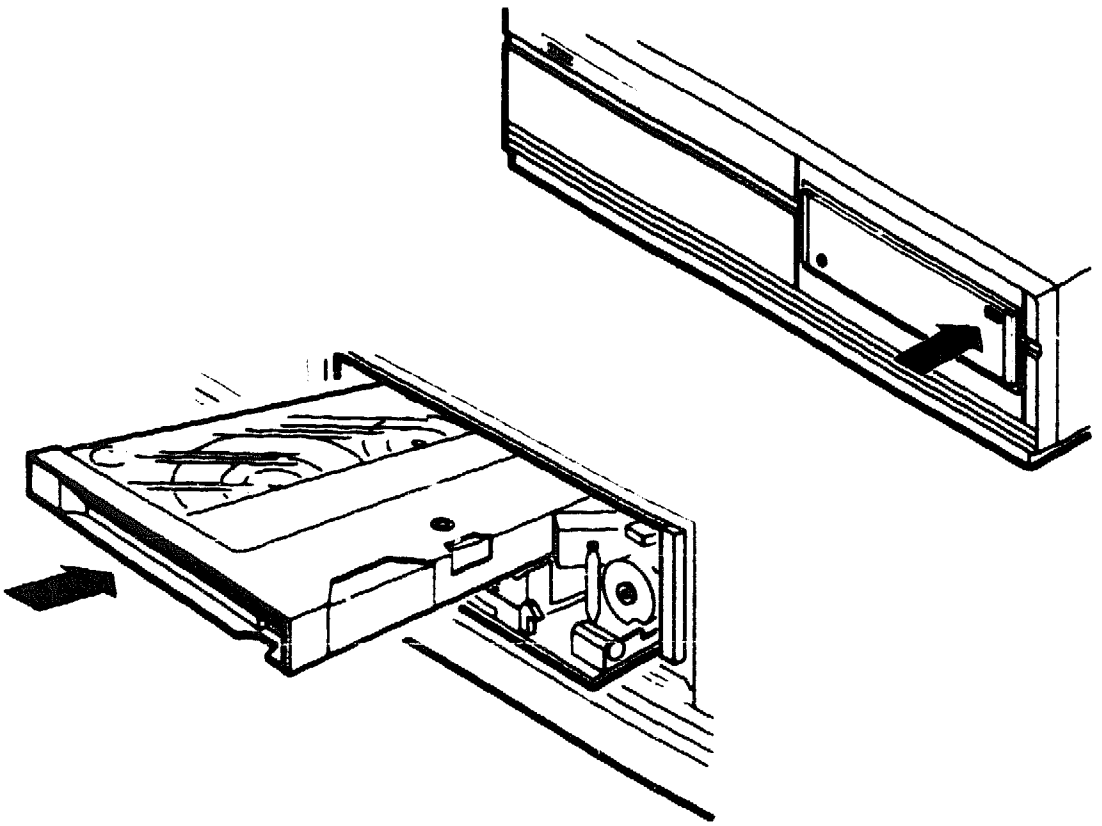
To insert a QIC tape into the TZK10, follow these steps:

1. Press the eject button to open the door on the front of the TZK10 (see Figure 2–5). The door partially opens.
2. Open the door fully.
3. Insert the QIC tape into the TZK10. Figure 2–5 shows the correct orientation of the tape as you insert it. Slide the tape in until you feel resistance.
4. Close the door.

When you insert the tape correctly, the LED turns green, then flashes green while the TZK10 makes several whirring sounds. Finally, the sounds stop and the LED stays green. You can now send operating system commands to the TZK10 QIC tape drive.

If the LED turns amber, see the *MicroVAX 3100 Model 30 Troubleshooting and Diagnostic Information* manual.

Figure 2–5 Inserting a QIC Tape



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2.3.4 Removing a QIC Tape from the TZK10

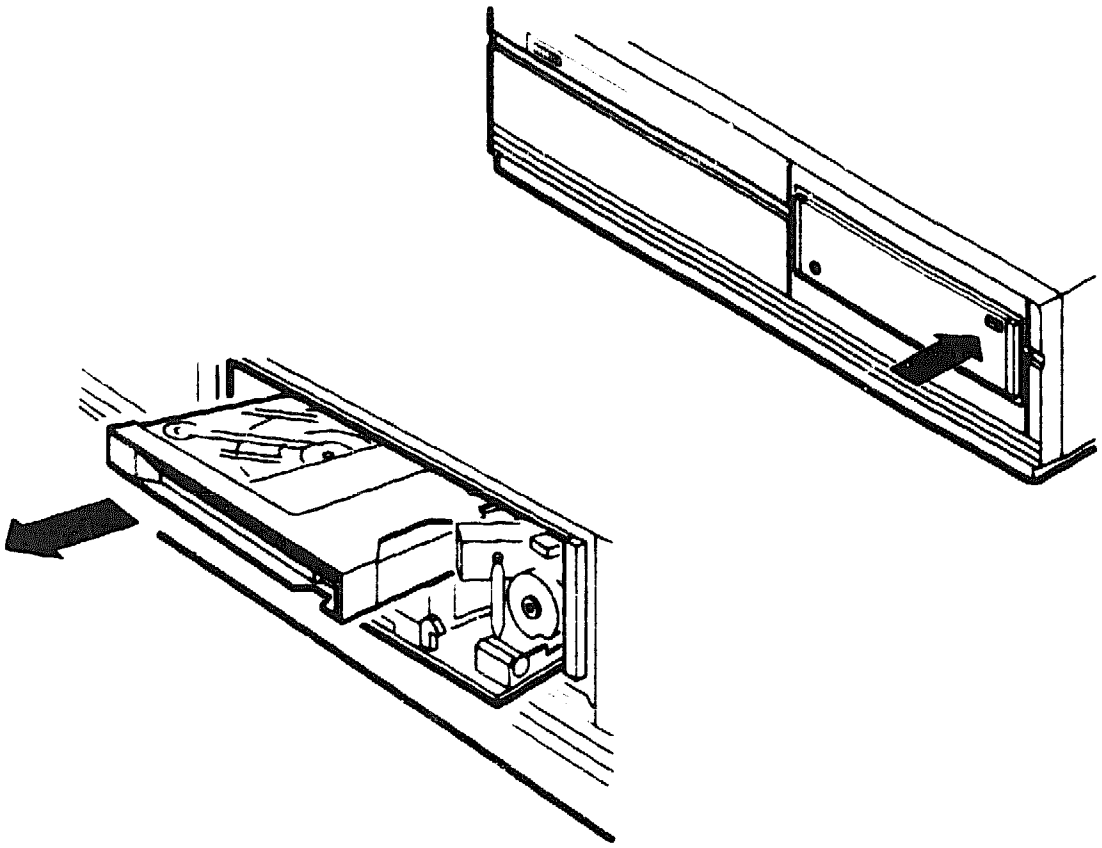
To remove a QIC tape from the TZK10, follow these steps.

1. Dismount the QIC tape by entering the commands from the operating system.

   Before you go to step 2, wait until the tape stops moving (the TZK10 stops whirring) and the LED stops flashing green and stays green.

2. Press the eject button (see Figure 2–6).
3. Open the door fully and remove the tape.
4. Close the door.

Figure 2–6 Removing a QIC Tape



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2.4 RX26 Diskette Drive

The system can include an RX26 diskette drive. This device allows you to read information from and write information to 3.5 inch removable diskettes. You can use high-density (HD) or extra-density (ED) diskettes.

The RX26 diskette drive can read from and write data to HD diskettes that have been formatted by an RX23 diskette drive. However, the ED diskettes used by the RX26 diskette drive cannot be used by the RX23 diskette drive. Appendix B contains information about both types of diskette.

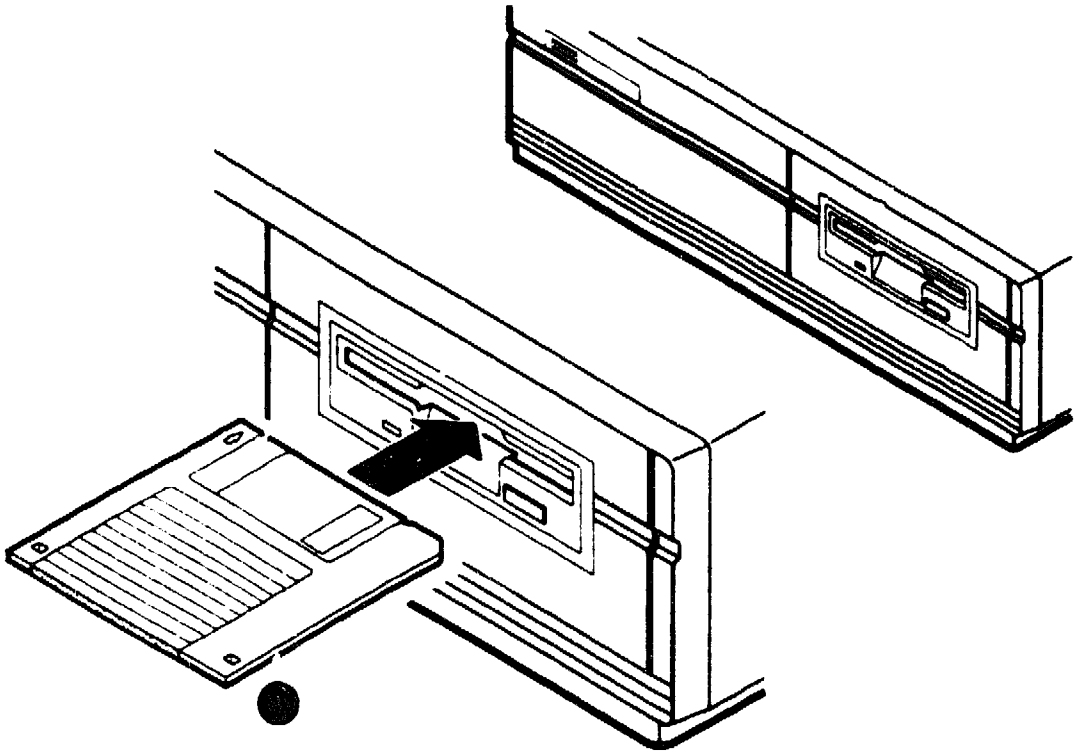
Caution

Never remove a diskette while the diskette drive is performing a function. When the diskette drive is performing a function, the activity LED either stays on or flashes, depending on the function.

2.4.1 Inserting a Diskette

To insert a diskette into the RX26 diskette drive, slide the diskette into the drive (see Figure 2–7). The diskette slides in and drops down to its load position.

Figure 2–7 Inserting a Diskette



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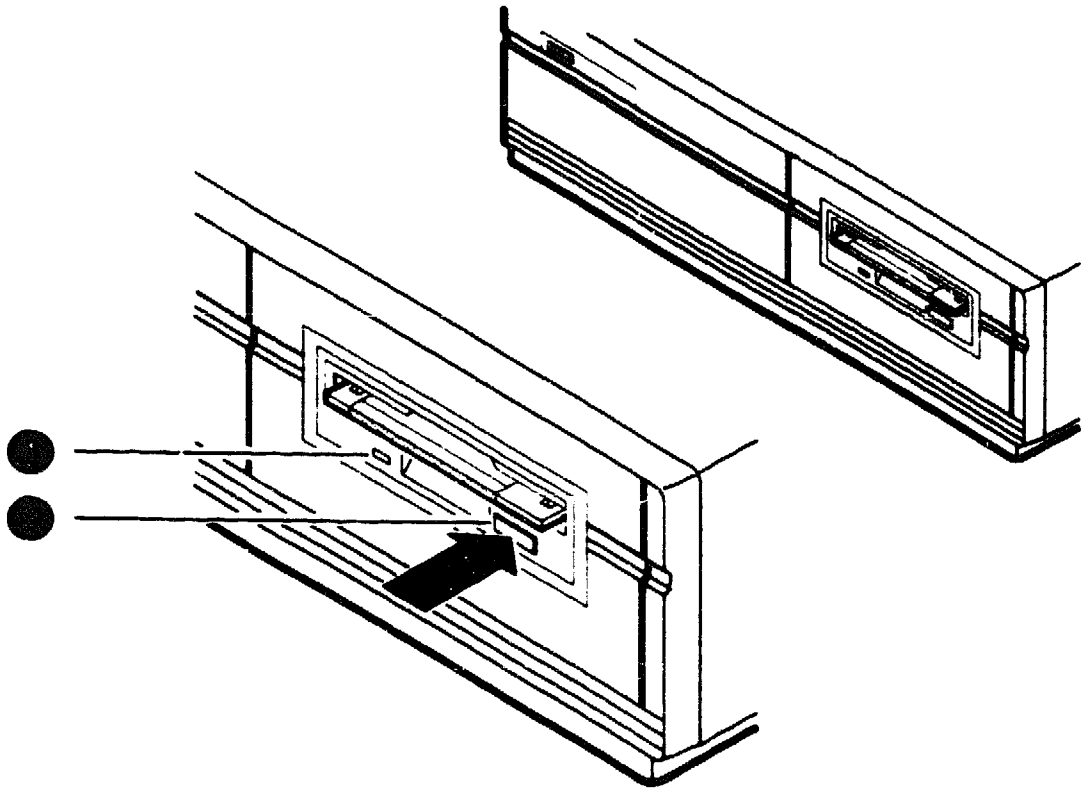
● Diskette

2.4.2 Removing a Diskette

You must dismount the diskette drive before removing a diskette. For information on dismounting a diskette, see the software documentation.

To remove a diskette from the diskette drive, press the eject button on the front of the diskette drive. Remove the diskette when it extends slightly from the diskette slot.



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- Activity Light
- Eject Button

2.5 Cleaning Device Drive Heads

This section describes the cleaning recommendations for the drive heads of the following devices:

- TZ30 tape drive
- TZK10 QIC drive
- RX26 disk cartridge drive

The heads are the components of the drives that read data from and write data to the media. Digital™ recommends that, when cleaning the heads, you use the following Digital-supplied cleaning kits:

- TZ30—Use the TKXX-HC head cleaning kit.
- TZK10—Use the TZK1X-HA head cleaning kit.
- RX26—Use the RXA3K-HC head cleaning kit.

To clean the heads, follow the instructions supplied with the cleaning kit.

Digital recommends that you clean the heads after approximately 8 hours of use or if you encounter problems reading or writing data. The following factors affect the cleaning interval:

- Frequency of use
- Quality of the tape
- Quality of the environment

2.6 System Disk

The system unit contains at least one hard disk. You cannot physically access the hard disk. This hard disk, called the system disk, holds the factory installed software (FIS). FIS is a VMS™ operating system, which is installed before the system is shipped. However, you can use an operating system stored in a different location if you prefer. See the *VMS Factory Installed Software User Guide* for more information on using VMS FIS.

3

Network Information

This chapter describes how to connect the system unit to a network and how to disconnect it from a network. It includes information on the following:

- Selecting the Ethernet type
- Connecting the system unit to a ThinWire Ethernet network
- Connecting the system unit to a standard Ethernet network
- Connecting the system unit to a DECconnect™ faceplate
- Testing the Ethernet installation
- Completing the Ethernet installation
- Removing the system unit from a network

This chapter may contain some terms that are unfamiliar to you. These terms are defined in the glossary.

If you have never connected a computer to an Ethernet network, you may need help from a system manager or a network co-ordinator. If a system manager or network co-ordinator is not available, contact your Digital Services representative.

Caution

Disconnecting Ethernet cables and terminators from the T-connectors on active Ethernet networks disrupts local network communications.

3.1 Selecting the Ethernet Type

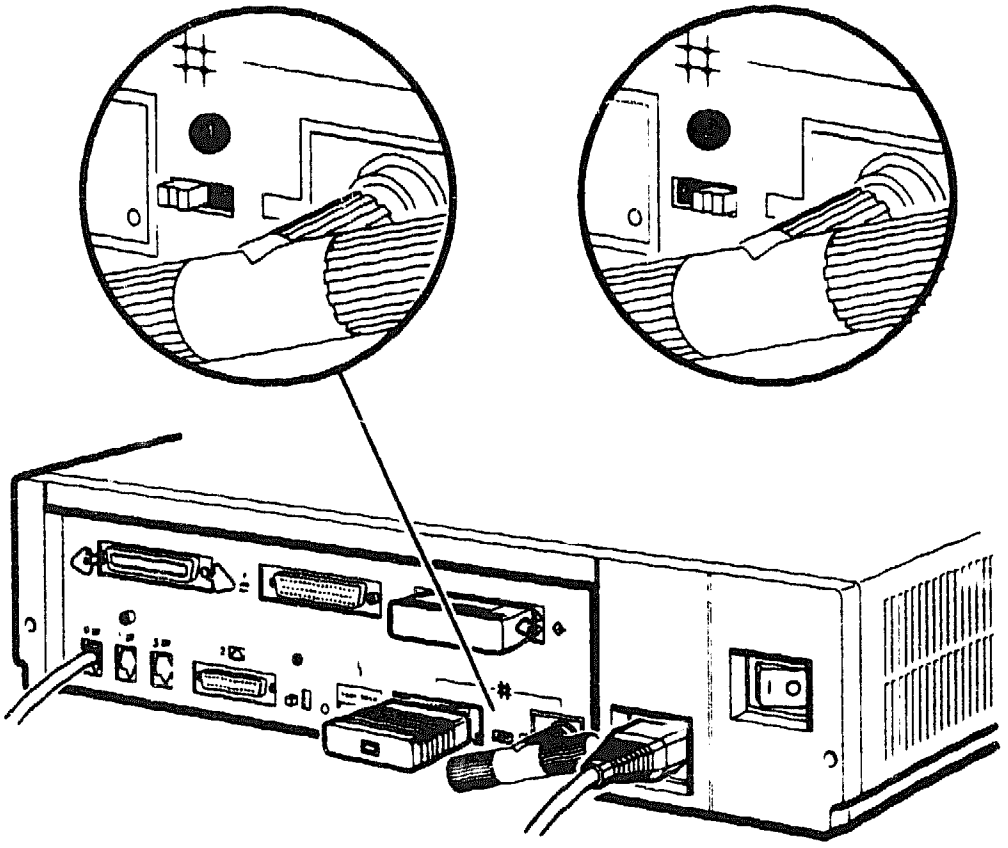
You can connect the system unit to either a ThinWire Ethernet or a standard Ethernet network. Before starting to connect the system unit to the network, ask the network co-ordinator to tell you which network type to use with the system.

The system unit has a network select switch that you must set depending on which Ethernet type you want to use. When you know which Ethernet type you want to use, set the network select switch as follows:

1. Set the system unit on/off switch to the off (O) position.
2. Set the network select switch to the correct position:
   - If you are using ThinWire Ethernet, slide the network select switch to the right-hand position (see Figure 3–1).
   - If you are using standard Ethernet, slide the network select switch to the left-hand position (see Figure 3–1).

Go to Section 3.4 if you are connecting the system to a standard Ethernet network.

Figure 3–1 Network Select Switch Positions



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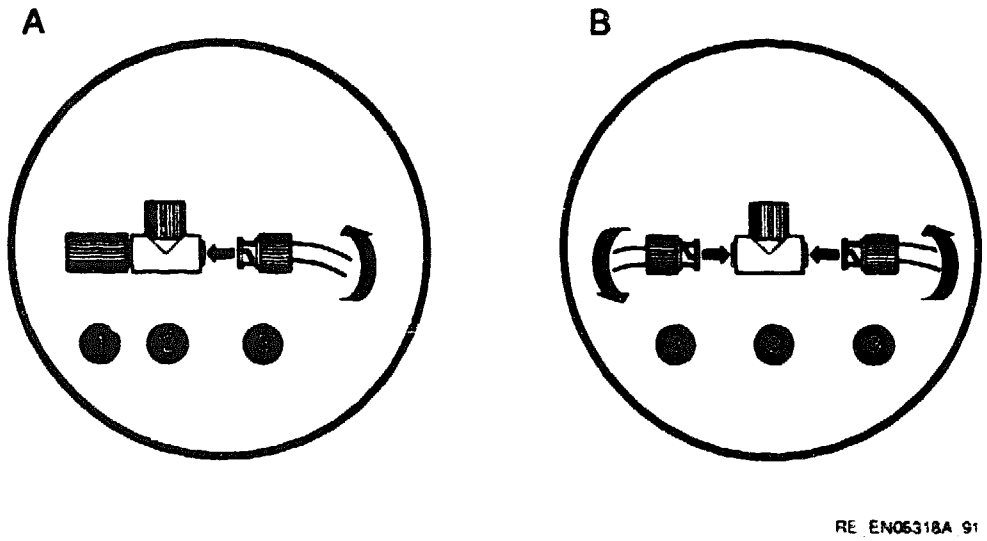
1. Standard Ethernet Position
2. ThinWire Ethernet Position

3.2 Connecting the System Unit to a ThinWire Ethernet Network

To connect the system unit to a ThinWire Ethernet cable, follow these steps:

1. If the ThinWire Ethernet cable is already assembled, connect the cable to the system (see Figure 3–3). Go to Section 3.5 if you are not connecting the system to a DECconnect faceplate.
2. If the system unit is the first or last system on the ThinWire Ethernet cable, remove one terminator from the T-connector on the back of the system unit. If the system unit is not the first or last system on the ThinWire Ethernet cable, remove both terminators.
3. Attach the ThinWire Ethernet cable to one side of the T-connector if you are connecting the system to the end of the ThinWire Ethernet cable (see Figure 3–2 A). Attach the ThinWire Ethernet cables to both sides of the T-connector if you are connecting the system to the middle of the ThinWire Ethernet cable (Figure 3–2 B).

