# VAXstation 3100 Model 38

## Owner's Manual

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# About This Guide

## Purpose of This Manual

This manual describes how to install, test, and maintain the hardware components of a VAXstation 3100 Model 38 system. This manual also includes information on how to configure and connect your new system to an Ethernet network.

## Who Should Use This Manual

This manual is for anyone setting up and using the VAXstation 3100 Model 38 workstation for the first time. Additionally, this manual is for anyone installing new devices inside the workstation system unit.

## Structure of This Manual

This manual contains nine chapters, five appendixes, a glossary of technical terms, and an index.

- Chapter 1 includes an overview of the VAXstation 3100 workstation and the associated VAXstation 3100 family of products. It includes an illustration of a VAXstation 3100 system configuration, and introduces you to some of the features of the product.

- Chapter 2 shows how to install your new VAXstation 3100 Model 38.

- Chapter 3 discusses how to use your VAXstation 3100 Model 38, including how to use the diskette drive and the TZ30 tape drive. It concludes with a short discussion of the keyboard and mouse.

- Chapter 4 describes how to add and use expansion boxes for your system.

- Chapter 5 tells you how to connect your system to a simple ThinWire daisy-chain network, as well as to standard Ethernet.

- Chapter 6 provides basic troubleshooting information.

- Chapter 7 provides instructions for running diagnostic tests.

- Chapter 8 lists the options available for your system. It also shows how to connect a printer or modem to your system.

- Chapter 9 tells you how to add optional devices inside your system unit.

- Appendix A tells you how to set your startup procedures, including how to reboot your system and change the default recovery action.

- Appendix B gives information about setting SCSI IDs for devices inside the workstation system unit and for devices in expansion boxes.

- Appendix C gives information about status and error codes resulting from diagnostic testing.

- Appendix D provides hardware specifications for system components.

- Appendix E lists additional documents to help you get acquainted with your new system.

- The glossary explains technical terms used in the manual.

- The index refers you to specific topics covered in the manual.

# Guide to VAXstation 3100 Documentation

The following table lists general titles of some of the manuals you will use to install and operate your VAXstation 3100 system. The manuals you receive with your equipment vary in title and number depending upon your hardware and software. The left column lists the manuals. The right column gives the topics described in each manual. See also Appendix E, Associated Documents.

| Manual | Topics |
| --- | --- |
| VAXstation 3100 Planning and Preparation | Planning workstation placement |
| | Checking power requirements |
| | Checking communications (networking) requirements |
| | Checking environmental requirements |
| VAXstation 3100 Model 38 Owner's Manual | Setting up the system unit |
| | Connecting the keyboard and mouse |
| | Turning your system on |
| | Setting the keyboard language |
| | Connecting to a network |
| | Creating simple networks |
| | Troubleshooting and diagnostic testing |
| | Connecting expansion boxes |
| | Adding devices inside the system unit |
| Monitor Installation/Owner's Guide | Connecting a monitor to your system unit |
| | Adjusting brightness and contrast |
| Workstations Network Guide | Defining networks |
| | Describing networking hardware and software |
| | Setting up a ThinWire Ethernet or standard Ethernet network |
| | Expanding local area networks (LANs) to extended networks or wide area networks |
| VMS Installation Guide | Installing VMS system software |
| | Backing up files |
| Desktop-VMS Installation Guide | Using Desktop-VMS, an optional software interface layered on VMS or ULTRIX |
| | Installing Desktop-VMS software |

| Manual | Topics |
| --- | --- |
| **VWS Installation Guide** | Using VWS software |
| | Installing VWS system software |
| | Backing up files |
| **ULTRIX Installation Guide** | Installing ULTRIX system software |
| | Backing up files |
| **DECwindows User's Guide** | Using DECwindows, an optional software interface layered on VMS or ULTRIX |
| | Using the mouse |
| | Manipulating windows |
| | Creating and using files |
| **Application Installation Guides** | Installing software applications |

# Conventions

The following conventions are used in this manual:

| | |
|---|---|
| Ctrl/x | A sequence such as Ctrl/x indicates that you must hold down the key labeled Ctrl while you press another key or a pointing device button. |
| Return | A key name is shown enclosed to indicate that you press a named key on the keyboard. |
| red ink | Red ink in interactive examples indicates information that you must enter from the keyboard. In the online version of the book, this user input is shown in bold type. |
| **bold** | Bold type is used to introduce new terms. New terms are defined in the Glossary. |
| UPPERCASE | Uppercase letters indicate that you must enter a command exactly as shown. For example, enter SHOW. |
| lowercase | Lowercase letters in commands indicate that you must provide a value. For example, enter SET PASSWORD new_password. |
| **Warning** | Warnings contain information to prevent personal injury. Read these carefully. |
| **Caution** | Cautions provide information to prevent damage to equipment or software. Read these carefully. |
| **Note** | Notes provide general information about the current topic. |

# Icon Descriptions
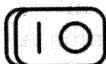
Throughout this manual, symbols or icons identify important switches, buttons, connectors, or procedures. These icons are briefly described here. Figure 2–3 shows the locations on the system unit for many of the ports, switches, and buttons.

## Icons That Signal Procedures

Certain icons act as reminders about important procedures that are being described in the text.

This icon signals that you must open another guide (for instance, the monitor guide) for more complete instructions on a certain procedure. Then you return to the procedures in this manual.

This representation of an on/off switch shows the off (0) position. This icon signals that you should turn off one or more devices, as described in the text.

The on/off switch is shown in the on ( | ) position. This icon signals that you should turn on one or more devices, as described in the text.

## Icons for Ports, Connectors, and Buttons

Some icons appear on the back of the system unit itself to identify the ports, connectors, and buttons. In text, the icon for a port or connector indicates that you connect a cable to that port or connector. The icon for a button indicates that you press that button. See Figure 2–3 for icon locations on the system unit.

The SCSI icon signals that you attach a cable or terminator to the SCSI port. See Chapter 4 for instructions.

The Ethernet icon signals a procedure involving one of the Ethernet connectors or the network select button. See Chapters 2 and 5 for instructions.

The halt icon signals that you press the halt button to put the system into console mode. See Chapter 6 for instructions.

The keyboard icon identifies the connector into which you insert the keyboard cable. See Chapter 2 for instructions.

The mouse icon identifies the connector into which you insert the mouse cable (or the tablet cable). See Chapter 2 for instructions.

This icon appears on the cable for the mouse (or tablet). You insert this cable into the port labeled with the mouse icon. See Chapter 2 for instructions.

The monitor icon identifies the connector into which you insert the monitor cable. See Chapter 2 for instructions.

The printer icon identifies the port for the printer cable. See Chapter 8. This port also supports a hardcopy terminal or an additional video terminal as an alternate console. See Appendix A.
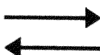
This icon identifies the communications port. If you purchase a modem, you insert the modem cable in this port. See Chapter 8.

**S3**

This icon identifies the alternate console switch. Appendix A gives instructions for installing and using an alternate console.

**ꟼ**

This icon identifies the row of diagnostic lights on the back of the system unit. Chapter 7 describes how to use these lights.

# 1

# Your VAXstation 3100 Model 38

This chapter describes some of the features of the VAXstation 3100 Model 38 system (Figure 1–1).

The VAXstation 3100 Model 38 system is a low-cost desktop system that offers all the advantages of Digital Equipment Corporation's VAX **architecture**. The VAXstation 3100 provides an integrated computing environment that offers desktop VAX computing, industry-standard personal productivity tools, and transparent access to distributed **applications** and resources.

**Figure 1–1    VAXstation 3100 System**
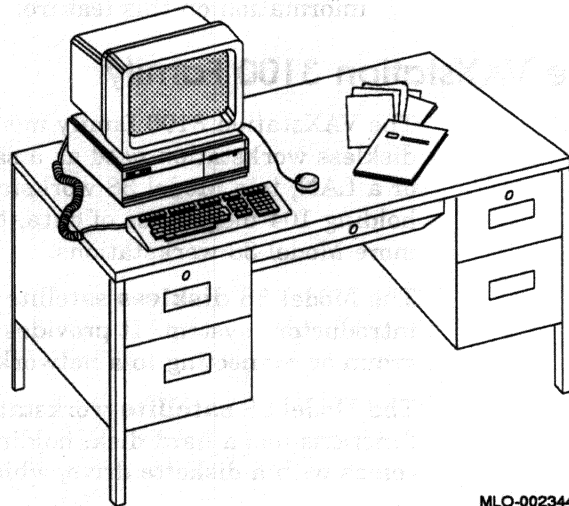
MLO-002344

## 1.1 System Highlights

- The VAXstation 3100 Model 38 provides you with an integrated computing environment that offers the best of **timesharing** and local or distributed **applications**.

- The compact, three-piece desktop package minimizes desktop **footprint**.

- Your system supports up to 32 **megabytes** of **memory**.

- You can choose either **VMS** or **ULTRIX** operating system software.

- Your VAXstation 3100 supports the VWS/UIS or the DECwindows **user interface**.

  The **DECwindows** interface is based on the **X Window System** industry standard. This means that all applications written for your VAXstation 3100 environment will give you a consistent style of interaction, thus reducing both learning time and errors.

- Your system is equipped with both standard and ThinWire Ethernet ports for connection to a DECnet **network** or Network File System (NFS) **cluster**.

- For customers requiring additional security in their VAX console, you can secure your system in the **console mode** using the password security feature. See Section 7.11 for more information on this feature.

## 1.2 The VAXstation 3100 Family

The VAXstation 3100 family members range from the Model 38 diskless workstation used as a satellite on a local area VAXcluster or a LAN, to a Model 38 workstation with three hard disks each holding 104 megabytes of data, to a Model 48 server for one or more Model 38 workstations.

The Model 38 **diskless** satellite workstation is the basic, introductory system. It provides the option of working in a small group or connecting to a network.

The Model 38 **satellite** workstation with **paging** and **swapping** functions has a hard disk, holding 52 megabytes of data. It also comes with a diskette drive, which uses 1.4 megabyte diskettes.

The VAXstation 3100 Model 48 gives you the option of working independently or connecting to a network. The VAXstation 3100 Model 48 workstation/server is described in the *VAXstation 3100 Model 48 Owner's Manual*.

# 2

# Installing System Hardware

After helping you check that you have all your equipment and the right location for your system, this chapter shows how to set up your system, including

- Connecting the keyboard (Section 2.3.2)
- Connecting the mouse (Section 2.3.3)
- Attaching Ethernet terminators to prepare either for networking or for diagnostic tests (Section 2.3.4)
- Connecting the monitor (Section 2.3.5)
- Connecting the power cords (Section 2.3.6)
- Inserting media (Section 2.4)
- Starting your system (Section 2.5 and Section 2.5.1)
- Installing your operating system (Section 2.9)
- Turning your system off (Section 2.10)

If you have ordered optional devices to install inside the system unit, it is important for you to set up your new system and become familiar with its operation before adding an internal device option. Chapter 8 describes available options and Chapter 9 tells how to add optional devices inside the system unit.

## 2.1 Choosing the Right Location

Use the following checklist to ensure that your VAXstation 3100 Model 38 operates at its best:

- Keep the temperature between 10°C and 40°C (50°F and 104°F) and the relative humidity between 10% and 90%.

- Keep the air well circulated to prevent excess heat and dust from accumulating.

- Keep your equipment away from heaters, photocopiers, direct sunlight, and abrasive particles.

- Select a surface that is large enough to hold a system unit with a monitor on top, a keyboard, and a mouse. Your desk or work table is a good choice. It is important that your system unit be positioned at least three feet away from other operating equipment. If you want to place your system unit on a shelf, order the long monitor cable (Section 8.14).

- Place the monitor so that the top line of the monitor display is at eye level.

- Choose a place where bright light will not reflect off the monitor, to eliminate screen glare.

- Keep the area clean. Do not place food or liquid on or near your equipment, and do not place your system unit directly on the floor. Dust and dirt damage system components.

- Keep air vents clear on each side of the system unit for proper ventilation.

- Do not place the system unit on its side. Blocking the air vents can cause the system unit to overheat.

- Connect your computer to an isolated grounded circuit.

- Let the equipment stabilize to room temperature before you turn it on.

- Finally, carefully read all installation instructions before you turn on the power.

## 2.2 Unpacking

Check to see whether your system unit box is labeled color or monochrome. Use the color or monochrome monitor cable that comes with your system unit to connect your monitor to the system unit. See Section 2.3.5.

Unpack your system unit box and monitor box. Figure 2–1 shows the basic components of your system. The contents of your shipment may differ from those shown in Figure 2–1, depending on what you order.

