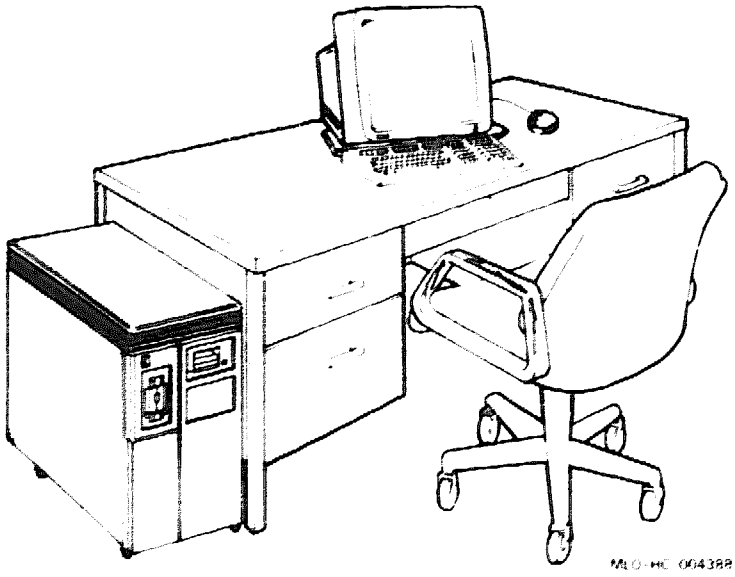

VAXstation 3

VAXstation 3 Owner's Manual, BA123 Enclosure

Order Number EK–155AA–OW–001



digital equipment corporation
maynard, massachusetts

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The READER'S COMMENTS form on the last page of this document requests the user's critical evaluation to assist in preparing future documentation.

ML-S763

FCC NOTICE: The equipment described in this manual generates, uses, and may emit radio frequency energy. The equipment has been type tested and found to comply with the limits for a Class A computing device pursuant to Subpart J of Part 15 of FCC Rules, which are designed to provide reasonable protection against such radio frequency interference when operated in a commercial environment. Operation of this equipment in a residential area may cause interference, in which case the user at his own expense may be required to take measures to correct the interference.

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Preface

This manual describes how to install, operate, and troubleshoot the VAXstation 3 in the BA123 Enclosure. DIGITAL recommends that you read this manual before you install your system. If you experience system problems, use this manual to isolate the error before seeking help from service personnel.

Description of the VAXstation 3

The VAXstation 3 with a BA123 Enclosure, is a stand-alone, 32-bit workstation based on the KA650–BA Central Processing Unit (CPU). The system supports up to 24 megabytes of memory. Other system components include a 47.5-centimeter (19-inch) diagonal color or monochrome monitor on a tilt-swivel base, a mouse or tablet, a keyboard, a video subsystem module, and an Ethernet communications module. You may have one or more of the following storage options: a tape drive, diskette drive, or fixed-disk drive.

The video subsystem, based on a VLSI (Very Large Scale Integration) graphics coprocessor, off-loads the KA650–BA main processor from computation-intensive graphics tasks. The system allows parallel processing in multiple planes so that no degradation in performance occurs as planes are added.

The VCB02 video subsystem is available in two versions: 4-plane and 8-plane. The 4-plane video subsystem, a 2-module set, can display 16 colors or shades of gray simultaneously. The 8-plane video subsystem, a 3-module set, can display 256 colors or shades of gray simultaneously.

The system unit can be placed on the floor beside a desk or table. Hardware options include printers, a tablet, a plotter, memory modules, disk drive subsystems, a tape drive, a dual diskette drive, a fixed-disk drive, asynchronous multiplexers, synchronous line controllers, a programmable communications controller, and a real-time interface module.

ULTRIX–32m and MicroVMS are the two operating systems offered for the VAXstation 3. Both operating systems offer layered-product software, networking software, and a wide range of tools and applications.

Workstation software expands the utility and convenience of the VAXstation 3 operating system by providing you with terminals simulated in windows

on the monitor screen. Each virtual terminal runs processes independent of those processes running in other windows. The keyboard may be associated with any window at any time. Software tools let you create windows and graphics from a program level. Your workstation software documentation contains additional information on your system and optional hardware.

Using the mouse or the tablet to move a pointer, you can view or manage a variety of activities at once. For example, you can do the following:

- Examine a compilation listing while editing the source file
- Read notices without exiting from a program
- Start one task and follow its progress while interacting with another task
- Send mail without exiting an editing session
- Log on to a remote VAX host to run tasks requiring intensive computation
- Print a list of files on your printer while creating other files (requires the printer option)

Conventions

Convention	Meaning
Bold	VAXstation 3 system controls and indicators are highlighted in bold lettering.
"Quotes"	Diagnostic media titles and tests appear in quotations.
Italics	Computer terms defined in the Glossary are italicized the first time the word appears in the text, beginning with Chapter 1.

Document Structure

The manual is divided into six parts:

Part I: Base System Installation

This part describes how to install and test the VAXstation 3.

- **Chapter 1** lists the components in your shipment and provides a brief site preparation review.
- **Chapter 2** describes how to set up, connect, and test the system components.

Part II: Operation

This part describes how to operate the VAXstation 3.

- **Chapter 3** describes the system controls and indicators.

Part III: Options

This part describes the hardware options for the VAXstation 3 and gives installation information where applicable.

- **Chapter 4** describes hard-copy output devices, input devices, memory, disk storage devices, and communications devices. The chapter provides installation information for those options.

Part IV: Troubleshooting

This part describes how to isolate a problem and decide what to do next.

- **Chapter 5** explains basic troubleshooting procedures, power-up messages, and the maintenance system for the VAXstation 3.
- **Chapter 6** describes how to call DIGITAL for help.

Part V: Appendixes

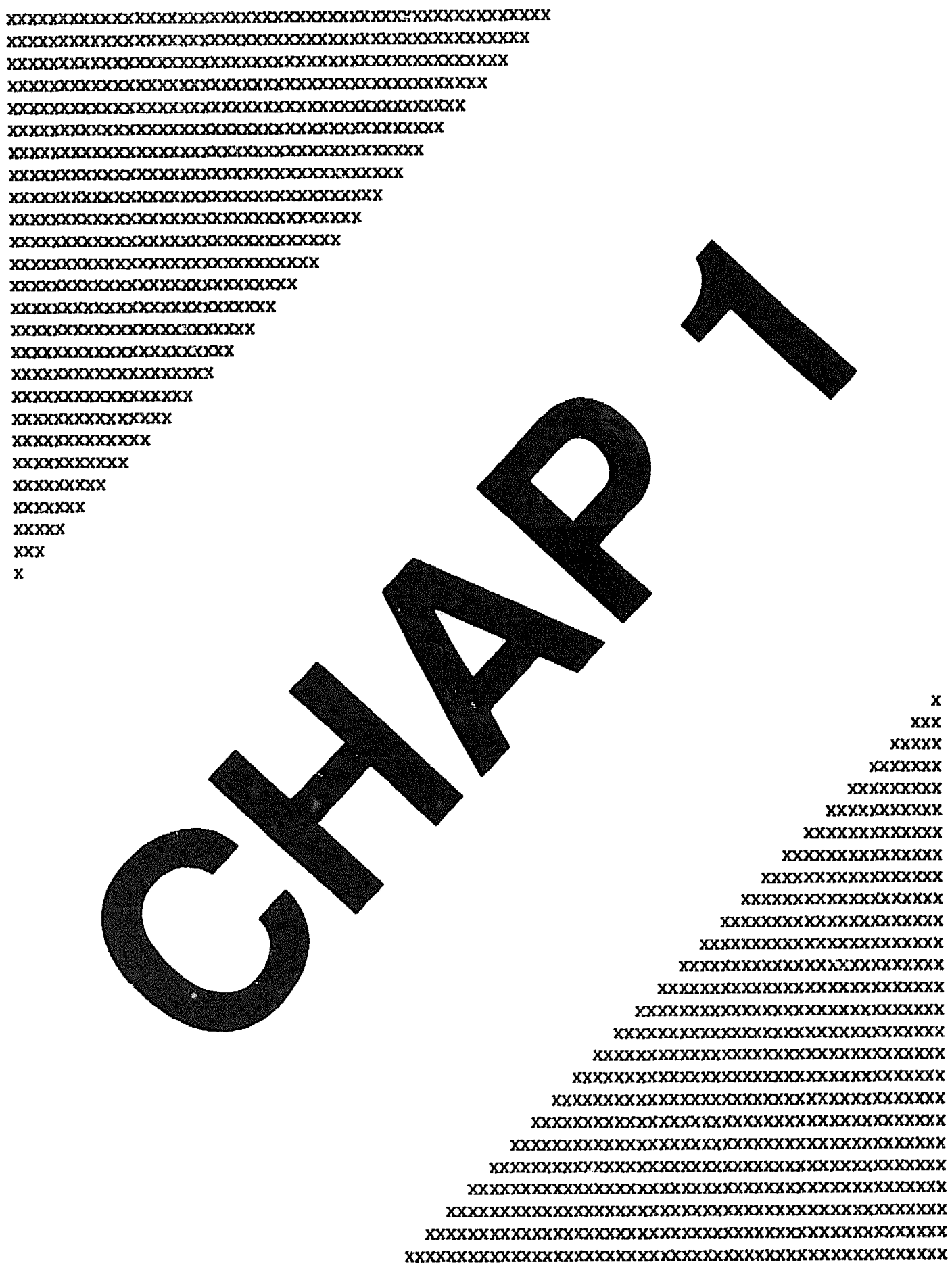
- **Appendix A** provides VAXstation 3 system specifications.
- **Appendix B** lists related documents.

Part VI: Glossary

The glossary defines computer terms that are italicized at first use in the text as well as other common computer terms.

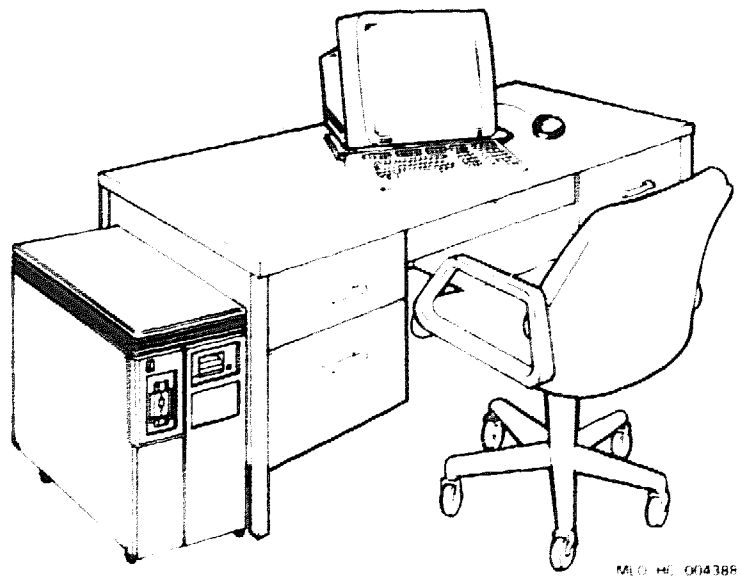
Intended Audience

This manual is for those people responsible for installing VAXstation 3 hardware and software. It is intended for use by DIGITAL service personnel during initial system installation.


CHAP 1

Chapter 1
Preparing for Installation

Figure 1–1: A VAXstation 3 in the BA123 Enclosure



System Components

1. The VAXstation 3 system unit and accessories.
   - Accessories Kit

     Installation and testing accessories, including a flat screwdriver, a Phillips screwdriver, assorted screws, label sheets, and a grant card (for use by your support personnel)
   - System unit power cord and loopback connectors
   - Video cable assembly

     BC18Z for the VR290 color monitor

BC18P for the VR260 monochrome monitor

- VAXstation 3 system unit (BA123 Enclosure)

2. *Hardware* Support Kit (Z1AAB).
   - *VAXstation 3 Owner's Manual, BA123 Enclosure* (this manual)
   - For systems with TK50s, TK70s, or RX50s: appropriate media for testing and troubleshooting (The ZNA01-C5 contains tape cartridges; the ZNA01-C3 contains RX50 *diskettes.*)
3. Graphics monitor (either color, VR290, or monochrome, VR260) and installation documentation.
   - Monitor power cord
   - Tilt-swivel base assembly for the monochrome monitor. The tilt-swivel base comes connected to the color monitor and needs no installation.
4. LK201 keyboard with cable to connect to the video cable assembly, rubber feet for the keyboard, and an extra power cord.
5. VSXXX-AA *mouse* or VSXXX-AB *tablet* with cable to connect to the video cable assembly.

NOTE: *You must order the BNE3x transceiver cable separately from the rest of the workstation components.*

Media and Documentation

If you order media and documentation, you receive *software* cartons for the *operating system* you select. The *MicroVMS Workstation Software* carton provides keyboard legend strips in addition to the media and documentation.

Check for optional items that you might have ordered, such as additional software or a *printer.*

If any components are damaged, or if any item is missing, contact your sales representative.

The "MicroVAX Diagnostic Monitor" Software

One of the software cartons contains the "MicroVAX Diagnostic Monitor," which you will use for functional verification of hardware operation. If your VAXstation malfunctions, MDM diagnostic programs can test the computer's hardware devices and identify the problem. MDM is supplied on either a

TK50 tape cartridge or an RX50 diskette, based on your system configuration. See item 2 above for systems with disks.

MDM diagnostics are *menu* controlled. You choose menu items 1, 2, 3, and 5 from the "MicroVAX Diagnostic Monitor's" "Main Menu" (see Chapter 2). The "Service Menu" (Item 4) is disabled in the "Customer Diagnostic Kit".

The "MicroVAX Diagnostic Monitor" for Diskless Systems

If the "MDM Ethernet Server" kit is installed on a VAX host, the MDM diagnostic software can be down-line loaded from a host system over DECnet/Ethernet *communication lines* to the VAXstation 3. Once the MDM software is in a VAXstation 3's volatile memory, you can run the diagnostic tests from the VAXstation. See the *MicroVAX Diagnostic Monitor Ethernet Server User's Guide*, Order No. AA-FNTAB-DN, for information on installing the server kit on a host VAX system. The diagnostic kit checks only *device controllers*; you do not need to modify the system before testing can occur.

The "Customer Diagnostic Kit" ZNA02-C3 contains RX50 diskettes, and the ZNA02-C5 kit contains the TK50 tape cartridge for use on diskless systems.

If additional options are purchased at a later date, you may need to order a new copy of the "MicroVAX Diagnostic Monitor".

Site-Preparation Review

Chapter 2 contains instructions for setting up your VAXstation 3. It is important to review the following site-preparation requirements before you set up your system. You must provide:

- Adequate space for the system unit and *peripheral devices*
- Proper electrical power
- A suitable operating environment

You may wish to review Appendix A, which provides VAXstation 3 system specifications, before you proceed with this chapter.

Space Planning

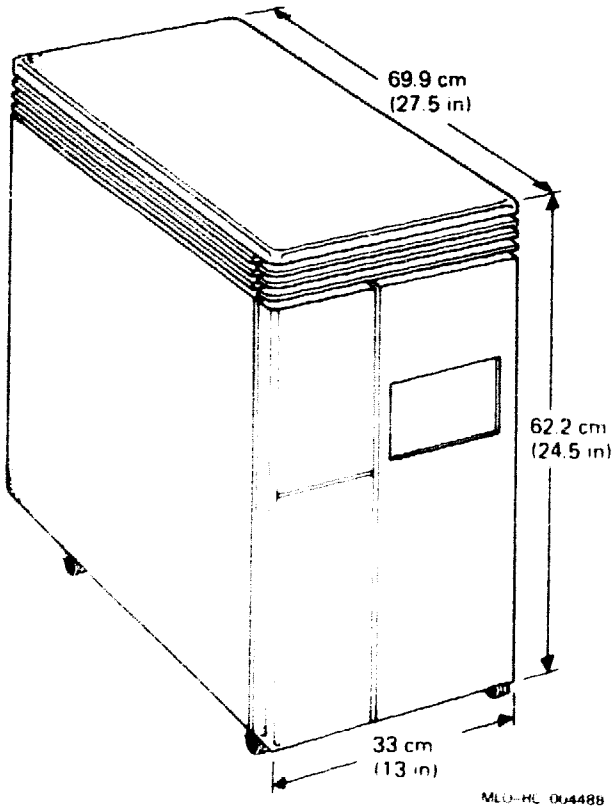
Leave enough space around the system unit and monitor to access the units and to allow air circulation through the units. Keep the system at least 90 centimeters (36 inches) from other terminals and monitors.

The System Unit

The vents on the system unit allow proper air flow. Do not block the vents in any way.

The unit weighs 59 kilograms (130 pounds).

Figure 1–2: Dimensions of the System Unit

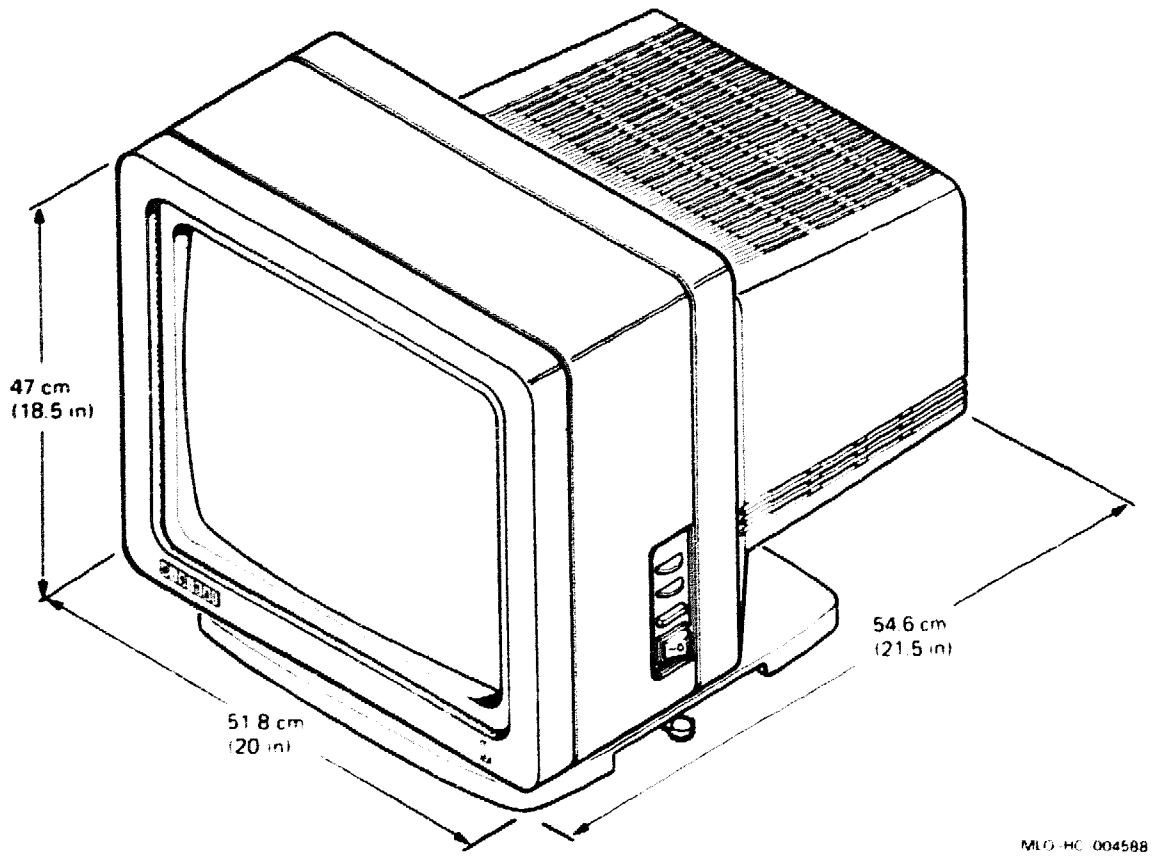


The VR290 Color Monitor

The vents on the monitor allow proper air flow. Do not block the vents in any way.

The VR290 color monitor weighs 36 kilograms (80 pounds).

Figure 1–3: Dimensions of the VR290 Color Monitor

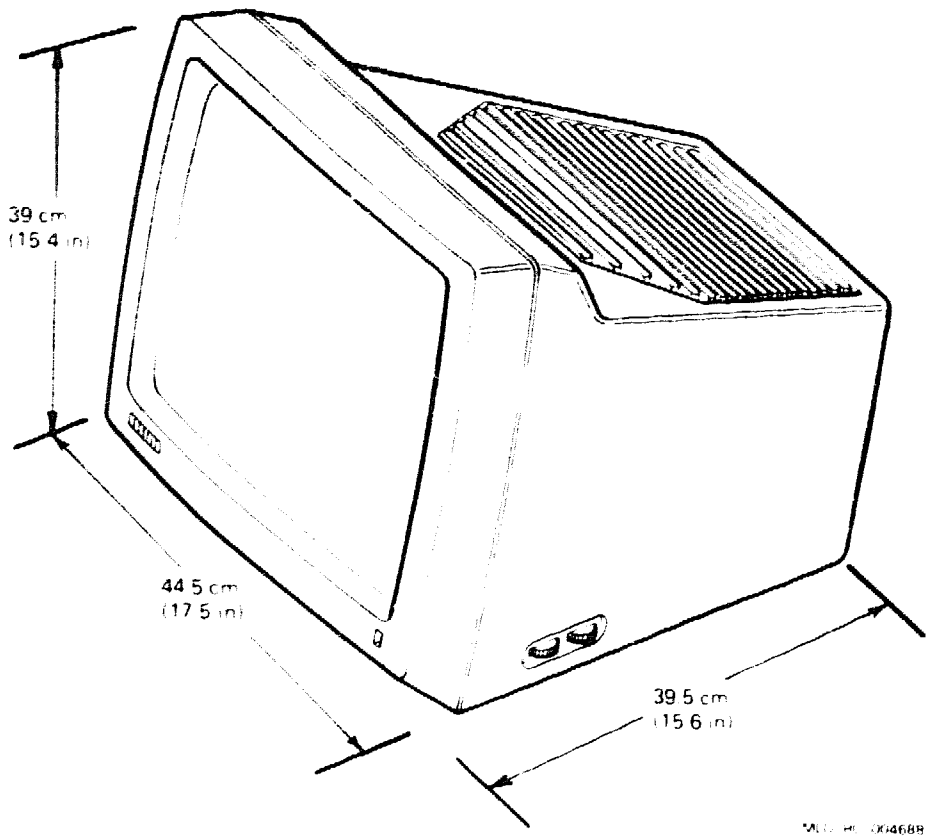


The VR260 Monochrome Monitor

The vents on the monitor allow proper air flow. Do not block the vents in any way.

The VR260 monochrome monitor weighs 18 kilograms (40 pounds).

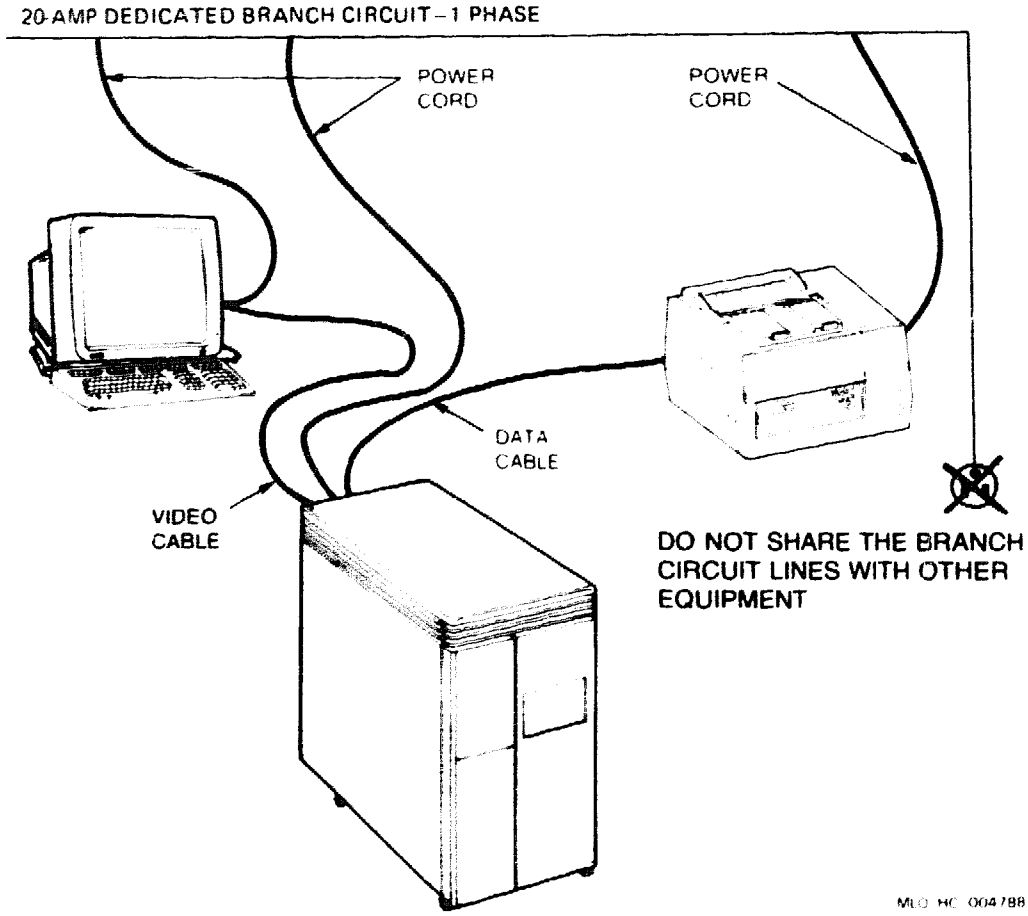
Figure 1–4: Dimensions of the VR260 Monochrome Monitor



Electrical Requirements

A 20-ampere branch circuit from a power distribution panel is recommended for each system. This circuit must meet national and local standards, provide a good system ground, be stable, and be free from electrical noise. Add power-conditioning equipment, where power disturbances cannot be prevented. Consult your service representative to assess your needs.

The ac power source should supply power to the original system and allow for system expansion. Do not connect other equipment (such as air conditioners, office copiers, or coffee pots) to the circuit dedicated to the system unit or the monitor.



Environment

Temperature and Humidity

The VAXstation 3 should be located in an environment where the temperature and humidity fall within the recommended values (see Table A–2). In addition, the system should be located so that air can circulate around the unit, thus preventing heat from accumulating.

Keep the VAXstation 3 away from heaters, photocopiers, or direct sunlight.

Static Electricity

Static electricity can cause a system to fail and *data* to be lost. The most common source of static electricity is the movement of people in contact with carpets and clothing. Low humidity causes the greatest buildup of static electricity. The following precautions reduce static buildup:

- Maintain greater than 40% relative humidity.
- Locate the system away from busy areas, such as office corridors.
- If a carpet is already fitted at the selected location, place antistatic pads under the system.

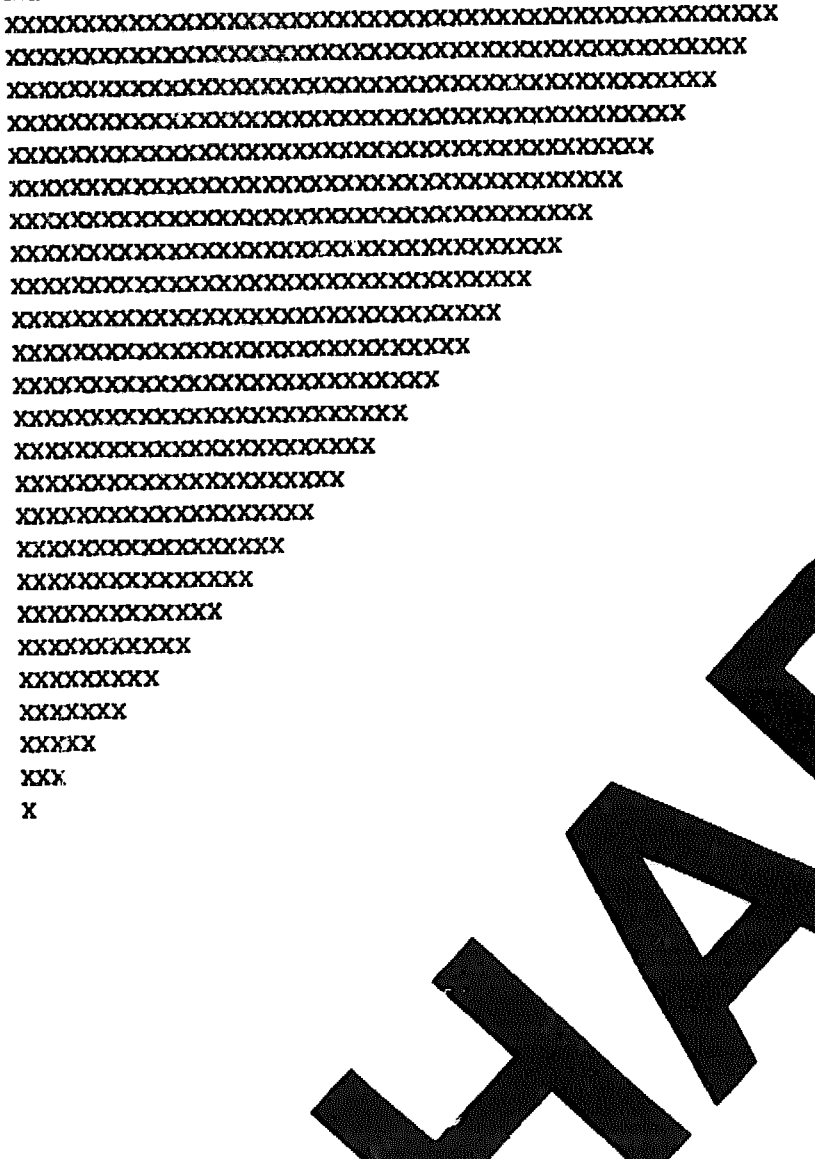
Clean Area

Dust particles can clog air passages inside the equipment, thus reducing the cooling air flow and diskette life, especially if the particles are abrasive. Keeping the system area clean and free from dust helps reduce those effects.

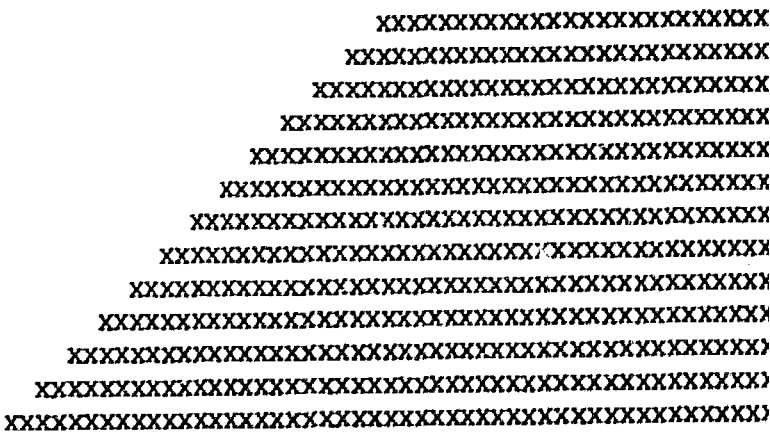
Do not place food or liquid on the system.

Supplies Storage

Store your diskettes and other supplies at the same temperature and humidity level as recommended for the system.



CHAP 2



Chapter 2
Setting Up the Hardware

This chapter describes how to assemble, connect, power up, and test your VAXstation 3.

CAUTION: *When connecting any component of the VAXstation 3 system, set all power switches to the 0 (OFF) position.*

WARNING: *Because of the weight of the system unit and the monitor, you will need two people to perform this procedure.*

Setting Up the System Unit

Make sure that the location selected for your system unit meets the site-preparation requirements described in Chapter 1. Read and follow the instructions associated with the level heads in this chapter during installation. If you need additional information:

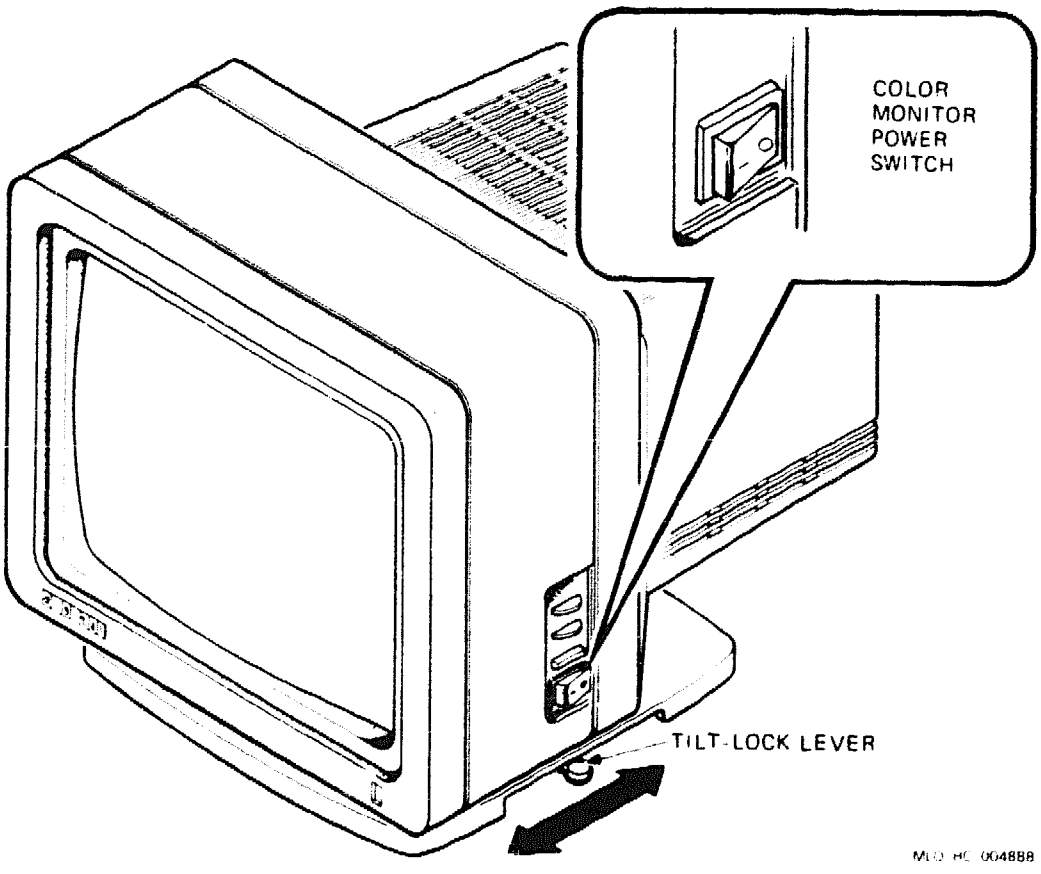
- See Chapter 5 for troubleshooting information.
- See Chapter 6 for service information.

Setting Up the VR290 Color Monitor

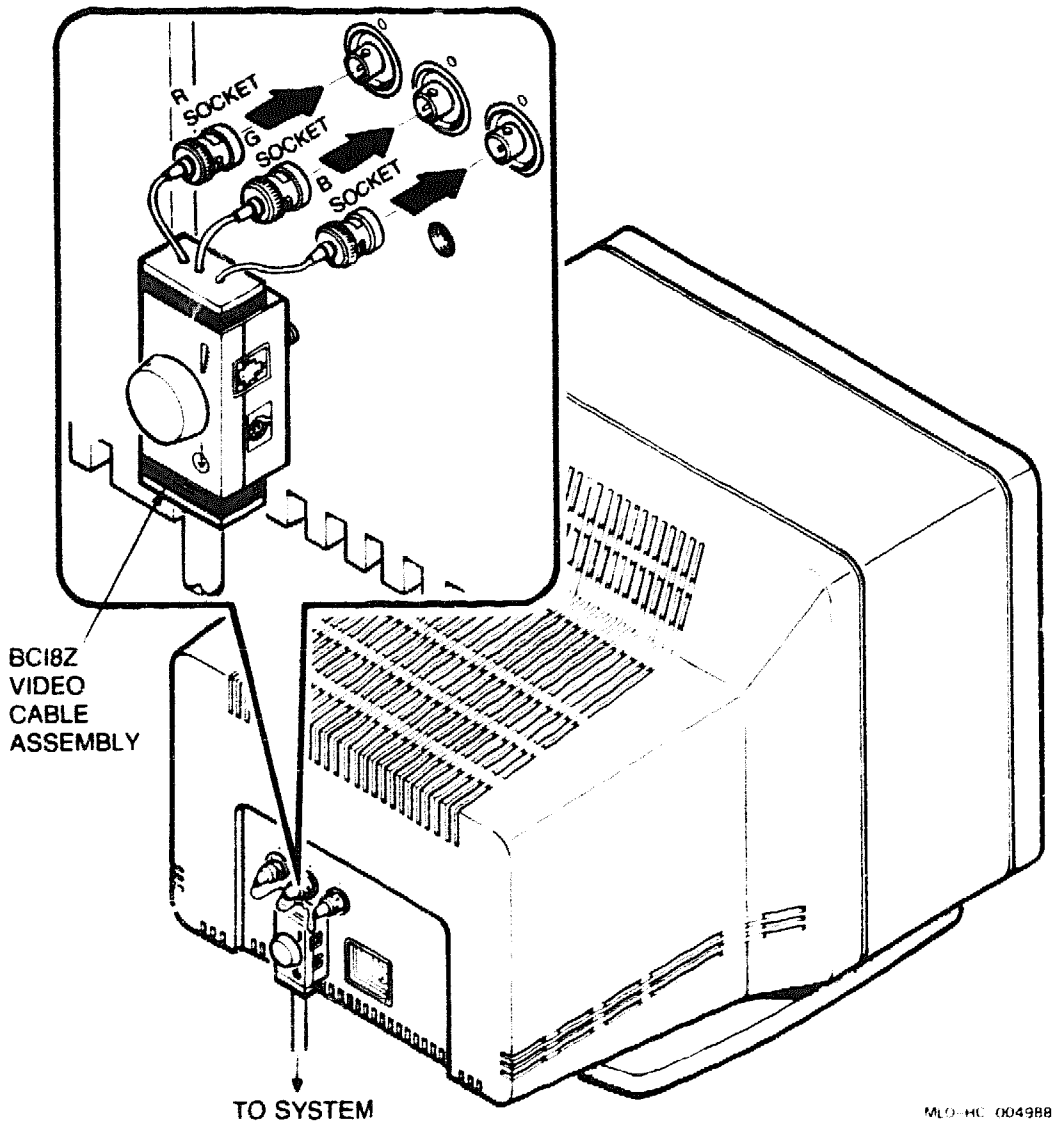
1. Remove the monitor from its shipping carton and place it on a level surface. Position it for ease of use. Make sure the tilt-lock lever is on the right when you face the monitor.

2. Adjust the monitor to a position you find comfortable. To tilt the monitor:
   - Slide the tilt-lock lever away from you (toward the back of the monitor) to unlock the monitor from the base.
   - Tilt the monitor to the desired position.
   - Slide the lever toward you to lock the monitor in place.
3. Set the monitor **power** switch to 0 (OFF).

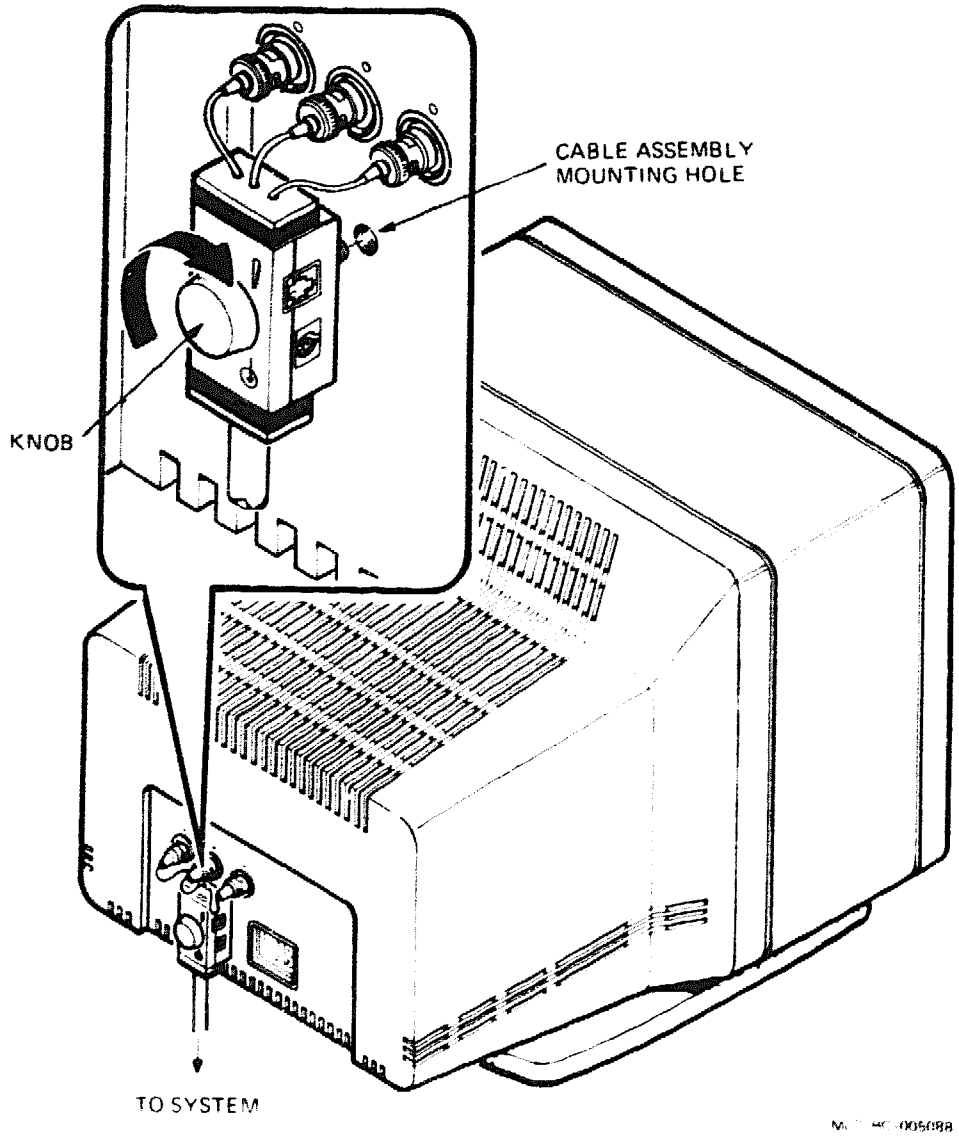
Figure 2–1: Setting the Power Switch



4. Locate and remove the BC18Z video cable assembly from the system unit carton. Plug the ends of the R, G, and B video cables into the corresponding **R**, **G**, and **B sockets** on the back of the monitor. Turn each connector clockwise to fasten.

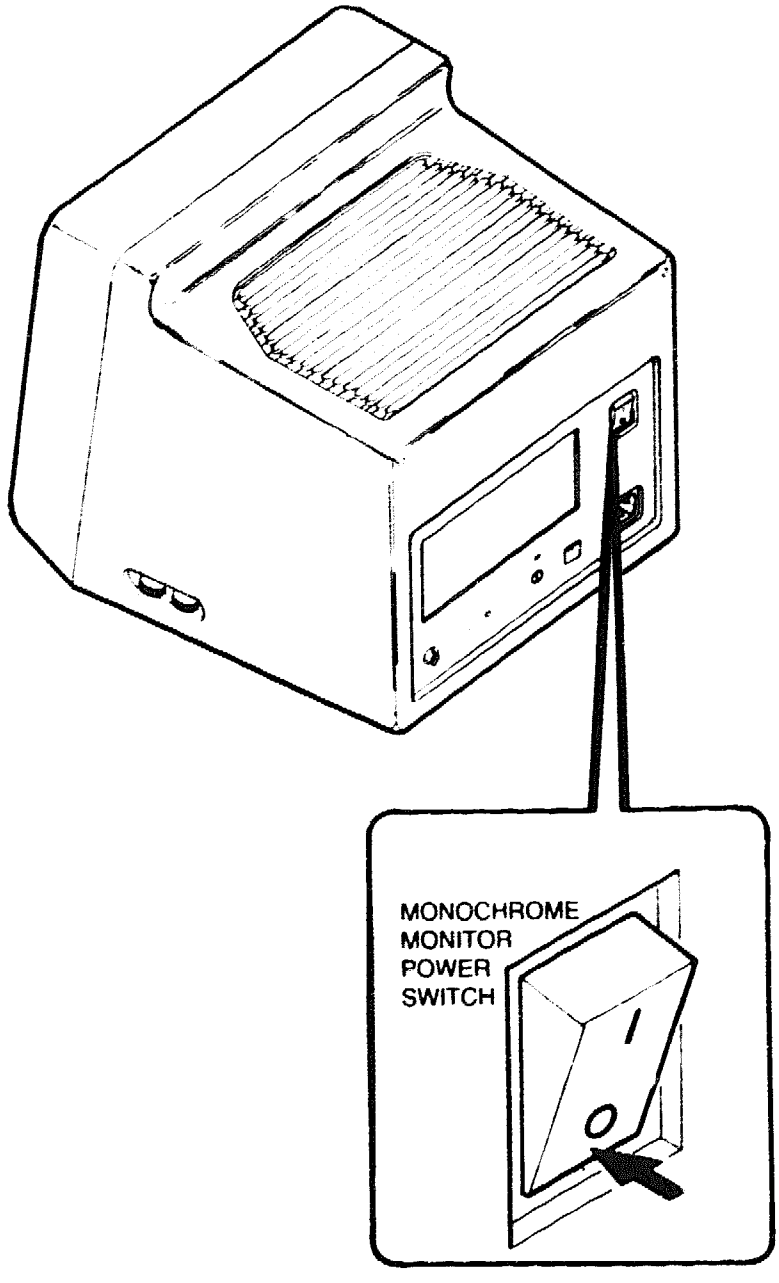


5. Screw the video cable assembly knob clockwise into the monitor.



Setting Up the VR260 Monochrome Monitor

1. Remove the VR260 monochrome monitor from the shipping carton and place it on a level surface. Position it for ease of use.
2. Set the monitor **power** switch to 0 (OFF).