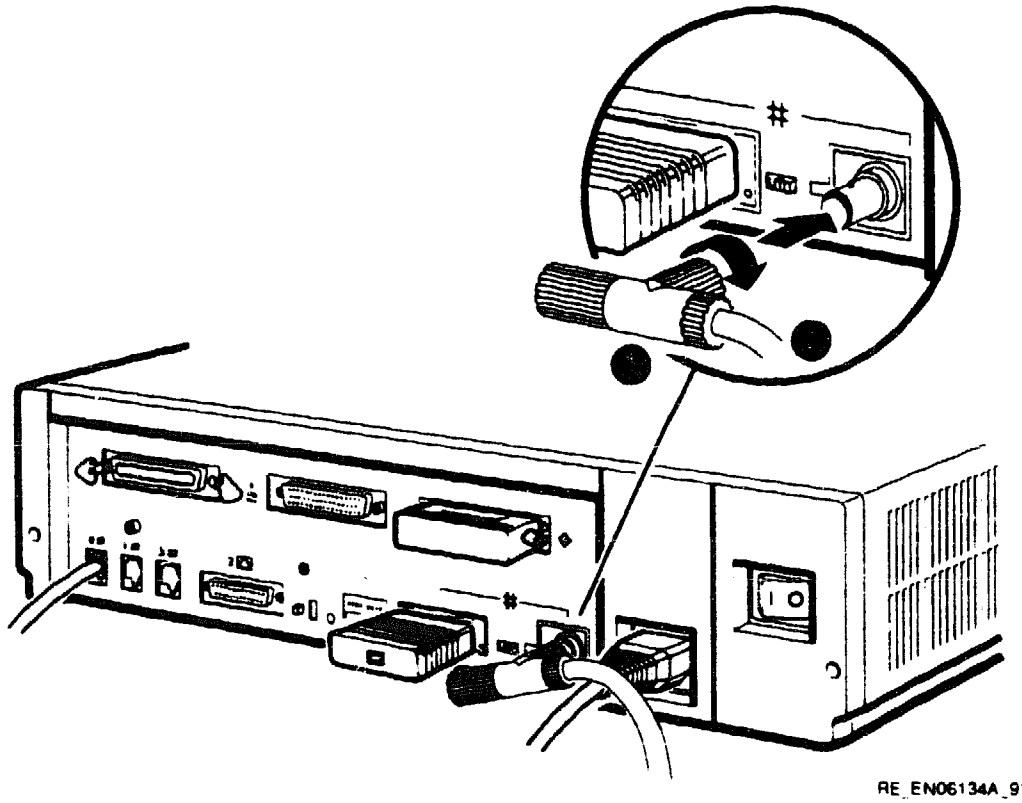
Figure 3–2 Connecting the ThinWire Ethernet Cable to the T-Connector



1. Terminator
2. T-Connector
3. ThinWire Ethernet Cable Connector

Go to Section 3.5 if you are not connecting the system to a DECconnect faceplate.

Figure 3–3 Connecting the ThinWire Ethernet Cable to the System Unit



- T-Connector
- ThinWire Ethernet Cable

3.3 Connecting the System Unit to a DECconnect Faceplate

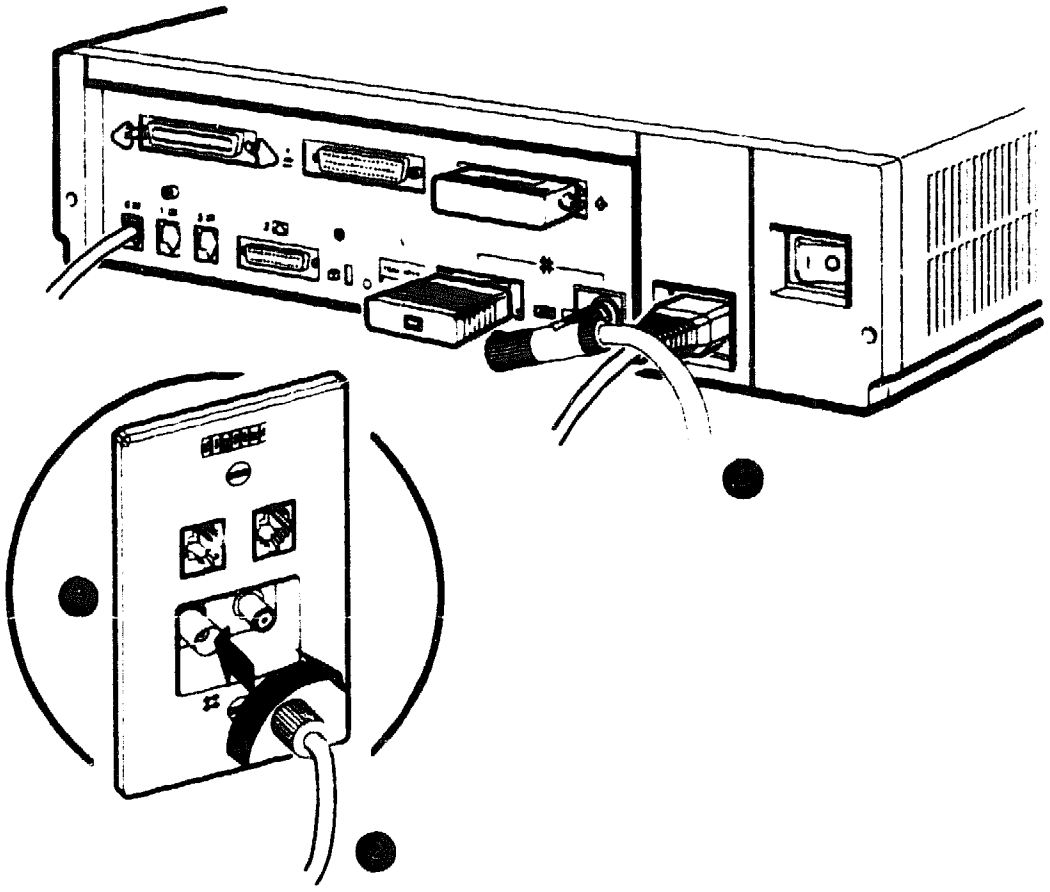
If DECconnect products are installed, a DECconnect faceplate may be on the wall. You can connect VAX™ systems to DECconnect faceplates using different methods. You can connect either a single VAX system or connect several VAX systems in series. Ask the network co-ordinator for advice on how to connect the system to the DECconnect faceplate.

If you want to connect only one system to the faceplate, follow these steps:

1. Remove the ThinWire Ethernet terminator from one side of the T-connector.
2. Attach the ThinWire Ethernet cable to one side of the T-connector.
3. Attach the other end of the ThinWire Ethernet cable to the DECconnect faceplate.

Go to Section 3.5 for information on how to test the network installation.

Figure 3–4 Connecting the System Unit to a DECconnect Faceplate



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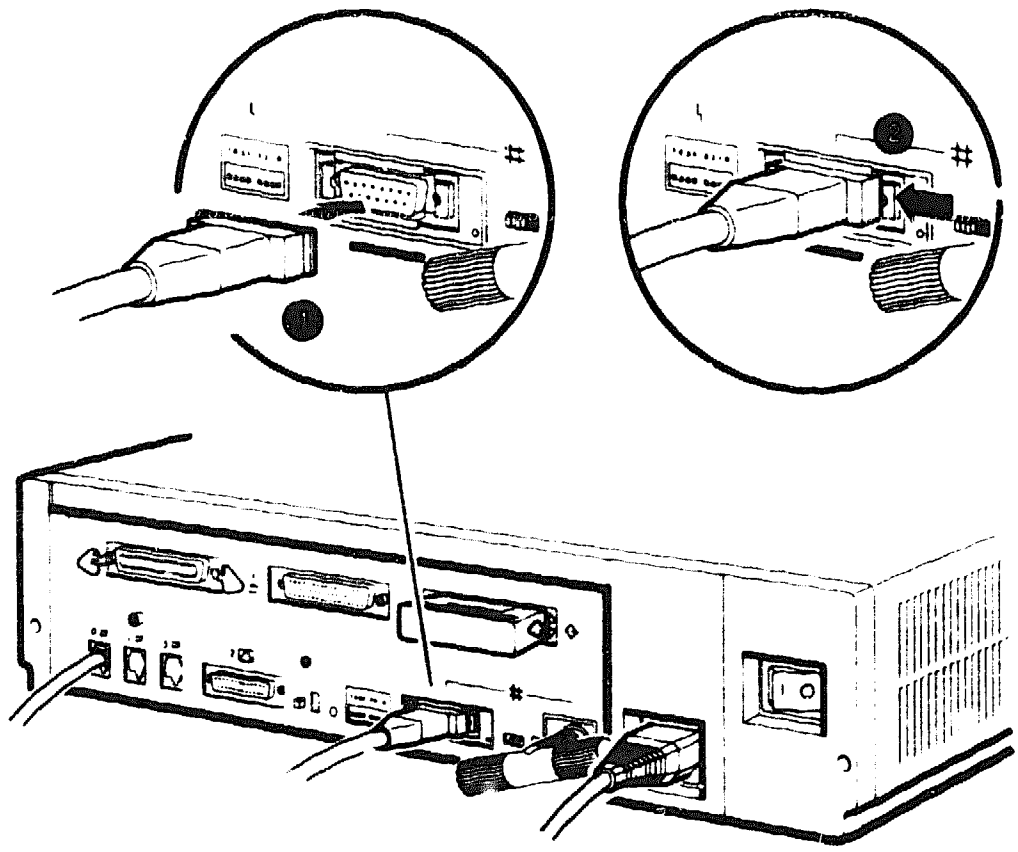
1. DECconnect Faceplate
2. ThinWire Ethernet Cable

3.4 Connecting the System Unit to a Standard Ethernet Network

To connect the system unit to a standard Ethernet network, follow these steps:

1. Remove the standard Ethernet loopback connector from the standard Ethernet port.
2. Attach the 15-pin connector on the standard Ethernet transceiver cable to the back of the system unit.
3. Move the sliding lock on the standard Ethernet connector to the left, securing the standard Ethernet connection.

Figure 3–5 Connecting a Transceiver Cable



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1. Standard Ethernet Transceiver Cable
2. Sliding Lock

3.5 Testing the Ethernet Installation

When you complete the network installation procedure, follow these steps:

1. Set the system unit on/off switch to the on (|) position.
2. Enter the following command to test the installation:

   ```
   >>> TEST 9
   ```

   The number 9 is the device number associated with the Ethernet device. If the test is successful, the system responds with the following display:

```
>>> TEST 9
[redacted]

OK
>>>
```

If the device fails the self-test, the system responds with a display similar to the following:

```
>>> TEST 9
[redacted]
?? 001   9          NI   0172

  84 FAIL
>>>
```

If the device fails, see the *MicroVAX 3100 Model 30 Troubleshooting and Diagnostic Information* manual.

3.6 Completing the Ethernet Installation

The network co-ordinator must complete the installation. You must give the following information to the network co-ordinator:

- A unique node name comprised of a maximum of six alphanumeric characters

  Choose any node name and ask the network co-ordinator to make sure that the node name is unique on the network.

- The system's Ethernet address

  To determine the system's Ethernet address, follow these steps:

  1. Enter the following command at the console prompt:

     ```
     >>> SHOW ETHERNET
     ```

     The system displays a response similar to the following:

     ```
     ETHERNET = 08-00-2B-1A-0B-BB
     ```

     The alphanumeric string, shown in the form *nn-nn-nn-nn-nn-nn*, is the Ethernet address.

  2. Write down the Ethernet address and give it to the network co-ordinator.

3.6.1 If the Network Installation Fails

If the network installation fails, contact your Digital Services representative.

3.7 Removing the System Unit from a Network

The following subsections describe how to remove the system unit from a network.

Note

Before removing the system unit from a network:

- Get the approval of the network co-ordinator.
- See the operating system documentation for information on the shutdown procedures before stopping or turning off the system.
- If the system is the server in a network, do not turn off, halt or restart the system without notifying the other network members.

3.7.1 Removing the System Unit from a ThinWire Ethernet Cable

To remove the system unit from a ThinWire Ethernet cable, follow these steps:

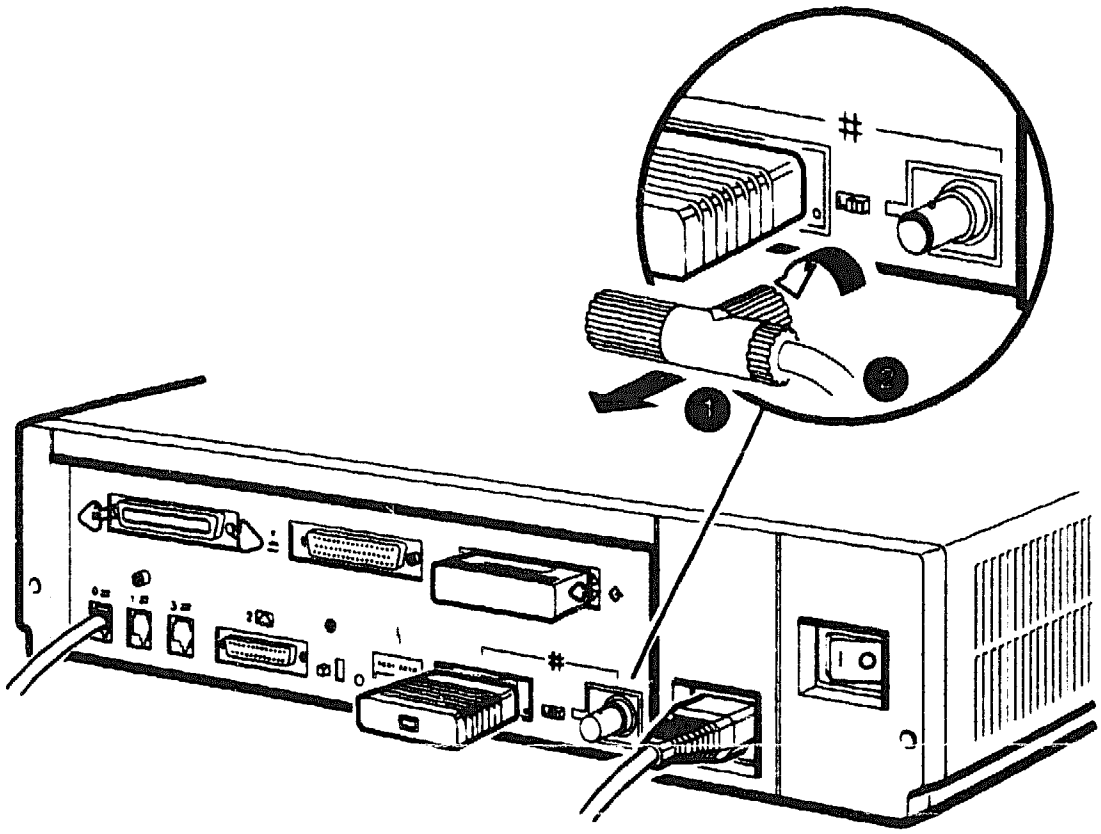
1. Set the on/off switch on the back of the system unit to the off (O) position.

Caution

Disconnecting the ThinWire Ethernet terminator or the ThinWire Ethernet cable connectors from the T-connector causes disruptions to network communications.

2. Disconnect the center of the T-connector from the ThinWire Ethernet connector on the back of the system unit (see Figure 3–6).

Figure 3–6 Disconnecting the System Unit from a ThinWire Ethernet Cable



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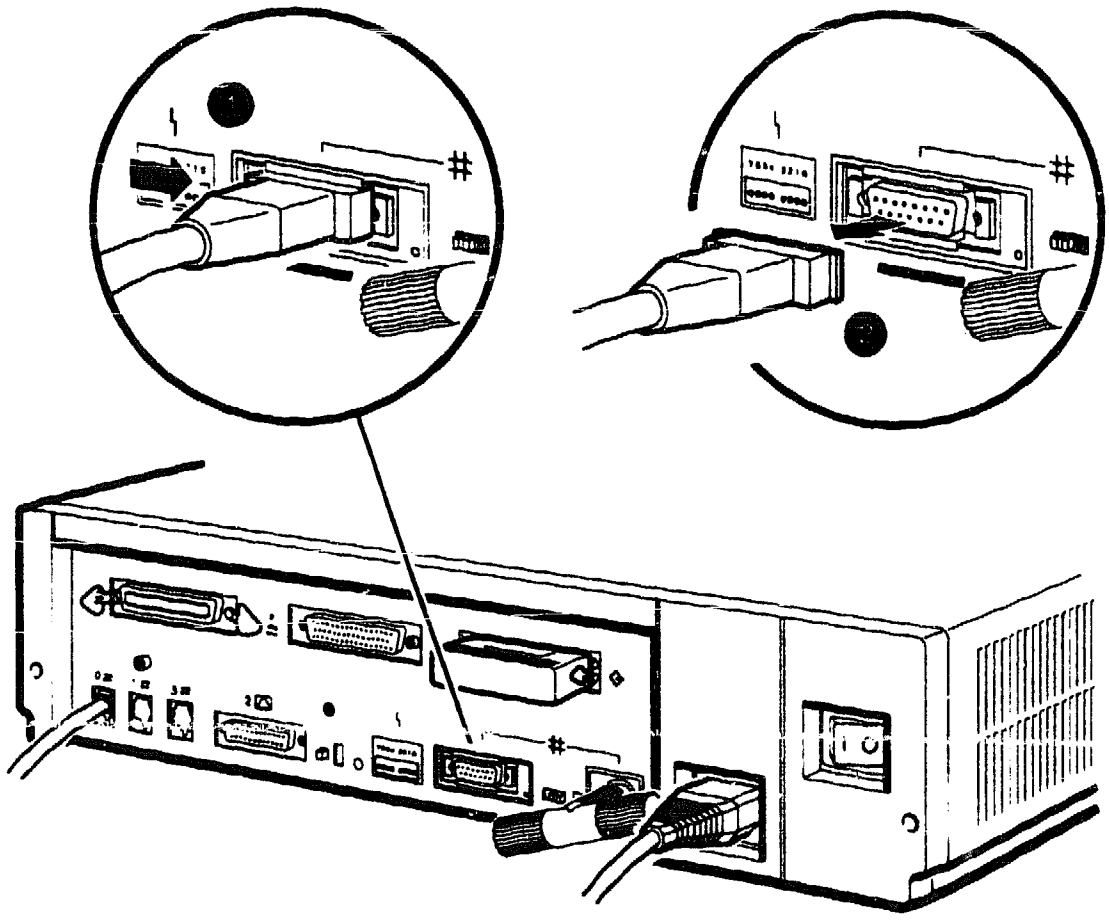
1. T-Connector
2. ThinWire Ethernet Cable

3.7.2 Removing the System Unit from a Standard Ethernet Transceiver Cable

To remove the system unit from a standard Ethernet transceiver cable, follow these steps:

1. Set the on/off switch on the back of the system unit to the off (O) position.
2. Push the sliding lock to the right (see Figure 3–7).
3. Disconnect the transceiver cable from the standard Ethernet connector on the back of the system unit (see Figure 3–7).

Figure 3–7 Disconnecting the System Unit from a Transceiver Cable



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1. Sliding Lock
2. Standard Ethernet Transceiver Cable

4

Hardware Options

This chapter describes the hardware options of the MicroVAX 3100 Model 30. It also describes how to connect the external hardware options to the system. It includes information on the following:

- Internal hardware options
- External hardware options
- Connecting a SCSI expansion box
- Connecting peripherals

4.1 Internal Hardware Options

The system supports the following internal hardware options:

- MS44 or MS44L memory modules—The Model 30 system has 8M bytes of memory on the system module. You can connect up to 24M bytes of optional MS44 or MS44L memory modules in 8M-byte increments to Model 30 systems giving a maximum memory capacity of 32M bytes.
- Synchronous communications options—The system supports the DSW41-AA synchronous communications option. This communications option provides one synchronous communications port and allows you to connect the system to a peripheral that uses an EIA-232/V.24 25-pin connector. You can use other interface standards with this option if you order different cables. Table 4–1 lists each interface standard and the part number of the corresponding cable.

Table 4–1 Interface Standards and Cable Part Numbers

Interface Standard	Cable Part Number	Extension Cable Part Number
EIA-232/V.24	BC19D-02[1]	BC22F-*nn*[3]
EIA-423/V.10	BC19E-02[2]	BC55D-*nn*[4]
EIA-422/V.11	BC19B-02[2]	BC55D-*nn*[4]

[1]Supplied with the DSW41-AA option.

[2]Optional cable, order separately.

[3]Optional cable, order separately. The value of *nn* represents the cable length in feet (10, 25, or 50).

[4]Optional cable, order separately. The value of *nn* represents the cable length in feet (25 or 50).

The BC19*x*-02 cables listed in Table 4–1 are 2-foot cables; extension cables are also available, but you must order them separately. Contact your Digital Sales representative for information on ordering any of the different cables that support these interface standards.

- Asynchronous communications options—The system supports two different asynchronous communications options. These options are as follows:
  - DHW41-AA—This asynchronous option provides eight asynchronous DEC423 data-line-only communications lines through one system port. You can connect up to eight peripherals using the MMJ ports on the harmonica (H3104) that connects to the option cable (BC16C-10).

Use the following cables instead of the BC16C-10 cable if you require longer cable lengths: BC16C-25, BC16C-50, BC16C-A0, or BC16C-B5. Use the following cables between the harmonica (H3104) and the DEC423 peripheral: BC16E-10, BC16E-25, or BC16E-50.

- DHW41-BA—This asynchronous option provides four asynchronous EIA-232 modem control lines through one system port using a breakout cable (BC29J-06).

  Attach one of the following cables to a connector on the breakout cable if you require longer cable lengths: BC22F-10, BC22F-25, or BC22F-50. The peripheral you are using may require a null-modem extension cable. See the peripheral documentation or contact your Digital Sales representative for information on the correct null-modem cable to use.

- SCSI storage devices—The system supports the following internal SCSI devices:
  - RZ23L, RZ24, and RZ25 hard disk drives
  - RX26 diskette drive
  - TZK10 (QIC) tape drive
  - TZ30 tape drive

Contact your Digital Sales representative for information on how to order any of these internal options. Your Digital Services representative installs the internal options for you.

4.2 External Hardware Options

The following sections contain information on connecting the external hardware options to the system unit. The external hardware options for the MicroVAX 3100 Model 30 include the following:

- SCSI expansion boxes
- Printers, terminals, modems, and other devices that use asynchronous or synchronous connectors

Your Digital Sales representative can give you information on how to order a full range of Digital SCSI expansion boxes, printers, terminals, modems, and other devices that are compatible with the MicroVAX 3100 Model 30 system.

4.3 Connecting a SCSI Expansion Box

The following subsections contain information on:

- Guidelines for connecting expansion boxes
- Selecting available SCSI IDs on the system
- Setting the SCSI ID of devices in the expansion box
- Preparing the system unit for an expansion box
- Connecting the SCSI cable
- Checking the expansion box connections

4.3.1 Guidelines for Connecting Expansion Boxes

Use the following guidelines when connecting expansion boxes:

- You can connect up to two expansion boxes (SZ12-series expansion boxes can contain two devices).
- The recommended maximum length of the SCSI cables (internal length plus external length) is 19.6 feet (6 metres).
- Each device in the expansion boxes must have a unique SCSI ID.
- You must attach the 50-pin terminator that comes with the expansion box to an unused SCSI connector on the back of an expansion box.
- Plug the expansion boxes into the same grounded power strip or electrical circuit.
- Do not connect more than two tape drive devices.

Caution

- Some expansion boxes are restricted to either 110 V ac or 220 V ac operation. Make sure that the voltage requirement of the expansion box used is compatible with the supply voltage.
- Turn on the expansion boxes before you turn on the system unit. This procedure ensures that the device in each expansion box is ready for use and that the system firmware includes the device in the configuration display.
- Do not connect or disconnect SCSI expansion boxes while the system is turned on. Doing so can cause damage to the equipment or corrupt data.
- Digital cannot guarantee the correct operation of any SCSI bus that uses cable assemblies not supplied by Digital or not configured in accordance with these guidelines.