**Figure 2–1    Unpacking**



Monitor

System Unit

Manuals

Monitor Cable
(Color Shown)

Keyboard

Mouse

Power Cords

Ethernet
Loopback Connector

Screwdriver

Two Terminators and
One T-Connector
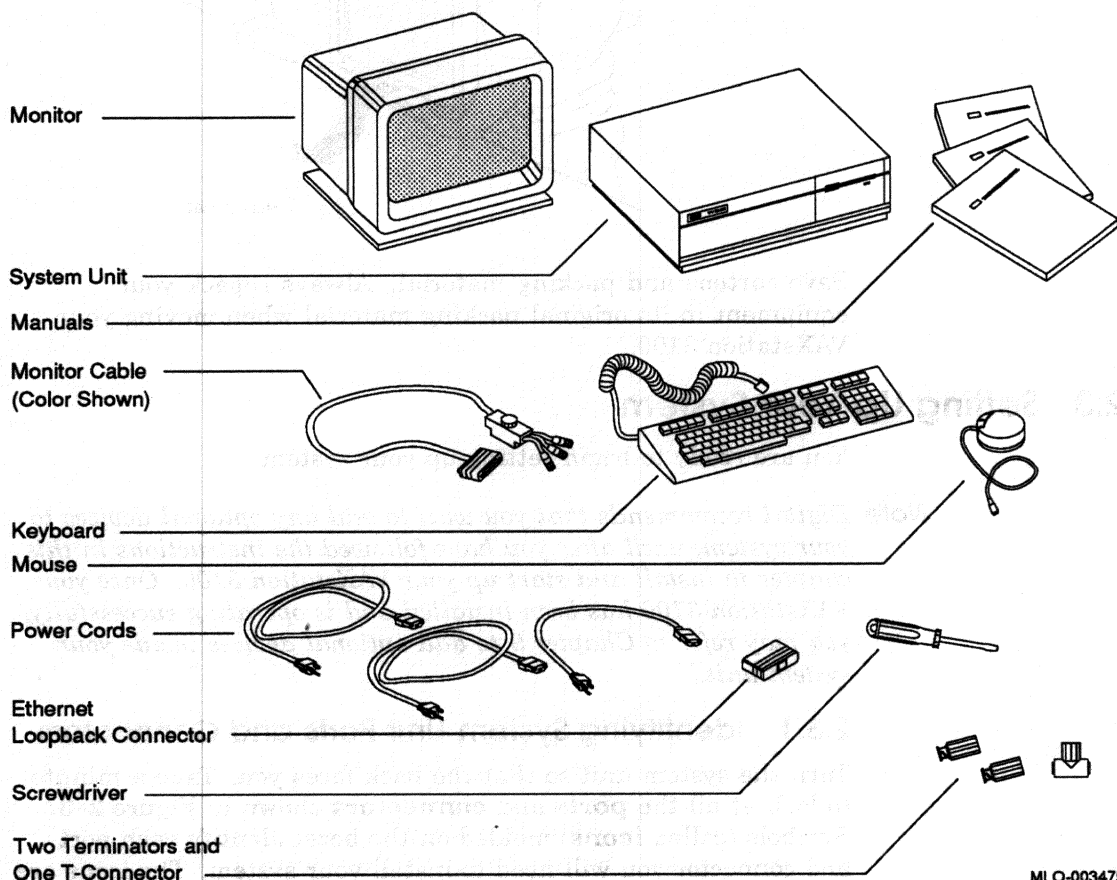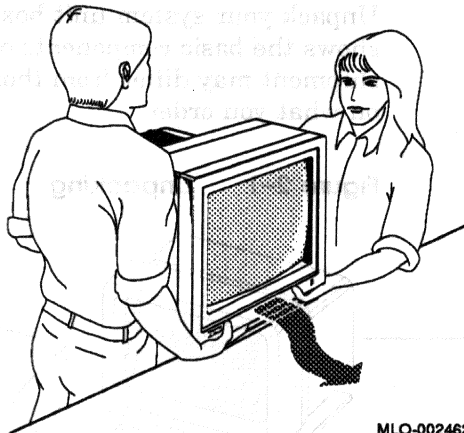
MLO-003475

**Warning** *Because of the weight of the system unit and the monitor, two people should lift the equipment out of the boxes and place it on a work surface (Figure 2–2).*

**Figure 2–2    Lifting Equipment**

MLO-002462

Save cartons and packing material. Always repack your equipment in its original packing material when moving your VAXstation 3100.

## 2.3  Setting Up Your System

You are ready to begin setting up your system.
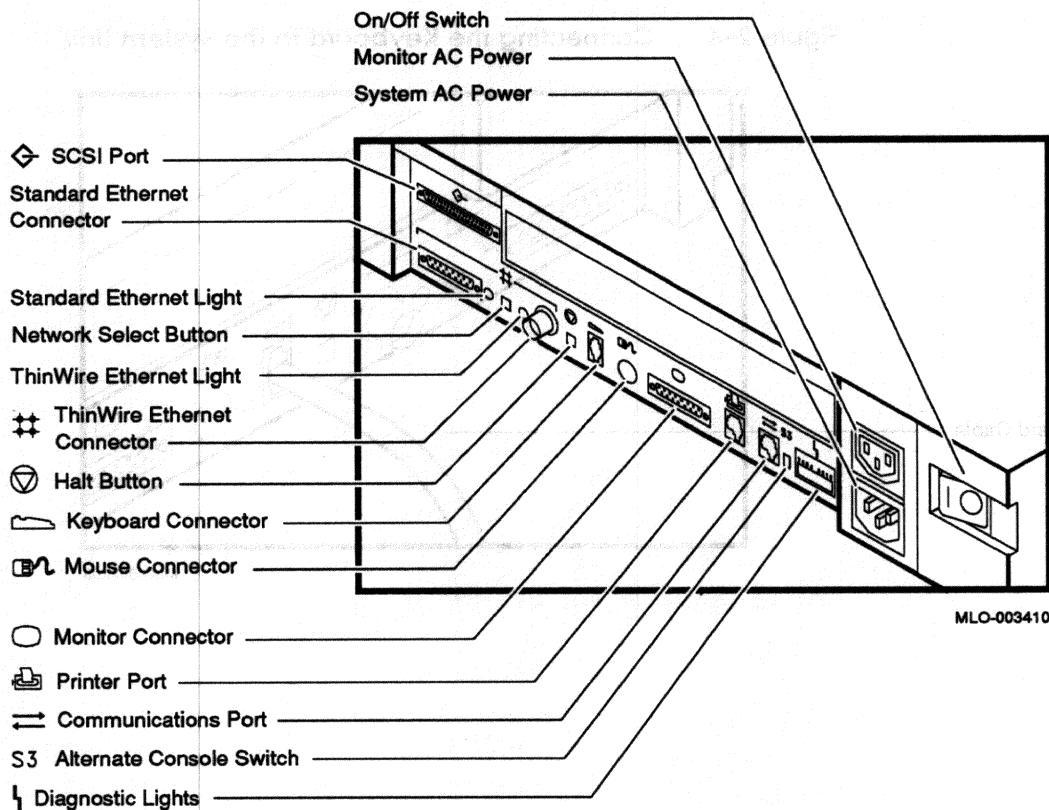
**Note** *Digital recommends that you wait to add any optional devices to your system, until after you have followed the instructions in this chapter to install and start up your VAXstation 3100. Once your VAXstation 3100 has been installed and is operating successfully, you may refer to Chapter 9 to add optional devices inside your system unit.*

### 2.3.1  Identifying System Unit Ports and Connectors

Turn the system unit so that the back faces you. Take a minute to look at all the **ports** and **connectors** shown in Figure 2–3. Symbols (called **icons**) molded on the bezel identify each port and connector you will need to install your system. The icons are defined in About This Guide. The appropriate icon appears in the margin of this manual whenever you need to connect or disconnect a cable from one of these ports, or when you need to operate a button.

If you have a hard disk in your system, there will be a SCSI connector on the back of your system unit with a cover. Chapter 4 gives you directions on how to remove this cover to connect an expansion box to your system.

**Figure 2–3    System Unit Ports, Connectors, and Icons**

On/Off Switch

Monitor AC Power

System AC Power

◇ SCSI Port

Standard Ethernet Connector

Standard Ethernet Light

Network Select Button

ThinWire Ethernet Light

⁑ ThinWire Ethernet Connector

▽ Halt Button

⊂⊐ Keyboard Connector

⊞ㄣ Mouse Connector

○ Monitor Connector

⊕ Printer Port

⇄ Communications Port

S3   Alternate Console Switch

ꟸ Diagnostic Lights

MLO-003410

### 2.3.2 Connecting the Keyboard

Connect the free end of the keyboard cable to the keyboard
connector on the back of the system unit, as shown in Figure 2–4.

**Caution** *Do not connect or disconnect the keyboard while the system is
turned on.*

**Figure 2–4    Connecting the Keyboard to the System Unit**

Keyboard Cable
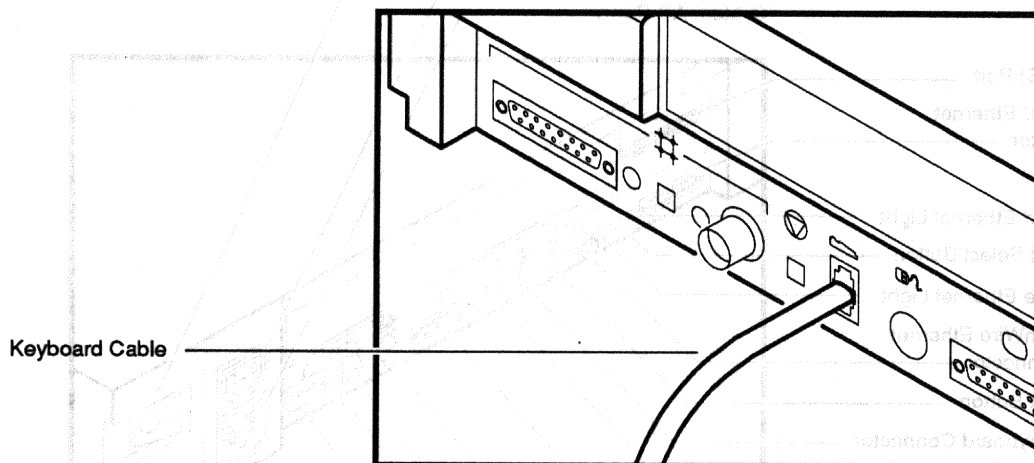
MLO-002203

### 2.3.3 Connecting the Mouse

Find the mouse cable with its pointing device icon, as shown in Figure 2–5.

Connect the free end of the mouse cable (pointing device icon on top) to the mouse connector on the back of the system unit, as shown in Figure 2–5. If you have ordered the optional tablet, connect the tablet to the system unit in the same manner described for connecting a mouse.

**Caution** *Do not connect or disconnect the mouse while the system is turned on.*

**Figure 2–5    Connecting the Mouse to the System Unit**



Pointing Device Icon

Mouse Cable
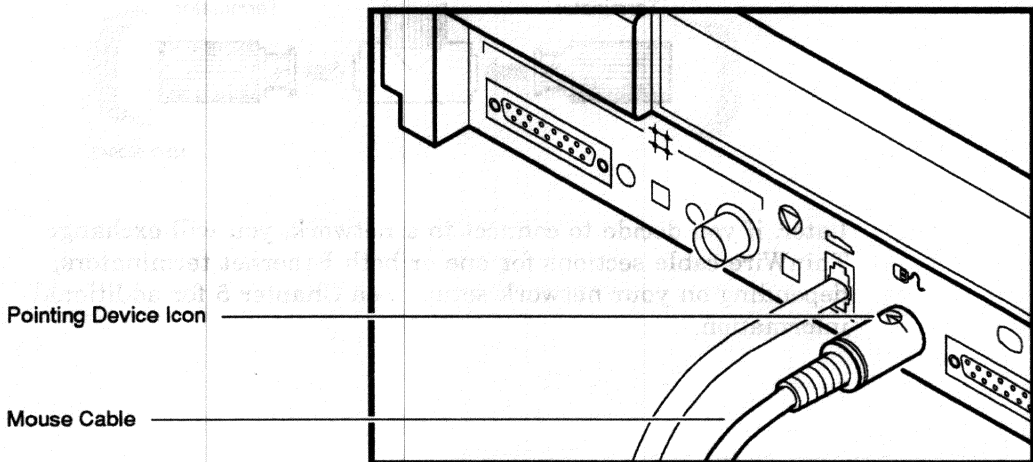
MLO-002205

### 2.3.4 Attaching Ethernet Terminators

You need to connect the **T-connector,** with two Ethernet
terminators, and the loopback connector to the system unit to
successfully complete the power-up test, discussed later in this
chapter.

1. Push an Ethernet **terminator** into each side of the T-
   connector and turn both to the right until they lock into place,
   as shown in Figure 2–6.

**Figure 2–6    Connecting Terminators to the T-Connector**



MLO-000947
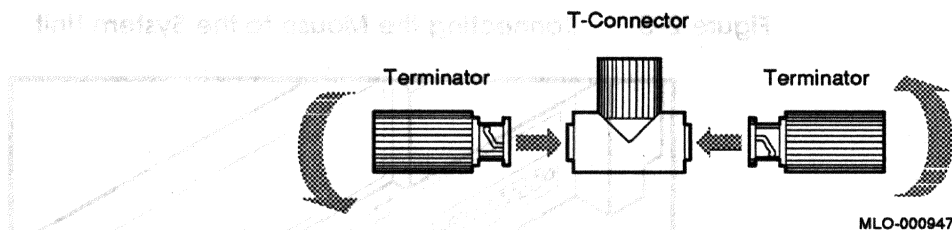
Later, if you decide to connect to a network, you will exchange
ThinWire cable sections for one or both Ethernet terminators,
depending on your network setup. See Chapter 5 for additional
information.

**2** Next, connect the T-connector to the ThinWire Ethernet connector on the back of the system unit. Turn the ribbed portion of the connector to the right until it locks into place, as shown in Figure 2–7.

**Figure 2–7    Connecting the T-Connector to the System Unit**
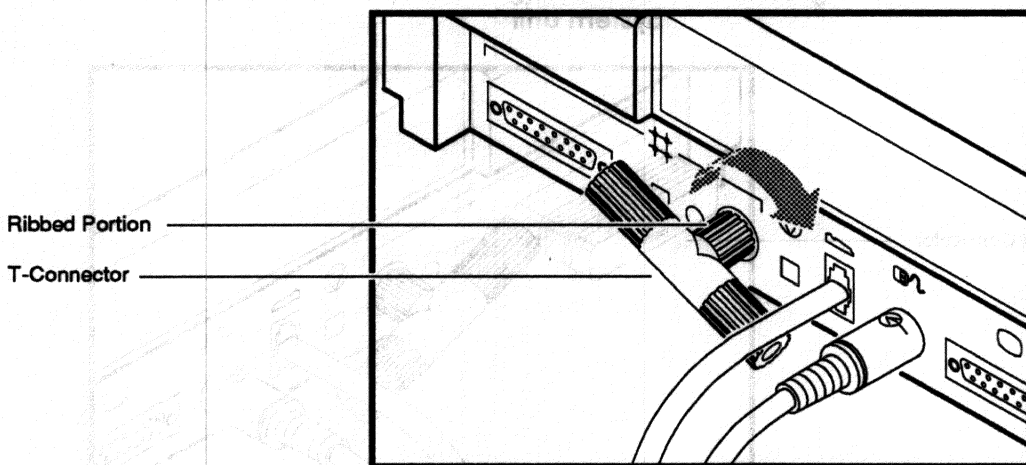


MLO-002209

Make sure the T-connector is set at an angle, as shown in Figure 2–7. This angle allows room for the loopback connector to be connected in the next step.

**3** Connect the loopback connector to the standard Ethernet connector on the back of the system unit, as shown in Figure 2–8. Later, when the system has been turned on, the green light on the connector will come on.