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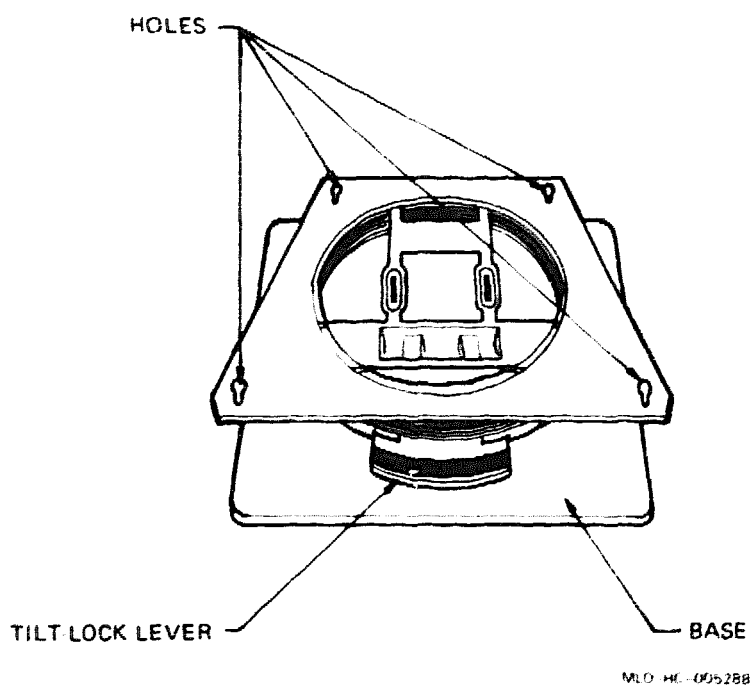
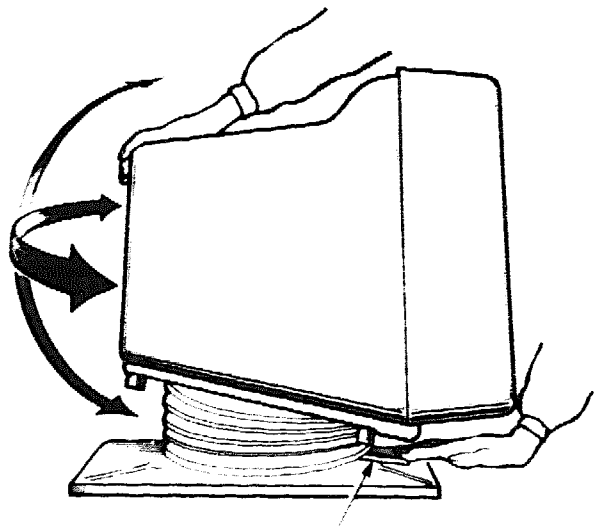
3. Locate and remove the tilt-swivel base from the consolidation carton.
4. To install your monitor on the tilt-swivel base:
   - Turn the monitor upside down.
   - Loosen the monitor feet by turning them counterclockwise.
   - Position the tilt-swivel base over the monitor with the tilt-lock lever on the front (screen) side of the monitor.
   - Lower the base so that the four monitor feet go into the corresponding holes on the base.
   - Pull the base toward the back of the monitor until the base slides and locks into place.
   - Tighten the monitor feet.



- Turn the monitor right side up. To adjust the tilt of the monitor, press down the tilt-lock lever of the base and move the monitor to the desired angle. Taking your hand off the lever locks the monitor in place.



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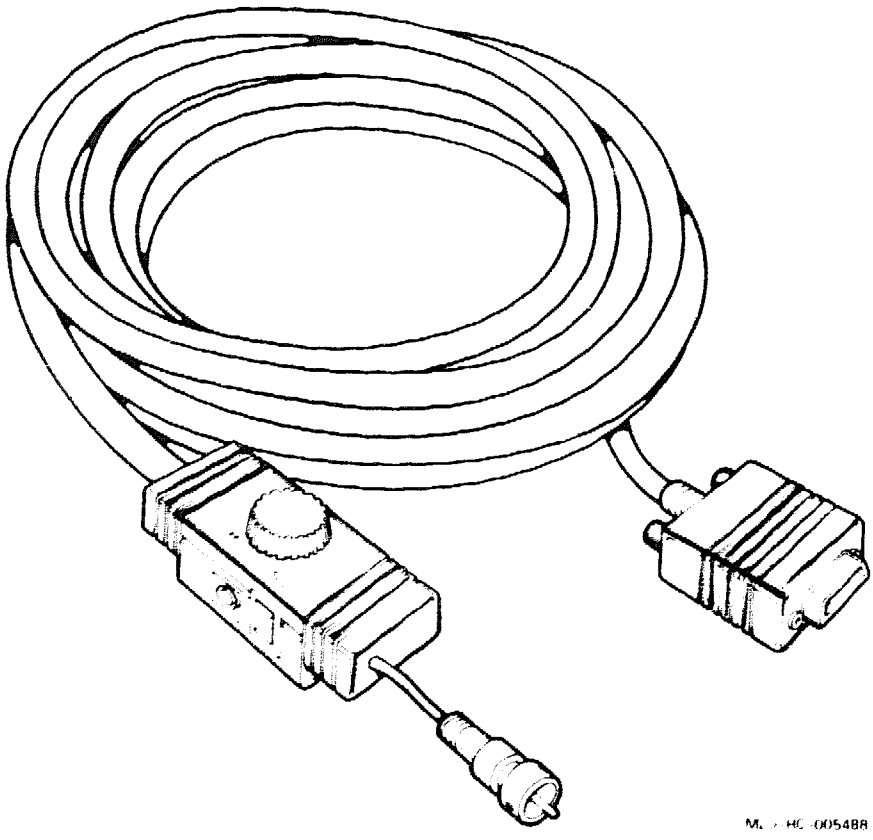
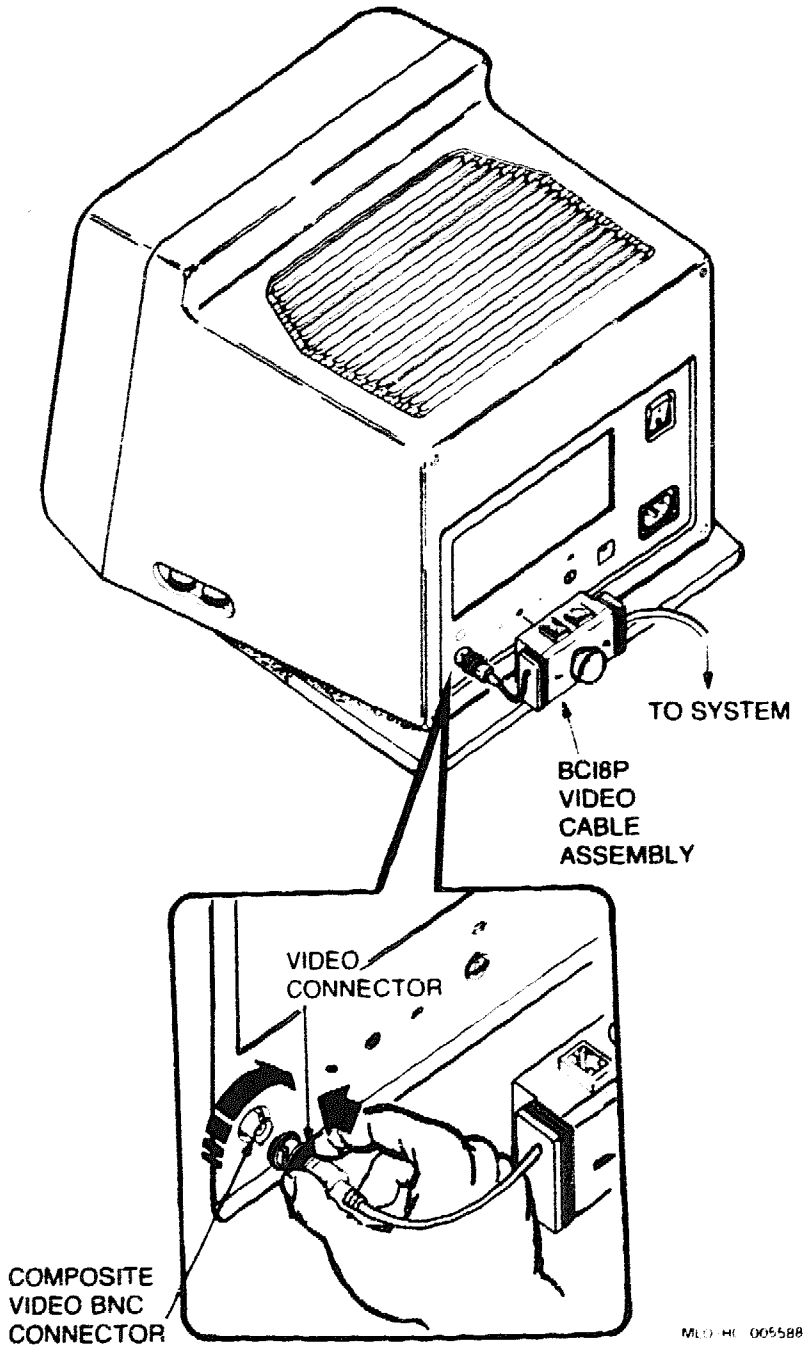
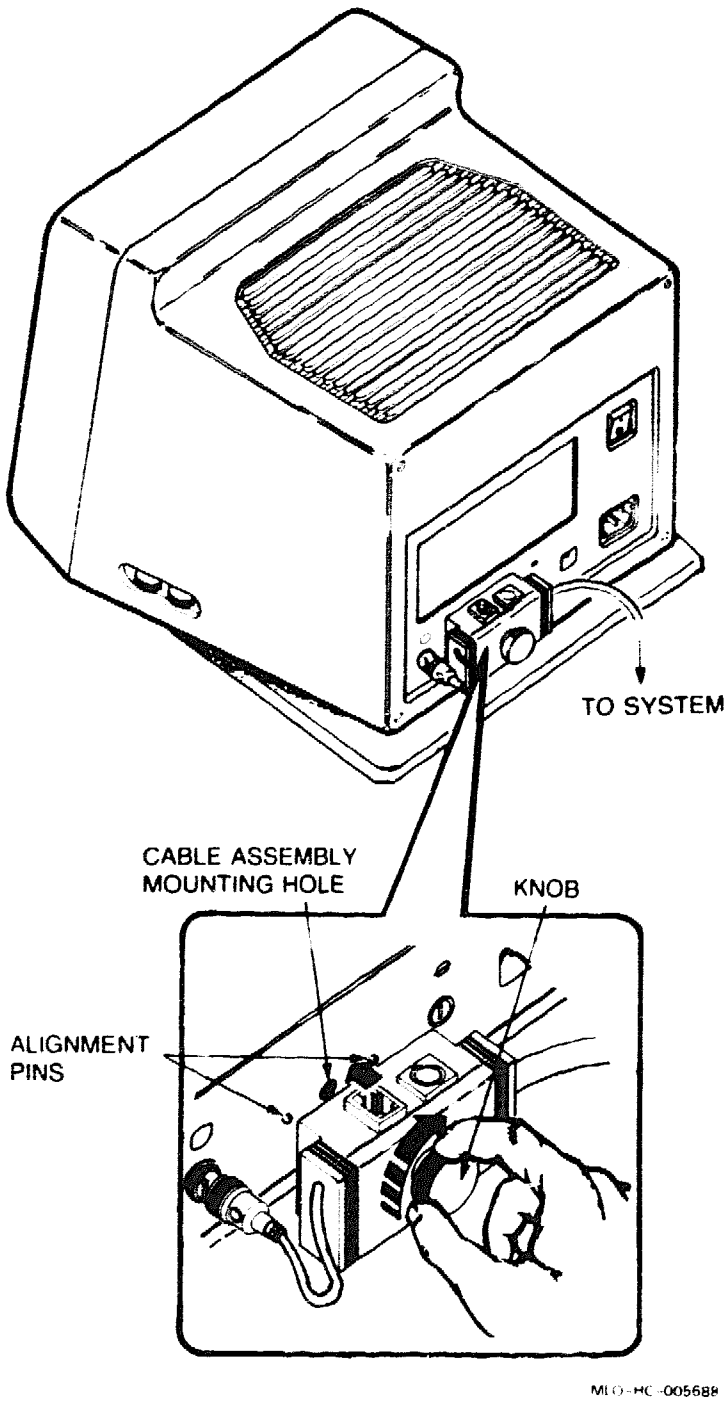
5. Locate and remove the BC18P video cable assembly from the system unit carton.



Plug the video cable into the connector at the far left of the back of the monitor (with the empty sockets on the assembly facing up). Turn the connector clockwise to fasten.



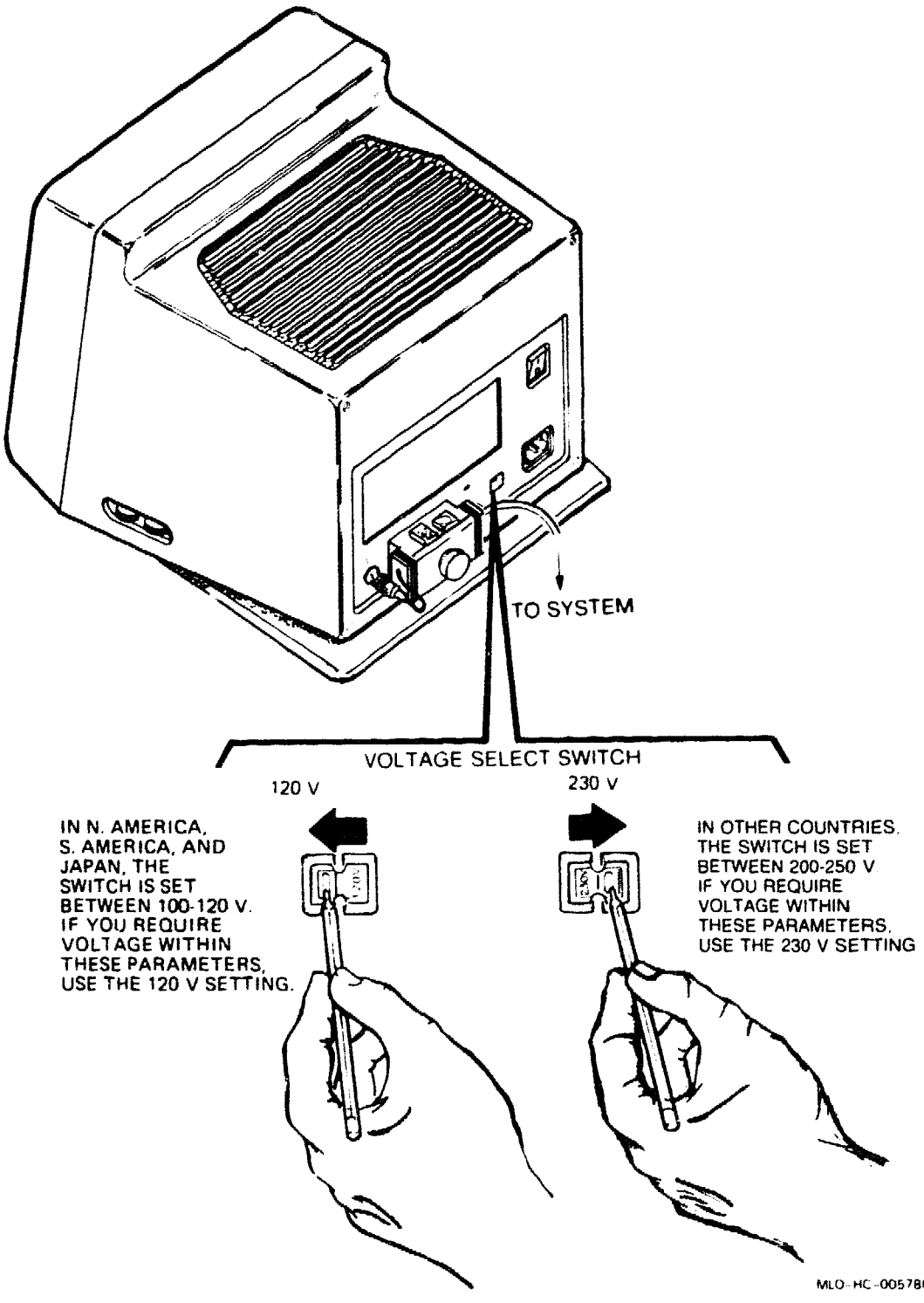
6. Align the pins and the mounting screw of the video cable assembly with the holes to the right of the video cable connector. Turn the knob clockwise to screw in the video cable assembly.



7. Make sure the **voltage select** switch setting on the monitor matches the source voltage.

CAUTION: *An incorrect* ***voltage select*** *switch setting will damage the monitor.*

Figure 2–2: Setting the Voltage Switch

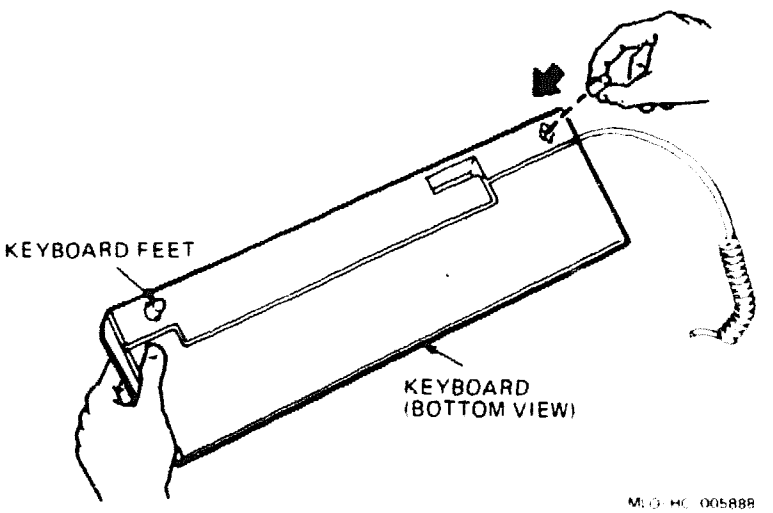


NOTE: *DIGITAL sets the* ***voltage select*** *switch on a monitor for the country where the monitor will be installed. If the switch setting does not match the voltage you use, change the setting.*

Setting Up the Keyboard and Pointing Device

1. Install the keyboard feet.

Figure 2–3: Setting Up the Keyboard



2. Connect the keyboard cable to the video cable assembly.

Figure 2–4: Connecting the Keyboard to a VR290 Color Monitor

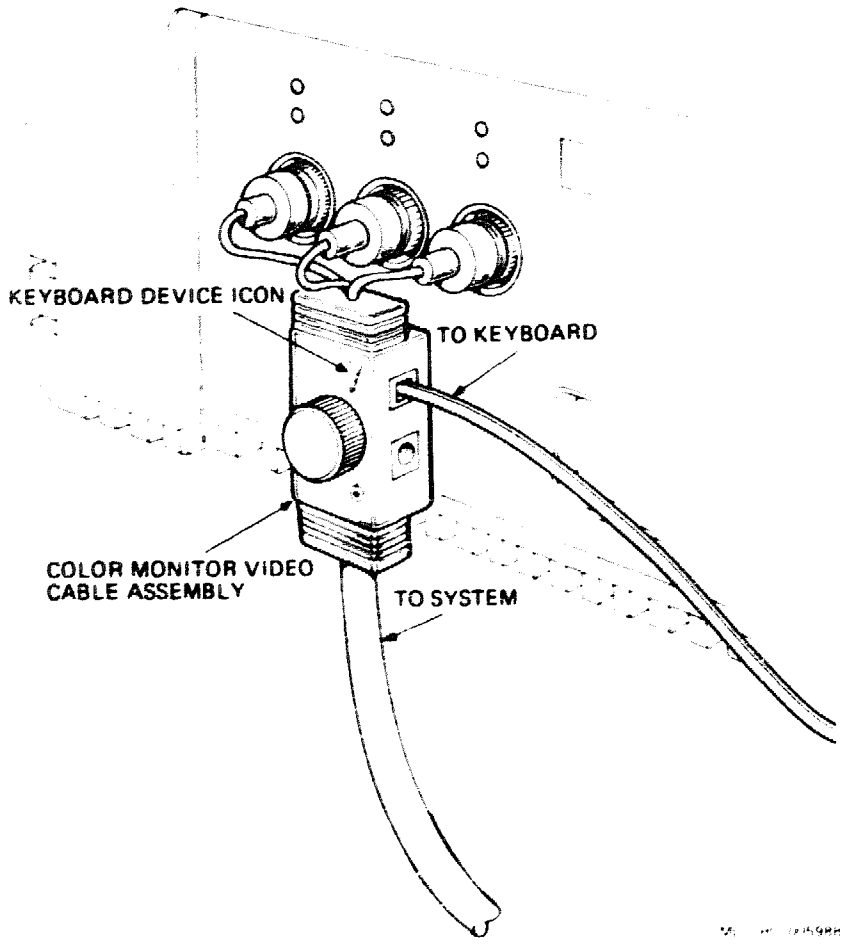
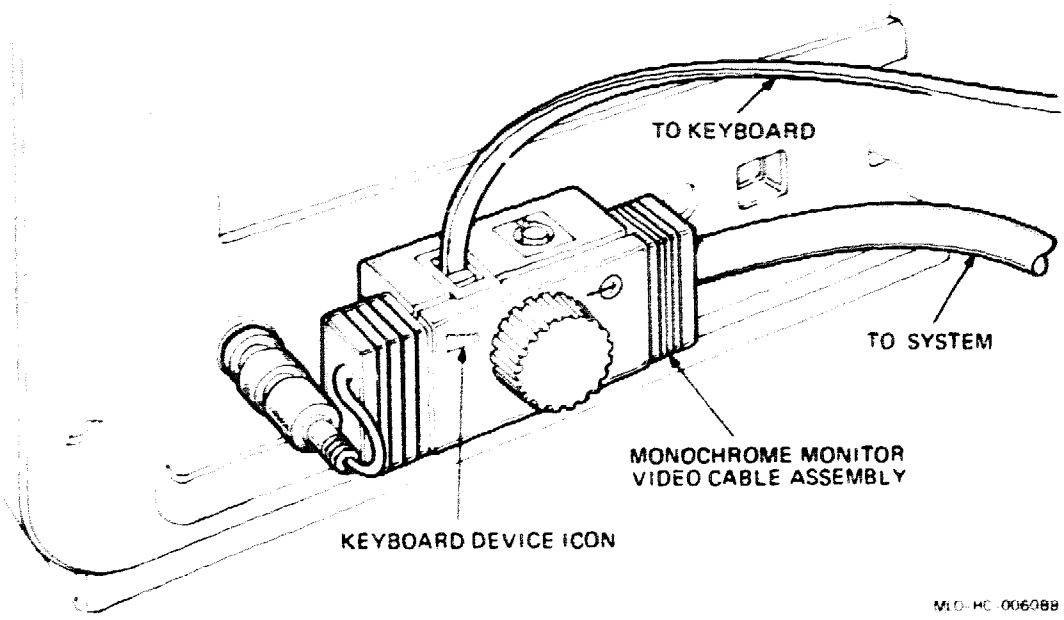


Figure 2–5: Connecting the Keyboard to a VR260 Monochrome Monitor



3. Locate the *pointing device* that you ordered (either a mouse, or a tablet with *puck* or *stylus*). Only one pointing device can be used at a time.
4. Plug the pointing device cable into the video cable assembly.

NOTE: *Attach the puck or stylus before connecting the tablet to the VAXstation 3. The instruction sheet that comes with the tablet explains how to connect the components. Save this sheet for future reference. To change the puck or stylus, first disconnect the tablet from the VAXstation 3, then swap the puck or stylus, and reconnect the tablet to the system.*

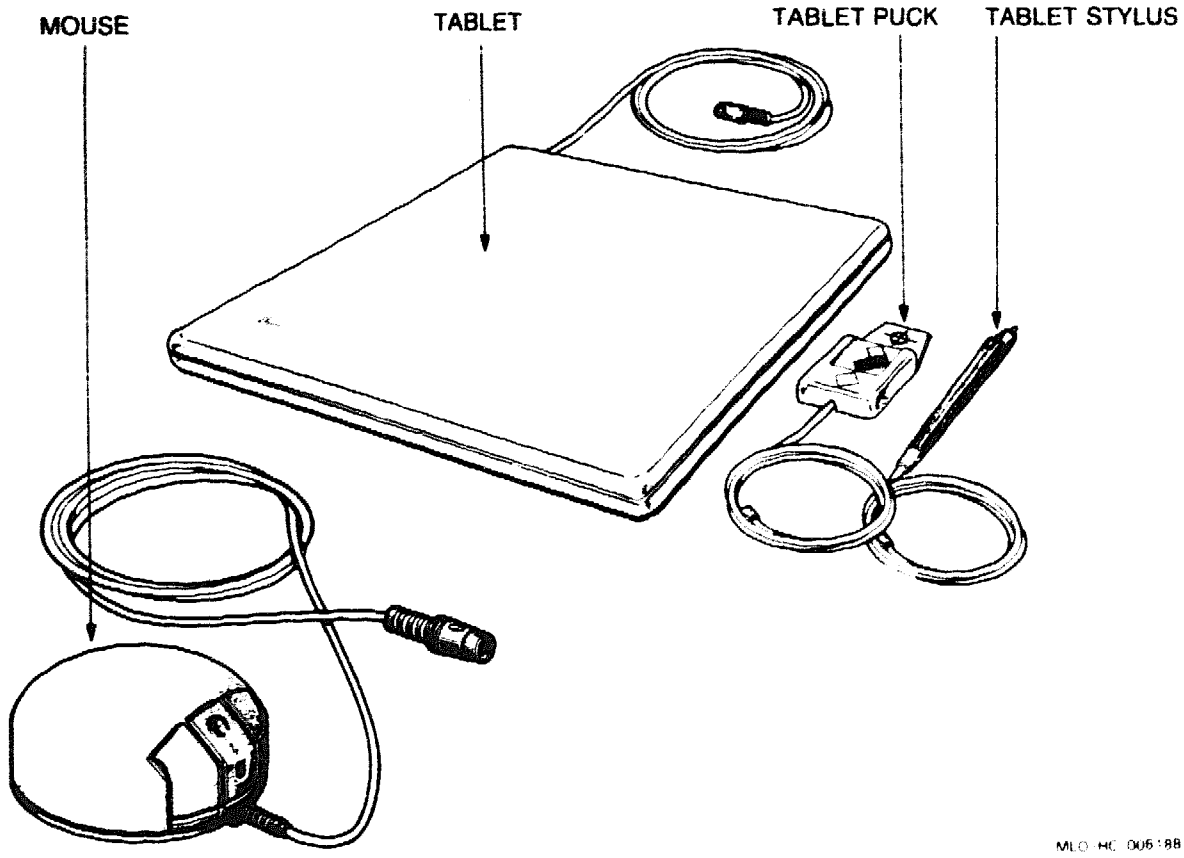


Figure 2–6: Connecting a Pointing Device to a VR290 Monitor

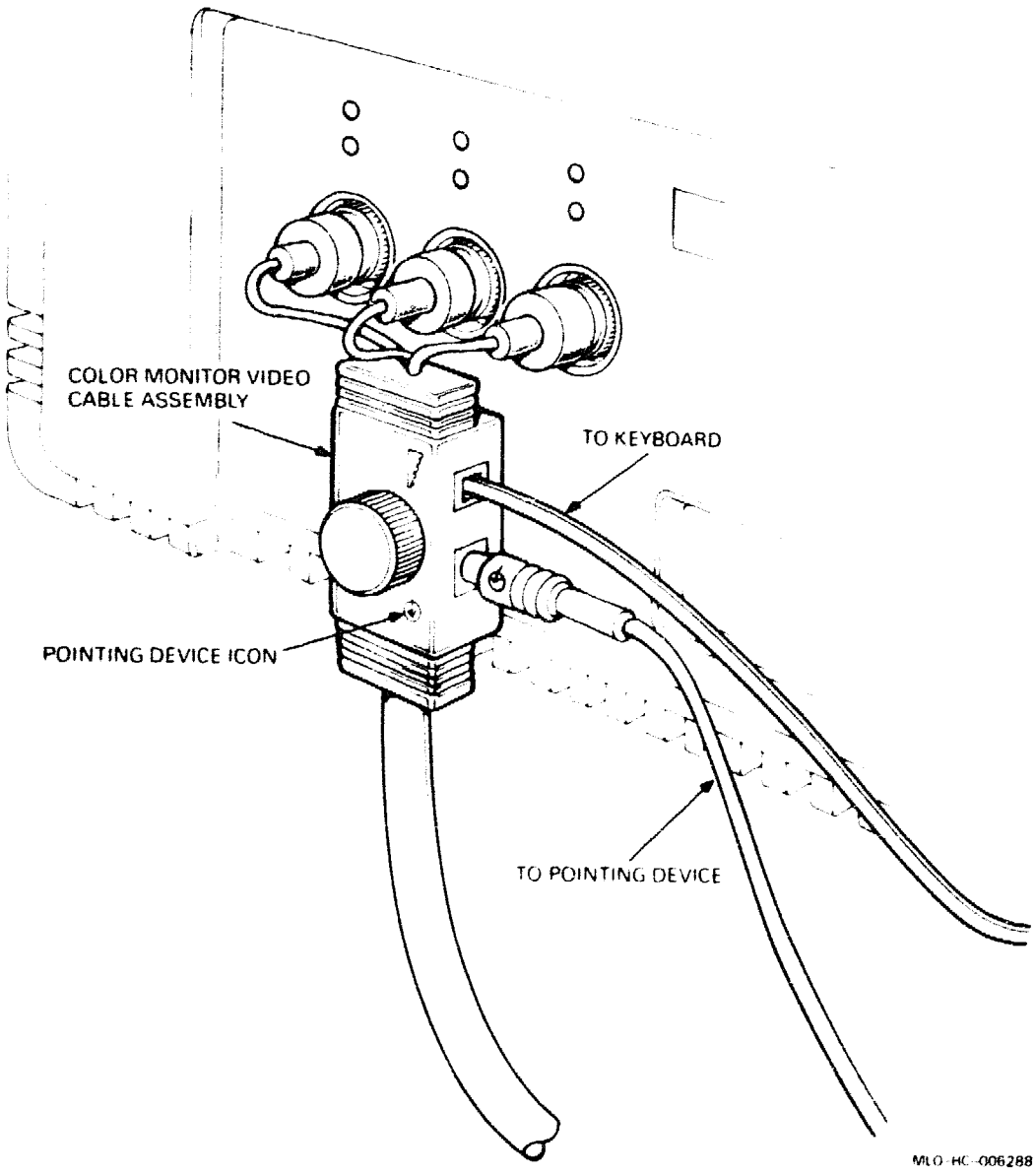
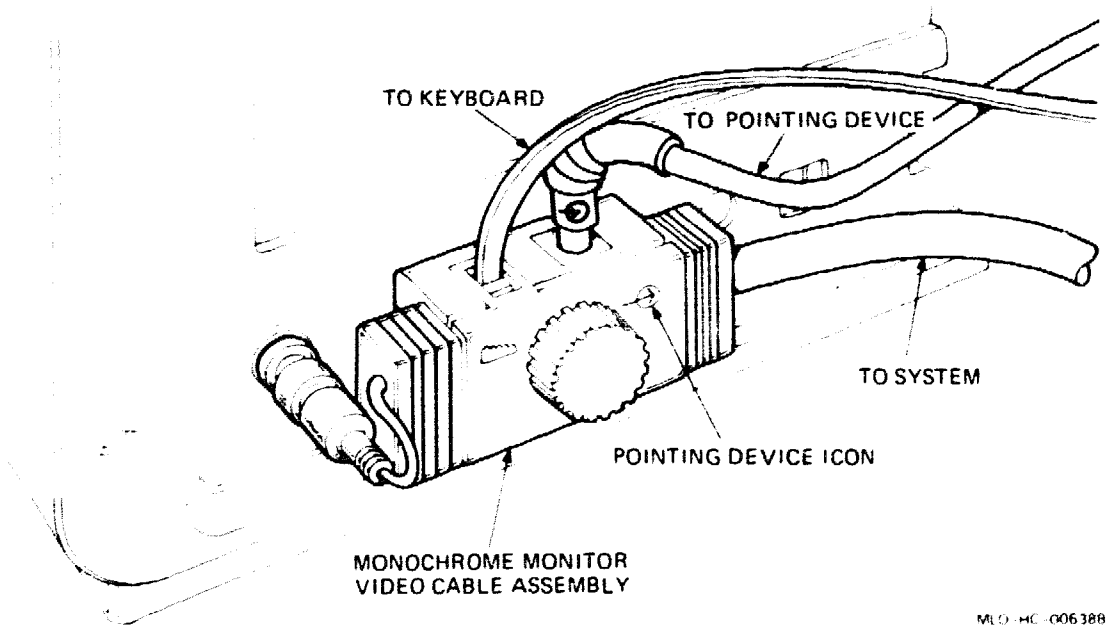


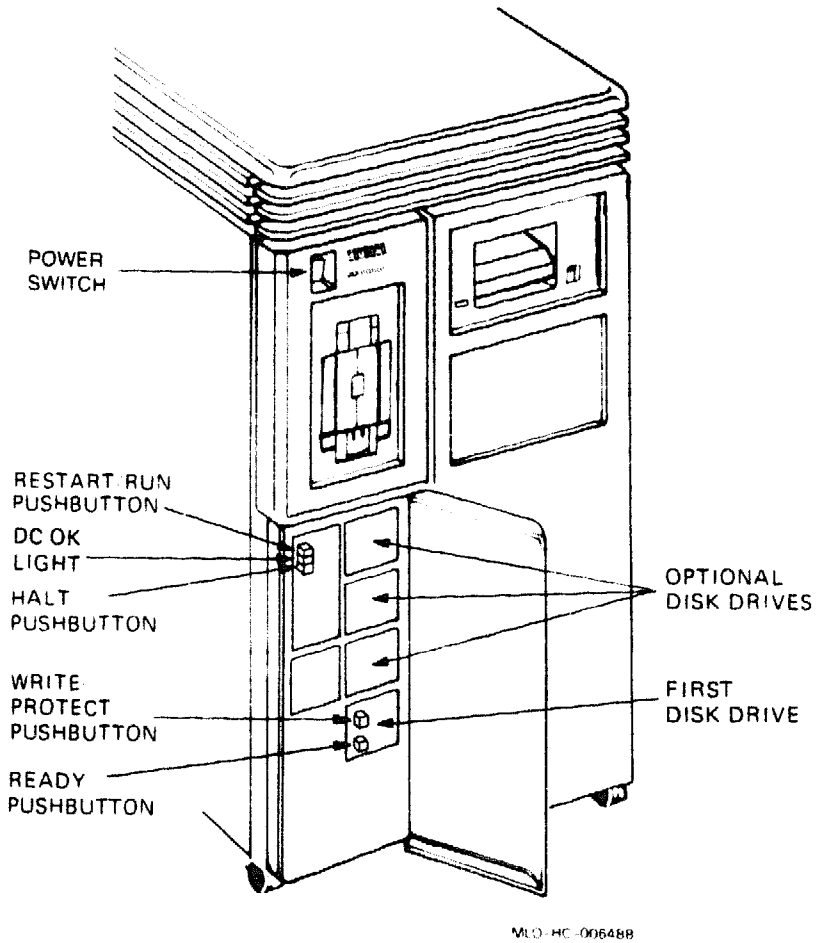
Figure 2–7: Connecting a Pointing Device to a VR260 Monitor



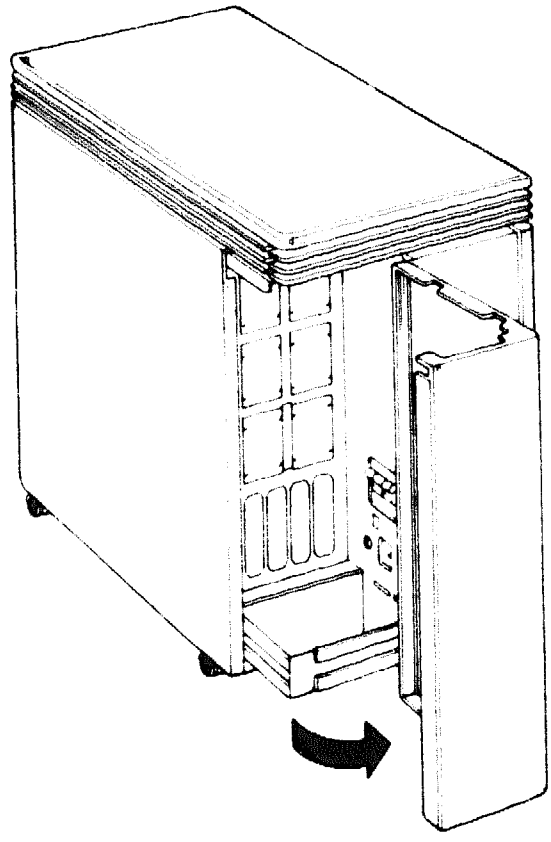
Connecting the VAXstation 3 to a Power Source

1. Make sure that all pushbuttons on the front *control panel* of the system unit are in the out position.
2. Locate and remove the sheet of labels from the Accessories Kit. Attach the labels to the appropriate places on the control panel (see Figure 2–8).
3. If your unit contains *diskette drives,* label the left drive 1 and the right drive 2.

Figure 2–8: Connecting the VAXstation to a Power Source



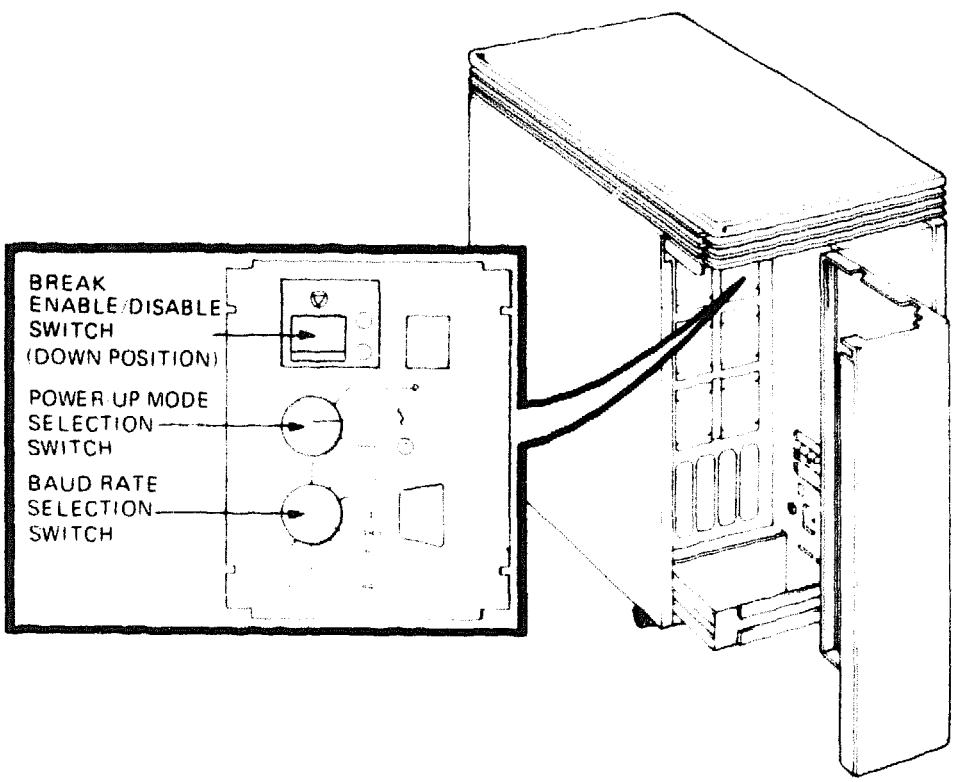
4. The *I/O* distribution panel is at the back of the system unit. Open the back door of your system unit by pulling open the left side. A pop fastener holds the door in place.



5. Set the controls located on the *CPU* distribution panel insert on the back of the system unit to the following positions:

   - **Break Enable/Disable** switch to the disable position (down), which is the normal operating position. Halts are disabled, and your system automatically *boots* the "MicroVAX Diagnostic Monitor" tape when powered up.
   - **Power-Up Mode** switch to the middle (language inquiry) position
   - *Baud Rate* switch to 4800 baud

NOTE: *The panel uses international symbols rather than text. Use the illustration as a guide.*



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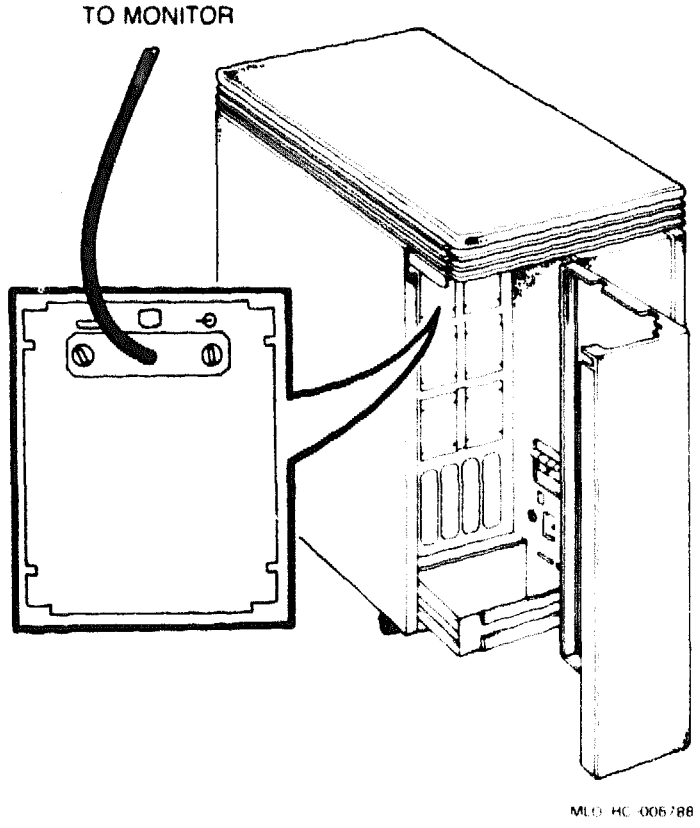
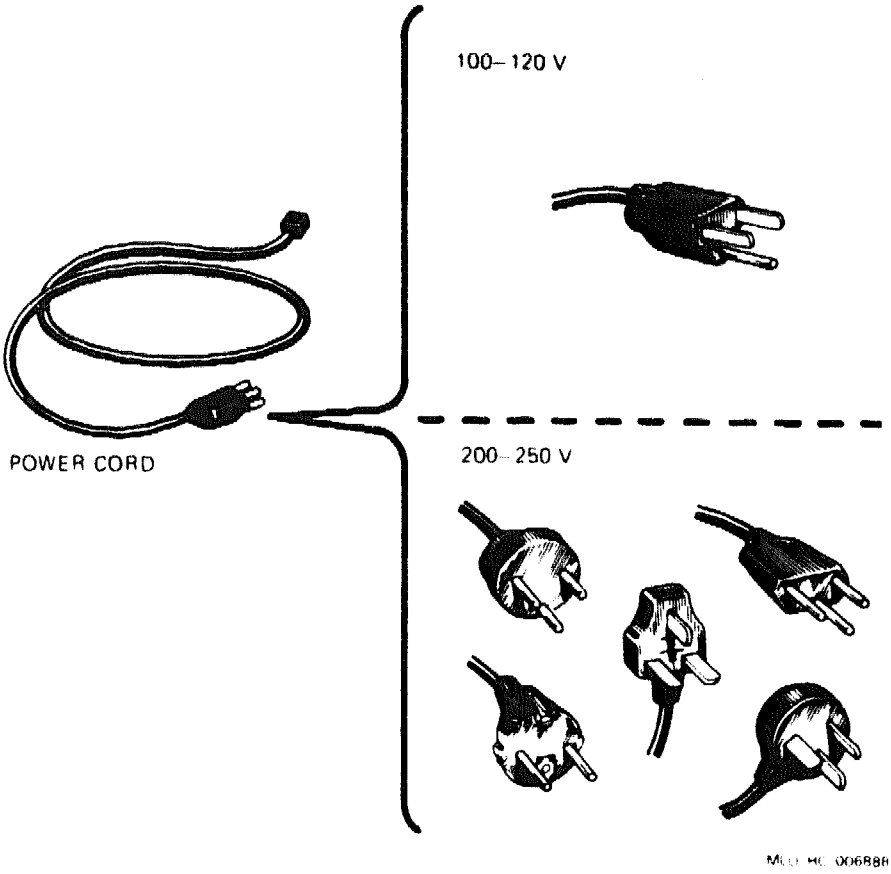
6. Feed the free end of the monitor video cable under the cable guide. Connect the cable to the back of the system unit.