4.3.2 Selecting Available SCSI IDs on the System

You must identify which SCSI IDs are available before connecting an expansion box. Use the configuration display to determine this information. To see the configuration display, enter the following command:

```
>>> SHOW CONFIG
```

The system displays information similar to the following:

```
DEVNBR   DEVNAM          INFO
------   ---------   ------------------------
     1         NVR   OK
     3          DZ   OK
     4       CACHE   OK
     5         MEM   OK
                     16MB = SY=8MB, S0/1=8MB, S2/3=0MB, S4/5= 0MB
     6         FPU   OK
     7          IT   OK
     8         SYS   OK
     9          NI   OK
    10        SCSI   OK                                    ❶
                     3-RZ24      6-INITR                   ❷
```

❶ Device 10 is the SCSI device. The letters OK indicate that it is functioning correctly.

❷ This line shows the SCSI IDs that are occupied by devices on the SCSI bus. For example, the RZ24 disk drive occupies SCSI ID 3.

SCSI ID 6 is the factory-set default ID for the SCSI bus controller, INITR.

There are eight SCSI IDs, numbered from 0 to 7. Select any SCSI ID that is not occupied by another device.

4.3.3 Setting the SCSI ID of Devices in the Expansion Box

The expansion box devices have default SCSI IDs set at the factory before they are shipped. If the default ID of a device is occupied, you must reset the SCSI ID of the device to an unused ID. See Section 4.3.2 for information on selecting the available SCSI IDs. See the documentation supplied with the expansion box for information on setting the SCSI IDs.

Table 4–2 shows the SCSI IDs that Digital usually assigns to devices.

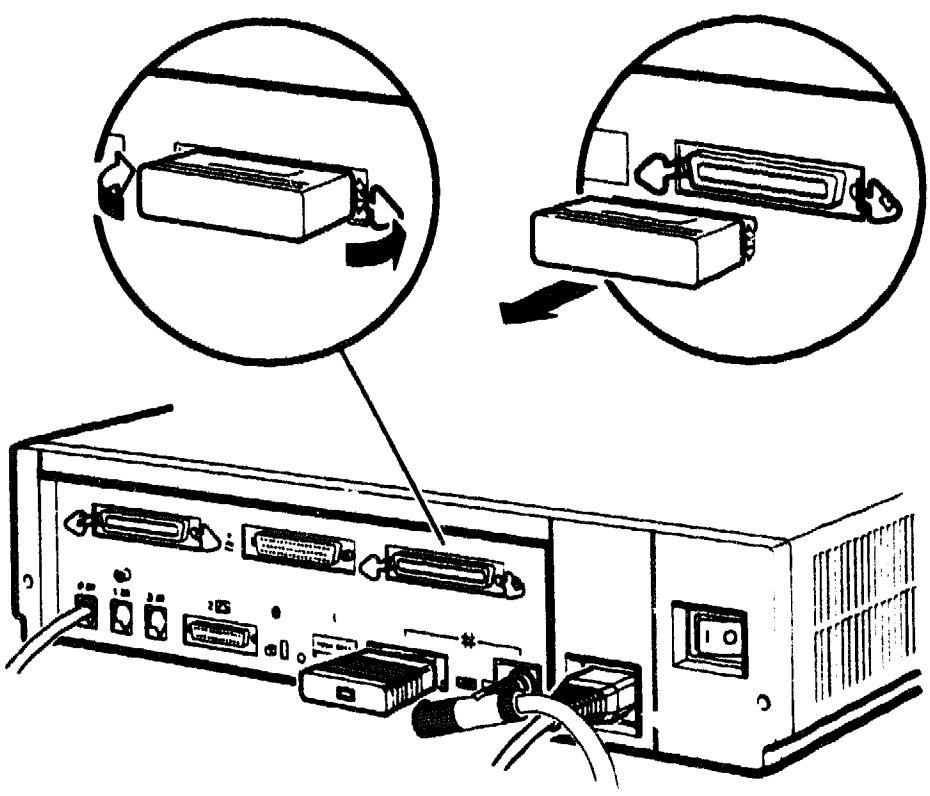
Table 4–2 Devices and Priorities Associated with SCSI IDs

SCSI ID	Priority	Devices
0	Lowest	Disk drive
1 to 3		Disk drive (SCSI ID 3 is normally the system disk)
4		CDROM or optical drive
5		Tape drive
6		SCSI controller
7	Highest	Not used, but available

4.3.4 Preparing the System Unit for an Expansion Box

To prepare the system unit for an expansion box, follow these steps:

1. Shut down the operating system using the procedure outlined in the operating system documentation.
2. Set the on/off switch on the system unit to the off (O) position.
3. Remove the SCSI terminator.
4. Keep the SCSI terminator. You must reattach it if you disconnect the expansion boxes from the system unit.



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4.3.5 Connecting the SCSI Expansion Box

Caution

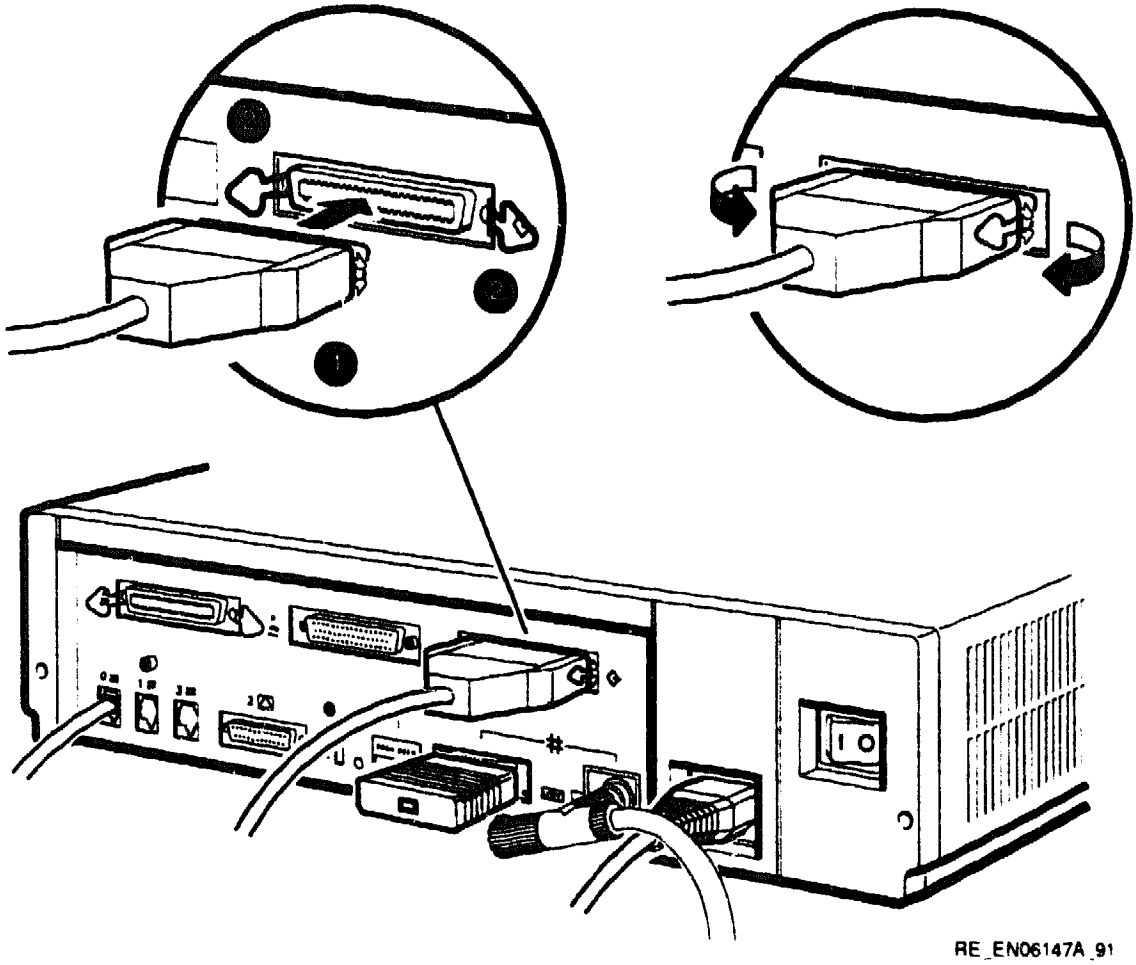
You must complete the procedures outlined in the following sections before you start the procedure in this section:

- Section 4.3, Connecting a SCSI Expansion Box
- Section 4.3.1, Guidelines for Connecting Expansion Boxes
- Section 4.3.2, Selecting Available SCSI IDs on the System
- Section 4.3.3, Setting the SCSI ID of Devices in the Expansion Box
- Section 4.3.4, Preparing the System Unit for an Expansion Box

To connect the SCSI cable to the system unit and to the expansion box, follow these steps:

1. Set the on/off switches on the system unit and the expansion box to the off (O) position.
2. Make sure that you have set the correct SCSI ID for each device in the expansion box. See Section 4.3.2 for information on selecting available SCSI IDs.
3. Connect one end of the 50-pin to 50-pin cable, supplied with the expansion box, to the SCSI port on the system unit. Close the bail lock loops. See Figure 4–1.
4. Connect the other end of the 50-pin to 50-pin cable to either of the SCSI ports on the expansion box. Close the bail lock loops.
5. Connect the SCSI terminator to the other SCSI port on the expansion box. Close the bail lock loops.
6. Connect the power cord to the expansion box.
7. Connect the other end of the power cord to the same grounded power strip or electrical circuit.
8. Set the on/off switch on the expansion box to the on (|) position.
9. Set the on/off switch on the system unit to the on (|) position.
10. Check the system to ensure that it recognizes the connection. See Section 4.3.6 for information on checking expansion box connections.

Figure 4–1 Connecting One Expansion Box



❶ SCSI Cable

❷ Bail Lock Loop

4.3.6 Checking Expansion Box Connections

Enter the following command to check the expansion box connections:

```
>>> SHOW CONFIG
```

The system responds with a display similar to the following:

```
DEVNBR   DEVNAM          INFO
------   ---------   ------------------------
     1        NVR   OK
     3         DZ   OK
     4      CACHE   OK
     5        MEM   OK
                    16MB = SY=8MB, S0/1=8MB, S2/3=0MB, S4/5= 0MB
     6        FPU   OK
     7         IT   OK
     8        SYS   OK
     9         NI   OK
    10       SCSI   OK
                    2-RZ55    3-RZ24    6-INITR        ❶
    11        AUD   OK
```

❶ If the system recognizes the expansion box that you have connected, this line contains the IDs and names of the expansion box devices that you connected, in this case an RZ55 with SCSI ID 2.

If you do not see the names and SCSI IDs of the devices, see the *MicroVAX 3100 Model 30 Troubleshooting and Diagnostic Information* manual.

4.4 Connecting Peripherals

The following subsections contain information on the following:

- Connecting peripherals to a DEC423 MMJ port
- Connecting a peripheral to the asynchronous modem control port (port 2)
- Connecting peripherals to an optional asynchronous port
- Connecting peripherals to an optional synchronous port

4.4.1 Connecting Peripherals to a DEC423 MMJ Port

To connect peripherals that use DEC423 cables (BC16E) to MMJ ports 0, 1, or 3, follow these steps:

1. Set the on/off switch on the peripheral to the off (O) position.
2. Connect one end of the DEC423 cable to either MMJ port 0, 1, or 3 (see Figure 4–2).

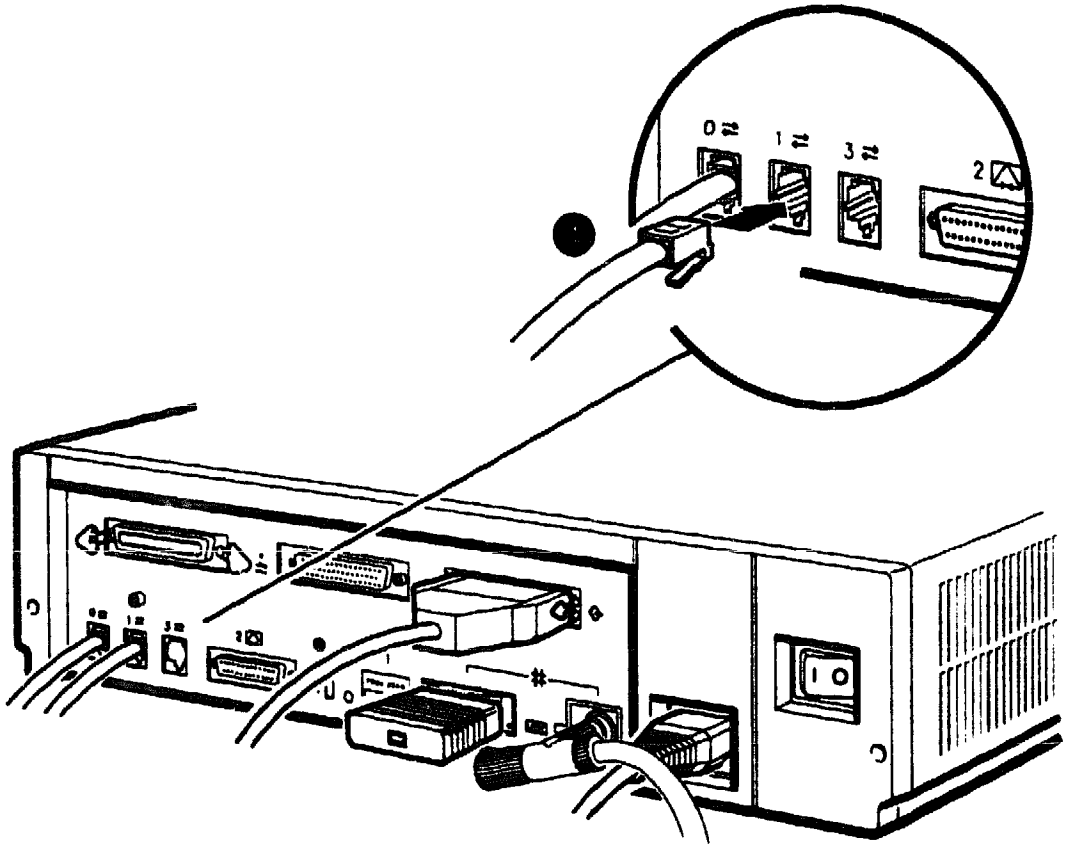
Note

In some countries, the peripheral cable has an earth drain wire. Connect this earth drain wire to the grounding pillar above MMJ port 1 using the screw provided with the cable.

3. Connect the other end of the DEC423 cable to the correct port on the peripheral.
4. Set the on/off switch on the peripheral to the on (|) position.

BC16E cables are available in the following lengths: 10 feet (BC16E-10), 25 feet (BC16E-25), or 50 feet (BC16E-50).

Figure 4–2 Connecting a Peripheral to MMJ Port 1



❶ DEC423 Peripheral Cable

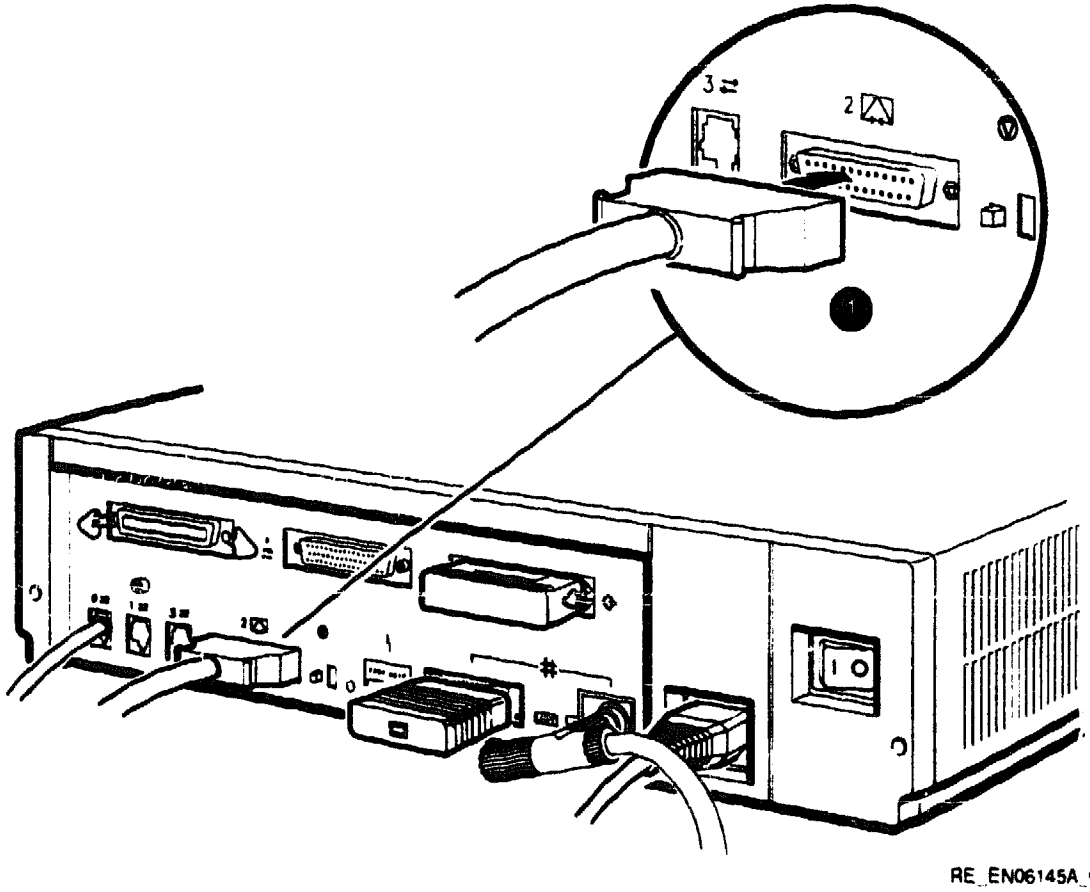
4.4.2 Connecting a Peripheral to the Asynchronous Modem Control Port

You can connect peripherals that use EIA-232 connectors to the asynchronous modem control port (port 2) on the back of the system unit. Alternatively, the supplied EIA-232 to DEC423 adapter (H8575-A) allows you to connect peripherals that use DEC423 connectors. To connect a peripheral to the asynchronous modem control port, follow these steps:

1. If you are connecting a peripheral using EIA-232 cables, follow these steps:
   a. Set the on/off switch on the peripheral to the off (O) position.
   b. Connect the 25-pin D-sub connector of the peripheral cable to the asynchronous modem control port (see Figure 4–3).
   c. If the connector has screws on either side, tighten them using a small screwdriver.
   d. Connect the other end of the peripheral cable to the correct port on the peripheral.
   e. Set the on/off switch on the peripheral to the on (|) position.

   EIA-232 cables are available in the following lengths: 10 feet (BC22F-10), 25 feet (BC22F-25), or 50 feet (BC22F-50). The peripheral you are using may require a null-modem extension cable. See the peripheral documentation or contact your Digital Sales representative for information on the correct null-modem cable to use.

Figure 4–3 Connecting a Peripheral to the Asynchronous Modem Control Port



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❶ EIA-232 Connector

2. If you are connecting a peripheral using DEC423 cables, follow these steps:

   a. Set the on/off switch on the peripheral to the off (O) position.

   b. Connect the EIA-232 to DEC423 adapter to the asynchronous modem control port (see Figure 4–4).

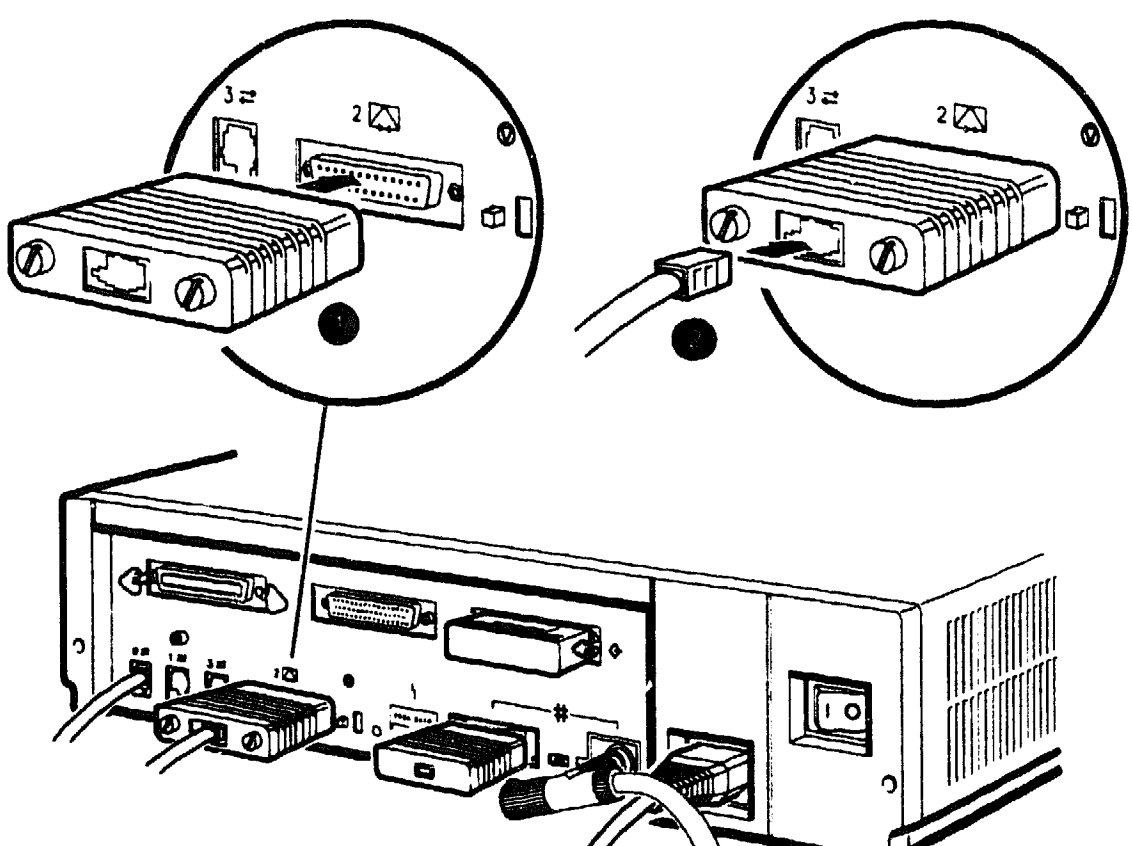
   c. Tighten the screws on each side of the adapter using a small screwdriver.

   d. Connect the DEC423 cable to the MMJ port on the adapter.

   e. Connect the other end of the DEC423 cable to the correct port on the peripheral.

   f. Set the on/off switch on the peripheral to the on (|) position.