**Figure 2–8    Connecting the Loopback Connector to the System Unit**

Ethernet
Loopback Connector ————
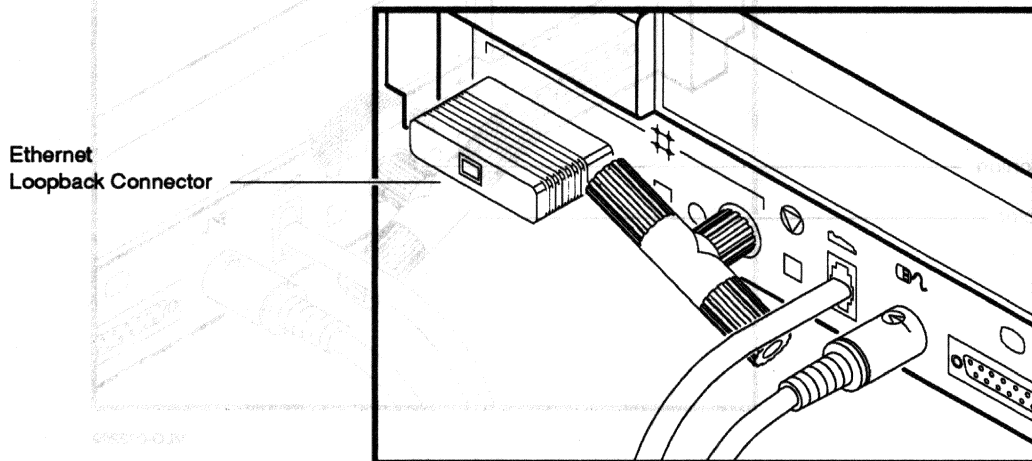
MLO-002211

### 2.3.5 Connecting the Monitor

You can put the monitor beside the system unit or on top of it. To place your monitor away from the system unit, you need to order an optional long monitor cable (Section 8.14).

Installation is basically the same for any of the monitors available for your system. With one exception (see step 7 below), install your monitor according to the instructions in your monitor guide. See your monitor guide for information on these procedures:

- Connecting the monitor cable

- Changing the voltage setting

- Replacing a fuse

- Adjusting brightness and contrast

To set up your monitor:

1   See your monitor guide for installation instructions. Note the one exception in step 7, below.

**Caution** *Never connect or disconnect the monitor cable to the system unit while the power is on.*

2   The color monitor cable will attach to the monitor using either a thumbscrew, or the universal strain relief strap (USRS). Check to see if there is an attachment point (screw hole) on the back of your monitor where a thumbscrew can be attached. If there is, proceed to step 3. If there is no attachment point, proceed to step 5 to attach the monitor cable to the monitor using the universal strain relief strap (Figure 2–9).

3   Select the appropriate thumbscrew for your monitor. The color monitor cable comes with two different thumbscrews to attach it to the monitor. Use the long screw for the large color monitor. Use the short screw for all other monitors.

4   Push the thumbscrew into the junction block of the monitor cable until it snaps in place. Then screw it into the attachment point in the back of the monitor, being careful not to overtighten.

**5** Attach the universal strain relief strap to the color monitor cable by following these steps:
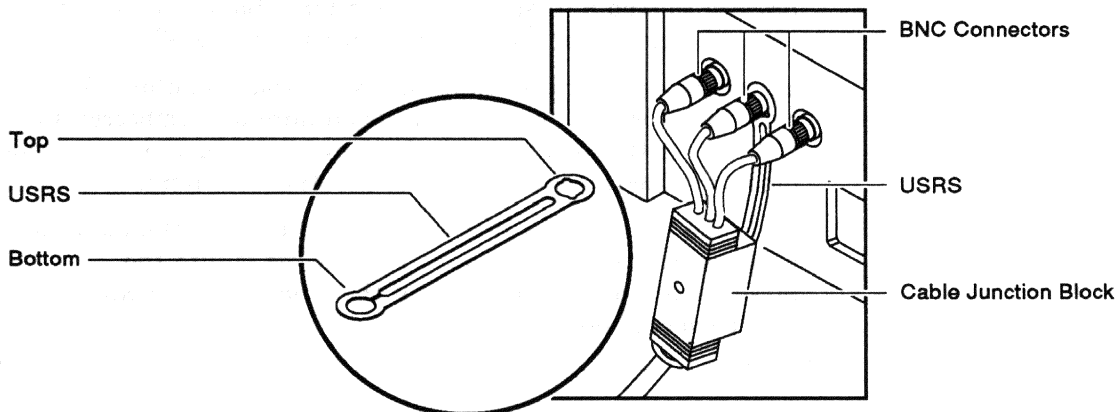
- Insert the three BNC connectors and cable junction block of the monitor cable through the center slot of the universal strain relief strap, making sure the strap is **under** the cable junction block.

**Note** *The bottom side of the cable junction block has the smaller of the two screw holes, and is dimpled. The universal strain relief strap should lie against this side of the cable junction block.*

- Pull the monitor cable into the slotted hole at the bottom end of the universal strain relief strap and bring the strap flush with the cable junction box.

- Align the center BNC connector (green) with the two key slots of the closed hole at the top end of the universal strain relief strap, and snap the BNC connector into the hole.

- Follow the instructions in your monitor guide to attach the BNC connectors to the back of the monitor.

  Figure 2–9 shows the monitor cable attached to the back of a monitor using the universal strain relief strap.

**Figure 2–9   Connecting the Monitor Cable to the Monitor Using the Universal Strain Relief Strap**



Top

USRS

Bottom

BNC Connectors

USRS

Cable Junction Block

MLO-004580

**6** Follow the directions in the monitor guide to connect the monitor cable to the monitor.

**7** Do not connect the keyboard and mouse to the monitor cable. (You have already connected them to the system unit.)

**8** Connect the free end of the monitor cable to the back of the system unit, as shown in Figure 2–10.

***Note*** *To position your monitor away from the system unit, order a 3-meter (10-foot) monitor cable. See Section 8.14.*

**Figure 2–10    Connecting the Monitor Cable to the System Unit**
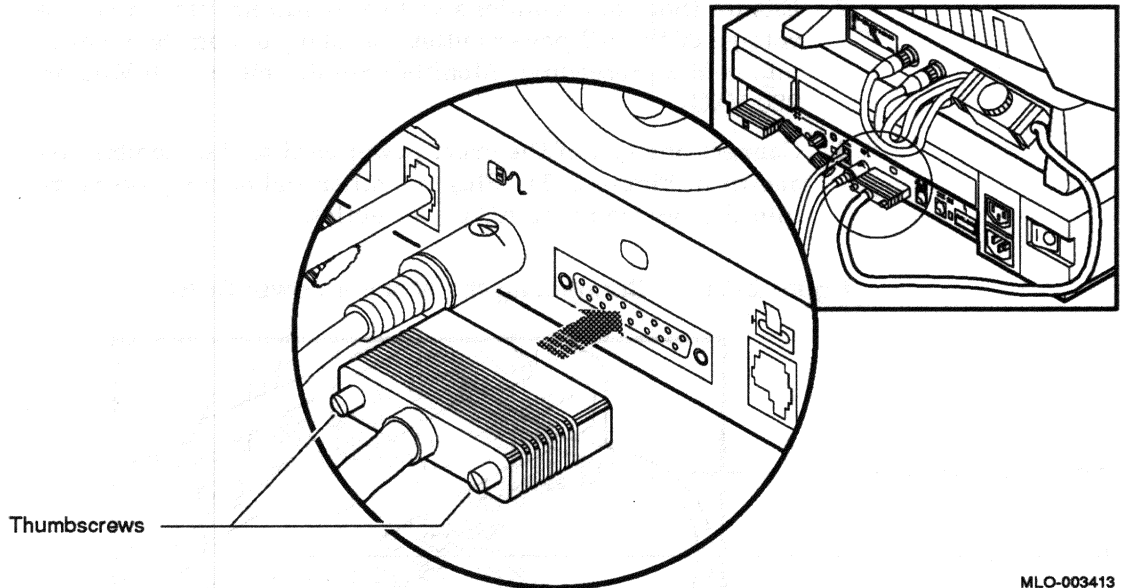


Thumbscrews

MLO-003413

**9** Tighten the thumbscrews on the monitor connector by turning them to the right.

## 2.3.6 Connecting the Power Cords

The power cord is an electrical ground for your system. To connect your system to a power source, perform the following steps:

1   Make sure that the monitor and the system unit power switches are off (0).

**Caution**   *While the system unit automatically adjusts itself to the correct voltage, your monitor may not. Refer to your monitor guide when checking the monitor voltage rating.*

2   Ensure that your monitor's voltage requirements match the voltage of the AC power outlet you plan to plug the monitor into before proceeding. Monitors require either 110 VAC or 220 VAC.

3   Connect one end of the short power cord to the monitor, as shown in Figure 2–11. Plug the other end of the power cord into the system unit's AC power outlet.

**Figure 2–11   Connecting the Monitor Power Cord**

Monitor Power Cord
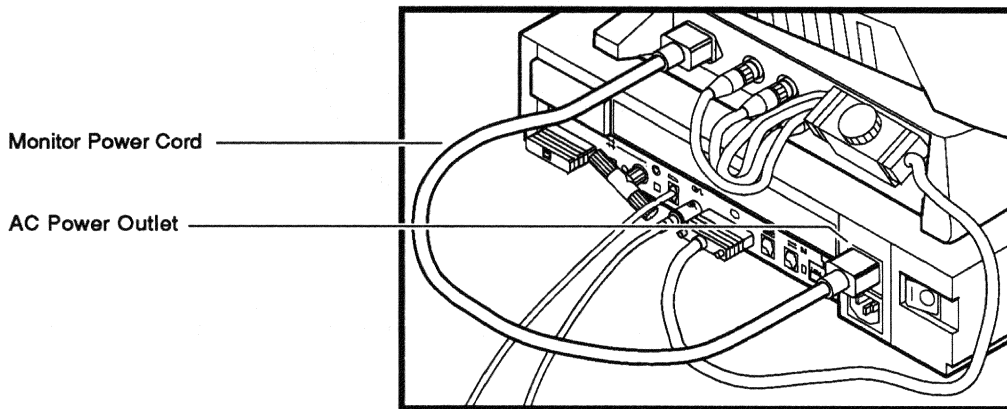
AC Power Outlet

MLO-005076

**4** Plug one end of the long power cord to the AC power connector on the back of the system unit, as shown in Figure 2–12. Plug the other end into a grounded electrical wall outlet.

**Figure 2–12   Connecting the System Power Cord**



AC Power Connector

System Power Cord
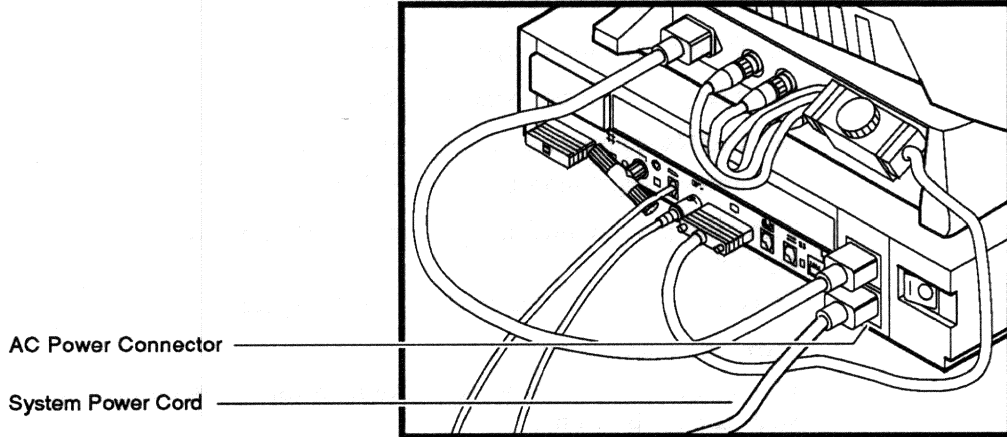
MLO-005077

## 2.4 Inserting Media

If you have an integral TZ30 tape drive (installed within the system box), you must power up the system before inserting tape cartridges into these drives. See Section 3.3.1 for instructions on inserting a tape cartridge into the TZ30 tape drive.

**Note** *Digital recommends that you wait to add any optional devices to your system until after you have followed the instructions in this chapter to install and start up your VAXstation 3100. Once your VAXstation 3100 has been installed and is operating successfully, refer to Chapter 9 to add optional devices inside your system unit.*

## 2.5 Starting Your System

To start your system, turn your system components on ( | ) in the order given here.

1   Turn expansion boxes on ( | ) in the following order:

   ■ RZ55 hard disk expansion box

   ■ Other hard disk expansion boxes

   ■ TK50Z–GA tape expansion box

   ■ RRD40 compact disc expansion box

   To connect expansion boxes, see Chapter 4.

2   Turn the printer and modem on ( | ), if you have this equipment.

   To connect a printer or modem, see Chapter 8.

3   Turn the monitor on ( | ).

   Leave the monitor on so that the monitor turns on and off with the system unit.

4   Turn the system unit on ( | ).

The green light on the front of the monitor and system unit should come on. It takes approximately 90 seconds for the first line of the power-up display to appear on the screen.

This is a good time to adjust the brightness and contrast of your monitor. Your screen looks blank if the brightness and contrast are turned down too low. Follow the directions in your monitor guide to set the brightness and contrast.

### 2.5.1   Checking the Power-Up Display

When you turn on the system unit, a power-up display appears on the monitor screen.

■ **Power-Up Display for Diskless System**

   If you have a diskless system, you will see a display similar to the following example. This display means that your system has passed all power-up tests:

```
KA42-B   V1.3

F...E...D...C..B...A...9...8...7_...6_...5...4...3_..2_..1..

VMS/VMB   ULTRIX   ADDR   DEVTYP   NUMBYTES   RM/FX   WP   DEVNAM
-------   ------   ----   ------   --------   -----   --   ------
ESA0      SE0      08-00-2B-07-E3-83

[ESA0:] ?>>>
```

■ **Power-Up Display for System with Hard Disk and Diskette Drive**

If you have a system with a hard disk and diskette drive, you see a display similar to the following example. This display means that your system has passed all power-up tests:

```
KA42-B   V1.3

F...E...D...C...B...A...9...8...7...6...5...4...3_..2_..1..

?   E   0040   0000.0005
?   D   0050   0000.0005
?   6   80A1   0000.4001
VMS/VMB   ULTRIX   ADDR    DEVTYP   NUMBYTES   RM/FX   WP   DEVNAM
-------   ------   ----    ------   --------   -----   --   ------
ESA0      SE0      08-00-2B-07-E3-83

DKA300    RZ3      A/3/0/00 DISK     52.4 MB    FX           RZ22
DKA500    RZ5      A/5/0/00          .......    RM           RX23
...HostID....      A/6     INITR

...HostID....      B/6     INITR

[ESA0] ?>>>
```

Press Ctrl/c to continue. That is, hold down the Ctrl key while you press the c key.