Figure 2–9: Connecting Monitor Cable to System Unit



7. Install and connect any customer-installable options. Option *modules* ordered with your initial system order come preinstalled.
   - Connect additional devices in any order.
   - Read Chapter 4 for descriptions of the options and installation information.
   - See the documentation included with the additional devices.

8. Locate the monitor and system unit power cords. The two cords are of the same type and are interchangeable. Ensure that the plugs fit the wall outlet.

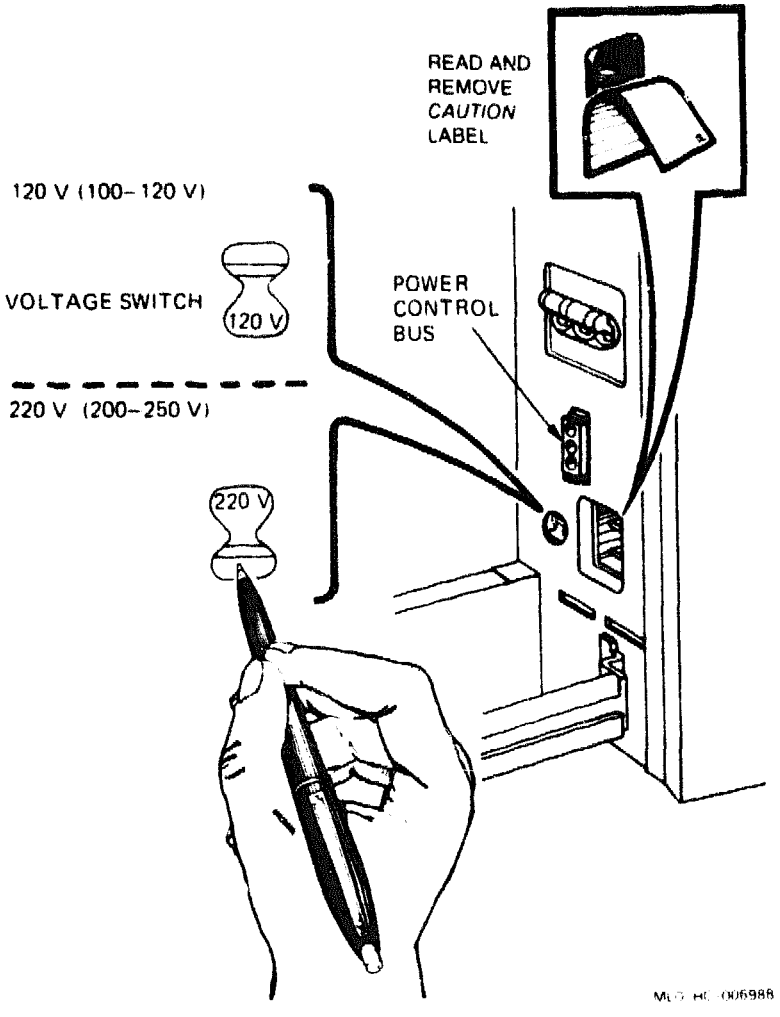


9. Look to the right of the I/O distribution panel. Read and remove the label covering the power connector of the system unit.

10. Check the **voltage** switch setting of the system unit. If necessary, change the switch setting to match the voltage source. To change the setting, use a pen or screwdriver to move the switch to the correct position.

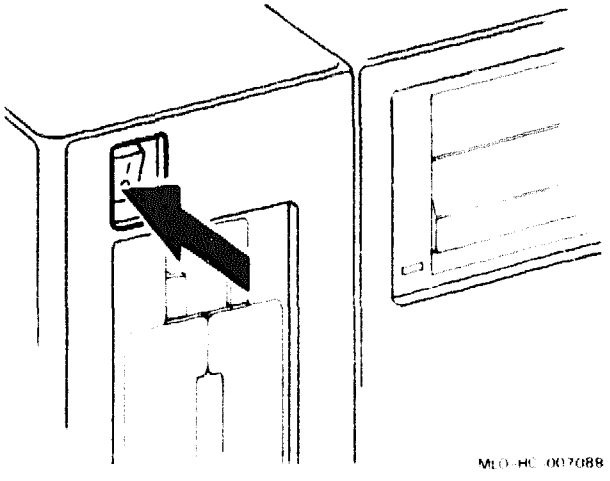
CAUTION: *An incorrect* ***voltage*** *switch setting will damage the VAXstation 3 system.*

Figure 2–10: Setting Voltage Switch on System Unit



11. The **power control bus** in Figure 2–10 is used to (1) connect two systems together and to (2) sequence the power-up of the systems so they do not drain all the power at once. An additional cable is required to connect the two systems together; contact your sales representative for ordering information.

12. Locate the **power** switch on the front of the VAXstation 3 system unit. The switch should be set to 0 (OFF).



13. Connect the monitor power cord to the monitor.
14. Plug the other end of the power cord into a wall receptacle.

CAUTION: *Ensure that the BC18Z monitor cable (for VR290), or the BC18P monitor cable (for VR260), is connected to the back of the system unit and the monitor before powering up the system. Damage to the VCB02 will occur if the monitor cable is not connected.*

Figure 2–11: Connecting the VR290 Monitor to a Power Source

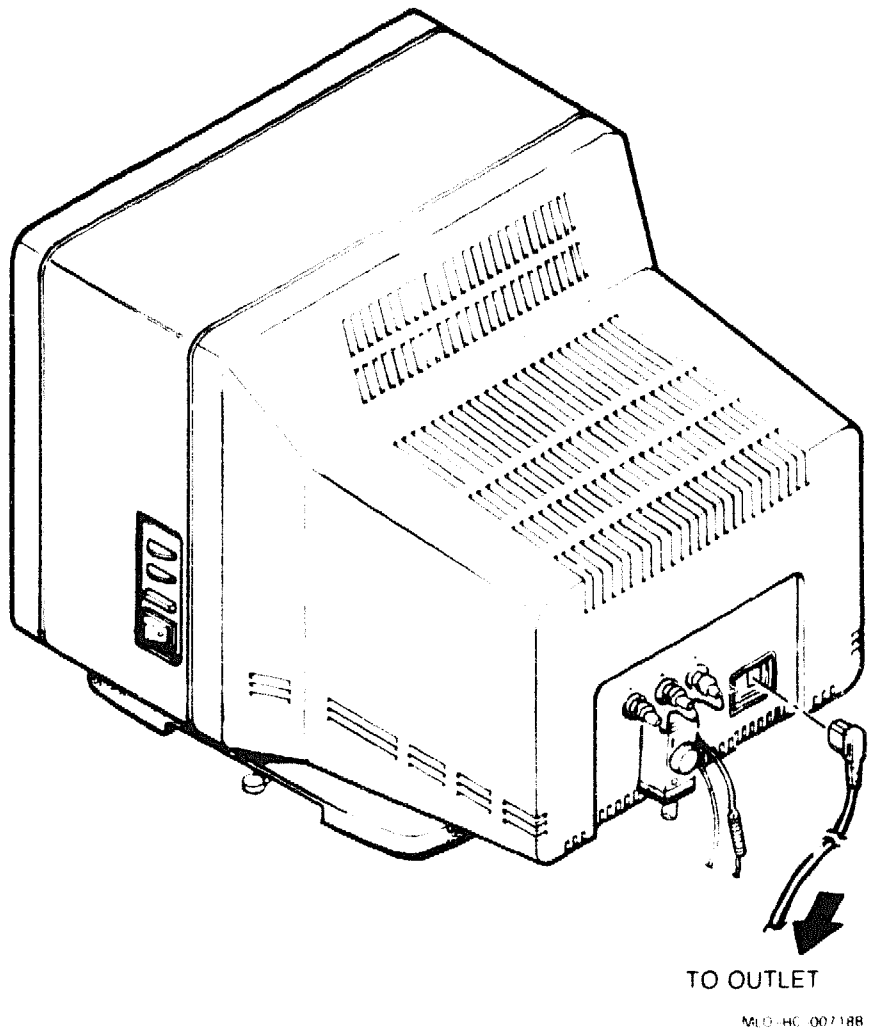
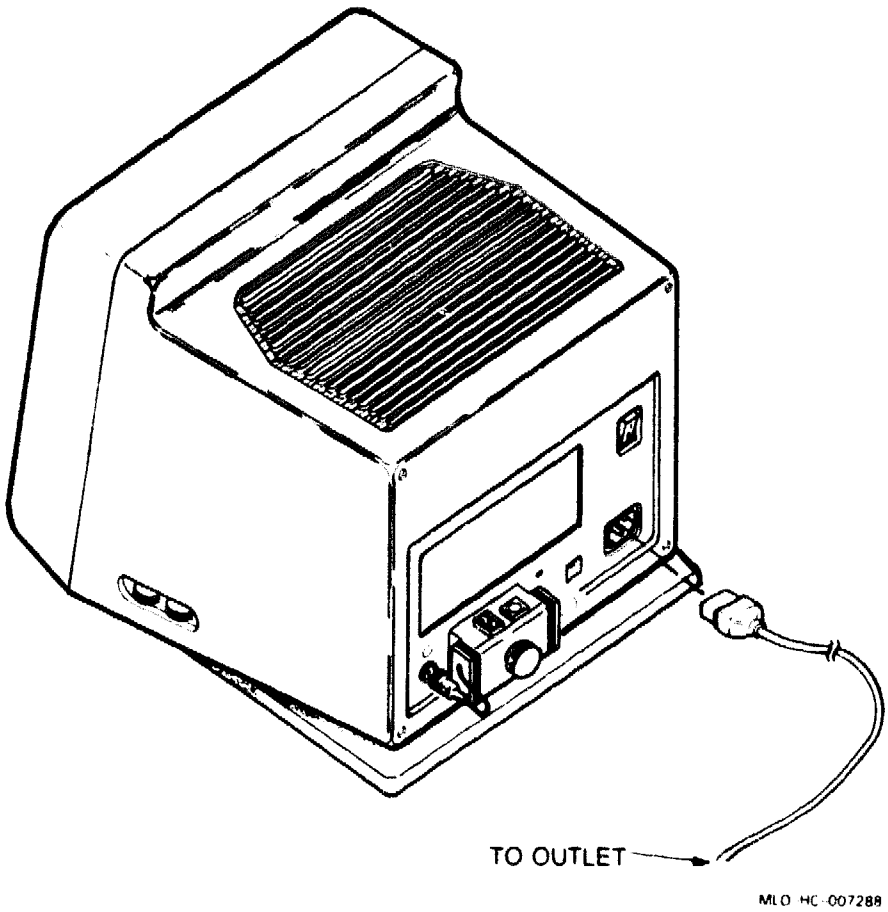
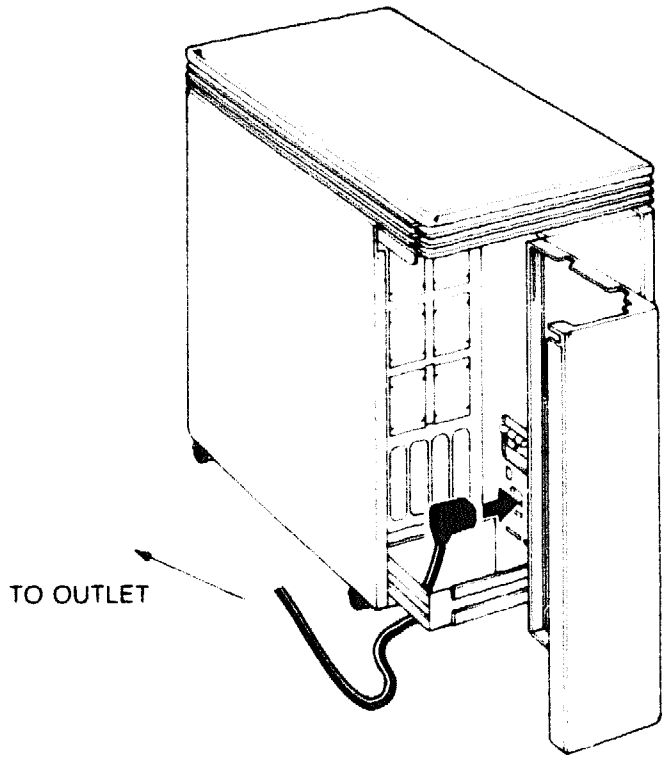


Figure 2–12: Connecting the VR260 Monitor to a Power Source



15. Plug in the ends of the system power cable.
    - Feed the cable under the cable guide and firmly plug one end into the system unit power connector.
    - Plug the other end of the power cable into the wall receptacle.
    - Run the power cable and any other cables where no one will trip over them. Avoid straining or bending the cables.
    - Leave open the back door of the system unit.



Connecting the VAXstation 3 to a Network

You can connect your workstation to either a standard or ThinWire Ethernet *network.*

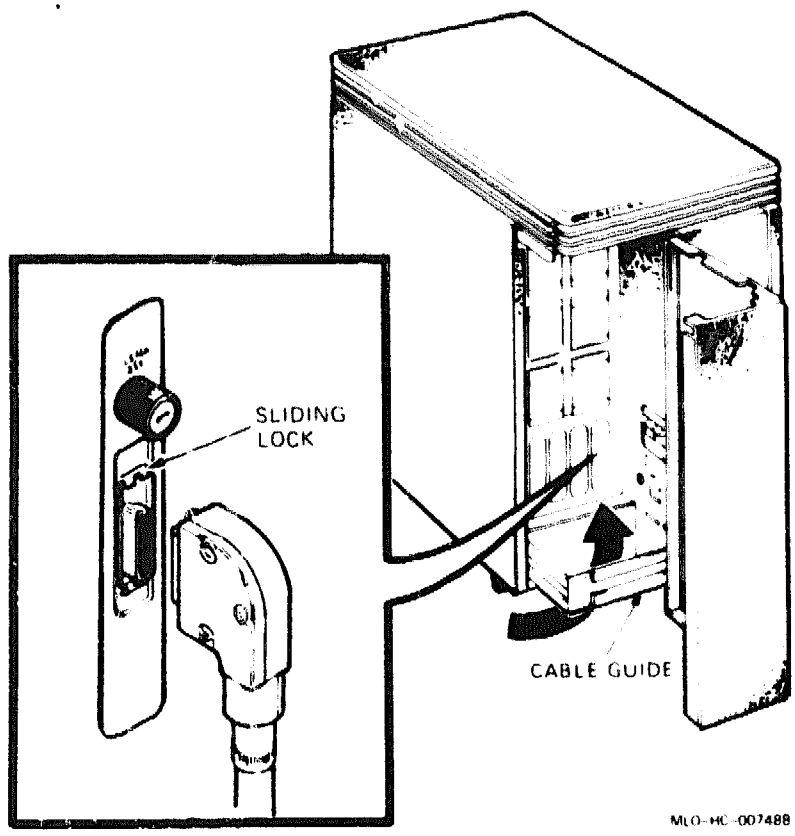
NOTE: *For a detailed description of ThinWire Ethernet networks, consult the DECconnect system guides listed in Appendix B.*

Connecting the Ethernet Transceiver Cable to the Workstation

To connect a transceiver cable to the VAXstation 3:

1. Set the system unit power switch to 0 (OFF).
2. Attach the BNE3x transceiver cable to the back of the system unit, routing the cable under the cable guide. Push the sliding lock into place.

Figure 2–13: Connecting to Ethernet

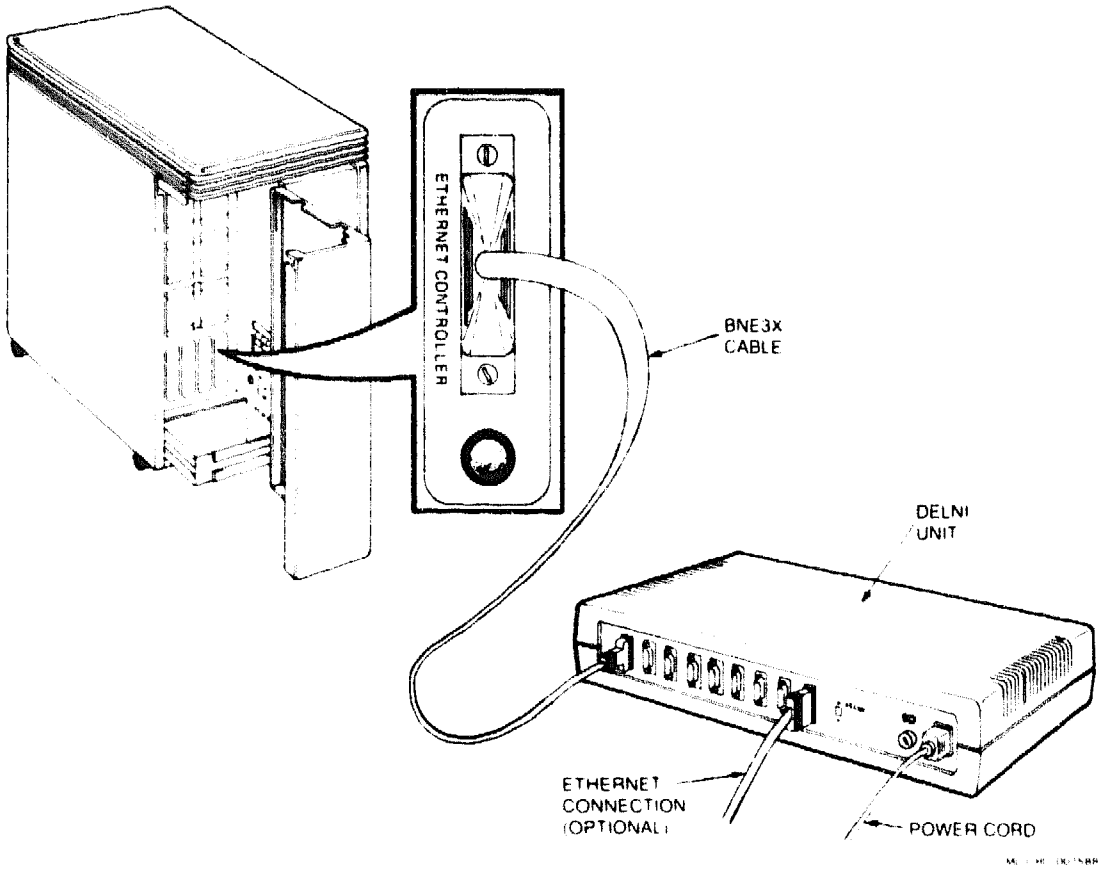


3. Connect the other end of the cable to a *DELNI* or *DESTA* or have your service representative connect your system to an H4000 transceiver.

Connecting to Standard Ethernet

To connect the VAXstation 3 to a DELNI, plug the male end of the BNE3x cable into a free port on the DELNI.

Figure 2–14: Connecting to a DELNI

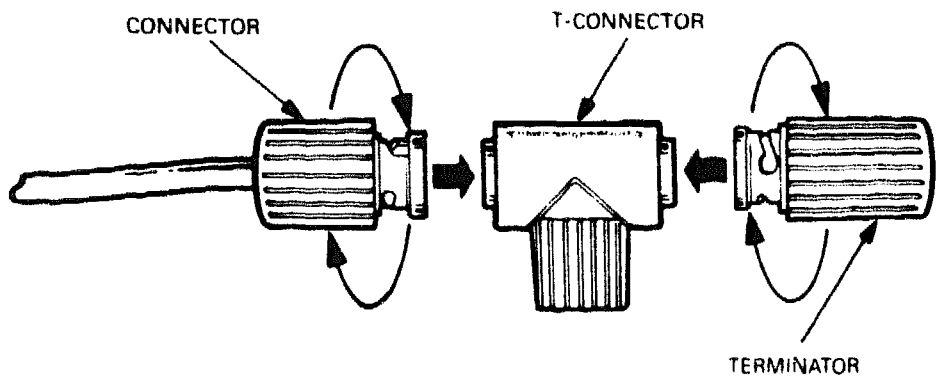


NOTE: *To communicate over an Ethernet network, you must also install the communication software supported by your operating system.*

See Chapter 4 for additional information on the DELNI and DESTA.

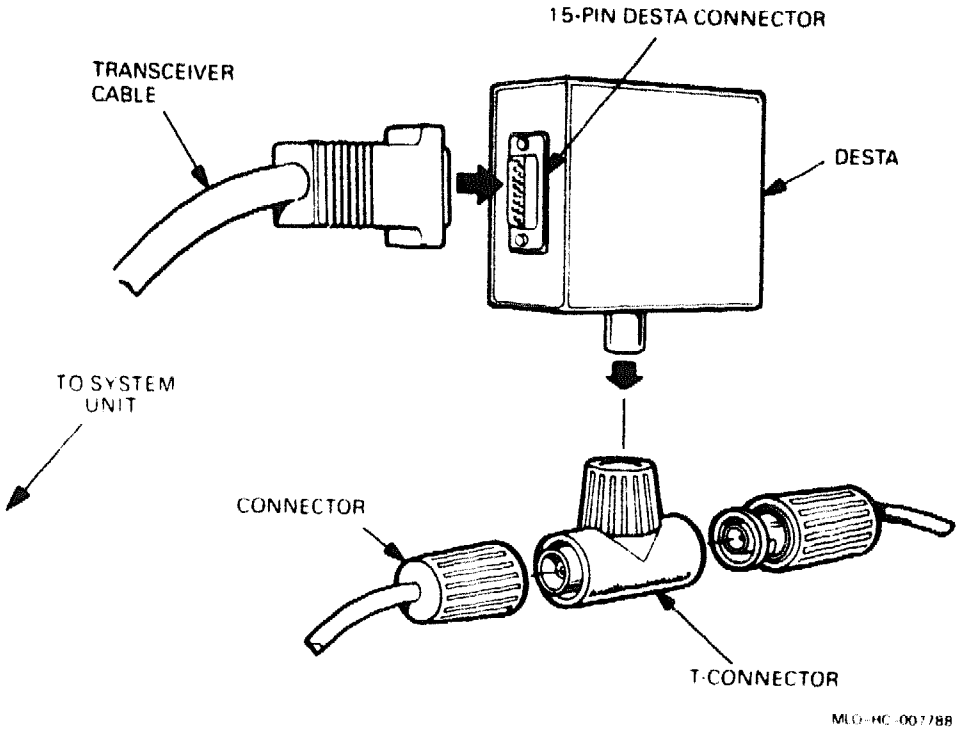
Connecting to ThinWire Ethernet Using the DESTA

1. Attach a ThinWire cable segment to one side of the T-connector. If you want to add and connect another system to the segment, add a ThinWire cable to the other side of the T-connector. If a system is the last system in a segment, attach a 50-ohm terminator to the T-connector.



2. Attach the T-connector to the DESTA's BNC connector, then attach the 15-pin connector on the transceiver cable to the DESTA.

Figure 2–15: Connecting to a DESTA



Powering Up the System for the First Time

Perform the following steps when you *power up* the system for the first time:

1. Ensure that all pushbuttons on the front control panel of the system unit are in the out position.
2. Ensure that the controls located on the CPU distribution panel on the back of the system unit are in the following positions:
   - **Break Enable/Disable** switch set to disable position (normal operating position). When the switch is in the disable position, diagnostic software automatically boots during system power-up, if the diagnostic media has been loaded into one of the drives.
   - **Power-Up Mode** switch set to language inquiry position
   - System unit baud rate set to 4800 baud
3. Ensure that the voltage switch matches the voltage source.
4. Set the monitor **power** switch to 1 (ON).
5. Wait for one minute and then set the system unit **power** switch to 1 (ON).

The language selection menu is displayed on your screen. Select the language that matches your keyboard. Respond to the menu by pressing a number key and then pressing the RETURN key.

```
KA650-B V1.2/0123

 1) Dansk                7) Nederlands
 2) Deutsch              8) Norsk
 3) English              9) Português
 4) Español             10) Suomi
 5) Français            11) Svenska
 6) Italiano

(1..11):
```

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If you select English, French, or German, a second menu is displayed. Select the variant of the language you prefer. For example, if you select English, you have the following choices:

```
1) United Kingdom
2) United States/Canada
```

NOTE: *If you delay selecting a language for more than 30 seconds, the system defaults to English and the United States/Canada variant.*

After making your selection, the numbers 23 through 03 are slowly displayed on the screen. Those numbers indicate completion of steps in normal system power-up tests.

```
KA650-B V1.2/0123

Performing normal system tests.

23..22..21..20..19..18..17..16..15..14..13..12..11..10..09..08..
07..06..05..04..03..
```

NOTE: *If the number sequence does not appear 30 seconds after starting, see Chapter 5 for troubleshooting hints.*

Testing the VAXstation 3

After you have powered up your system for the first time, you will want to test the hardware components in your system.

If you have neither a *tape drive* nor a diskette drive, your service representative can test your system. If you have either a tape or diskette drive, then carefully read the following section.

Loading the Diagnostic Medium

If you have a TK50 tape drive, perform step 1.

If you have a TK70 tape drive, perform step 2.

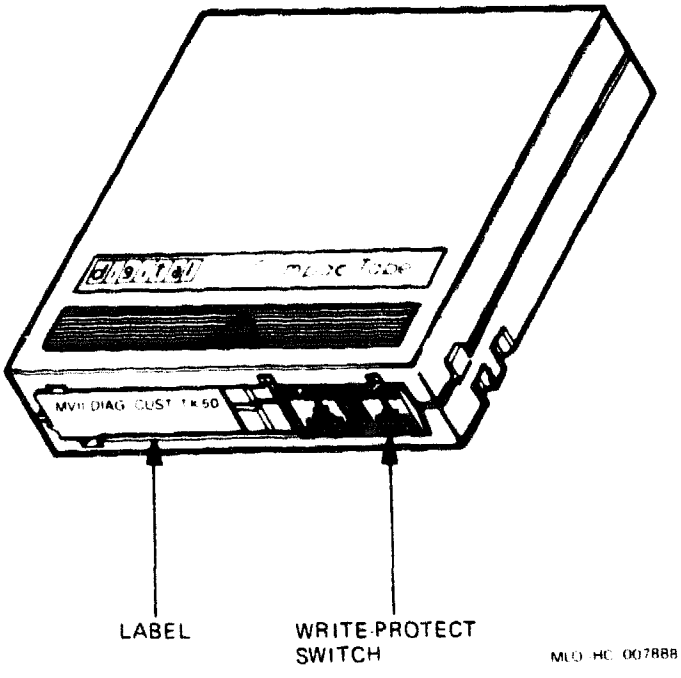
If you are using a diskette(s) to *load diagnostics*, perform step 3.

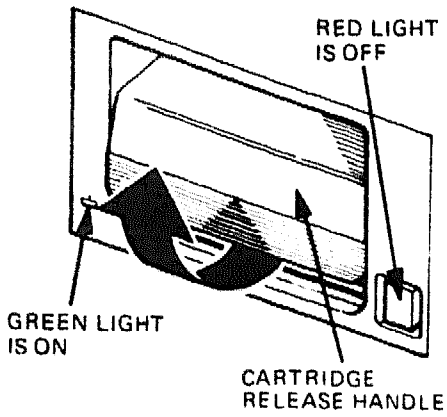
When you finish either step 1, or step 2, or step 3, proceed to step 4, "The MicroVAX Diagnostic Monitor".

STEP 1—Insert Cartridge into TK50 Tape Drive

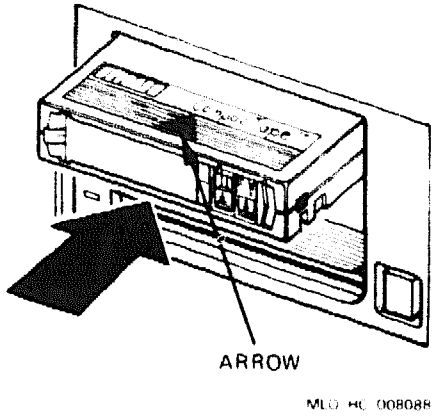
Verify that the system **power** switch is set to 1 (ON). You cannot move the **cartridge release handle** if the **power** switch is set to 0 (OFF).

Figure 2–16: TK50 Tape Cartridge

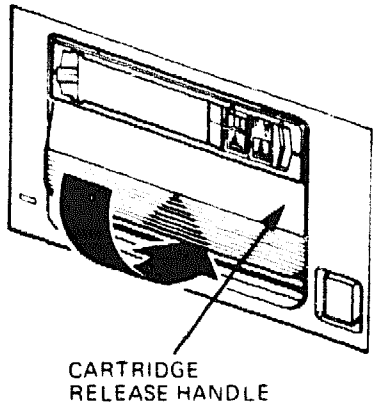




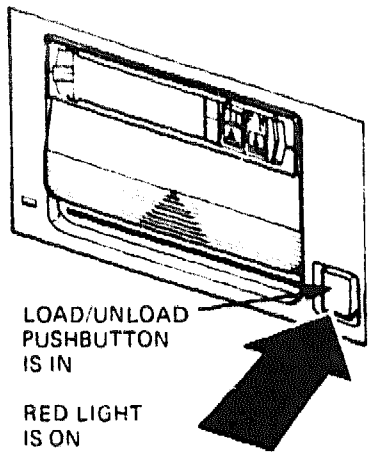
Wait until the **Tape Activity** green light is ON and the **Load/Unload** red light is OFF. The tape drive will make a short audible beep. Make sure the **Load/Unload** pushbutton is in the out position and is not glowing. Pull open the **cartridge release handle**.



Make sure the label on the front slide slot of the tape cartridge is facing out. Insert the cartridge fully into the drive until you encounter a firm stop.



Push the **cartridge release handle** to the closed position.



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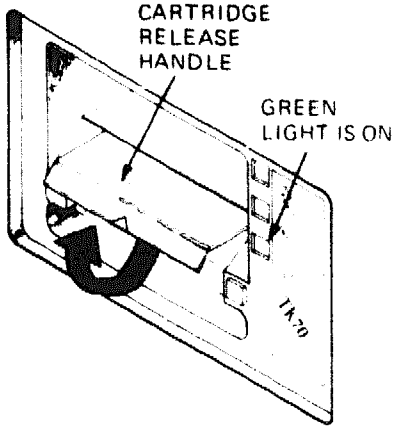
Push the **Load/Unload** pushbutton to the IN (Load) position. The red light stays ON. When the **Tape Activity** green light is ON (green light blinks when tape is moving), the tape is ready for use.

CAUTION: *Do not pull open the **cartridge release handle** until the **Load/Unload** red light is OFF and the **Tape Activity** green light is ON. Do not pull open the **cartridge release handle** while an indicator light blinks.*

Proceed to step 4, "The MicroVAX Diagnostic Monitor".

STEP 2—Insert Tape Cartridge into TK70 Tape Drive

Verify that the system **power** switch is set to 1 (ON). You cannot move the **cartridge release handle** if the **power** switch is set to 0 (OFF).



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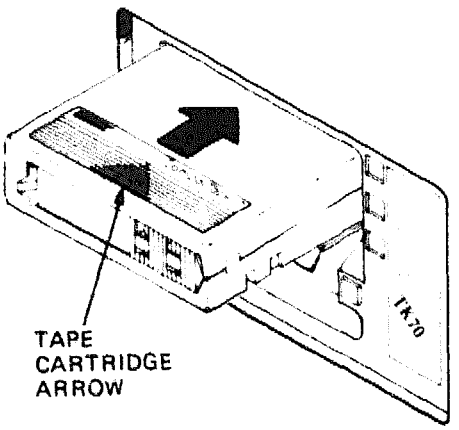
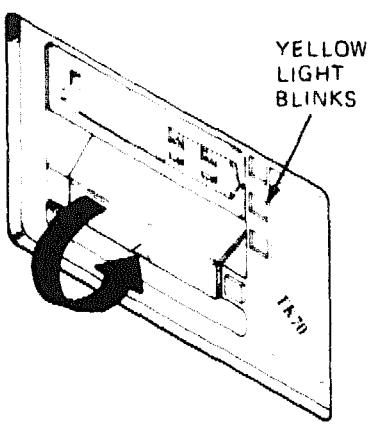
When the power is first turned on, all three indicator lights glow briefly, the orange and green lights turn OFF, and the yellow light blinks while the tape drive initializes. Wait until only the green light is ON and the drive beep sounds. Pull open the **cartridge release handle**.



MLO-HC-008488

Make sure the label on the front of the tape cartridge is facing out. Insert the tape cartridge fully into the drive until you encounter a firm stop.



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Push in the **cartridge release handle** to the closed position to lock the tape cartridge in place. The yellow light blinks as the tape loads and glows steadily when the tape is ready for use.

CAUTION: *Do not pull open the* ***cartridge release handle*** *until the green light is ON. If any indicator light continues to blink, see the Basic Troubleshooting section in Chapter 5.*

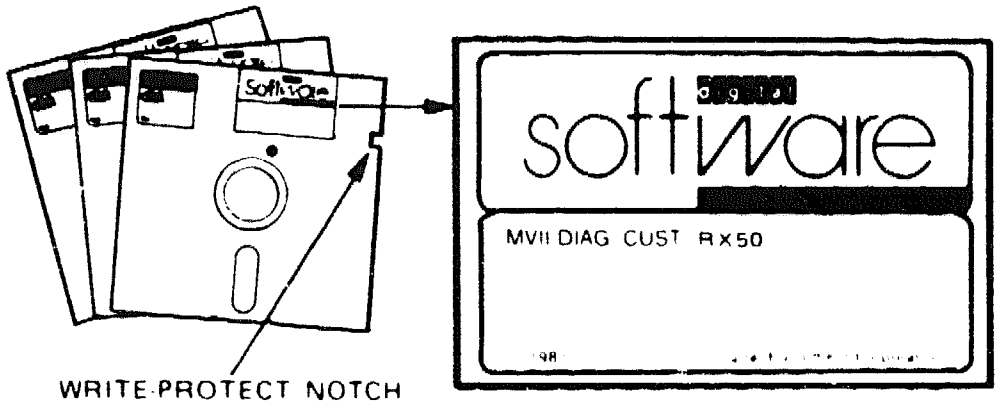
NOTE: *For a more detailed discussion of the TK50 and TK70 tape drive controls and procedures, see Chapter 3.*

Proceed to step 4, "The MicroVAX Diagnostic Monitor".

STEP 3—Insert RX50 Diskettes into Diskette Drive

Locate the RX50 diskettes in the diskette holder at the front of this binder.

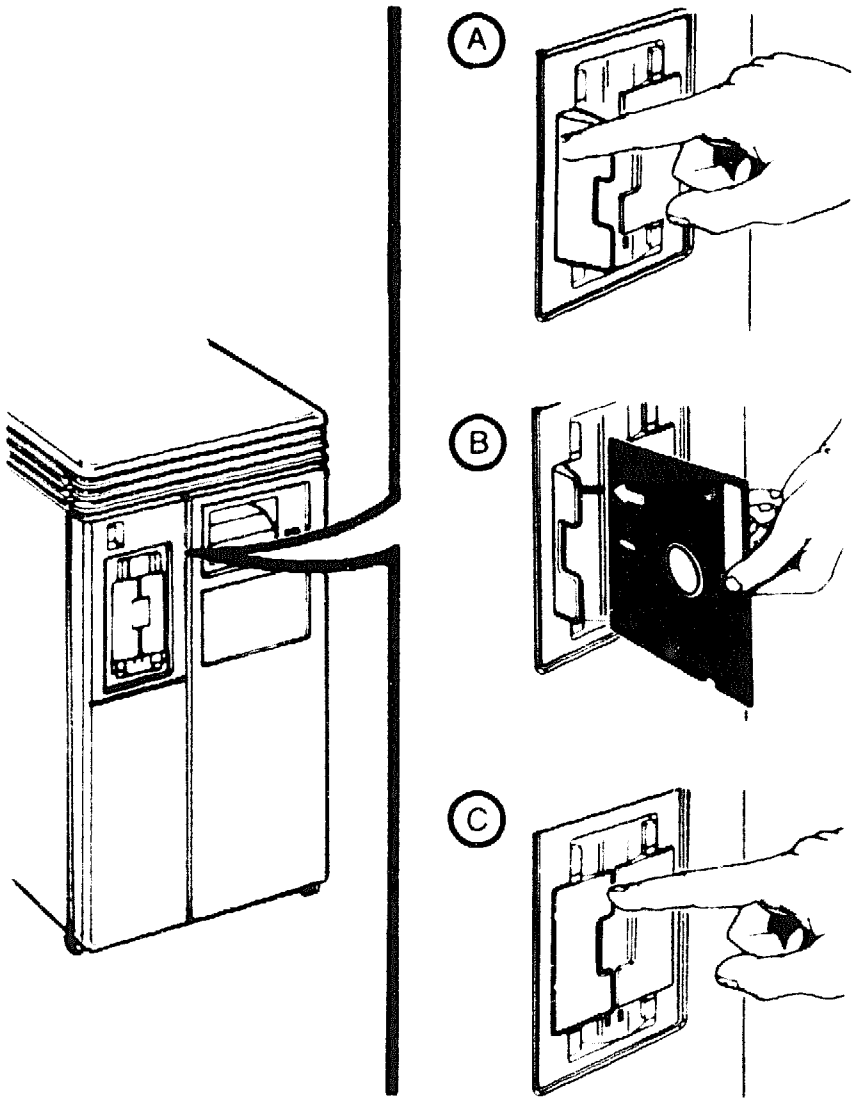
Figure 2–17: Using RX50 Diskettes



a. Open drive 1. The diskette drives contain a cardboard shipping card. Remove the cardboard card before diskette insertion.

b. Align the orange arrow on the diskette labeled "SYS RX50A" with the orange stripe on the drive. Insert the diskette labeled "SYS RX50A" into drive 1.

c. Close drive 1.



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d. Screen text instructs you to remove the diskette labeled "SYS RX50A" and insert the diskette labeled "SYS RX50B". The system informs you if additional diskettes are needed to complete testing.

NOTE: *If you are not prompted for all the diskettes in the diagnostics package, your system configuration does not need the additional diskettes for testing.*

If you neglected to or took too much time to insert the diagnostic medium, the monitor displays a "?54 retry" *error message.* Insert the *diagnostic medium* into the load device (if you have not already done so) and press the red **Restart** pushbutton to *reboot* the system.

STEP 4—The MicroVAX Diagnostic Monitor

The power-up tests are finished, and you have loaded your diagnostic tape or diskettes.

The numbers 02 through 0 are displayed on the screen; they indicate that the system is loading the "MicroVAX Diagnostic Monitor" software.

```
Loading system software.

   02..01..0
```

An introductory screen is displayed.

NOTE: *You may have a more recent version of the "MicroVAX Diagnostic Monitor" than the version used for the following "MicroVAX Diagnostic Monitor" example. The menus displayed on your screen may differ from the example.*

```
MicroVAX Diagnostic Monitor initializing.....Please wait.

MicroVAX Diagnostic Monitor - Version V2.2

                CONFIDENTIAL DIAGNOSTIC SOFTWARE
                        PROPERTY OF
                DIGITAL EQUIPMENT CORPORATION

    Use Authorized Only Pursuant to a Valid Right-to-use License

Copyright (c) 1986, 1987
Digital Equipment Corporation

Current date and time is: 25-Jun-1988 12:30:10

Press the RETURN key to continue
OR enter new date and time, then press the RETURN key.

        [DD-MMM-YYYY HH:MM]:
```

1. Make sure the date and time on the display are accurate.
   - If the date and time are accurate, press the RETURN key.
   - If the date and time are inaccurate, type the correct date and time in the format 25-JUN-1988 12:30. Press the RETURN key.

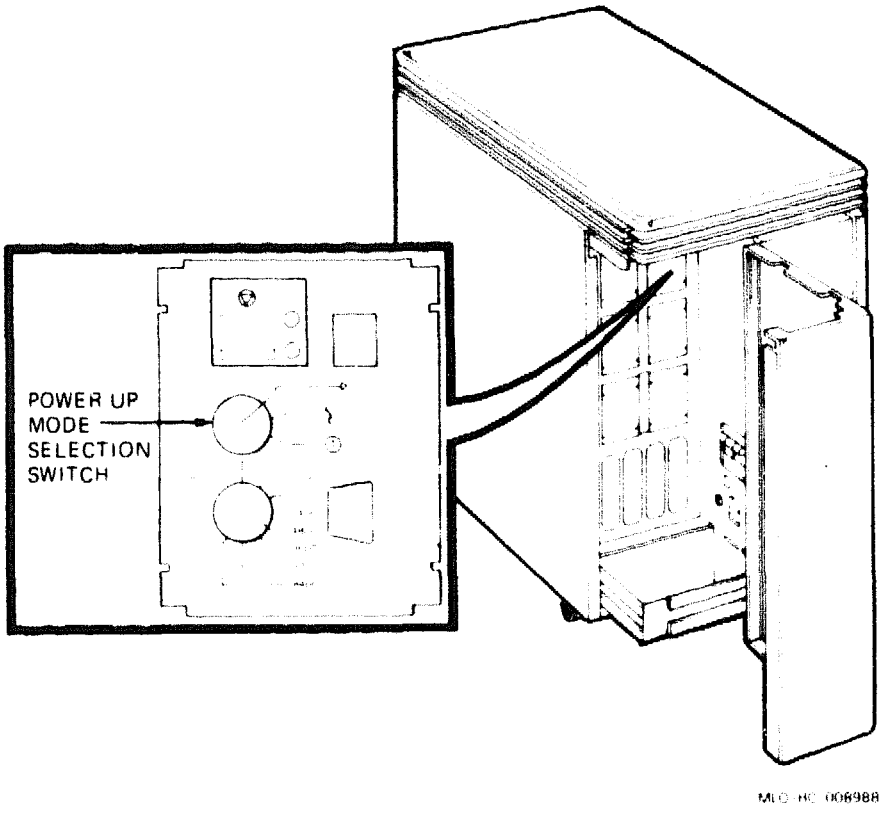
```
The system is preparing for testing.

This may take several minutes.
Please wait...
```

2. The test preparation display informs you the system is preparing for testing. Loading of the test software takes between 5 and 30 minutes, depending on the type of storage device used.
3. The "Diagnostic Monitor Main Menu" is displayed. Chapter 5 describes each of the options.

NOTE: *Do not make a selection at this time.*

```
Press the RETURN KEY to continue.>
MAIN MENU                                   Version 2.2
      1 - Test the system
      2 - Show System Configuration and Devices
      3 - Display the System Utilities Menu
      4 - Display the Service Menu
      5 - Exit MicroVAX Diagnostic Monitor
Type the number; then press the RETURN key. >
```

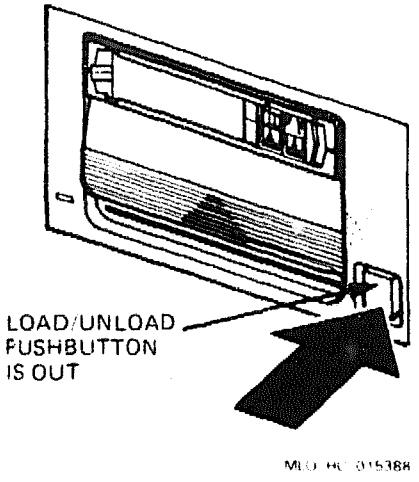
4. Turn the **Mode** switch counterclockwise on the back of the system unit to the next position to save the language you selected earlier. Close the back door of the system unit.