Figure 4–4 Connecting a Peripheral to the Asynchronous Modem Control Port Using an EIA-232 to DEC423 Adapter



❶ EIA-232 to DEC423 Adapter (H8575-A)

❷ DEC423 MMJ Connector

4.4.3 Connecting Peripherals to an Optional Asynchronous Port

There are two asynchronous communications options available for the MicroVAX 3100 Model 30:

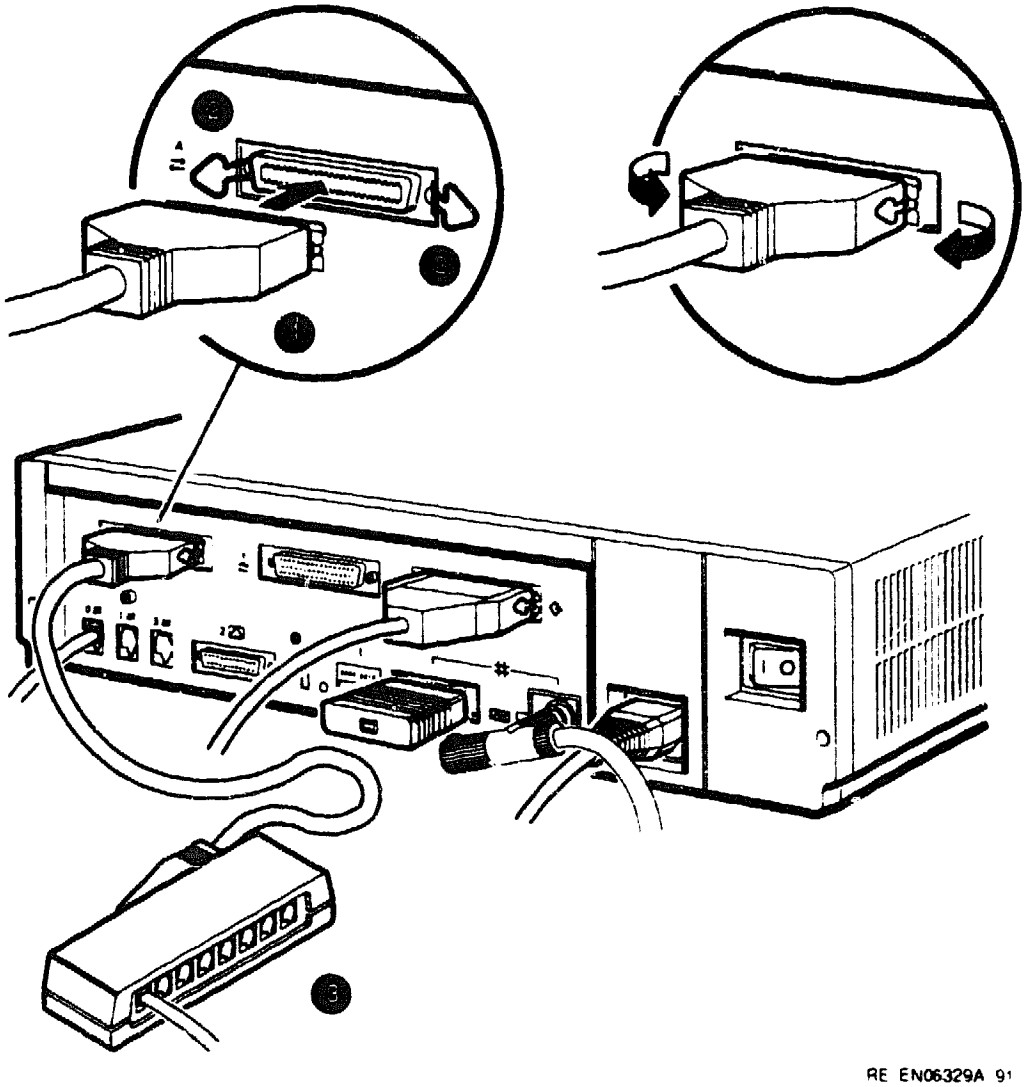
- DHW41-AA—Provides one eight-line data-line-only asynchronous port
- DHW41-BA—Provides one four-line asynchronous port with modem control

Connecting Peripherals to a DHW41-AA Option

If the system has the DHW41-AA asynchronous communications option installed, the system has one eight-line data-line-only asynchronous port. You can connect up to eight peripherals to this port using the H3104 harmonica. Section 4.1 gives more information on the DHW41-AA asynchronous communications option. To connect a peripheral to an asynchronous port, follow these steps:

1. Set the on/off switch on the peripheral to the off (O) position.
2. Connect the straight connector of the BC16C-10 cable to the asynchronous port on the back of the system unit (see Figure 4–5).
3. Close the bail lock loops on each side of the connector.
4. Connect the angled connector of the BC16C-10 cable to the H3104 harmonica.
5. Close the bail lock loops on each side of the connector.
6. Connect one end of a DEC423 cable to one of the eight MMJ ports on the harmonica.
7. Connect the other end of the DEC423 cable to a DEC423 port on the peripheral.
8. Set the on/off switch on the peripheral to the on (|) position.

Figure 4–5 Connecting a Peripheral to Asynchronous Port A



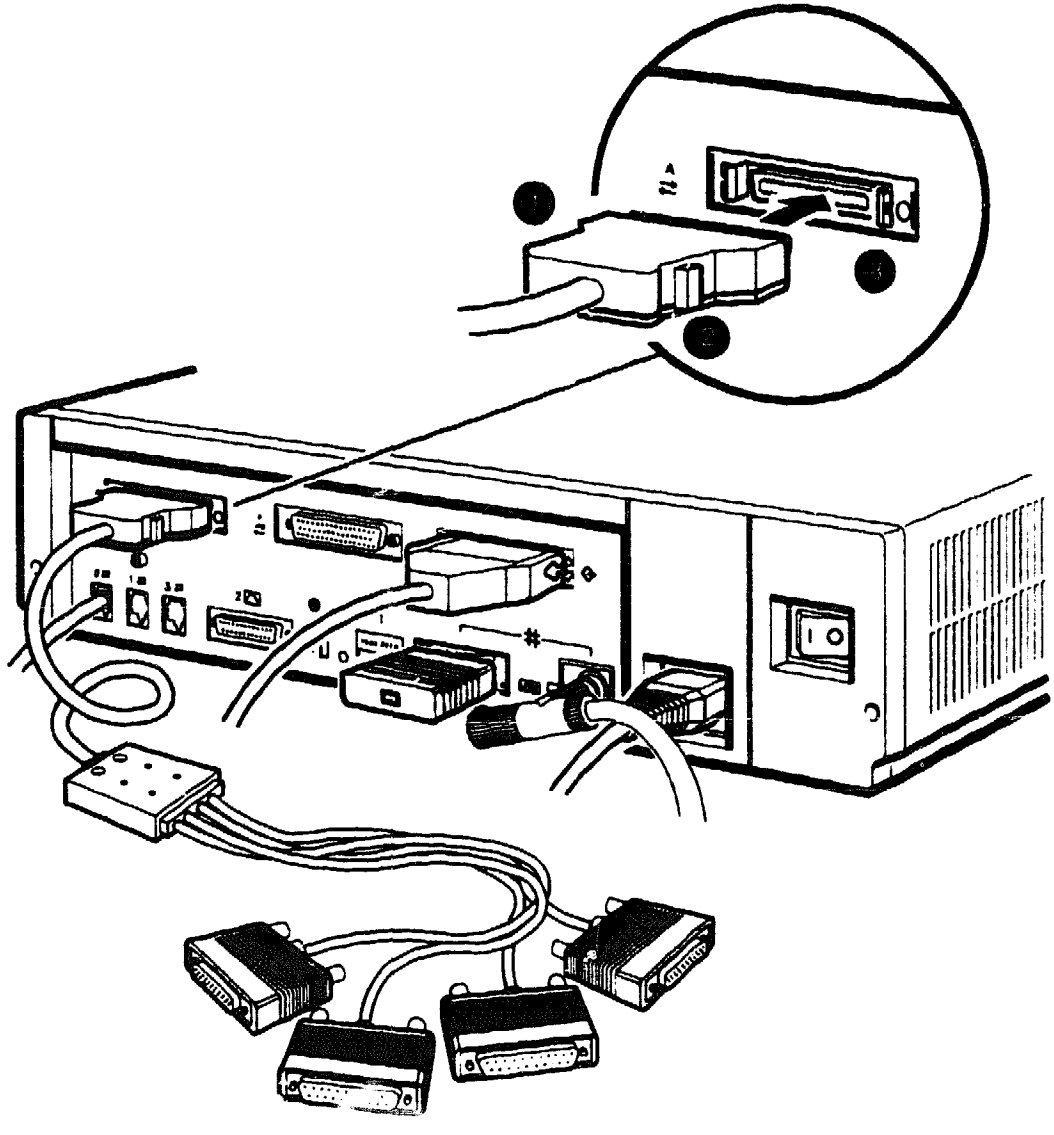
1. Asynchronous Option Cable (BC16C-10)
2. Bail Lock Loops
3. Harmonica

Connecting Peripherals to a DHW41-BA Option

If the system has the DHW41-BA asynchronous communications option installed, the system has one four-line asynchronous port with modem control. You can connect up to four peripherals to this port using the breakout cable (BC29J-06) supplied with the option. Section 4.1 gives more information on the DHW41-BA asynchronous communications option. To connect a peripheral to the asynchronous port, follow these steps:

1. Set the on/off switch on the peripheral to the off (O) position.
2. Hold in the connector clips on either side of the 50-pin connector of the breakout cable and connect it to the asynchronous port on the back of the system unit (see Figure 4–6).
3. Release the clips. The hooks on the port secure the connector in place.
4. Connect one of the four EIA-232 connectors on the breakout cable to the peripheral.
5. Set the on/off switch on the peripheral to the on (|) position.

Figure 4–6 Connecting a Peripheral to Asynchronous Port A (DHW41-BA)



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1. Asynchronous Option Breakout Cable (BC29J-06)
2. Connector Clip
3. Hook

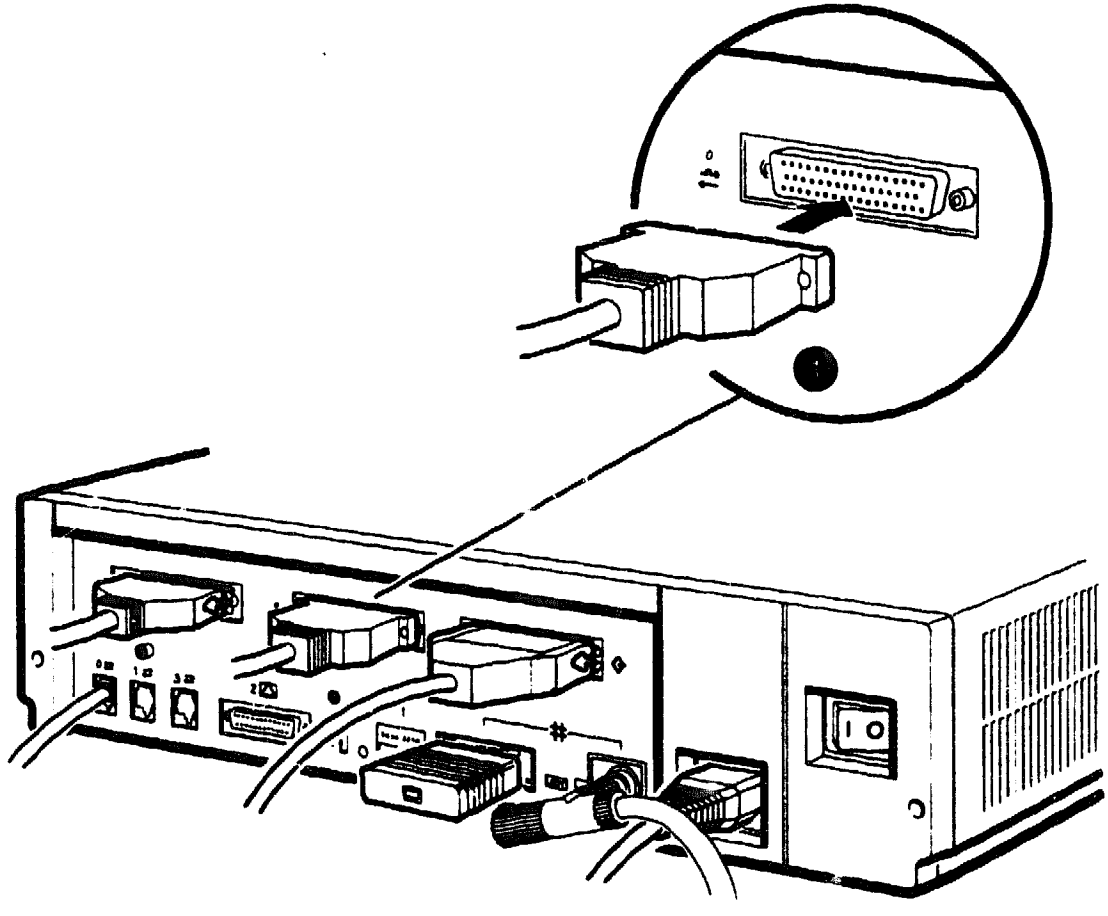
4.4.4 Connecting Peripherals to an Optional Synchronous Port

If the system has the DSW41-AA synchronous communications option installed, the system has one synchronous modem port. Section 4.1 gives more information on the DSW41-AA synchronous communications option. Table 4–1 lists the cables that you can use with the option. The EIA-232/V.24 cable (BC19D-02) is the standard cable shipped with the option. If you are using a synchronous interface standard other than EIA-232/V.24, use one of the optional cables listed in Table 4–1.

To connect a peripheral to the synchronous port, follow these steps:

1. Set the on/off switch on the peripheral to the off (O) position (see Figure 4–7).
2. Connect the 50-pin connector of the option cable to the synchronous port on the back of the system unit (see Figure 4–7).
3. Connect the other connector of the option cable to the communications port on the peripheral.
4. If the option cable connectors are fitted with screws, secure the connectors to the ports by tightening them on each side.
5. Set the on/off switch on the peripheral to the on (|) position.

Figure 4–7 Connecting a Peripheral to Synchronous Port 0



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❶ Synchronous Option Cable

A

Associated and Related Documents

This appendix lists the associated and related documents. Some of the following documents may not be available in every country. Contact your Digital Sales representative for information on the availability of particular documents.

A.1 Associated Documents

The following documents contain information on the MicroVAX 3100 Model 30:

- *MicroVAX 3100 Model 30 Cover Letter* (EK-A0515-CL.001)
- *MicroVAX 3100 Model 30 Installation Information* (EK-A0520-IN.001)
- *MicroVAX 3100 Model 30 Customer Technical Information* (EK-A0522-TD.001)
- *MicroVAX 3100 Model 30 Troubleshooting and Diagnostic Information* (EK-A0516-TM.001)

VMS Factory Installed Software (FIS) Documentation

The following document contains information on VMS FIS:

- *VMS Factory Installed Software User Guide* (EK-A0377-UG)

A.2 Related Documents

The following documents contain information related to the system:

Internal Removable Media Device Documentation

- *TZ30 Cartridge Tape Drive Subsystem Owner's Manual* (EK-OTZ30-OM)
- *TZK10 Cartridge Tape Drive Owner's Guide* (EK-TZK10-OG)
- *RX26 Diskette Drive Owner's Reference Card* (EK-RX26D-RC)
- *RRD42 Disc Drive Owner's Manual* (EK-RRD42-OM)

VAX Handbook Series

- *VAX Architecture Handbook* (EB-19580-20)
- *VAX Software Handbook* (EB-21812-20)

DECconnect System Documentation

- *DECconnect System General Description* (EK–DECSY–GD)
- *DECconnect System Requirements Evaluation Workbook* (EK–DECSY–EG)
- *DECconnect System Installation and Verification Guide* (EK–DECSY–VG)
- *DECconnect System Standalone ThinWire Networks: Planning and Installation Guide* (EK–DECSY–TG)
- *DECconnect System Planning and Configuration Guide* (EK–DECSY–CG)
- *Workstations Network Guide* (EK-VS315-GD)

B

Removable Storage Media

This appendix contains information on the use and storage of the following media types that are used by the optional removable media storage devices:

- Tape cartridges
- QIC tapes
- Diskettes

B.1 Tape Cartridges

The CompacTape cartridge (see Figure B–1) is a 10 cm by 10 cm (4 inches by 4 inches) plastic tape cartridge that can be used by TZ30 or TK50 tape drives. The TZ30 tape drive is supplied with a CompacTape.

The CompacTape II is the successor to the CompacTape cartridge. The CompacTape II has tighter tolerances than the CompacTape, which support the higher recording densities of the TK70. The CompacTape and the CompacTape II (when used with TZ30 and TK50 tape drives) have a capacity of 95M bytes.

The TZ30 can use a CompacTape or CompacTape II cartridge that was originally written by the TK50. If a CompacTape II cartridge written by a TK70 is used on a TZ30, the TZ30 automatically unloads the tape cartridge, because the TZ30 cannot read the tape cartridge. The green LED flashes, indicating a tape error.

Figure B–1 CompacTape Cartridge

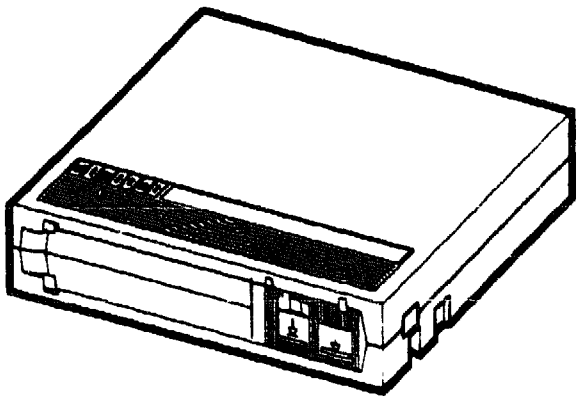

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Table B–2 and Table B–1 show the compatibility of CompacTape and CompacTape II tape cartridges with TZ30, TK50, and TK70 tape drives.

Table B–1 Noninitialized Cartridge Compatibility

	CompacTape (TK50-K)	CompacTape II (TK52-K)
TZ30 drive	Yes	Yes
TK50 drive	Yes	Yes
TK70 drive	No	Yes

Table B–2 Initialized Cartridge Compatibility

	TK50 Drive	TK70 Drive	TZ30 Drive
TZ30 initialized cartridge	R/W[2]	R[1]	R/W
TK50 initialized cartridge	R/W	R	R/W
TK70 initialized cartridge	NC[3]	R/W	NC

[1]Read only

[2]Read/write

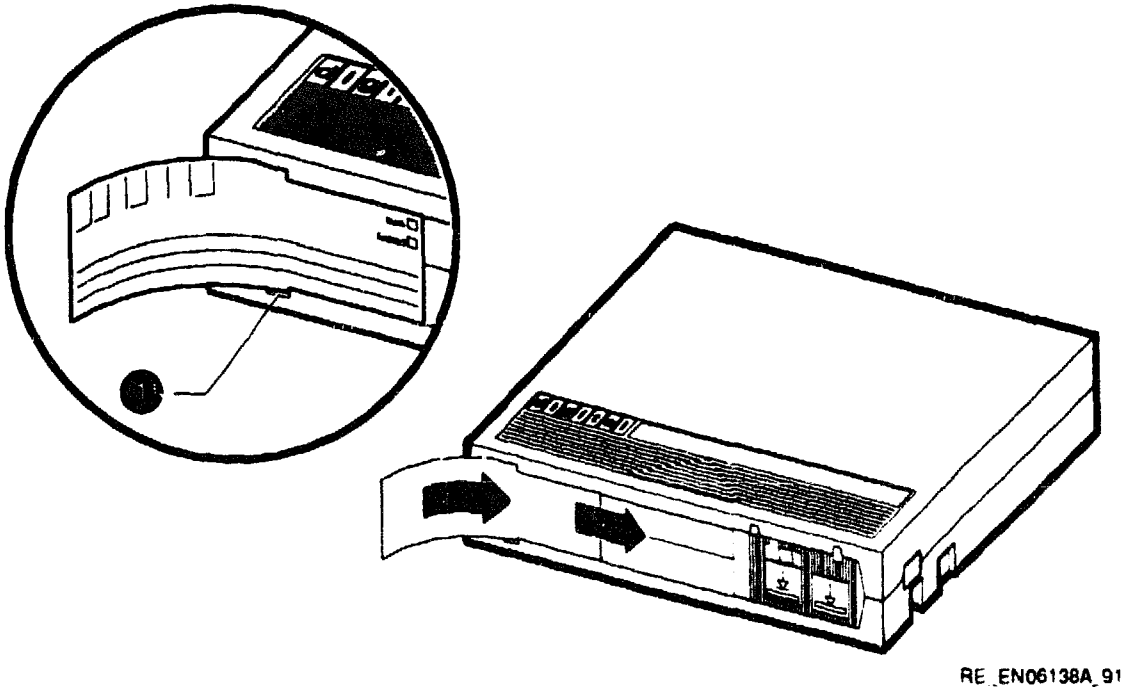
[3]Not compatible

B.1.1 Labeling a Tape Cartridge

Always label tape cartridges. There is a slot for the label on the front of the cartridge. The label is visible when the cartridge is in the drive. Labels or markings on any other part of the cartridge can interfere with the proper operation of the drive. Do not write on the cartridge with a pen, pencil, or other marking instrument.

The labels supplied with the CompacTape II cartridges have spaces that mark the capacity of the tape cartridge. If a TK50 or TZ30 wrote data to the tape cartridge, mark the 95M-byte block on the label. If a TK70 wrote data to the tape cartridge, mark the 296M-byte block on the label.

If you use TK70 and TZ30 drives, note that the TZ30 is unable to read or write tapes that have originally been written to by the TK70. However, the TK70 can read tapes written by the TZ30 or the TK50.



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1 Label Slot

B.1.2 Writing to and Write-Protecting Tape Cartridges

CompacTape and CompacTape II cartridges have a write-protect switch that prevents an accidental overwrite of data. The system can read information on the tape regardless of the position of the write-protect switch. However, the system cannot write data to a write-protected tape.

Write-Protecting a Tape

When you use a tape to install software, set the write-protect switch on the front of the cartridge to the write-protect position.

To write-protect a tape, set the write-protect switch to the write-protect position by sliding it left towards the label until it locks in place (see Figure B–2). An orange rectangle appears when the write-protect switch locks in the write-protect position.

