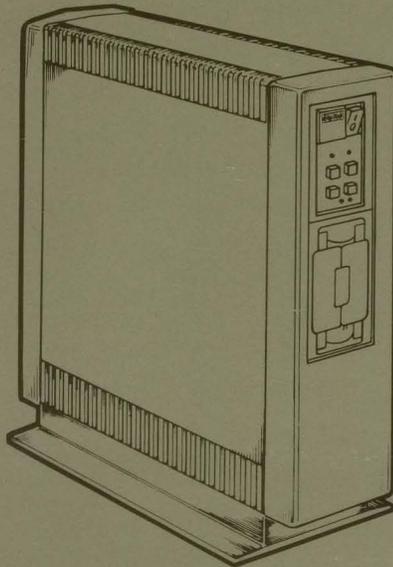


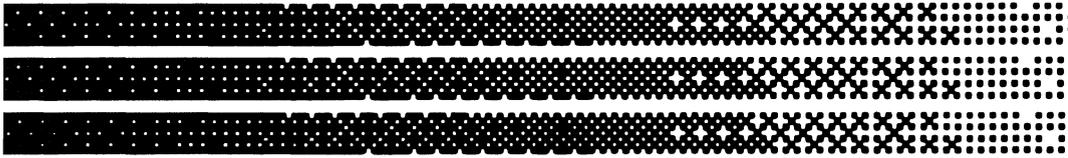
MicroPDP-11 Systems

Owner's Manual



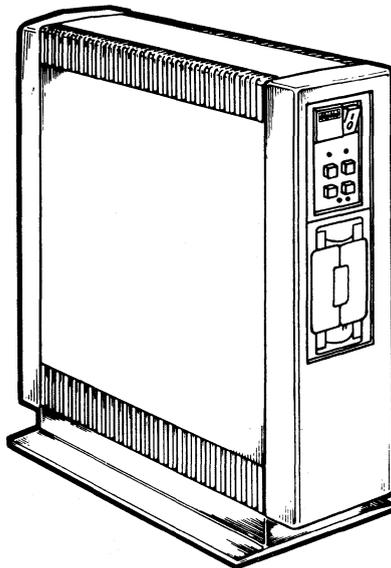
Owner's Manual

AZ-FI13A-MC
(Formerly EK-MIC11-OM-002)



MicroPDP-11 Systems

Owner's Manual



Prepared by Educational Services
of Digital Equipment Corporation

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Introduction

This book describes how to install and operate MicroPDP-11 systems and what to do if you should have a problem with your system.

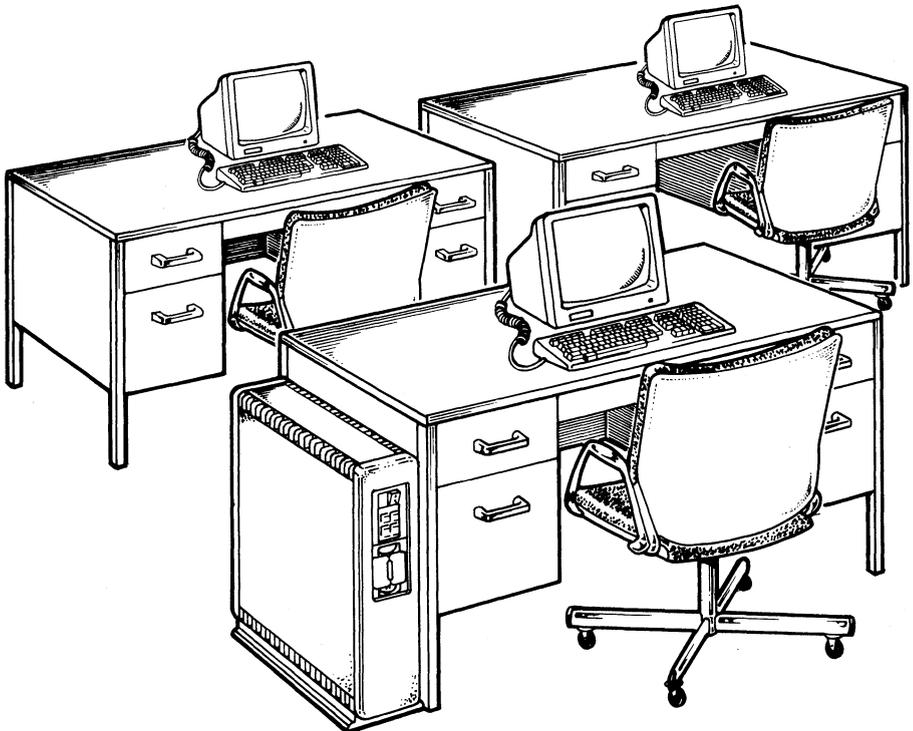
This manual assumes the user has little or no previous computer experience. To help new users, a glossary of common computing terms is included.

Detailed technical information is available in the *MicroPDP-11 Systems Technical Manual* and in other related documents. Appendix C provides ordering information.

User responses are in **color** when they appear in examples of dialogue between the user and the system.

INTRODUCTION

To install your system correctly, you should follow the steps in order. If you need help at any time, refer to Chapter 3, Troubleshooting, or call your service representative.



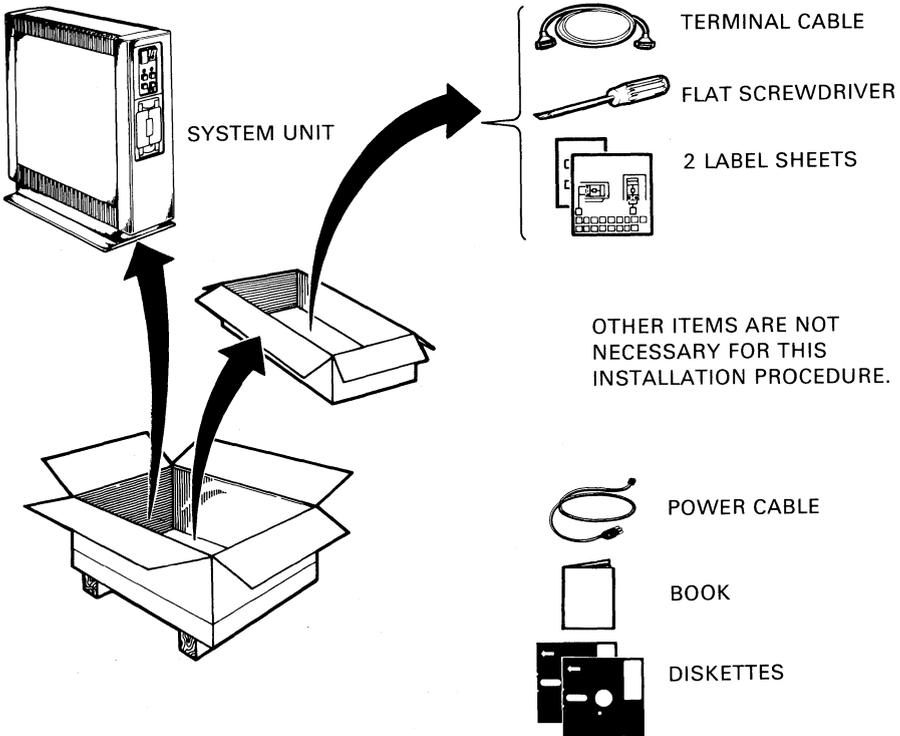
1 UNPACK THE SYSTEM UNIT

If any items are damaged or missing:

- Contact your sales representative or store.
- Contact your delivery agent.

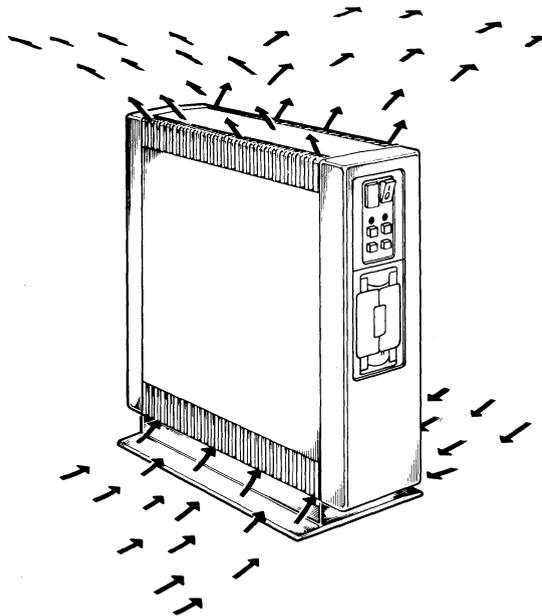
CAUTION

Do not pick up the system unit by its front and rear covers when moving it.



2 PUT THE SYSTEM UNIT WHERE IT WILL BE USED

- Allow space around the system for air circulation and servicing.
- Place the system away from heaters, photocopiers, and direct sunlight.
- Minimize static by placing the system away from busy office corridors.
- Keep the area free from dust and other abrasive materials.
- Keep food and liquid away from the system.
- Refer to Appendix B for more details.



NOTE

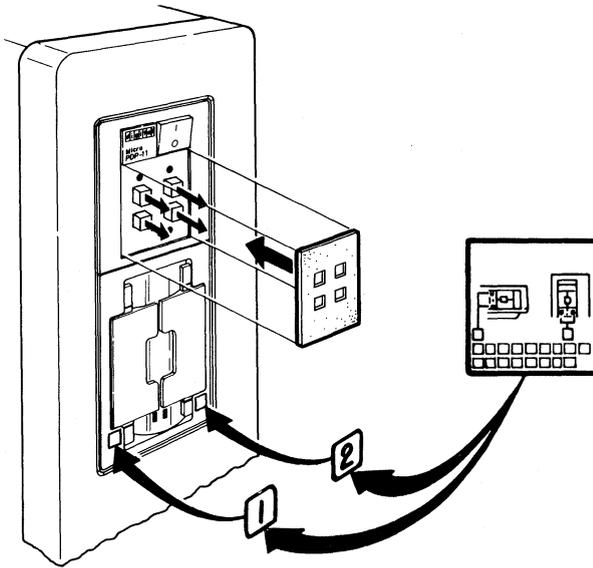
Prepare the optional desktop or rack mount systems. Follow the instructions in Appendix A and continue with Step 3.

3 LABEL THE PANEL AND DISKETTE DRIVE UNITS

- Label the diskette drives 1 and 2.
- Make sure that all buttons on the control panel are out.

NOTE

If your system does not have a fixed disk drive, label the diskette drives 0 and 1. Most systems have a fixed disk drive, so this book will refer to the diskette drives as drive 1 and drive 2.



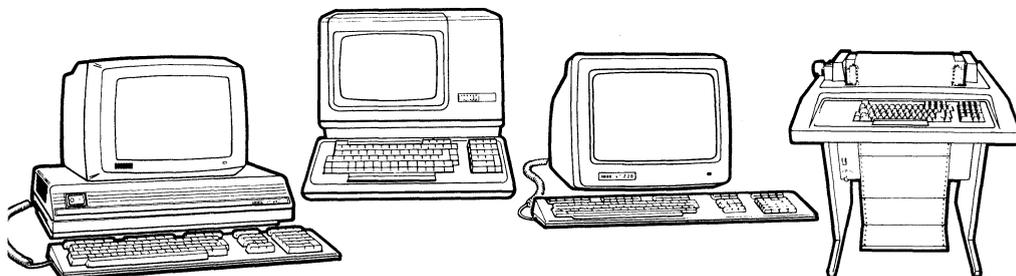
4 UNPACK THE INSTALLATION GUIDE FOR THE FIRST TERMINAL YOU WANT TO CONNECT TO THE SYSTEM UNIT

- The first terminal connected to your system unit is called the console terminal.



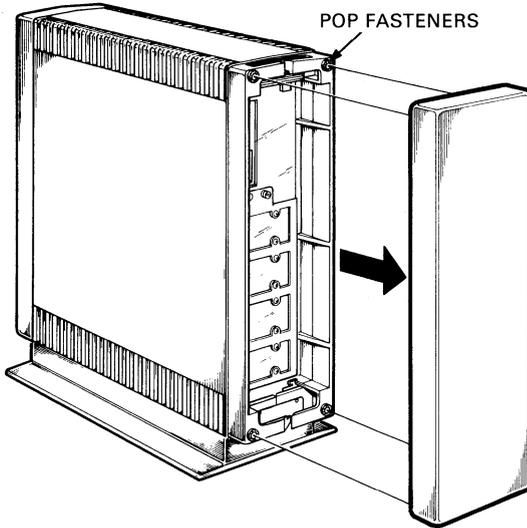
5 USE THE INSTALLATION GUIDE TO UNPACK AND INSTALL THE CONSOLE TERMINAL

- If you have a VT100-series terminal, refer to page A-7 in Appendix A for its installation instructions.



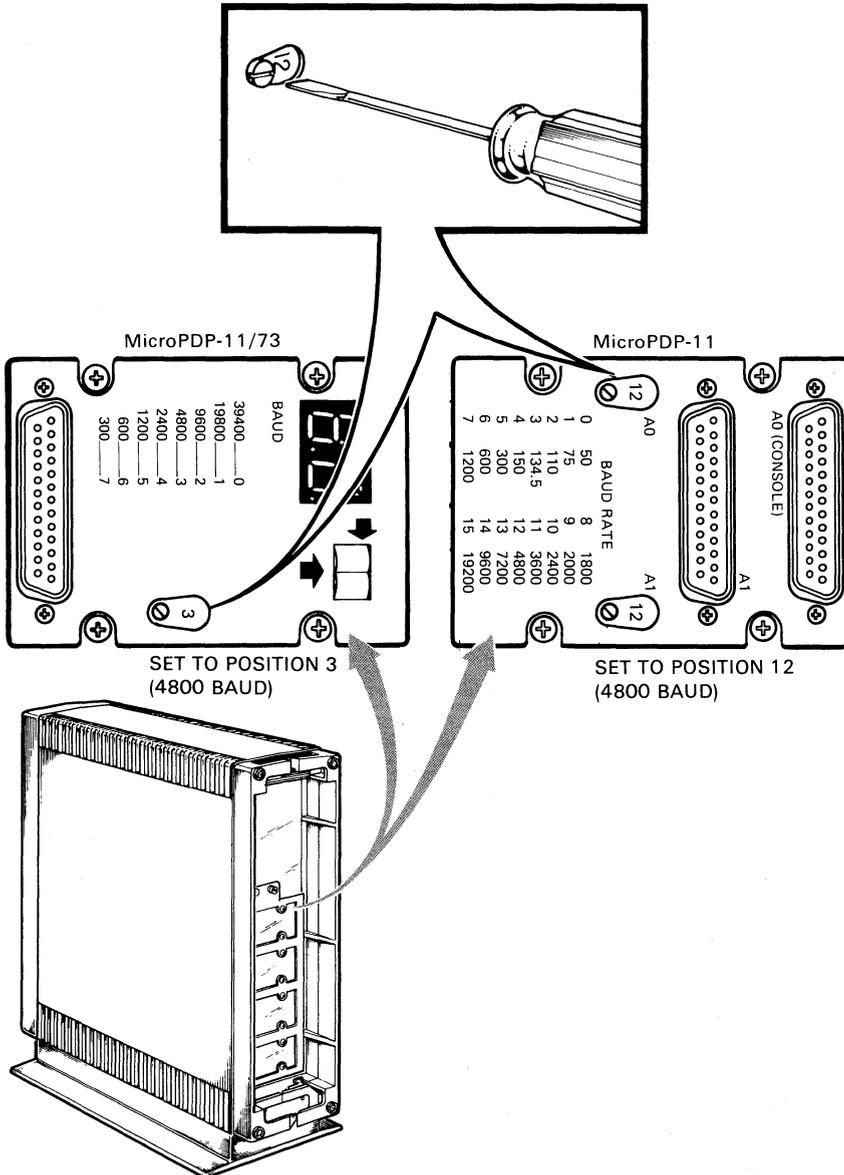
6 PULL THE REAR COVER OFF THE SYSTEM UNIT

- The cover is held in place with pop fasteners.