Remove all media from integral devices or expansion boxes after you have checked the power-up display. See Chapter 3 and Chapter 4 for instructions on how to remove the media.

## 2.5.2  If You Have Problems

If you do not see one of the power-up displays, turn off your system unit and review each installation step. Repeat the power-up procedure. If you still have problems, see Chapter 6 for information on power-up error messages.

## 2.6 If You Need to Set the Keyboard Language

If the following display appears on your monitor, you need to set your keyboard language. If this display does not appear, your keyboard language has been set.

```
0) Dansk                          8) Français (Suisse Romande)
1) Deutsch                        9) Italiano
2) Deutsch (Schweiz)              10) Nederlands
3) English                        11) Norsk
4) English (British/Irish)        12) Português
5) Español                        13) Suomi
6) Français                       14) Svenska
7) Français (Canadien)            15) Vlaams

3? >>>
```

Use the following guidelines to select a language from the keyboard language menu that matches the type of keyboard you have.

1   If you want to select the default language (Option 3: English), press the Return key.

2   If you want to select another language, enter the number of the language that matches the language of your keyboard, and press the Return key.

A different keyboard is available for each language. If you do not know the language variation of the keyboard you received, check the packing list.

The language you chose or that has already been set for you is saved in memory. If you need to change the keyboard language later, refer to Section 7.9.

## 2.7 Installing Optional Equipment

If you have ordered optional equipment, turn to the following chapters for instructions on connecting the equipment to your system:

- To connect expansion boxes, see Chapter 4.

- To connect a printer, see Chapter 8.

- To connect a modem, see Chapter 8.

- To connect a tablet, see Section 2.3.3

## 2.8 What to Do Next

If you plan to connect your workstation to a network or to add an additional expansion box to your system, you need to do so before installing your operating system software. The following table shows you where to find instructions for completing these tasks.

| Task | Location |
|------|----------|
| Adding expansion boxes | Chapter 4 |
| Installing network hardware | Chapter 5 |
| Connecting a printer | Chapter 8 |
| Connecting a modem | Chapter 8 |
| Connecting a tablet | Chapter 2 |
| Adding optional devices inside the system unit | Chapter 9 |

After installing your network and optional hardware, you are ready to install your operating system software.

## 2.9 Installing Your Operating System

To install your VMS or ULTRIX operating system software, you need one of the following:

- TZ30 tape drive

- Connection to a network to load the software from another system

- RRD40 compact disc expansion box

- TK50Z–GA tape drive expansion box

Before you install your operating system software, set the system start-up choices to start the operating system from the disk drive on which you plan to install your software. See Appendix A.

To install VMS or ULTRIX software on the VAXstation 3100, follow the operating system installation instructions that came with the software. During software installation, you transfer operating system software from the installation media to a hard disk in your VAXstation 3100 or in an expansion box.

If you are connecting a printer to your VAXstation 3100, refer to Section 8.8 for device-specific information needed to complete installation of your operating system.

If you are connecting a modem to your VAXstation 3100, refer to Section 8.9 for device-specific information needed to complete installation of your operating system.

If you are a member of a local area VAXcluster configuration, you access operating system software from your server.

If you are part of an Ethernet local area network, you can use the **Remote System Manager (RSM)** on the server to install your operating system as well as application software.

For information about using RSM or accessing the VMS or ULTRIX operating system software on your server, refer to your operating system documentation.
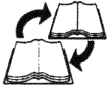
## 2.10 Turning Your System Off

If you need to turn your system off (0), follow the shutdown instructions in your operating system software documentation.

**Note** *See operating system documentation for shutdown procedures before turning your system off. Also, you should not turn off, halt, or restart the system without notifying work group members.*

After shutting down the operating system, turn your system components off in the following order:

1    Expansion boxes

2    Printer, modem, or other equipment

3    System unit and monitor

# 3

# Learning About Your System

Your VAXstation 3100 can use disk drives, diskettes, or tape cartridges to store and retrieve information and compact discs to retrieve information. You may have a diskless system, or you may have one or more built-in storage devices. Others can be added, either inside the system unit, as explained in Chapter 9, or as expansion boxes, as explained in Chapter 4.

This chapter shows how to use

- RZ22, RZ23, and RZ24 hard disk drives (Section 3.1)
- Tape cartridges (Section 3.2)
- TZ30 tape drive (Section 3.2.1)
- RX23 diskette drive (Section 3.2.2)
- Mouse (Section 3.5)

## 3.1 Hard Disk Drives

A **hard disk drive** stores information on a nonremovable **disk**. Disks come in different sizes. You can have one, two, or three 3.5-inch RZ22, RZ23, or RZ24 hard disk drives in your system unit.

- The RZ22 hard disk drive stores 52.4 megabytes of information.
- The RZ23 hard disk drive stores 104 megabytes of information.
- The RZ24 hard disk drive stores 209 megabytes of information.

See Chapter 9 for information about adding hard disk drives inside your system unit. For information about adding external hard disk expansion boxes, see Chapter 4.

## 3.2 Using Tape Cartridges

This section shows you how to label a tape cartridge, write to and protect tape cartridges, and handle and store tape cartridges.

### 3.2.1 Labeling a Tape Cartridge

Always label tape cartridges. A slot for the label is provided on the front of the cartridge, as shown in Figure 3–1. This label is visible when the cartridge is in the drive. Do not write directly on the cartridge with pen, pencil, or other marking medium. Labels or markings on any other part of the cartridge can interfere with proper operation of the drive.

**Figure 3–1     Labeling a Tape Cartridge**



Label Slot
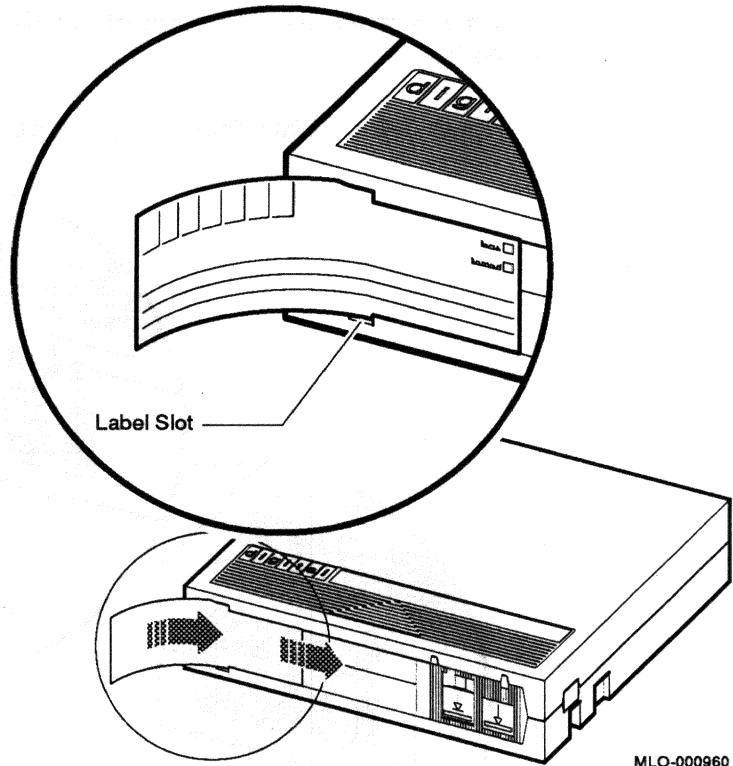
MLO-000960

## 3.2.2   Writing to and Protecting Tape Cartridges

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

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

To write protect a tape, slide the write-protect switch left toward
the label until it locks in place (Figure 3–2). An orange rectangle
appears when the write-protect switch locks in the write-protect
position.

**Figure 3–2    Write-Protecting a Tape**



Write-
Protected

Not Write-
Protected

MLO-000961
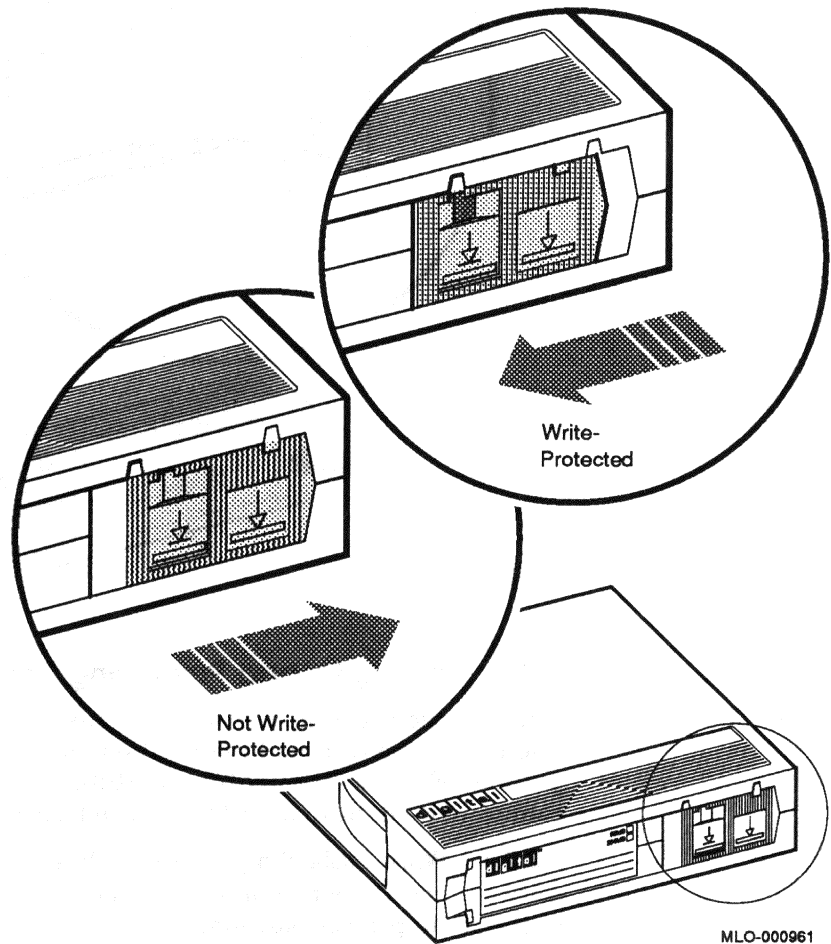
If you move the write-protect switch to the right during operation,
the software does not recognize that the tape is no longer
write-protected. To write-enable the tape, unload the tape (see
Section 3.3.2), slide the write-protect switch to the right, and
begin tape loading procedures again. The software will now
recognize the cartridge as write enabled.

Similarly, if you move the write-protect switch to the left during operation, the tape is not write-protected until the current command completes.

**3.2.2.2 Writing to a Tape** When you use a tape to make a backup copy or to write out data, set the write-protect switch to enable writing to the tape.

To enable writing, slide the switch to the right, away from the label, until the switch locks in place.

## 3.2.3 Handling and Storing Tape Cartridges

Take the following precautions when handling and storing tapes:

- Never touch the exposed surface of the tape.

- Avoid dropping the tape cartridge. The impact can damage the cartridge.

- Allow new tape cartridges to stabilize to room temperature before using them.

- Write on the identification label before sliding it into the slot on the tape cartridge. Do not put the label anywhere else on the cartridge.

- Store tape cartridges away from dust in their plastic covers.

- Keep tape cartridges out of direct sunlight, and away from heaters and other heat sources. Store tape cartridges at an even temperature between 10°C and 40°C (50°F and 104°F). Store cartridges where the relative humidity is between 40% and 80%.

- Keep tape cartridges away from magnets and equipment that generate magnetic fields, such as motors, transformers, and video monitors and terminals.

- Keep cartridges away from X-ray equipment.

## 3.3 Using the TZ30 Tape Drive

The TZ30 tape drive holds one removable magnetic tape cartridge.
The tape cartridge stores up to 95 megabytes of data. Use the
tape cartridge to load software or data or to make copies (or
backups) of software or data. Figure 3–3 shows the TZ30 indicator
lights and the unload button.

The TZ30 tape drive can read data from and write data to a tape
that was written by a TK50Z–GA tape drive. The TZ30, however,
cannot read from or write data to a tape that has been written by
a TK70 tape drive.

**Figure 3–3    TZ30 Lights and Controls**



Lever

Write-Protect Light

Tape-in-Use Light

Operate-Lever Light

Unload Button
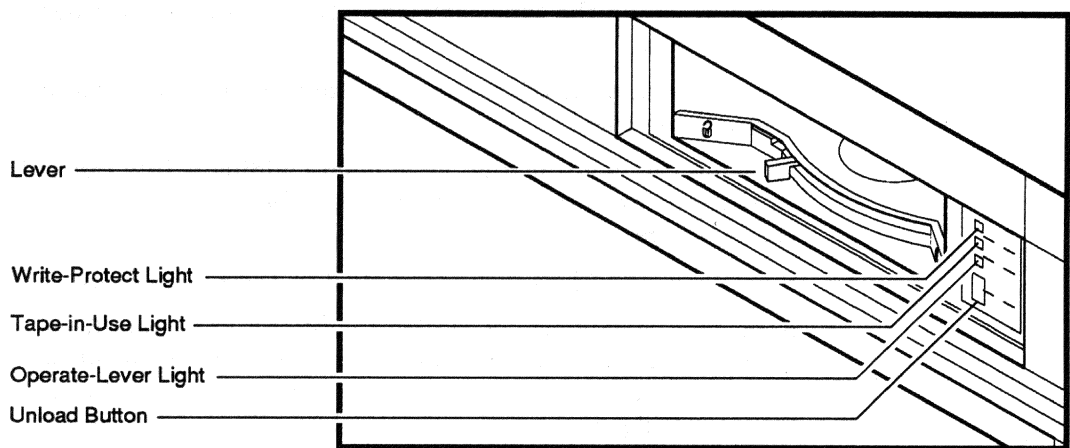
MLO-005078

### 3.3.1 Inserting a Tape Cartridge

The TZ30 tape drive uses TK50K or TK52K (CompacTape) tape cartridges. To learn about tape cartridges, see Section 3.2.