Writing to a Tape

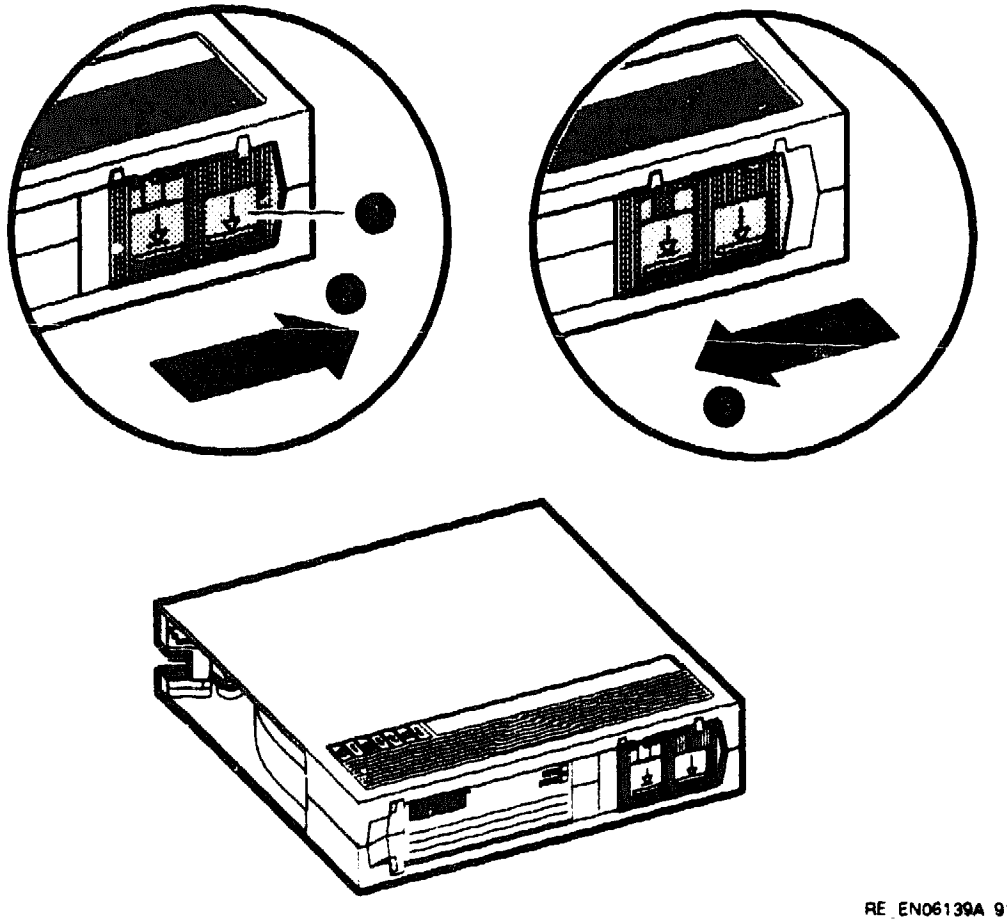
When you use a tape to make a backup copy or to write data, set the write-protect switch to the write-enable position. To set the switch to the write-enable position, slide it to the right, away from the label, until the switch locks in place.

B.1.3 Handling and Storing Tape Cartridges

Inside the cartridge, a 600-foot single reel of magnetic tape stores data. A plastic tape leader is at the beginning of the tape. Take the following precautions when handling and storing tapes:

- Do not touch the exposed surface of the tape.
- Do not drop the tape cartridge.
- Allow tape cartridges to reach room temperature before using them.
- Store the tape where the room temperature is between 10°C and 40°C (50°F and 104°F) and the humidity is between 20% and 80%.
- Place the identification label in the slot provided on the tape cartridge.
- Store the tape cartridge in its plastic cover.
- Do not expose the tape to direct sunlight, heat, magnetic fields, or X-rays.

Figure B–2 Write-Protect Switch Positions



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1. Write-Protect Switch
2. Write-Enable Position
3. Write-Protect Position

B.2 Quarter-Inch Cartridge (QIC) Tapes

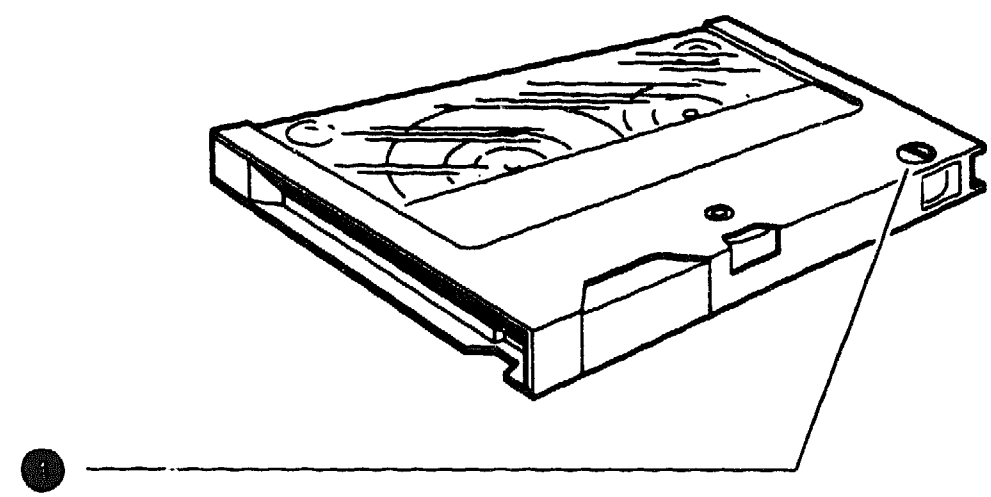
The TZK10 cartridge tape drive is shipped with a DC6320 QIC tape. You can also use the TZK10 with the DC6525 QIC tape. Table B–3 describes both QIC tapes.

Table B–3 Cartridge Compatibility

Cartridge	Capacity	Format	R/W
DC6525	Up to 525M bytes	QIC-525	R/W
DC6320	Up to 320M bytes	QIC-320	R/W

Figure B–3 identifies the parts of a QIC tape.

Figure B–3 QIC Tape



1 Write-Protect Switch

B.2.1 Guidelines for Using QIC Tapes

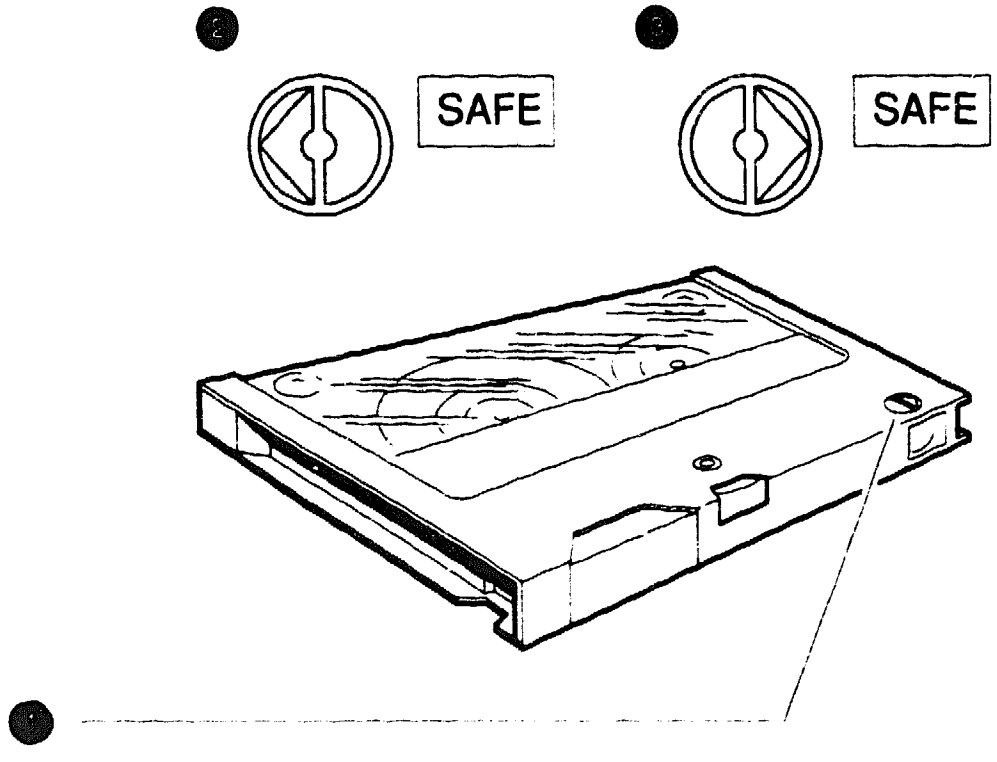
Use the following guidelines when using QIC tapes:

- Do not drop the tape.
- Store the tape where the room temperature is between 10°C and 40°C (50°F and 104°F) and the humidity is between 20% and 80%.
- Do not expose the tape to direct sunlight, abrasive particles, or electromagnetic fields.
- Store the QIC tape in its protective container, placed on its edge, or stacked. Do not stack QIC tapes more than five high.
- Place the identification label in the space provided on the top of the QIC tape.

B.2.2 Setting the QIC Tape Write-Protect Switch

There is a write-protect switch on one corner of the QIC tape. This switch allows you to write-protect the data on the tape. After writing data to the QIC tape, write-protect the tape to prevent accidental erasure or overwriting of that data. Use the write-protect switch as follows:

- Turn the write-protect switch to the safe (write-protect) position when you want to protect the data on the tape, or when you want to read or copy data from the tape.
- Turn the write-protect switch to the write-enable position when you want to write data to the tape.



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1. Write-Protect Switch
2. Write-Enable Position
3. Write-Protect Position

B.3 Diskettes

Diskettes are magnetic disks that store information. Digital recommends that you use either high-density (HD) or extra-density (ED) diskettes. ED diskettes have a capacity of 2.88M bytes and HD diskettes have a capacity of 1.44M bytes.

Keep the diskettes dry, out of extreme temperatures and direct sunlight, and away from devices that contain magnets, such as telephones.

B.3.1 Writing to and Write-Protecting Diskettes

Write-protecting a diskette prevents accidental erasure of information. The RX26 diskette drive can read information on the diskette regardless of the position of the write-protect switch. However, the system cannot write data to a write-protected diskette.

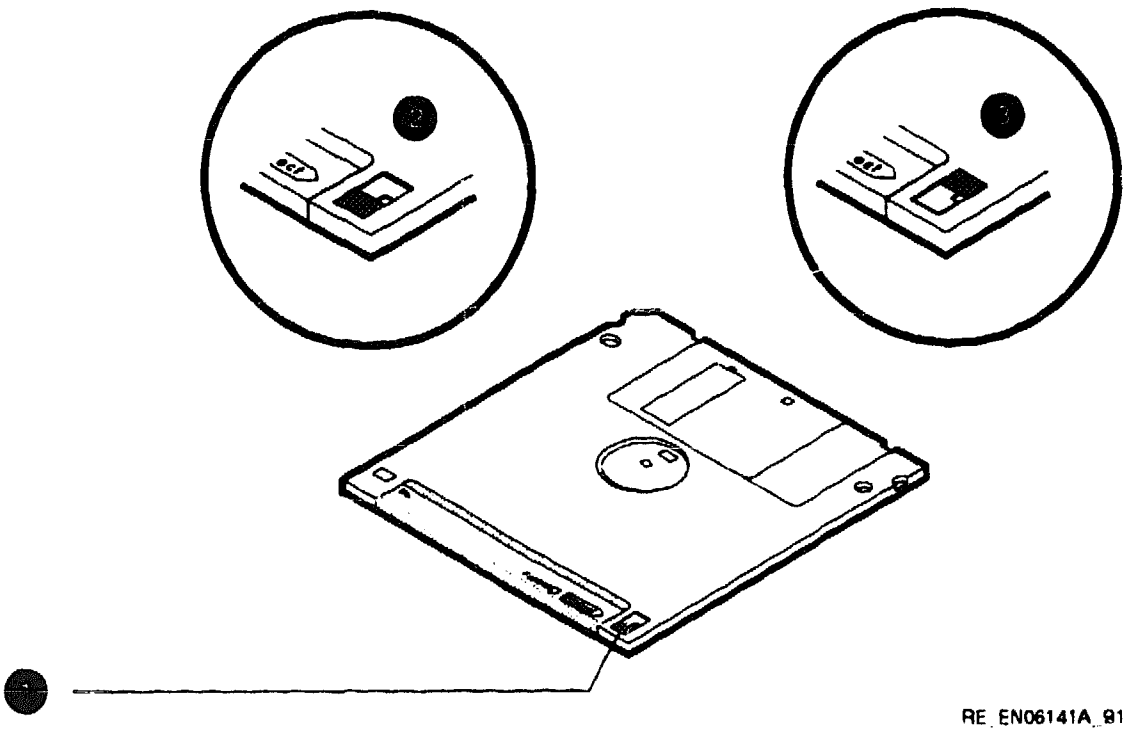
Write-Protecting a Diskette

When you use a diskette to install application software on the system or to protect information on the diskette, set the write-protect switch on the back of the diskette to the write-protect position by moving the switch down until it locks in place (see Figure B–4).

Writing to a Diskette

When you use a diskette to make a backup copy of a file or to write data to a diskette, set the write-protect switch to enable writing to the diskette. To enable writing, set the switch to the write-enable position by moving it up, until it locks in place.

Figure B–4 Write-Protect Switch Positions



1. Write-Protect Switch
2. Write-Protect Position
3. Write-Enable Position

Glossary

The glossary defines some of the technical terms used in this manual.

802.3

An Institute of Electrical and Electronics Engineers (IEEE) standard describing the physical and data link layers of a local area network based on bus topology and Carrier Sense Multiple Access/Collision Detect (CSMA/CD).

backup copy

A copy of data stored on a disk.

backup process

The process of making copies of the data stored on a disk so that you can recover that data after an accidental loss. You make backup copies on tape cartridges or on another disk.

binary

A number system that uses two digits: 0 and 1. They are represented in system circuitry by two voltage levels, and programs are executed in binary form.

bit

A binary digit; the smallest unit of information in a binary system of notation, designated as a 0 or a 1.

bus

A channel (a set of wires) along which communication signals in a computer system travel.

byte

A group of 8 binary digits (bits). A byte is one-quarter of a VAX system longword.

caddy

The holder for inserting a compact disc into a compact disc drive.

central processing unit

See CPU.

communications line

A cable along which electrical signals are transmitted. Devices or systems that are connected by a communications line can share information and resources.

console mode

The state in which the computer is controlled from the console terminal. You can put the system in console mode by pressing the halt button on the back of the system unit. Console mode is indicated by the console prompt (>>>) on the monitor screen.

console prompt

A prompt used for communication between the system manager and the computer when the computer is in console mode.

controller

A system component, usually a printed circuit board, that regulates the operation of one or more peripheral devices.

CPU

Central processing unit. The part of the system that controls the interpretation and execution of instructions.

daisy-chain

A group of systems linked together sequentially.

data

A formal representation of information suitable for communication, interpretation, and processing by humans or computers.

DECconnect

Digital's simple, cost-effective cabling system for extending Ethernet and terminal interconnections into offices and work areas.

DECconnect faceplate

See faceplate.

default

A value or setting that in most cases is *normal* or *expected*.

DEMPR

A multiport repeater that provides eight ThinWire Ethernet drops from a single standard Ethernet connection.

device

The general name for any unit connected to the system that is capable of receiving, storing, or transmitting data.

device name

The name by which a device or controller is identified in the system.

diagnostics

Programs, located in read-only memory, that detect and identify abnormal system hardware operation. (*See* ROM.)

disk

A flat circular plate with a coating on which data is magnetically stored in concentric circles (tracks). A disk resides permanently inside a disk drive, while a diskette is removable.

disk drive

A device that holds a disk. The drive contains mechanical components that spin the disk and move the read/write heads that store and read information on the surface of the disk.

Ethernet

A type of local area network based on Carrier Sense Multiple Access with Collision Detection (CSMA/CD).

faceplate

A wall receptacle that provides a single network connection for the system.

file

A collection of related information treated by the system as a single unit.

format

To prepare a disk, diskette, or tape to accept data.

formatted data

Data that is structured in a particular pattern to be understood by the system software.

ground

A voltage reference point in a system that has a zero voltage potential.

hard disk

A hard disk resides permanently inside a disk drive.

hardware

The physical components—mechanical and electrical—that make up a system. (*Compare with* software.)

head

The part of a fixed disk drive, diskette drive, or tape drive that reads, records, and erases data. Also called read/write head.

IEEE

Institute of Electrical and Electronics Engineers.

LAN

Local area network. A high-speed communications network that covers a limited geographical area, such as a section of a building, an entire building, or a cluster of buildings. It is a privately owned communications network whose speed is upward of 1M bits/second.

LED

Light-emitting diode. LEDs are used as indicators on the system enclosure.

load

To copy software (usually from a peripheral device) to memory. To physically place a disk in a disk drive or a tape in a tape drive.

Local Area Network

See LAN.

magnetic tape

A tape used for storing data that is made of plastic and coated with magnetic oxide. Also called magtape.

memory

The area of the system that electrically stores instructions and data, often temporarily.

memory module

A printed circuit board that contains additional memory for the system.

module

A printed circuit board that contains electrical components and electrically conductive pathways between components. A module stores data or memory or controls the functions of a device.

multiport repeater

A repeater used to connect two or more cable segments. The repeater lets you extend Ethernet networks beyond the limits imposed by a single segment. Repeaters perform the basic actions of restoring signal amplitude, waveform, and timing amplitude to normal data and collision signals.

network

A group of individual computer systems that are connected by communications lines to share information and resources.

network co-ordinator

The network co-ordinator manages the network, assigns unique node names and addresses for each system on the network, and provides administrative assistance to network users.

node

An individual information-processing unit, such as a computer, workstation, or peripheral device, that is connected to a network. A node is an end point to any branch of a network or a junction common to two or more branches.

operating system

A collection of system programs that controls the operation of the system and allows the user to access data files, input/output devices, and applications programs. The operating system software performs such tasks as assigning memory to programs and data, processing requests, and scheduling jobs.

peripheral

A device that provides the CPU with additional memory storage or communication capability. Examples are disk and diskette drives, video terminals, and printers.

port

The name of the socket or connector at the back of the computer to which a terminal, printer, or other communication devices are connected.

printer

A peripheral device that provides paper copies of information stored on the system.

prompt

Words or characters that the system displays to indicate that it is waiting for you to enter a command.

RAM

Random-access memory. Memory that can be both read and written to and can randomly access any location during normal operations. The type of memory the system uses to store the instructions of programs currently being run. *Compare with* ROM.

random-access memory

See RAM.

read-only memory

See ROM.

ROM

Read-only memory. A memory whose contents cannot be modified. The system can use the data contained in a ROM but cannot change it. *Compare with* RAM.

SCSI

Small computer system interface. It is an interface designed for connecting disks and other peripheral devices to computer systems. SCSI is defined by an American National Standards Institute (ANSI) standard and is used by many computer and peripheral vendors throughout the industry.

Small computer system interface

See SCSI.

software

Programs executed by the system to perform a chosen or required function. (*Compare with* hardware.)

standard Ethernet

IEEE standard 802.3 compliant Ethernet network composed of standard Ethernet cable as opposed to ThinWire Ethernet cable.

storage medium

Any device capable of recording information; for example, a diskette.

store

To enter data into a storage device, such as a disk, or into memory.

system

A combination of system hardware, software, and peripheral devices that performs specific processing operations.

tape drive

A device that contains mechanical components and holds, turns, reads, and writes on magnetic tape.

tape leader

A plastic leader at the beginning of magnetic tape.

tape lever

This lever sets internal TZ30 mechanisms to accept or eject the tape cartridge. Move the lever to the left to insert a tape, move to the right so the tape can be used, and move to the left again to eject the cartridge after the tape has been completely rewound.

T-connector

Connector used to join ThinWire Ethernet cable sections. The connector also has a connector that is attached directly to a system.

terminal

An input/output device that lets you communicate with the system. Terminals are divided into two categories: video and hard-copy.

terminator

A connector used on one or both ends of an Ethernet segment that provides the 50-ohm termination resistance needed for the cable.

ThinWire

A Digital trademark used to describe its 10 base 2 (IEEE standard 802.3 compliant) Ethernet products used for local distribution of data.

ThinWire connector

The connector on the back of the system unit to which the ThinWire Ethernet cable is attached.

transceiver

A device that provides a single physical connection between standard Ethernet and Ethernet communication equipment.

unload switch

A switch on the front of the TZ30 tape drive that rewinds and unloads the tape.

VMS

Digital's proprietary operating system.

write-protect

To protect a disk, diskette, or other storage medium from the addition, revision, or deletion of information.

write-protect switch

The switch that you set on tapes, cartridges, or diskettes to prevent loss of data by accidental overwriting.

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TROUBLESHOOTING AND DIAGNOSTICS

MicroVAX 3100 Model 30

Troubleshooting and Diagnostic Information

Order Number: EK-A0516-TM.001

October 1991

This manual describes the troubleshooting procedures and diagnostic commands that you can use to solve basic problems with the MicroVAX 3100 Model 30 system.

Revision Information: This is a new manual.

Digital Equipment Corporation
Maynard, Massachusetts

October 1991

The postpaid Reader's Comments forms at the end of this document request your critical evaluation to assist in preparing future documentation.

This document was prepared using VAX DOCUMENT, Version 2.0.

Contents

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Preface

This manual describes the troubleshooting procedures and diagnostic commands that you can use to solve basic problems with the MicroVAX™ 3100 Model 30 system.

Audience

This manual is inter ‹ed for people who have some experience of computers.

Structure of This Manual

This manual has one chapter and an index.

Additional Information

See the *MicroVAX 3100 Model 30 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 MicroVAX 3100 Model 30 system. It contains information on the following:

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

It also lists the information that you must give to your Digital Services representative and 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 power cords
- ThinWire™ Ethernet cable or standard Ethernet cable

6. Check that the following terminators, if installed, are correctly connected and are not damaged:
   - SCSI terminator
   - ThinWire Ethernet terminator (T-connector and two terminators)
   - Standard Ethernet loopback connector

   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 terminal cable is not correctly connected.	Make sure that all the cables are connected at both ends.
	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 *MicroVAX 3100 Model 30 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.

(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 DZ 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 display contains question marks.	A soft error or hard error.	One question mark (?) followed by numbers in the power-up display indicates a soft error. Do not take any action unless the system fails to boot. If the system does not boot, see Section 1.3.
		Two question marks (??) followed by numbers in the power-up display indicate a hard error. See Section 1.3.
The power-up test display contains unexpected characters.	The terminal settings are incorrect or the DZ 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.

(continued on next page)

Table 1–1 (Cont.) Basic Troubleshooting

Symptom	Possible Cause	Suggested Solution
TZ™30 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 *MicroVAX 3100 Model 30 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 *MicroVAX 3100 Model 30 Operator Information* manual.

(continued on next page)

Table 1–1 (Cont.) Basic Troubleshooting

Symptom	Possible Cause	Suggested Solution
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 *MicroVAX 3100 Model 30 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.