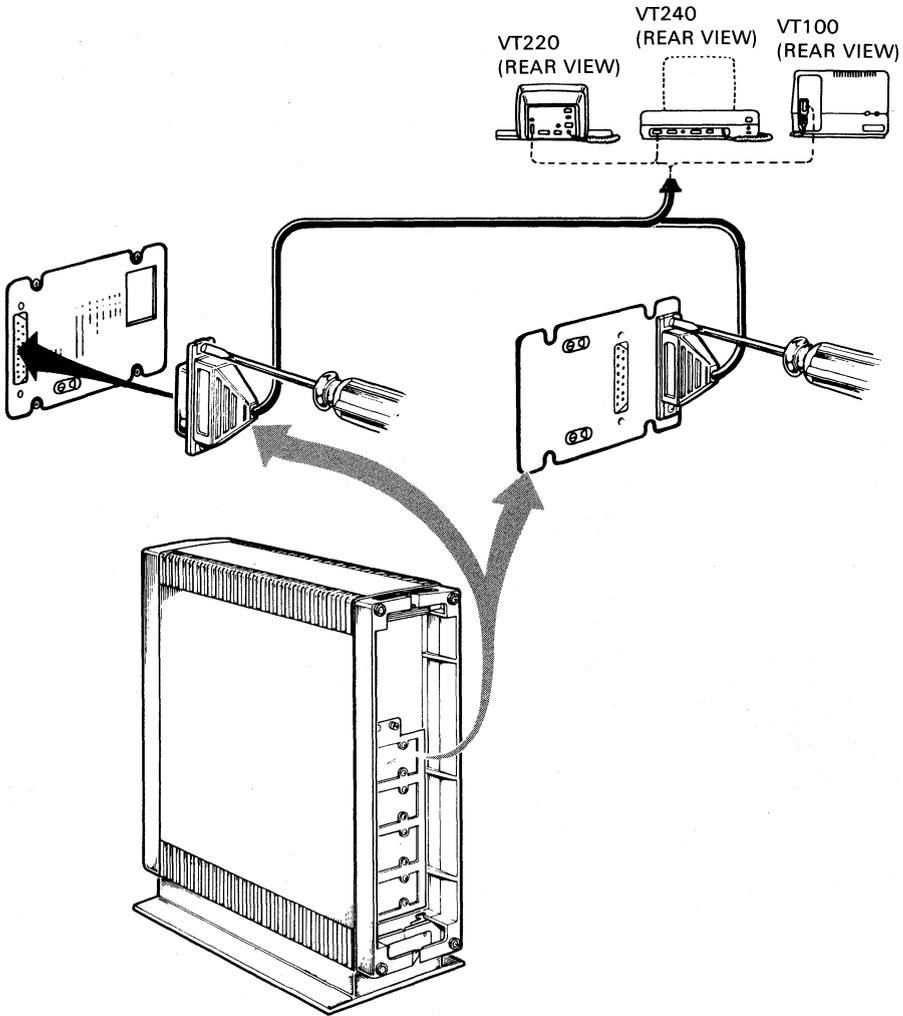


7 SET THE SPEED CONTROL KNOB FOR THE CONSOLE TERMINAL

- The speed of most of Digital's terminals is set to 4800 baud.

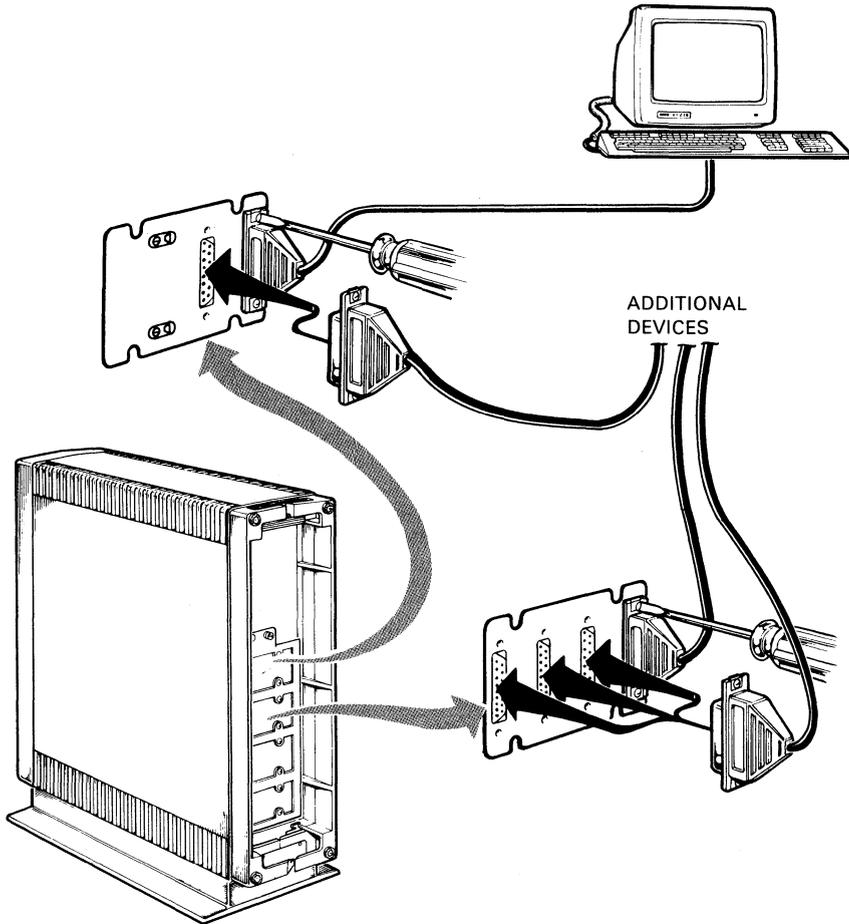


8 CONNECT THE CONSOLE TERMINAL CABLE TO THE CONSOLE TERMINAL AND THE SYSTEM UNIT



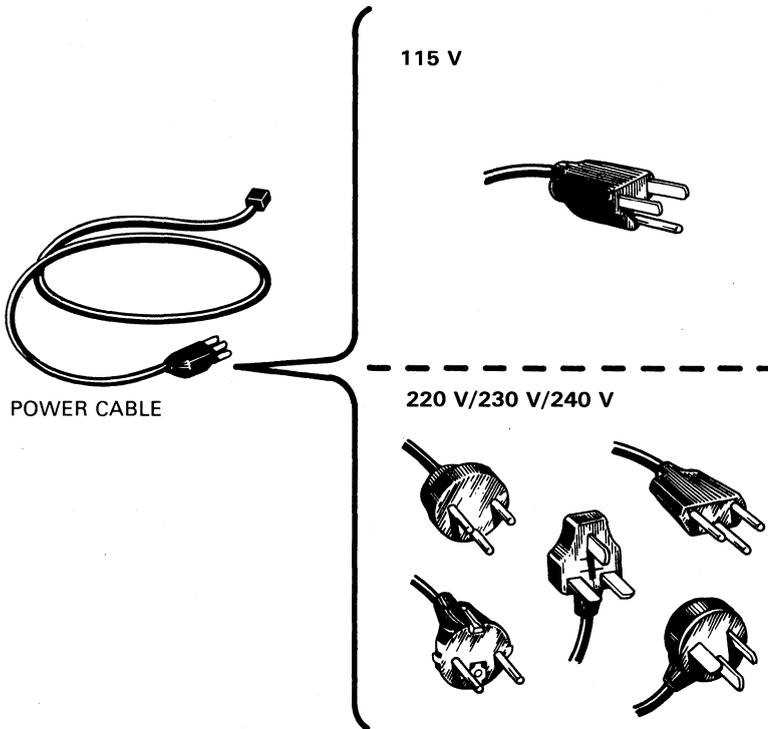
9 INSTALL AND CONNECT ANY ADDITIONAL DEVICES

- Additional devices may include terminals, printers, and modems. You may connect them in any order.
- Refer to each device's installation guide for instructions.



10 IDENTIFY THE POWER CABLE

- Make sure the power cable's plug matches the wall outlet.



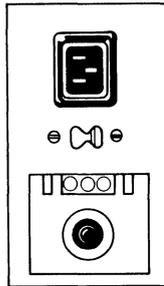
11 CHECK THE VOLTAGE SWITCH SETTING

CAUTION

An incorrect voltage setting can damage the system.

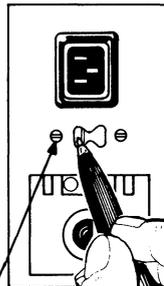
115 V

IN N. AMERICA THE SWITCH IS SET TO 115 V



220 V/230 V/240 V

IN OTHER COUNTRIES THE SWITCH IS SET TO 230 V. IF NOT, LOOSEN HOLD DOWN SCREWS AND SLIDE SWITCH TO 230 V.



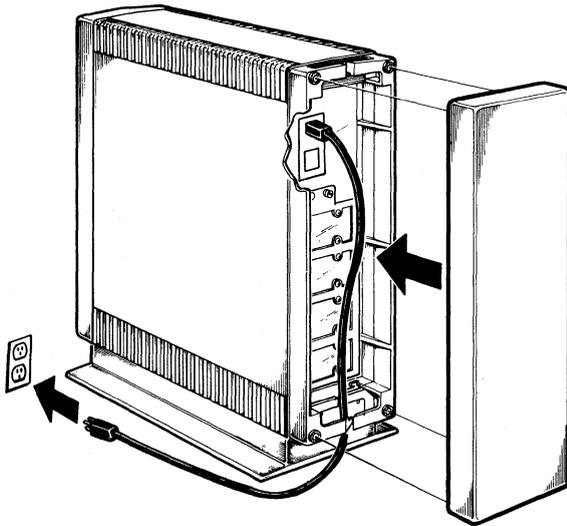
HOLD DOWN SCREWS



12 SET THE POWER SWITCH TO 0 (OFF)

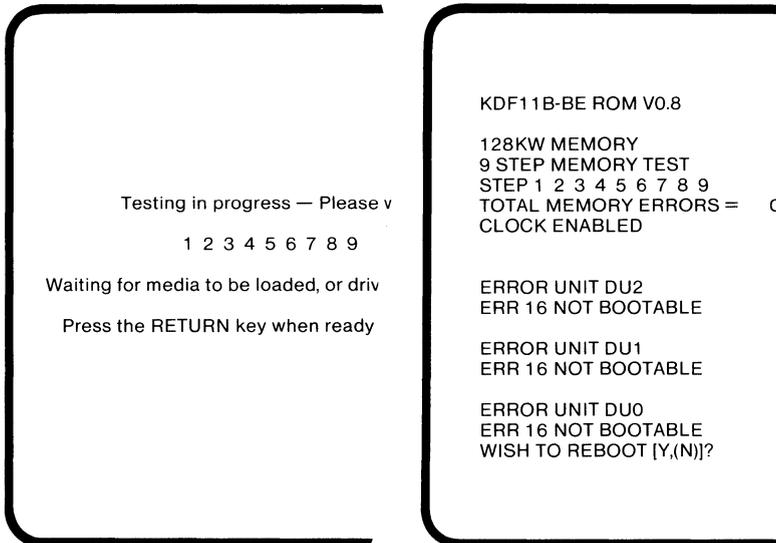
13 PLUG IN THE POWER CABLE

- Thread all the cables through the lower cable guide.
- Replace the cover.



14 SET THE POWER SWITCH TO 1 (ON)

After a few moments, the system displays a message similar to the following.



The system is now ready for testing.

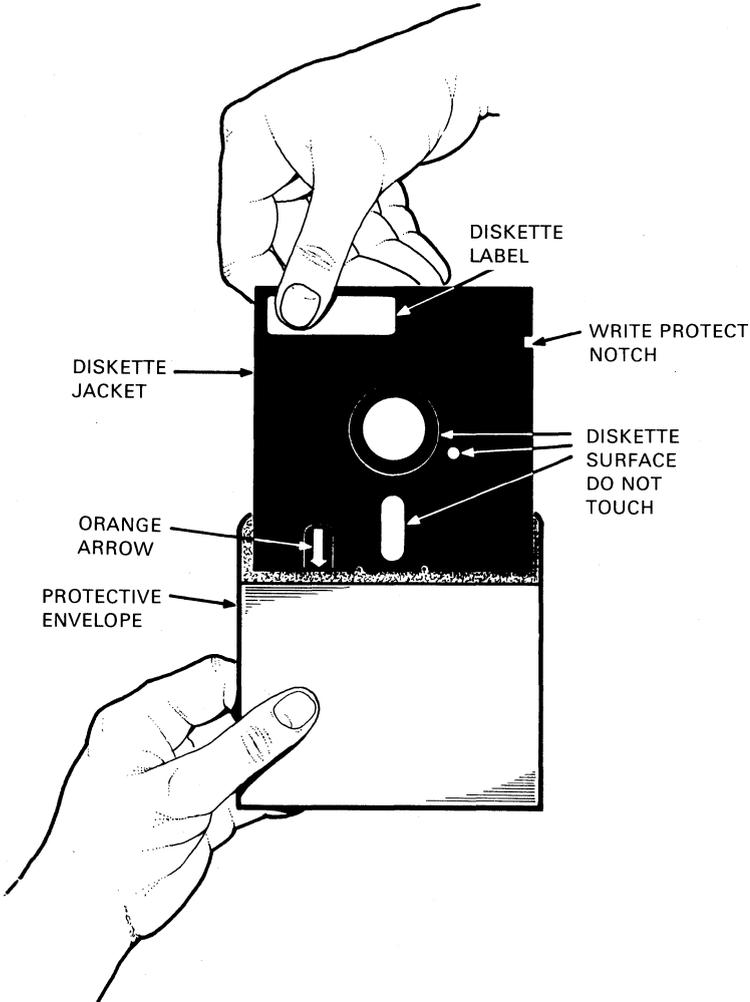
The system contains either an RX50 diskette drive or a TK50 tape drive.

If the system has an RX50 diskette drive, go to Step 15.

If the system has a TK50 tape drive, go to Step 17.

15 FIND THE USER TEST DISKETTE AND THE BLANK DISKETTE IN THE LAST DISKETTE HOLDER IN THIS BOOK

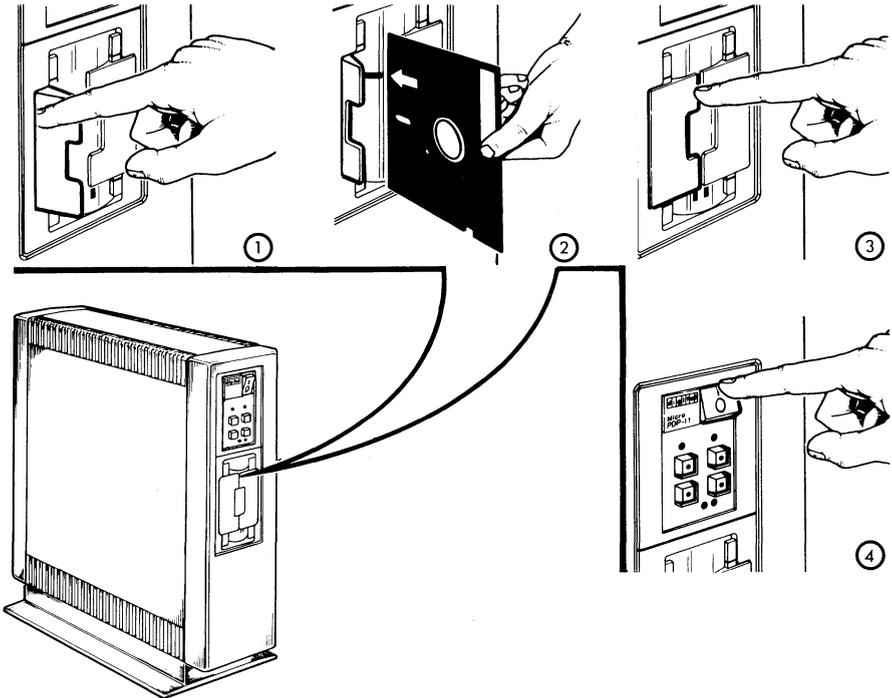
- Use the diskette labeled "Micro-11 User TSTS #1".



16 OPEN DRIVE 1 AND INSERT THE DISKETTE

- Close the diskette drive door.

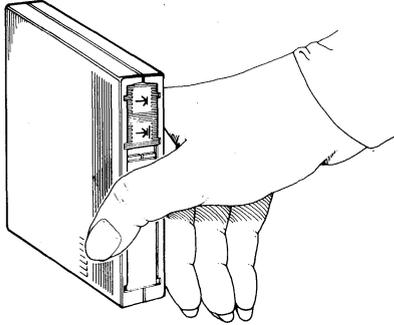
ALIGN THE ORANGE ARROW ON THE DISKETTE WITH THE ORANGE STRIPE.



Go to Step 20.

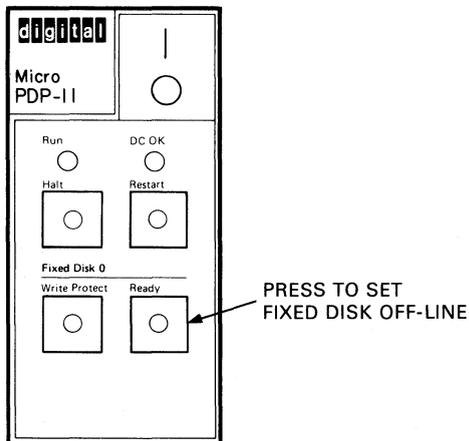
17 FIND THE USER TEST TAPE CARTRIDGE IN THE CARTRIDGE HOLDER IN THIS BOOK

- Use the tape labeled "Micro-11 User TSTS".