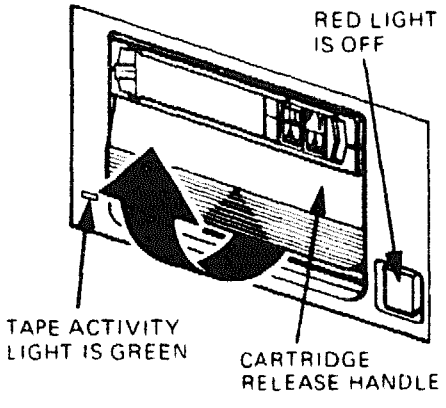
MLO HC 006988

5. Check the system's configuration.
   - Select the "Show System Configuration and Devices" choice by pressing the 2 key and the RETURN key. The diagnostics display the system's configuration. Check the configuration to make sure it matches what you ordered.
   - Your Ethernet hardware address is also displayed. Record this address for future reference.
   - When you are finished with this procedure, press the RETURN key to get back to the main menu.

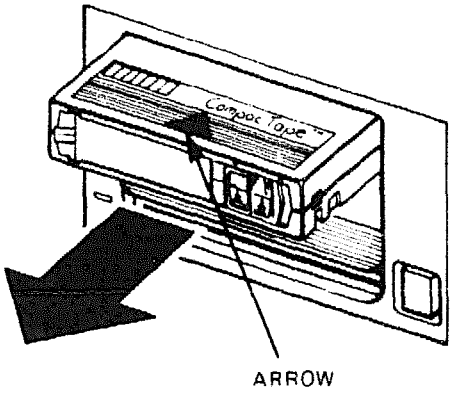
6. Rewind and unload the TK50 tape cartridge.



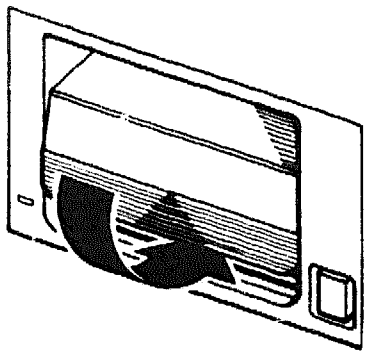
To rewind the cartridge, press the **Load/Unload** pushbutton to the OUT (Unload) position. Both the **Load/Unload** red light and the **Tape Activity** green light blink as the tape rewinds.



When the unwind procedure is complete, the **Load/Unload** red light goes OFF, and the **Tape Activity** green light goes ON. Pull open the **cartridge release handle** to eject the cartridge.



Remove the tape cartridge.



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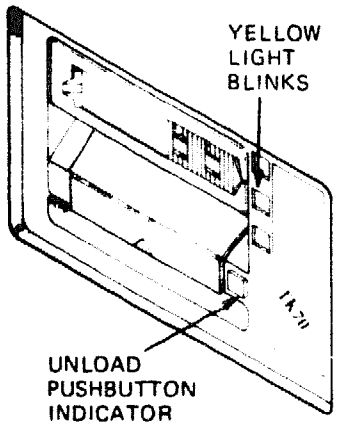
Push the **cartridge release handle** to the closed position.

NOTE: *Rewinding a tape can also be done under software control. See your software documentation for information.*

To rewind and unload the tape from the TK70 tape drive:



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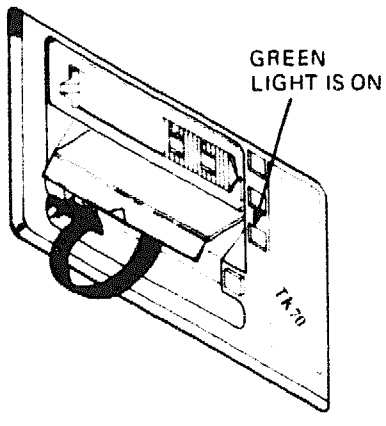
Press the **Unload** pushbutton. The yellow light blinks as the tape rewinds.



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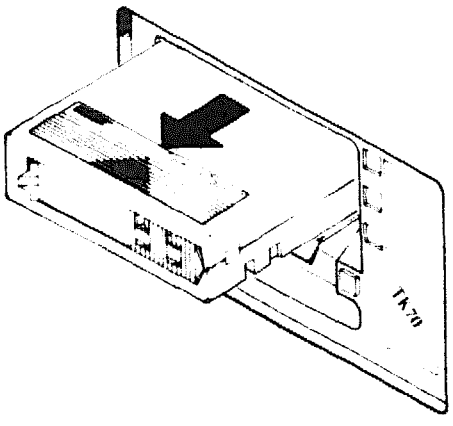
When the unwind procedure is complete, the **Unload** pushbutton stops glowing, an audible beep sounds, and the green light comes on. Pull open the **cartridge release handle**.



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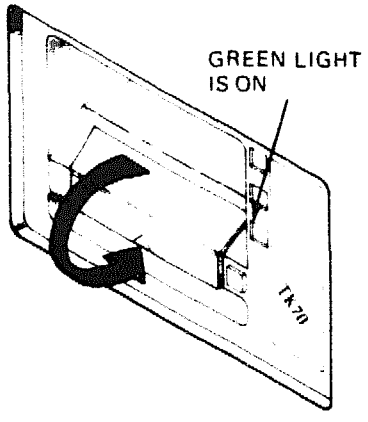
The cartridge ejects.



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Remove the tape cartridge and push the **cartridge release handle** to the closed position.

7. Select the "Test the System" diagnostic by pressing the number [1] key and then the [RETURN] key. The diagnostics check system components.

   A few moments later, the "System Test" screen is displayed.

```
MAIN MENU                                          Version 2.2
SYSTEM TEST

This is a test of the MicroVAX computer and its devices.

No additional preparation for this testing is required;
the MicroVAX is ready to be tested.

Testing occurs in two parts: The functional tests quickly
test each device sequentially; the exerciser test (lasting
about 4 minutes) tests how the devices work together.

To halt the test at any time and return to the Main Menu,
type CTRL-C by holding down the CTRL key and pressing the C key.

Press the RETURN key to begin testing,
or type 0 and press the RETURN key to return to the Main Menu.>
```

8. Press the RETURN key to begin testing. The monitor displays several messages to inform you of the progress of the system tests.

   After about 15 minutes, a message is displayed that tells you the system has passed testing.

```
SYSTEM TEST PASSED

    All devices passed functional tests and the system passed
    the exerciser test.

    At this point you may exit from the MicroVAX Diagnostic
    Monitor or perform more specialized testing.  If you would
    like additional information, consult the system
    documentation.

Press the RETURN key to return to the previous menu.
```

   You have successfully installed and tested your VAXstation 3 system.

   NOTE: *If error messages appear, see the troubleshooting section of Chapter 5.*

9. Press the RETURN key to get back to the "Main Menu". The "Main Menu" is displayed on the screen. Chapter 5 describes the diagnostic tests.

10. Press the number 5 key and then press the RETURN key to exit. The screen contains the following information:

```
Exiting MicroVAX Diagnostic Monitor

    Exit complete.  You may now load your system software.
```

You are now ready for software installation. If you are unfamiliar with the system unit controls and indicators, read Chapter 3, which covers system operation. Remember to read the rest of this manual after software installation.


CHAP 3

Chapter 3
VAXstation 3 Hardware

This chapter contains information on the following topics:

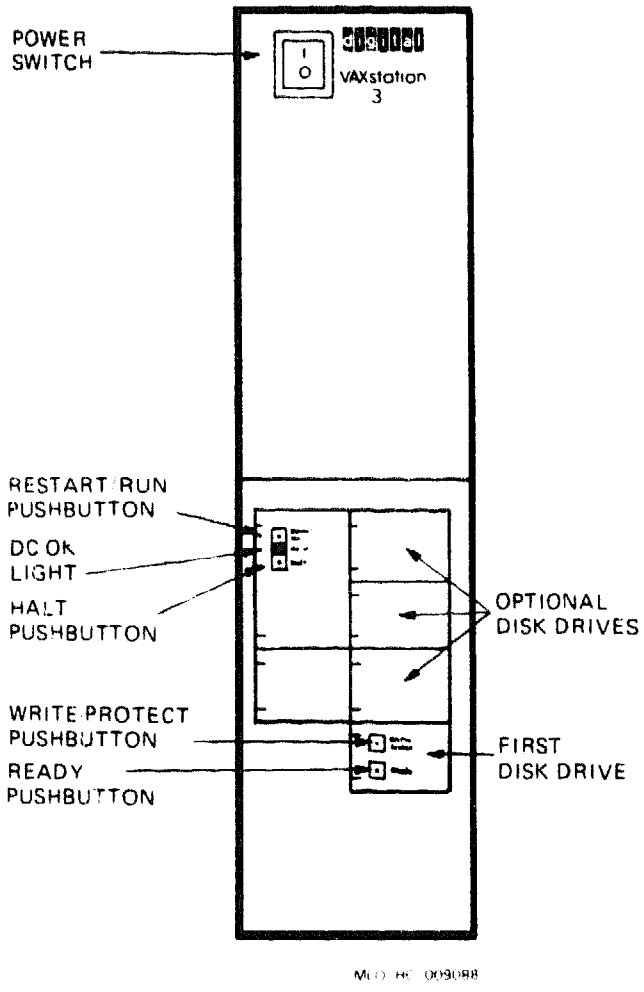
- VAXstation 3 controls and indicators
- Turning on the VAXstation 3
- Turning off the VAXstation 3
- VR290 color monitor controls and indicators
- VR260 monochrome monitor controls and indicators
- Video subsystem
- *Fixed-disk drive*
- Tape drive and tapes
- Dual diskette drive and diskettes
- *Back-up copies*
- *DELQA* Ethernet communications module

VAXstation 3 Controls and Indicators

The front control panel (Figure 3–1) contains the following controls and indicators:

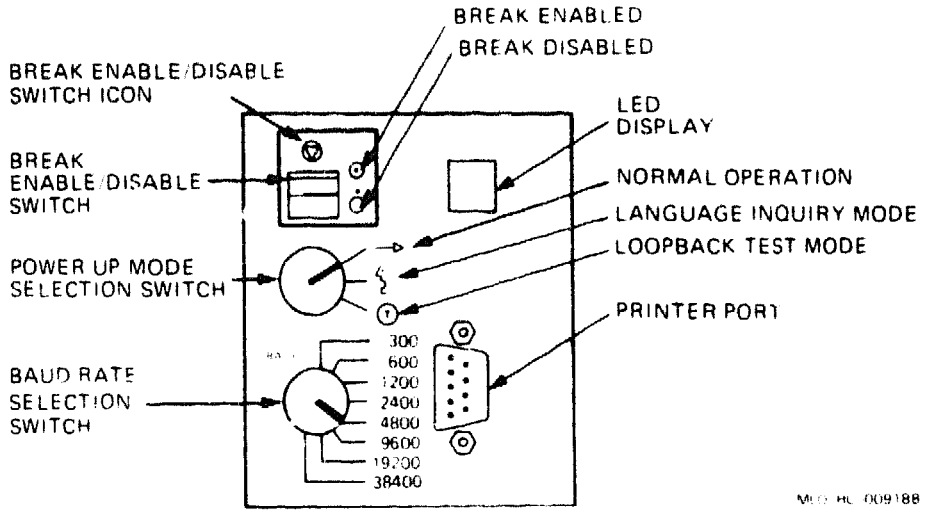
- System **power** switch
- **Restart/Run** momentary-contact pushbutton
- **DC OK** indicator
- **Halt** pushbutton
- Fixed-Disk **Write-Protect** pushbutton
- Fixed-Disk **Ready** pushbutton

Figure 3–1: Controls and Indicators



Additional controls and indicators are located on the CPU distribution panel on the back of the VAXstation 3 system unit.

Figure 3–2: The CPU Distribution Panel



The switches, indicator, and connector on the CPU distribution panel provide the following functions:

Break Enable/Disable Switch

Switch Position	Function
Up ⊙	Halts are enabled. On power-up or restart, the system will enter console I/O mode at the completion of start-up diagnostics. Pressing the **Halt** pushbutton on the front control panel or the BREAK key on the console terminal stops the processor and transfers control to the console program.
Down ○	Halts are disabled. On power-up or restart, the system will attempt to load software from one of the boot devices at the completion of start-up diagnostics. The disable position is the normal operating position. Pressing the BREAK key on the console has no effect on the system.

Power-Up Mode Selection Switch

Switch Position	Mode
Arrow	Run (the normal operating position). This 3-position rotary switch determines how the system responds at power-up. If the system supports the Multinational Character Set (MCS), the user will be prompted for language only if the battery backup has failed. Full start-up diagnostics are run.
Face	Language inquiry (factory setting). If the system supports MCS, the user will be prompted for language on every power-up and restart. Full start-up diagnostics are run.
T in a Circle	Test. ROM programs run wraparound serial line unit (SLU) tests.

Baud Rate Selection Switch

This switch sets the baud rate of the console terminal serial-line. The factory setting is 4800 baud. The baud rate of this switch must match that of the printer, if present.

Light-Emitting Diode (LED) Display

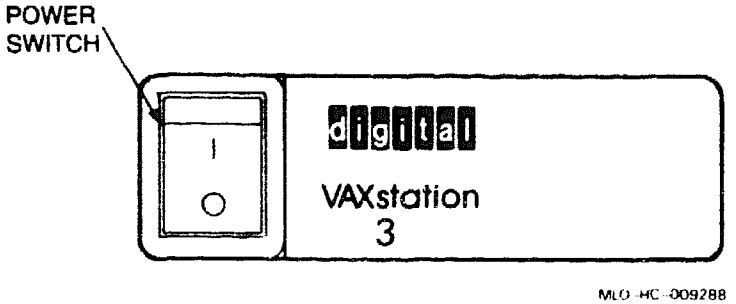
This indicator displays the numbers of on-going steps during power-up tests and boot procedures. If a failure occurs, the display indicates the field replaceable unit (FRU) that is the most probable cause of the failure. See Chapter 5, the Power-Up Messages section, for a brief description of the hexadecimal numbers.

Printer Port

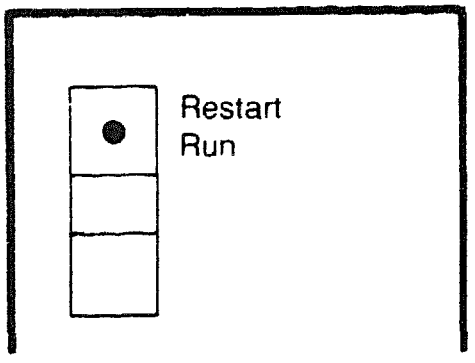
This is a 9-pin serial-line unit connector for a cable to a printer.

The System Power Switch

The system **power** switch controls the ac power. Setting the switch to 1 turns on the power. Setting the **power** switch to 0 turns off the power.



The Restart/Run Pushbutton



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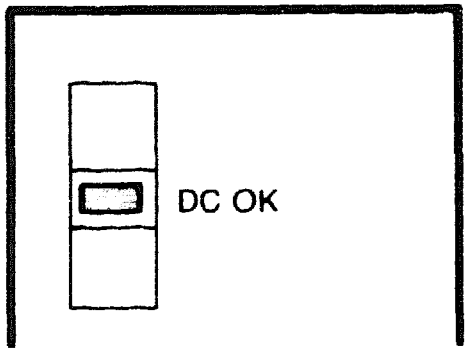
The **Restart/Run** momentary-contact pushbutton reboots the operating system software when pushed in.

When the system is on, the **Restart/Run** pushbutton glows green to indicate normal software operation. If the pushbutton does not glow, see Chapter 5 for troubleshooting information.

The DC OK Indicator



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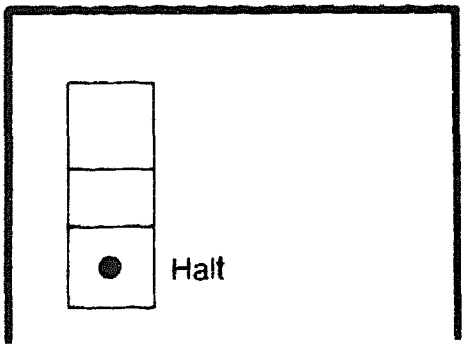
The **DC OK** indicator glows green when the voltages are within tolerance. If the indicator does not glow, the voltages may not be within tolerance. See Chapter 5 for troubleshooting suggestions.

The Halt Pushbutton



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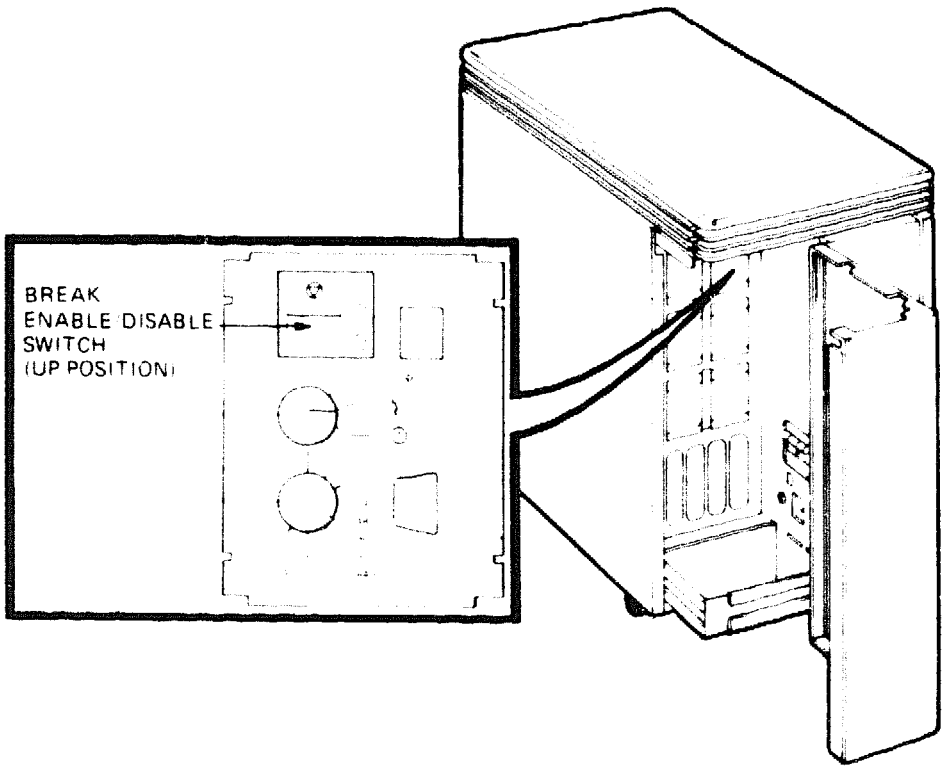
The **Halt** pushbutton stops the *program* currently *running* without shutting down the VAXstation 3. When the **Halt** pushbutton is pressed, it latches in and glows orange. The **Halt** pushbutton should be set in the out position and not glowing for normal software operation.

The **Break Enable/Disable** switch (on the back of the VAXstation 3 cabinet) is normally set to the disable position (down) to (1) permit automatic loading of bootable software and to (2) prevent the system from going into *console mode*. The disable position stops devices (such as a printer) connected to the auxiliary port from halting the processor.

When the **Break Enable/Disable** switch is set to the enable position (up), the system powers up to console mode, indicated by the >>> prompt (after completing its self-tests). To load system software from console mode, you must use the BOOT command (BOOT device_name). For example, BOOT MUA0 tells the system to boot from the cartridge in the TK50 or TK70 tape drive.

To halt the system, first shut down any software that may be executing. Then press the **Halt** pushbutton on the front control panel twice or press the BREAK key on the console terminal. Any data not saved before pressing the **Halt** pushbutton will be lost. When the console prompt >>> is displayed on your screen, the system is halted. The *MicroVAX II Maintenance Manual* describes the console *commands*.

Figure 3–3: Break Enable/Disable Switch



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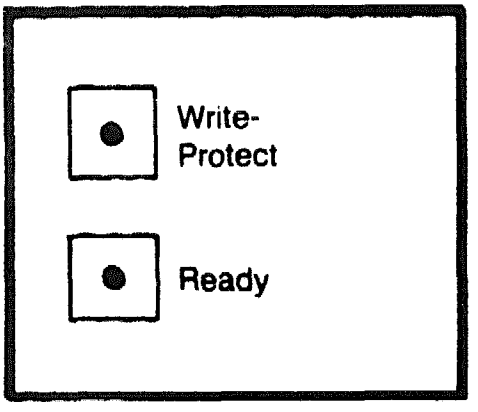
The Fixed-Disk Pushbuttons



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Your system may contain one or more fixed disks with external pushbuttons. The pushbuttons are inoperable, if your system does not have a fixed disk.

The **Fixed-Disk Write-Protect** pushbutton is set in the out position and not glowing for normal software operation. System software can read or write information on the disk. To *write-protect* the disk, preventing system software from erasing or writing on the disk, push in the **Write-Protect** pushbutton. The pushbutton glows orange.

The **Fixed-Disk Ready** pushbutton glows green when it is set to the out position and indicates that the fixed disk is ready to *store* information. When pushed in, the pushbutton stops glowing, and the fixed disk is disabled. In effect, the fixed disk is turned off.

Turning On the System

This procedure assumes that the system's hardware components have been installed according to the installation instructions in this manual and that the system software has been installed. If the software has not been installed, consult the software documentation to install the software.

Initial Control Panel Switch Settings

1. If you have a fixed disk, set the **Fixed-Disk Ready** pushbutton to the out (ready) position.
2. Set the system **power** switch to 1 (ON).
3. Set the monitor **power** switch to 1 (ON).

When you turn on the power, the VAXstation 3 control panel indicators appear as described in Table 3–1.

Table 3–1: Normal Power-On Indications

Control/Indicator	Normal Indication
Restart/Run	Red light ON
DC OK	Green light ON
Halt	Red light OFF
Fixed-Disk Write-Protect	Green light OFF
Fixed-Disk Ready	Green light ON within 30 seconds
TK50 Tape Drive Load/Unload	Red light ON for 4 seconds and then OFF
TK50 Tape Activity	Green light ON
TK70 Tape Drive Indicator Lights	Orange, yellow, and green lights ON during self-tests. The green light remains ON.
Monitor Power Indicator	Green light ON

If you do not observe the indications listed in Table 3–1, see Chapter 5 for troubleshooting information.

The monitor then displays the power-up screen.

```
KA650-B V1.2/0123

Performing normal system tests.

23..22..21..20..19..18..17..16..15..14..13..12..11..10..09..08..
07..06..05..04..03..

Tests completed.

Loading system software.

02..01..0
```

The monitor slowly displays the numbers 23 through 03, indicating completion of steps in the power-up system test. The VAXstation 3 performs power-on system tests each time you turn on the system.

Then, the monitor displays the numbers 02 through 0 to indicate that the VAXstation 3 system is loading the system software. The first screen for the system software appears on the monitor after a few seconds.

The VAXstation 3 system is now ready for use. See the system software documentation for instructions on using the VAXstation 3 system.

Turning Off the System

To prevent loss of data and to ensure an orderly system shutdown, follow the system shutdown procedure described in your system software documentation.

CAUTION: *Turning off your system without following the shutdown procedure described in your system software manuals may result in the loss of data.*

Turn off the VAXstation 3 system by setting the **power** switch to 0 (OFF).

CAUTION: *Before moving a monitor, turn it off and wait 30 seconds to allow the CRT to discharge.*

NOTE: *Users of diskless systems in a VAXcluster should not turn off, halt, or restart their systems without consulting the cluster manager. Those activities affect the functioning of the entire cluster.*

VR290 Color Monitor Controls and Indicators

The front and side of the monitor have the following six controls and indicators:

The **contrast control** adjusts the video display.

The **brightness control** adjusts the video *raster* (background intensity) to compensate for ambient light in the room. To adjust the raster, set the **brightness control** to minimum. Slowly turn up the control until horizontal lines appear on the screen, then reduce the brightness until the lines disappear.

The **degauss** switch clears picture distortion caused by external interference. Press the **degauss** switch after any movement of the monitor to correct color distortions. If you need to press the **degauss** switch a second time, wait 10 minutes to allow the circuit to reactivate.

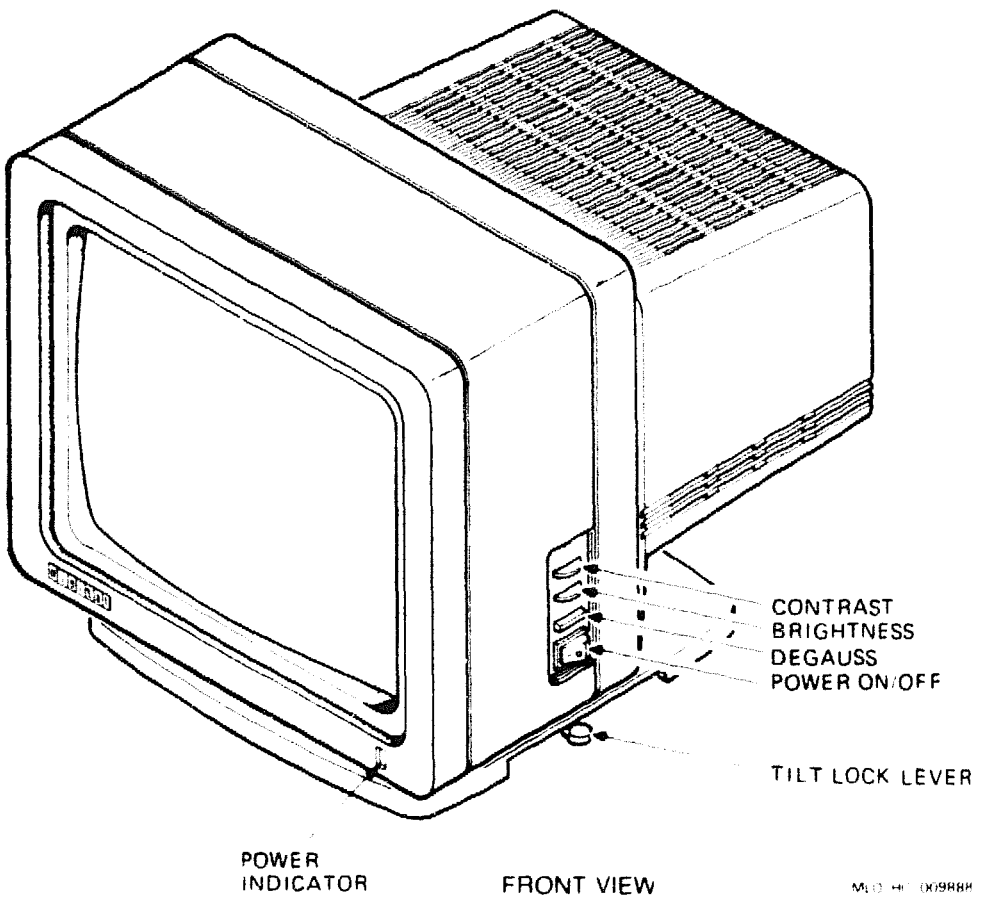
The **power** switch turns on or off the monitor. Press 1 to turn on the power. Press 0 to turn off the power.

The **tilt-lock** lever adjusts the angle of the monitor. Set the **tilt-lock** lever back to adjust the tilt. Pull the lever forward to the original position to lock the monitor at the desired angle. The lock prevents the tilting mechanism

from moving the monitor. You can swivel the monitor on the base, and the angle will be maintained.

The **power** indicator glows green to indicate that power is applied to the monitor.

Figure 3–4: Front and Side Controls, VR290 Color Monitor



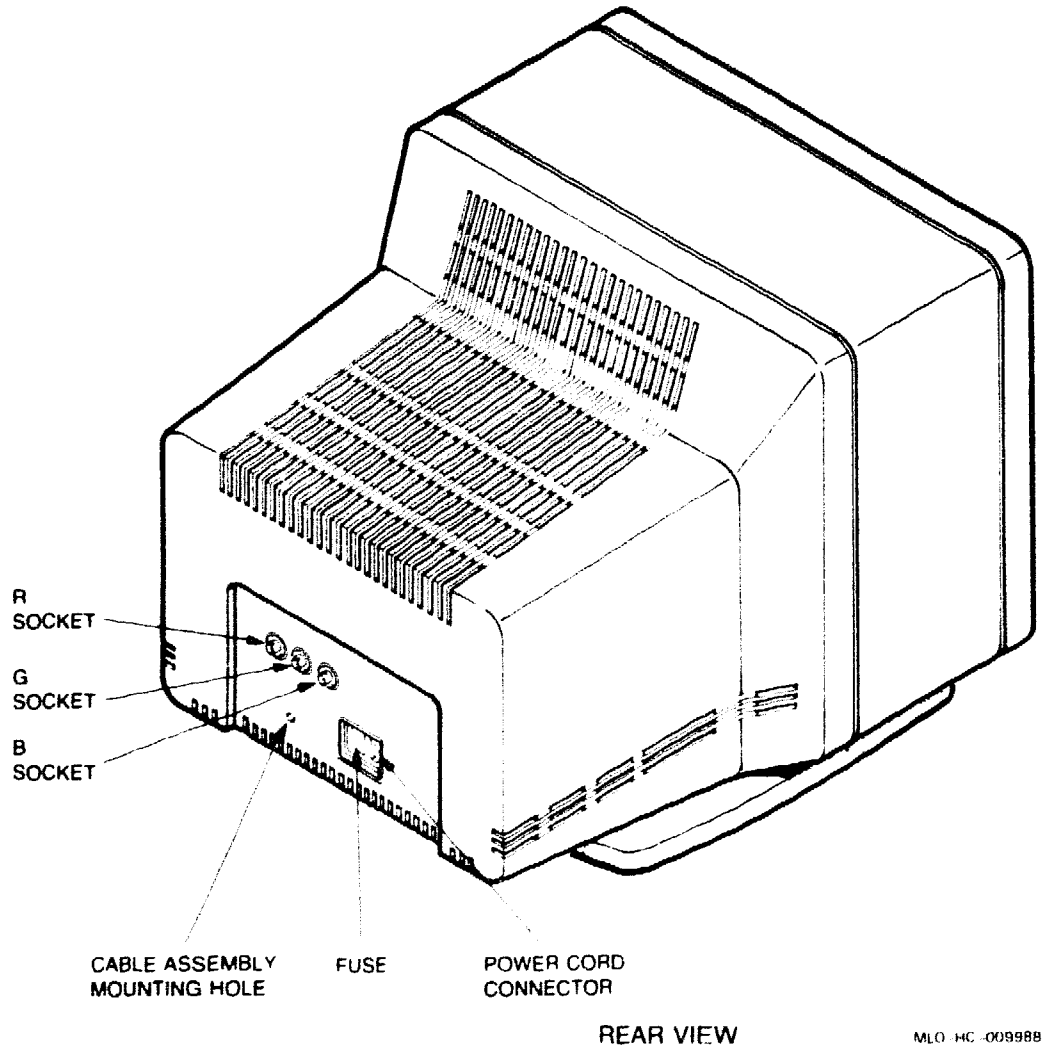
The back of the monitor has the following six connectors and controls:

The end of the R, G, and B video cables plug into the **R**, **G**, and **B sockets**. The monitor, keyboard, and pointing device are joined to the system unit through the video cable assembly, which screws into the **cable assembly mounting hole**.

The **fuse** protects the monitor from electrical damage.

The monitor power cord plugs into the **power cord connector**.

Figure 3–5: Rear Controls and Connectors, VR290 Color Monitor



VR260 Monochrome Monitor Controls and Indicators

The front and side of the monitor have the following three controls and indicators:

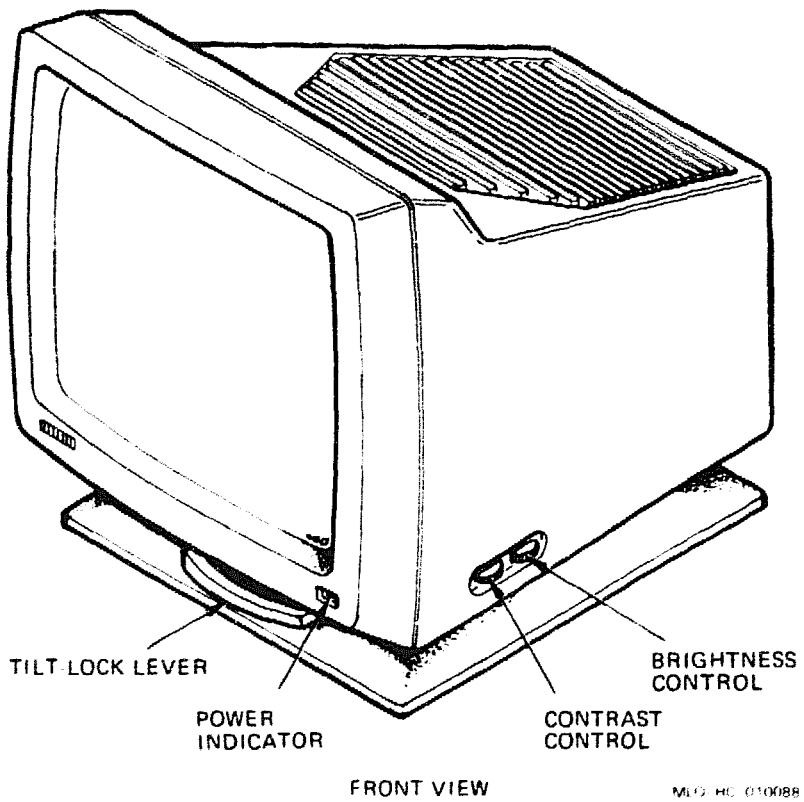
The **power** indicator glows green to indicate that the correct amount of power is applied to the monitor.

The **contrast control** lets you adjust the video display intensity.

The **brightness control** lets you adjust the video raster (background intensity) to compensate for ambient light in the room. To adjust the raster, set the **brightness control** to minimum and slowly turn up the control. If horizontal lines appear on the screen, then reduce brightness until the lines disappear.

If you installed the monitor base, the **tilt-lock lever** lets you adjust the angle of the monitor. To change the angle, press down the lever and move the monitor to the desired tilt. Taking your hand off the **tilt-lock lever** locks the monitor in place. You can swivel the monitor on the base and the angle will be maintained.

Figure 3–6: Front and Side Controls, VR260 Monochrome Monitor



The back of the monitor has the following six connectors and controls:

The **power** switch turns on or off the monitor. Press 1 to turn on the power. Press 0 to turn off the power.

The monitor power cord plugs into the **power cord connector**.

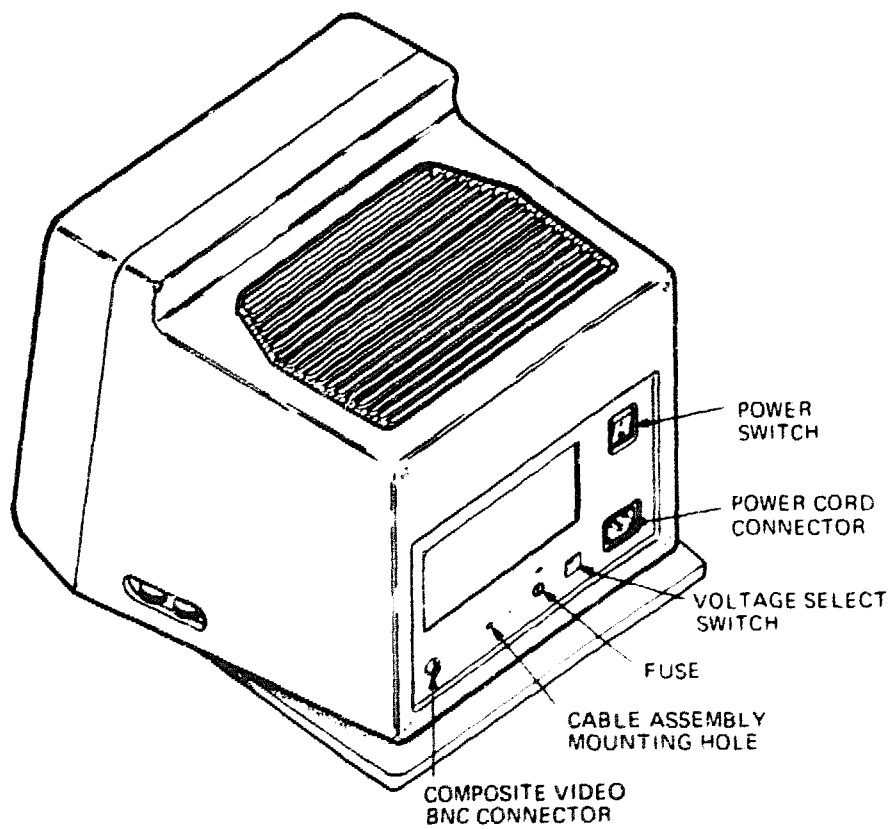
The **voltage select** switch matches the monitor voltage to the wall outlet voltage.

The **fuse** protects the monitor from electrical damage.

The monitor, keyboard, and pointing device are joined to the system unit through the video cable assembly, which screws into the **cable assembly mounting hole**.

The video cable plugs into the **composite video BNC connector** from the video cable assembly.

Figure 3–7: Rear Controls and Connectors, VR260 Monochrome Monitor



The Video Subsystem

The VCB02 Video Subsystem consists of

- One M7169 base module
- One or two M7168 4 *plane* modules

The M7169 and M7168 modules provide a high performance, high-resolution, full page direct *memory* access (DMA) color video subsystem based on the Q22 *bus*. The modules are based on a *VLSI* graphics coprocessor, which off loads the KA650-BA main processor from computation-intensive graphics tasks.

The video subsystem can be configured in 4- or 8-plane variations. The base module (M7169) provides the hardware for the system interface, the user I/O interface, and the full-page video support for the 4- or 8-planes of video memory.

- The 2-module set, the M7169 base module and one 4-plane module, can display 16 colors or shades of gray simultaneously.
- If an optional second 4-plane module is added, the 3-module set becomes an 8-plane video subsystem, which can display 256 colors or shades of gray simultaneously.

The modules allow parallel processing in multiple planes so that no degradation in performance occurs as planes are added.

The 4-plane module provides variable character size or positioning and inherent graphics capability. The module's major hardware components include four video processor (DC322) chips, four planes of video memory with two pages/plane, subsystem support logic, video shifters, and cable connectors for the base module interface.

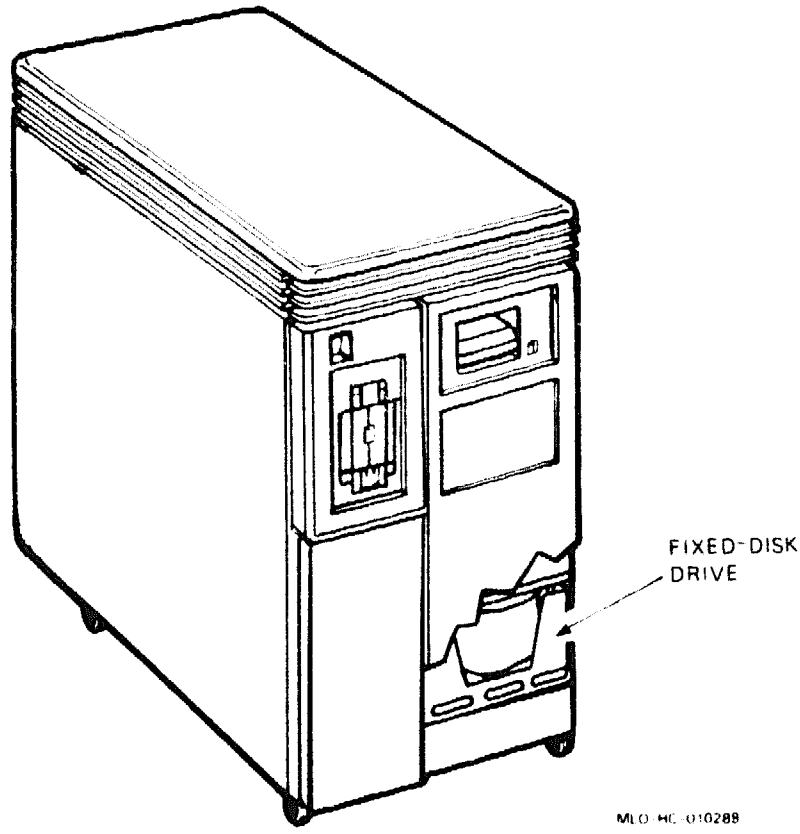
To order an additional 4-plane (M7168) module after initial system installation, contact your sales representative. Additionally, contact your DIGITAL representative to install the option.

For more information on the 4-plane module, see the following document:

- *VCB02 Video Subsystem Technical Manual* (Order No. EK-104AA-TM).

Disk Drives

The RD5x series of fixed-disk drives, inside the system unit, store information on a nonremovable disk. The RD53 fixed disk stores up to 71 *megabytes* of data. The RD54 fixed disk stores up to 159 megabytes of data.



The RA series of disk drives give you a growth path for data storage. The disks can only be housed in the H9642 Enclosure. The KDA50-Q disk controller, in the back of the BA123 Enclosure, can connect up to four RA series disk drives to the Q22-bus. The RA60 removable disk stores up to 205 megabytes of data. The RA81 fixed disk stores up to 456 megabytes of data.

Figure 3–8: The RA60 Removable Disk Drive

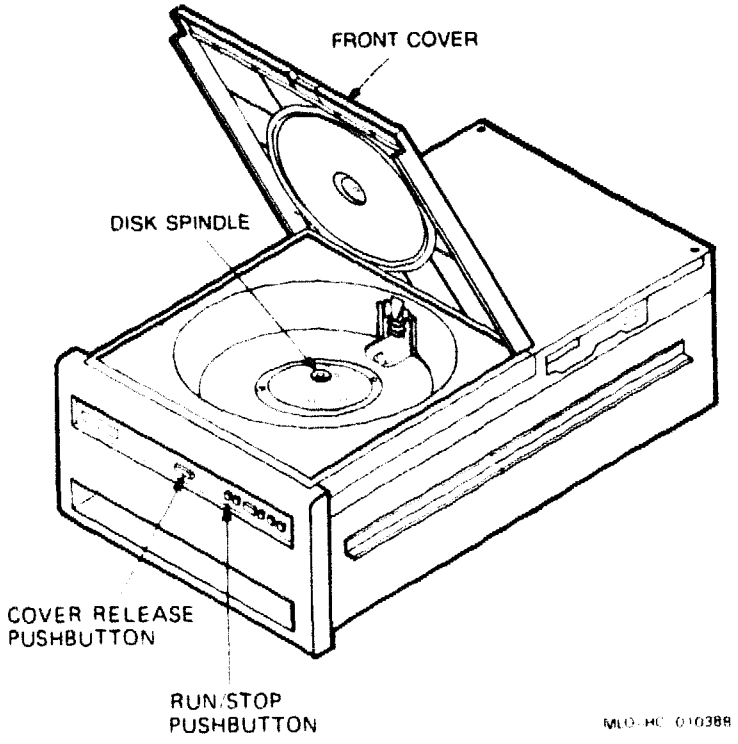


Figure 3–9: The RA81 Fixed-Disk Drive

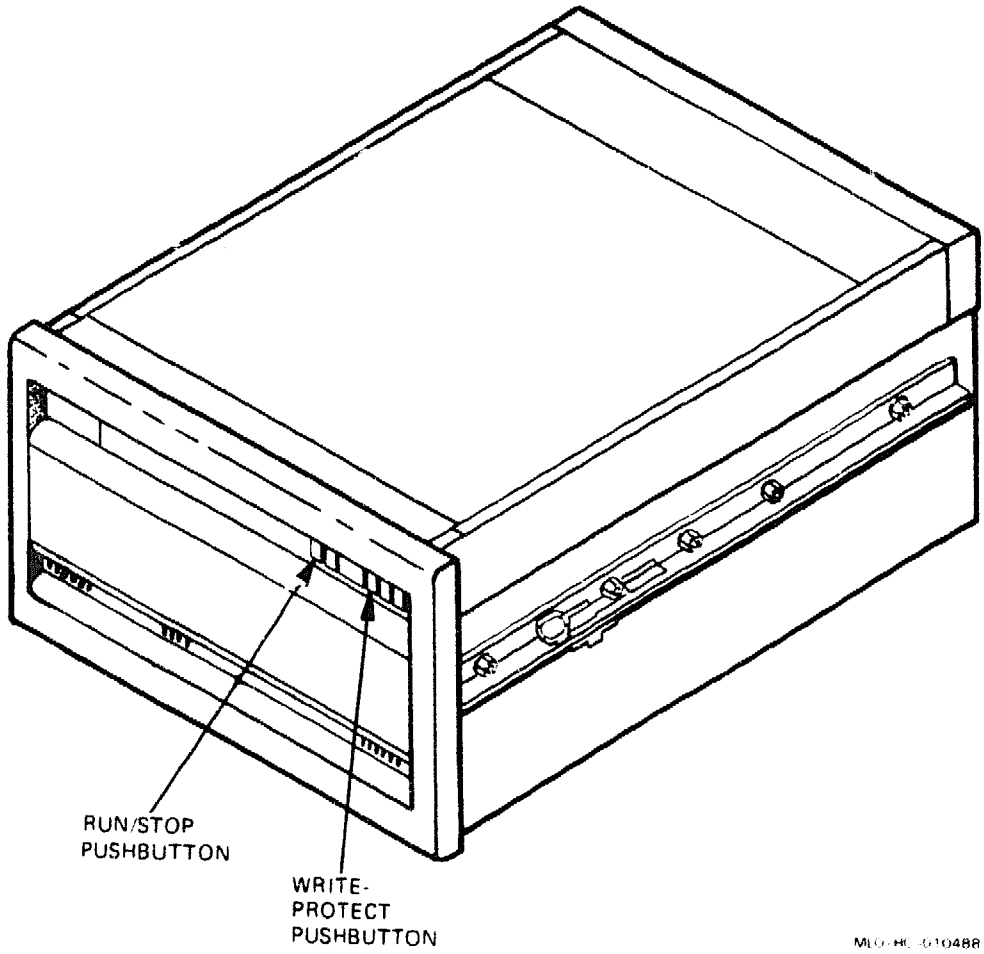
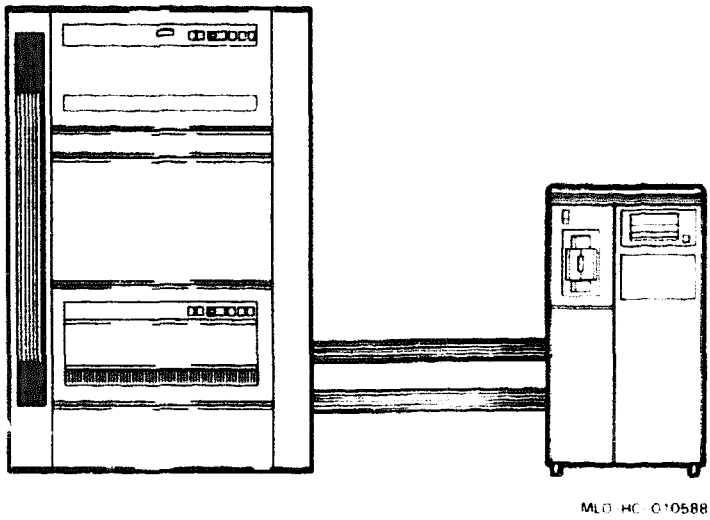


Figure 3–10: The H9642–RA60/81–BA123 Enclosure Configuration



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See the *RA60 Disk Drive User Guide* and *RA81 Disk Drive User Guide* (shipped with the disk drives) for more information on those configurations.