To use the tape drive:

1  Make sure the tape drive and the system unit are on ( I ).

2  Make sure the tape drive lever is to the left in the unlock position (see Figure 3–4).

3  Insert the tape cartridge, as shown in Figure 3–4.

   The operate-lever light (green) comes on.

**Figure 3–4    Inserting a Tape Cartridge into the TZ30**
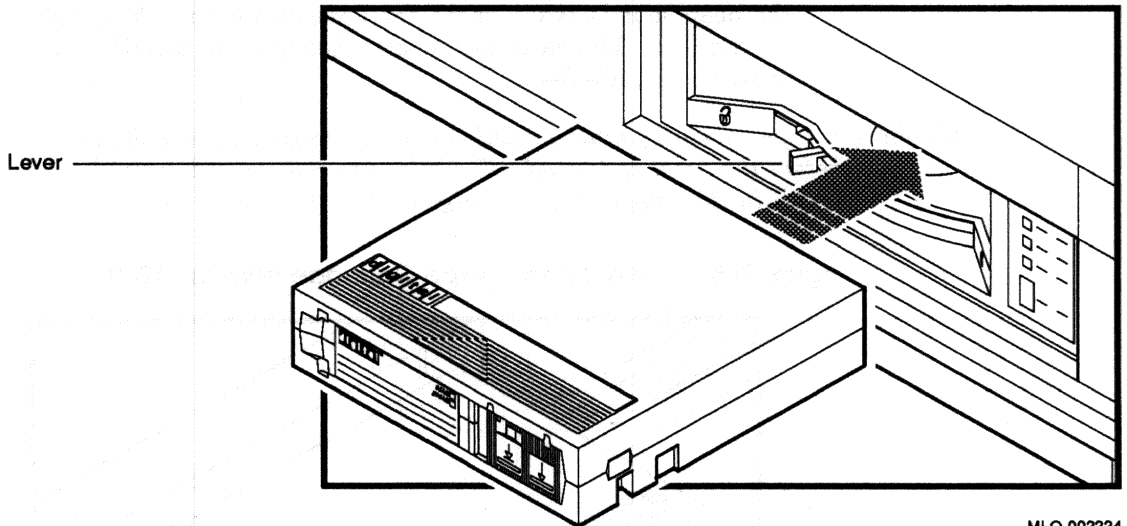


Lever

MLO-002224

4  With the cartridge all the way in, move the lever to the lock position, all the way to the right. The green light goes off and the yellow (tape-in-use) light blinks, indicating that the tape is loading.

   When the tape is loaded and ready for use, the yellow light stays on continuously. Whenever the yellow light is on continuously and it is the only light on, the tape is ready to use.

When the tape is being read, written to, or rewound, the yellow light blinks.

**Note** *If the write-protect switch on the cartridge is in the protected position, the orange write-protect light on the front of the tape drive comes on and you will not be able to write data to the tape.*

### 3.3.2 Removing a Tape Cartridge

To remove a tape cartridge,

1   Press the unload button.

2   Wait approximately two minutes for the tape to rewind. As the tape rewinds, the yellow light flashes.

3   When the green light comes on, the yellow light goes off and the beep sounds twice, move the lever to the unlock position (to the left). The cartridge ejects. Remove the cartridge, as shown in Figure 3–5.

**Caution** *A tape cartridge must be unloaded and removed from the drive before the drive is turned off. Failure to remove the cartridge can result in damage to the cartridge and to the drive.*

**Figure 3–5    Removing a Tape Cartridge from the TZ30**
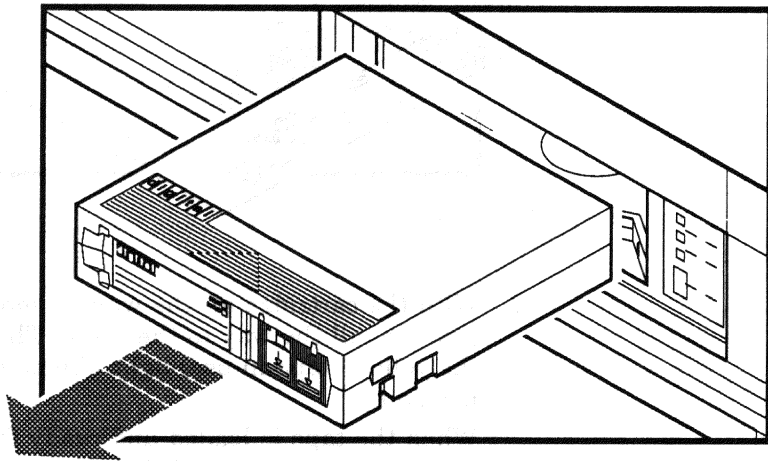


MLO-002225

### 3.3.3 Understanding TZ30 Indicator Lights

Table 3–1 is a summary of the possible indicator light combinations on the TZ30 tape drive.

**Table 3–1    TZ30 Indicator Lights**

| Light | State | Meaning |
|---|---|---|
| Green (operate-lever) | On | OK to operate the cartridge lever. |
| | Off | Do not operate cartridge lever. |
| | Blinking | Cartridge or calibration error detected |
| Yellow (tape-in-use) | Blinking | Tape is in use.[1] |
| | On | Tape loaded and ready for use |
| Orange (write-protect) | On | Tape write-protected |
| | Off | Tape write-enabled |
| All three lights | On[2] | Power-up diagnostic test running |
| | Blinking | Drive fault |

[1]Intermittent fast yellow blinking indicates that a write is in progress. Continuous fast blinking indicates that a read is in progress. Medium blinking indicates calibration. Slow blinking indicates that the tape is initializing, loading, unloading, or rewinding. Light blinks slowly for 10 seconds indicating drive initialization. This occurs only on power-up after the power-up diagnostic test has run.

[2]All three lights stay on for a few seconds while the power-up diagnostic test is running. If all three lights stay on for longer than a few seconds, the power-up diagnostic test has failed or an error has occurred during an operation. For troubleshooting instructions, see Section 6.1.

### 3.3.4 If You Have Problems

If an error occurs when you are reading or writing to a tape, all three lights blink. If an error occurs when you are inserting the tape cartridge, the green light blinks and the tape does not move. If either of these events occurs, or if you cannot insert a tape cartridge into the drive, see Table 6–1 for troubleshooting instructions.

## 3.4 Using the RX23 Diskette Drive

The RX23 diskette drive provides 1.4 megabytes of storage space on RX23K diskettes.

### 3.4.1 Using Diskettes

Diskettes are magnetic disks that store information the same way a hard disk does, though their storage capacity is considerably less. Digital requires that you use high-density (HD) diskettes.

Keep your diskettes dry, out of extreme temperatures and direct sunlight, and away from any equipment that contains a magnet, such as a telephone.

**Caution** *Do not place diskettes or magnetic media on or near your monitor. The heat and electromagnetism from your monitor may damage diskettes by distorting or erasing the magnetic data.*

### 3.4.2 Formatting a Diskette

If you have installed your operating system software, you can format a diskette through a software command (see your software documentation). If you have not installed your software, you can format a diskette by entering TEST 76 at the console prompt as shown here:

```
>>>   TEST 76  Return
        ScsFlpFmtter
PV_SCS_FMT_CHN   (0=SCSIA, 1=SCSIB)?   0  Return      ❶
PV_SCS_FMT_ID   (0,1,2,3,4,5,6,7)?    5  Return       ❷
PV_SCS_FMT_RUSURE (1/0)?     1  Return                ❸

PV_SCS_FMTING...
PV_SCS_CHKpass..........

PV_SCS_FMT_SUCC                                       ❹

>>>
```

❶ Select SCSI-A bus or SCSI-B bus. In this example, the SCSI-A bus is selected.

❷ Specify SCSI ID 5, as shown in the example.

❸ Enter 1 to conclude formatting, or 0 to discontinue formatting.

❹ Your diskette has been formatted successfully.

The following example of the diskette formatting procedure shows an error message number at the end of the display.

```
>>> TEST 76 Return
      ScsFlpFmtter
PV_SCS_FMT_CHN  (0=SCSIA, 1=SCSIB)?  0 Return
PV_SCS_FMT_ID   (0,1,2,3,4,5,6,7)?   5 Return
PV_SCS_FMT_RUSURE (1/0)?    1 Return

PV_SCS_FMTING...
PV_SCS_CHKpass...........

PV_SCS_FMT_ERR#3

>>>
```

Table 3–2 describes the error codes for the diskette formatting utility.

**Table 3–2     Error Messages for Diskette Formatting Utility**

| Error Code | Meaning |
| --- | --- |
| 1 | Illegal unit number entered. |
| 2 | Error occurred during a SCSI bus command. |
| 3 | Reassign blocks failed. |
| 4 | Unit not ready. |
| 5 | Illegal device type for operation. |
| 6 | SCSI bus hung after reset attempt. |
| 7 | Data compare error. |

If an error message appears, refer to Section 7.1.1.

### 3.4.3 Writing to and Protecting Diskettes

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

**3.4.3.1 Write-Protecting a Diskette**  If you use a diskette to install software applications on your system, or to protect information on the diskette, move the write-protect switch on the back of the diskette toward the protect label until it locks in place, as shown in Figure 3–6.

**Figure 3–6    Write-Protecting a Diskette**

Write-Protect Switch ─────────────────────────────────────                                    MLO-002056
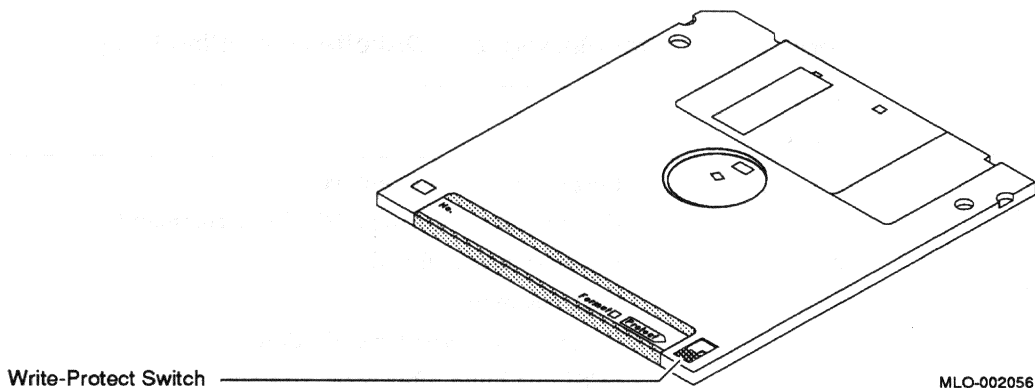
**3.4.3.2 Writing to a Diskette**  When you use a diskette to make a backup copy of a file or to write out data, set the write-protect switch to enable writing to the tape.

To enable writing, slide the switch away from the protect label until the switch locks in place.

### 3.4.4 Inserting a Diskette
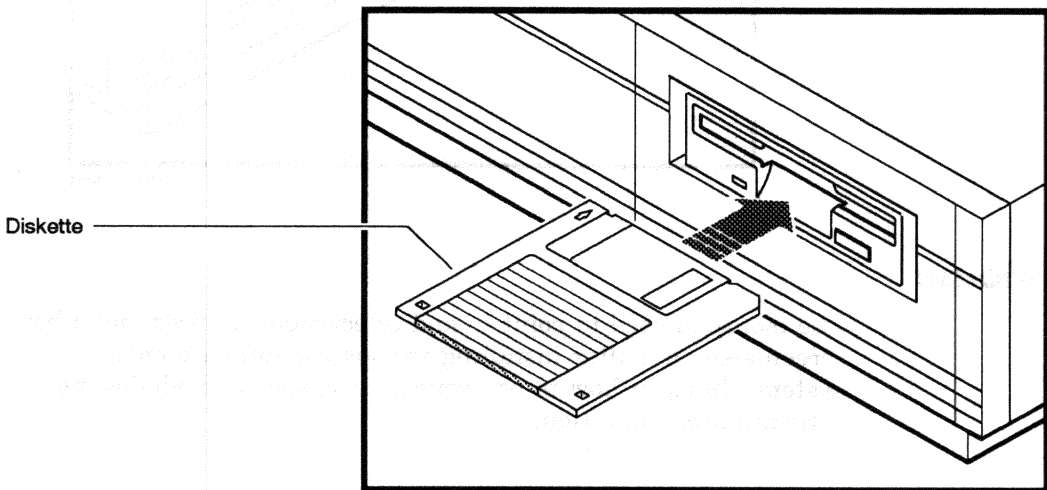
The diskette drive, if installed in the system, is located at the front of your system unit. The drive can hold one diskette.

**Caution** *Never remove or insert a diskette while the diskette drive is performing a function. When the diskette drive is in use, the green light on the front of the diskette drive is on. Inserting or removing a diskette while your system is using the diskette can cause incorrect data to be written to the diskette, and can damage the diskette itself.*

To insert a diskette into the diskette drive slot, slide the diskette into the drive, with the front of the disk up (Digital logo showing). See Figure 3–7.

The diskette slides straight in and drops down to its load position.

**Figure 3–7    Inserting a Diskette**



Diskette

MLO-003405

### 3.4.5 Removing a Diskette

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

To remove a diskette from the diskette slot, push the eject button, as shown in Figure 3–8. Then remove the diskette.