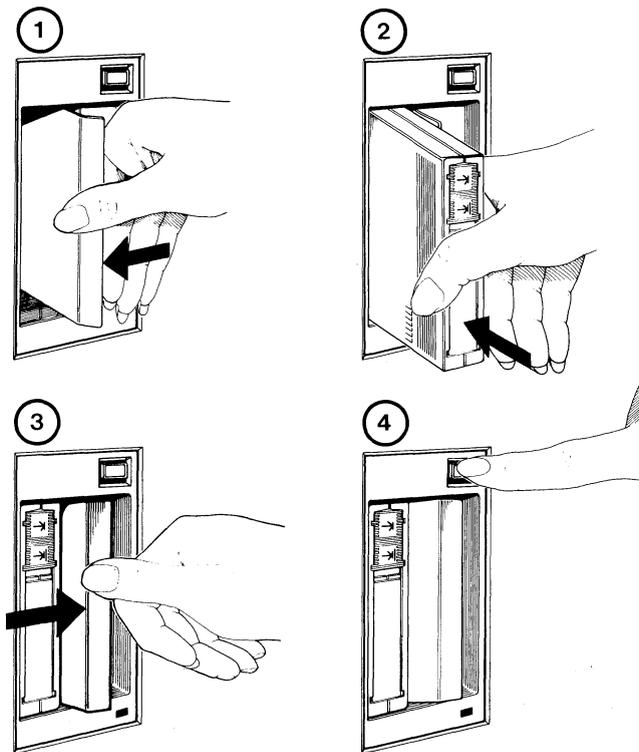
18 PRESS THE READY BUTTON ON THE CONTROL PANEL

- Pressing the **Ready** button places the fixed disk off-line and the green indicator goes out.



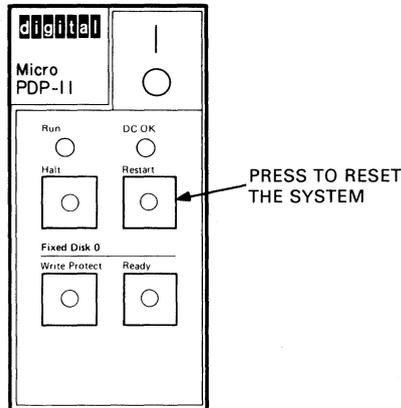
19 UNLOCK THE TK50 TAPE DRIVE AND INSERT THE TAPE CARTRIDGE*

- Unlock the tape drive by pushing the cartridge release handle to the left.
- Insert the tape cartridge completely into the tape drive. Make sure the arrow on the tape cartridge faces left.
- Push the cartridge release handle to the right to lock the tape cartridge in place.
- Press the **Load/Unload** button on the tape drive.

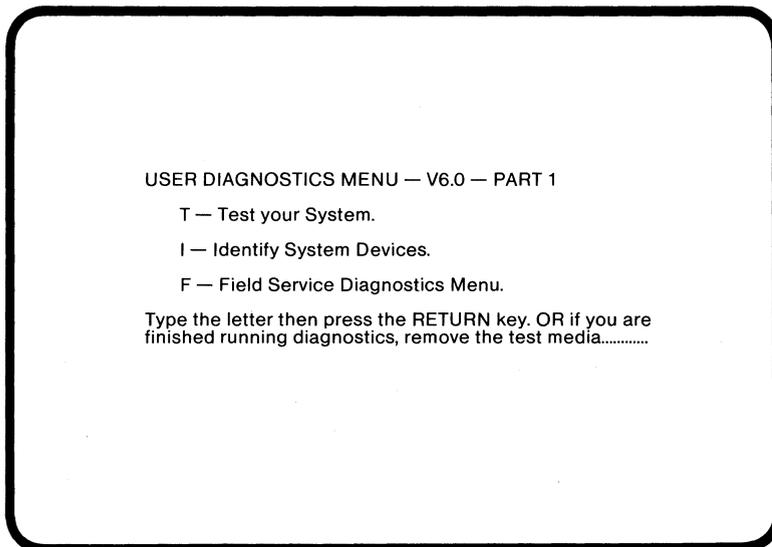


* Refer to Chapter 2, Operation, Tables 2-2 and 2-3 and pages 2-18 through 2-20 for a more detailed discussion of the TK50 tape drive's controls and procedures.

20 PRESS THE RESTART BUTTON ON THE SYSTEM CONTROL PANEL



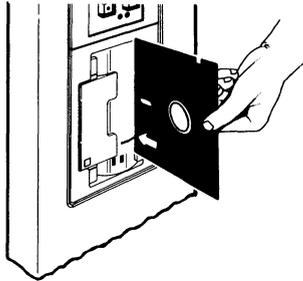
In a few moments, the system displays the User Diagnostics Menu.



If you see any other message, go to Chapter 3, Troubleshooting, for help.

21 TYPE T AND PRESS THE RETURN KEY

Follow the directions displayed on the screen. If you are testing with a diskette, these include inserting a blank diskette into drive 2.



In about 10 minutes, the system displays the following message.

YOUR SYSTEM HAS PASSED THE SYSTEM TEST.

To return to the User Diagnostics Menu, type U then press the RETURN key, or if you are finished running diagnostics, remove the test media. You may then turn your system off or start the system software

If you see any other messages, go to Chapter 3, Troubleshooting, for help.

You have successfully installed and tested your system.

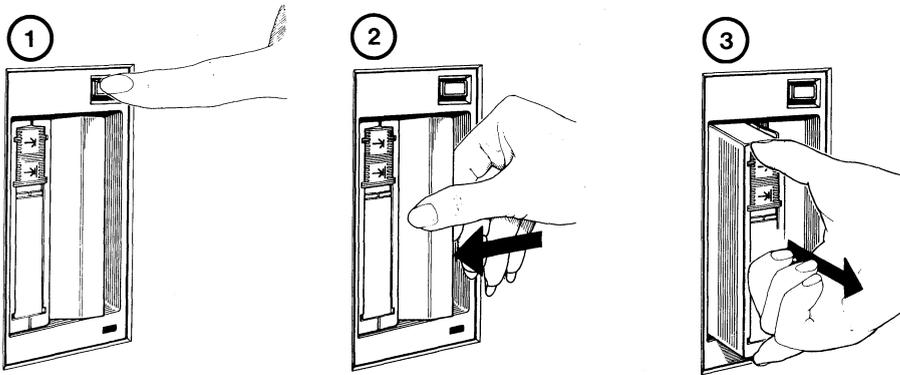
Return to the User Diagnostics Menu as shown on the screen.

22 REMOVE THE TAPE CARTRIDGE OR DISKETTE*

If you tested with a diskette, return it to its holder and go to Step 23.

If you tested with a tape, you must rewind and unload the tape before you can remove the tape cartridge from the tape drive. Use the following procedure.

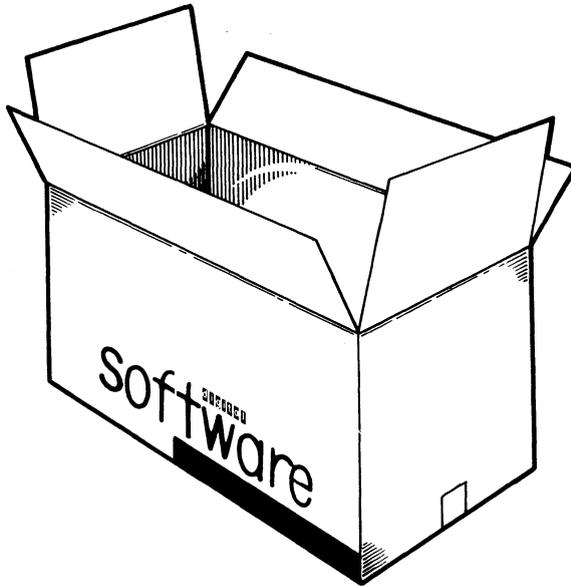
- Press the **Load/Unload** button to rewind and unload the tape. When the red indicator light remains OFF, the rewind and unload process is completed.
- Push the cartridge release handle to the left and remove the tape cartridge.
- Store the tape cartridge in its holder in the back of the book.



* Refer to Chapter 2, Operation, Tables 2-2 and 2-3 and pages 2-18 through 2-20 for a more detailed discussion of the TK50 tape drive's controls and procedures.

23 INSTALL YOUR SOFTWARE

Follow the instructions provided with your software.



24 PREPARE YOUR OPERATING SYSTEM

Perform a one-time system generation (SYSGEN) or configure (CONFIG) operation, if appropriate. Refer to your operating system documentation for information and instructions.

These programs inform your operating system that legal devices are installed in your computer upon which data may be written.

NOTE

Your operating system may not require a SYSGEN or CONFIG operation.

Go to Chapter 2, Operation.

INTRODUCTION

This chapter describes the controls and indicators of the computer and the TK50 tape drive, and what happens when you turn the system on.

The following is also provided for users unfamiliar with RX50 diskette drives and diskettes, or with TK50 tape drives and tape cartridges.

- How to handle and store RX50 diskettes.
- How to use the RX50 diskette drive.
- How to handle and store TK50 tape cartridges.
- How to use the TK50 tape drive.

CONTROL PANEL

You control the system by using the On/Off switch and the Halt, Restart, Write-Protect, and Ready buttons.

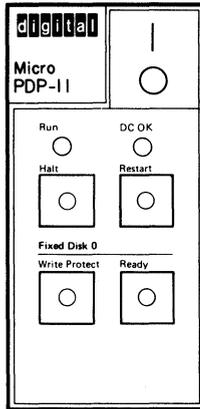


Table 2-1 summarizes the operation of the control panel buttons and indicators.

Table 2-1 MicroPDP-11 Controls and Indicators

Controls and Indicators	Position	Function
On/Off	1 (lit – red)	Turns the system on.
	0	Turns the system off.
Halt	Out	Out is the normal operating position. The system may run only when the Halt button is out.
	In (lit – red)	Stops the system. Press and release the Halt button and type P to start the system.
Restart	In	Restarts the system as if the power switch had just been turned on. Any work in progress is lost. Press and release the Halt button twice before restarting the system.
Fixed Disk 0 Write Protect	Out	Out is the normal operating position. System software is free to read and write information on the disk.
	In (lit – yellow)	Prevents the system software from writing on the fixed disk. You may write-protect the fixed disk so that information is not accidentally erased during diagnostic testing. You may also write-protect the disk drive when you copy the entire contents of the fixed disk to diskettes as a backup.
Fixed Disk 0 Ready	Out (lit – green)	The fixed disk is ready to be used for information storage by the system software.
	In	Disables the fixed disk. In effect, the fixed disk is turned off.
Run	Lit	This indicator is lit (green) when the processor is operating.
DC OK	Lit	This indicator is lit (green) when the power supply is generating the correct dc voltages.

TK50 CONTROLS

You control the TK50 tape drive by using the On/Off switch on the computer and the Load/Unload button on the tape drive. Two indicators show the current operating status of the TK50 tape drive.

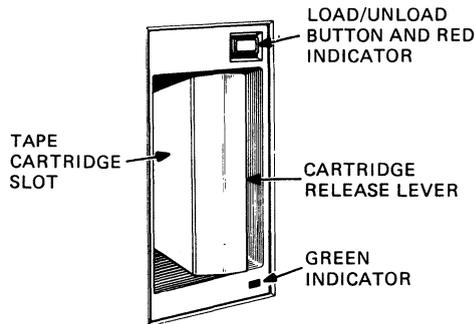


Table 2-2 lists the function of the TK50 tape drive's controls. Table 2-3 lists the operating conditions as indicated by the two indicators.

Table 2-2 TK50 Tape Drive Controls

Control	Position	Function
Load/Unload button	In	Loads the tape (10–15 seconds). If a tape is already in place when the power is turned on, rewinding and loading can take up to 2 minutes.
	Out	Rewinds and unloads the tape.
Cartridge release handle	Up	Lets you insert or remove a tape after rewind and unload operations are completed.
	Down	Locks tape in operating position.

NOTE

If a tape is already in place when the power is turned on, rewinding and loading may take up to 2 minutes.

Table 2-3 TK50 Tape Drive Indicators

Red	Green	Condition
Off	Off	No power to the tape drive.
Off	On	You may lift cartridge release handle; power is present.
On	Off	Do not lift the cartridge release handle. <ul style="list-style-type: none">• Power-up self-test is occurring.• Cartridge is inserted but handle is still up.• Tape is loading or unloading.• Tape is stopped.
On	On	Tape is successfully loaded.
On	Flashing	Tape is in motion (except rewind). Read/write commands are being processed. Irregular fast blinking means tape calibration is occurring.*
Flashing	Flashing	Tape is rewinding.
Flashing rapidly	Flashing	There is a fault. Press and release the Load/Unload button four times. If the problem persists, do not use the tape drive and do not try to remove the tape cartridge. Call your service representative.

* If tape is new, the system performs a calibration sequence that takes approximately two minutes.

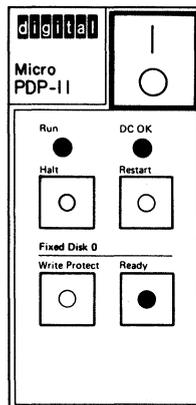
SWITCHING THE SYSTEM ON

When you turn the system on, the power-up sequence begins.

Table 2-4 describes the power-up sequence and what to do if there is a problem. The figure shows how your system's control panel should look when everything is working correctly.

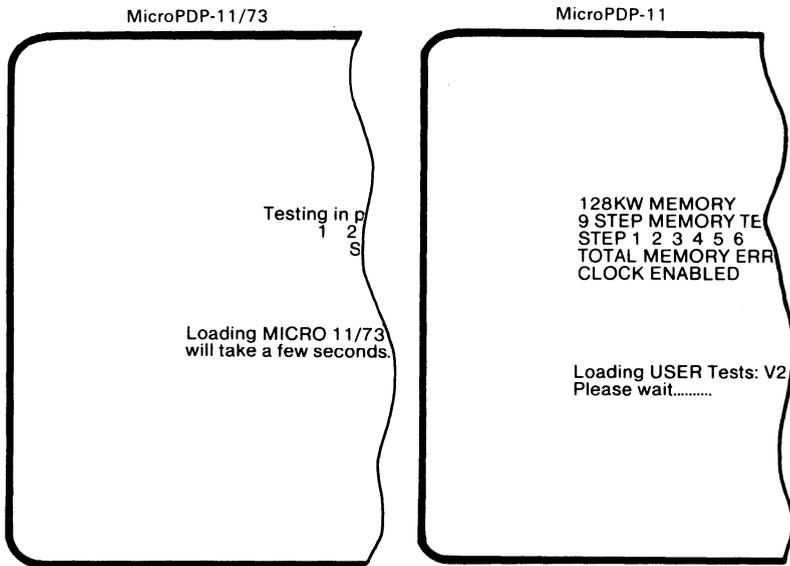
Table 2-4 Power-Up Problem Solutions

Normal Sequence	Problem	Solution
On/Off switch is lit.	1/0 button not lit	Refer to Chapter 3, Troubleshooting.
Run and DC OK indicators are lit.	Run and DC OK indicators are not lit.	Refer to Chapter 3, Troubleshooting.
Halt button indicator is not lit.	Halt button indicator is lit.	Press and release the Halt button.
Ready button indicator lights after 30 seconds if a fixed disk drive is present.	Ready button indicator does not light.	Press and release the Ready button.
Red indicator on TK50 tape drive goes out after two seconds. Green indicator is lit.	Red indicator flashes rapidly.	Press the Load/Unload button four times. If the problem persists, call your service representative.



POWER-UP SEQUENCE WITH SOFTWARE INSTALLED

If software has been installed, the system displays a message similar to this:



The terminal displays the numbers 1 through 9 slowly, indicating completion of steps in the memory test. The system performs these tests each time you turn it on or press the Restart button.

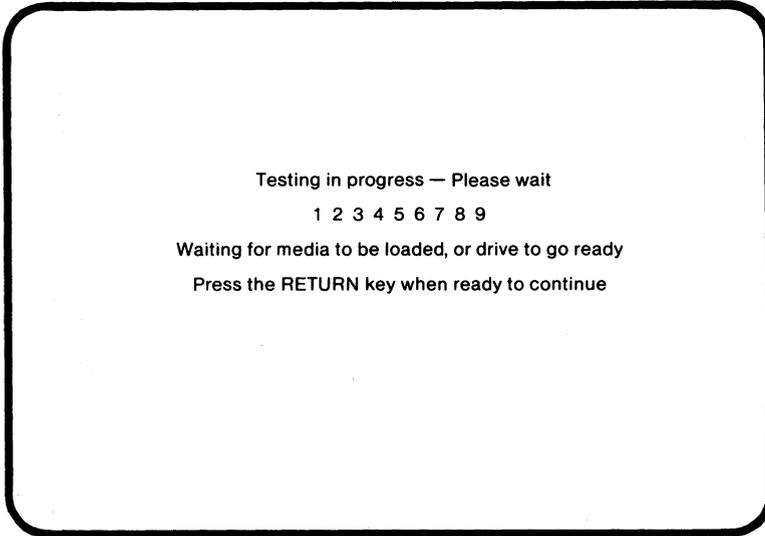
NOTE

The version number displayed on the screen may be different in your system.

- The series of dots indicates the system is loading software. The first screen for the software installed on your system appears in a few seconds.
- The system is now ready for use. Refer to your software documentation for instructions.
- If the terminal displays a message different from the one shown here, there may be a fault with the system. Refer to Chapter 3, Troubleshooting, for help.