Tape Drives

The system can have either TK50 or TK70 tape drives installed. The TK50 and TK70 store information on *magnetic tape* cartridges.

A TK50 tape cartridge can store up to 94.5 megabytes of information. A TK70 tape cartridge can store up to 296 megabytes of information.

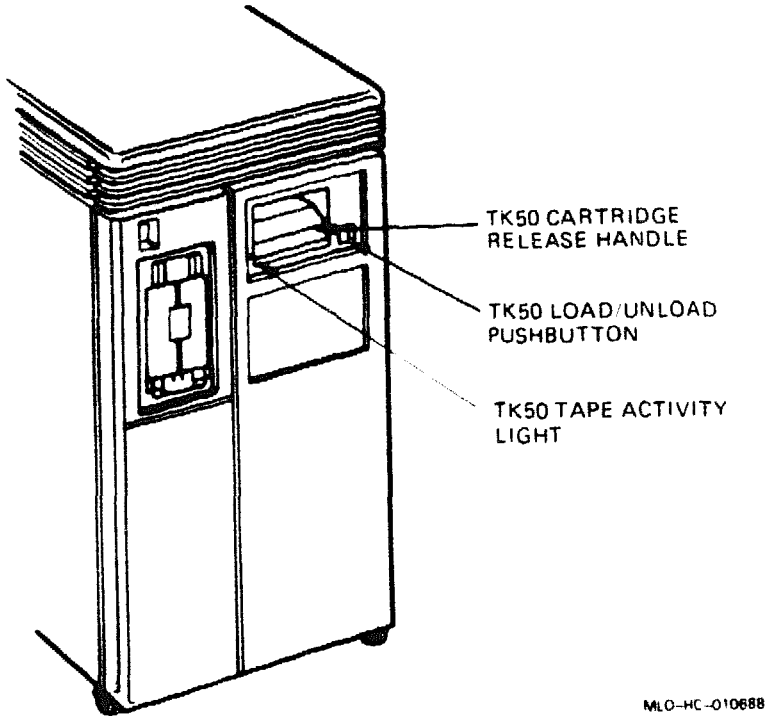
The TK50

The TK50 tape drive holds one removable TK50 magnetic tape cartridge. The information is magnetically stored on one side of a TK50 tape. Information can be erased, and new information stored in its place.

The tape cartridge can be used as both an input and *output device.* As an input device, it can be used to load software or data into the system. As an output device, the tape cartridge can be used to make copies (backups) of software or to store other data.

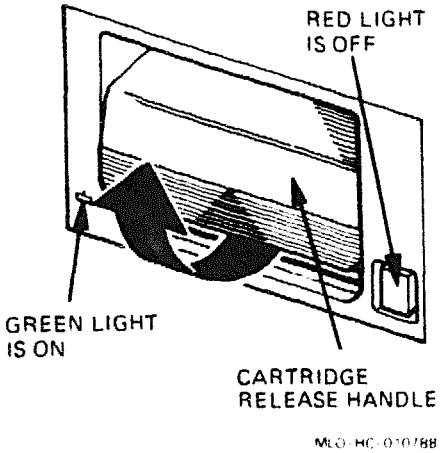
The tape drive has two primary controls: the **cartridge release handle** and the **Load/Unload** pushbutton. The **cartridge release handle** is used to insert or remove cartridges and lock them into position. The **Load/Unload**

pushbutton controls winding and rewinding of the tape. The pushbutton is a 2-position control; when the pushbutton is first pressed in, the tape winds onto the take-up reel inside the drive. When pressed again, the pushbutton pops out and winds the tape back into the tape cartridge.

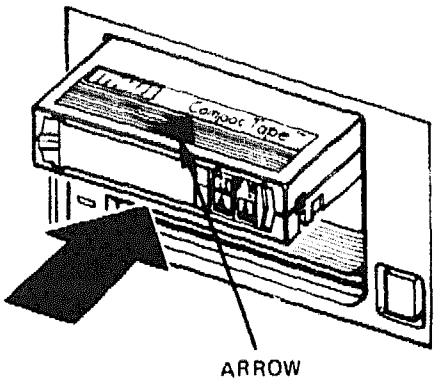


Inserting the Tape Cartridge

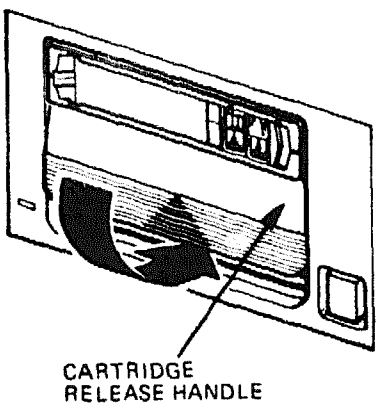
Verify that the system **power** switch is set to 1 (ON). You cannot move the **cartridge release handle** if the **power** switch is set to 0 (OFF).



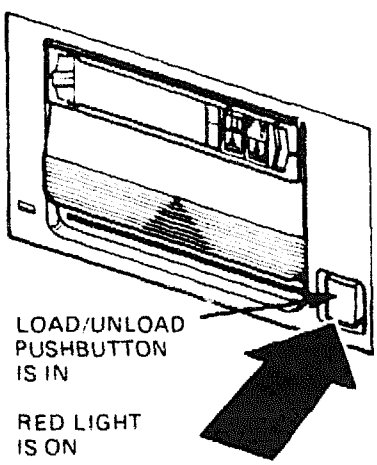
Wait until the **Tape Activity** green light is ON and the **Load/Unload** red light is OFF (light is red for approximately 4 seconds during power-on self-test). The tape drive will make a short audible beep. Make sure the **Load/Unload** pushbutton is in the out position and is not glowing. Pull open the **cartridge release handle**.



Make sure the label on the front slide slot of the tape cartridge is facing out. Insert the tape cartridge fully into the drive until you encounter a firm stop.



Push the **cartridge release handle** to the closed position.



Push the **Load/Unload** pushbutton to the IN (Load) position. The red light stays ON. When the **Tape Activity** green light is ON (green light blinks when tape is moving), the tape is ready for use.

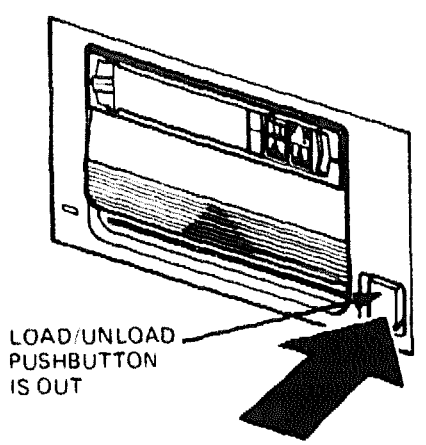
The tape is loaded in 10–15 seconds. If a tape is new, the system performs a calibration sequence that takes approximately 40 seconds. The **Tape Activity** indicator blinks green rapidly and irregularly during calibration.

CAUTION: *Do not pull open the **cartridge release handle** until the **Load/Unload** red light is OFF and the **Tape Activity** indicator green light is ON. Do not pull open the **cartridge release handle** while an indicator light blinks.*

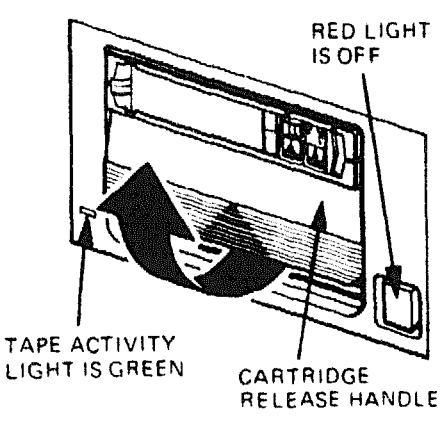
*If the **Load/Unload** pushbutton red light blinks rapidly at any time, press it four times. If the problem persists, do not attempt to use the tape drive or to remove the tape cartridge. Call your service representative.*

Rewinding and Unloading the Tape Cartridge

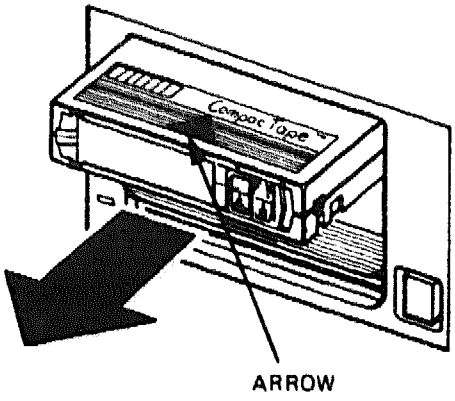
Rewind and unload a tape cartridge before removing it from the tape drive.



To rewind and unload the tape cartridge from the tape drive, press the **Load/Unload** pushbutton to the OUT (Unload) position. Both the **Load/Unload** pushbutton and the **Tape Activity** indicator blink as the tape rewinds.



When the unwind procedure is complete, the **Load/Unload** red light goes OFF, and the **Tape Activity** green light goes ON. Pull open the **cartridge release handle** to eject the cartridge.



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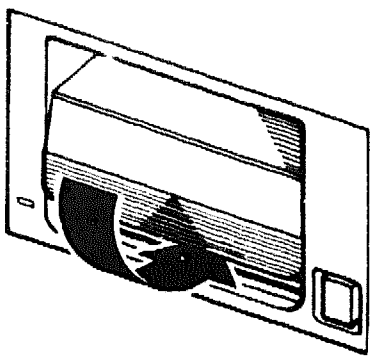
Remove the tape cartridge.



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Push the **cartridge release handle** to the closed position.

NOTE: *Rewinding a tape can also be done under software control. See your software documentation for information.*

Table 3-2 describes the TK50 tape drive controls and indicators.

Table 3–2: TK50 Tape Drive Controls and Indicators

Control	Position	Condition
Load/Unload Pushbutton	In	Slowly blinking. Tape is loading (10–15 seconds). Rewinding and loading can take up to 2 minutes.
	Out	Tape is rewinding and unloading.

Tape Activity Indicator	Load/Unload Pushbutton Indicator	Condition
OFF	OFF	No power to the tape drive.
ON	OFF	Safe to pull **cartridge release handle** to insert or remove a tape. This is the only condition in which the handle can be used. Power is present.
OFF	ON	Unsafe to lift the cartridge release handle. • Power-on self-test is occurring—glows for only 4 seconds. • Cartridge is inserted but handle is not in closed position. • Tape is loading or unloading. • Tape is stopped.
ON	ON	Tape loaded successfully.
Blinking	ON	Tape is in motion (except rewind). Read/write commands are being processed. Irregular fast blinking means tape calibration is occurring.[1]
Blinking	Blinking	Tape is rewinding.

[1] If a tape is new, the system performs a calibration sequence that takes approximately 40 seconds.

Table 3–2 (Cont.): TK50 Tape Drive Controls and Indicators

Tape Activity Indicator	Load/Unload Pushbutton Indicator	Condition
Blinking	Blinking rapidly	A fault is occurring. Press and release the **Load/Unload** pushbutton four times. If the problem persists, do not attempt to use the tape drive or to remove the tape cartridge. Call your DIGITAL representative.

Handle	Position	Function
Cartridge Release Handle	Out	Allows a tape to be inserted or removed after rewind and unload operations are completed.
	In	Locks tape in operating position.

The TK70

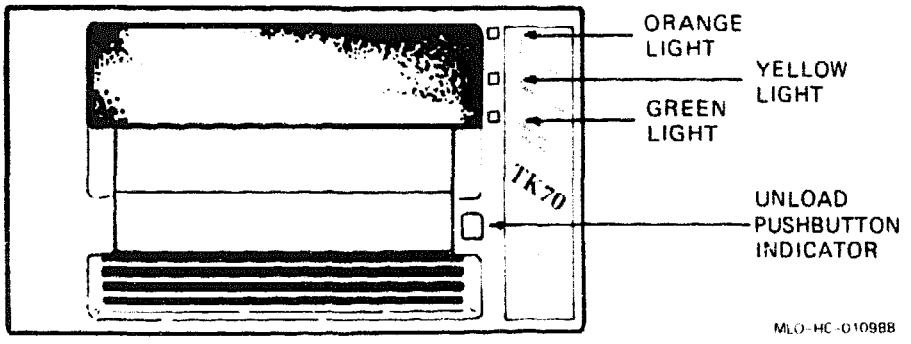
The TK70 tape drive holds one removable magnetic tape cartridge. The TK70 can read data written on either CompacTape II or CompacTape cartridges. It can also read data from TK50 tape cartridges, but cannot write data to TK50 tape cartridges.

The TK70 can be used as both an input or output device. As an input device, it can use either CompacTape II or CompacTape cartridges to load software or data into your system. The TK70 tape drive can read data on both types of cartridges whether it was recorded on a TK70 or TK50 tape drive.

As an output device, only CompacTape II cartridges should be used to make copies (backups) of software or data. The TK70 tape drive cannot write data to a CompacTape that has been written on by a TK50 tape drive.

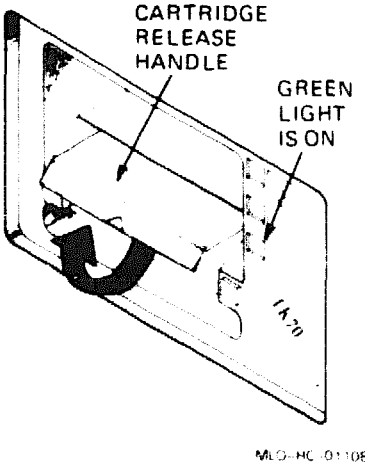
The tape drive has two primary controls: the **cartridge release handle** and the **Unload** pushbutton. You use the **cartridge release handle** to insert or remove cartridges and lock them into position. The **Unload** pushbutton controls winding and rewinding of the tape.

The TK70 also has three indicator lights—green (Operate Handle), yellow (Tape in Use), and orange (Write-Protected)—that let you know the status of the tape drive. To operate the tape drive properly, you must carefully monitor the indicator lights. Tables 3–3 and 3–4 summarize the TK70 tape drive controls and indicators.

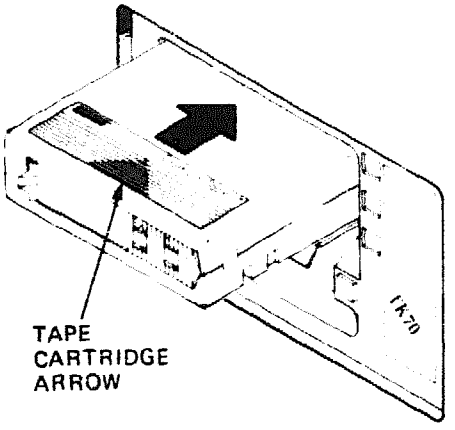


Inserting the Tape Cartridge

Verify that the system **power** switch is set to 1 (ON) and that the **power** switch glows orange. You cannot move the **cartridge release handle** if the **power** switch is set to 0 (OFF). During power-up, the TK70 drive runs self-tests that last a few seconds.



When the power is first turned on, all three indicator lights glow briefly, the orange and green lights turn OFF, and the yellow light blinks while the tape drive initializes. Wait until only the green light is ON and the drive beep sounds. Pull open the **cartridge release handle**.



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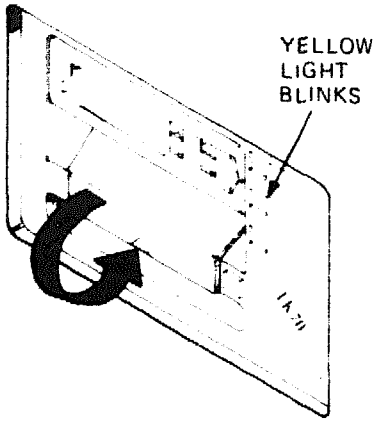
Make sure the label on the front of the tape cartridge is facing out. Insert the tape cartridge fully into the drive until you encounter a firm stop.



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Push in the **cartridge release handle** to the closed position to lock the tape cartridge in place. The yellow light blinks as the tape loads and glows steadily when the tape is ready for use.

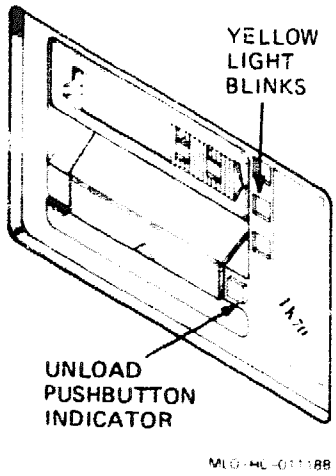
CAUTION: *If the green light blinks rapidly when you push in the* ***cartridge release handle****, the drive has detected a cartridge fault. Pull open the* ***cartridge release handle*** *and remove the cartridge. Use another cartridge.*

CAUTION: *Move the* ***cartridge release handle*** *only when the green indicator glows steadily. Moving the* ***cartridge release handle*** *while the yellow and/or orange lights are glowing could damage the drive. If all three indicator lights blink rapidly at any time, a fault condition exists. Press the* ***Unload*** *pushbutton to unload the tape. If the fault is cleared, the yellow indicator light blinks as the tape unloads. If the fault is not cleared, the three indicator lights continue to blink. Do not attempt to use the tape drive or to remove the tape cartridge. Call your DIGITAL representative.*

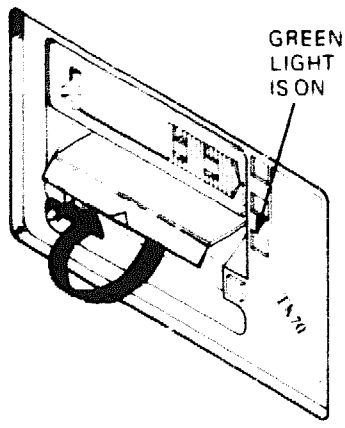
If the tape cartridge is new, the tape drive performs a calibration sequence that takes approximately 30 seconds. The yellow indicator light blinks rapidly during calibration.

Rewinding and Unloading the Tape Cartridge

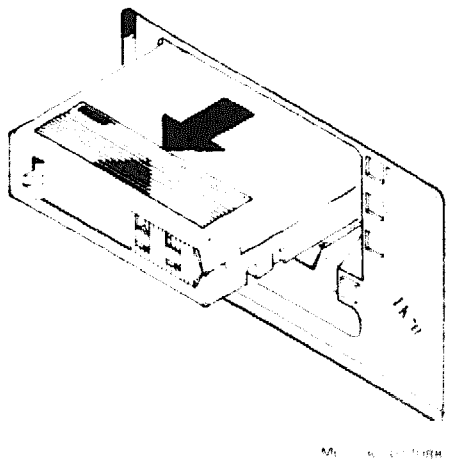
Rewind and unload the tape before removing it from the TK70 tape drive.



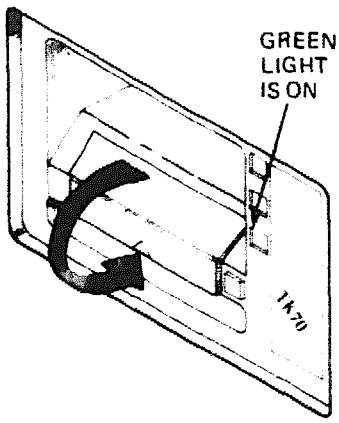
Press the **Unload** pushbutton. The yellow light blinks as the tape rewinds.



When the unwind procedure is complete, the **Unload** pushbutton stops glowing, an audible beep sounds, and the green light comes on. Pull open the **cartridge release handle**.



The cartridge ejects.



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Remove the tape cartridge and push the **cartridge release handle** to the closed position.

Summary of TK70 Tape Drive Controls and Indicator Lights

Table 3–3 summarizes the TK70 tape drive controls. Table 3–4 describes the indicator lights.

Table 3–3: TK70 Tape Drive Controls

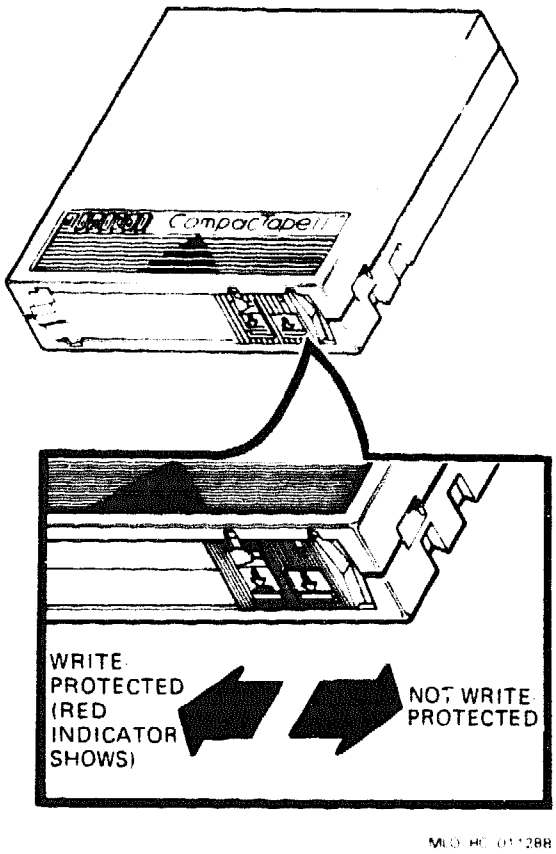
Control	Position	Function
Handle	Out	Lets you insert or remove a tape cartridge after rewind and unload operations are completed.
	In	Locks tape cartridge in operating position and begins load sequence.
	Momentary contact switch	Rewinds and unloads the tape.

Table 3–4: TK70 Tape Drive Indicators

Green	Orange	Yellow	Condition
OFF	OFF	OFF	No power to the tape drive.
ON steadily	OFF	OFF	Safe to move **cartridge release handle**. Power is present.
Blinking	OFF	OFF	Load fault. The cartridge leader may be defective. Pull out the **cartridge release handle** and remove the cartridge. Do not use the cartridge.
OFF	ON/OFF	ON steadily	Tape is loaded but not in motion.
OFF	ON/OFF	Blinking	Tape is in motion.
Blinking	Blinking	Blinking	A fault is occurring. Press the **Unload** pushbutton to unload the tape cartridge. If the fault is cleared, the yellow indicator light blinks while the tape rewinds. If the fault is not cleared, all three indicator lights continue to blink. Do not attempt to remove the tape cartridge. Call your DIGITAL representative.

Protecting Tape Cartridges from Accidental Overwriting

The TK50 tape cartridges have a write-protect feature to prevent loss of data by accidental overwriting. To write protect the tape, slide the *write-protect switch* toward the tape label slot. An orange write-protect indicator is visible.



NOTE: *The system can* ***read*** *information on the tape, regardless of the position of the write-protect switch. However, the system cannot* ***write*** *data to the tape when the switch is set to the write-protect position.*

Handling and Storing Tape Cartridges

Follow these guidelines when handling and storing TK50 tape cartridges:

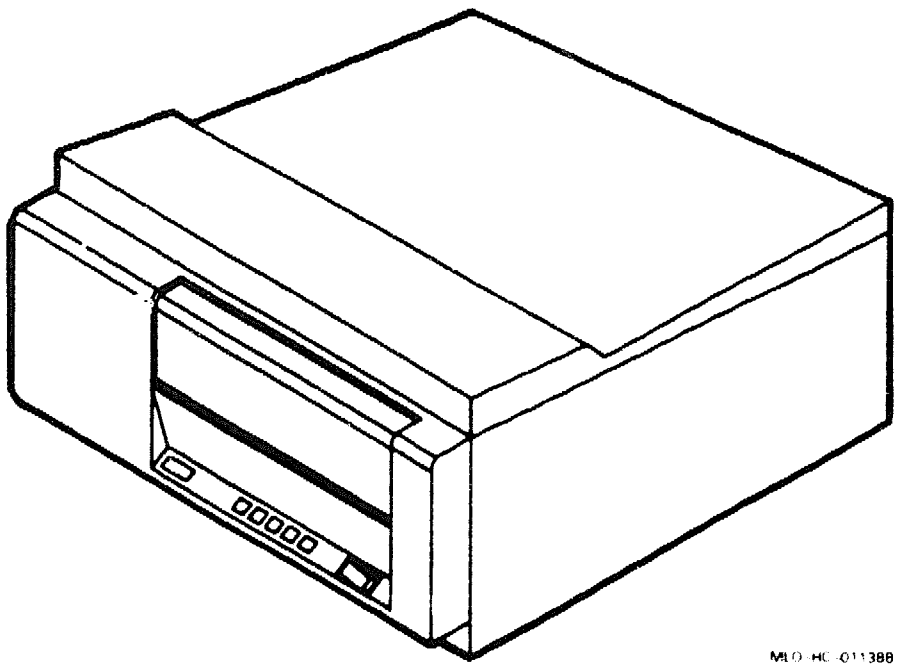
- Keep tape cartridges away from magnets and equipment, such as motors, transformers, *terminals*, monitors, and audio equipment, that generate magnetic fields.
- Keep tape cartridges away from direct sunlight, heaters, and other sources of heat. Store tape cartridges in a stable temperature between 10 and 40 degrees Celsius (50 and 104 degrees Fahrenheit).
- Allow new blank and prerecorded tapes to stabilize at room temperature for 24 hours before using them.
- Keep tapes away from x-ray equipment.
- Write on the identification label before inserting it in the label slot on the front of the cartridge.
- Do not apply any labels to the top, bottom, sides, or rear of a cartridge. Place labels **only** in the label slot on the front of the tape cartridge.
- Store tape cartridges in a dust-free environment.
- Do not drop the tape cartridge.
- Do not touch the exposed surface of the tape.

See Chapter 5 for troubleshooting information on the TK50 and TK70.

The TS05

The TS05 tape drive is a mass storage device that uses a 40.5-megabyte capacity magnetic tape cartridge for backup data storage. The TS05 can only be stored in the top section of an H9642 Enclosure. This tape drive contains its own controller module; with this controller, the TS05 is known as the TSV05 tape transport subsystem.

Figure 3–11: The TS05 Tape Drive



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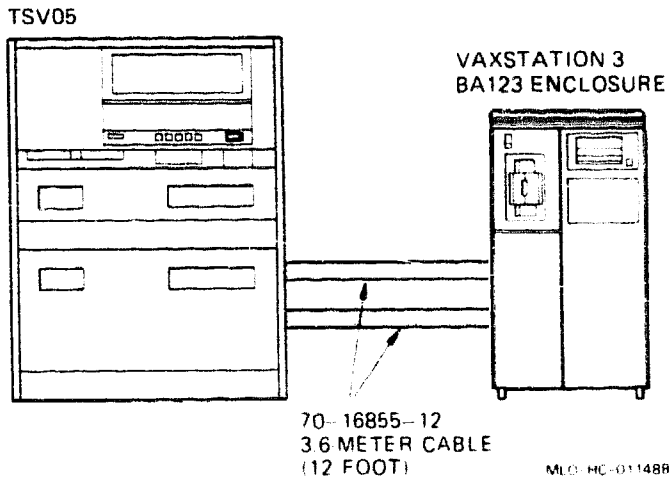
If your BA123/H9642 Enclosure configuration contains a TS05 tape drive, the *TS05 Tape Subsystem User Guide* has been shipped with your system. Please see that manual for more information about features of the TS05 tape drive. Please see the *TSV05 Tape Transport Subsystem User's Guide* for instructions on how to connect the TS05 to a BA123 Enclosure and operate the system.

Figure 3–12: The H9642–TS05–BA123 Enclosures Configuration

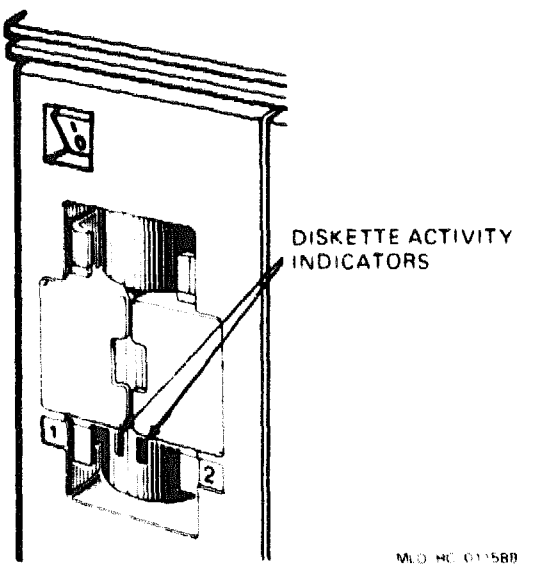


RX50 Dual Diskette Drive

The RX50 dual diskette drive holds up to two 13.13-centimeter (5.25-inch) diskettes. Each diskette stores 400 *kilobytes* of information, which is roughly 150 typewritten pages.

Close the drive door when using a diskette. The drive does not work with the door open.

A **Diskette Activity** indicator on each drive glows red when a drive is in use. Keep the drive doors closed when the **Diskette Activity** indicator(s) is glowing red. Opening the doors could erase data or delete information.

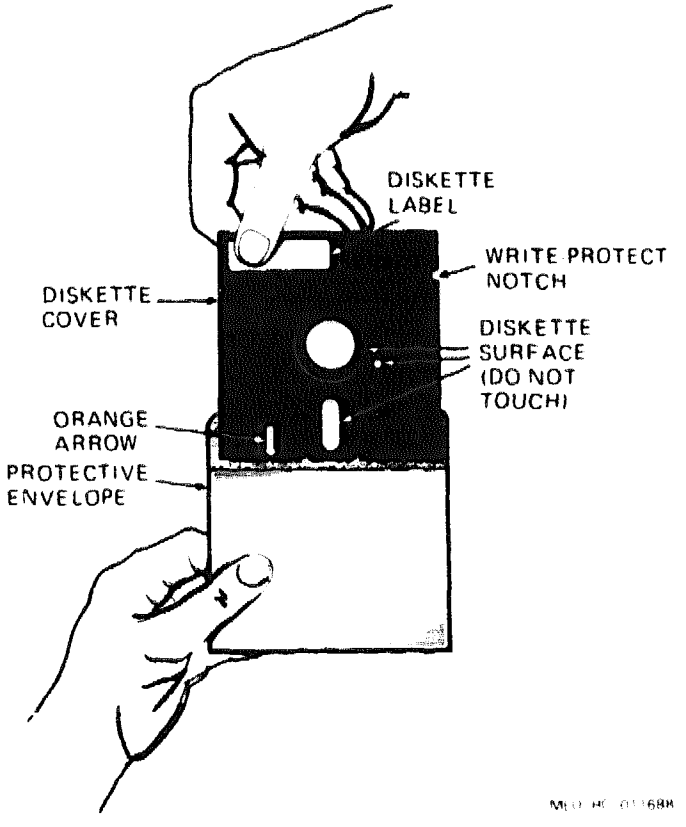


RX50 Diskette

The information on RX50 diskettes is magnetically stored on one side of the diskette. Stored information can be erased, and new information stored in its place.

The diskette, permanently enclosed in a cover, rotates inside the cover. The soft fabric lining of the cover continuously cleans the diskette.

NOTE: *Use only formatted RX50 diskettes from DIGITAL or DIGITAL's licensed distributors.*



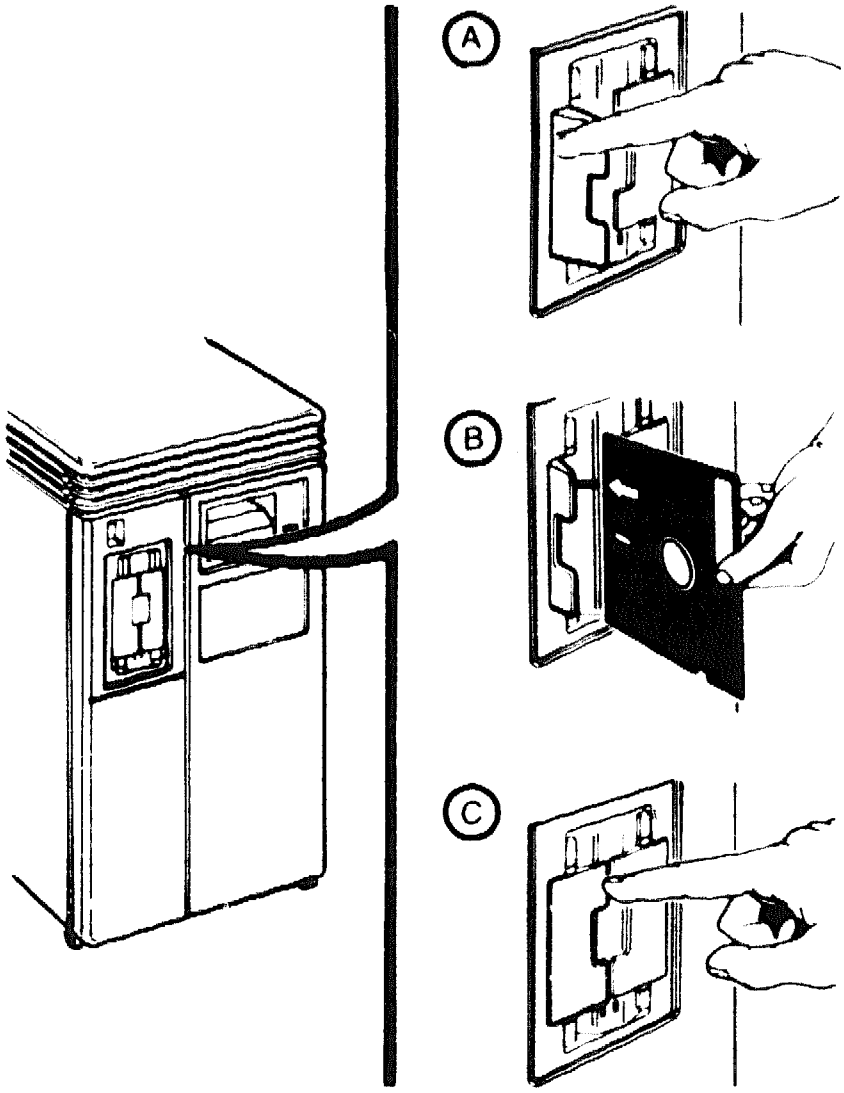
Inserting an RX50 Diskette in Drive

Keep the diskette drive door closed while a **Diskette Activity** indicator is glowing red. Opening the door might damage the drive *heads*. Wait for the indicator to stop glowing, which indicates that diskette drive activity has finished.

a. Open the drive door by pressing on the door's outer edge.

b. Align the orange arrow on the diskette cover with the orange stripe on the drive and insert the diskette. The *write-protect notch* is down for drive 1 and up for drive 2.

c. After inserting the diskette, press the drive door closed. Do not use excessive force; the door should close easily.



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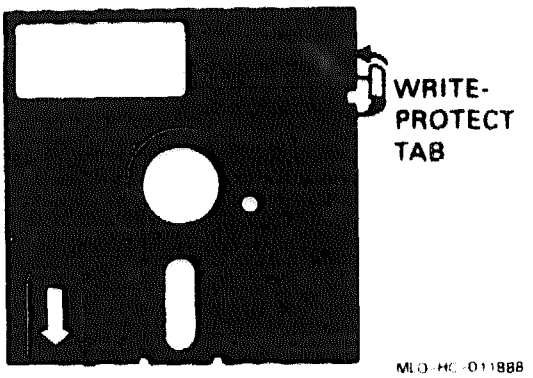
Protecting RX50 Diskettes from Accidental Overwriting

The RX50 diskette has a write-protect feature to prevent loss of data from accidental overwriting. To protect the data, cover the write-protect notch on the side of the cover with a self-adhesive foil tab supplied with your diskettes. Remove the tab when you want to add, change, or delete information.



Handling and Storing RX50 Diskettes

Incorrect handling and storing of diskettes can damage them (and the RX50 recording head) causing loss of data. The following precautions should be taken:

- Store the diskette away from strong magnetic fields and steel objects. Magnetic fields (produced by motors, transformers, and terminals) can erase data.
- Store the diskette away from direct sunlight and heaters.
- Do not touch the recording surface of the diskette. When out of its envelope, handle only the top (label area) of the diskette.
- Do not fold, bend, or drop the diskette cover.
- Write on the label before applying it to the diskette cover to avoid creasing the cover. To change the label, use a felt-tipped pen.
- To keep out dust and dirt, put the diskette in its envelope when the diskette is not in use.
- Store the diskette vertically (with the label at the top) and loosely to prevent the cover from becoming warped.

Back-up Copies

Making back-up copies of files ensures a copy for you if information is accidentally lost. As a general rule:

- Make back-up copies on diskettes or magnetic tape.
- Make a daily back-up copy of information you create or change that day.
- Make a weekly back-up copy of information stored on your fixed-disk drive.
- Store back-up copies in a safe place.

Make back-up copies of system software files as described in the system software documentation.

DELQA Ethernet Communications Module

The DELQA is a Q22-bus-compatible communications module that interfaces between an Ethernet *Local Area Network (LAN)* and a Q22-bus.

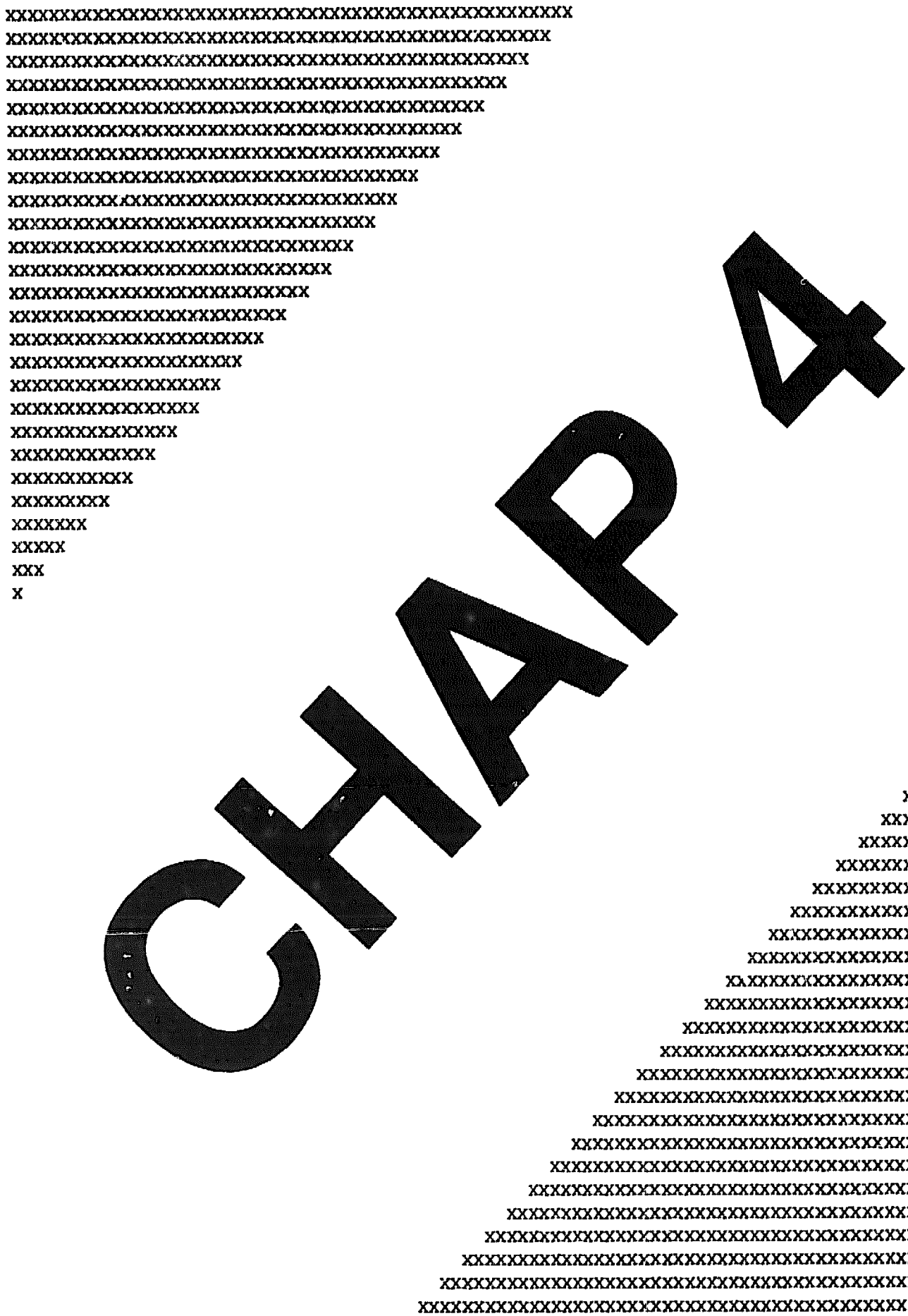
With a DELQA interface and communications software, the VAXstation 3 system becomes an addressable node on a network, which can communicate with other computers that are also nodes on the network.

Either a DELQA communications module or a *DEQNA* communications module will be shipped with your system. The DELQA module is described in Chapter 3. The DEQNA module is described in Chapter 4 in the Ethernet Communications Modules section.

The DELQA has all DEQNA functions plus Maintenance Operator Protocol (MOP) functions. The DELQA supports DEQNA mode and DELQA mode.

The DELQA module is part of the VAXstation 3 system. If it is to be installed after initial system installation, you must contact your DIGITAL representative for installation. Once the module is installed, the VAXstation 3 may join an existing standard Ethernet network either through a DELNI or an H4000 transceiver.

For more information on the DELQA, see the *DELQA User's Guide*, Order No. EK-DELQA-UG.