**Figure 3–8    Removing a Diskette**



Diskette

Drive Select Light

Ejection Button
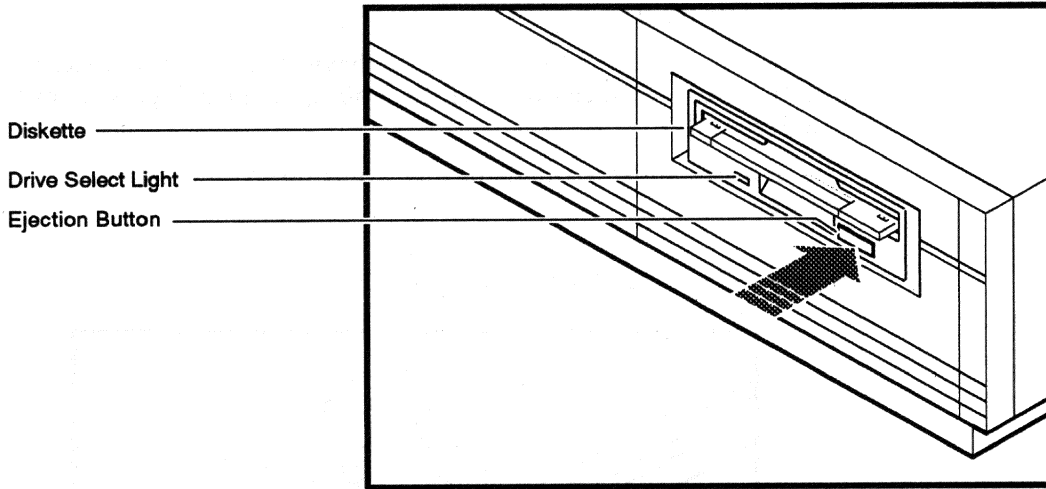
MLO-003409

## 3.5 Mouse

The mouse is used to point to and select menu choices and other screen elements after installing windowing software on your system. To learn how to use your mouse, see your windowing software documentation.

# 4

# Adding and Using Expansion Boxes

This chapter provides information about installing and using compact disc, hard disk, and tape drive expansion boxes. An expansion box is an external box that connects to your system unit to provide additional compact disc, hard disk, or tape storage.

Each expansion box is shipped with the appropriate cables and connectors for connecting more than one box. Cable connections and installation instructions are similar for all three types of expansion boxes. The following expansion boxes can be used with a VAXstation 3100 Model 38 system:

- 332-megabyte RZ55 hard disk expansion box

- 95-megabyte TK50Z–GA tape drive expansion box

- 600-megabyte RRD40 compact disc

- Various hard disk expansion box storage options in the RZ5x-xx series.

The RZ55 and the TK50Z–GA expansion boxes provide disk and tape storage for your system. Optionally, the TK50Z–GA can be used to load additional software.

The RRD40 is a read-only storage device that reads data from removable compact discs.

The RRD40 can be used for many purposes. For example, it can be used for software installation, database storage, and online documentation.

Instructions for the following tasks are included in this chapter:

- Connecting one or more expansion boxes to your system unit

- Verifying the SCSI ID default (factory) switch setting on the first expansion box

- Resetting the SCSI switches on a second expansion box

- Adding and using the RRD40 compact disc expansion box

- Adding and using the TK50Z–GA tape drive expansion box

- Testing your expansion boxes

## 4.1 Guidelines for Connecting Expansion Boxes

**Note** *See operating system documentation for shutdown procedures before turning your system off. Also, you should not turn off, halt, or restart the system without notifying work group members.*

Use the following guidelines when connecting expansion boxes.

- Connect no more than three expansion boxes to the VAXstation 3100 SCSI port. Remember the following SCSI rules:

  - Seven SCSI IDs are available for customer configuration.

  - Multiple SCSI devices may be housed in one expansion box, but the number of SCSI devices cannot exceed seven. For more information on SCSI, please refer to the following documentation kit, *Small Computer System Interface: An Overview and a Developer's Guide*.

  - Each device must have its own unique SCSI ID.

- Some SCSI devices may not be housed in an expansion box. Always limit the number of SCSI devices to seven when you configure your VAXstation 3100 system.

- Use only the expansion boxes purchased for the VAXstation 3100 system. Expansion boxes purchased for use with other Digital equipment must be upgraded by a Digital customer service representative.

- A system must have a SCSI mass storage controller module in order to support an expansion box. You need this internal device if you have a diskless system (a system which has no drive plate with an attached SCSI mass storage controller module). Contact your Digital sales representative for information on ordering a SCSI/SCSI Disk Drive Plate Controller Kit (VS42D–Jh). See Chapter 9 for information on how to add this internal device before adding an expansion box.

- You must attach the 50-pin terminator that comes with your expansion box to the unused SCSI port on the back of the last expansion box.

- All expansion boxes should be plugged into the same grounded power strip or electrical source.

- To reduce potential problems with signal integrity that may occur when transmission lines are poorly matched, Digital recommends that:

  Cables be no more than 4 meters long.
  Cables and terminators be supplied by Digital.

- After installation but before you turn on the Model 38 system unit, turn on all expansion boxes in the following order:

  1   RZ55 hard disk expansion box or boxes

  2   Other hard disk expansion boxes

  3   TK50Z–GA tape drive expansion box

  4   RRD40 compact disc expansion box or boxes

  This procedure ensures that the device in each expansion box is ready to be used and that the system **firmware** includes each device in its configuration.

- To test your system after installation, see Section 7.3 for instructions on how to display your new system configuration with TEST 50. See Section 7.7 for instructions on how to run the system exerciser with TEST 0.

## 4.2 Unpacking an Expansion Box

**Note** *This section describes the TK50Z–GA expansion box, the RZ55 expansion box and the RRD40 compact disc drive. The newer RZ5x–xx expansion box options have their own user documentation. Please refer to individual RX5x–xx documentation for specific installation instructions.*

Each expansion box is shipped from the factory with the following accessories, as shown in Figure 4–1.

- Either a cable with a 68-pin connector at one end and a 50-pin connector at the other end, or a cable with a 50-pin connector on each end and a 68-pin to 50-pin adapter, which you will plug into one end of your 50-pin cable. Use this cable to connect the expansion box to the system unit.

**Note** *The 68-pin connector is smaller than the 50-pin connector. See Figure 4–1.*
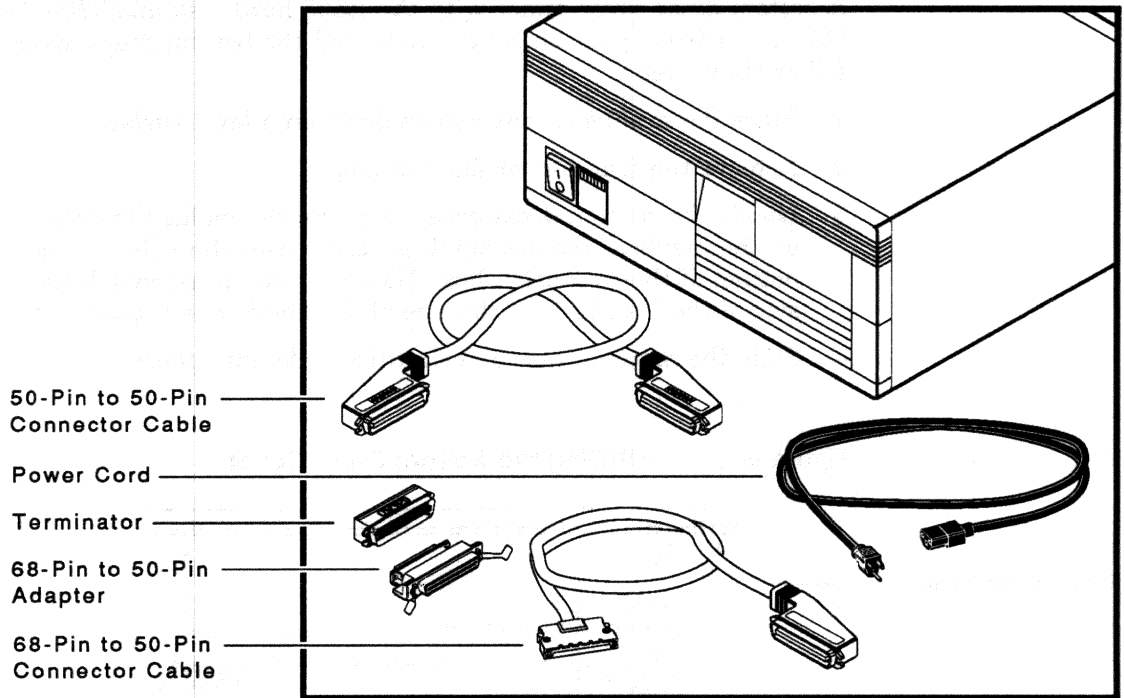
- One 50-pin to 50-pin cable for connecting two expansion boxes in a chain.

- One power cord.

- One 50-pin terminator, as shown in Figure 4–5. Use this to terminate the last expansion box.

Note that the RRD40 compact disc expansion box differs somewhat from the RZ55 or TK50Z–GA shown in the figure, but the cables and terminator are identical.

The TK50Z–GA and the RZ55 also include a bottom dress cover (see Section 4.2.1).

The TK50Z–GA expansion box comes with a blank tape cartridge. The RRD40 compact disc drive comes with an empty compact disc caddy and test disc.

**Figure 4-1    Unpacking an RZ55 or TK50Z-GA Expansion Box**



50-Pin to 50-Pin
Connector Cable

Power Cord

Terminator

68-Pin to 50-Pin
Adapter

68-Pin to 50-Pin
Connector Cable

MLO-004582

## 4.2.1 Installing the Bottom Dress Cover

A bottom dress cover comes with the RZ55 hard disk and TK50Z–GA tape drive expansion boxes. To install the bottom dress cover, follow these steps:

1 Place the expansion box upside down on a level surface.

2 Remove the four rubber feet (optional).

3 Locate the bottom dress cover. Line up the molded inserts on the inside of the bottom dress cover over the holes on the bottom of the expansion box. Note that you must match the size of the inserts with the size of the holes. See Figure 4–2.

4 Slide the bottom dress cover until it locks into place.

**Figure 4–2    Installing the Bottom Dress Cover**
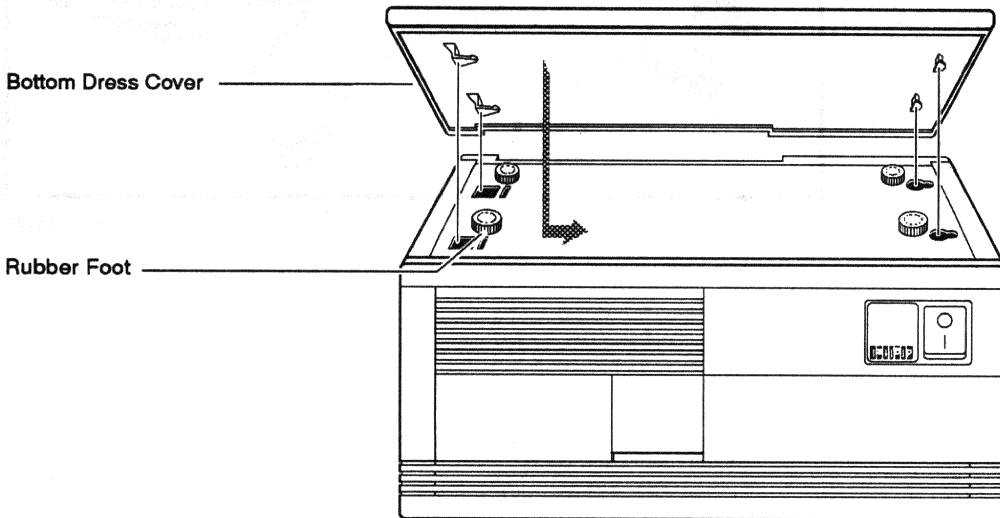


MLO-005080

## 4.3  Preparing Your System for an Expansion Box

**Note** *See operating system documentation for shutdown procedures before turning your system off. Also, you should not turn off, halt, or restart the system without notifying work group members.*

To add an expansion box to your system, you must first remove the SCSI cover and the terminator from the SCSI port.

1   Turn your system off (0).

2   To remove the SCSI cover, place your fingers under the locking tab and lift the cover to release it, as shown in Figure 4–3.
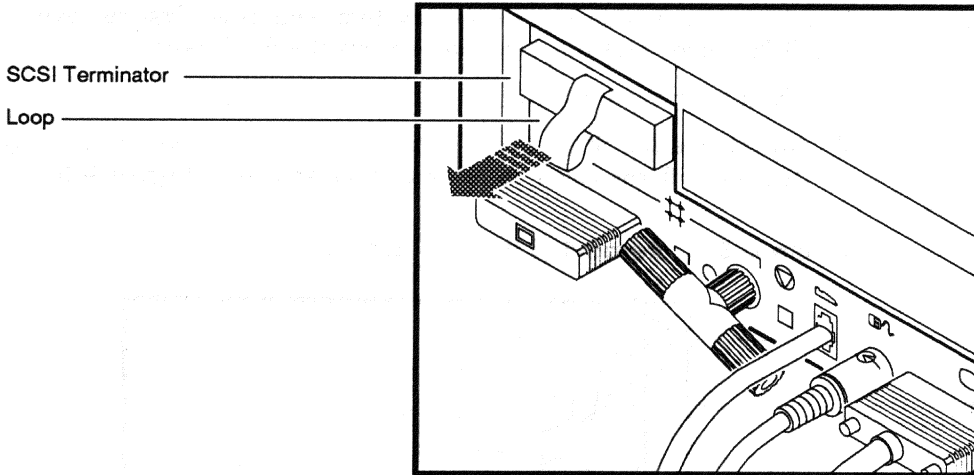
**Figure 4–3    Removing the SCSI Cover**

SCSI Cover

Lift Locking Tab
to Release
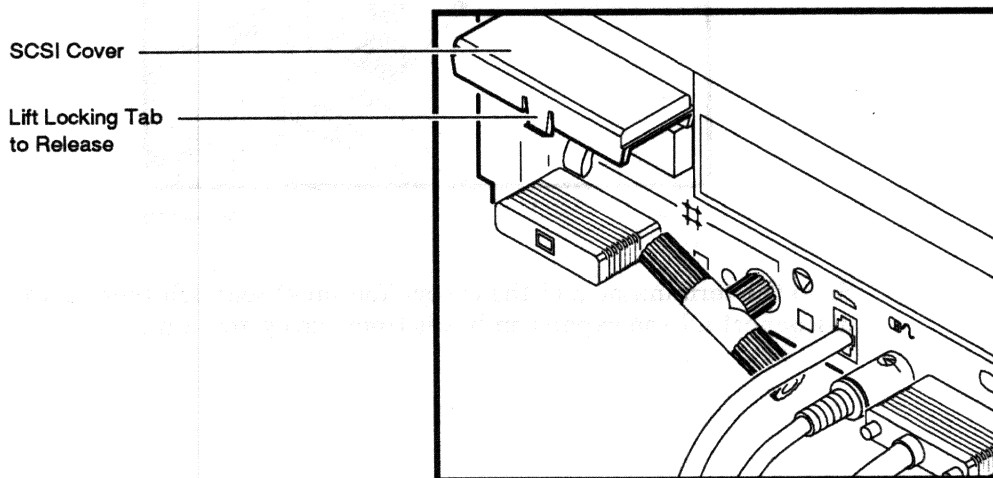
MLO-002227

**3** To remove the SCSI terminator, place your fingers under the loop and pull out. Figure 4–4 shows how to remove the terminator.