POWER-UP SEQUENCE WITH NO SOFTWARE INSTALLED

If no software has been installed, the system displays a message similar to this:



You have two options:

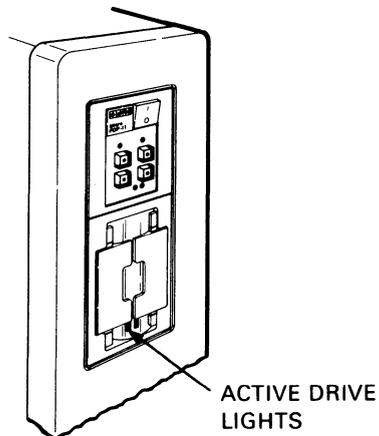
1. You can install software. Follow the instructions provided with the software.
2. You can run the User Test. Refer to Chapter 1, Installation, Step 15.

If the terminal displays a message different from the one shown here, refer to Chapter 3, Troubleshooting, for help.

RX50 DISKETTES

A diskette stores information magnetically, in much the same way that sound is recorded on audio tape. A diskette stores roughly 150 typewritten pages. An indicator on each drive lights when the drive is reading or writing information on a diskette.

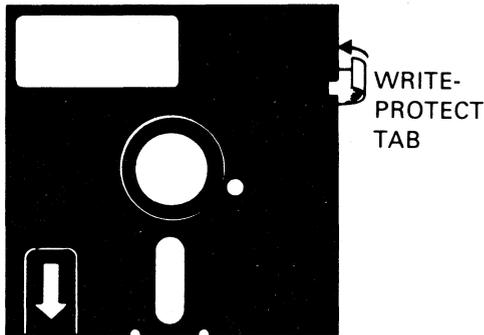
- Information stored on a diskette may be erased and replaced.
- A diskette stores information only on one side. As you insert a diskette into a diskette drive, make sure you align the orange arrow on the diskette with the orange stripe on the drive.



Write-Protecting a Diskette

To prevent the system from adding or changing information on a diskette, carefully cover its write-protect notch with a self-adhesive foil tab. This procedure is known as write-protecting the diskette.

Remove the write-protect tab when you want to add or change information on the diskette.



Diskette Handling and Storage Guidelines

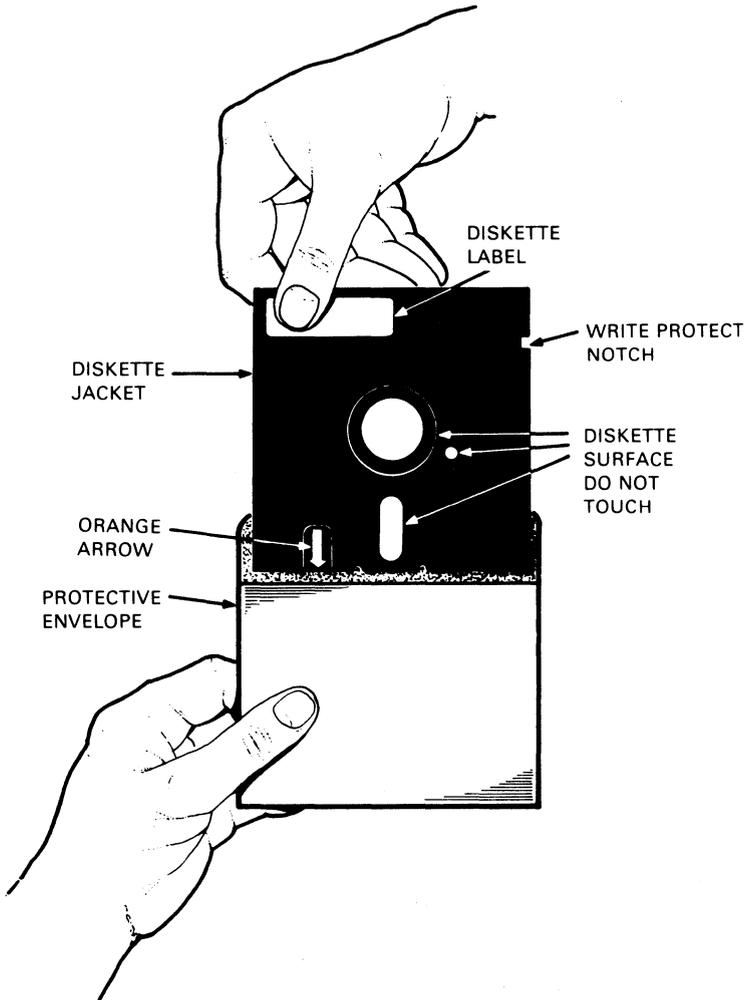
- Never touch the exposed surfaces of the diskette.
- Do not bend or fold a diskette.
- Write the label **before** applying it to the diskette. Writing the label on the diskette may crease the jacket.
- Always return a diskette to its protective envelope to keep out dust and dirt.
- Always store diskettes vertically and loosely to prevent their jackets from warping.
- Keep diskettes away from direct sunlight, heaters, and other sources of heat.
- Keep diskettes away from magnets and equipment that generates magnetic fields, such as motors, transformers, and terminals.
- Always handle diskettes gently.

Diskette Handling

The diskette rotates inside its jacket. It is continuously cleaned by the soft fabric lining within.

NOTE

Use only formatted RX50K diskettes, available from Digital or its licensed distributors.



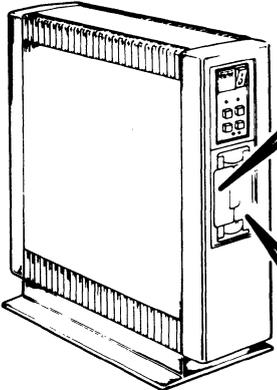
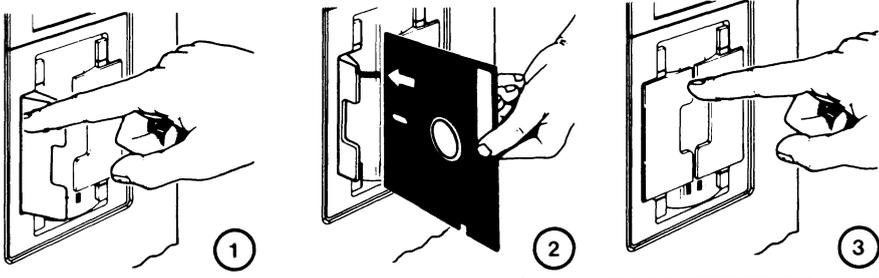
Inserting a Diskette

- Open the diskette drive door by pressing on its outer edge.
- Align the orange arrow on the diskette with the orange stripe on the drive and insert the diskette.
- After inserting the diskette, press the diskette drive door to close it.
- Make sure the drive door is fully closed. The drive does not work with the door open.
- Do not open the drive doors when the drive indicators are lit. Information could be lost.
- Always return diskettes to their protective envelopes when you are through using them. Tiny particles of dirt or dust can cause errors in reading or writing data.
- Make and keep backup copies of all working diskettes. Refer to your software documentation for instructions.

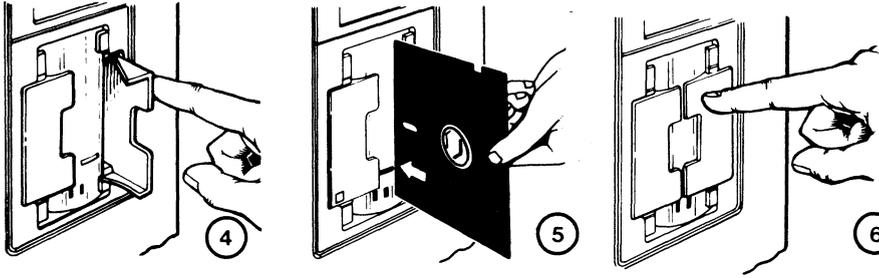
Backup Diskettes

Backup diskettes are duplicates of the information stored in your disk drive(s). They provide insurance against accidental loss of your information.

- Make backup copies on diskettes or magnetic tape.
- Make a daily backup copy of all information you have changed or created.
- Make a weekly backup copy of all information stored on your fixed disk drive.
- Store all backup copies in a safe place.
- Keep an extra copy of each backup diskette.
- Refer to your software documentation for instructions.



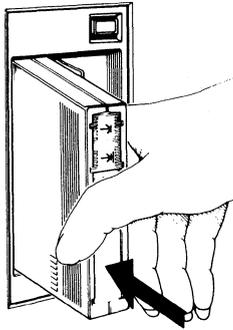
ALIGN THE ORANGE ARROW ON THE DISKETTE WITH THE ORANGE STRIPE.



TK50 TAPE CARTRIDGE

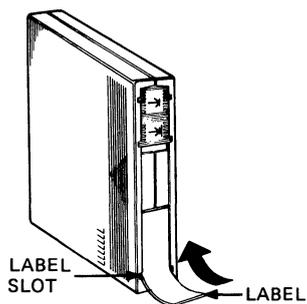
The TK50 tape drive holds one removable magnetic tape cartridge.

- The TK50 tape cartridge stores information magnetically in the same way sound is recorded on an audio cassette.
- Each tape cartridge stores up to 94 million characters – the equivalent amount of information that can be stored on 232 RX50 diskettes.
- Information stored on a tape can be erased and replaced.
- A TK50 tape cartridge stores information on only one side. You must insert the tape cartridge correctly. Make sure the arrow on the tape cartridge faces left.



Labeling a TK50 Tape Cartridge

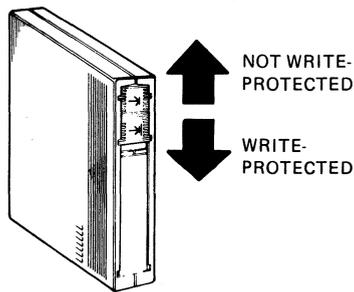
- Insert the label into the slot on the front of the tape cartridge.
- Never apply adhesive labels to the top, bottom, or sides of the tape cartridge.
- Never write on the tape cartridge with a pen or pencil.



Write-Protecting a Tape Cartridge

Write-protecting a tape cartridge prevents accidental overwriting of information stored on the tape.

- Slide the write-protect switch to the left to write-protect the tape.
- Slide the write-protect switch to the right when you want to add or change information on the tape.

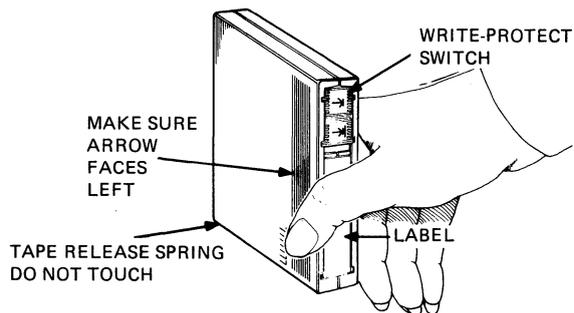


Care and Handling of Tape Cartridges

- Allow a new, prerecorded tape cartridge to stabilize for 24 hours at room temperature before using it.
- Store cartridges in a dust-free environment.
- Store at an even temperature between 10°C–40°C (50°F–104°F).
- Keep cartridges away from heaters, photocopiers, and direct sunlight.
- Keep cartridges away from magnets and equipment that generates magnetic fields, such as motors and transformers.
- Keep cartridges away from terminals and X-ray equipment.
- Always handle tape cartridges gently.

NOTE

Use only TK50 COMPACTapes available from Digital or its licensed distributors.



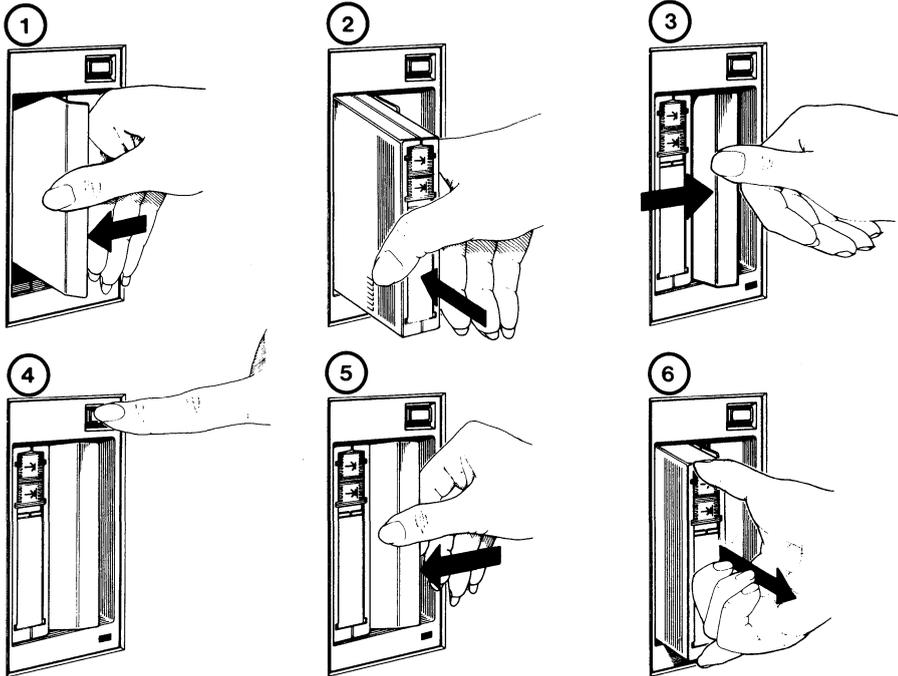
Inserting a Tape Cartridge

- Make sure the **Load/Unload** button is out.
- Set the system's **On/Off** switch to 1 (ON).
 - The TK50 red indicator is ON during the tape drive power-up self-test (approximately two seconds).
 - The red indicator goes OFF and the green indicator goes ON.
- Push the cartridge release handle to the left.
- Fully insert the tape cartridge into the tape drive. Make sure the arrow on the tape cartridge faces left. When the tape cartridge is correctly seated, it locks in place.
 - The red indicator goes ON.
 - The green indicator goes OFF.
- Push the cartridge release handle to the right to engage the drive's gears.
 - The red indicator goes OFF.
 - The green indicator goes ON.
- Push in the **Load/Unload** button.
 - The red indicator goes ON.
 - The green indicator goes OFF.
- The tape loads in 10–15 seconds to the beginning of tape (BOT)*. A mechanism inside the drive picks up the tape and places it on a take-up reel within the drive.
 - The red indicator remains ON.
 - The green indicator goes ON.

* If tape is new, the system performs a calibration sequence that takes approximately two minutes. The green indicator blinks rapidly and irregularly during calibration.

CAUTION

If the red indicator flashes rapidly at any time, press and release the Load/Unload button four times. If the problem persists, do not attempt to use the tape drive or remove the tape cartridge. Call your service representative.



Removing a Tape Cartridge

You must unload a tape (includes rewinding and uncoupling) before you can remove the cartridge from the tape drive. Use the following procedure.

1. Press the Load/Unload button to the out (unload) position.

The red and green lights flash slowly, but not in unison, as the tape rewinds to the beginning of the tape. This may take up to 90 seconds.

The red light remains on and the green light goes off, as the tape unloads into the cartridge.

When the tape is completely unloaded, the red light goes off and the green light comes on.

2. Pull the cartridge release handle up.

NOTE

Rewinding a tape can also be done under software control. Refer to your software manual for information.

3. Remove the tape cartridge and store it in a safe place.
4. Push the cartridge release handle down.

The green light remains on showing that there is power to the drive and that you can safely move the cartridge release handle.

CAUTION

Always remove the tape cartridge from the tape drive when the cartridge is not in use or before you turn off the system. Failure to remove the cartridge may result in damage to the tape cartridge.

Backup Tape Cartridges

A TK50 tape is an ideal medium for storing backup copies of files created on your diskette or fixed disk drives. Refer to your software documentation for instructions to perform a backup or file copy operation.

- Make a daily backup copy of all information you have changed or created.
- Make a weekly backup copy of all information stored on your fixed disk drive.
- Store all backup copies in a safe place.

NOTE

Write-protect diskettes and fixed disk drives when making backup copies onto tape to prevent accidental loss of information.

INTRODUCTION

Troubleshooting is the process of isolating and repairing minor problems. The MicroPDP-11 system's power-up test checks the system's internal circuitry.

From time to time you may encounter a problem that is not related to the system's diagnostic tests. For your convenience, Table 3-1 provides a basic troubleshooting checklist of some of these problems, their possible causes, and ways to correct them.

The User and Field Service test diskettes provide extended testing of the circuitry and check the devices installed on the system.

TESTING STRATEGY

A power-up test runs every time you turn the computer on. This test checks the internal circuitry of the system. It also checks for the presence of software on the system. If the test determines that no software is present, it displays a message on the screen. See "Example of Isolating a Problem" on the next page.