(continued on next page)

Table 1–1 (Cont.) Basic Troubleshooting

Symptom	Possible Cause	Suggested Solution
RX™26 Diskette Drive Problems		
The system cannot read from or write to the diskette.	The diskette is not formatted.	Format the diskette.
	The diskette is not correctly inserted.	Eject the diskette. Try inserting the diskette again.
	The diskette is faulty.	Try a different diskette.
	The diskette drive is faulty.	Contact your Digital Services representative.
	The diskette density is incorrect.	The RX26 accepts only high-density (HD) or extra-density (ED) diskettes.
	The diskette drive head may be dirty.	See the *MicroVAX 3100 Model 30 Operator Information* manual for information on cleaning the diskette drive head.
The system can read from but cannot write to a diskette.	The write-protect switch is in the write-protect position.	Eject the diskette and reset the switch. Try writing to the diskette again.
The diskette does not eject.	The diskette is incorrectly positioned in the drive.	Gently press the diskette with your finger and reposition it. Press the eject button again.

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]
- System exerciser[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 *MicroVAX 3100 Model 30 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:

```
KA45-A  V1.0 (1)
08-00-2B-1A-0B-BB (2)
16MB (3)
(4)

OK

>>> (5)
```

(1) Central Processing Unit (CPU) Name (KA45) and Firmware Version Number (V1.0).

(2) Ethernet Hardware Address.

(3) Memory Size.

(4) Status Bar—The completion mark (|) indicates the full extent of the status bar. When the status bar reaches the completion mark, the power-up test is complete. On some terminals, the status bars are displayed as a line of number signs (#).

(5) Console Prompt[1].

[1] The system may not display the console prompt if the default recovery action is set to boot or restart. See the *MicroVAX 3100 Model 30 Customer Technical Information* manual for more information on system defaults.

If the power-up tests encounter an error, the system responds with a display similar to the following:

```
KA45-A  V1.0
08-00-2B-1A-0B-BB
16MB
                                                    |
?? 001   9        NI    0104
❶ ❷   ❸        ❹     ❺                            ❻
>>>
```

- ❶ Error Type—Two question marks (??) indicate a hard error, that is, a fatal error that prevents the system from booting. One question mark (?) indicates a soft error, that is, a nonfatal error that does not prevent the system from booting.
- ❷ Field Replaceable Unit (FRU).
- ❸ Device Number.
- ❹ Device Mnemonic.
- ❺ Error Message.
- ❻ Completion Mark—The completion mark (|) indicates the full extent of the status bar when the power-up test is successful.

In this display, one question mark (?) indicates a soft error, whereas two question marks (??) indicate a hard error.

Usually, you can ignore soft errors. Soft errors are often caused by temporary problems, and the system can boot despite the error. Hard errors, however, usually indicate a more serious problem that may prevent the system from successfully booting. If you encounter a hard error, see Section 1.2.2.

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.

If you encounter a hard error in the power-up test display, follow these steps:

1. Write down the number or mnemonic of the tests that failed.

   In the examples in this section, device 9 (NI), the Ethernet device, has a hard error associated with it. Table 1–2 lists the device numbers, mnemonics, and names of the system devices.

2. 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.

3. Run the self-test on each device that failed by entering a command similar to the following:

   ```
   >>> TEST 9
   ```

   Alternatively, instead of the device number, you can enter the command using the device mnemonic:

   ```
   >>> TEST NI
   ```

   If the self-test is successful, the system responds with the following display:

```
>>> TEST 9
[redacted]

OK
>>>
```

If the device fails the self-test, the system responds with the following display:

```
>>> TEST 9
?? 001   9         NI  0172

  84 FAIL
>>>
```

4. If the error remains, contact your Digital Services representative (see Section 1.3).

Table 1–2 lists all the device numbers, mnemonics, and device names.

Table 1–2 Device Numbers, Mnemonics, and Names

Number	Mnemonic	Device Name
1	NVR	Nonvolatile RAM
3	DZ	Serial line controller
4	CACHE	Cache memory
5	MEM	System internal memory
6	FPU	Floating point unit
7	IT	Interval timer
8	SYS	Miscellaneous CPU module hardware
9	NI	Network interface (Ethernet)
10	SCSI	SCSI controller
12	COMM	Synchronous communications option
14	ASYNC	Asynchronous communications option

1.2.3 Configuration Display

The configuration display shows the system configuration and the error messages that were detected while the most recent power-up tests and self-tests were running. If you add expansion boxes to the system and do not run the power-up tests or self-tests, the configuration display does not recognize the reconfiguration. Enter the following command to see the configuration display:

```
>>> SHOW CONFIG
```

If the system does not detect any errors in the most recent power-up tests and self-tests, it responds with a configuration display similar to the following:

```
KA45-A V1.0
08-00-2B-16-44-48
16MB
  ❶      ❷        ❸
DEVNBR  DEVNAM      INFO
------  --------- ------------------------
1          NVR    OK
3           DZ    OK
4        CACHE    OK
5          MEM    OK
                  8MB = SY=8MB, S0/1=8MB, S2/3=0MB, S4/5=0MB  ❹
6          FPU    OK
7           IT    OK
8          SYS    OK
9           NI    OK
10        SCSI    OK
                  3-RZ23L  6-INITR                            ❺
12        COMM    OK
                  DSW41/42 1 CHANNEL V3.11-47
14       ASYNC    DHW41/2         V1.5
```

❶ Device Number Column.

❷ Device Mnemonic Column.

❸ Device Status Column.

❹ Memory Configuration—The total internal capacity of the system equals the memory on the system module (SY) plus the optional memory in each of the internal banks (S0 to S5). In this example, the capacity is 16M bytes.

❺ SCSI IDs and SCSI Device Names.

If the system detects errors in the most recent power-up tests and self-tests, it responds with a configuration display similar to the following:

```
KA45-A V1.0
08-00-2: -16-44-48
16MB
DEVNBR  DEVNAM      INFO
------  --------- ------------------------
1          NVR    OK
3           DZ    OK
4        CACHE    OK
5          MEM    OK
                  8MB = SY=8MB, S0/1=8MB, S2/3=0MB, S4/5=0MB
6          FPU    OK
7           IT    OK
8          SYS    OK
9           NI    ?? 001  0104 ●
10        SCSI    OK
                  3-RZ23L  6-INITR
12        COMM    OK
                  DSW41/42 1 CHANNEL V3.11-47
14       ASYNC    DHW41/2        V1.5
```

● Error Information—Write down this information before you contact your Digital Services representative.

1.2.4 System Exerciser

Use the system exerciser if the system develops intermittent problems. The system exerciser simulates the operating system by testing the simultaneous operation of multiple devices in the system. The system runs the tests twice and then shows the results in the system exerciser display.

Note

Remove the removable media from all the internal and external removable media devices.

To run the system exerciser, enter the following command:

```
>>> TEST 100
```

The system responds with a display similar to the following:

```
❶                          ❷                    ❸
KA45/47 V1.0   System Test CU                  0 00:01:29
     3    DZ #
     9    NI #
    10    SCSI #
    12    COMM #                                    0
    14    ASYNC #
    ❹     ❺ ❻
***** SYT_DISPLY_SUMRY (('1'=Y), ('0'=N)).............. ? ❼
```

❶ Central Processing Unit (CPU) Name and Firmware Version Number – KA45 is the CPU in the Model 30 system (KA47 is the CPU in the Model 80 system). V1.0 is the firmware version number.

❷ Test Environment—CU is the customer environment.

❸ The Duration of the Test—Days hours:minutes:seconds.

❹ Device Number.

❺ Device Mnemonic.

❻ Status Bars—The status bars show the progress of each test. On some terminals, the status bars are displayed as a line of number signs (#), on other terminals the status bars are solid lines.

❼ A prompt for summary screens (see Section 1.2.5). Enter 1 to display the summary screens; enter 0 to return to the console prompt.

If a device fails the system exerciser tests, the system displays the following:

```
KA45/47 V1.0   System Test CU                    0 00:00:59

     3    DZ #

     9    NI #

    10    SCSI #

    12    COMM #                                          0
❶ ❷     ❸   ❹      ❺                  ❻
??  14    ASYNC  40     0305          0 00:01:26

***** SYT_DISPLY_SUMRY (('1'=Y), ('0'=N))..................... ?  ❼
```

❶ **Error Report—The error report replaces the status bar when a device fails the system exerciser tests. Two question marks (??) indicate a hard error, that is, an error that you must correct before booting the system. One question mark (?) indicates a soft error, that is, an error that you do not have to correct before booting the system.**

❷ **Device Number.**

❸ **Device Mnemonic.**

❹ **Field Replaceable Unit (FRU).**

❺ **Error Message.**

❻ **Elapsed Time—The time elapsed since the test started.**

❼ **A prompt for the summary screens (see Section 1.2.5). Enter 1 to display the summary screens; enter 0 to return to the console prompt.**

If you see an error report, write it down. Then contact your Digital Services representative (see Section 1.3).

1.2.5 Summary Screens

The system exerciser generates summary screens, which show the progress or results of the most recent system exerciser test. You do not need to use or understand the summary screens. However, your Digital Services representative might ask you to display a summary screen. The system displays a summary screen when one of the following conditions is satisfied:

- The system has completed the system exerciser test and you choose to view the summary screens
- You press Ctrl/C to interrupt a system exerciser test and you choose to view the summary screen
- You enter the command SHOW ESTAT

The summary screens are displayed in the order in which the tests were performed. When the system exerciser is completed, it displays a prompt at the bottom of the screen as follows:

```
***** SYT_DISPLY_SUMRY (('1'=Y), ('0'=N))..................... ?
```

Enter 1 to view the first summary screen, or 0 to return to the console prompt.

The following display shows a summary screen for the DZ test that was performed during a system exerciser test:

```
********** FST EXT_ERRPT   3DZ      0 00:01:25 **********

   Line  L_Param  Chr_Xmt   Chr_Rec          Error
   ----  -------  --------  --------  ---------------------

     0           00000780  00000780  ***** No Err    *****
     1           00000780  00000780  ***** No Err    *****
     2           00000780  00000780  ***** No Err    *****
     3           00000000  00000000  *Not Tstd - Cons_lin*


********** SYSTST_NXT_SCR (('  (('1'=Y), ('0'=N))..... ?
```

1.2.6 Error Display

The error display lists the errors detected by the most recent self-test or system exerciser test. To see the error display, enter the following command:

```
>>> SHOW ERROR
```

The system responds with a display similar to the following:

```
?  000   1       NVR  0003

?? 001   9        NI  0068
001 0010 00000000 00000020 000000AA 00000000
```

Write down this information before you contact your Digital Services representative.

1.3 Contacting Digital Services

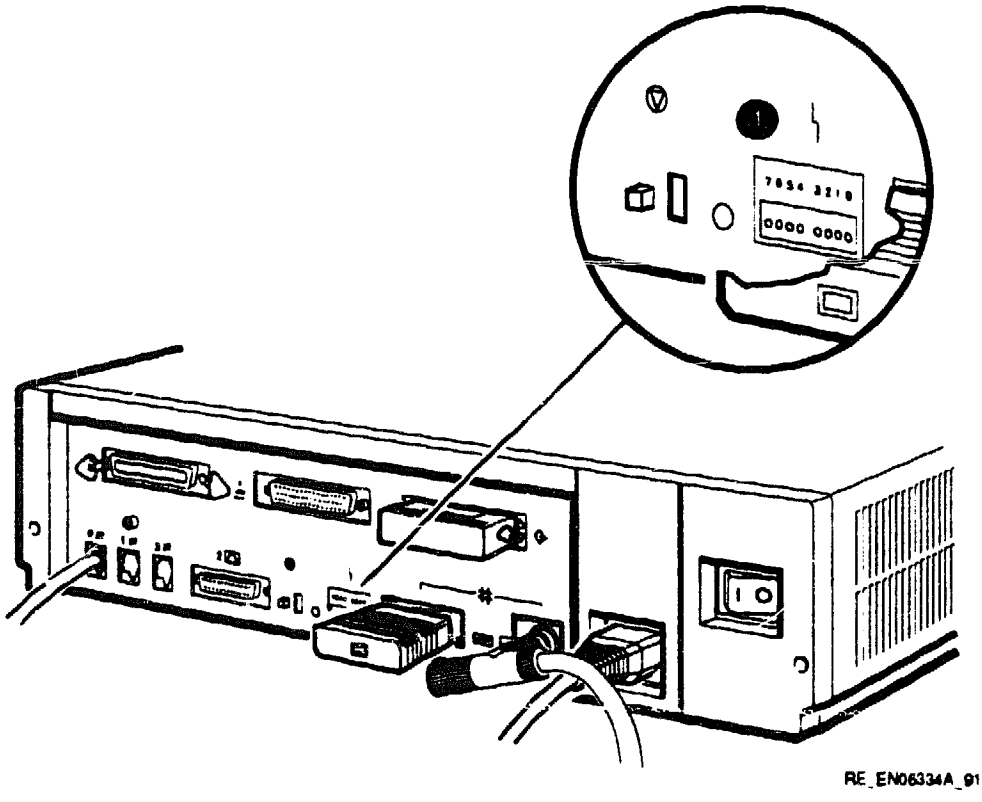
WARNING

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



1 Status LED Display

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CUSTOMER
TECH INFO

MicroVAX 3100 Model 30

Customer Technical Information

Order Number: EK-A0522-TD.001

October 1991

This manual describes technical information about the MicroVAX 3100 Model 30 system. It also gives a list of the console commands, and specifications for the system unit and internal SCSI devices.

Revision Information: This is a new manual.

Digital Equipment Corporation
Maynard, Massachusetts

October 1991

The postpaid Reader's Comments forms at the end of this document request your critical evaluation to assist in preparing future documentation.

This document was prepared using VAX DOCUMENT, Version 2.0.

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Preface

This manual describes technical information about the MicroVAX™ 3100 Model 30 system. It also gives a list of the console commands, and specifications for the system unit and internal SCSI devices.

Audience

This manual is intended for experienced users, for example, system programmers or system managers.

Structure of This Manual

This manual is divided into four chapters and an index:

- Chapter 1 describes technical information about the Model 30 system.
- Chapter 2 describes the console security feature and how to set system defaults.
- Chapter 3 describes the console commands.
- Chapter 4 gives specifications for the system unit and for internal SCSI devices.

Additional Information

See the *MicroVAX 3100 Model 30 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.
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.
italic type	Italic type emphasizes important information, indicates variables, and indicates complete titles of manuals.
nn nnn.nnn nn	A space character separates digits in numerals with 5 or more digits. For example, *10 000* equals *ten thousand*.
n.nn	A period in numerals signals the decimal point indicator. For example, *1.75* equals *one and three-fourths*.
UPPERCASE	Words in uppercase indicate a command.
lowercase	In format descriptions, words in lowercase indicate parameters or arguments to be specified by the user.
|	In command syntax descriptions, a vertical bar | separates similar options, one of which you can choose.
Note	A note contains information of special importance to the reader.
Ctrl/*x*	Ctrl/*x* indicates that you hold down the Ctrl key while you press another key or mouse button (indicated here by *x*).
x	A lowercase italic *x* indicates the generic use of a letter. For example, *xxx* indicates any combination of three alphabetic characters.
n	A lowercase italic *n* indicates the generic use of a number. For example, 19*nn* indicates a 4-digit number in which the last 2 digits are unknown.
{ }	In format descriptions, braces indicate required elements. You must choose one of the elements.
[ ]	In format descriptions, brackets indicate optional elements. You can choose none, one, or all of the options.

1

System Description

This chapter gives a technical description of the MicroVAX 3100 Model 30. This chapter includes information on the following:

- Model 30 system
- Internal mass storage devices
- Communications devices

1.1 Model 30 System

The Model 30 system uses the KA45 central processing unit (CPU) module. The KA45 CPU module is based on system on a chip (SOC) silicon technology. The KA45 CPU module contains the following components:

- DC222 (SOC) processor, which includes an internal floating point unit and cache memory
- The DC7201 S-chip, which is the primary interface between the CDAL bus and all memory, video, and input/output circuits
- 8M bytes of onboard random-access memory (RAM) with parity checking
- Support for up to 24M bytes of additional parity RAM
- 256K bytes of read-only memory (ROM), containing the boot and diagnostic firmware for the system
- 32K bytes of ROM, containing the boot and diagnostic firmware for the onboard options
- 32-byte network address ROM
- Time-of-year clock, which includes 50 bytes of nonvolatile RAM
- Three DEC423 asynchronous data-leads-only ports that use modified modular jack (MMJ) connectors
- One asynchronous modem control port (DB25 connector)

- IEEE 802.3 Ethernet controller for standard or ThinWire™ Ethernet
- SCSI controller
- Support for asynchronous communications options, which provide eight additional DEC423 ports or four additional asynchronous modem control ports
- Support for a synchronous communications option, which provides one additional synchronous port

1.1.1 Model 30 VAX Architecture Support

The KA45 CPU module in the Model 30 system supports the following VAX™ data types:

- byte, word, longword, quadword
- character string
- variable-length bit field
- f_floating point, d_floating point, and g_floating point

The operating system uses software emulation to support other VAX data types.

The KA45 CPU module supports the following VAX instructions:

- integer and logical
- address
- variable-length bit field
- control
- procedure call
- miscellaneous
- queue
- character string instructions:
- CMPC3/CMPC5
- LOCC
- MOVC3/MOVC5
- SCANC
- SKPC
- SPANC
- Operating system support
- f_floating point, d_floating point, and g_floating point

The operating system uses software emulation to support other VAX instructions.

1.2 Internal Mass Storage Devices

Table 1–1 shows the internal mass storage devices that are supported by the Model 30 system.

Table 1–1 Supported Internal Mass Storage Devices

Device	Size (inches)	Capacity (bytes)	Description
RZ23L	3.5	121M	Hard disk drive
RZ24	3.5	209M	Hard disk drive
RZ25	3.5	426M	Hard disk drive
TZ30	5.25	95M	Tape drive
TZK10	5.25	320M or 525M	Tape drive
RX™26	3.5	1.44M or 2.88M	Diskette drive

The system supports a maximum of three internal SCSI devices, only one of which can be a removable media device. An RZ-series disk in the system contains factory installed software (FIS). Chapter 4 gives the specifications for each internal SCSI device.

1.3 Communications Devices

The Model 30 system supports asynchronous and synchronous communications devices.

1.3.1 Asynchronous Communications Devices

Table 1–2 lists the asynchronous devices supported by the Model 30.

Table 1–2 Supported Asynchronous Devices

Device	Description
DHW41-AA	Eight-line DEC423 asynchronous option
DHW41-BA	Four-line EIA-232 modem asynchronous option

1.3.2 Synchronous Communications Devices

Table 1–3 lists the synchronous devices supported by the Model 30.

Table 1–3 Supported Synchronous Devices

Device	Description
DSW41-AA	One-line EIA-232/V.24 synchronous option

If you order a different synchronous option cable, you can use different interface standards with the synchronous communications module. Table 1–4 lists each standard and the part number of the corresponding cable.

Table 1–4 Synchronous Communications Option Cable Part Numbers

Standard	Option Cable Part Number
EIA-232/V.24	BC19D-02
EIA-423/V.10	BC19E-02
EIA-422/V.11	BC19B-02

2

Console Security Feature and System Defaults

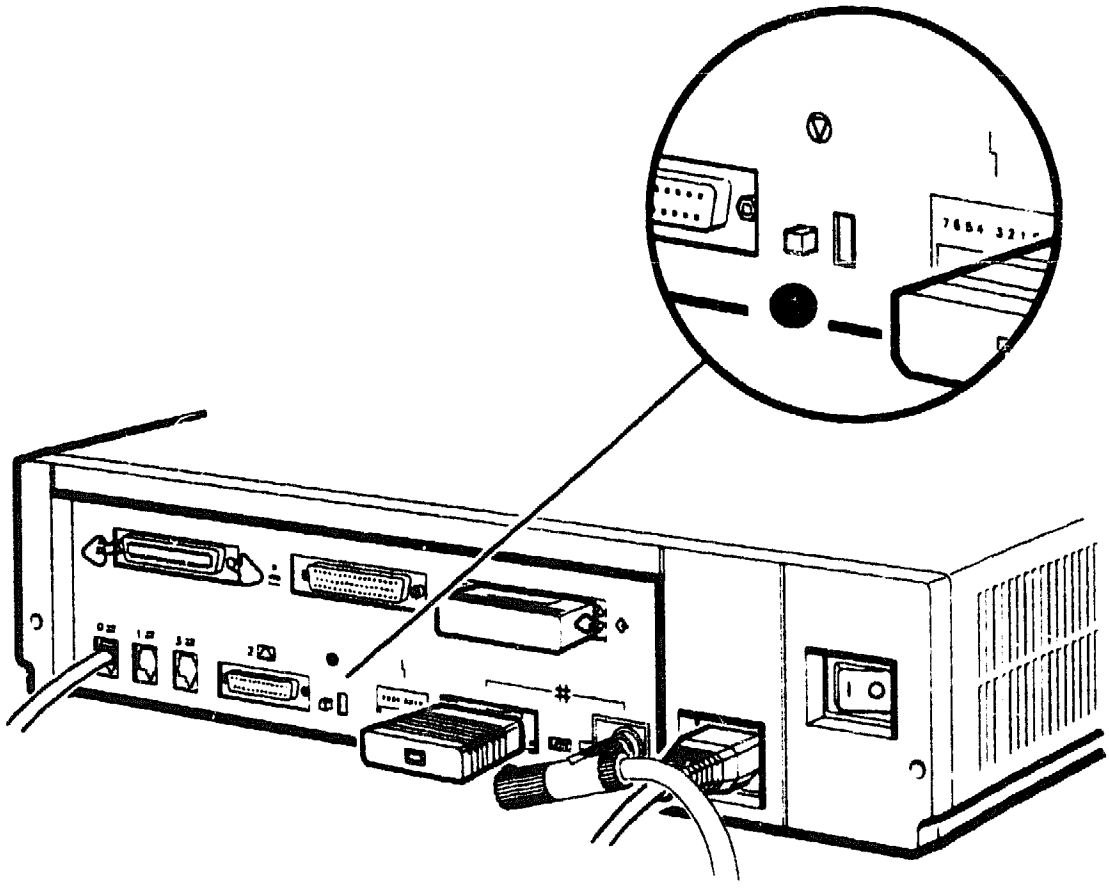
This chapter describes how to set system defaults and how to use the console security feature. It includes information on the following:

- Returning to console mode
- Using the alternative console port
- Console security feature
- Setting the default boot device
- Setting the default recovery action

2.1 Returning to Console Mode

To use the procedures described in this chapter, the system must be in console mode. Before returning to console mode, you must shut down the operating system software if it is running. See the operating system documentation for information on the shutdown procedures. To return to console mode, follow these steps:

1. Shut down the operating system software if it is running.
2. Press the halt button on the back of the system unit. The system responds with the console prompt (>>>) when it is in console mode.