CHAP 4

Chapter 4
Options

Five categories of options are supported in the VAXstation 3:

- **Hard-Copy Output Devices**—Printers and Plotter (LN03, LN03 PLUS, LN03R, LA50, LA75, LA210, LPS40, LCG01, LJ250/252, and LVP16)
- **Input Devices**—Tablet (VSXXX-AB), Mouse (VSXXX-AA)
- **Memory**—*Memory Module* (MS650-AA)
- **Storage Devices**—Disk Drives (RD53 and RD54 in the BA123 Enclosure; RA Series Disk Controller (KDA50-Q), RA60 and RA81 in the BA123/H9642 Enclosure), Tape Drives (TK50 or TK70 in the BA123 Enclosure; TS05 in the H9642 Enclosure), and Dual Diskette Drives (RX50)
- **Communications**—DEQNA Q22-Bus Ethernet Communications Controller, ThinWire Ethernet connectors and terminators, DIGITAL Ethernet Station Adapter (DESTA), *Asynchronous Multiplexers* (DZQ11 and DHV11), RA Series Disk Controller (KDA50-Q), and Modems (DF03, DF112, DF124, and DF224).

This chapter describes each option and directs you to the appropriate installation instructions. You may install a printer, the tablet, and the color or monochrome monitor yourself. However, contact your service representative to install the other options.

The VAXstation 3 may be upgraded to a 2-user *ULTRIX* system having two monitors, two keyboards, two input devices, and two VCB02 graphics modules. Contact your sales representative for information.

CAUTION: *Memory modules, disk drives, tape drives, dual diskette drive, communications modules, asynchronous multiplexers, synchronous line controllers, programmable controllers, disk drive controllers, and communications controllers are field service installable options. If you try to install them yourself, you may damage the system.*

To order an option after initial system installation, contact your sales representative. For more information on those options, see the documents listed at the end of each subsection.[1]

Hard-Copy Output Devices

The VAXstation 3 can be used with any one of 10 printers: the LN03, the LN03 PLUS, the LN03R, the LPS40, the LA210, the LA75, the LA50, the LCG01, and the LJ250/252. The VAXstation 3 can also be used with the LVP16 plotter. Each of the following sections describes one of those options. The final section explains how to connect a printer or plotter to a VAXstation 3.

Printers

To order a printer after the initial system installation, contact your sales representative. You can install the printer yourself. For information about a specific printer, see the documents listed at the end of each subsection.

The LN03

The LN03 laser printer is a desk-top, nonimpact printer that produces letter-quality text at 8 pages/minute. For systems running MicroVMS, the printer can also display graphics.

The LN03 offers 16 fonts, including Courier, Elite, and the *VT100* Line-Drawing Set (the DIGITAL standard set). *ASCII* multinational technical character sets and 12 national language character sets can also be used.

The printer comes with three character sets. If you want to mix type styles and point sizes, the LN03 can print up to 24 fonts/page. To expand memory or add additional fonts, you can purchase more programmable *RAM* or precoded *ROM* cartridges from DIGITAL.

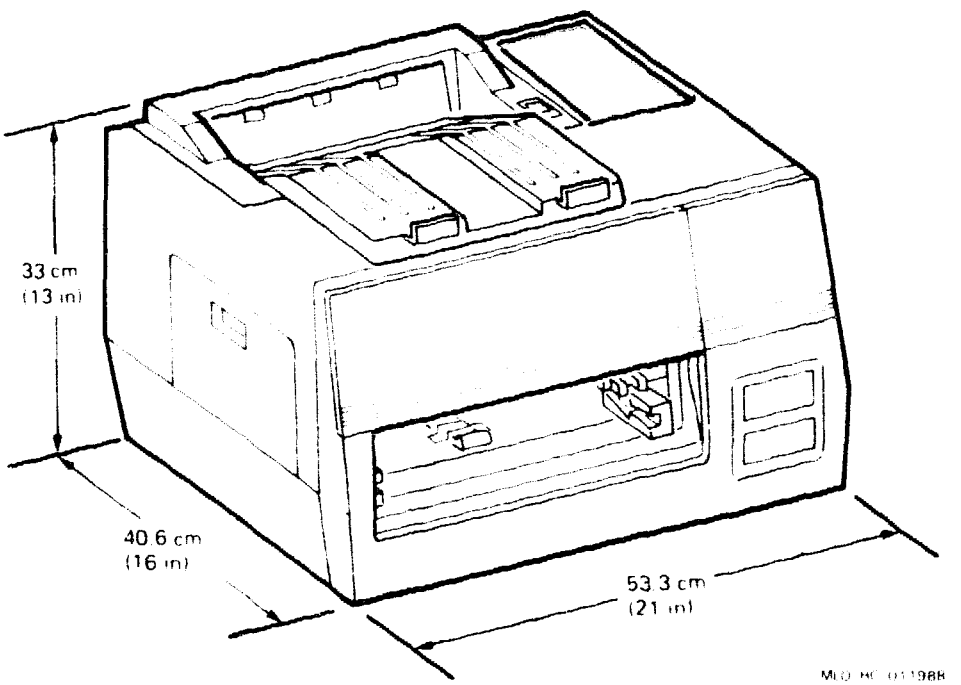
The LN03 uses only cut sheet paper. A paper cassette holds 250 sheets of paper. The printer automatically collates output for you in its face-down output tray. The LN03 can also handle preprinted single-part forms, transparencies, and labels. The LN03 can print in either landscape (horizontal) or portrait (vertical) mode.

[1] These documents pertain only to customers in the United States. If you are not a U.S. customer or if you require translated documents, check the appropriate country's product listing.

CAUTION: *When the LN03, LN03 PLUS, or LN03R ScriptPrinter is connected to an operating VAXstation 3, make sure the* ***Break Enable/Disable*** *switch is disabled before powering on and off the system. Otherwise, you may cause the irretrievable loss of data.*

The LN03 weighs 28 kilograms (66 pounds).

Figure 4–1: The LN03



For more information about the LN03 printer, see the following documents:

- *Installing and Using the LN03* (Order No. EK-0LN03-UG)
- *LN03 Programmer Reference Manual* (Order No. EK-0LN03-RM)

The LN03 PLUS

The LN03 PLUS is the upgrade configuration of the LN03 laser printer. The LN03 PLUS system consists of a base LN03 laser printer and an LN03S *bitmap* option module. The LN03 PLUS needs the firmware microcode V4.4 installed in the base LN03 printer.

The LN03 PLUS enables the LN03 printer to print documents composed of text and graphics. The LN03 PLUS lets you process ANSI and Tektronix[2] data files with any ratio of text to graphics and with no limits on image complexity.

The LN03S bitmap option module consists of a printed circuit board that is inserted into the available option slot of the LN03 printer. This option module's key feature is an on-board memory capacity of one M *byte* of dynamic RAM used for bitmap storage. The LN03S option module also contains up to 128 kilobytes of ROM for program and font storage.

The printer and host system communicate through the standard EIA RS-232-C serial *interface.*

All setup features in the LN03 PLUS are the same as in the base LN03 and are controlled through the default setting of configuration switches or under program control.

CAUTION: *When the LN03, LN03 PLUS, or LN03R ScriptPrinter is connected to an operating VAXstation 3, make sure the* ***Break Enable/Disable*** *switch is in the disable position before powering on and off the system. Otherwise, you cause the irretrievable loss of data.*

For more information about the LN03 PLUS, see the following document:

- *LN03 PLUS User Guide* (Order No. EK-LN03S-UG)

The LN03R ScriptPrinter

The LN03R ScriptPrinter is a nonimpact page printer that uses laser recording technology to produce high-quality prints. Using the PostScript[3] language, the ScriptPrinter can combine and print complex pages, including text, graphics, and sampled images. The high-printing density of 750 dots/centimeter (300 dots/inch), both vertically and horizontally, lets the ScriptPrinter produce very sharp images. When performing continuous text printing, the ScriptPrinter prints eight pages/minute.

The printer and host system communicate through the standard EIA RS-232-C serial interface.

All setup features in the LN03R ScriptPrinter are the same as in the base LN03 and are controlled through the default setting of configuration switches or under program control.

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[2] Tektronix® is a registered trademark of Tektronix, Inc.

[3] POSTSCRIPT is a trademark of Adobe Systems, Inc.

CAUTION: *When the LN03, LN03 PLUS, or LN03R ScriptPrinter is connected to an operating VAXstation 3, make sure the* ***Break Enable/Disable*** *switch is disabled before powering on and off the system. Otherwise, you cause the irretrievable loss of data.*

For more information about the LN03R SCRIPTPRINTER, see the following documents:

- *LN03R ScriptPrinter Installation Guide* (Order No. EK-LN03R-UG)
- *LN03R ScriptPrinter Operator Guide* (Order No. EK-LN03R-OG)

The PRINTSERVER 40 (LPS40)

The PRINTSERVER 40 is a MicroVAX II-based laser printer containing POSTSCRIPT software. The PRINTSERVER 40 is designed as an Ethernet *node* that serves many users.

A dedicated MicroVAX II-based data controller interprets *applications programs* that output in POSTSCRIPT, a powerful industry-standard page description language. The PRINTSERVER 40 supports existing software using ANSI text/sixels, ReGIS, or *Tektronix 4010/4014* format through the use of host-based translators.

The PRINTSERVER 40 prints monochromatically at a rate of 40 pages/minute at a resolution of 750 x 750 dots/centimeter (300 x 300 dots/inch). Paper sizes include letter, legal, and ledger and A4, A5, B4, and B5 metric sizes. A large capacity input tray holds 2000 sheets of cut sheet paper, and two auxiliary trays hold 250 sheets each.

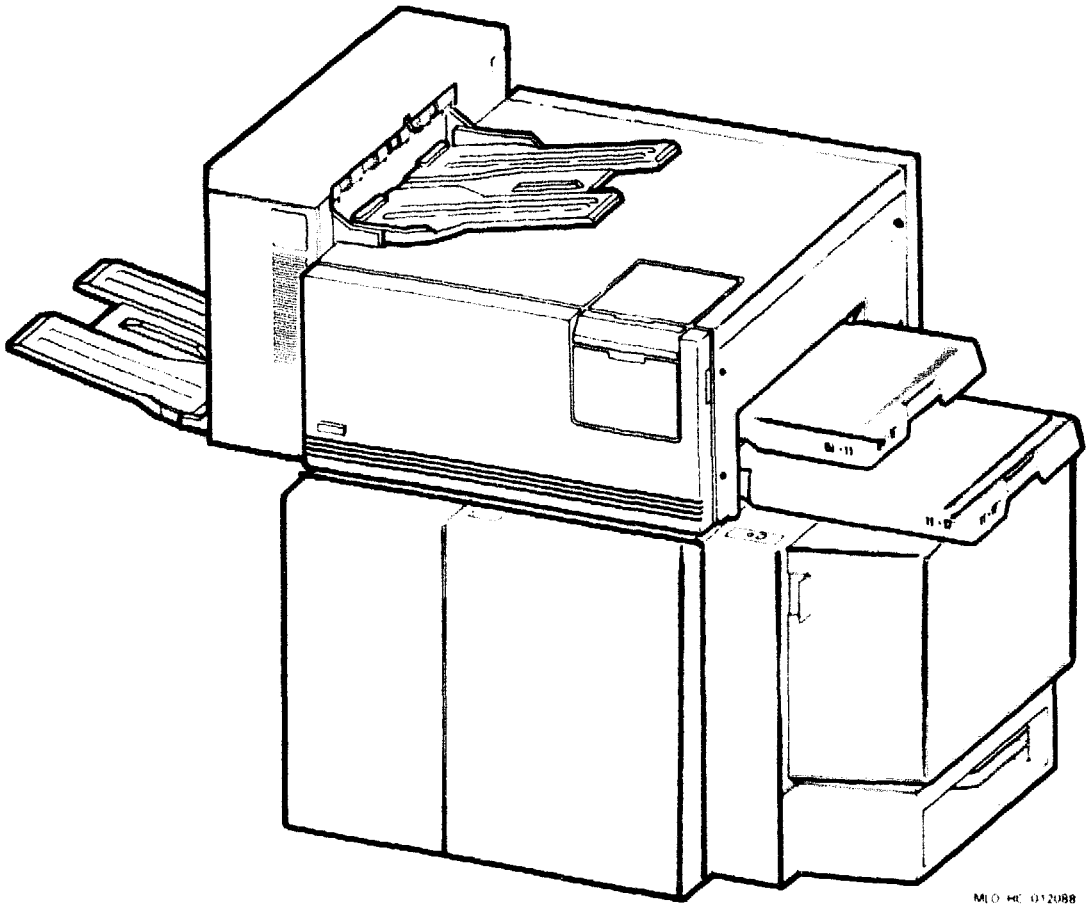
The PRINTSERVER 40 contains a library of 29 typefaces that may be scaled to any point size, rotated to any degree, and positioned anywhere on a page, using POSTSCRIPT commands.

Specifications for the PRINTSERVER 40:

- Size: 102.62 centimeters (40.4 inches) high x 72.14 centimeters (28.4 inches) deep x 152.4 centimeters (60.0 inches) wide
- Weight: 219.99 kilograms (484 pounds)
- Voltage:

  200/208/240 V, 60 Hz
  200/220/230/240 V, 50 Hz

Figure 4–2: The PRINTSERVER 40 (LPS40)



For more information on the PRINTSERVER 40, see the following document:

- *PrintServer 40 Operator's Guide* (Order No. EK–LPS40–OP)

The LA210

The LA210 is a desk-top *dot-matrix* printer that can produce high-speed drafts (240 characters/second) or near letter-quality correspondence (40 characters/second). With the addition of an optional font cartridge, the LA210 can print memo-quality correspondence (80 characters/second). The LA210 also prints bitmap graphics.

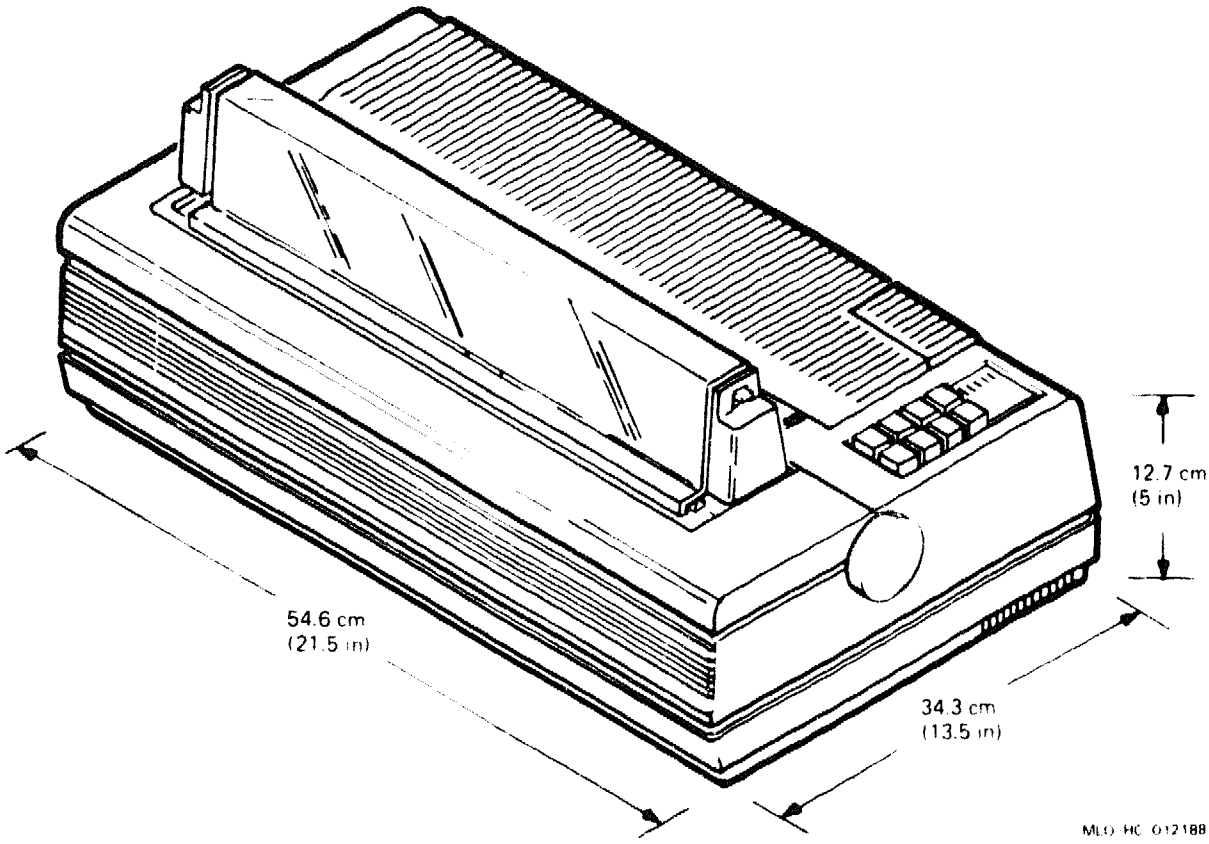
The printer can print in USASCII, 10 national languages in Courier 10, and the VT100 Line-Drawing Set (the DIGITAL standard set). Other features

include three optional typefaces: Gothic, Orator, and Italic. More than 30 optional character sets, including symbols and technical characters, can be added by plug-in font cartridges. You can select up to eight character widths.

The LA210 prints on single-sheet and fanfold paper and handles forms with up to four parts. The printer's carriage accommodates paper ranging in width from 8.9 centimeters (3.5 inches) to 37.8 centimeters (14.9 inches).

The printer weighs 11.3 kilograms (25 pounds).

Figure 4–3: The LA210



For more information about the LA210 printer, see the following documents:

- *Installing the LA210 Letterprinter* (Order No. EK-LA210-IN)
- *LA210 Letterprinter User Guide* (Order No. EK-LA210-UG)
- *LA210 Letterprinter Programmer Reference Manual* (Order No. EK-LA210-RM)

- *LA210 Letterprinter Operator and Programmer Reference Guide* (Order No. EK-LA210-RC)
- *LA210 Letterprinter Emulation Modes Reference Guide* (Order No. EK-LA210-RG)

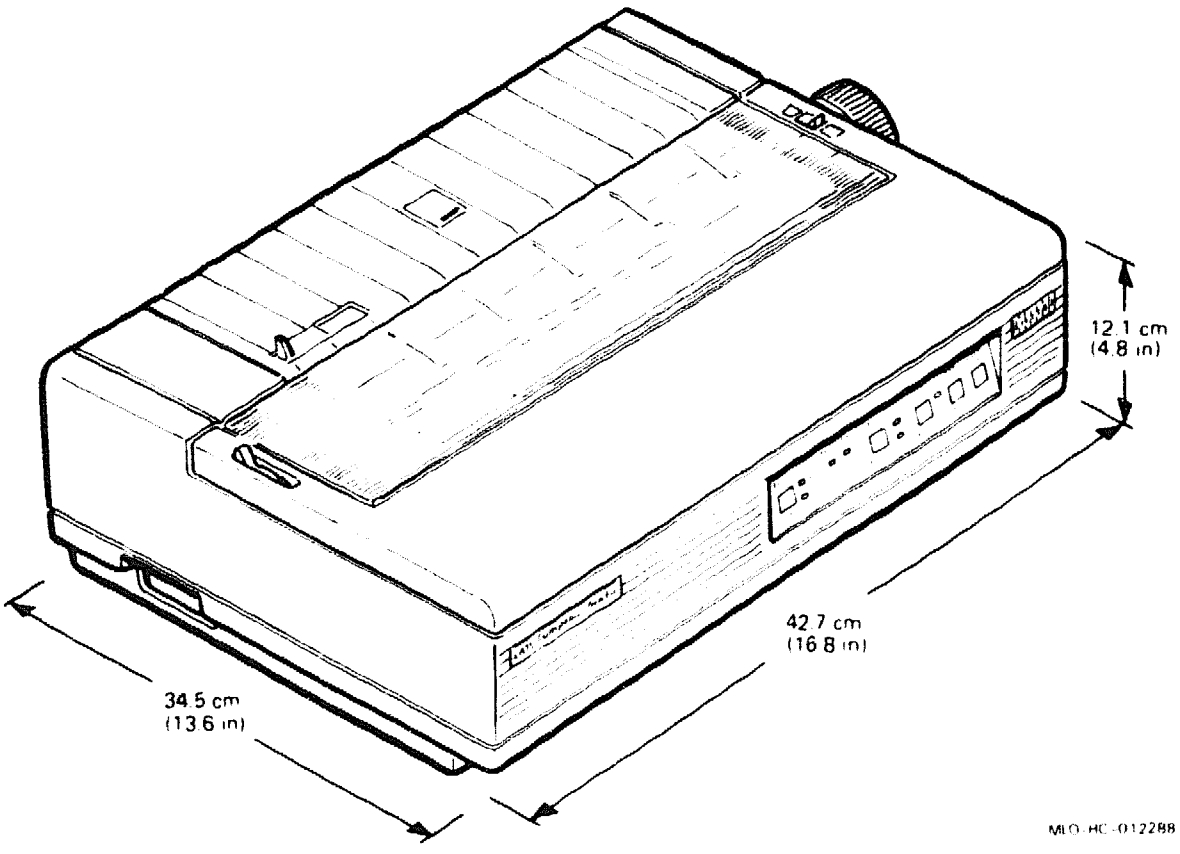
The LA75

The LA75 is a desk-top dot-matrix printer that can produce sixel-protocol bitmap graphics. The LA75 prints in draft speed (250 characters/second), memo speed (125 characters/second), and letter-quality speed (32 characters/second). The printer offers optional font cartridges and international character sets. You can use office stationery or fanfold paper.

The LA75 is compatible with DIGITAL's LA50 and LA210 printers as well as IBM's PRO printer. The LA75 uses the DEC423 serial interface.

The LA75 weighs 10 kilograms (22 pounds).

Figure 4–4: The LA75



To connect the LA75 printer to your VAXstation 3 you need an adapter, the H8571-B and a cable, either the BC16E-10 (30.48 meters/10 feet), BC16E-25 (76.2 meters/25 feet), or the BC16E-50 (152.4 meters/50 feet).

For more information about the LA75 printer, see the following documents:

- *Installing and Using the LA75 Companion Printer* (Order No. EK-OLA75-UG)
- *LA75/LA75P Technical Manual* (Order No. EK-OLA75-TM)
- *LA75 Companion Printer Programmer Reference Manual* (Order No. EK-OLA75-RM)

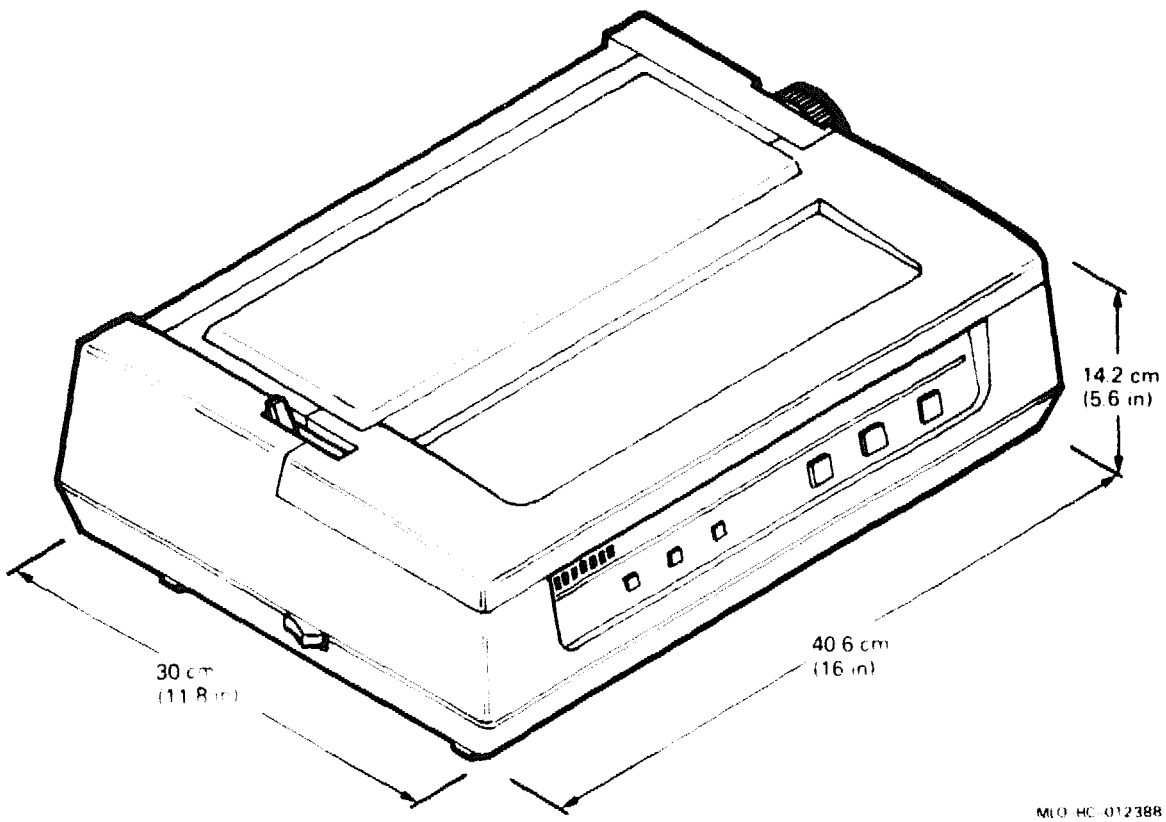
The LA50

The LA50 is a desk-top dot-matrix printer that can produce bitmap or character cell graphics.

The LA50 prints in draft speed (100 characters/second) and memo speed (50 characters/second). The printer offers one font and six character widths. Ten national character sets are available. You can use office stationery or fanfold paper.

The LA50 weighs 8.5 kilograms (18.7 pounds).

Figure 4–5: The LA50



For more information about the LA50 printer, see the following documents:

- *Installing and Using the LA50 Printer* (Order No. EK–0LA50–UG)
- *LA50 Printer Programmer Reference Manual* (Order No. EK–0LA50–RM)

The LCG01

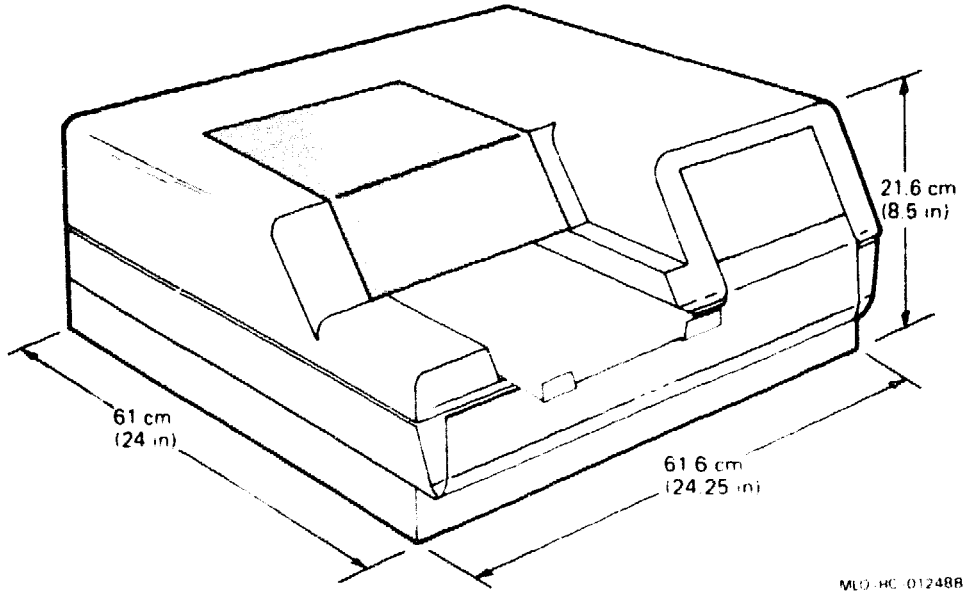
The LCG01 is a high-resolution serial ink-jet color printer. The LCG01 provides 385 dots/centimeter (154 dots/inch) resolution and prints in 216 colors.

The printer offers five fonts. One is ROM resident, and the others are *down-line loaded* at system startup. The LCG01's automatic sheet feeder holds paper and transparencies.

The LCG01 color printing system consists of the LCG01 color printer and an LCG01 graphics protocol processor. The controller weighs 11.7 kilograms (26 pounds). The printer measures 21.6 centimeters (8.5 inches) x 61 centimeters (24 inches) x 61.6 centimeters (24.25 inches).

The LCG01 printer weighs 31.8 kilograms (70 pounds).

Figure 4–6: The LCG01



For more information about the LCG01, see the following documents:

- *LCG01 Installation and Operator Manual* (Order No. EK-LCG01-IN)
- *LCG01 User's Guide* (Order No. EK-LCG01-UG)
- *LCG01 Pocket Service Guide* (Order No. EK-LCG01-PS)

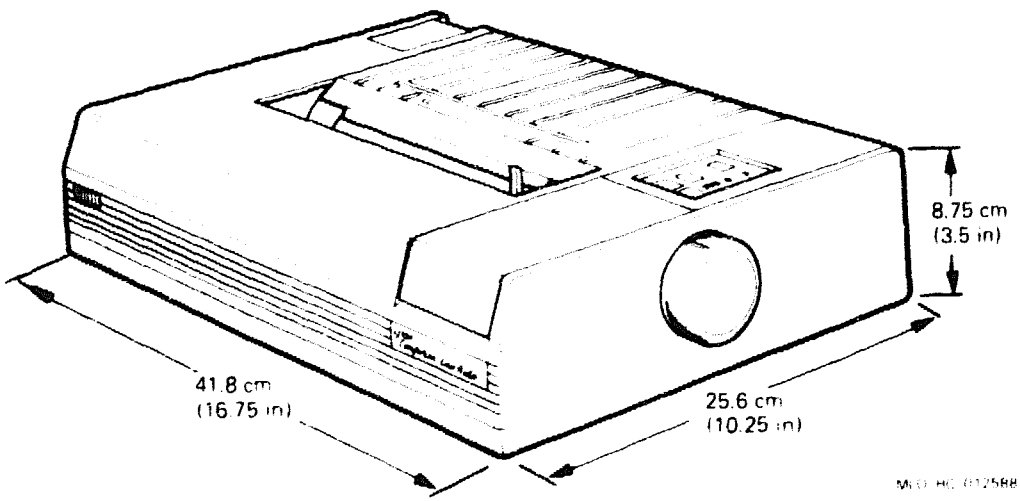
The LJ250/252

The LJ25x desk-top dot-matrix color printer is available either in serial (LJ250) or parallel (LJ252) versions. Other than the interface portion (including the connectors and configuration switches) of the logic module, the serial and parallel printers are the same. The printers can print both text and graphics in color and come with an optional paper tray.

The LJ250/252 provides up to 457 dots/centimeter (180 dots/inch) graphics resolution. The LJ250/252 can print in standard USASCII, VT100 Special Graphics set, DEC Supplemental Graphics, DEC Technical Set, National Replacement (NRC), and ISO 8-bit Supplemental sets.

The LJ250/252 weighs 4.5 kilograms (10 pounds).

Figure 4–7: The LJ250/252



For more information about the LJ250/252 printer, see the following documents:

- *Installing and Using the LJ250/252 Companion Color Printer* (Order No. EK–LJ250–DK)

Plotter

The LVP16

The LVP16 is a high performance 6 pen color graphics plotter. The LVP16 prints graphics at 38 centimeters/second (15 inches/second). Using any of 19 character sets, the LVP16 can annotate graphs with text in any direction, with or without character slant, and in varying sizes. The LVP16 is accurate to 0.025 millimeter (0.001 inch).

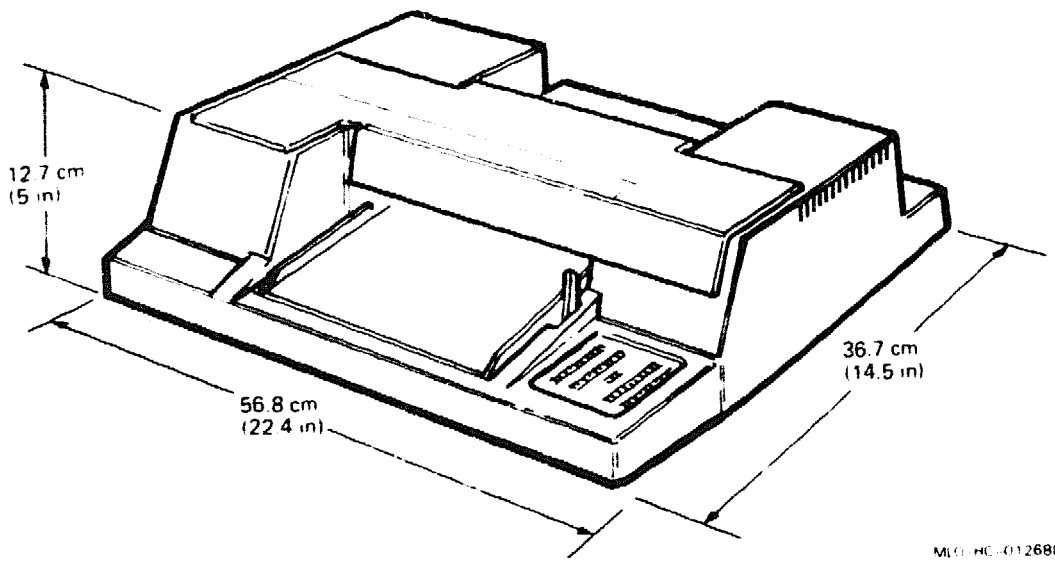
Multicolor high-quality graphics are produced by programs, using the front-panel selection of six pens. For drawing with additional colors, the program can be stopped, and additional pens can be manually installed. The fiber-tip pens are available in 2 nib sizes along with a selection of 10 vibrant colors for paper and 7 for transparencies.

The LVP16 can be used with plain paper or transparencies. Each page is manually removed and inserted for every plotting.

The LVP16 measures 12.7 centimeters (5 inches) x 56.8 centimeters (22.4 inches) x 36.7 centimeters (14.5 inches).

The LVP16 plotter weighs 7 kilograms (16 pounds).

Figure 4–8: The LVP16



To properly operate the LVP16, set the rocker switches according to the following list. This information supplements the *LVP16 Graphics Plotter Owner's Manual*.

- B1 through B4 control baud rate. For example, set B1 and B4 to on for a 4800-baud rate.
- The next two switches control paper size. For example, set to US and A4 for United States letter-size paper.
- The Y/D switch controls cabling. The D setting is for a direct connection, and the Y setting is for the eavesdrop connection.
- The S1 and S2 switches control byte size and parity. Set both to off for 8-*bit* bytes and no parity checking.

For more information about the LVP16, see the following documents:

- *LVP16 Graphics Plotter Owner's Manual* (Order No. EK-LVP16-OM)
- *LVP16 Graphics Plotter Programmer Reference Manual* (Order No. EK-LVP16-RM)
- *The LVP16 Reference Card*

Printer and Plotter Connection to the System

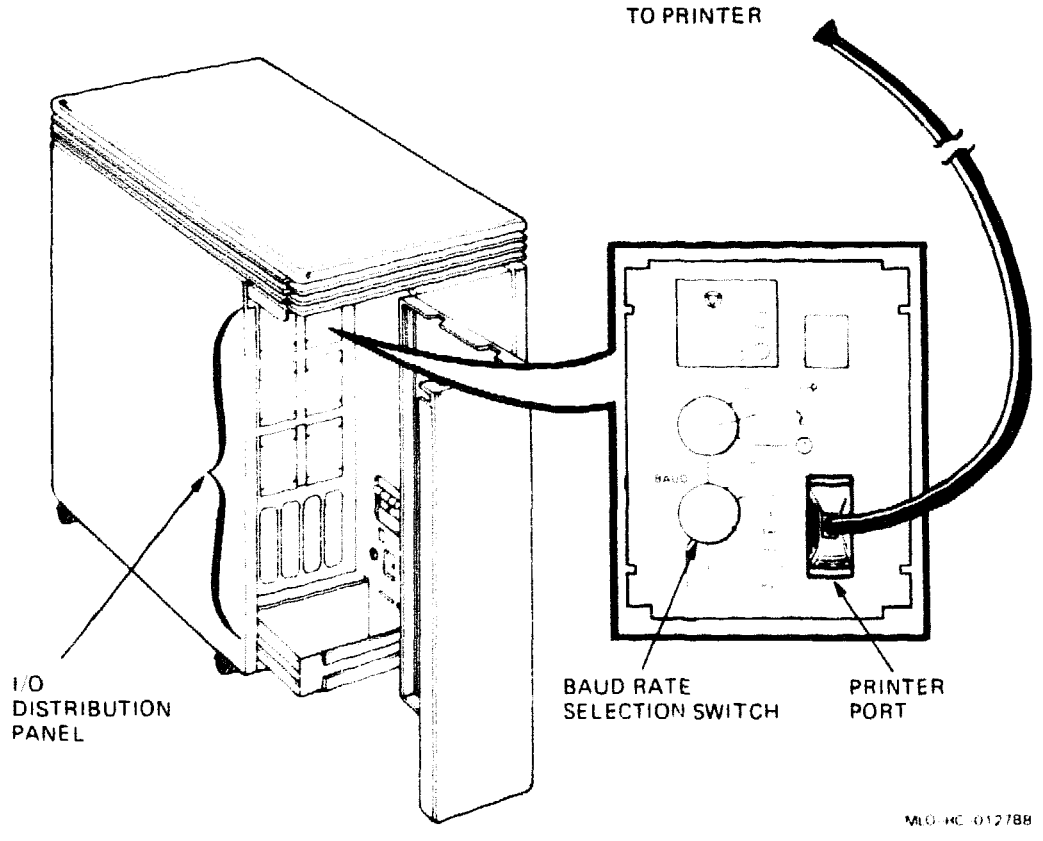
Cables are needed to connect a printer or plotter to the VAXstation 3. The LN03 series, LA210, LA50, and LCG01 printers use the BCC08 cable, the LJ250/252 use the BCC20 cable, and the LVP16 plotter uses the BCC19 cable. You must order a cable in addition to the printer or plotter.

For systems running ULTRIX, you must also add print commands to the system (see the *ULTRIX Workstation Software and Management Guide*) and set the printer for 7-bit ASCII (see the appropriate printer manual). To connect a printer or plotter to a VAXstation 3:

1. Make sure the **power** switches for the printer or plotter and the VAXstation 3 are off.
2. Open the back door of the system unit.
3. Check that the printer or plotter and the system unit are set to the same baud rate (4800).
4. Attach the larger end of the printer or plotter cable to the back of the printer or plotter.

5. Attach the free end of the printer or plotter cable to the printer port on the I/O distribution panel, which is located on the rear of your VAXstation 3 (see Figure 4–9).
6. Close the back door of the system unit.

Figure 4–9: Connecting a Printer and Plotter to the System



NOTE: *If you are connecting the LA210 printer to the VAXstation 3, make sure that XOFF and wrap are enabled. See the LA210 documentation for more information.*

Input Devices

The Tablet

The tablet system consists of a digitizing tablet, a puck, a 2-button stylus, and a 1.5-meter (5-foot) power/signal cable. The tablet with the puck or stylus

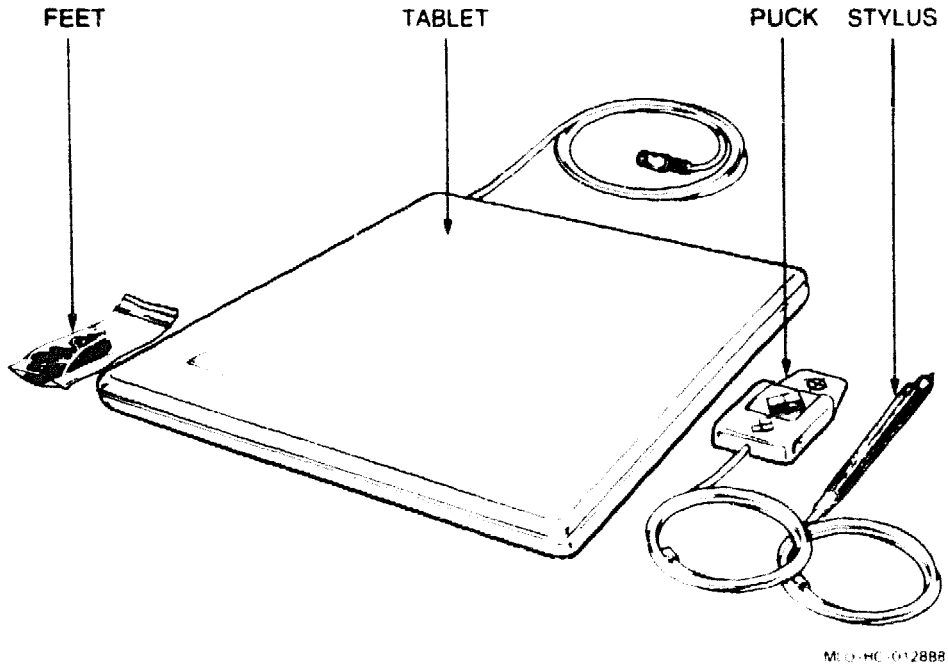
may be used as a pointing device instead of the mouse for menu selection, graphics entry, and cursor control.

The tablet is an *input device* that sends X–Y coordinates to the VAXstation 3 puck on the tablet's surface. The tablet has a resolution of 79 counts/centimeter (200 counts/inch). The stylus is used like a pen, while the puck is similar to a mouse but instead glides on a felt bottom.

The tablet communicates with the VAXstation 3 through an asynchronous, full-duplex serial interface at 4800 baud (+/–2%).

The active area of the tablet is 27.5 centimeters x 27.5 centimeters (11 inches x 11 inches). The tablet weighs 3.2 kilograms (7 pounds).

Figure 4–10: The Tablet



To order a tablet after the initial system installation, contact your sales representative. To install the tablet yourself, see Chapter 2.

For more information about the tablet, see:

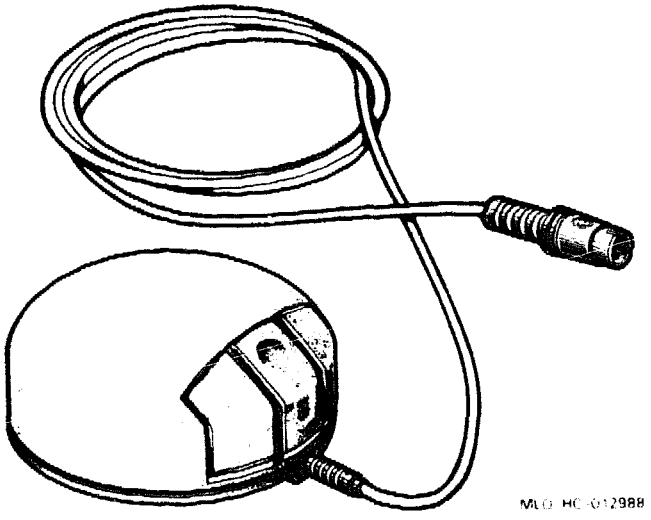
- *Tablet Information Sheet* (Order No. EK–VSXXB–IN)

The Mouse

The mouse is a small, circular, plastic-bodied input device with three buttons. You use the mouse and buttons to position the cursor and select on-screen items. Signals from the mouse are transferred to the monitor through a 1.5-meter (5-foot) cable.

The mouse weighs 0.82 kilogram (0.37 pound).

Figure 4–11: The Mouse



To order a mouse after the initial system installation, contact your sales representative. To install the mouse yourself, see Chapter 2.

For more information about the mouse, see:

- *Mouse Information Sheet* (Order No. EK-VSXXA-IN)

Memory Modules

The VAXstation 3 comes with a minimum of 8 megabytes of memory. With the addition of one or two memory modules, you can expand from 8 to a total of 24 megabytes of memory. The following table describes the memory expansion module:

Part Number	Description
MS650-AA	8 Mbyte Memory Expansion Module, quad-height module with 256K RAM

To order a memory module after the initial system installation, contact your sales representative. Contact your service representative to install a memory module.

Storage Devices

The VAXstation 3 has the following eight mass storage devices available as options:

- The RD53 fixed-disk drive
- The RD54 fixed-disk drive
- The RA60 removable disk drive
- The RA81 fixed-disk drive
- The TK50 tape drive
- The TK70 tape drive
- The TS05 tape drive
- The RX50 dual diskette drive

Table 4–1 shows the optional storage devices, the option package number, and the controller that lets your system access the storage device. If you have the required controller, you can add optional storage devices up to your system's limit. Contact your sales or service representative to determine your system's specific requirements.

Table 4–1: Optional Storage Devices

Storage Device	Option Package Order Number[4]	Required Controller
Fixed-Disk Drives		
RD53	RD53A-BA	RQDX3-BA
RD54	RD54A-BA	RQDX3-BA
RA81	RA81-HA	KDA50-QA
Removable Disk Drive		
RA60	RA60-AF	KDA50-QA
Tape Drives		
TK50	TK50-AA	TQK50-BA
TK70	TK70-AA	TQK70-BA
TS05	TS05-AA	TSV05-ZA
Dual Diskette Drive		
RX50	RX50A-BA	TQK50-AA

[4] An option package contains the storage device and necessary parts for connection to your system.