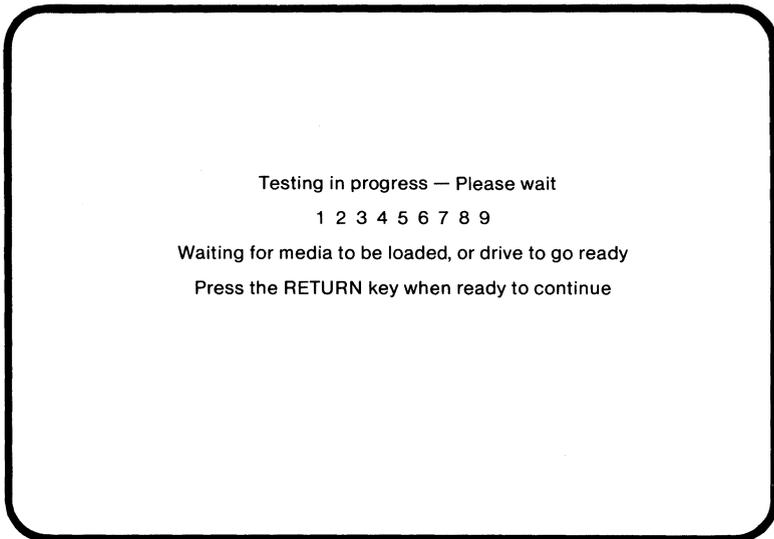
If the test finds an error, it displays what is called a "hardware-initiated error" message on the screen. Table 3-2 lists MicroPDP-11/73 and MicroPDP-11/83 error messages, their possible causes, and ways to correct them. Table 3-3 lists MicroPDP-11 error messages, their possible causes, and ways to correct them.

The User Test isolates and identifies faults in the system. Use this test either in response to an error message or to periodically test your system. The User Test Diagnostics Menu is described on page 3-12. The method of running the User Tests, sample screens, and an example of an error message follows the description of the User Test Diagnostics Menu.

EXAMPLE OF ISOLATING A PROBLEM

The following error message appears for one of these reasons:

- Software is not present.
- A bootable diskette is not present, and
- The Return key has been pressed repeatedly.



- Insert the User Test diskette into drive 1.
- Press the **Restart** button.

The system performs its self-test and loads the User Test diagnostics.

TROUBLESHOOTING TABLES

The corrective procedures listed in Table 3-1 are for minor problems.

It is sometimes necessary to replace a faulty component. The *MicroPDP-11 Systems Technical Manual* describes how to replace a number of them.

NOTE

Major repairs should be carried out only by qualified Field Service personnel.

If you have a problem, first try to identify and solve the problem. Use the information in this section. Then, if necessary, refer to the *MicroPDP-11 Systems Technical Manual*.

If you are not able to correct the problem, call your service representative.

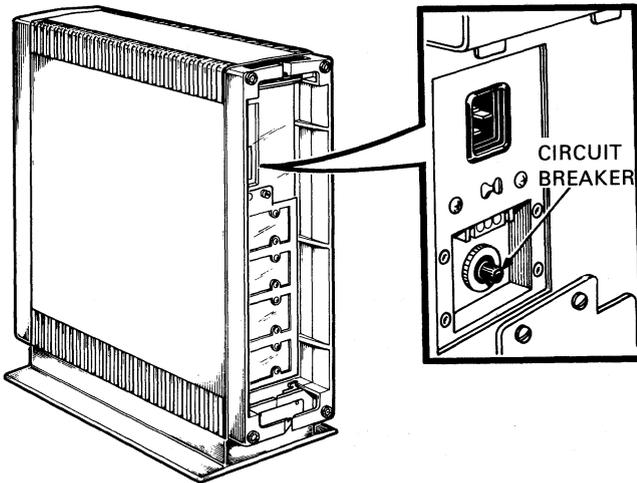


Table 3-1 Basic Troubleshooting Procedure

Problem	Possible Cause	Corrective Action
No response when the power switch is turned on. (Switch is not lit.)	The system is not plugged in.	Plug the system in.
	There is no power at the wall outlet.	Try using a different wall outlet.
	The system circuit breaker is tripped.	Reset the circuit breaker by pressing it in. (The circuit breaker is shown on the previous page.) If it trips again, your system needs repair. Call your service representative.
Power is on but there is no response from the system. (Switch is lit.)	The power cable is incorrectly installed.	Check that the cable is fully seated into its socket at the rear of the system unit and the wall outlet.
	The Halt button is pressed in (lit).	Press and release the Halt button; it should not be lit.
	The console terminal is turned off.	Turn the terminal on.
	The console terminal is off-line.	Put the terminal on-line. Refer to the terminal's documentation.
	The console terminal cable is not installed correctly.	Make sure the cable is installed properly at both ends.
	The baud rate settings of the system and the terminal do not match.	Make sure the baud rate settings are the same. Refer to Chapter 1, Installation, Step 7.
System does not start from the TK50 tape drive.	The Halt button on the control panel is pressed in.	Press and release the Halt button; it should not be lit.

Table 3-1 Basic Troubleshooting Procedure (Cont.)

Problem	Possible Cause	Corrective Action
System does not start from the fixed disk drive.	The Ready button is pressed in.	Press and release the Ready button; it should be out and its indicator lit.
	There is no software on the fixed disk.	Load your software onto the fixed disk drive. Follow your software instructions.
System does not start from the diskette drive.	There is no diskette in the drive.	Insert a diskette into the drive and close the door.
	The drive door is not closed.	Close the diskette drive door.
	The diskette is upside down.	Check that the orange arrow on the diskette aligns with the orange stripe on the drive.
	The diskette is not the correct kind.	Use a bootable system diskette.
	The diskette is worn.	Try another diskette.
TK50 tape drive passes the power-up test but does not work.	Tape cartridge not present or not loaded.	Insert a tape cartridge and press the Load/Unload button to load the tape.
	The controller module may be faulty.	Call your service representative or run the Field Service Diagnostic Tests.
TK50 red indicator flashes rapidly.	Possible problem with the tape drive.	Press and release the TK50 Load/Unload button four times. If the problem persists, stop the operation of the tape drive and call your service representative.
Tape cartridge release handle does not lift.	Power-up test still in process.	Wait for the red indicator to go out and try again. If the problem persists, there may be a mechanical problem; call your service representative.

Table 3-1 Basic Troubleshooting Procedure (Cont.)

Problem	Possible Cause	Corrective Action
Tape cartridge release handle does not lock.	Tape is not seated properly.	Reinsert the tape cartridge. If the problem persists, there may be a mechanical problem; call your service representative.
Tape does not unload.	Load/Unload button is in Load position.	Make sure the Load/Unload button is in the Unload position. Wait for the red indicator to go out before removing the tape cartridge.
Not configured or illegal device name message.	Operating system does not detect a TK50 tape drive.	Perform a SYSGEN or CONFIG operation. See Chapter 1, Installation, Step 24, or call your service representative.
Fixed disk read error message.	The Ready button is pressed in.	Press and release the Ready button. The button should be out and its indicator lit.
Fixed disk write error message.	The Ready button is pressed in.	Press and release the Ready button. The button should be out and its indicator lit.
	The disk is write-protected.	Press and release the Write-Protect button. Its indicator should not be lit.
Diskette drive read error message.	There is no diskette in the drive.	Insert a diskette into the drive and close the door.
	The drive door is not closed.	Close the diskette drive door.
	The diskette is upside down.	Check that the orange arrow on the diskette aligns with the orange stripe on the drive.
	The diskette is incorrectly formatted.	Use preformatted RX50K diskettes from Digital.
	The diskette is worn out.	Try another diskette.

Table 3-1 Basic Troubleshooting Procedure (Cont.)

Problem	Possible Cause	Corrective Action
Diskette drive write error message.	There is no diskette in the drive.	Insert a diskette into the drive and close the door.
	The drive door is not closed.	Close the diskette drive door.
	The diskette is upside down.	Check that the orange arrow on the diskette aligns with the orange stripe on the drive.
	The diskette is write-protected.	Use a blank diskette or remove the write-protect tab.
	The diskette is full.	Use another diskette.
	The diskette is incorrectly formatted.	Use preformatted RX50K diskettes from Digital.
The User Test diskette does not run.	The diskette is worn out.	Try another diskette.
	The drive door is not closed.	Insert the diskette into the drive and close the door.
	The diskette is upside down.	Check that the orange arrow on the diskette aligns with the orange stripe on the drive.
Tape read error message.	The diskette is damaged.	Try another copy of the diskette.
	The tape cartridge may be faulty.	Try starting the tape again. If the problem persists, try another tape cartridge.
Tape write error message.	The tape is write-protected.	Slide the write-protect switch on the tape cartridge to the right. If the problem persists, try another tape cartridge.

MICROPDP-11/73 and MICROPDP-11/83 HARDWARE-INITIATED ERROR MESSAGES

If you have a MicroPDP-11 system, see page 3-10.

When you turn your MicroPDP-11/73 or MicroPDP-11/83 system on, it may display one or more messages on the terminal. The system hardware generates these messages, and, in most cases, they indicate faults in the system. Table 3-2 lists the possible messages and how to respond to them. If you need help at any time, refer to the *MicroPDP-11 Systems Technical Manual* or call your service representative.

Table 3-2 MicroPDP-11/73 and MicroPDP-11/83 Hardware-Initiated Error Messages

Error Number	Error Title	Corrective Action
1, 2, 3		Boot is in progress. Wait for boot to complete.
4		Waiting for user to select a boot device. Choose a device.
5, 6		The system is inoperative. Call your service representative.
7	BOOT ERROR	The automatic boot sequence failed to find a device that could boot. Press the Return key to list the boot error messages.
10	DRIVE NOT READY	Check that there is a diskette in the drive and the drive door is closed. Release the Ready button; its indicator should be lit.
11	NON BOOTABLE MEDIA IN THE DRIVE	Try another diskette.
12	NO DISK PRESENT OR DRIVE IS NOT LOADED	Insert a diskette into the drive and close the drive door.

Table 3-2 MicroPDP-11/73 and MicroPDP-11/83 Hardware-Initiated Error Messages (Cont.)

Error Number	Error Title	Corrective Action
13	NO TAPE PRESENT	Install a tape cartridge in the tape drive.
14	NON-EXISTENT CONTROLLER	Make sure you have typed the disk unit number correctly. Press the Restart button to restart the system. If the error persists, refer to the <i>MicroPDP-11 Systems Technical Manual</i> , which explains how to select an alternate drive.
15	NON-EXISTENT DRIVE	Make sure you have typed the device name correctly.
16	INVALID UNIT NUMBER	Select a different disk drive unit number.
17	INVALID DEVICE	Choose a different device.
20	CONTROLLER ERROR	Call your service representative.
21	DRIVE ERROR	Check the diskette drive. Make sure the diskette is properly inserted. Press the Ready button; its indicator should be lit.
22-76		Call your service representative.
77	CPU HUNG	Release the Halt button. If the error persists, call your service representative.

MICROPDP-11 HARDWARE-INITIATED ERROR MESSAGES

When you turn the MicroPDP-11 system on, it may display one or more messages on the terminal. The system hardware generates these messages, and, in most cases, they indicate faults in the system. Table 3-3 lists the possible messages and how to respond to them. If you need help at any time, refer to the *MicroPDP-11 Systems Technical Manual* or call your service representative.

Table 3-3 MicroPDP-11 Hardware-Initiated Error Messages

Error Number	Error Title	Corrective Action
1-11		Your system is inoperative. Call your service representative.
12	NON-EXISTENT CONTROLLER	Press the Restart button to restart the system. If this message persists, refer to your technical manual, which explains how to select an alternate drive.
13	DRIVE NOT READY	Make sure a diskette is in the drive.
14	DRIVE ERROR	Check the diskette drive. Make sure the diskette is properly inserted.
15	CONTROLLER ERROR	Call your service representative.
16	NOT BOOTABLE	Install software or run the User Test. Try a different diskette.
17	NO DISK	Insert a diskette in the disk drive. Close the diskette drive door. The diskette may be upside down. Check that the orange arrow on the diskette matches with the orange stripe on the drive.
18	NO TAPE	Install a tape cartridge in the tape drive.
19	NON-EXISTENT UNIT	Press the Restart button to the system. Make sure you type in the correct device name.
20-23		Your system is inoperative. Call your service representative.

USER TEST

The User Test diagnostics program isolates and identifies faults in the system.

You can run the User Test either in response to a message or to periodically test your system.

You must use the console terminal to run the tests. The tests are stored on two diskettes and are supplied with your system.

NOTE

There are several diskettes labeled Field Service Tests. These tests require extensive knowledge of the XXDP+ software and are to be used only by Field Service technicians. Refer to the *MicroPDP-11 Systems Technical Manual* for more details.

User Diagnostics Menu

The User Diagnostics Menu lists the options available to you when you run the User Tests:

USER DIAGNOSTICS MENU — V6.0 — PART 1

T — Test your System.

I — Identify System Devices.

F — Field Service Diagnostics Menu.

Type the letter then press the RETURN key. OR if you are finished running diagnostics, remove the test media.....

- T Runs a quick test of all devices known to be attached to the system. If the test detects an error, the system tells you where the fault lies.
- I Causes the system to display a list of all of the devices known to be on the system. This list includes the components of the basic system only. To return to the User Diagnostics Menu, hold down the **CTRL** key and press **C**.
In most cases, <CTRL/C> cancels the present operation, and returns you to the User Diagnostics Menu.
- F Causes the system to display the Field Service Diagnostic Menu. This option is for your service representative only.

If you select an option by mistake:

- Press the **U** key to return to the User Diagnostics Menu.
- If this does not work, press the **Restart** button on the control panel. This cancels the test and returns you to the condition as though you had just set the power switch to 1 (ON).

If you type something the system does not recognize as a command, it displays:

- A question mark, or
- A message explaining that you must type a single letter followed by the **Return** key.

Running the User Test

You can run the User Test in response to most messages.

To run the tests:

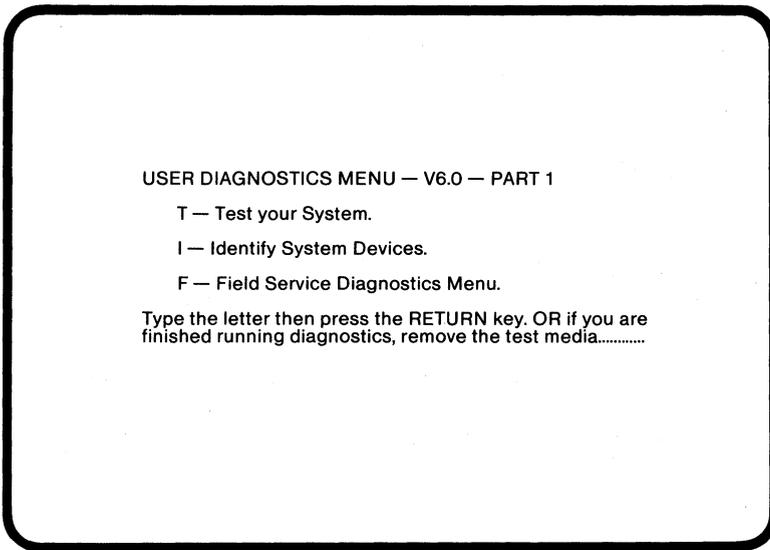
- Insert a copy of User Test #1 into diskette drive 1.
- Press the **Restart** button.
- The system displays a message similar to the following.

BOOTING DU1

Loading USER Tests: V6.00 this will take a few seconds.

Please wait.....

- After a few seconds, the system displays the User Diagnostics Menu.

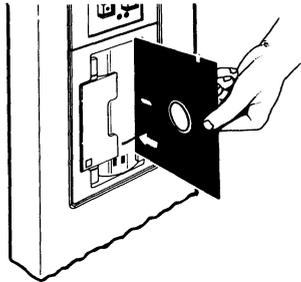


The version number on your screen may be different.

If this message does not appear, try using the second copy of User Test #1. If this does not work, refer to Tables 3-1 through 3-3 for help.

Type T and Press the Return Key

Follow the directions on the screen. These include inserting a blank diskette into drive 2. If you have additional RX50 diskette drives in your system, insert blank diskettes into these drives also.



The system displays the following message.

SYSTEM TEST DIRECTIONS.

This is a test of all system devices identified by the diagnostic.

Install blank diskettes in other diskette drives to be tested. Make sure the orange arrow on the diskette is aligned with the orange stripe on the drive.

Make sure Write Protect for the Fixed Disk is turned off (write protect indicator is not lit). Data stored on the fixed disk will not be harmed.

NOTE: During one of the tests, a pattern of characters will appear on other terminals connected to the system this is normal.

Press the RETURN key to begin the test, OR to return to the User Diagnostics Menu, type U then press the RETURN key

The system confirms the test is running:

SYSTEM TEST IN PROGRESS.

The test will take about 10 minutes. Results will be reported at the end of the test. Angle brackets and stars will be printed to indicated testing is in progress.

To halt the test at any time and return to the User Diagnostics Menu, type \diamond C by holding down the CTRL key and pressing the C key.

IDENTIFICATION OF SYSTEM DEVICES.
The System Test will test the Processor, Memory and Line Clock. Additional Devices that have been detected and will be tested are:

DEVICE	QUANTITY
Removable Disks (RX50)	2
Fixed Disk (RD52)	1
4-Port Interface (DZV11)	1

NOTE

The list of devices to be tested may be different from the one shown above.