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● Halt Button

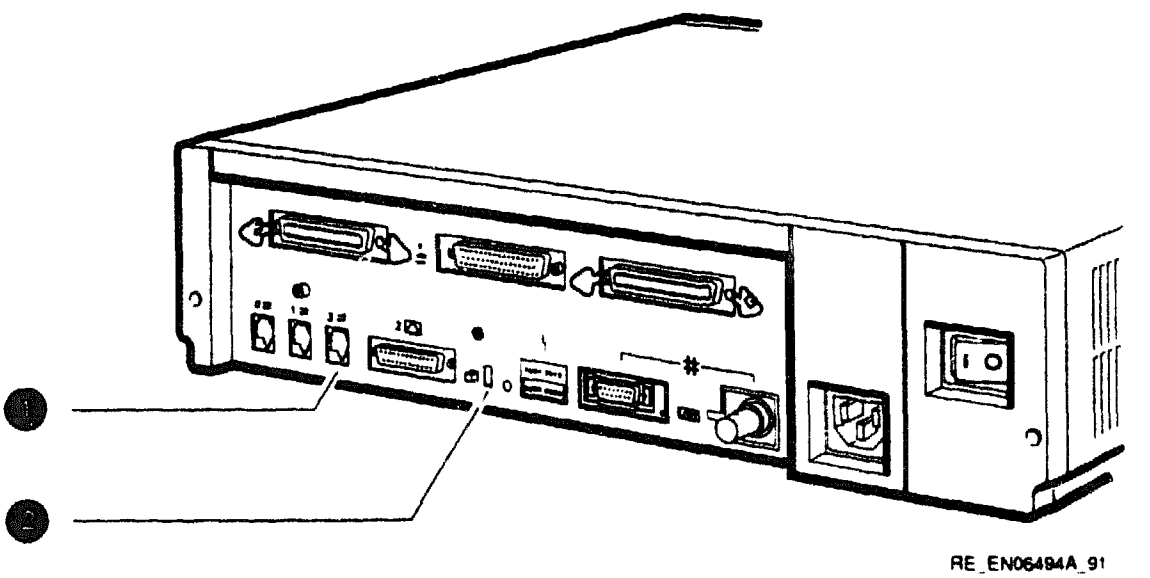
2.2 Using the Alternative Console Port

The MicroVAX 3100 systems provide an alternative console port through MMJ port 3. You can use this alternative console port in the same way as you would use the standard console port, MMJ port 0. However, the alternative console port allows you to halt the system by pressing the break key on the keyboard, a feature that is not available when you use the standard console port. To enable the alternative console port, follow these steps:

1. Set the on/off switch on the system unit to the off (O) position.
2. Connect a terminal to MMJ port 3.
3. Set the break/enable switch to the up position.

   The break enable LED lights when you set the switch to the up position.
4. Set the on/off switch on the system unit to the on (|) position.

   The system recognizes the position of the switch only when you set the power switch to the on (|) position.



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1. MMJ Port 3
2. Break/Enable Switch

2.3 Console Security Feature

The console security feature allows you to disable most of the system console commands. When the security password is set, there are two types of users: privileged users and unprivileged users. Privileged users know the security password and can use the full range of console commands; unprivileged users can use only the following commands:

- LOGIN—Use this command with the security password to become a privileged user.
- BOOT—Use this command without parameters to boot the operating system.
- CONTINUE—Use this command to return to the operating system after pressing the halt button.

Chapter 3 describes the console commands.

The following subsections describe how to do the following:

- Set the security password
- Enable the console security feature
- Log in to privileged console mode
- Change the security password
- Disable the security password
- Exit from privileged console mode

2.3.1 Setting the Security Password

The console security feature is disabled when you receive the system. To set the security password on the system, follow these steps:

1. Enter the following command at the console prompt (>>>):

   ```
   >>> SET PSWD
   ```

   The system responds with the following prompt:

   ```
   PSWD1 >>>
   ```

   Note

   - The security password must be a string of exactly 16 hexadecimal characters (0 to 9 and A to F).
   - Write down the security password and store it in a safe place. If you forget the security password, you must call your Digital Services representative to disable the console security feature.

2. Enter a security password and press Return.

   The system does not display the security password as you type it. The system responds with the following prompt:

   ```
   PSWD2 >>>
   ```

3. Verify the security password by entering it a second time.

   The system does not display the security password as you type it. If you enter the same security password at each prompt, the system saves the security password in nonvolatile memory. The system does not lose the security password when you turn off the system.

   If the second security password does not match the first, the system responds with the following error message:

   ```
   ?34 ILL PSWD
   >>>
   ```

4. Repeat steps 1 to 3 if you see an error message.

2.3.2 Enabling the Console Security Feature

When you have set the security password, you must enable the console security feature. To enable the console security feature, enter the following command at the console prompt:

```
>>> SET PSE 1
```

The system responds with the following display when you have enabled the console security feature:

```
PSE = 00000001
```

2.3.3 Logging in to Privileged Console Mode

When the console security feature is enabled, you must enter the security password to log in to privileged console mode. In privileged console mode you can use the full range of console commands. To log in to privileged console mode, follow these steps:

Note

You must set the security password before following these steps (see Section 2.3.1).

1. Enter the following command:

   ```
   >>> LOGIN
   ```

   The system responds with the following prompt:

   ```
   PSWD0 >>>
   ```

2. Enter the security password and press Return.

   The system does not display the security password as you type it. If you enter the correct security password, the system returns you to the console prompt and you become a privileged user. You can now use the full range of console commands.

   If you enter an incorrect security password, the system responds with the following error message:

   ```
   ?34 ILL PSWD
   >>>
   ```

3. Repeat steps 1 and 2 if an error message is displayed.

2.3.4 Changing the Security Password

You must be a privileged user to change the security password. To change the security password, follow these steps:

1. Follow the procedure in Section 2.3.3 using the current security password to log in to the system.
2. Enter the following command:

   ```
   >>> SET PSWD
   ```

   The system responds with the following prompt:

   ```
   PSWD0 >>>
   ```

3. Enter the current security password and press Return.

   The system does not display the security password as you type it. The system responds with the following prompt:

   ```
   PSWD1 >>>
   ```

4. Enter a new security password and press Return.

   The system does not display the security password as you type it. The system then responds with the following prompt:

   ```
   PSWD2 >>>
   ```

5. Verify the new security password by entering it a second time.

   The system does not display the security password as you type it. If you enter the correct, current security password at the PSWD0 >>> prompt, and correctly enter the new security password a second time, the system saves the new security password in nonvolatile memory. The system does not lose the new security password when you turn off the system.

   If you incorrectly enter the current password or incorrectly enter the new security password a second time, the system responds with the following error message:

   ```
   ?34 ILL PSWD
   >>>
   ```

6. Repeat steps 1 to 5 if an error message is displayed.

2.3.5 Disabling the Console Security Feature

When you disable the console security feature, all users can use the full range of console commands. To disable the console security feature, follow these steps:

1. Follow the procedure in Section 2.3.3 using the current security password to log in to the system.
2. Enter the following command:

```
>>> SET PSE 0
```

The system responds with the following display when you have disabled the console security feature:

```
PSE = 00000000
```

2.3.6 Exiting from Privileged Console Mode

When you exit from privileged console mode, privileged users must enter the LOGIN command with the correct password before they can use the full range of console commands. To exit from privileged console mode, enter one of the following commands:

- BOOT (with any supplied parameters)
- CONTINUE
- HALT
- START

Chapter 3 describes each of these commands.

2.4 Setting the Default Boot Device

When the system is shipped, it is set to boot from the system disk, DKA300. This RZ-series disk holds the factory installed software (FIS).

You can set the system to boot from a different default boot device that holds the operating system software. Table 2–1 shows the alternative default boot devices and their associated VMS™ device names.

Table 2–1 Alternative Default Boot Devices

Device	VMS Device Name
Hard disk (SCSI ID 0 to 7)	DKA*x*00[1]
Network (the system boots from a remote system)	ESA0
Tape drive (SCSI ID 0 to 7)	MKA*x*00[1]
Compact disc (SCSI ID 0 to 7)	DKA*x*00[1]

[1] *x* represents the SCSI ID of that device.

To set an alternative default boot device, enter the SET BOOT command using the VMS device name of the alternative default boot device. For example, to set the system to boot over the network, enter the following command:

```
>>> SET BOOT ESA0
```

The system responds with the following display when you have set ESA0 as the default boot device:

```
BOOT = ESA0
```

2.5 Setting the Default Recovery Action

There are three default recovery actions. You can change the default recovery action by entering the SET HALT command and the value associated with the action you want to set. Table 2–2 shows the three default recovery actions and their associated values. When the system is shipped, the default recovery action is set to halt.

Table 2–2 Default Recovery Actions and Associated Values

Recovery Action	Associated Value	Result
Restart	1	The system tries to restart the operating system. If it fails to restart the operating system, it tries to boot. If the system fails to boot, it halts.
Boot	2	The system tries to boot. If it fails to boot, it halts.
Halt	3	The system halts and displays the console prompt.

To set an alternative default recovery action, enter the SET HALT command using the value associated with the recovery action you want to set. For example, to set the system to halt, enter the following command:

```
>>> SET HALT 3
```

The system responds with the following display when you have set the default recovery action to 3.

```
HALT = 00000003
```

3

Console Commands

This chapter describes the console commands that you can enter when the system is in console mode. The system displays the console prompt (>>>) when it is in console mode. If the system is running the operating system software, see Chapter 2 for information on returning the system to console mode.

If the console security feature is enabled and a security password is set, you must log in to privileged console mode before using most of these commands. See Chapter 2 for information on the console security feature.

The following sections describe all the console commands, give the command format, and describe the significance of each parameter.

3.1 BOOT

Passes control to the virtual machine bootstrap (VMB) program, which resides on the system ROM. The format of this command is as follows:

B[OOT] [/[R5:]<bflg>] <ddau>[:]]

where:

- *R5:* represents a register, through which the hexadecimal value represented by <bflg> is passed to the VMB.
- <*bflg*> is the boot flag value.
- <*ddau*> is the name of the boot device. It passes to the VMB in register R0.

  The Ethernet network boot device name is ESA0; SCSI boot device names have the following format:

  ddcull

  where:

  - *dd* is the device mnemonic
  - c is the controller destination (always A)

- *u* is the SCSI ID value of the boot device
- *ll* is the logical unit number

The console program accepts device names in lowercase characters, but it is recommended that you use uppercase characters. You can specify more than one boot device, and you can type a colon at the end of the device names as shown in the command format. You can specify up to two devices on the command line. You must separate device names by typing either a space or a comma.

If the nonvolatile RAM (NVR) contains a default boot device name, the console program passes the descriptor for this device to the VMB. The VMB then boots the system from the specified device.

If you do not specify a device name or qualifiers or both in the command, the system attempts to boot from the default boot device specified in the NVR. If the default boot device is not defined (NULL), the console program passes a descriptor for device ESA0 to the VMB program. This triggers the VMB program to boot the system over the network.

3.2 CONTINUE

Allows you to exit from console mode and enter (or reenter) program mode (the operating system). The format of this command is as follows:

C[ONTINUE]

The address to which control passes is one of the following:

- The address stored in the program counter when the system went into console mode
- The address that the user specifies using the DEPOSIT command

3.3 DEPOSIT

Transfers the specified data to the specified address. The format of this command is as follows:

D[EPOSIT] [{/B | /W | /L | /Q | /A}] [{/P | /V | /I}] [/G] [/U] [/N:<n>] [{<addr> | <sym> | + | - | * | @} [<datum>]]

where:

- */B /W /L /Q /A /P /V /I /G /U /N:*<*n*> are deposit command qualifiers (see Table 3–1).

If you do not specify a size or address qualifier, the console program uses the size and address qualifier of the previous memory-specific command. If you specify conflicting qualifiers, the console program ignores the command and generates an error message. The effects of the miscellaneous qualifiers are not valid outside the command in which they are specified.

Note

The /U (unprotect) qualifier allows access to almost any address. If you do not use the /U qualifier, you can access address locations in the range 2000.0000 to 3FFF.FFFF (excluding the TOY clock). The /U qualifier is intended for use only by firmware developers.

- <*addr*> is the hexadecimal address into which you want to deposit the data.
- <*sym*> is a mnemonic that represents the address into which you want to deposit data (see Table 3–2).
- + - * @ are operators that you can use for relative memory addressing (see Table 3–3).
- <*datum*> is the value you want to deposit in the address location you specify.

Table 3–1 DEPOSIT Command Qualifiers

	Qualifier Type	
Size	**Address**	**Miscellaneous**
/B (byte)	/V (virtual memory)	/N:<n> (repeat count)
/W (word)	/P (physical memory)	/U (unprotect)
/L (longword)	/I (internal register)	
/Q (quadword)	/G (general purpose register)	
/A (ASCII)		

Table 3–2 Memory Address Mnemonics

Mnemonic	IPR Number	Type[1]	Description
KSP	0	RW	Kernel stack pointer
ESP	1	RW	Executive stack pointer
SSP	2	RW	Supervisor stack pointer
USP	3	RW	User stack pointer
ISP	4	RW	Interrupt stack pointer
P0BR	8	RW	P0 base register
P0LR	9	RW	P0 length register
P1BR	10	RW	P1 base register
P1LR	11	RW	P1 length register
SBR	12	RW	System base register
SLR	13	RW	System length register
PCBB	16	RW	Process control block base
SCBB	17	RW	System control block base
IPL	18	RW	Interrupt priority level
ASTLVL	19	RW	AST level
SIRR	20	W	Software interrupt request
SISR	21	RW	Software interrupt summary
ICCS	24	RW	Interval clock control
NICR	25	W	Next interval count (not implemented)
ICR	26	R	Interval count (not implemented)
TODR	27	RW	Time of year (not implemented)
CCR	37	RW	Cache control
MSER	39	RW	Memory system error register
SAVPC	42	R	Console saved PC
SAVPSL	43	R	Console saved PSL
MAPEN	56	RW	Memory management enable
TBIA	57	W	Translation buffer invalidate all
TBIS	58	W	Translation buffer invalidate single

[1]R indicates read; W indicates write.

(continued on next page)

Table 3–2 (Cont.) Memory Address Mnemonics

Mnemonic	IPR Number	Type[1]	Description
SID	62	R	System identification
TBCHK	63	W	Translation buffer check
	64 to 127		Reserved

[1]R indicates read; W indicates write.

Table 3–3 Memory Addressing Mnemonics

Symbol	Addressing Method Description
*	The memory address specified by the most recent DEPOSIT or EXAMINE command.
+	The memory address immediately following the address specified by the most recent DEPOSIT or EXAMINE command. For physical or virtual memory address, the address specified is the address of the most recent DEPOSIT or EXAMINE command plus the size that the most recently specified size qualifier indicates (1 for byte, 2 for word, 4 for longword.)
-	The memory address immediately before the address specified by the most recent DEPOSIT or EXAMINE command. For physical or virtual memory address, the address specified is the address of the most recent DEPOSIT or EXAMINE command minus the size that the most recently specified size qualifier indicates (1 for byte, 2 for word, 4 for longword).
@	Indirect addressing. The format is @<address>, where <address> is a hexadecimal address used as a pointer to another address. If you do not specify an address, the address that the command uses is the address used by the most recent memory referencing command.

Table 3–4 shows some examples of memory addressing.

Table 3–4 Examples of Memory Addressing

Example	Description
DEPOSIT R0 200	Stores the value 200 in the register R0.
DEPOSIT/P @R0 200	Stores the value 200 in the address pointed to by the register R0. The /P qualifier specifies that the value in the R0 register is a physical address reference.
DEPOSIT/V @R0 200	Stores the value 200 in the address pointed to by the register R0. The /V qualifier specifies that the value in the R0 register is a virtual address reference.
DEPOSIT @ 200	Stores the value 200 in the address specified by the most recent memory referencing command.

3.4 EXAMINE

Displays, in hexadecimal format, the contents of the specified address. The format of this command is as follows:

E[XAMINE] [/B | /W | /L | /Q | /A] [/P | /V | /I] [/G] [/U] [/N:<n>] [<addr> | <sym> | + | - | * | @] [<datum>]

where:

- */B /W /L /Q /A /P /V /I /G /U /N:<n>* are qualifiers. The EXAMINE command uses the same set of qualifiers as the DEPOSIT command (see Table 3–1).
- *<addr>* is the hexadecimal address into which you want to deposit the data.
- *<sym>* is a mnemonic that represents the address that you want to examine. The EXAMINE command uses the same mnemonics as the DEPOSIT command (see Table 3–2).
- + - * @ are operators that you can use for relative memory addressing. The EXAMINE command uses the same operators for memory addressing as the DEPOSIT command (see Table 3–3).
- *<datum>* is the value you want to deposit in the address location you specify.

3.5 FIND

Forces the console program to search the main RAM memory (starting at physical address zero) for the following:

- A page-aligned 128K-byte segment of main memory
- A restart parameter block (RPB)

If the console program finds a 128K-byte memory segment or an RPB, the console program places the starting address of the segment or RPB, plus 512, in the stack pointer (SP) register. If the console program does not find a memory segment or RPB, the console program issues an error message. The format of this command is as follows:

F[IND][/MEMORY | /RPB

where:

- */MEMORY* is a qualifier that specifies a search for a 128K-byte, page-aligned segment of memory.
- */RPB* is a qualifier that specifies a search for an RPB.

The FIND command searches for an RPB if you do not enter a qualifier.

3.6 HALT

Displays a halt message followed by the console prompt. The format of this command is as follows:

H[ALT]

3.7 HELP

Displays a list of the console commands that the system supports. The format of this command is as follows:

HE[LP] or **?**

Figure 3–1 shows the help display.

Figure 3–1 Help Display

```
BOOT [/[R5:]<bflg>] <ddau>[:]]
CONTINUE
DEPOSIT [{/B|/W|/L|/Q|/A}] [{/P|/V|/I}] [/G] [/U] [/N:<n>]
    [{<addr>|<sym>|+|-|*|@} [<datum>]]
EXAMINE [{/B|/W|/L|/Q|/A}] [{/P|/V|/I}] [/G] [/U] [/N:<n>]
    [{<addr>|<sym>|+|-|*|@}]
FIND [{/MEMORY|/RPB}]
HALT
HELP
INITIALIZE
LOGIN
REPEAT <cmd>
SET BOOT <ddau>
SET BFLG <bflg>
SET DIAGENV <1-3>
SET FBOOT <0-1>
SET HALT <1-3>
SET KBD <0-15>
SET MOP <0-1>
SET PSE <0-1>
SET PSWD
SET SCSI <0-7>
SET TRIG <0-1>
SHOW { BOOT|BFLG|CONFIG|DEV|DIAGENV|FBOOT|ETHER|ERROR|
       ESTAT|HALT|KBD|MEM|MOP|PSE|SCSI|TRIG}
START <addr>
TEST [/UTIL] <devnam|devnbr>
UNJAM
X <addr> <cnt> ...
?
```

3.8 INITIALIZE

Performs a processor initialization sequence. The format of this command is as follows:

I[NITIALIZE]

Table 3–5 gives the values of the registers that the processor initialization sequence sets.

Table 3–5 Initial Values of Processor Registers

Register	Value
PSL	041F.0000
ASTLVL	4
SISR	0
ICCS	0
MAPEN	0

The processor initialization sequence also sets registers R0 to R13 to 0, the interrupt stack pointer (ISP) to 200, and the program counter (PC) to 200.

3.9 LOGIN

Allows you to put the system in privileged console mode. When the console security feature is enabled (see Section 3.11.8) and when you put the system in console mode, the system operates in unprivileged console mode. You can access only a subset of the console commands. To access the full range of console commands, you must use this command. The format of this command is as follows:

LO[gin]

When you enter the command, the system prompts you for a password as follows:

```
PSWD0 >>
```

You must enter the current console security password. If you do not enter the correct password, the system displays the error message, ILL PSWD. When you enter the console security password, the system operates in privileged console mode. In this mode, you can use all the console commands. The system exits from privileged console mode when you enter one of the following console commands:

- BOOT
- CONTINUE
- HALT
- START

3.10 REPEAT

Allows you to specify a command that you want to repeat continuously. The format of this command is as follows:

R[EPEAT] <cmd>

where:

- *<cmd>* is the command that you want to repeat. You can repeat only the following commands:
  - DEPOSIT
  - EXAMINE
  - TEST

To stop a REPEAT command, press Ctrl/C.

3.11 SET

Sets the console NVR parameter to the specified value. The format of this command is as follows:

SE[T]<parameter-name><value>[<value>]

The following subsections describe the SET commands.

3.11.1 SET BFLG

Sets the default boot flags. The format of this command is as follows:

SE[T] BF[LG] <bflg>

where:

- *<bflg>* is a hexadecimal number up to eight characters long. The boot flag is placed in register R5. The console program does not check the validity of the hexadecimal number you enter. Table 3–6 shows the valid boot flags for VMS systems.

Table 3–6 Boot Flags Used by VMS

Flag	Definition
00000001	RPB$V_CONV—Conversational boot. At various points in the system boot procedure, the bootstrap code requests parameters and other input from the console terminal. If the DIAG is also on, the diagnostic supervisor then goes into MENU mode and prompts the user for devices to test.
00000002	RPB$V_DEBUG—Debug. If this flag is set, VMS maps the code for the XDELTA debugger into the system page tables of the operating system.
00000004	RPB$V_INIBPT—Initial breakpoint. If RPB$V_DEBUG is set, VMS executes a BPT instruction immediately after enabling mapping.
00000008	RPB$V_BBLOCK—This skips the files-11 boot and performs only the boot block type boot.
00000010	RPB$V_DIAG—Diagnostic boot. The secondary bootstrap is an image called [SYSMAINT]DIAGBOOT.EXE.
00000020	RPB$V_BOOBPT—Bootstrap breakpoint. Stops the primary and secondary bootstraps with a breakpoint instruction before testing the memory.
00000040	RPB$V_HEADER—Image header. Takes the transfer address of the secondary bootstrap image from that file's image header. If RPB$V_HEADER is not set, transfers control to the first byte of the secondary boot file.
00000080	RPB$V_NOTEST—Memory test inhibit. Sets a bit in the PFN bit map for each page of memory present. Does not test the memory.
00000100	RPB$V_SOLICT—File name. Prompts for the name of a secondary bootstrap file.
00000200	RPB$V_HALT—Halt before transfer. Executes a halt instruction before transferring control to the secondary bootstrap.
00000400	RPB$V_NOPFND—No PFN deletion (not implemented); intended to inform the VMB not to read a file from the boot device that identifies bad or reserved memory pages, so that the VMB does not mark these pages as valid in the PFN bitmap.
00000800	RPB$V_MPM—Specifies that multiport memory is to be used for the total executive memory requirement. No local memory is to be used. This is for tightly-coupled multiprocessing. If the DIAG is also on, then the diagnostic supervisor goes into AUTOTEST mode.