**Figure 4–4    Removing the SCSI Terminator**

SCSI Terminator ──────────

Loop ──────────

MLO-002228

Save the terminator and the cover. You must reattach them if you disconnect all the expansion boxes from the system unit.

## 4.4  Connecting One Expansion Box

**Note** *See operating system documentation for shutdown procedures before turning your system off. Also, you should not turn off, halt, or restart the system without notifying work group members.*

To connect a single expansion box to your system unit, follow these steps:

1   Turn both the system unit and the expansion box off (0).

2   Turn the expansion box so that the back is facing you.

3   Verify that the SCSI ID switches are set to the correct default switch positions.

Each device is shipped from the factory with the default switch positions shown in Table 4–1. (Refer to Table B–7, Table B–8, or Table B–9, if you have changed the default switch positions.)

**Table 4–1    Expansion Box SCSI ID Factory Default Positions**

| Expansion Box | SCSI ID | Switch Positions (Left to Right) |
|---|---|---|
| RZ55 | 1 | Down, Down, Up |
| TK50Z–GA | 5 | Down, Up, Down |
| RRD40 | 4 | Up, Down, Down, Down |

For illustrations of the SCSI ID switch settings and additional information about verifying factory default settings, see these sections:
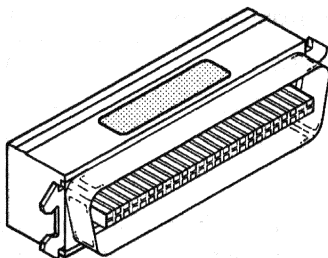
- RRD40 compact disc expansion box: Section 4.8.2 and Figure 4–14

- RZ55 hard disk expansion box: Section 4.6.1 and Figure 4–9

- TK50Z–GA compact disc expansion box: Section 4.7.1 and Figure 4–11

- RZ5x-xx expansion boxes: See your individual expansion box documentation.

4   Connect the 68-pin-to-50-pin cable, as shown in Figure 4–6 for
    the TK50Z–GA and as shown in Figure 4–7 for the RRD40.

    ■ Note the orientation of the pins in the system unit SCSI
      connector. There are more pins in the top row. Turn the
      68-pin connector (small end of the cable) so its holes match
      the pins.

    ■ Press the clips on the sides of the 68-pin connector and
      push the connector into the system unit SCSI port until
      the clips lock into place.

**Caution** *Do not force the 68-pin connector into the SCSI port. You
may damage the pins in the SCSI port.*

    ■ Connect the 50-pin connector (large end of the cable) to
      either port on the back of the expansion box and snap the
      bail lock in place.

5   Connect the 50-pin SCSI terminator that comes with the
    expansion box to the unused port on the expansion box.
    Figure 4–5 shows the 50-pin terminator.

**Figure 4–5    SCSI 50-Pin Terminator**



MLO-002346

**6** Connect the power cord to the expansion box receptacle and plug the other end into a grounded power source.

Figure 4–6 shows how to connect one RZ55 or one TK50Z–GA expansion box to your system unit.

**Figure 4–6    Connecting One TK50Z–GA or One RZ55 Expansion Box**

Terminator

Connector Cable

Power Cord

MLO-002231
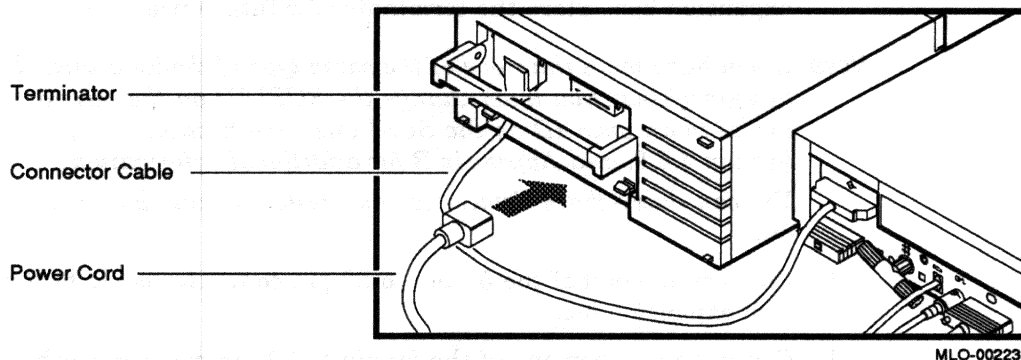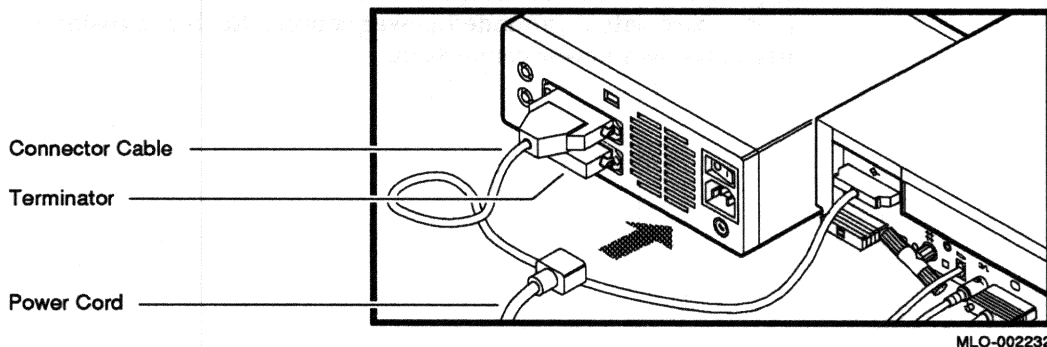
Figure 4–7 shows how to connect one RRD40 compact disc drive expansion box to your system unit.

**Figure 4–7    Connecting One RRD40 Expansion Box**

Connector Cable

Terminator

Power Cord

MLO-002232

# 4.5 Daisy-Chaining Multiple Expansion Boxes

You can add additional expansion boxes and **daisy-chain** the new boxes to the previous ones. To daisy-chain (link expansion boxes together in series), perform the following steps:

1  Turn the system unit and all expansion boxes off (0).

2  Remove the 50-pin terminator on the most recently added expansion box. Store the terminator for future use.

**Note** *If you have more than one of the same type of device attached to your system, you must change the SCSI ID on the second device to an open ID on the SCSI bus. See Section 4.8.3, Section 4.6.2, and Appendix B for additional information.*

*You can daisy-chain devices to your system in any physical order.*
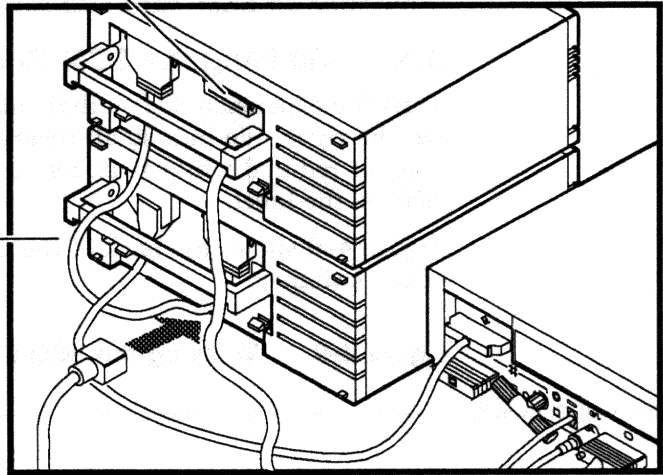
3  Connect one end of the 50-pin-to-50-pin connector cable to the new expansion box.

4  Connect the other end of the 50-pin-to-50-pin connector cable to the available port on the first expansion box.

5  Attach the 50-pin terminator that you just removed from the first expansion box to the unused SCSI port on the new expansion box.

6  Connect the power cord for the new expansion box to the expansion box power receptacle. Plug the other end of the power cord into a grounded power source. Each expansion box needs its own power connection.

Figure 4–8 shows how to daisy-chain two expansion boxes.

**Figure 4–8    Daisy-Chaining Two Expansion Boxes**

Terminator

50-Pin to 50-Pin
Connector Cable

MLO-002342

## 4.6 Adding an RZ55 Hard Disk Expansion Box
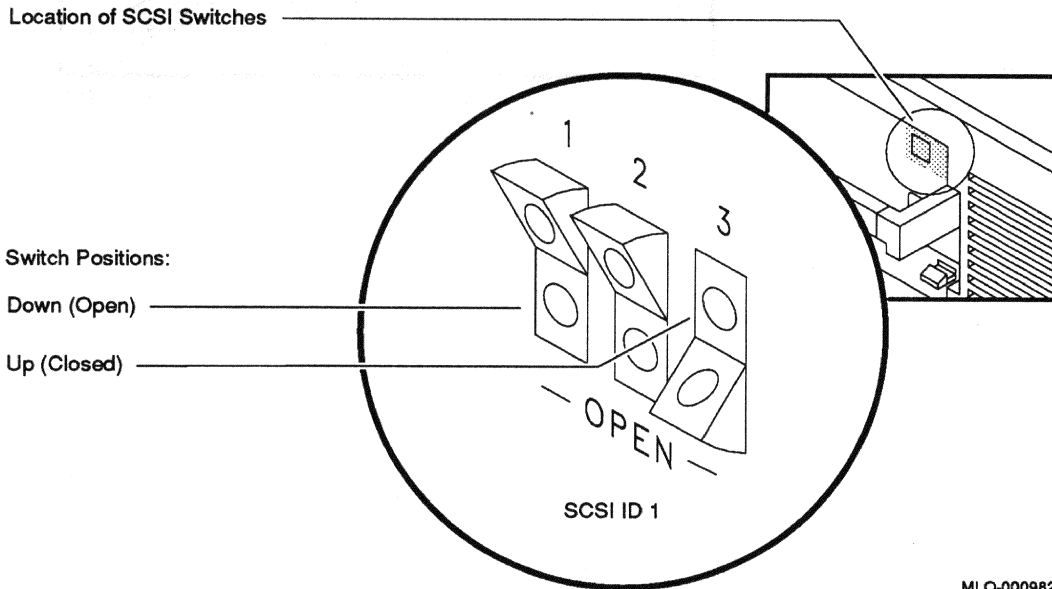
To provide additional disk storage for your VAXstation 3100, an RZ55 hard disk is available in an expansion box. Each hard disk provides an additional 332 megabytes of disk storage. See Section 4.1, Section 4.2, and Section 4.5 for instructions on connecting an RZ55 hard disk expansion box.

### 4.6.1 Verifying the SCSI ID on the First RZ55

Turn the expansion box so that the back of the unit is facing you. On the right side in a small recessed area behind the handle is a set of red and white switches surrounded by a label. Do not remove the label.

Figure 4–9 shows the back of the expansion box and the location of the switches.

**Figure 4–9    Verifying the SCSI ID on the First RZ55**

Location of SCSI Switches

Switch Positions:

Down (Open)

Up (Closed)

1

2

3

OPEN

SCSI ID 1

MLO-000982

Verify that the switches are in the following positions (left to right): down, down, up. The RZ55 hard disk expansion box is shipped from the factory with the switches set to SCSI ID 1. You do not need to change the SCSI ID on the first RZ55 expansion box.

## 4.6.2 Resetting the SCSI ID on the Second RZ55

To determine available IDs on the SCSI-B bus for a fully configured system, enter TEST 50 at the console prompt (>>>), then press the Return key. Your system configuration is displayed on the screen, as shown in the example below. In the example, the SCSI IDs 0 to 7 are identified by the callouts 1 to 8. The code FFFFFF05 indicates an open ID.

```
SCSI-B      1C1C.0001    V1.3
FFFFFF05 00000001 FFFFFF05 FFFFFF05 05000001 01000000 FFFFFF03 FFFFFF05
   ❶         ❷        ❸        ❹        ❺        ❻        ❼        ❽
```

The SCSI IDs show in the example are identified below:

❶  SCSI ID 0 — open

❷  SCSI ID 1 — RZ55

❸  SCSI ID 2 — open

❹  SCSI ID 3 — open

❺  SCSI ID 4 — RRD40

❻  SCSI ID 5 — TK50Z–GA

❼  SCSI ID 6 — SCSI-B controller

❽  SCSI ID 7 — open

If you are adding a second RZ55, you must change the SCSI ID to 0 or any other open ID on the SCSI-B bus. To set the SCSI ID to 0, use a pen or small pointed object to put the switches in the following positions: down, down, down. Figure 4–10 shows the proper switch setting. For more information on SCSI ID switch settings, see Appendix B and Table B–8.

**Figure 4–10    Resetting the SCSI ID on the Second RZ55**



SCSI ID 0
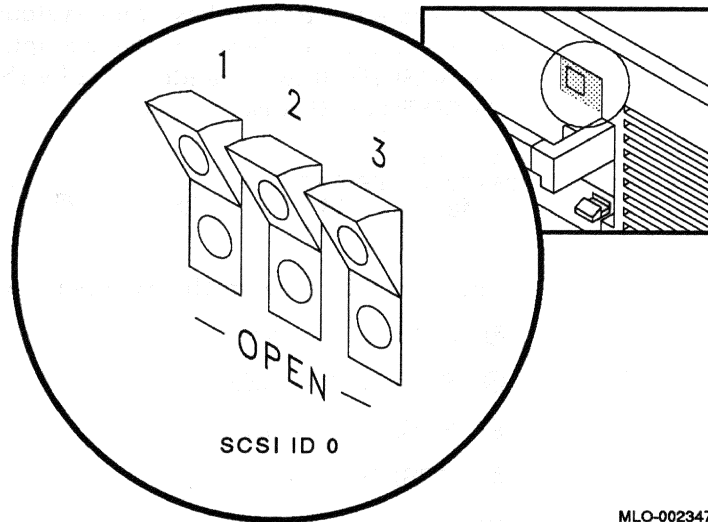
MLO-002347

# 4.7  Adding and Using a TK50Z–GA Tape Expansion Box

The TK50Z–GA tape drive is available in an expansion box. The drive holds one removable TK50K or TK52K magnetic tape cartridge. The tape cartridge stores up to 95 megabytes of data. Use the tape cartridge to load software, databases, or to make copies (or backups) of your files. See Section 4.2 and Section 4.4 for connection instructions.