Chapter 1, Installation, outlines the conclusion of a successful test. The following section explains what you see if the system detects a fault.

Sample Error Message

If the system detects an error, the test halts and displays a message similar to the following.

ERROR DETECTED IN SYSTEM TEST

The system instructs you to insert User Test #2. Follow the directions displayed on your screen.

The test then lists each component in turn, the time taken to test each component, and the result of the test.

The following example shows that the test detected a fault in the removable disks and controller.

NOTE

The list of devices to be tested may be different from the one shown below.

Device tests will now be run to determine the cause of the error.

DEVICE	MAXIMUM RUN TIME (MIN.)	RESULTS
Processor.....	0.5	OK
Memory.....	7.0	OK
DZV11 4-Port Interface Test #1 ...	0.5	OK
DZV11 4-Port Interface Test #2 ...	2.0	OK
Fixed Disk & Controller.....	1.0	OK
Removable Disks & Controller.....	5.0	ERROR
DEQNA Ethernet-Qbus Adapter ...	1.0	OK

Your system has an error as indicated above. Check the Troubleshooting chapter of the Owner's Manual on how to proceed, or call your Field Service Representative. OR...

To return to the User Diagnostic Menu, type U then press the RETURN key.....

At this point, you may:

- Check for any problems listed in Tables 3-1 through 3-3.
- Type **U** and press the **Return** key to return to the User Diagnostics Menu #2 and rerun the test.
- Go to the User Diagnostics Menu #1. To do this, remove User Test #2 and insert User Test #1. Type **U** and press the **Return** key to go to the User Diagnostics Menu #1.

If the message persists when you retry the test:

- Call your service representative, or
- Run the hardware-initiated diagnostics to further test the system, as explained in the *MicroPDP-11 Systems Technical Manual*.

NOTE

It is not recommended you run the hardware-initiated tests or Field Service tests unless you are a trained Field Service technician.

Upgrade **4**

As you upgrade your system, insert your documentation here for future reference.



Appendix A

Installation/Conversion Procedures

INTRODUCTION

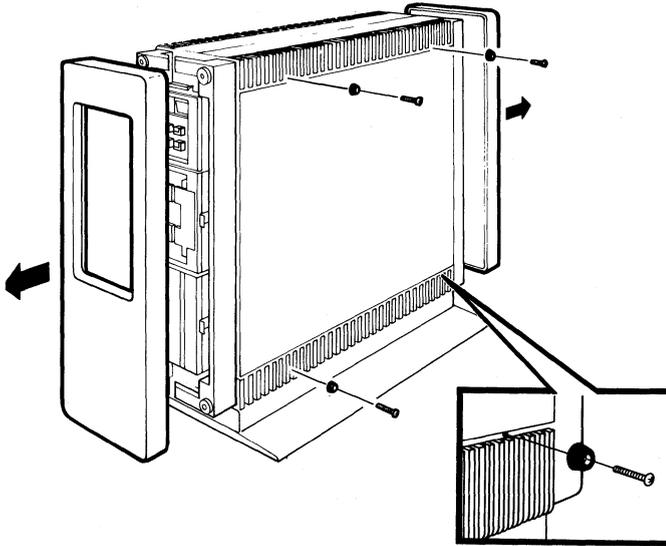
This section shows you how to do the following.

- Convert a floor stand system to a desktop system.
- Prepare a rack mount unit.
- Install any VT100-series video terminal and set the baud rate.

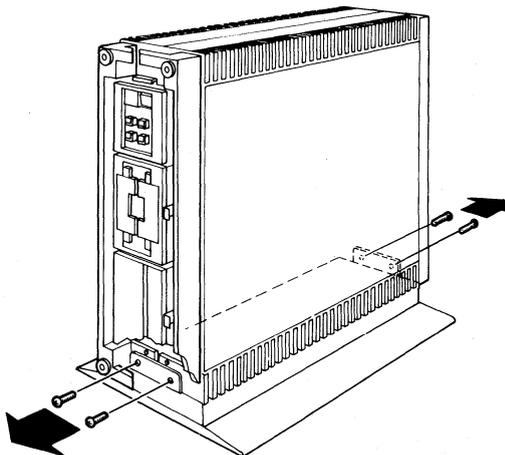
DESKTOP CONVERSION

1 Remove the Front and Rear Covers.

- Install the four rubber feet on the right side of the system.



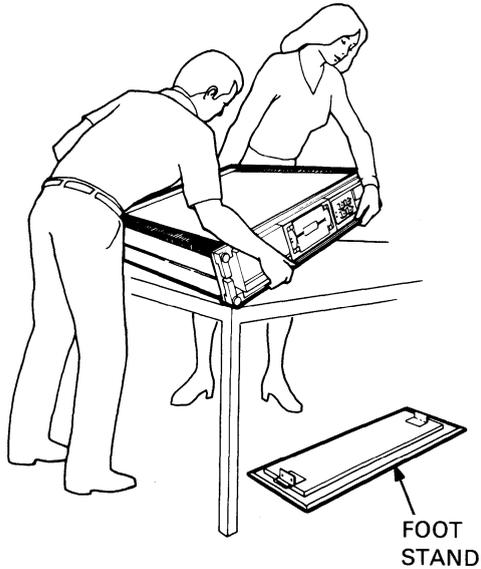
2 Remove the Four Screws at the Base of the System as Shown.



3 Place the System Unit on a Table.

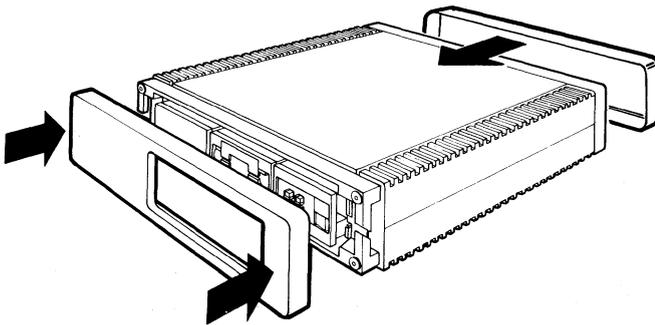
WARNING

You need two people to do this since the system weighs 30 kg (65 lbs).



4 Replace the Front and Rear Covers.

- Return to Step 4 of Chapter 1, Installation.



PREPARING A RACK MOUNT MODEL

1 Check the Contents of your Rack Mounting Kit.

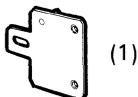
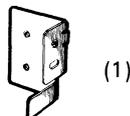
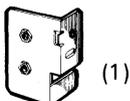
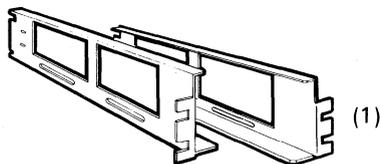
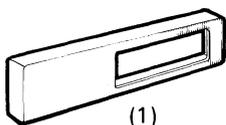
If any item is missing or damaged:

- Contact your salesperson or distributor.
- Contact your delivery agent.

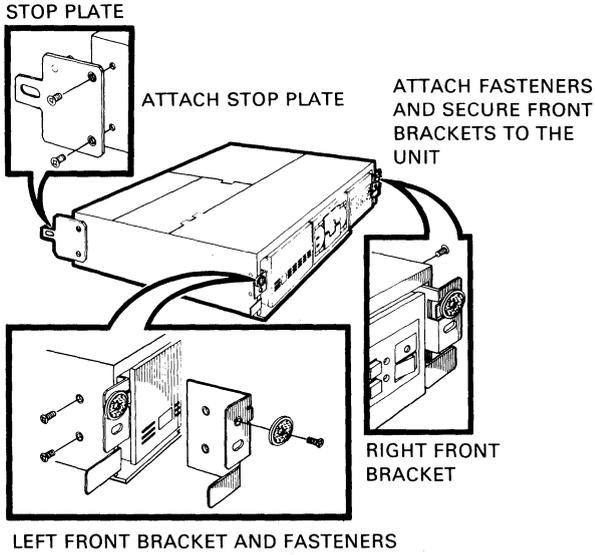
If you need help, call your service representative.

WARNING

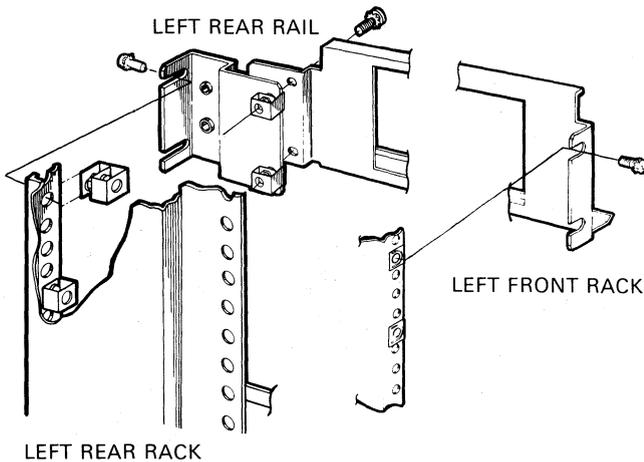
You need two people for this procedure since the rack mount system weighs 27 kg (60 lbs).



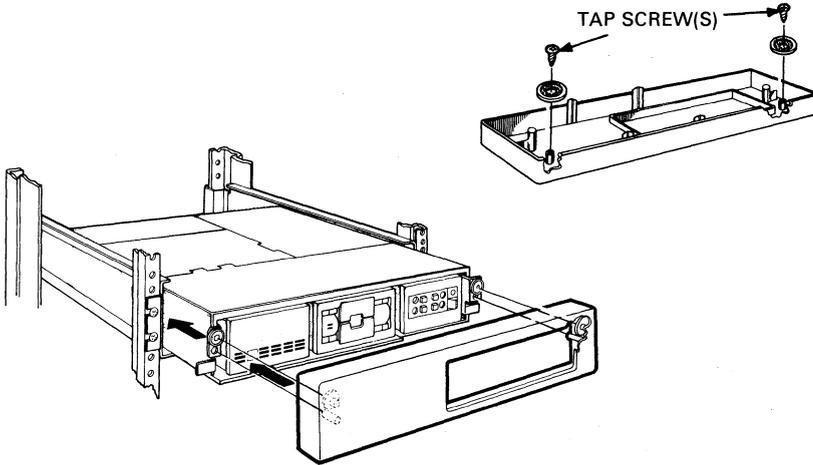
2 Install all Brackets. Install the Front Fasteners.



3 Secure the End Plate to the Rails. Attach the Left and Right Rails to the Rack.

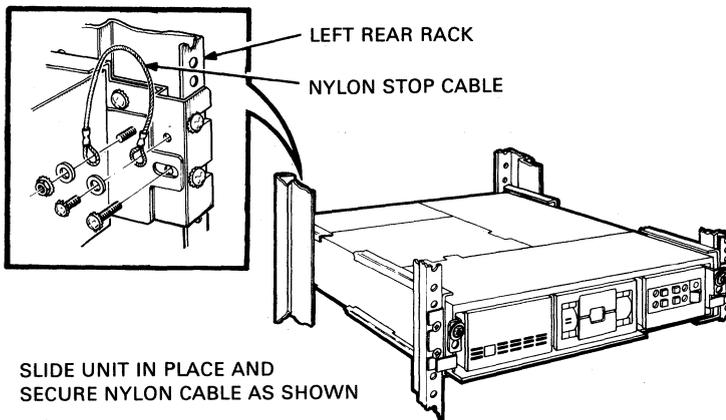


4 Slide the System into the Rack. Attach the Front Cover.



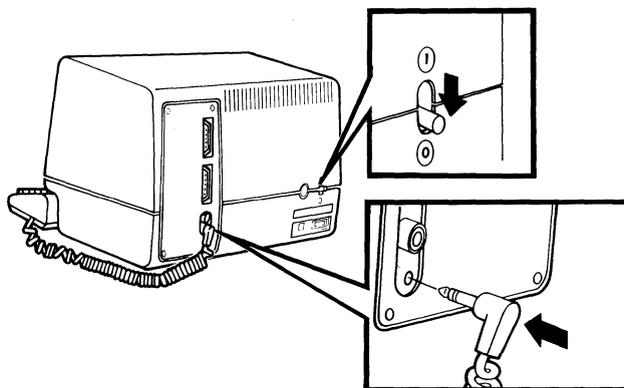
5 Secure the Restraining Cable and Attach the Locking Plate to the Rack.

- Return to Step 4 of Chapter 1, Installation.



VT100 INSTALLATION

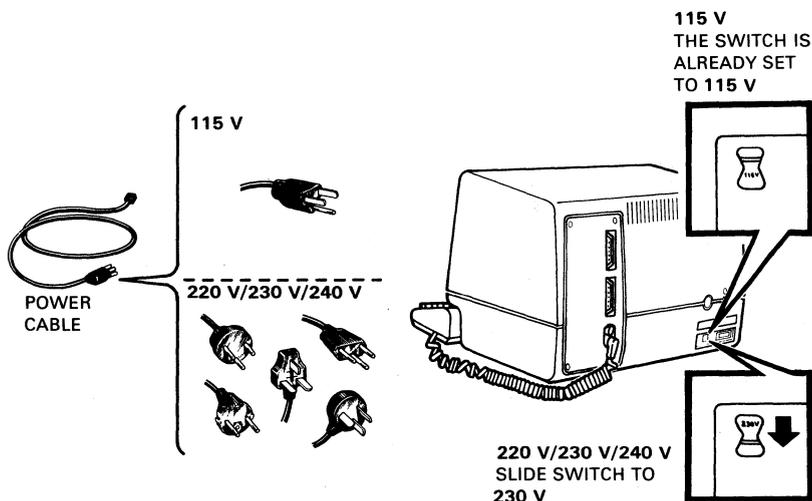
- 1 Set the Terminal Power Switch to 0 (OFF) and Connect the Keyboard.



- 2 Identify the Power Cable Plug and Check the Terminal Voltage Switch Setting.

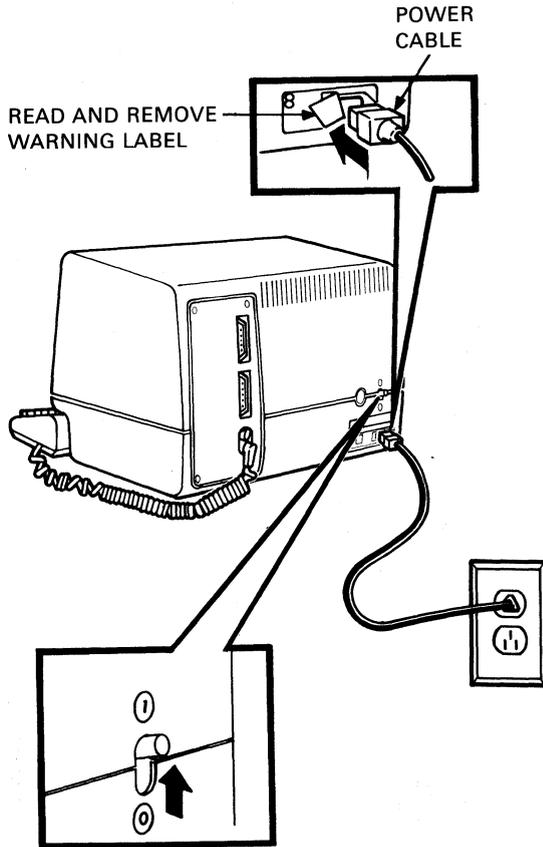
CAUTION

An incorrect voltage setting will damage your terminal.



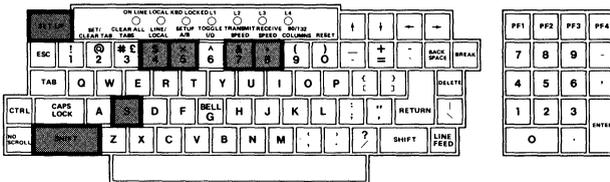
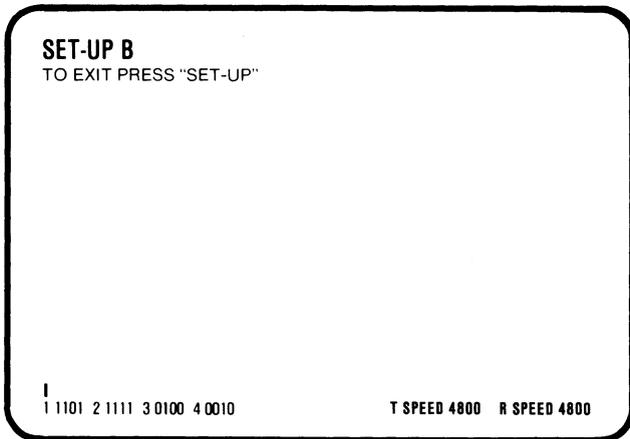
3 Plug the Terminal in and Set the Power Switch to 1 (ON).

- After a beep, a blinking cursor appears.
- If a flashing 4 appears, check that the keyboard cable is firmly plugged in.