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Table 3–6 (Cont.) Boot Flags Used by VMS

Flag	Definition
00001000	RPB$V_PFILE (overlays RPB$V_USEMPM)—File name. Prompts for the name of the parameters file on a network bootstrap operation.
00002000	RPB$V_MEMTEST—Specifies that a more extensive algorithm must be used when testing main memory for hardware nonrecoverable (RDS) errors.
00004000	RPB$V_FINDTEST—Requests use of MA780 memory if the MS780 is insufficient for booting. Used for 11/782 installations.
00008000	RPB$V_AUTOTEST—Used by diagnostic supervisor.
00010000	RPB$V_CRDTEST—Requests pages with CRD errors to be removed from the bitmap.
X0000000	RPB$V_TOPSYS—The X position specifies the top-level directory number for system disks with multiple systems.

3.11.2 SET BOOT

Sets the default boot device. The format of this command is as follows:

SE[T] BO[OT] <ddau>

- *<ddau>* is the boot device name. This parameter must be a valid boot device name that the BOOT command accepts (see Section 3.1).

When you enter a period (.) as a value, the console program resets the boot device. If you enter the SHOW BOOT command, the system responds with the following display:

```
BOOT = {NULL}
```

If you enter a BOOT command when the default boot device is reset, the system attempts to boot from the network (boot device ESA0).

3.11.3 SET DIAGENV

Sets the diagnostic environment. The format of this command is as follows:

SE[T] DI[AGENV] <1-3>

where:

- *<1-3>* represents a number in the range 1 to 3 that you enter to set the diagnostic environment (see Table 3–7).

Table 3–7 Diagnostic Environment Values

<1-3>	Description
1	Customer environment. This is the default test environment.
2 and 3	Reserved for Digital use only.

3.11.4 SET FBOOT

Sets the diagnostic startup mode. The format of this command is as follows:

SE[T] F[BOOT] <0-1>

The parameter <0-1> is a number in the range 0 to 1 that determines the type of diagnostic startup (see Table 3–8).

Table 3–8 FBOOT Values

<0-1>	Description
0	Normal diagnostic startup tests
1	Fast diagnostic startup tests

Note

Minimal diagnostic testing is performed during a fast diagnostic startup operation.

3.11.5 SET HALT

Sets the default recovery action, that is, the action that the console program takes when you turn on the system or following an error. The format of this command is as follows:

SE[T] H[ALT] <1-3>

where:

- *<1-3>* represents a number in the range 1 to 3 that you enter to set the default halt action (see Table 3–9).

Table 3–9 Halt Action Values

Value	Halt Action	Description
1	Restart	The system tries to restart the operating system. If it fails to restart the operating system, it tries to boot. If the system fails to boot, it halts.
2	Boot	The system tries to boot. If it fails to boot, it halts.
3	Halt	The system halts and displays the console prompt. This is the default value.

3.11.6 SET KBD

This command is not applicable to MicroVAX 3100 systems.

3.11.7 SET MOP

Enables or disables the network listener. The format of this command is as follows:

SE[T] MO[P] <0-1>

where:

- *<0-1>* represents a number in the range 0 to 1 that you enter to set the network listener condition (see Table 3–10).

Table 3–10 Network Listener Values

Value	Description
0	Disabled
1	Enabled (default)

Note

For remote triggering and remote console connection, you must set the MOP and TRIG values to 1, console security must be enabled (PSE = 1), and you must have a valid password set up.

3.11.8 SET PSE

Allows you to enable or disable the console security feature of the system. The format of this command is as follows:

SE[T] PSE <0-1>

where:

- *<0-1>* represents a number in the range 0 to 1 that you enter to enable or disable the console security feature (see Table 3–11).

Table 3–11 Console Security Feature Values

Value	Description
0	Disabled
1	Enabled

Note

For remote triggering and remote console connection, you must set the MOP and TRIG values to 1, console security must be enabled (PSE = 1), and you must have a valid password set up.

When the console security feature is enabled, only a subset of the console commands are available to the user. These commands are listed in Section 2.3. To enable the complete set of console commands once the console security feature is enabled, you must use the LOGIN command (see Section 3.9).

3.11.9 SET PSWD

Allows you to set or change the console security password. The console security password is used for:

- Remote trigger verification—When the password is set, the network listener must verify the password before processing a remote trigger request to boot the system.
- Putting the system in privileged console mode—When the password is set, you must use the LOGIN command and enter the correct password to access the full range of console commands.

Note

For remote triggering and remote console connection, you must set the MOP and TRIG values to 1, console security must be enabled (PSE = 1), and you must have a valid password set up.

The format of this command is as follows:

SE[T] PSW[D]

When you are entering the console security password for the first time, the system prompts you for the password, then asks you for confirmation of the password as follows:

```
PSWD1 >>>
PSWD2 >>>
```

The password you enter must be exactly sixteen hexadecimal characters.

Note

The password is not displayed on the screen.

When you want to change the console security password, you must put the system in privileged console mode, using the LOGIN command (see Section 3.9).

When the system is in privileged console mode, you can use the SET PSWD command to change the password. The system prompts you for the current password, a new password, and confirmation of the new password as follows:

```
PSWD0 >>>
PSWD1 >>>
PSWD2 >>>
```

Note

If you forget the password, you must contact your Digital Services representative.

3.11.10 SET RADIX

Sets the default input radix. The format of this command is as follows:

SE[T] R[ADIX] <value>

The parameter <value> determines the radix type (see Table 3–12).

Table 3–12 Radix Values

Value	Description
0	Default RADIX for the associated command
10	Decimal
16	Hexadecimal

Note

You can use the introducers %X and %D on the command line at any time to change the default radix. These introducers inform the console program that the next value is of the radix that the introducer specifies. %X specifies hexadecimal; %D specifies decimal.

3.11.11 SET SCSI

Sets the SCSI ID of the SCSI controller. The format of this command is as follows:

SE[T] S[CSI] <0-7>

where:

- *<0-7>* is a number in the range 0 to 7, that is, the ID you want to assign to the SCSI controller. The SCSI ID of the SCSI controller is set to 6 before the system is shipped.

3.11.12 SET TRIG

Enables or disables the remote trigger utility. When the remote trigger utility is enabled, a remote system can force the local system to boot from the local system's default boot device. The format of this command is as follows:

SE[T] T[RIG] <0-1>

where:

- *<0-1>* is a number in the range 0 to 1 that determines the remote trigger condition (see Table 3–13).

Table 3–13 Remote Trigger Values

Value	Description
0	Disabled
1	Enabled

Note

For remote triggering and remote console connection, you must set the MOP and TRIG values to 1, console security must be enabled (PSE = 1), and you must have a valid password set up.

3.12 SHOW

Displays the value of the console NVR parameter you specify. The format of this command is as follows:

SH[OW]<parameter-name>

where:

- *<parameter-name>* is the NVR parameter that you want to view. See the following subsections for more information.

3.12.1 SHOW BFLG

Displays the default boot flags. The format of this command is as follows:

SH[OW] BF[LG]

The following is an example of the display that this command produces when no default boot flags are set:

```
BFLG = 00000000
```

3.12.2 SHOW BOOT

Displays the default boot device. The format of this command is as follows:

SH[OW] BO[OT]

The following is an example of the display that this command produces:

```
BOOT = DKA200
```

3.12.3 SHOW CONFIG

Displays the system configuration. The format of this command is as follows:

SH[OW] CONF[IG]

The command displays information about devices that the firmware has tested. It also displays the device errors that the most recent device test detected. Figure 3–2 is an example of the display that the SHOW CONFIG command produces.

Figure 3–2 SHOW CONFIG Display

```
KA45-A V1.0
08-00-2B-16-44-48
8MB
DEVNBR  DEVNAM    INFO
------  --------- ------------------------------------
1          NVR    OK
3           DZ    OK
4        CACHE    OK
5          MEM    OK      ❶       ❷       ❸       ❹
                  8MB = SY=8MB, S0/1=0MB, S2/3=0MB, S4/5=0MB
6          FPU    OK
7           IT    OK
8          SYS    OK
9           NI    OK
10        SCSI    OK
                  3-RZ23L  6-INITR
12        COMM    OK
                  DSW41/42 1 CHANNEL V3.11-47
14       ASYNC    DHW41/2          V1.5
```

❶ Basic CPU Module Memory

❷ Memory Expansion Increment 1 (Connectors 1H and 1L)

❸ Memory Expansion Increment 2 (Connectors 2H and 2L)

❹ Memory Expansion Increment 3 (Connectors 3H and 3L)

3.12.4 SHOW DEVICE

Displays the current status of the Ethernet and SCSI devices in the system. The format of this command is as follows:

SH[OW] DE[VICE]

The display includes the Ethernet address and information about the SCSI devices connected to the SCSI bus. Figure 3–3 is an example of the display that the SHOW DEVICE command produces.

Figure 3–3 SHOW DEVICE Display

```
  ❶        ❷        ❸        ❹        ❺      ❻      ❼      ❽
VMS/VMB   ADDR   DEVTYPE   NUMBYTES   RX/FX   WP   DEVNAM   REV
-------   ----   -------   --------   -----   --   ------   --
ESA0      08-00-2B-16-44-48
DKA300    A/3/0   DISK      ......    FX           RZ23L   1F25
..HostID.. A/6 INITR
```

❶ VMS/VMB Device Name

❷ Ethernet or SCSI Address of the Device

❸ Device Type— For example, disk drive (DISK) or tape drive (TAPE)

❹ Number of Megabytes

❺ Media Type—Removable (RX) or fixed (FX)

❻ Write Protected

❼ Option Name

❽ Revision Number

3.12.5 SHOW DIAGENV

Displays the current diagnostic environment. The format of this command is as follows:

SH[OW] DI[AGENV]

Table 3–7 gives the values and the meaning of each value. The following is an example of the display that this command produces:

```
DIAGENV = 1
```

3.12.6 SHOW ERROR

Displays the errors that the most recent self-test or system exerciser test detected. The format of this command is as follows:

SH[OW] ER[ROR]

Figure 3–4 is an example of the display that the SHOW ERROR command produces for a system exerciser test.

Figure 3–4 SHOW ERROR Display

```
❶ ❷  ❸   ❹    ❺
?  000   1    NVR  0003
?? 130  10   SCSI  0018
130 000E 00000003 00120012 00180000 FFFF001B 00000000 00000000 FFFFFFFF❻
```

❶ A question mark (?) indicates a soft error, that is, an error that you do not have to correct before you boot the system. Two question marks (??) indicate a hard error, that is, an error that you must correct before you boot the system.

❷ The FRU number of the failing device.

❸ The Device Number.

❹ The Device Mnemonic.

❺ A Device Specific Error Code.

❻ Additional error information about the preceding error.

3.12.7 SHOW ESTAT

Displays a set of summary screens associated with the most recent system exerciser test. The format of this command is as follows:

SH[OW] ES[TAT]

If the system exerciser test hangs or halts, you can use this command to determine the status of the system before it hangs or halts.

3.12.8 SHOW ETHERNET

Displays the hardware Ethernet address. The format of this command is as follows:

SH[OW] ET[HERNET]

The following is an example of the display that this command produces:

```
ETHERNET = 08-00-2B-26-45-AD
```

When the Ethernet address is not valid, the console program displays the following:

```
ETHERNET = XX-XX-XX-XX-XX-XX
```

3.12.9 SHOW FBOOT

Displays the current diagnostic startup type. The format of this command is as follows:

SH[OW] F[BOOT]

Table 3–8 gives the values and the description of each value.

3.12.10 SHOW HALT

Displays the current status of the halt action flag. The format of this command is as follows:

SH[OW] H[ALT]

Table 3–9 gives the values and the corresponding halt action. The following is an example of the display that this command produces:

```
HALT = 00000002
```

3.12.11 SHOW KBD

This command is not applicable to MicroVAX 3100 systems.

3.12.12 SHOW MEM

Displays information about the memory in the system. The format of this command is as follows:

SH[OW] ME[M]

Figure 3–5 is an example of the display that the SHOW MEM command produces.

Figure 3–5 SHOW MEM Display

```
MEM_TOP = 00800000 ❶
MEM_BOT = 00000000 ❷

    MEM_NOT_AVAIL
-----------------
007C3600:007fffff ❸
```

❶ The total amount of memory in the system, including the console data structures.

❷ The first address of a 256K-byte block of contiguous memory, generally used by the VMB.

❸ This line and subsequent lines show the address ranges of the memory areas that are not available to the operating system. These memory areas include the memory area that is reserved for the console program.

3.12.13 SHOW MOP

Displays the status of the network listener flag. The format of this command is as follows:

SH[OW] MO[P]

Table 3–10 gives the values and the meaning of each MOP value. The following is an example of the display that this command produces:

```
UTC       = 00000000E0D8BAE0
AccurTDF  = 10000000000186A0
BytesRx   = 0000000000000000
BytesTx   = 0000000000000078
FramesRx  = 0000000000000000
FramesTx  = 0000000000000002
McBytsRx  = 0000000000000000
McFrmsRx  = 0000000000000000
FrmDefer  = 0000000000000000
Frm1Coll  = 0000000000000000
FrmMColl  = 0000000000000000
TerXsCol  = 0000000000000000
TerCarCk  = 0000000000000000
TerShCkt  = 0000000000000000
TerOpCkt  = 0000000000000000
TerFrLng  = 0000000000000000
TerNoDef  = 0000000000000000
RerFCSEr  = 0000000000000000
RerFrmEr  = 0000000000000000
RerFrLng  = 0000000000000000
UnknDest  = 0000000000000000
DataOvrn  = 0000000000000000
SyBuffUn  = 0000000000000000
UsBuffUn  = 0000000000000000
HrtBtErr  = 0000000000000001

MOP = 00000001
```

3.12.14 SHOW PSE

Displays the condition of the console security feature of the system. The format of the command is as follows:

SH[OW] PSE

Table 3–11 gives the values and a description of each value.

3.12.15 SHOW RADIX

Displays the current default radix value. The format of this command is as follows:

SH[OW] R[ADIX]

Table 3–12 shows the values and the meaning of each value.

3.12.16 SHOW SCSI

Displays the current SCSI ID that the firmware assigns to the system's SCSI controller. The format of this command is as follows:

SH[OW] S[CSI]

The normal SCSI ID of the system's SCSI controller is 6 when the system is shipped. The following is an example of the display that this command produces:

```
SCSI = 00000006
```

3.12.17 SHOW TRIG

Displays the status of the remote trigger flag. The format of this command is as follows:

SH[OW] TR[IG]

Table 3–13 gives the values and a description of each value. The following is an example of the display that this command produces:

```
TRIGGER = 00000000
```

3.13 START

Allows you to specify the address from which program execution starts. The format of this command is as follows:

S[TART] <addr>

where:

- *<addr>* is the address from which program execution starts.

You must specify the <addr> parameter.

3.14 TEST

Allows you to invoke the diagnostic tests, extended tests, and utilities. The format of this command is as follows:

T[EST] [/UTIL] <devnam \| devnbr>

where:

- */UT[IL]* is a qualifier that invokes a utility
- *<devnam>* is the device name
- *<devnbr>* is the device number

3.15 UNJAM

Provides a system reset. The format of this command is as follows:

U[NJAM]

The firmware returns all the devices to known, initial states. All registers and logic states are set to 0.

3.16 X (transfer)

Note

This command is intended for use by host software that communicates with the system through a console device connected to MMJ port 0 or MMJ port 3. Do not enter this command at the console prompt.

Transfers binary data to and from physical memory. The format of this command is as follows:

X<address><count><CR><checksum><data_stream><checksum>

where:

- *<address>* is the physical address (in hexadecimal format), to which or from which the data is transferred.
- *<count>* is the number of bytes to transfer. It is an 8-bit hexadecimal number. When the high order bit of this parameter is 1, the data is transferred from physical memory to the console device. When the high order bit of this parameter is 0, the data is transferred from the console device to physical memory.
- *<CR>* is a carriage return.
- *<checksum>* is the two's complement of the command string.
- *<data_stream>* is the returned data.
- *<checksum>* is the two's complement of the data stream.

3.17 ! (comment)

Note

You use this command when writing host software that communicates with the system through a console device connected to MMJ port 0 or MMJ port 3.

Prefixes a comment. The format of this command is as follows:

! <comment>

where:

- *<comment>* is the comment text.

You can place the exclamation point (!) anywhere on a command line. The console program ignores all text after an exclamation point (!).

4

Hardware Specifications

This chapter lists the hardware specifications of the following:

- System unit
- Internal SCSI device

4.1 System Unit Specifications

The following tables list the specifications for the Model 30 system.

Table 4–1 System Specifications: Model 30

Subject	Description
Processor	KA45.
Boot and diagnostic firmware ROM	256K bytes.
Options ROM	32K bytes.
DRAM memory	8M bytes, expandable to 32M bytes. The first 8M bytes are on the system module.
Hard disk	RZ23L, RZ24, or RZ25 (the system supports a maximum of three devices).
Tape drive	TZ30, TZK10.
Diskette drive	RX26.
Terminals	Supports the VT™ series.
Interfaces	One SCSI port, one ThinWire Ethernet port[1], one standard Ethernet port[1], three DEC423 MMJ ports, one modem port. Optional: eight additional asynchronous DEC423 MMJ ports or four additional asynchronous modem ports, one additional synchronous port.
Input voltage	Automatically adjusting ac input. Range: 100 volts (V) ac to 120 V ac or 220 V ac to 240 V ac.
Maximum inrush current	32 Amperes (A).
Maximum running current	1.0 A at 110 V ac, 0.5 A at 220 V ac.
Steady state current	0.8 A at 110 V ac, 0.4 A at 220 V ac.
Maximum power consumption	100 Watts (W).
Frequency	49 hertz (Hz) to 61 Hz.

[1]Both Ethernet types cannot be used simultaneously.

Table 4–2 System Unit Metrics

System Unit	Weight[1] kg (lb)	Height cm (in)	Width cm (in)	Depth cm (in)
Model 30	11.5 (25.22)	10.03 (4.07)	46.38 (18.26)	40.00 (15.75)

[1]Depends on configuration

Table 4–3 System Storage Conditions

Storage Condition	Range or Value
Temperature range	5°C to 50°C (41°F to 122°F)
Relative humidity	10% to 95% at 66°C (noncondensing)
Altitude	0 m to 2400 m (0 ft to 8000 ft)
Maximum wet bulb temperature	32°C (90°F)
Minimum dew point	2°C (36°F)

Table 4–4 System Operating Conditions and Nonoperating Conditions

Operating Conditions	Range or Value
Temperature range	10°C (50°F) to 32°C (90°F) with TZ30 tape drive; otherwise 10°C (50°F) to 40°C (104°F)
Temperature change rate	11°C (20°F) per hour maximum
Relative humidity	10% to 90% noncondensing
Maximum wet bulb temperature	28°C (82°F)
Minimum dew point	2°C (36°F)
Altitude	2400 m (8000 ft) at 36°C (96°F)

(continued on next page)

Table 4–4 (Cont.) System Operating Conditions and Nonoperating Conditions

Nonoperating Conditions	
Temperature range	–40°C (–40°F) to 66°C (151°F)
Relative humidity	10% to 95% at 66°C (151°F)
Altitude	4900 m (16 000 ft)
Maximum wet bulb temperature	28°C (82°F)
Minimum dew point	2°C (36°F)

4.2 Internal SCSI Device Specifications

Digital's hardware and software are fully compatible with the SCSI-1 specifications and adhere to all the mandatory features of revision 10d of the ANSI SCSI-2 specification draft.

The following tables list the specifications for the internal SCSI devices.

Table 4–5 RZ23L, RZ24, and RZ25 Hard Disk Drive Specifications

Formatted Storage Capacity	RZ23L	RZ24	RZ25
Per drive (M bytes)	121	209	426
Blocks per track	39	38	48 to 74
Blocks per drive	237 588	409 792	832 031
Buffer size (K bytes)	64	64	60

Performance	RZ23L	RZ24	RZ25
Transfer rate to or from media (M bytes/second)	1.5	1.5	2.1 to 3.2
Data transfer rate (M bytes/second)	1.13	1.13	2.33
Transfer rate to or from buffer, asynchronous (M bytes/second)	3	3	3
Transfer rate to or from buffer, synchronous (M bytes/second)	4	4	4
Average seek time (milliseconds)	$\leq$ 19	16	14
Maximum seek time, full stroke (milliseconds)	$\leq$ 35	$\leq$ 35	28
Average latency (milliseconds)	8.8	8.6	6.8
Average access (milliseconds)	26.8	24.6	20.8

(continued on next page)

Table 4–5 (Cont.) RZ23L, RZ24, and RZ25 Hard Disk Drive Specifications

Functional Specifications	RZ23L	RZ24	RZ25
Recording density (bits/inch)	36 250	31 800	38 834
Track density (tracks per inch)	1850	1700	1760
Area density (M bytes per square inch)	67.06	54.06	68.28
Read/write heads	4	8	9
Disks	2	4	5
Recording mode	CF[1]	CF	ZBR[2]

Power	RZ23L	RZ24	RZ25
Maximum seeking (W)	3.8	6.6	14
Typical seeking (W)	3.6	6.6	10
Maximum starting (W)	14.5	27.5	34.5

[1]Continuous frequency

[2]Zone bit recording

Table 4–6 TZ30 Tape Drive Specifications

Subject	Description
Mode of operation	Streaming
Media	12.77 mm (0.5 in) unformatted magnetic tape
Bit density	2624 bits/cm (6667 bits/in)
Number of tracks	22
Transfer rate (at host)	62.5K bits/s
Tape speed	190 cm/s (75 in/s)
Track format	Multiple track serpentine recording
Cartridge capacity	95M bytes, formatted (approx)

Table 4–7 TZK10 QIC Tape Drive Specifications

Subject	Description
Mode of operation	Streaming.
Media	DC6320, DC6525, or Digital approved equivalent. See the *MicroVAX 3100 Model 30 Operator Information* manual.
Track width: write	0.1778 mm +0.0000, -0.0127 mm (0.0070 in +0.0000, -0.0005 in).
Track width: read	0.1270 mm +0.0127, -0.0000 mm (0.0050 in +0.0005, -0.0000 in).
Bit density	16K bits/in.
Number of tracks	26.
Transfer rate	200K bytes/s at average streaming mode, 1.5M bytes /s at SCSI maximum.
Tape speed	305 cm/s (120 in/s).
Track format	Multiple track serpentine recording.
Cartridge capacity	320M or 525M bytes, formatted (approx), depending on the QIC tape used.

Table 4–8 RX26 Diskette Drive Specifications

Subject	Description
Diskette size	9 cm (3.5 in)
Diskettes per diskette drive	1
Number of read/write heads	2
Data capacity (formatted)	1.44M bytes—high density (HD) diskettes
	2.88M bytes—extra density (ED) diskettes
Number of bytes per sector	512
Number of sectors per track	18 (HD diskettes)
	36 (ED diskettes)
Number of cylinders	80
Number of tracks per cylinder	2
Transfer rate	500K bits/s (HD diskettes)
	1M bits/s (ED diskettes)

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