The Disk Drives

The four disk drives available for the VAXstation 3 are the RD53 and RD54, which are stored in the BA123 Enclosure, and the RA60 and RA81, which can be stored only in the H9642 Enclosure. The RD53 has a formatted capacity of 71 megabytes. The RD54 has a formatted capacity of 159 megabytes. The RA60 has a formatted capacity of 205 megabytes. The RA81 has a formatted capacity of 456 megabytes. The disk drives provide additional data storage for the VAXstation 3.

The VAXstation 3 in a BA123 Enclosure supports a maximum of four RD5x series of fixed-disk drives with either a 4- or 8-plane video *subsystem*. The H9642 Enclosure supports a maximum of four RA series of disk drives (see Chapter 3). Contact your service representative for information about your specific system capacities.

To order a disk drive after the initial system installation, contact your sales representative. Contact your service representative for installation.

For more information about the disk drives, see the following documents:

- *RD53 Disk Drive Technical Description* (Order No. EK-RD53A-TD)
- *RD54 Disk Drive Technical Description* (Order No. EK-0RD54-TD)
- *RA60 Disk Drive User Guide* (Order No. EK-ORA60-UG)
- *RA81 Disk Drive User Guide* (Order No. EK-ORA81-UG)

The Tape Drives

The TK50 tape drive with a TK50 tape cartridge, or the TK70 tape drive with a TK70 tape cartridge, provide additional data storage for your system and can be used to load software, including system diagnostics. The TK50 can store up to 94.5 megabytes of data, and the TK70 can store up to 296 megabytes of data.

The TS05 tape drive is a mass storage device, which can hold up to 40.5 megabytes of data on its magnetic tape cartridge for *back-up* data storage. The TS05 can only be configured in the H9642 Enclosure.

For a more complete description of the tape drives, see Chapter 3. To order a tape drive after the initial system installation, contact your sales representative. You need to order the tape drives, tape cartridges, and the signal cable option package. Contact your service representative to install those options.

For more information about the tape drives, see the following documents:

- *TK50 Tape Drive Subsystem Owner's Manual* (Order No. EK-LEP05-OM)
- *TK50 User's Guide* (Order No. EK-OTK50-UG)
- *TK50 Technical Manual* (Order No. EK-OTK50-TM)
- *TK70 Tape Drive Subsystem Owner's Manual* (Order No. EK-OTK70-OM)
- *TK70 Tape Drive Subsystem Technical Manual* (Order No. EK-OTK70-TM)
- *TK70 Tape Drive Subsystem Service Manual* (Order No. EK-OTK70-SM)
- *TSV05 Tape Transport Subsystem User's Guide* (Order No. EK-TSV05-UG)

The Dual Diskette Drive

For a description of the RX50 dual diskette drive, see Chapter 3. To order an RX50 dual diskette drive after the initial system installation, contact your sales representative. You need to order the dual diskette drive option package (RX50A-BA) and the signal cable option package (17-00867-01). Contact your service representative to install that option.

Communications

This section identifies and briefly describes the communications options that allow connection of your VAXstation 3 to a DIGITAL communications network. The options included in this section are:

- Ethernet communications modules (DEQNA, DELNI, and H4000 transceiver)
- ThinWire Ethernet components (connectors, terminators, and DESTA transceiver)
- Multiplexers (DZQ11 and DHV11)
- Controller (KDA50-Q)

Ethernet Communications Modules

The DEQNA is a Q-bus-compatible communications module that interfaces between an Ethernet Local Area Network (LAN) and a VAXstation 3, under DECnet Phase IV software. The DEQNA provides Ethernet data link functions and communication with other addressable devices on an Ethernet.

With a DEQNA interface and communications software, the VAXstation 3 system becomes a node on a Local Area Network and can communicate with nodes on the network. The DEQNA also enables a VAXstation 3 to be down-line loaded with a *system image* from a host computer on the network.

If the DEQNA module board is ordered after initial system installation, you must contact your service representative for installation. Once the module is installed, the VAXstation 3 may join an existing standard Ethernet network either through a DELNI or an H4000 transceiver.

The DELNI (DIGITAL Equipment Local Area Network Interconnect) is a low-cost Ethernet device consisting of a short section of coaxial cable containing eight transceivers. Each transceiver supplies a port for one system on the network. The DELNI is limited to a range of 35-40 meters (112-128 feet), but can be expanded through a connection to a second DELNI or to a larger

Ethernet network. The ninth port on the DELNI allows for such a connection. To order a DELNI, contact your sales representative.

The H4000 Ethernet Transceiver can accommodate a more extensive network. The H4000 can be configured with 100 nodes for each 500-meter (1600-foot) segment. The transceiver consists of a small printed circuit board and a cable-tapping assembly contained in a rugged plastic housing. That installation also needs a transceiver cable. To order an H4000 or transceiver cable, contact your sales representative.

You can connect the system to a DELNI yourself. However, you must contact your service representative to connect the VAXstation 3 to an H4000 transceiver.

You need a BNE3x cable to connect a DELNI or an H4000 transceiver to a VAXstation 3. To order additional cable, contact your sales representative. The BNE3x transceiver cable comes in four types:

- BNE3A—PVC, straight connector
- BNE3B—PVC, right-angle connector
- BNE3C—Teflon, straight connector
- BNE3D—Teflon, right-angle connector

The BNE3x cable comes in different lengths, specified by the part number extension to the type of cable desired.

Part No. Extension	Length
-05	5 meters (16.4 feet)
-10	10 meters (32.8 feet)
-20	20 meters (65.6 feet)
-40	40 meters (131.2 feet)

For example, a BNE3C-20 is a 20-meter (65.6-foot), Teflon, straight connector. For any questions regarding your specific requirements, contact your service representative.

ThinWire Ethernet Components

This section describes the ThinWire Ethernet components you can use to connect your VAXstation 3, using ThinWire Ethernet.

ThinWire Ethernet Cable

A ThinWire segment is a single length of cable. The maximum recommended length of cable from a *terminator* at the last station to the first station is 185 meters (606 feet). At least 0.5 meter (1.6 feet) of cable is needed between stations.

Connectors

You need two connectors, one at each end, for each segment of ThinWire cable.

Barrel Connectors and T-Connectors

Systems on a ThinWire segment can be interconnected by *barrel* or *T-connectors*. You need one T-connector for each DESTA and VAXstation 3. You need one terminator at the end of the last ThinWire segment.

DESTA and Transceiver Cable

If you want to connect a VAXstation 3 or any devices like a bridge, repeater, or server that use transceiver cables to connect to ThinWire Ethernet, you will need a **DESTA** and a *transceiver* cable.

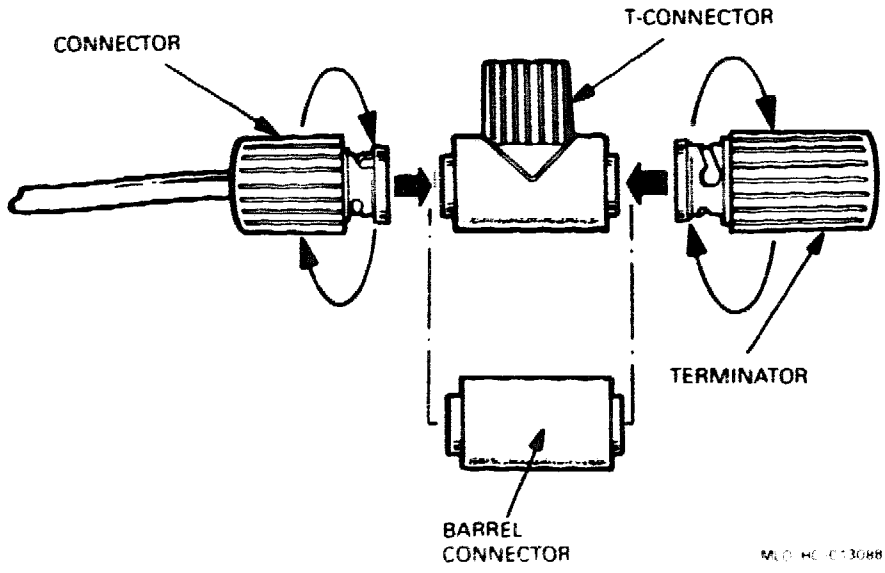
Connectors and Terminator

The ThinWire connectors and the terminator you need to configure your ThinWire network follow:

- T-connector (H8223A)—A 3-way connector that joins two ThinWire Ethernet cable segments. The third opening attaches to a ThinWire cable/DESTA or directly to DESTA.
- Barrel connector (H8224A)—A recessed connector that connects two ThinWire Ethernet cable segments.
- Terminator (H8225A)—A connector at the end of a ThinWire segment that provides the 50-ohm termination resistance needed for the cable. If the ThinWire cable connects to a DIGITAL Ethernet Multiport Repeater *(DEMPR)*, then a terminator is needed only at one end of the cable segment.

Figure 4–12 shows the connectors you need to connect to ThinWire Ethernet.

Figure 4–12: ThinWire Connectors



DIGITAL Ethernet Station Adapter (DESTA)

The DESTA is an Ethernet/IEEE 802.3 transceiver that connects systems that have transceiver-type connectors to ThinWire Ethernet cable. A transceiver is a device that provides a single physical connection between standard Ethernet and Ethernet communication equipment. The DESTA provides the physical and electrical interface between the ThinWire coaxial cable and the Ethernet devices (controllers, servers, and so on) on the transceiver cable.

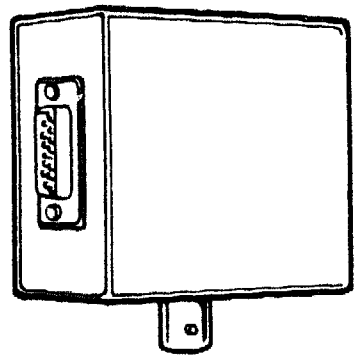
The DESTA has two ports: one port connects to the ThinWire T-connector that connects to the system unit, the second port connects to a transceiver cable that connects to the Ethernet.

Figure 4–13 shows a DESTA.

The DESTA provides:

- Connection of a system with a transceiver cable to ThinWire Ethernet.
- Attachment to devices connected to Ethernet communication controllers by way of transceiver cables.

Figure 4–13: DIGITAL Ethernet Station Adapter (DESTA)



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For more information on those options, see the following documents:

- *DEQNA Ethernet User's Guide* (Order No. EK-DEQNA-UG)
- *DELNI Installation and Owner's Manual* (Order No. EK-DELNI-IN)
- *Ethernet Installation Guide* (Order No. EK-ETHER-IN)
- *DESTA Installation Card* (Order No. EK-DESTA-IN)
- *DESTA Technical Description* (Order No. EK-DESTA-TM)

Modems

Four modems are available for use with the VAXstation 3:

Modem	Description
DF224	300, 1200, and 2400 bps (bits/second) full-duplex synchronous/asynchronous
DF124	1200 and 2400 bps full-duplex synchronous/asynchronous
DF112	300 and 1200 bps full-duplex synchronous/asynchronous
DF03	300 and 1200 bps full-duplex synchronous/asynchronous

DF224

The DF224 modem provides full-duplex communication at speeds of 300, 1200, and 2400 bps (asynchronous) and 1200 and 2400 bps (synchronous). The DF224 allows both rotary pulse and pushbutton dialing over dial-up or leased-line networks.

The DF224 contains an autodialer with memory and provides auto-answer capability in addition to manual operation. A data/talk switch and automatic adaptive equalizer are also provided. The DF224's diagnostics test the modem at each power-up.

DF124

The DF124 modem provides full-duplex communication at speeds of 1200 and 2400 bps (asynchronous and synchronous) over dial-up or leased-line networks. The DF124 contains an autodialer with memory, a data/talk switch, and diagnostic self-tests.

DF112

The DF112 modem communicates at 300 and 1200 bps full-duplex (asynchronous and synchronous) over dial-up or leased-line networks. An autodialer with memory and data/talk switch is provided. The DF112 is compatible with rotary dial and pushbutton dialing.

DF03

The DF03 modem is a 300 and 1200 bps full-duplex (asynchronous and synchronous) modem.

To order a modem after initial system installation, contact your sales representative.

The DZQ11 Asynchronous Multiplexer

The DZQ11 is an asynchronous multiplexer that connects the Q22-bus with up to four asynchronous serial data communications channels. A dual-height module, the DZQ11 connects *hard-copy* and *video terminals*, with or without modems, to a system. With a VAXstation 3, the DZQ11 can also be used as an asynchronous *DECnet* link. The DZQ11 allows dial-up (auto-answer) operations with modems capable of full-duplex operation, such as DIGITAL's models DF03, DF112, DF124, and DF224.

The DZQ11 provides flexible control of parameters, such as baud rate (50 to 9600), character length, number of stop bits for each line, odd or even parity for each line, and transmitter-receiver interrupts. Additional features include limited data set control, break generation and detection, and silo buffering of received data.

To order a DZQ11 after the initial system installation, contact your sales representative. You need to order a base module (DZQ11-M) and a cabinet kit (CK-DZQ11-DA). Contact your service representative to install the DZQ11.

For more information about the DZQ11, see:

- *DZQ11 Asynchronous Multiplexer User's Guide* (Order No. EK-DZQ11-UG)

The DHV11 Asynchronous Multiplexer

The DHV11 is an asynchronous multiplexer that connects up to eight serial lines to a Q-bus for data communications.

The DHV11, a quad-height module with programmable functions, connects hard-copy and video terminals to the VAXstation 3. The DHV11 allows dial-up (auto-answer) operations with modems capable of full-duplex operation, such as DIGITAL's modems DF03, DF112, DF124, and DF224.

Applications for the DHV11 cover data concentration, terminal interfacing, and cluster controlling. The features include full modem control, DMA or silo output, silo input buffering, programmable split speed, and module throughput of 15,000 characters/second.

To order a DHV11 after the initial system installation, contact your sales representative. You need to order a DHV11 base module (DHV11-M) and a cabinet kit, which includes filter connectors and cables (CK-DHV11-AB). Contact your service representative to install the DHV11.

For more information about the DHV11, see:

- *DHV11 Technical Manual* (Order No. EK-DHV11-TM)

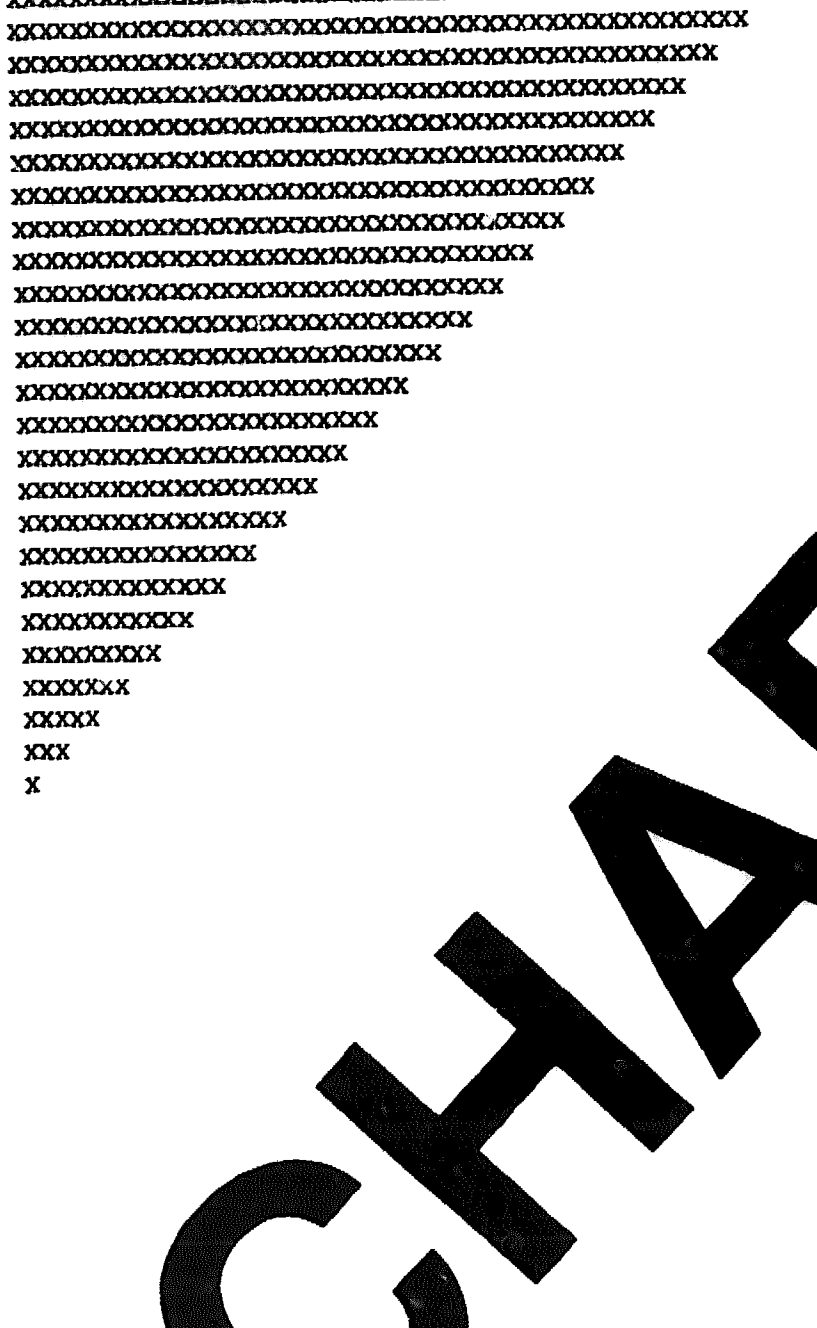
The KDA50-Q Disk Controller

The KDA50-Q disk controller can connect up to four 16-bit RA series disk drives to the Q22-bus. The KDA50-Q consists of two quad-height modules, the processor module, and the standard disk interface (SDI) module. The KDA50-Q is an intelligent controller with on-board microprocessors. Host system programs communicate with the controller and drives by using the mass storage protocol (MSCP).

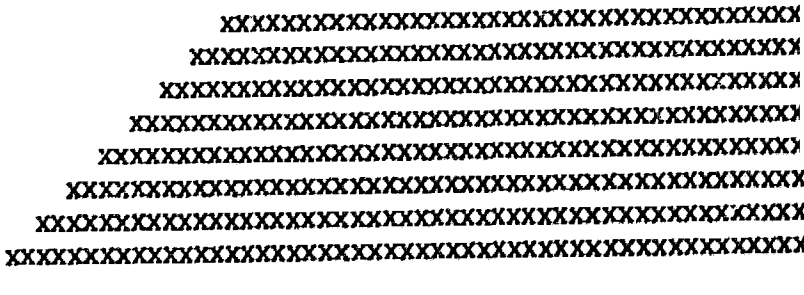
To order a KDA50-Q after the initial system installation, contact your sales representative. Contact your service representative to install the KDA50-Q.

For more information about the KDA50-Q, see the following document:

- *KDA50-Q User's Guide* (Order No. EK-KDA5Q-UG)



CHAP 5



Chapter 5
Troubleshooting Procedure

This chapter, divided into three parts, provides troubleshooting information for the VAXstation 3:

- POWER-UP MESSAGES—discusses the indications that appear when the system is turned on.
- BASIC TROUBLESHOOTING—provides a checklist of potential minor problems with the system unit, monitor, fixed-disk and diskette drives, tape drive, and pointing device and the corrective actions you can take.
- MICROVAX DIAGNOSTIC MONITOR (MDM)—describes the VAXstation 3 "MicroVAX Diagnostic Monitor System" (MDM) software tests and the "Main Menu" maintenance options.

For troubleshooting procedures on the RA series of disk drives and the TS05 tape drive, see the respective manuals listed in Chapter 4 for instructions.

Power-up Messages

During the power-up sequence, the VAXstation 3 executes built-in diagnostic and *bootstrap* routines that provide maintenance information. The information is displayed in single letters and numbers on the light-emitting diode (*LED*) display, located on the CPU distribution panel on the back of the VAXstation 3 system unit. Normally, the display progresses from F (15 in hexadecimal numbers) to 0. The countdown sequence is as follows:

- From F through 3, the system is performing internal tests, the memory and CPU are being tested.
- From 2 through 0, the system is loading system software.

A problem exists if the display stops in the F to 0 range.

- If the display stops in the F to 3 range, a hardware error might exist in the VAXstation 3 system.
- If the display stops on 6, check the keyboard connection, the pointing device connection, and the cable connection to the system. (See Setting

Up the Keyboard and Pointing Device and the Connecting the VAXstation 3 to a Network sections in Chapter 2.)

- If the display stops on 2, check the "system does not boot from..." problem indications listed in Table 5–1.
- If the display stops on 1, the bootstrap device might not contain bootable system software. Complete the system software installation as directed in the documentation supplied with your system software.

CAUTION: *Disconnecting the pointing device from the monitor when the monitor and/or system is on causes damage to the system.*

Basic Troubleshooting

Tables 5–1 through 5–5 list causes and corrective actions for minor system problems that you can fix. The basic troubleshooting procedures are separated into system unit, tape drive, fixed disk and diskette, and monitor problems.

If the corrective action does not work or the problem is more serious, run the "MicroVAX Diagnostic Monitor System" (MDM) software to isolate the problem (see the Maintenance System section of this chapter) and contact your service representative.

Monitor fuse replacement instructions, monitor screen and cover maintenance instructions, and mouse maintenance procedures follow Table 5–5.

Table 5–1: System Unit Troubleshooting Procedures

Power Up

Problem	Possible Cause	Corrective Action
No response when the **power switch** is turned to 1 (ON).	System is not plugged in.	Set the **power switch** to 0 (OFF). Plug in the system. Set the **power switch** to 1 (ON).
	Wall outlet is faulty.	Use a different wall outlet.
	System circuit breaker is tripped.	Set the **power switch** to off. Reset the circuit breaker by pressing down and then pulling up the circuit breaker lever. (See Figure 5–1.) Set the **power switch** to on. If the circuit breaker trips again, contact your service representative.
No response when the **power switch** is turned on.	Power cable is incorrectly installed.	Set the **power switch** to off. Check that the cable is fully seated into the socket in the back of the system. Set the **power switch** to 1 (ON).
Power is on, but the display on the monitor does not appear.	Monitor is off.	Turn on the monitor.
	Monitor cable is incorrectly installed.	Make sure the monitor cable is installed properly. (See Chapter 2.)
	Brightness and **contrast controls** are not set properly.	Adjust **brightness** and **contrast** controls.
	Rear panel **LED** display indicates a power-up error.	Insert bootable system software diskette.

Table 5–1 (Cont.): System Unit Troubleshooting Procedures

Power Up

Problem	Possible Cause	Corrective Action
	Keyboard cable installed incorrectly.	Make sure the keyboard cable is installed properly. (See Chapter 2.)
	A keyboard key or pointing device pushbutton is accidentally pressed during a system boot.	Remove anything that may be activating those devices and reboot the system.
Instead of automatically booting when the **power switch** is turned on, the arrow prompt (>>>) is displayed on the monitor.	The **Break Enable/Disable** switch is set to the Enable position (the system is set to console mode).	Type B DUA0 and press the RETURN key to boot the system. Or, exit console mode by setting the **Break Enable/Disable** switch to the disable (down) position and then press the **Restart** pushbutton to have the system boot automatically.
Monitor displays the message ?54 RETRY when the system diagnostics are running.	You failed to insert a system diagnostic medium into the load device in the time allotted.	Press the **Restart** pushbutton to reboot the system. Insert a diagnostic medium.
System does not boot from the fixed-disk drive.	The **Fixed-Disk Ready** pushbutton is in, or drive is not ready.	Press and release the **Fixed-Disk Ready** pushbutton.
	System software is not on the disk.	Load (install) the system software on the fixed disk, using the system software installation instructions supplied with the software.
System does not boot from the TK50 tape drive.	**Fixed-Disk Ready** pushbutton is not in.	Press in the **Fixed-Disk Ready** pushbutton.
	Tape is worn or damaged.	Try another tape.

Table 5–1 (Cont.): System Unit Troubleshooting Procedures

Power Up

Problem	Possible Cause	Corrective Action
	Tape **cartridge release handle** is not locked.	Press down the **cartridge release handle**.
	TK50 tape is not fully inserted into the tape drive.	Make sure the tape is fully inserted and the **cartridge release handle** is locked down.
System does not boot from the diskette drive.	Diskette is not in the diskette drive.	Insert a diskette containing bootable system software in diskette drive 1 and enter the applicable boot command for the device.
	Diskette drive door is open.	Close the diskette drive door.
	Diskette is upside down in the diskette drive.	Align the orange stripe on the diskette with the stripe on the diskette drive.
	Diskette is not bootable.	Use a diskette containing bootable system software.
	Diskette is worn or damaged.	Try another diskette.
	Diskette is write protected.	Remove the foil tab covering the write-protect notch or use a different diskette.
System does not reboot when **power switch** is pressed off and on.	**Power switch** was not set in off position for enough time.	Set **power switch** to off for at least 15 seconds before pressing the **power switch** to the 1 position.
System halts unexpectedly during normal operation.	The **Halt** pushbutton was pressed (the system is in console mode).	Type C at the >>> prompt. You will return to the point where the system was halted.

Figure 5–1: System Circuit Breaker

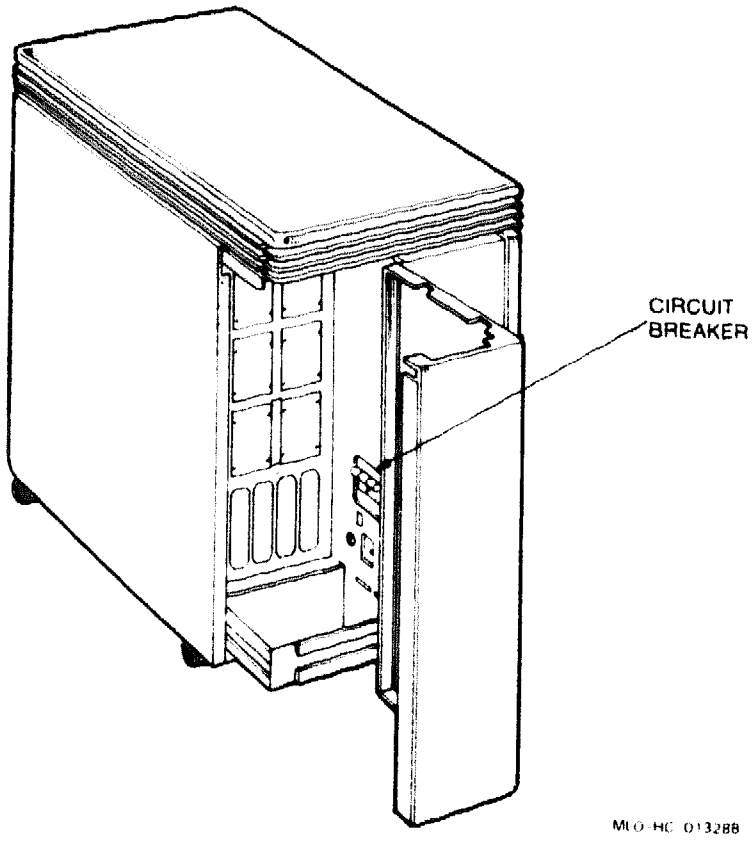


Table 5–2: RD5x Fixed-Disk and RX50 Diskette Drives Troubleshooting Procedures

Read/Write Errors

Problem	Possible Cause	Corrective Action
Fixed-disk read error message is displayed.	**Fixed-Disk Ready** pushbutton is in.	Press and release the **Fixed-Disk Ready** pushbutton.
	Disk is write protected. **Write-Protect** pushbutton glows orange.	Press and release the **Write-Protect** pushbutton so it does not glow.
Fixed-disk write error message is displayed.	Disk is write protected.	Press and release the **Write-Protect** pushbutton.
Diskette read error message is displayed.	The diskette drive is empty.	Insert a diskette into the diskette drive.
	Diskette drive door is open.	Close the diskette drive door.
	Diskette is upside down in the diskette drive.	Align the orange stripe on the diskette with the stripe on the diskette drive.
	Diskette is not *formatted*.	Use a preformatted RX50 diskette.
	Diskette is worn or damaged.	Try another diskette.
Diskette write error message is displayed.	The diskette drive is empty.	Insert a diskette in the diskette drive.
	Diskette drive door is open.	Close the diskette drive door.
	Diskette is upside down in the diskette drive.	Align the orange stripe on the diskette with the stripe on the diskette drive.
	Diskette is not formatted.	Use a preformatted RX50 diskette.
	Diskette is worn or damaged.	Try another diskette.
	Diskette is write protected.	Remove the foil tab covering the write-protect notch.

Table 5–3: TK50 Tape Drive Troubleshooting Procedures

Problem	Possible Cause	Corrective Action
TK50 passes the power-up test but does not work.	Tape is not in the drive, or the drive is not loaded.	Insert the tape and press the **Load/Unload** pushbutton.
	Load/Unload pushbutton is out.	Press the **Load/Unload** pushbutton.
TK50 **Load/Unload** red indicator flashes rapidly, and no unusual sounds are heard.	A problem exists with the tape drive.	Press the **Load/Unload** pushbutton four times. If the problem persists, do not attempt to use the tape drive or to remove the tape cartridge. Call your service representative.
Load/Unload indicator flashes rapidly, and you hear a whirring sound.	Leaders are not properly coupled.	Immediately turn off the system by pushing the on/off switch to 0 (OFF). Do not attempt to use the tape drive or to remove the tape cartridge. Call your service representative.
Tape **cartridge release handle** does not lift.	The power-up test is still in process.	Wait for the **Load/Unload** indicator to stop glowing and the **Tape Activity** indicator to glow green. Try again. If the problem persists, call your service representative.
	System power is not on.	Turn on the system power.

Table 5–3 (Cont.): TK50 Tape Drive Troubleshooting Procedures

Problem	Possible Cause	Corrective Action
Tape **cartridge release handle** does not lock.	Tape is not inserted properly.	Reinsert the tape cartridge. If the problem persists, call your service representative.
Tape does not unload.	The **Load/Unload** pushbutton is in load position.	Make sure the **Load/Unload** pushbutton is in the unload position. Wait for the indicator to go out before trying to remove the tape.

Table 5–4: TK70 Tape Drive Troubleshooting Procedures

Problem	Possible Cause	Corrective Action
Green light flashes rapidly after you insert the tape.	Tape cartridge leader is defective.	Pull out the **cartridge release handle** and remove the cartridge. Use another cartridge.
Orange, yellow, and green lights flash in unison.	A problem with the tape drive.	Press the **Unload** pushbutton once. If the orange and green lights stop glowing and the yellow light flashes, the cartridge is unloading. When the green light glows and you hear a beep, remove the tape cartridge. If all three lights continue to flash after you press the **Unload** pushbutton, the fault is not cleared. Do not try to remove the cartridge. Call your DIGITAL service representative.
Cartridge release handle does not move.	Power-on test is still in progress.	Wait for the orange and yellow lights to stop glowing and for the green light to glow steadily. Try again.
	Tape drive is active.	Do not attempt to move the handle while the yellow light is glowing.

Table 5–4 (Cont.): TK70 Tape Drive Troubleshooting Procedures

Problem	Possible Cause	Corrective Action
Cartridge release handle does not lock.	Tape cartridge is not inserted properly.	Reinsert the tape cartridge. If the problem persists, call your DIGITAL representative.
Tape cartridge does not unload.	The **Unload** pushbutton is not working properly.	
TK70 passes power-on self-test, but does not work.	The controller may be bad, or the connection between the drive and the controller may be loose.	Run MDM software.

Table 5–5: Monitor Troubleshooting Procedures

Problem	Possible Cause	Corrective Action
Power indicator on the front of the monitor does not glow green when you turn on the monitor.	Power cord is not connected to the monitor or the wall outlet.	Connect the power cord to the monitor and wall outlet.
	Monitor is not turned on.	Turn on the system and then the monitor.
	No power exists at the wall outlet.	Use another outlet.
	Monitor fuse is blown.	Replace the fuse. See the Replacing the Fuse section.
Screen is blank and **power indicator** on the front of the monitor is glowing green.	System's CRT saver feature is activated.	Press any key to reactivate the display.

Table 5–5 (Cont.): Monitor Troubleshooting Procedures

Problem	Possible Cause	Corrective Action
Screen goes blank after successful power-up, and the **power indicator** on the front of the monitor stops glowing.	Monitor fuse is blown.	Replace the fuse. See the Replacing the Fuse section.
Screen displays raster, but no cursor or text appears.	Signal cable is disconnected.	CAUTION: Power off the system. Then secure the video cable connection between the monitor and the system.
	System is not on.	Turn on the system.
	Contrast control is set to minimum.	Turn up the **contrast control.**
	Host system's CRT saver feature is activated.	Press any key to reactivate the display.
Screen display is distorted, rolling or flickering, or the wrong color appears.	Video cable is incorrectly installed.	CAUTION: Power off the system. Then make sure the video cable is properly installed.
For the VR290 color monitor, color is not even; poor color purity.	Electromagnetic interference exists.	Press the **degauss switch** for a few seconds. After 30 seconds, recheck purity.
		Move any electromechanical device away from the monitor or move the monitor.

CAUTION: *Before moving the monitor, turn off the monitor and wait 30 seconds for the CRT to discharge.*

Table 5–6: Pointing Device Troubleshooting Procedures

Problem	Possible Cause	Corrective Action
Mouse does not track properly.	The tracking ball is dirty.	Clean the tracking ball. See the Mouse Maintenance section.
Pointing device indicator does not appear on the monitor screen, or the monitor does not respond to the pointing device commands.	Cable is installed incorrectly.	Unplug and then replug the cable to reset the device. (See Chapter 2.)

Replacing the Fuse

If the Monitor Troubleshooting Procedures (Table 5–4) indicate that you need to replace the fuse for the monitor, follow the instructions.

The VR290 Color Monitor

The VR290 color monitor has an automatic voltage-switching mechanism. Therefore, you **do not need to change the voltage switch setting**. Use either of the following fuses:

- 3AG, a 2-Amp, 250-volt, slow-blow fuse. (DIGITAL part no. 12–14676–04)
- IEC, a 2-Amp, 250-volt, slow-blow fuse. (DIGITAL part no. 12–19283–03)

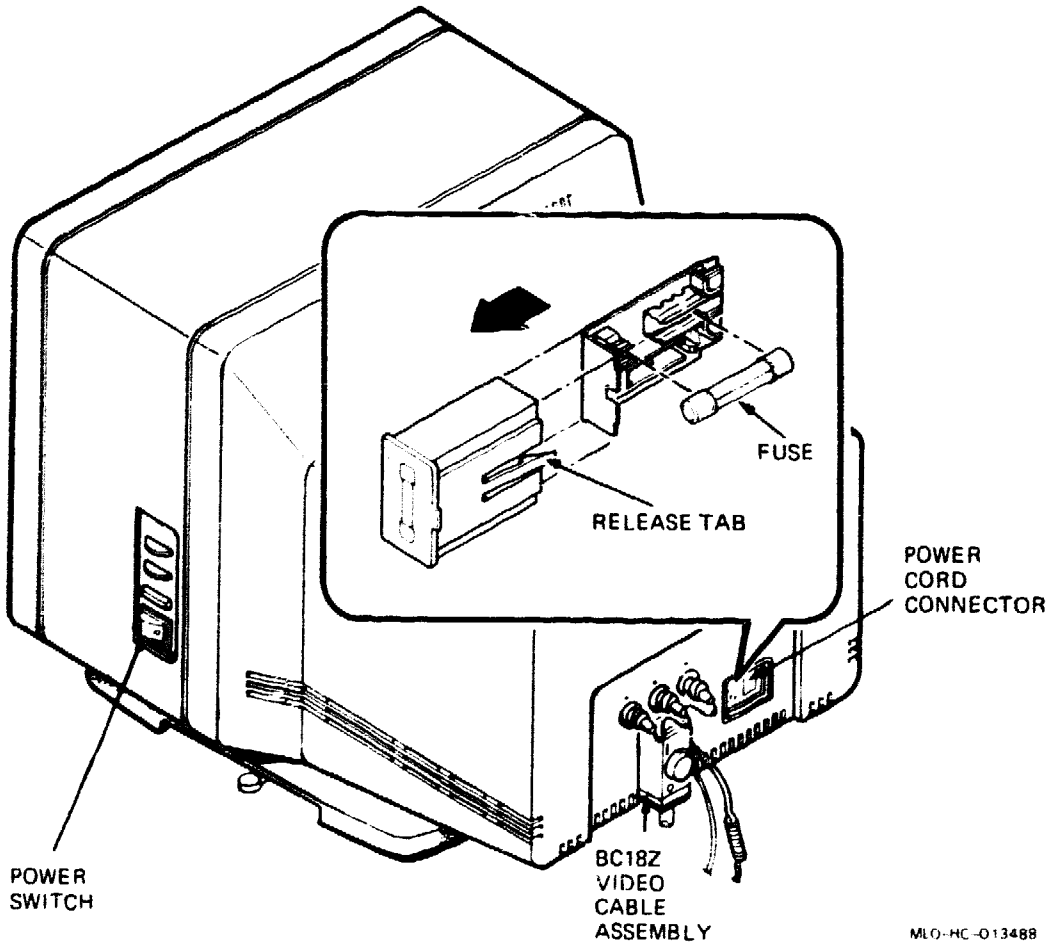
To replace the fuse:

WARNING: *Turn off the power and wait 10 seconds to allow the high voltage power to discharge.*

1. Unplug the power cord from the wall outlet and then from the monitor.

2. Carefully pry out the fuse carrier with a screwdriver.

Figure 5–2: Fuse Location, VR290 Color Monitor



3. Carefully pry open the release tab, remove the inner fuse holder, and replace the fuse.
4. Replace the inner fuse holder in the fuse carrier.
5. Replace the fuse carrier in the back of the monitor.
6. Plug the power cord back into the monitor and then into the wall outlet.
7. Turn on the power.

Monitor Screen and Cover Maintenance

To clean fingerprints, smudges, and dust off the monitor's antiglare screen, order DIGITAL's VT1XX-KF/KR Screen Cleaning Kit. The kit contains the necessary cleaning fluid and 15 soft, lint-free cloths.

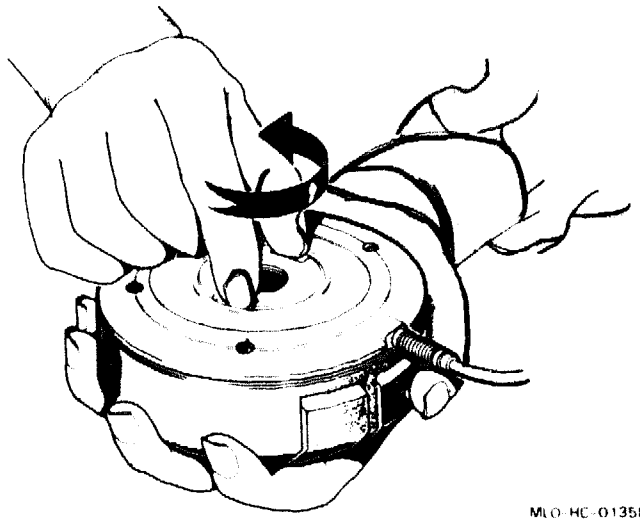
To clean the monitor cover, use a soft cloth dampened with a mild solution of soap and water. Be sure the monitor power switch is set to 0 (OFF) and the system unit is unplugged when doing this procedure. Do **not** let any cleaning solution get inside the monitor.

Mouse Maintenance

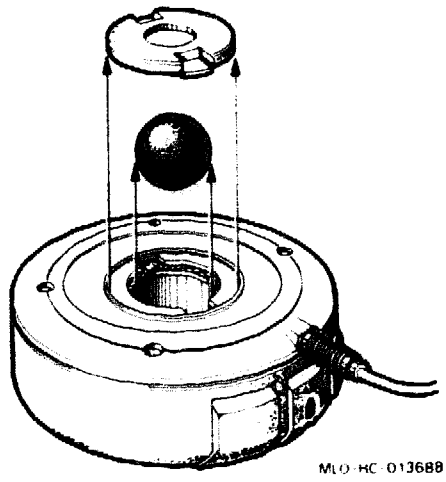
The rubber-coated ball under the mouse can be removed for cleaning or replacement. Clean the ball when the mouse fails to smoothly move the cursor on the screen. In an average office environment, cleaning the ball every 6 months is enough.

To remove and clean the mouse ball:

1. Turn the mouse upside down. Remove the ball housing cover plate by placing your fingers in the grooves on the plate and turning the plate counterclockwise.



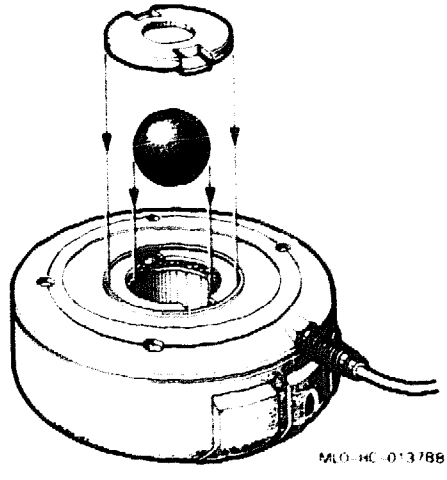
2. Lift off the cover plate and remove the ball.



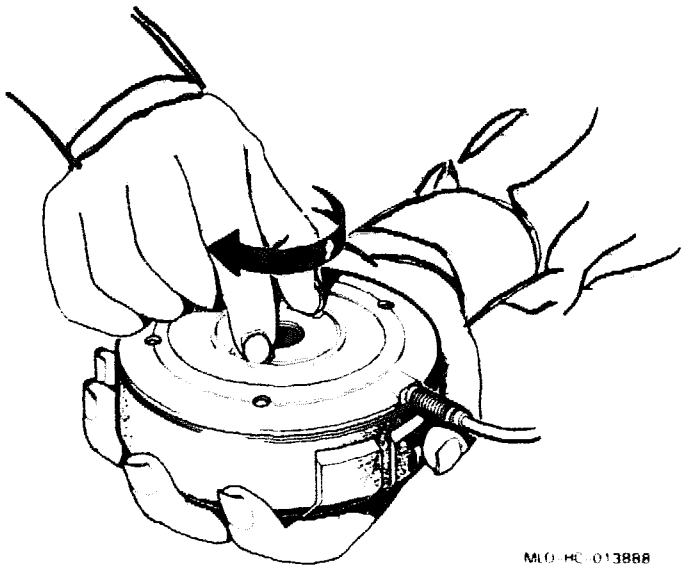
3. Clean the ball with lukewarm water and, if necessary, a mild soap.

   CAUTION: *Do not use organic solvents such as toluene or trichlorethane, which will damage the rubber coating.*

4. Dry the ball with a soft, lint-free cloth.
5. Replace the ball and cover plate.



6. Lock the cover plate into position by placing your fingers into the grooves on the cover plate and turning it clockwise.



MLO-HC-013888

MicroVAX Diagnostic Monitor

The "MicroVAX Diagnostic Monitor" (MDM) system software provides user tests that isolate and identify faults in the system. Use this software to test the system in response to an error message or to test your system periodically. Test the system (and record the results) before calling your service representative.

In addition, the maintenance software displays list system utilities and system devices.

The maintenance software is stored on RX50 diskettes or on TK50 or TK70 tape cartridges. To run the maintenance programs and to call up VAXstation 3 system displays, use the monitor and keyboard for command inputs.

The MicroVAX Diagnostic Monitor Main Menu

The "MicroVAX Diagnostic Monitor Main Menu" display lists the testing options. See the Testing the VAXstation 3 section of Chapter 2 for instructions on accessing the "Main Menu."

```
Press the RETURN key to continue. >

MAIN MENU

      1 -- Test the system

      2 -- Display System Configuration and Devices

      3 -- Display the System Utilities Menu

      4 -- Display the Service Menu

      5 -- Exit MicroVAX Diagnostic Monitor

Type the number; then press the RETURN key. >
```

The following maintenance system options appear in the "Main Menu" in the previous picture:

- 1—Test the System. That option tests the devices supplied by DIGITAL for a VAXstation 3 system. See the Testing the VAXstation 3 section of Chapter 2 for instructions on testing devices.