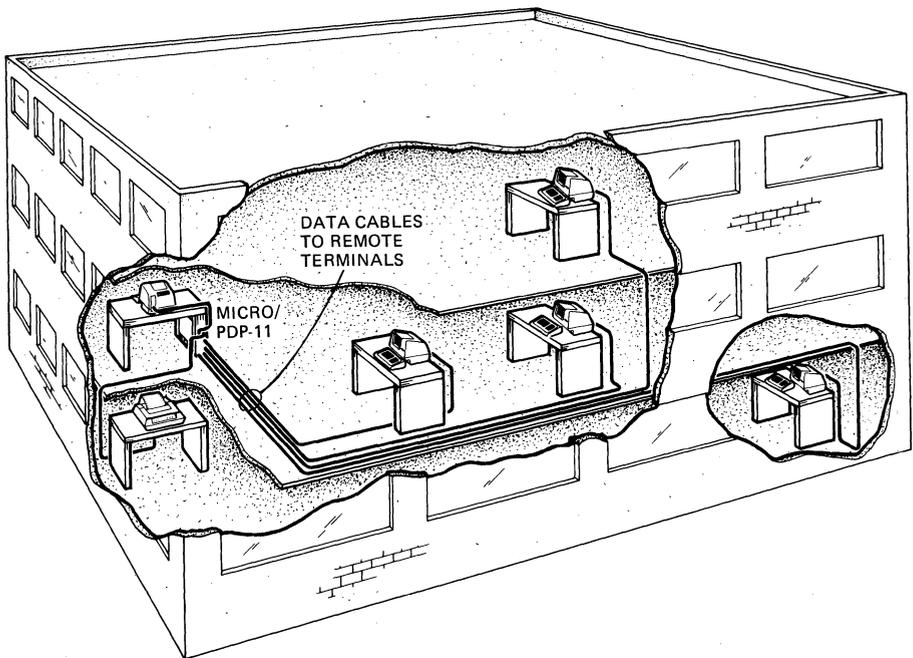
4 Set the Terminal Transmit and Receive Speeds (Baud Rates).

- Press the **Set-Up** key. The terminal displays Set-Up A.
- Press the **5** key. The terminal displays Set-Up B.
- Set T (transmit speed) to 4800; press the **7** key until 4800 appears.
- Set R (receive speed) to 4800; press the **8** key until 4800 appears.
- Check that the On-Line light on your keyboard is on and the Local light is off.
- Press the **4** key to set the terminal on-line.
- Hold down the **Shift** key and press the **S** key. This saves the new settings.
- Press the **Set-Up** key to exit from Set-Up mode.



Appendix B System Specifications

MicroPDP-11 systems allow multiple terminal installations on more than one floor of a building or in more than one building. Your sales representative can provide you with more information.



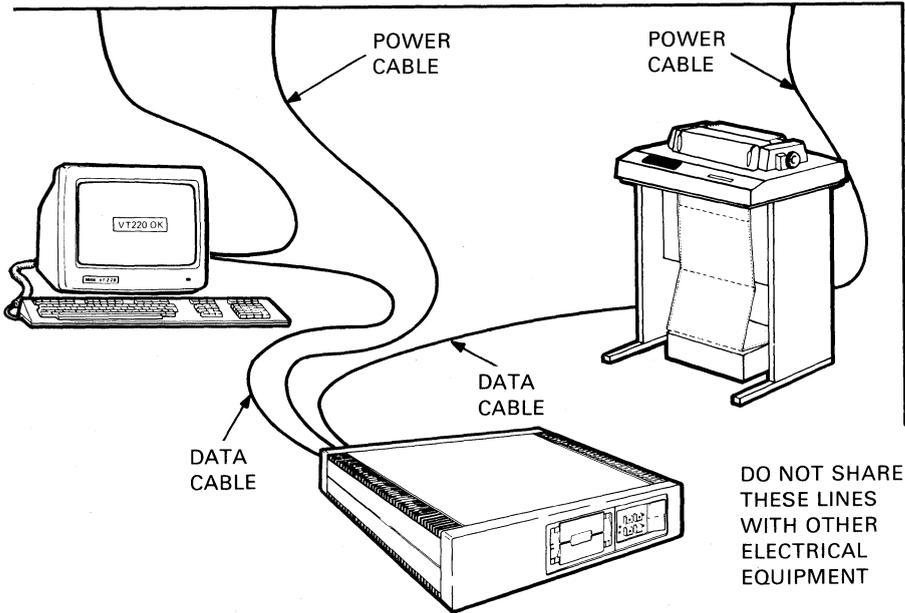
System Specifications

To get the best possible performance from your MicroPDP-11 system, you need to provide the right operating conditions.

NOTE

Your terminal and printer may be different from those shown.

15 AMP DEDICATED CIRCUIT 1 PHASE



OPERATING ENVIRONMENT**Table B-1 Electrical Requirements**

Input	Specifications*	
Line voltage	120 V	240 V
Voltage tolerance	88 V–128 V	176 V–256 V
Power source phasing	Single	Single
Frequency	60 Hz	50 Hz
Line frequency tolerance	47 Hz–63 Hz	47 Hz–63 Hz
Running current	4.4 A	2.2 A
Power consumption (max.)	345 W	343 W
Universal power supply	Switchable for input voltage	

* These depend on the voltage setting that you select.

Table B-2 Environmental Conditions

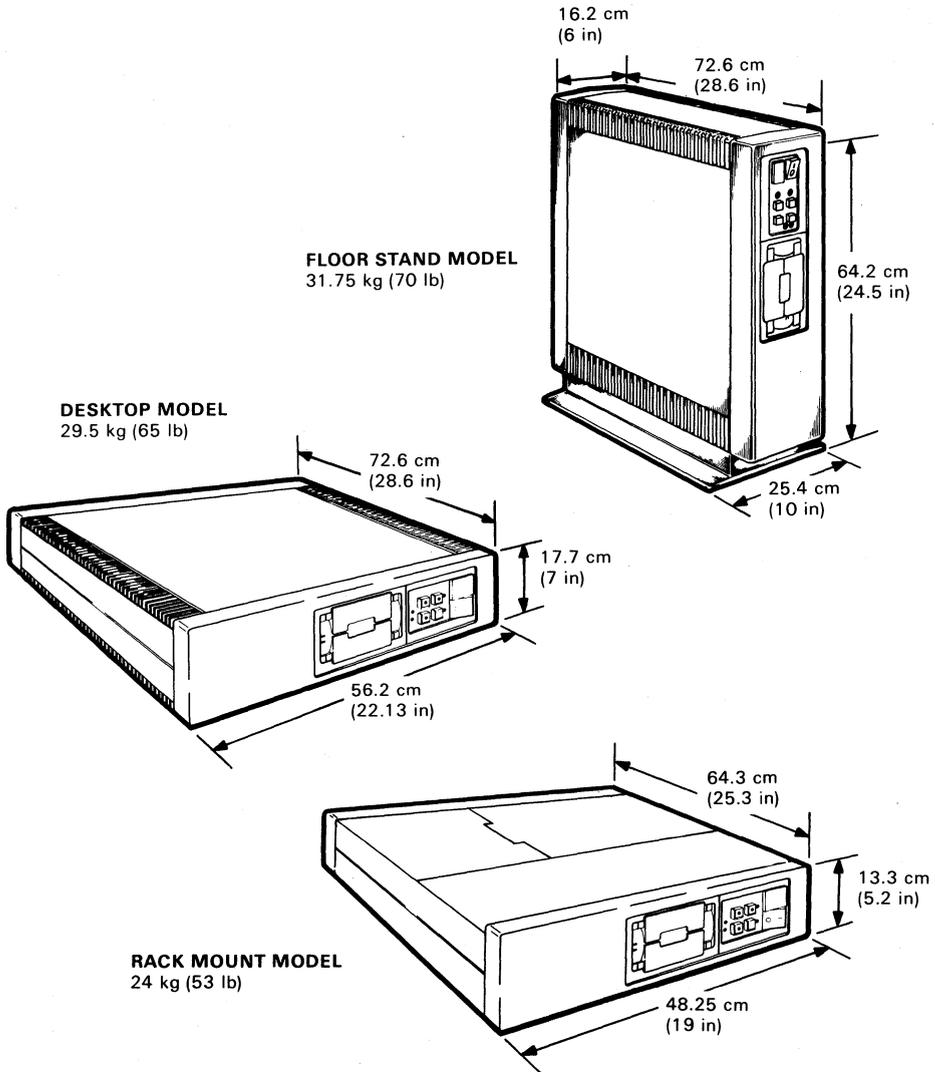
	Operating	Nonoperating
Maximum altitude	2400 m (8000 ft)	12000 m (39400 ft)
Temperature range*	15°C–32°C (59°F–89.6°F)	-40°C–60°C (-40°F–140°F)
Temperature change rate	1°C/hour (33.8°F/hour)	–
Relative humidity (noncondensing)	20% to 80%	10% to 95%

* Reduce the temperature specification by 1.8°C (1°F) for each 1000 m (3300 ft) increase in altitude.

NOTE

Your service contract may require specific limits for temperature and humidity.

PHYSICAL SPECIFICATIONS – MicroPDP-11 SYSTEMS



RX50 DUAL DISKETTE DRIVE**Performance**

Diskettes per dual diskette drive	2
Number of recording surfaces per diskette	1

Storage capacity

per diskette (96 tracks)	400 K (409,600 bytes)
per track (10 sectors)	5,120 bytes
per sector	512 bytes

Transfer rate	31.25 Kbytes/s
Average access time	264 ms

Functional Specifications

Rotational speed	300 r/min
Density	96 tracks per inch

Physical Specifications

Height	8.4 cm (3.3 in)
Width	14.7 cm (5.8 in)
Depth	21.6 cm (8.5 in)
Weight	1.7 kg (3.8 lbs)

RD51 FIXED DISK DRIVE

Performance Specifications

Average access time	85 m/s
Average rotational latency	8.33 m/s
Transfer rate	5 Mbits/s (625 Kbytes/s)

Media Characteristics

Formatted capacity	11.059 Mbytes
Recording surfaces (heads)	4
Disks	2
Bytes per track	8,192
Bytes per sector	512
Sectors per track	16
Track per drive	1,200
Recording method	Modified Frequency Modulation (MFM)

Physical Specifications

Height	8.4 cm (3.3 in)
Width	14.7 cm (5.8 in)
Depth	21.6 cm (8.5 in)
Weight	2.7 kg (5 lbs)

RD52 FIXED DISK DRIVE**Performance Specifications**

Average access time	53 m/s
Average rotational latency	8.5 m/s
Transfer rate	5 Mbits/s

Media Characteristics

Formatted capacity	30.96 Mbytes
Recording surfaces (heads)	6
Disks	3
Bytes per track	10,416
Tracks per drive	3,072
Track density (tpi)	591
Recording method	Modified Frequency Modulation (MFM)

Physical Specifications

Height	8.25 cm (3.25 in)
Width	14.6 cm (5.75 in)
Depth	20.32 cm (8 in)
Weight	3.15 kg (7 lbs)

TK50 TAPE DRIVE

Performance Specifications

Start distance	12.7 cm (5 in) (min.); 30.5 cm (12 in) (max.)
Stop distance	8.9 cm (3.5 in) (min.); 12.7 cm (5 in) (max.)
Data rate	45 Kbytes/s
Tape speed	75 in/s
Access time from insertion of a new cartridge	1 min (min.); 35 min (max.)

Media Characteristics

Unformatted capacity	132 Mbytes
Recording medium	1.27 cm (1/2 in) wide; 182.88 m (600 ft) long magnetic tape
Recording density	6667 bits per in
Number of tracks	22
Mode of operation	Streaming
Read/Write method	Serpentine
Recording method	Modified Frequency Modulation (MFM)

Physical Specifications

Height	8.25 cm (3.25 in)
Width	14.6 cm (5.75 in)
Depth	20.32 cm (8 in)
Weight	2.3 kg (5 lbs)

POWER SUPPLY

Output Current

+5 Vdc	4.5 A–36 A
+12 Vdc	0 A–6 A
Total power output	230 W (max.)
Overvoltage protection	
Overcurrent protection	
Thermal shutdown	
Digital standard AC OK, DC OK, and remote controller signals.	

Appendix C Related Documentation

Table C-1 MicroPDP-11 Library

Document	Order Number
MicroPDP-11 System Site Preparation and Verification Guide	EK-OLCP5-SP
MicroPDP-11 Systems Owner's Manual	EK-MIC11-OM
MicroPDP-11 Systems Technical Manual	EK-MIC11-TM
MicroPDP-11 System Pocket Service Guide	EK-MIC11-PS
MicroPDP-11 System Illustrated Parts Breakdown	EK-OLCP5-IP
MicroPDP-11 Systems Maintenance Guide	EK-MIC11-SG
DZV11 Asynchronous Multiplexer Technical Manual	EK-DZV11-TM
KDJ11-B CPU Module User's Guide	EK-KDJ1B-UG
KDF11-BA CPU Module User's Guide	EK-KDFEB-UG
KDF11-B Print Set	MP-01650-01
KDJ11-BC Print Set	MP-01969-01
MSV11-P User Guide	EK-MSVOP-UG
MSV11-J MOS Memory User's Guide	EK-MSV1J-UG
RQDX1 Controller Module User's Guide	EK-RQDX1-UG
RQDX2 Controller Module User's Guide	EK-RQDX2-UG
RQDX3 Controller Module User's Guide	EK-RQDX3-UG
RD52A Technical Description Manual	EK-RD52A-TD
TK50 Tape Drive Subsystem Owner's Manual	EK-LEP05-OM
Microcomputer Handbook Series	
Microcomputer Interfaces Handbook	EB-20175-20
Microcomputer and Memories Handbook	EB-18451-20
MicroPDP-11 Systems Handbook	EB-24944-20
PDP-11 Software Handbook	EB-08687-20
Software Documentation	
Introduction to RT-11	DEC-11-ORITA-A-D
RT-11 System User's Guide	DEC-11-ORGDA-A-D
RSTS/E System User's Manual	AA-5133B-TC
RSX-11M System Generation and Installation Guide	AA-H625C-TC
RSX-11M-PLUS System Generation and Installation Guide	AA-H431C-TC

Related Documentation

You may order these by writing to:

Digital Equipment Corporation
Accessories and Supplies Group
P.O. Box CS2008
Nashua, NH 03061

Attention: Documentation Products

Table C-2 Diagnostic Software Documentation

Document	Order Number
XXDP+/SUPR User's Manual	AC-F348A-MC
DEC/X11 User's Manual	AC-F053-MC
DEC/X11 Cross Reference Manual	AC-F055-MC

For further information on diagnostic software, refer to the *PDP-11 Software Components Catalog* (AV-BO21E-TC). To order these documents, contact your Digital sales representative.

Appendix D MicroPDP-11 Options

Many information management and software tools are available for MicroPDP-11 systems. Refer to the *PDP-11 Software Components Catalog* (AV-BO21E-TC) or contact your sales representative for a list of these tools.

You may add additional modules and components to the computer if there is available space on the backplane. The capacity of the power supply may also affect the addition of options. Some options are customer-installable, while others require installation by trained personnel.

For specific information about MicroPDP-11 options, refer to the *MicroPDP-11 Systems Technical Manual* or to the documentation provided with the option.

TERMINAL AND PRINTER OPTIONS

You can use any of Digital's video or hard-copy terminals, and any LA-series printer with MicroPDP-11 systems. MicroPDP-11 systems support terminals and printers that meet EIA standard RS-232C.

The number of terminals or printers you may connect to a MicroPDP-11 system depends on the model.

Some options available for MicroPDP-11 systems allow addition of four or more terminals and printers. See the *MicroPDP-11 Systems Technical Manual* for further details.

PROCESSOR OPTIONS

The basic MicroPDP-11 system processor can be expanded by the addition of floating-point capability and commercial instruction set options. The following options are for KDF11-B systems only.

1. The KEF11-AA Floating-Point Option (for KDF11-Bx only)

The KEF11-AA option performs operations on 32-bit and 64-bit floating-point numbers. It provides up to 17 digits of precision and integer-to-floating-point conversion. The option is a 40-pin chip that mounts directly on the CPU module.

2. The FPF11 Floating-Point Option (for KDF11-B only)

The FPF11 option also performs operations on 32-bit and 64-bit floating-point numbers and it provides up to 17 digits of precision, as well as integer-to-floating-point conversions. The FPF11 option operates six times faster than the KEF11-AA option. The option is a quad-height module that is mounted in the backplane.

3. The KEF11-BB Commercial Instruction Set (CIS) Option (for KDF11-Bx only)

The KEF11-BB option provides improved COBOL performance, text editing, and word processing capability. The CIS option adds character string instructions to the basic PDP-11 instruction set. The option is a double-socket chip that is mounted on the CPU module.

MEMORY OPTIONS

Table D-1 lists some of the memory options available for MicroPDP-11 systems.

Table D-1 MicroPDP-11 Memory Options

Module Number	Capacity	Chip
MCV11-DC	32 Kbytes	16 K CMOS
MSV11-PK	256 Kbytes	64 K
MSV11-PL	512 Kbytes	64 K
MRV11-D	64 Kbytes	Customer-supplied PROMs

COMMUNICATION OPTIONS

Table D-2 lists some of the communication options available for MicroPDP-11 systems.

Table D-2 Communication Options

Model	Maximum Speed	Transmission Mode
DUV11-AP	19,200	Synchronous
DPV11-AP	56,000	Synchronous
DZV11-DP	9,600	Asynchronous
DHV11-AP	38,400	Asynchronous
DLVJ1-LP	38,400	Asynchronous
DLVE1-DP	19,200	Asynchronous
DMV11-AP	56,000	Synchronous
DMV11-BP	56,000	Synchronous
DMV11-CP	56,000	Synchronous
DMV11-FP	56,000	Synchronous
DEQNA-KP	Controller to interface to a local area Ethernet network.	

There may be some software restrictions on baud rates. Refer to your software documentation.

MASS STORAGE OPTIONS

Table D-3 lists some of the mass storage options available for MicroPDP-11 systems.

Table D-3 MicroPDP-11 Mass Storage Options

Type	Storage Type	Formatted Capacity per Drive	DMA Capability
TU58	Tape	512 Kbytes	No
TK25	Tape	60 Mbytes	Yes (22-bit) Block mode
RXV21-EP	Diskette	512 Kbytes	Yes (18-bit)
RLV22-AP	Disk	10.4 Mbytes	Yes (22-bit)
RX50	Diskette	2 × 400 Kbytes	Yes (22-bit) Block mode
RD51	Fixed disk	10 Mbytes	Yes (22-bit) Block mode
RD52	Fixed disk	31 Mbytes	Yes (22-bit) Block mode
RC25	Disk platter fixed/removable	52 Mbytes	Yes (22-bit) Block mode
TSV05	Tape	40 Mbytes	Yes (22-bit)

This is only a partial list of options available for MicroPDP-11 systems. For a complete, up-to-date list, contact your sales representative.

NOTE

Italicized words in definitions are themselves Glossary entries.

Access time

The total time taken to find *data* in a storage location. For *disks*, the access time is equal to the sum of the average *latency time* and the average *seek time*.

ANSI

The acronym for "American National Standards Institute."

Answerback

A preprogrammed response from a *terminal*.

Application program

A *program* designed to meet specific user needs; for example, one that monitors a manufacturing process.

Assembled program count

The address of an instruction relative to the starting address of the program.

Asynchronous multiplexer

A *device* that controls and alternates the transmission of signals in order that more than one signal can be transmitted over a single *communications line*. The data transmitted contains the necessary synchronizing information in the form of start and stop signals.

Backplane

The panel into which all the system's printed circuit boards are inserted. The backplane contains all their interconnecting wiring and permits the printed circuit boards to share signals.

Backup

The process of making copies of the data stored in your *disk drive(s)* so that you can recover that data after an accidental loss. You make these copies on *diskettes* or *magnetic tape*.

Backup copy

A copy of data stored in your disk drive(s) or on diskettes. Backup copies are made on diskettes or magnetic tape. It is good practice to make daily backup copies of all data files you have changed. Also, each week, make a backup copy of all the files on your fixed disk drive.

Baud rate

The speed at which signals are transmitted along a communications line. In the case of *binary* signals, one baud equals one *bit* per second.

Binary

A number system that uses only 2 digits: 1 and 0. These digits are represented in computer circuitry by the presence of current (equivalent to 1) or its absence (equivalent to 0). All computer programs are executed in binary form.

Bit

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

Boot

A commonly used abbreviation for *bootstrap*.

Bootable medium

A device containing *software* (such as an *operating system*) that the computer's bootstrap program can activate in order for the computer to begin processing.

Bootstrap

1. A program which, in the case of the MicroPDP-11 system, you activate when you turn on the computer. The program loads preliminary instructions into *memory*. These instructions then load an operating system or other software into memory so the computer can begin processing.
2. To use a bootstrap program.

BOT

1. The acronym for "beginning of transmission."
2. The acronym for "beginning of tape."

Buffer

A storage area that temporarily holds data being transferred between two devices.

Bug

A mistake in the design or implementation of a program.

Bus

A group of electrical connections (wires) that carries signals between different parts of a *computer system*.

Bus error trap

A high-priority *interrupt* that halts the processor routine and initiates a sub-routine. The interrupt occurs because of an error on the *bus* (for example, a device fails to answer at its expected address) and usually indicates a faulty *CPU* or memory module.

Bus grant

Composed of two signals used by the CPU to acknowledge requests for the bus.

1. The bus interrupt acknowledge (BIAK) signal acknowledges an interrupt request.
2. The bus direct-memory-access grant (BDMG) signal acknowledges a DMA request.

A device receiving one of these signals will pass the signal on to the next device on the *backplane*, only if it does not require the bus itself. Therefore, devices closer to the CPU have priority over those further down the backplane.

Byte

A group of eight binary digits (bits). A byte is typically one-half or one-quarter the size of a *word*, depending on the computer.

CCITT

The acronym for “Comité Consultatif Internationale de Télégraphie et Téléphonie” (International Telegraph and Telephone Consultative Committee).

Central processing

The activities carried out by the *central processing unit*.

Central processing unit (CPU)

The part of a computer system that controls the interpretation and execution of instructions.

Channel

A path for electrical transmission between two points.

Command

An order given by a user to a computer, often through a terminal keyboard.

Communications line

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

Computer system

A combination of *hardware* and *software* that performs specified operations on data; often abbreviated as *system*.

Console terminal

The terminal you use when installing software and running *diagnostic programs*. In a MicroPDP-11 system, the console terminal is usually connected to the A0 socket at the rear of the system.

Control status register (CSR)

A register that contains status information about a device.

Controller

The computer component, usually a printed circuit board, that regulates the operation of one or more *peripheral devices*.

Control panel

The part of a computer that contains its control switches and indicators.

CPU

Central processing unit.

CRC

The acronym for “cyclic redundancy check,” a method of detecting errors.

Data

A formalized representation of facts, concepts, or instructions suitable to automated or human communication, interpretation, or processing.

Data transmission

The movement of data, in the form of electrical signals, along a communications line.

Debug

To detect, locate, and correct mistakes (*bugs*) in a program.

Default

The value of a selection assumed by the computer when a specific value is not supplied by the user.

Delimiter

A character that terminates a character string or message, or separates it from surrounding text.

Device

Any equipment connected to a computer that is capable of receiving, storing, or transmitting data. See *input device*, *output device*, *input/output device*.

Device name

The name that identifies a device within a computer system and used to refer to that device when communicating with the system.

Diagnostic program

A program that detects and isolates malfunctions in a computer's hardware.

Disk

A rigid, flat, circular plate with a magnetic coating on which data is stored in concentric circles (tracks). Disks come in different sizes, with different storage capacities.

Disk drive

A device that records information on one or more rapidly spinning disks.

Diskette

A flexible, flat, circular plate with a magnetic coating, contained in a sealed envelope, and used for storing data. Standard diameters are 133.4 mm (5.25 in) and 203.2 mm (8 in).

Diskette drive

A device that records information on one or more rapidly spinning diskettes.

DMA

The acronym for “direct memory access,” a facility that allows input/output transfers to bypass the CPU’s general registers and go directly to and from memory.

DTR

The acronym for “data terminal ready,” a control signal that enters a *modem* from the terminal or communications device using the modem. When the signal is set, it informs the modem that the terminal is ready to transmit or receive data. When the signal is clear, the terminal is not ready.

Dual-height module

An option for *Q22-Bus* systems that requires half a slot on the backplane.

Duplex

In communications, simultaneous, two-way, independent transmission in both directions; also called *full-duplex*.

EIA

The acronym for the “Electronic Industries Association.”

EIA interface

The standard code defined by the Electronic Industries Association for use in data exchange.

EOT

1. The acronym for “end of transmission.”
2. The acronym for “end of tape.”

EPROM

The acronym for “erasable programmable read-only memory,” a ROM that can be reprogrammed by a user.

Error message

A message displayed by the computer that indicates it has detected a mistake or malfunction.

FCC

The acronym for “Federal Communications Commission,” Washington, D.C.

File

A collection of related information treated by the computer as a single item.

Firmware

A program of instructions that is in *read-only-memory (ROM)* so it will not be changed. For example, the MicroPDP-11 and MicroVAX systems' firmware includes the self-test program that runs every time you turn the computer on.

First address range

The range within which the starting address of a memory module must occur. (For examples, see Table 4-4 in the *MicroPDP-11 Systems Technical Manual*.) The actual starting address is determined by the combination of the *first address range* and the *partial starting address*.

Floating-point processing

A method of calculation that automatically moves the decimal point.

Formatted data

Data laid out in a particular pattern to conform to a predetermined structure. The structure is dictated by the operating system.

FRU

The acronym for "field replaceable unit."

Full-duplex

A form of data transmission in which messages can pass through a circuit, in both directions, simultaneously; also called *duplex*.

Graphics

The use of lines and figures to display data, as opposed to the use of printed characters.

Half-duplex

A form of data transmission in which messages can pass through a circuit in both directions. However, transmission in both directions cannot take place simultaneously.

Hard-copy terminal

A terminal that displays information on paper, rather than on a screen. Compare *video terminal*.

Hardware

The physical components, mechanical and electrical, that make up a computer system. Compare *software*.

Head

The part of a disk or diskette drive that reads, *records*, and erases data; also called read/write head.

Hertz (Hz)

A unit of frequency equal to one cycle per second.

Input device

A piece of equipment that is used to get data into a computer; a keyboard, for example.

Input/output (I/O) device

A piece of equipment that accepts data for transmission both to (input) and from (output) a computer; a terminal, for example.

Instruction set

A group of commands that tells the computer what operation to perform.

Interactive

A method of communicating with a computer system in which you type a *command* at the *keyboard*, the system executes the command and responds, usually with a prompt for a further command.

Interface

A device or software program that allows two components of a computer to communicate with each other.

Interrupt

A break in a program, caused by an external source, that requires that control pass temporarily to another program.

I/O

Abbreviation for “input/output.”

I/O page address

The physical address of a device register.

ISAM

The acronym for “Index Sequential Access Method,” the technique for accessing records in files that have an indexed sequential organization.

Jumper

An electrical conductor used to complete a circuit, and so affect the logic of a circuit board.

K

When referring to the storage capacity of a computer, the symbol that means 2 to the 10th power (1024 in decimal notation). Hence, a 4 K memory has 4096 words.

Kbyte

Abbreviation for *kilobyte*.

Keyboard

The part of a terminal you use to type commands and text.

Kilobyte

1024 *bytes*.

Latency time

The delay while waiting for data on a rotating disk to reach the disk *head*. The average latency time is equal to half the time taken for one revolution of the disk.

LED

The acronym for “light-emitting diode.”

List processing

A feature of some *word processing software* you can use to produce many copies of a standard text, with certain information changing from one copy to the next. For example, you can use list processing to produce personalized letters.

Load

1. To move software, usually from a peripheral device into memory.
2. To physically place a disk into a disk drive, or tape into a tape drive.

LSI

The acronym for “large-scale integration.”

Magnetic tape

A long strip of plastic coated with magnetic oxide, used for storing data; often called magtape.

Mbyte

Abbreviation for *megabyte*.

Megabyte

1,048,576 bytes.

Memory

The area where a computer finds the instructions and data it needs to process, and where it stores the results. Memory is organized as a series of locations, or cells, each of which can hold one word. The locations are numbered in sequence. These numbers, or addresses, enable the computer to refer to the memory's contents.

Memory management unit

A device that extends the amount of memory the CPU can access to 64 *Kbytes* or more. The memory management unit also protects and organizes areas of memory.

Menu

A displayed list of options.

Mode

A state (e.g., line or local mode) or method of operation (e.g., console dialog mode).

Modem

The acronym for "modulator-demodulator," a telecommunications device that provides an interface between a computer and a peripheral device or another computer.

MOS

The acronym for "metallic oxide semiconductor."

Mount (a disk)

To load a disk into a disk drive, and put the drive *on-line*.

MSCP

The acronym for "mass storage control protocol."

Nonvolatile memory

A storage medium that retains its data in the absence of power.

ODT

The acronym for "on-line *debugging* technique."

Off-line

Pertaining to equipment, devices, and events that are not under direct control of a computer.

On-line

Pertaining to equipment, devices, and events that are in direct communication with a CPU and thereby under its control in some way.

Operating system

A collection of computer programs that controls the overall operation of a computer and performs such tasks as:

1. Assigning places in memory to programs and data
2. Processing requests, scheduling jobs, and
3. Controlling the operation of input and output devices.

Output device

A piece of equipment used to extract data from a computer system; a *printer*, for example.

Parity bit

An extra bit added to a byte or word to ensure there is always either an even or odd number of bits, according to the logic of the system.

Parity error

An error caused when the value calculated for a parity bit is not equal to its actual value.

Partial starting address

The starting address of a memory module relative to the first address range for that module. (For examples, see Table 4-4 in the *MicroPDP-11 Systems Technical Manual*.) The actual starting address of the module is determined by the combination of the first address range and the partial starting address.

Peripheral device

Any device distinct from the central processing unit that provides it with additional memory storage or communication capability; disk and *diskette drives*, video terminals, and printers, for example.

Power-up sequence

A series of ordered events that occurs when you turn on a system.

Printer

A peripheral device that provides paper copies of information stored in a computer.

Processor status word

A register in some computers that indicates the current priority of CPU operation, the condition of the previous operation, and other basic control information.

Program

A complete sequence of instructions necessary for a computer to perform a task. See *software*.

Program counter

A register in the CPU that holds the address of the next instruction (except in the case where the current instruction causes a jump).

PROM

The acronym for “programmable read-only memory,” a *ROM* that can be programmed by a user.

Prompt

A word or symbol a computer displays to indicate it is waiting for you to type a command.

Protocol

A formal set of conventions governing the format and relative timing of message exchanges between two communicating processes.

Q22-Bus

An extended version of the LSI-Bus that allows 22-bit addressing.

Quad-height module

An option for Q22-Bus systems that requires a full slot on the backplane.

RAM

The acronym for “*random-access* memory,” a memory in which the CPU can access all locations with equal facility.

Random-access

Pertains to a storage device from which data or blocks of data can be read in any order.

Read-only memory (ROM)

A memory that does not allow modification of its contents. That is, a computer can use the data in a ROM, but cannot change it.

Real-time

Refers to the actual time during which a process takes place.

Reboot

To restart a computer system. Pressing the Restart button on the control panel *reboots* the MicroPDP-11 system.

Record

A set of related data that a program can treat as a unit. A *file* consists of a number of records.

Reserved instruction

An instruction that is not available to the system. For example, instructions relating to floating-point operations are not available to systems that have no floating-point options installed.

Reserved instruction trap

A jump to a specified location that occurs when the system attempts to execute a reserved instruction.

ROM

The acronym for “read-only memory,” preprogrammed memory that can be read from, but not written to.

RTS

The acronym for “request to send,” a signal sent from a terminal to a modem to inform the modem that the terminal is ready to transmit data.

Run

1. A single, continuous execution of a program.
2. To execute a program.

Seek time

The time taken for a disk drive’s read/write heads to move to the required *track* on the disk.

Serial line unit

A device that provides an interface between a serial communications line and the CPU module.

Serial transmission

A method of transferring data in which the bits of the characters are sent sequentially on a single path.

Software

Programs executed by a computer system to perform chosen or required functions. Compare *hardware*.

Software package

A set of related programs that together perform a specific task.

Stop bits

In *serial transmission*, one or two bits that are transmitted at the end of a data word. The stop bits give the receiver time to ready itself for the next data word.

Storage medium

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

Store

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

Synchronous

1. Having identical time periods.
2. A communications format in which each data character uses the same time period. The data, including blank time, is controlled by an external clock device or modem.

System

A computer system; a combination of hardware and software that performs specific processing operations.

System management

Tasks performed by the operating system that control the overall operation of the computer system.

System mapping routine

A program that finds and displays the hardware addresses of the devices in a system.

Terminal

An input/output device generally used for communication between the user of a computer system and the system itself. Terminals are divided into two basic categories: video and hard-copy.

Track

A path on a diskette, disk, or tape that holds data.

Trap

A conditional jump to a known memory location, performed automatically by hardware. The jump occurs when the execution of an instruction causes an unexpected result. The address location from which the jump is made is stored. (A trap is distinguished from an interrupt in that an interrupt is caused by an external event.)

USART

The acronym for “universal asynchronous receiver/transmitter,” a device that performs parallel-to-serial and serial-to-parallel conversion.

Utility program

A program used to perform some frequently required process in the operation of a computer.

Video terminal

A terminal that displays information on a screen. Compare *hard-copy terminal*.

Winchester disk

A hard disk permanently sealed in a drive unit to prevent contaminants from affecting the read/write head.

Word

The largest number of bits a MicroPDP-11 system can process in any one operation. Some computers can process longwords (two words), and quadwords (four words).

Word processing software

Software you use to process text; for example, to create, edit, and print documents.

Write-protect

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

Write-protect sensor

The part of a diskette drive that registers whether the *write-protect notch* of a diskette is covered.

Write-protect notch

A small notch in the side of a diskette’s jacket that you cover with an adhesive label or tab to *write-protect* the diskette.

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