- 2—Display System Configuration and Devices. That option displays a list of the devices supplied by DIGITAL for a VAXstation 3 system. A sample screen is shown in the following illustration. Your configuration might be different from this example.

```
Type the number; then press the RETURN key. >2

MAIN MENU                                    Version V2.2

SYSTEM CONFIGURATION AND DEVICES

SYSTEM CONFIGURATION

    CPUA...MicroVAX/rtVAX/Mayfair CPU
       KA650-BA MC=02 FW=12
    MEMA...MicroVAX memory system
             MS650-AA... 8MB memory module
    RQDXA...Winchester/diskette controller.
       Revisions=2 and 1
            RD53...Unit #0, Nonremoveable
            RD54...Unit #1, Nonremoveable
    DEQNAA...Ethernet controller.
       DELQA L 08-00-2B-02-17-D3
    VCB02A...Graphics Processing Extension

            M7168...Unit #0, 1st Four Plane Memory Upgrade
            TK-Q-REV  MC=1

Press the RETURN key to return to the previous menu. >
```

NOTE: *The last letter in each device listed differentiates among multiple devices of the same type. For example, DEQNAA indicates the first DEQNA module; DEQNAB a second, and so forth.*

- 3—Display the System Utilities Menu. That option allows you to format your fixed disk or diskette.
- 4—Display the Service Menu. That option displays the Field Service diagnostics. Only your service representative should use this menu.
- 5—Exit MicroVAX Diagnostic Monitor. That option allows you to exit from the "MicroVAX Diagnostic Monitor".

The System Utilities Menu

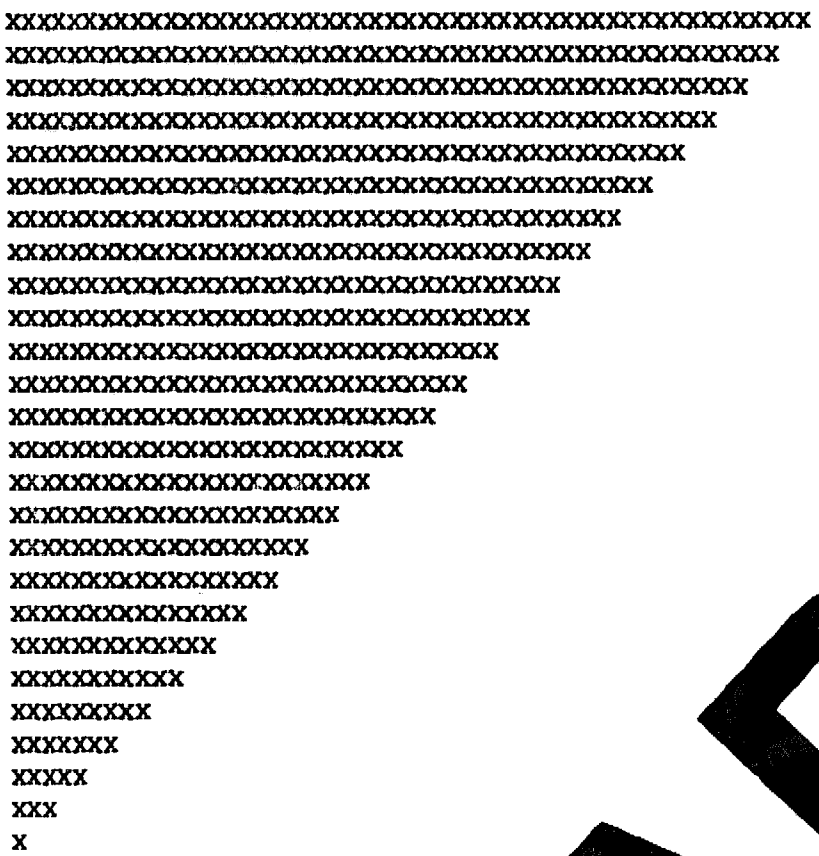
The only option in this menu is the Customer Disk Drive Formatter. That option lets you format a fixed disk or a diskette. Your fixed disk or diskette must be formatted before you can use it to store data.

CAUTION: *Formatting a fixed disk or diskette destroys all data on the disk or diskette. Use the formatting utility only if you have made copies of any data on the disk you want to save or if the disk is empty.*

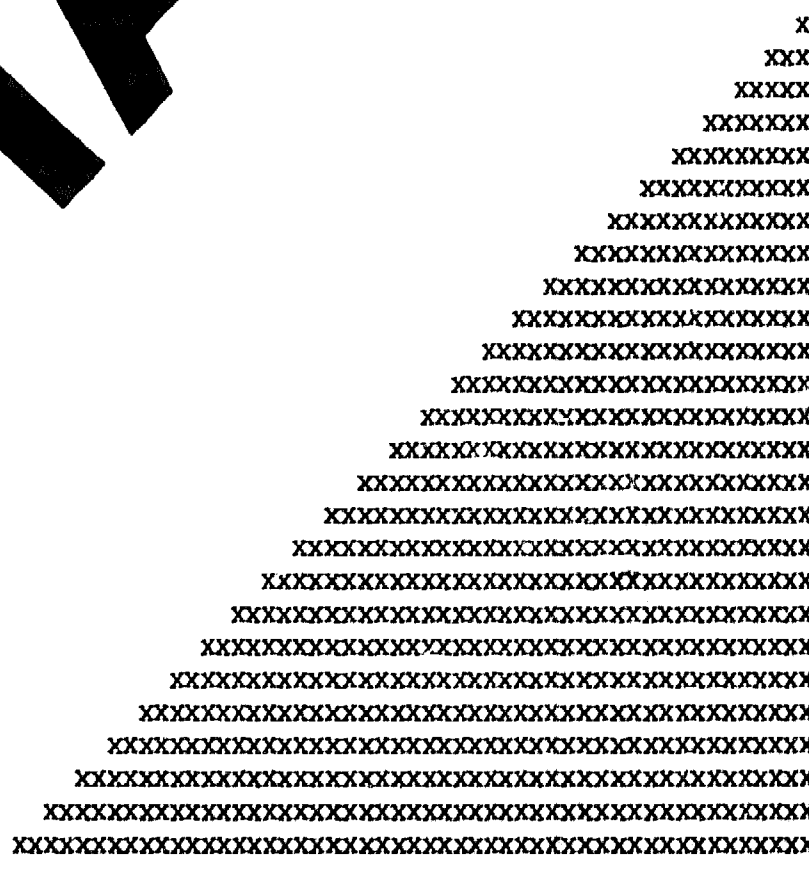
To format a system fixed disk or a diskette in the diskette drives with the screen displaying the System Utilities screen:

1. Type 1 and press the RETURN key.
2. If you are formatting a fixed disk, you are prompted to write protect all the drives except the one you want to format. Push the write-protect pushbutton to make sure that it is in the out (write-enable) position on the drive control panel.
3. Press the RETURN key. The screen displays a list of the drives and their unit numbers and prompts you for the number of the unit (drive) you want to format.
4. Type the number of the unit and press the RETURN key. You are asked to verify the unit number.
5. If the unit number is correct, type 1 and press the RETURN key. If the unit number is incorrect, type 0 and enter the correct unit number.

The screen displays status messages as the formatting continues and informs you when the formatting process is complete.



CHAP 6



Chapter 6
Service

If you are unable to correct a problem with your VAXstation 3 system, contact your service representative.

How to Call for Service

Before you call:

1. Check the problem-solving suggestions listed in Chapter 5. You can often solve a problem yourself.
2. Write down the serial and model numbers of your VAXstation 3. The numbers are located on the rear panel of the system unit (and on the service tag on system front panel).
3. Summarize the problem. Make a note of what you were doing when the system failed. Note if any indicators turned on or off, or if you heard any new sounds before or after the system failed.

Who you call:

1. Call your service representative. If you are under warranty or have a DIGITAL service contract, you may also call the customer support center for assistance. In the United States, the customer support hot line number is 1-800-DEC-8000. If you are located outside the United States, contact your sales representative for the local service branch office phone number.

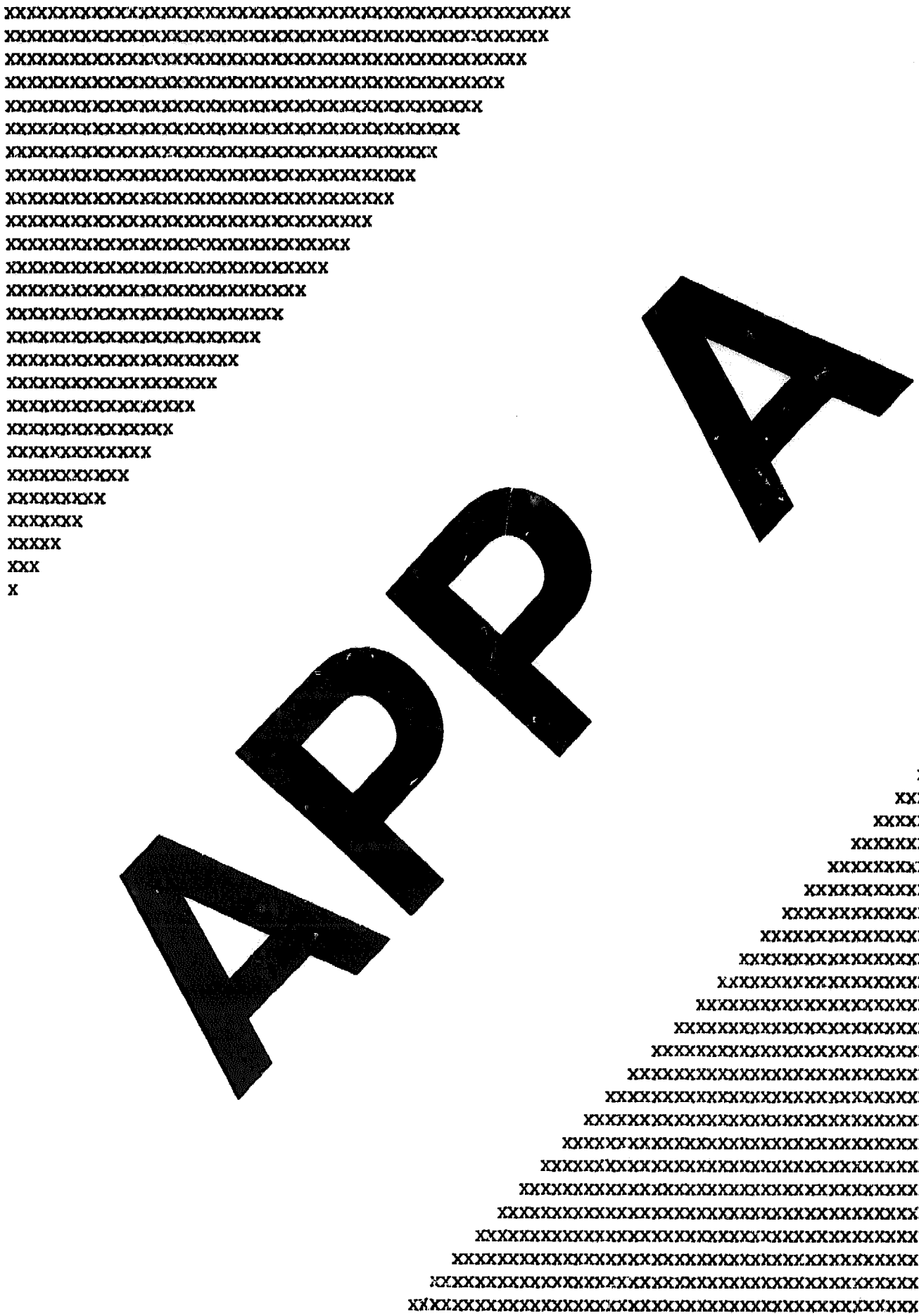
When you call:

1. Stay near the VAXstation 3.
2. Have the materials available (for example, manual, serial and model numbers, and problem summarization) to assist the service representative in helping you.

DIGITAL Services

Your DIGITAL hardware warranty gives you access to DIGITAL's best resources, including technical expertise, spare parts inventories, and worldwide service.

After warranty, DIGITAL's support continues through optional on-site and off-site services for as long as you own your DIGITAL hardware. DIGITAL's on-site services include fast response time and full support, including the cost of parts and labor. Contact your service representative for a description of the DIGITAL services available in your area.


APP A

Appendix A
VAXstation 3 System Specifications

Table A–1: System Electrical Requirements

	Specifications[1]	
Input	**120 V ac**	**220 V ac**
Voltage range	88–128 V	176–256 V
Power source phasing	single	single
Frequency	60 Hz	50 Hz
Line frequency range	47–63 Hz	47–63 Hz
Running current (typical)	8.8 A	4.4 A
Power consumption (maximum)	690 W	690 W

[1]These requirements depend on the line voltage setting of the country in which the system resides.

Table A–2: System Environmental Requirements

	Operating	Nonoperating
Maximum altitude	2400 m	12000 m
Temperature range[1]	15 to 32 deg. C	-40 to 60 deg. C
	(60 to 90 deg. F)	(-40 to 140 deg. F)
Relative humidity	20% to 80%	10% to 95%

[1] Reduce the maximum temperature specification by 1.8 degrees Celsius (3.24 degrees Fahrenheit) for each 1000-meter increase in altitude.

NOTE: *Your service contract may require limits for temperature and humidity that override the limits listed above.*

Table A–3: VR290 Color Monitor Specifications

Description	Characteristics
Physical	
Height	47 cm (18.5 in)
Width	51.8 cm (20 in)
Depth	54.6 cm (21.5 in)
Weight	Approximately 41 kg (90 lb)
Picture Tube Size Diagonal	
	47.5 cm (19 in) viewable
Video Format	
	RGB color, composite video
Display Characteristics	
	0.31 mm dot pitch with high-efficiency antiglare treatment
	1024 x 864 pixels, giving approximate picture size of 326 x 275 mm
Timing	
Vertical rate	60 Hz
Horizontal rate	54 KHz

Table A–3 (Cont.): VR290 Color Monitor Specifications

Description	Characteristics
Video R and B Input Signals	
	0.7 V pp/75 Ohm
Video G Composite Signal (with Sync)	
	1 V pp/75 Ohm
Power	
ac input	88 to 132 V, 50/60 Hz 185 to 264 V, 50 Hz
Power consumption	150 W (nominal)
Fuse (either may be used)	2 A, 250 V slow blow (3AG) DIGITAL part no. 12–14676–04
	2 A, 250 V slow blow (IEC) (European designation T2A-250 volt) DIGITAL part no. 12–19283–03
External Controls	
	Contrast Brightness Degauss Tilt-lock lever On/off
Operating Temperature Range	
	10 to 40 deg. C (50 to 104 deg. F)
Humidity	
	10% to 95% relative humidity, noncondensing

Table A–4: VR260 Monochrome Monitor Specifications

Description	Characteristics
Physical	
Height	39 cm (15.4 in)
Width	45.5 cm (17.5 in)
Depth	39.5 cm (15.6 in)
Weight	Approximately 18 kg (40 lb)
Picture Tube Size (Diagonal)	
	19 in (480 mm) viewable
Video Format	
	Composite video Black negative 70 MHz bandwidth
Timing	
Vertical rate	60 Hz
Horizontal rate	54 KHz
Power	
Supply	Transistor, switch type ac to dc converter
ac input	Switch selected
Power consumption	Approximately 65 W
115 V nominal (110/115/120)	Single-phase, 3-wire 8 to 132 V rms 47 to 63 Hz line frequency
230 V nominal (200/220/230)	Single-phase, 3-wire 185 to 264 V rms 47 to 63 Hz line frequency
Fuse	
120 V	1 A, 250 V slow blow DIGITAL part no. 90-07212-00
240 V	0.5 A, 250 V slow blow (European designation T2A-250 volt) DIGITAL part no. 12-19283-19

Table A–4 (Cont.): VR260 Monochrome Monitor Specifications

Description	Characteristics
External Controls	
	Contrast Brightness Tilt-swivel base lever On/off
Operating Temperature Range	
	10 to 40 deg. C (50 to 104 deg. F)
Humidity	
	10% to 90% relative humidity, with a maximum wet bulb of 28 deg. C (82 deg. F) and a minimum dew point of 2 deg. C (36 deg. F)

Table A–5: VSXXX–AA Mouse Specifications

Description	Characteristics
Physical	
Height	4 cm (1.57 in)
Diameter	8.8 cm (3.47 in)
Weight	0.82 kg (0.37 lb)
Cable	1.5 m (5 ft) in length, 0.38 cm (0.15 in) diameter, six conductors, shielded, high-flexibility design
Connector	7-pin Micro-DIN type (male)
Temperature	
Operating	10 to 40 deg. C (50 to 104 deg. F)
Nonoperating	-40 to 66 deg. C (-104 to 140 deg. F)
Electrical	
Power	+5 V +/-5% at 130 mA -12 V +/-10% at 20 mA (serial)
Interface	EIA RS-232-C voltage level compatible TTL compatible
FCC/EMI	Class B certified
Performance	
Resolution	79 counts/cm (200 counts/in)
Tracking speed	73.5 cm/sec (30 in/sec)
Accuracy	+/-3% 0 to 24.5 cm/sec (0 to 10 in/sec) any direction +/-15% 24.5 to 49 cm/sec (10 to 20 in/sec) any direction +/-30% 49 to 73.5 cm/sec (20 to 30 in/sec) any direction
Operating	
Modes	Incremental Stream Prompt
Data format	Delta Binary
Sampling rate	55 reports/sec in incremental stream mode, up to 95 reports/sec when polling
Baud rate	4800 baud

Table A–5 (Cont.): VSXXX–AA Mouse Specifications

Description	Characteristics
Pin assignments	
Pin	**Function**
1	ground
2	transmit data
3	receive data
4	-12 V
5	+5 V
6	not used (+12 V)
7	not used
shell	protective ground

Table A–6: VSXXX–AB Tablet Specifications

Description	Characteristics
Physical	
Construction	Molded, high-impact plastic
Finish	Fine matte finish to minimize glare and fingerprints
Color	Light gray
Power/signal cable	1.5-m (5-foot) cable wired to tablet, terminated in a 7-pin Micro-DIN connector
Height	2 cm (0.8 in)
Width	41.2 cm (16.2 in)
Length	40.6 cm (16 in)
Weight	3.2 kg (7 lb)
Performance	
Resolution	79 counts/cm (200 counts/in)
Active area	27.5 mm x 27.5 mm (11 in x 11 in)
Proximity (Nominal)	1.27-cm (0.5-in) cursor 0.63-cm (0.25-in) stylus
Interfaces	Serial, asynchronous, full-duplex, with EIA RS–232–C signal levels
Sampling rate	55, 72, or 120 pairs/sec
Data rate	4800 or 9600 baud (software selectable)
Coding	Binary 5-byte format. The first byte contains synchronization, pushbutton status, and proximity information. Second and third bytes have absolute X coordinate positions. The fourth and fifth bytes have absolute Y coordinate positions. Each byte is found by one start bit and one stop bit. The data byte contains 8 bits of data and 1 bit for parity (odd parity).
Coordinate origin	Lower left corner of active area

Table A–6 (Cont.): VSXXX–AB Tablet Specifications

Description	Characteristics
Operating Modes	
Remote request	X–Y coordinate update and proximity report when polled by host.
Incremental	Position reports are generated as long as cursor is in motion. Reports are also generated when the pushbuttons are pressed or released.
Diagnostics	Built-in diagnostics that check electronics, communication, tablet, and transducers.
Interface	
Description	EIA RS–232–C compatible signals
Power requirements	+12 V dc +/-10% at 0.3 A
Output connector (Power and Data)	7-Pin Micro-DIN (male)
Mating connector	7-Pin Micro-DIN (female)
Pin assignments	7 Pin (EIA RS–232–C)
Pin	**Function**
1	signal and power signal
2	transmit data (from table)
3	receive data
4	not used
5	not used
6	(+12 V)
7	tablet present

Table A–7: RD53 Fixed-Disk Drive Specifications

Description	Characteristics
Storage	
Total capacity	71,303,168 bytes
User capacity	70,987,776 bytes
User capacity	138,648 blocks
Performance[1]	
Average seek time	30 msec
Average rotational latency	8.33 msec
Average access time	38.33 msec
Transfer rate	184.32 kb/sec
Physical	
Height	8.25 cm (3.25 in)
Width	14.6 cm (5.75 in)
Depth	20.32 cm (8 in)
Weight	3.18 kg (7 lb)

Table A–8: RD54 Fixed-Disk Drive Specifications

Description	Characteristics
Storage	
Total capacity	191 mbytes
User capacity	159 mbytes
User capacity	310,550 blocks
Performance[1]	
Average seek time	30 msec
Average rotational latency	8.33 msec
Average access time	38.3 msec
Transfer rate	5 mb/sec
Physical	
Height	8.25 cm (3.38 in)
Width	14.6 cm (5.75 in)
Depth	20.32 cm (8.2 in)
Weight	2.8 kg (6.3 lb)

[1]When operating with RQDX3 controller

Table A–9: RA60 Removable Disk Drive Specifications

Description	Characteristics
Storage	
User capacity	205 mbytes
User capacity	400,176 blocks
Performance[1]	
Average seek time	41.67 msec
Average rotational latency	8.33 msec
Average access time	50.3 msec
Transfer rate	15.84 mb/sec
Physical	
Height	26.52 cm (10.44 in)
Width	48.26 cm (19 in)
Depth	85.09 cm (33.75 in)
Weight	68.95 kg (152 lb)

[1] When operating with KDA50-Q controller

Table A–10: RA81 Fixed-Disk Drive Specifications

Description	Characteristics
Storage	
User capacity	456 mbytes
User capacity	891,070 blocks
Performance[1]	
Average seek time	28 msec
Average rotational latency	8.32 msec
Average access time	36.3 msec
Transfer rate	12.2 mb/sec
Physical	
Height	26.3 cm (10.38 in)
Width	44.5 cm (17.5 in)
Depth	67.3 cm (26.5 in)
Weight	61.2 kg (135 lb)

[1] When operating with KDA50-Q controller

Table A–11: RX50 Dual Diskette Drive Specifications

Description	Characteristics
Medium	
Diskettes/RX50 drive	2 Recording surfaces per diskette
Storage capacity	
Per diskette (80 tracks)	409,600 bytes
Per track (10 sectors)	5120 bytes
Per sector (1 logical block)	512 bytes
Performance[1]	
Average seek time	164 msec
Average rotational latency	100 msec
Average access time	264 msec
Transfer rate	12.8 kb/sec
Physical	
Height	8.5 cm (3.25 in)
Width	14.6 cm (5.75 in)
Depth	21.6 cm (8.5 in)
Weight	2.8 kg (6.3 lb)

[1] When operating with RQDX3 controller

Table A–12: TK50 Tape Drive Specifications

Description	Characteristics
Medium	
Magnetic tape	
Dimensions	1.27 cm (0.5 in) wide 183 m (600 ft) long
Mode of operation	Streaming
Read/Write method	Serpentine
Recording density	16,934 bits/cm (6667 bits/in)
Number of tracks	22
Capacity	
Unformatted	131 mb
Formatted	94.5 mb
Performance[1]	
Tape start time	300 msec maximum
Tape speed	190.5 cm/sec (75 in/sec)
Streaming data rate	500 kb/sec
Access time	1 min minimum
(from insertion of a new tape)	35 min maximum
Physical	
Height	8.25 cm (3.25 in)
Width	14.6 cm (5.75 in)
Depth	21.44 cm (8.44 in)
Weight	2.27 kg (5 lb)

[1] When operating with TQK50 controller

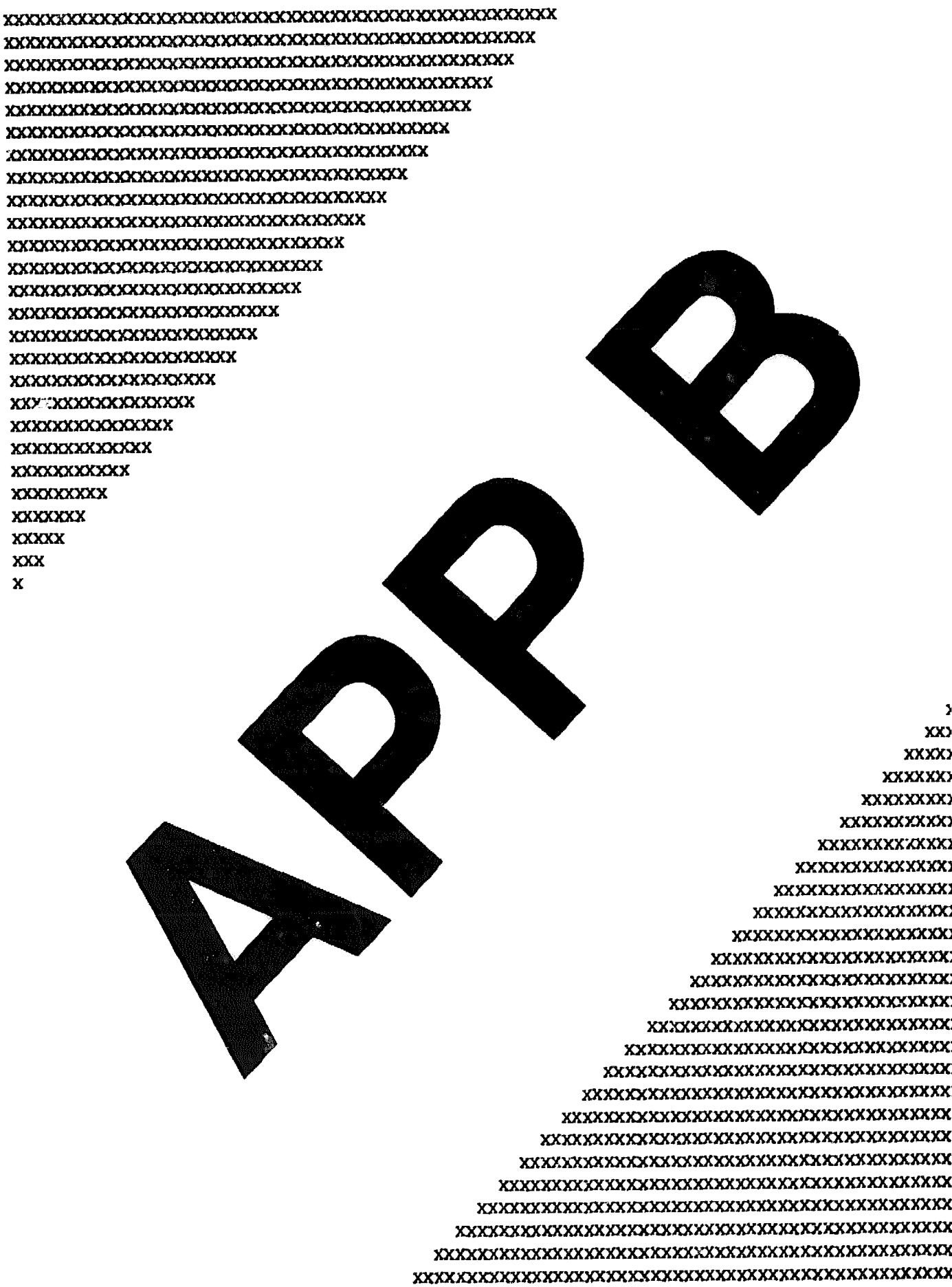
Table A–13: TK70 Tape Drive Specifications

Description	Characteristics
Medium	
Magnetic tape	
Dimensions	1.27 cm (0.5 in) wide 182.9 m (600 ft) long
Mode of operation	Streaming
Read/Write method	Serpentine
Recording density	25,000 bits/cm (10,000 bits/in)
Number of tracks	48
Capacity	
Formatted	296 mb
Performance	
Tape start time	325 msec maximum
Tape speed	254 cm/sec (100 in/sec)
Streaming data rate	125 kb/sec
Access time (from insertion of a new tape)	
TK50 mode (read only)	35 min maximum
TK70 mode	60 min maximum
Physical	
Height	8.25 cm (3.25 in)
Width	14.6 cm (5.75 in)
Depth	21.44 cm (8.44 in)
Weight	2.27 kg (5 lb)

Table A–14: TS05 Tape Drive Specifications

Description	Characteristics
Medium	
Magnetic tape	
Dimensions	1.27 cm (0.5 in) wide 183 m (600 ft) long
Mode of operation	Streaming
Read/Write method	Serpentine
Recording density	4064 bits/cm (1600 bits/in)
Number of tracks	9
Capacity	
Unformatted	46 mb
Formatted	40.5 mb
Performance[1]	
Tape start time	260 msec maximum
Tape speed	64 cm/sec (25 in/sec)
Streaming data rate	160 kb/sec
Access time	1 min minimum
(from insertion of a new tape)	25 min maximum
Physical	
Height	22.23 cm (8.75 in)
Width	48.26 cm (19 in)
Depth	61.6 cm (24.25 in)
Weight	36 kg (80 lb)

[1] When operating with TSV05 controller


APP B

Appendix B

VAXstation 3 Related Documents

This appendix lists and describes documents pertaining to a VAXstation 3 system in the BA123 Enclosure.

The last page of this book provides information on ordering documentation.

Table B–1: Hardware Documentation

Document	Order Number
Micro Systems Site Preparation Guide	EK-BA123-SP
VCB02 Video Subsystem Technical Manual	EK-104AA-TM
VR290 Color Video Monitor Installation/Owner's Guide	EK-VR290-IN
VR260 Installation/Owner's Guide	EK-VR260-IN
Mouse Installation Sheet	EK-VSXXA-IN
Tablet Installation Guide	EK-VSXXB-IN
KA650 CPU Module Technical Manual	EK-KA650-TM
MicroVAX II Maintenance Information Kit	ZNA3X-C3
MicroVAX Handbook	EB-25156-47

Table B–2: ULTRIX Software

Document	Order Number
ULTRIX–32w Documentation Kit Overview	Q4X32–GZ
ULTRIX WS 1.1 Release Notes	AA–HF07B–TN
ULTRIX–32w Technical Summary	AA–GT87A–TN
ULTRIX–32w Installation and Management Guide	AA–GT88A–TN
Using and Customizing the Window Manager	AA–GT89A–TN
ULTRIX–32w QDSS/VCB02 Driver Reference	AA–GT90B–TN
ULTRIX–32w QDSS Interface Library Programming	AA–GT91B–TN
ULTRIX–32w Xlib Programming Reference	AA–GT92A–TN
ULTRIX–32w GKS/2b Programming	AA–GT93B–TN
ULTRIX–32w Services Reference	AA–GT94B–TN
C Language X Interface	AA–HF10A–TN

Table B–3: VMS Software

Document	Order Number
VMS Release Notes, V4.6A or later	AA–KV94A–TE
MicroVAX 3000-Series Installation and Operations Guide	AA–KV93A–TN

Table B–4: Microcomputer Handbook Series

Document	Order Number
VAX Architecture Handbook	EB–19580–20
VAX Software Handbook	EB–21812–20
Microcomputer Interfaces Handbook	EB–20175–20
Microcomputers and Memories Handbook	EB–18451–20
A Technical Summary of Digital's VAXstation Family	EB–29389–51

Table B–5: Network Documentation

Document	Order Number
DECconnect System General Description	EK-DECSY-GD
DECconnect System Requirements Evaluation Workbook	EK-DECSY-EG
DECconnect System Planning and Configuration Guide	EK-DECSY-CG
DECconnect System Installation and Verification Guide	EK-DECSY-VG
DECconnect System Stand-Alone ThinWire Networks: Planning and Installation Guide	EK-DECSY-TG
Networks and Communications Buyer's Guide	ED-28752-42
DESTA Installation Card	EK-DESTA-IN
DESTA Technical Description	EK-DESTA-TM
DELQA Ethernet User's Guide	EK-DELQA-UG


GLOSS

Glossary

application program
A program designed to perform a task, such as monitoring a manufacturing process.

ASCII
American Standard Code for Information Interchange. A set of 8-bit binary numbers representing the alphabet, punctuation, numerals, and other special symbols used in text representation and communications protocol.

asynchronous multiplexer
A device that provides asynchronous communication and brings together several low-speed communications channels. The device controls and alternates the transmission of signals with start and stop signals so that more than one signal can be transmitted over a single communications line.

backplane
A connector block that connects modules through a bus and provides physical support of those modules.

back-up copy
A copy of data stored on your disk. The duplicate copy is stored on RX50 diskettes or TK50, TK70, or TS05 magnetic tape cartridges.

back-up
The process of making copies of the data stored on your disk so that you can recover that data after an accidental loss. You make back-up copies on RX50 diskettes or TK50, TK70, or TS05 magnetic tape cartridges.

barrel connector
A female connector for linking two sections of Ethernet coaxial cable.

baud rate
The speed at which signals are serially transmitted along a communications line. One baud equals one bit/second.

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

bitmap
The type of graphics supported by the VAXstation 3. With bitmap graphics, the workstation software can individually access each dot (pixel) on the video screen.

boot
See *bootstrap.*

bootable medium
A fixed disk, diskette, or magnetic tape cartridge containing software (such as an operating system) that a bootstrap program can load into the system memory and begin program execution.

bootstrap
1. A program that you start when you turn on the system. The bootstrap loads software contained on fixed disk, diskette, or magnetic tape cartridge into memory; the system stops executing the bootstrap and starts executing the software in memory. The software usually loads an operating system or other software into memory so that the system can start processing.
2. To use a bootstrap program.

bus
A printed circuit module that is part of the backplane. The bus permits the sharing of signals among the system modules.

byte
A group of eight binary digits (bits). A byte is one-quarter of the size of a system word.

Central Processing Unit (CPU)
The part of the system that controls the interpretation and execution of instructions. In the VAXstation 3 system, CPU functions are contained on one KA650–BA CPU chip.

command
An order you can give to the system, often through a terminal keyboard.

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.

computer system
A combination of system hardware, software, and external devices that performs operations or tasks.

console mode
The stage at which a device can communicate directly with the CPU. For the VAXstation 3, console mode is activated by pressing the halt pushbutton when the **Break Enable/Disable** switch is enabled (up) and is indicated by the arrow prompt (>>>) on the system monitor.

controller
A system component, usually a printed circuit module, that regulates the operation of one or more peripheral devices. Controllers are often called interface units.

control panel
The panel on the front of the system cabinet that contains control switches and indicator lights.

CPU
Abbreviation for Central Processing Unit. See *Central Processing Unit.*

CRT (Cathode Ray Tube)
A vacuum tube that generates and guides electrons onto a fluorescent screen to produce characters or graphics. A term often used to refer to a monitor.

data
A representation of facts, concepts, or instructions in a formalized manner suitable for communication, interpretation, or processing by people or by automatic means.

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

debug
To detect, locate, and correct errors (bugs) in system hardware or software.

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

DECnet
DIGITAL networking software that lets you access information on a remote computer over communication lines.

DELNI
A local network interconnect product that provides eight separate network interfaces from a single transceiver tap.

DELQA
A Q22-bus-compatible communication module that interfaces between an Ethernet Local Area Network (LAN) and a VAXstation 3.

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

DEQNA
A Q22-bus-compatible communication module that interfaces between an Ethernet Local Area Network and a VAXstation 3, under DECnet Phase IV software. The DEQNA provides Ethernet data link functions and communication with other addressable devices on an Ethernet.

DESTA
A ThinWire Ethernet Station Adapter (DESTA) permits a single station with standard Ethernet cable to be connected to ThinWire Ethernet cable.

device
The general name for any unit connected to the system, which can receive, store, or transmit data. See *input device, output device, Input/Output device,* and *controller.*

device name
The name by which a device or controller is identified in the system. You use that name to refer to that device when you are communicating with the system.

diagnostic medium
Diskette or tape that contains diagnostics. See *diagnostics.*

diagnostics
A program that detects and identifies abnormal system hardware operation. The VAXstation 3 "Maintenance System" software contains several diagnostic programs.

disk
A flat circular plate with a coating on which data is magnetically stored in concentric circles (tracks). The VAXstation 3 contains at least one fixed disk, either the RD53 or RD54 disk drive subsystems, or both. The VAXstation 3 also uses the RA60 and RA81 disk drives in the H9642 Enclosure.

disk drive subsystem
A free-standing disk drive that provides additional storage for the system. The RD53, RD54, RA60, and RA81 are disk drive subsystems that can be added to the VAXstation 3.

diskette
A flexible, floppy disk contained in a square paper envelope. The VAXstation 3 uses the RX50 13.13-centimeter (5.25-inch) diskettes.

diskette drive
A disk drive that only reads or writes on removable diskettes. The VAXstation 3 diskette drive uses RX50 diskettes.

dot matrix
A method of generating characters for printing that uses dots to produce readable characters.

down-line load
To send a copy of a system image or other file over a line to the memory of a target node.

error message
A message displayed by the system to indicate a mistake or malfunction.

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

fixed-disk drive
A device that holds a fixed 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. The VAXstation 3 disk drive can

read and write on the RD53 and RD54 fixed disks, as well as the RA60 and RA81 disk drives.

formatted data
A pattern of data that conforms to a predetermined structure dictated by the system software.

GKS
Graphics Kernel System. GKS acts as one of the graphics interfaces for the VAXstation 3.

hard-copy terminal
A terminal that displays information on paper. Compare to *video terminal.*

hardware
The physical components—mechanical and electrical—that make up a system. Compare to *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.

host
The primary or controlling computer in a multiple computer network.

input device
A piece of equipment that is used to transfer data to the system. For example, a keyboard is an input device.

Input/Output (I/O) device
A piece of equipment that accepts data for transmission to (input) and from (output) the system. For example, a terminal.

interface
A device or piece of software that lets system components communicate.

I/O
Abbreviation for Input/Output. See *Input/Output (I/O) device.*

K
The symbol that means 2 to the 10th power (or 1024 in decimal notation).

kilobyte
1000 bytes.

LED
Light Emitting Diode. LEDs are used as indicators on the control panel. A segmented LED display on the CPU distribution panel insert on the back of the VAXstation 3 cabinet displays the characters F–0 during the power-on sequence to indicate CPU status and normal/abnormal operation.

load
1. To move software (usually from a peripheral device) to memory.
2. To physically place a disk on a disk drive or a tape on a tape drive.

Local Area Network (LAN)
A privately owned data communications network serving a geographically confined group of end systems through a single transmission circuit. A LAN offers high-speed communications channels optimized for connecting information-processing equipment; for example, Ethernet.

M
The symbol for 1024 squared (1,048,576 in decimal notation).

magnetic tape
A strip of plastic coated with magnetic oxide and used for storing data. Often called magtape.

megabyte
1,000,000 bytes.

memory
The area of the system that holds the instructions and data that temporarily store information.

memory module
A logic circuit module that contains additional memory for the system. Up to 3 memory modules with 8 megabytes of memory can be added to the VAXstation 3.

menu
A displayed list of options that you can select to run.

MicroVAX Workstation
Any workstation based on the 32-bit MicroVAX CPU. The workstations include the MicroVAX and the VAXstation systems.

MicroVMS
A micro version of the VAX/VMS operating system for MicroVAX-based systems. MicroVMS enables installation of only those parts of the VMS operating system you need, but allows access to all VMS operations.

MicroVMS Workstation Software
Window management software for a MicroVAX-based system. The system must run MicroVMS as the operating system. Workstation software lets you control and view several programs on one screen. You specify the window with which to interact by using a pointing device.

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

mouse
A relative-positioning input device that is rolled across the desktop to move the cursor on the monitor screen and is used to select menu options and draw graphics. The mouse is palm sized and contains three pushbuttons (function keys) and a ball bearing. The mouse is the pointing device for the VAXstation 3.

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

node
An individual information-processing unit, such as a computer, workstation, or peripheral device, that is connected to a network.

off-line
Pertaining to equipment, devices, and events that are not controlled by the system.

on-line
Pertaining to equipment, devices, and events that communicate with the system.

operating system
A collection of system programs that controls the operation of the system and performs such tasks as assigning memory to programs and data, processing requests, scheduling jobs, and controlling the operation of input and output devices.

output device
A device that extracts data from the system. A printer is an example of an output device.

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

plane
A video subsystem module that measures 1K x 1K x 2K and contains a total of 256K of memory. Each bit (one of two possible values, 0 and 1) corresponds to a pixel on the video screen. A 4-plane video subsystem uses 4 bits to represent a pixel and can display 16 colors or shades of gray simultaneously. An 8-plane video subsystem uses 8 bits to represent a pixel and can display 256 colors simultaneously.

pointing device
A terminal input device that lets you make a selection from a menu or draw graphics. See *mouse, puck, stylus,* and *tablet.*

power-up sequence (power up)
A series of ordered events that occur when you supply power by turning on the system.

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

program
The sequence of instructions the system needs to perform a task. See *software.*

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

puck
A flat, rectangular, 4-pushbutton pointing device included with the tablet, which moves the cursor on the monitor screen, draws graphics, and makes selections from the menu. See also *tablet*.

RAM
Abbreviation for Random-Access Memory. See *Random-Access Memory (RAM)*

Random-Access Memory (RAM)
Memory that can be both read and written into during normal operations. The type of memory the system uses to store the instructions of programs being run.

raster
A linear measurement unit for graphics characters.

Read-Only Memory (ROM)
A memory whose contents cannot be modified. The system can use the data contained in a ROM but cannot change it.

reboot
To restart the system. Pressing the Restart pushbutton on the control panel reboots the VAXstation 3 system, if the **Break Enable/Disable** switch on the back of the VAXstation 3 cabinet is in the up (enable) position.

ROM
Abbreviation for Read-Only Memory. See *Read-Only Memory (ROM)*.

run
1. A single execution of a job on a computer.
2. To execute a program.

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

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.

stylus
A stencil-shaped pointing device included with the tablet, which moves the cursor on the monitor screen, draws graphics, and makes selections from the menu. See also *tablet.*

subsystem
A collection of mechanical and policy (access) modules that implements a particular facility in the system. Examples include the file subsystem and the batch subsystem.

synchronous line controller
A device that provides high-speed synchronous communication for distributed networks. Three varieties of the DMV11 are optional synchronous line controllers for the VAXstation 3.

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

system image
The image that is read into memory from disk when the system is started up (booted).

T-connector
T-shaped connector used to join two ThinWire Ethernet cable segments directly to a station.

tablet
An absolute-positioning input device comprised of a flat-surfaced digitizing tablet, a puck, or a stylus. The tablet is a drawing surface used with the puck or stylus as a pointing device to move the cursor on the monitor screen, to draw graphics, and to make selections from the menu. The tablet may be used with the VAXstation 3.

tape drive
A device that contains mechanical components and holds, turns, reads, and writes on magnetic tape. The VAXstation 3 uses the TK50, TK70, and TS05 tape drives.

Tektronix 4014
A storage-tube display terminal sold by Tektronix, Inc.

terminal
An Input/Output device that allows you to communicate with the system. Terminals are divided into two categories: video and hard-copy.

terminator
A special connector used on both ends of an Ethernet segment. That connector provides the 50-ohm termination resistance needed for the cable.

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

32-bit length
The length of the internal data path of the CPU. That length provides more concentrated data, allows more data types, and enables more data to be transferred at one time than a 16-bit internal data path.

ULTRIX–32m
ULTRIX–32m is an interactive, time-sharing operating system derived from UNIX®[1] and enhanced by DIGITAL to work with MicroVAX hardware and software.

ULTRIX–32w
The window management software for a MicroVAX-based system. The system must run ULTRIX–32m as the operating system. Workstation software lets you contrc and view several programs on one screen. You specify the window with which to interact by using a pointing device.

VCB02
A video subsystem that provides 1024 x 864 pixel resolution on a 47.5-centimei :r (19-inch) color monitor. The 4-plane subsystem simultaneously displays 16 colors, while the 8-plane subsystem simultaneously displays 256 colors.

video terminal
A terminal that displays information on the screen of a cathode ray tube (CRT). Compare to *hard-copy terminal.*

[1] UNIX® is a registered trademark of American Telephone & Telegraph Company.

VLSI
Very Large Scale Integration of integrated circuit chips. A large number of chips can fit on a printed circuit module; therefore, fewer modules are needed, and the system can be smaller.

VT100 terminal
An American National Standards Institute (ANSI)-compatible terminal offered by DIGITAL.

Winchester disk
A hard disk permanently sealed in a drive unit to prevent contaminants from affecting the read/write head. The sealed Head/Disk Assembly (HDA) helps to increase drive reliability and ensure data integrity.

window
An area on your monitor screen in which you can start, run, and view a separate process. Windowing is supported by both MicroVMS and ULTRIX workstation software.

word
The largest number of bits (32) that the VAXstation 3 can handle in an operation. The VAXstation 3 can also handle longwords (that is, two words or 64 bits).

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

write-protect notch
The small notch on the side of an RX50 diskette that you can cover with an adhesive-backed foil label or tab to prevent loss of data by accidental overwriting.

write-protect switch
The switch that you slide down on a TK50 or TK70 tape cartridge to prevent loss of data by accidental overwriting.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