## 4.7.1  Verifying the SCSI ID on the TK50Z–GA

Turn the expansion box so that the back is facing you. On the right side in a small recessed area is a set of red and white switches surrounded by a label. Do not remove the label.

Figure 4–11 shows the back of the expansion box and the location of the switches.

**Figure 4-11    Verifying the SCSI ID on the TK50Z-GA**

Location of SCSI Switches ————————————————————————

Switch Positions:

Down (Open) ————————————————

Up (Closed) ————————————

OPEN
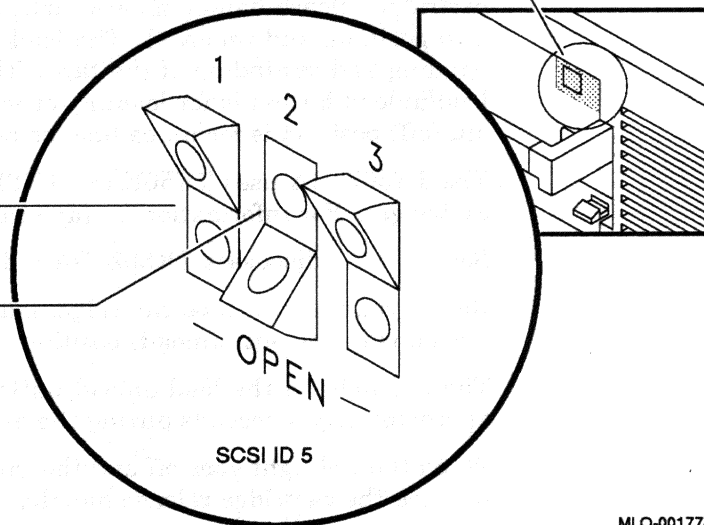
SCSI ID 5

MLO-001774

The TK50Z–GA expansion box is shipped from the factory with the SCSI ID set to 5. The switches should be in the following positions: down, up, down. Leave the switches in the default (factory) position for the first TK50Z–GA expansion box you add to your system.

If you are adding two or more TK50Z–GA expansion boxes, you must set the second and each additional TK50Z–GA expansion box to a unique SCSI ID other than 5. Appendix B gives information on setting TK50Z–GA SCSI ID switches.

### 4.7.2 Inserting a Tape Cartridge

The TK50Z–GA expansion box has two primary controls: the cartridge release handle and the load/unload button. The cartridge release handle allows cartridges to be inserted, locked into position, and removed. The load/unload button controls winding and rewinding of the tape. The in (on) position of the load/unload button is for loading, or winding, tape cartridges. The out (off) position is for unloading, or rewinding, tape cartridges.

The TK50Z–GA uses TK50K or TK52K (CompacTape) tape cartridges. For information on tape cartridges, see Chapter 3.

Section 4.7.4 discusses TK50Z–GA indicator lights and controls.

Before you insert a tape cartridge, make sure the load/unload button is in the out (unload) position.

The red light in the load/unload button comes on for approximately 4 seconds during the automatic power-up test.

When the red light goes off and the green light comes on, it is safe to move the cartridge release handle.

If a cartridge is new, the tape drive performs a calibration sequence that takes approximately 40 seconds. The green light flashes rapidly and irregularly during calibration.
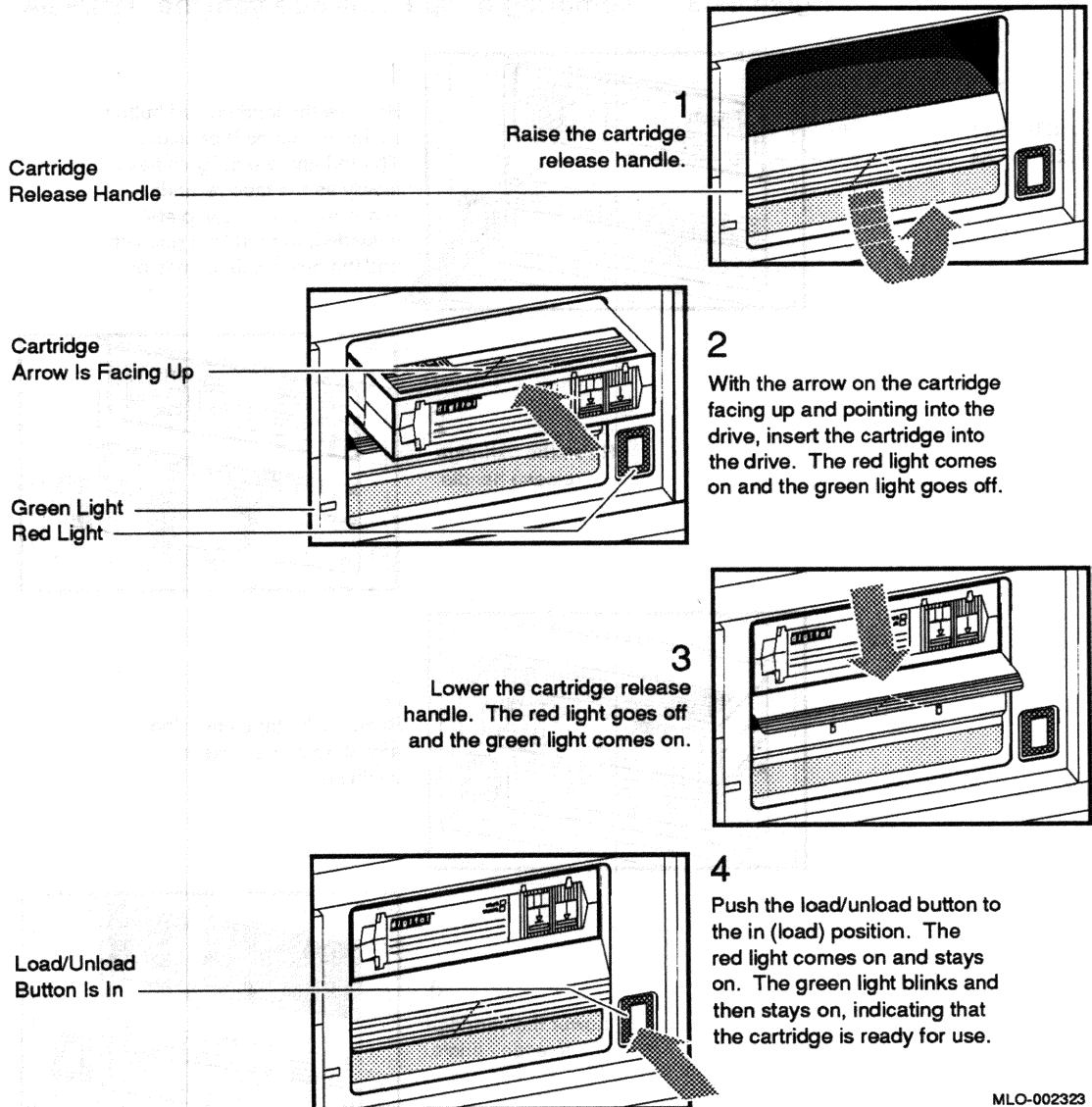
**Caution** *Do not move the cartridge release handle unless the red light is off and the green light is on.*

*Do not move the cartridge release handle while either light is flashing.*

*If the red light flashes rapidly at any time, press the load/unload button four times. If the problem persists, do not attempt to use the tape drive or remove the cartridge.*

Figure 4–12 shows how to insert a tape cartridge.

**Figure 4–12    Inserting a Tape Cartridge into the TK50Z–GA**

**1**
Raise the cartridge release handle.

Cartridge Release Handle

**2**
With the arrow on the cartridge facing up and pointing into the drive, insert the cartridge into the drive. The red light comes on and the green light goes off.

Cartridge Arrow Is Facing Up

Green Light
Red Light

**3**
Lower the cartridge release handle. The red light goes off and the green light comes on.

**4**
Push the load/unload button to the in (load) position. The red light comes on and stays on. The green light blinks and then stays on, indicating that the cartridge is ready for use.

Load/Unload Button Is In

MLO-002323

### 4.7.3 Removing a Tape Cartridge

Figure 4–13 shows how to unload and remove a tape cartridge.

**Figure 4–13    Removing a Tape Cartridge from the TK50Z–GA**

Load/Unload
Button Is Out

**1**

Release the load/unload button
to the out (unload) position.
The red and green lights flash
slowly as the tape rewinds.
When the tape is completely
unloaded, the red light goes off
and the green light comes on.

**2**

Raise the cartridge
release handle.

**3**

Remove the tape cartridge
and store it in its plastic
container.

**4**

Lower the cartridge
release handle.

MLO-002324

## 4.7.4  Using TK50Z–GA Controls and Indicator Lights

Table 4–2 lists the functions of TK50Z–GA controls.

**Table 4–2    Using TK50Z–GA Controls**

| Control | Position | Function |
|---|---|---|
| Load/unload button | In | Loads tape (10 to 15 seconds). |
| | Out | Rewinds and unloads tape. |
| Cartridge release handle | Up | Ready to insert or remove tape after rewinding and unloading stops. |
| | Down | Locks tape in operating position. |

Table 4–3 lists the functions of TK50Z–GA indicator lights.

**Table 4–3    Understanding TK50Z–GA Indicator Lights**

| Green Light | Red Light | Function |
|---|---|---|
| Off | Off | No power to tape drive. |
| On | Off | Safe to move cartridge release handle. Power is present. |
| Off | On | Do not move cartridge release handle. One of following conditions is in effect: power-up test is occurring; cartridge is inserted but handle is still up; tape is loading or unloading; tape is stopped. |
| On | On | Tape loaded successfully. |
| Flashing | On | Tape is in motion (except rewind). Read/write commands are being processed. Irregular fast flashing of green light means tape calibration is occurring. (First use of tape.) |
| Flashing slowly | Flashing slowly | Tape is rewinding. |
| Off | Flashing rapidly | Tape or drive fault exists. |

## 4.8 Adding and Using the RRD40 Compact Disc Expansion Box

This section shows you how to:

- Select the voltage on the RRD40
- Verify and set SCSI IDs on one or two RRD40s
- Insert and remove compact discs

For instructions on unpacking and connecting an RRD40 expansion box, read the beginning of this chapter through Section 4.4.

### 4.8.1 Selecting the Voltage

Turn the RRD40 so that the back is facing you. Note that the RRD40 has a voltage selector switch that can be set to one of two voltages (110V or 220V). Check that the voltage selector switch on your RRD40 is set to the correct voltage for your power requirements (Figure 4–14).
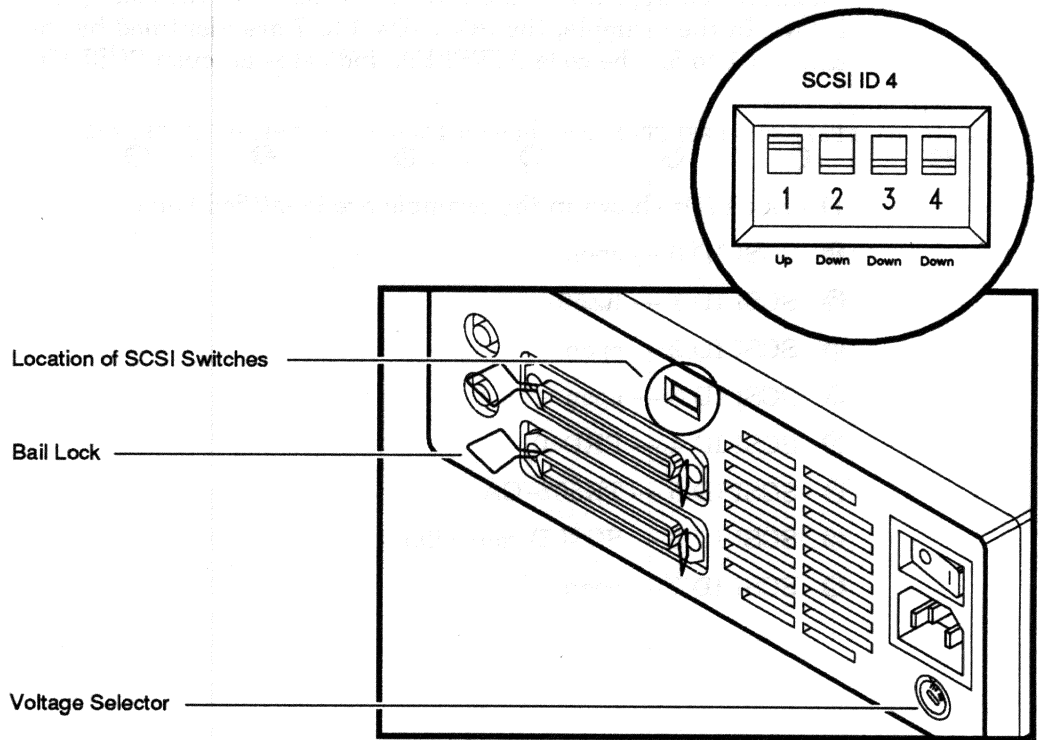
### 4.8.2 Verifying the SCSI ID on the First RRD40

The RRD40 expansion box is shipped from the factory with the SCSI ID set to 4, as shown in Figure 4–14. Leave the SCSI ID on the first RRD40 set to 4. If you are adding a second RRD40 to your system, see Section 4.8.3 for information on the correct SCSI ID setting.

### 4.8.3 Resetting the SCSI ID on a Second RRD40

If you are adding a second RRD40 expansion box to your configuration, you must reset the switches. The second RRD40 expansion box should be set to an open SCSI ID (one that is not currently being used); for example, SCSI ID 1, with the switches in the following positions: down, down, up, down. See Table B–7 for additional information.

**Figure 4–14    RRD40 Voltage Selector and Factory SCSI ID Switch Positions**



Location of SCSI Switches

Bail Lock

Voltage Selector

MLO-002338

To determine available IDs on the SCSI-B bus, enter TEST 50 at the console prompt (>>>), then press the Return key. Your system configuration appears on the screen, as shown in the example below. In the example, the SCSI IDs 0 to 7 are identified by the callouts 1 to 8. The code FFFFFF05 indicates an open SCSI ID.

```
SCSI-B      1C1C.0001    V1.3
FFFFFF05 00000001 FFFFFF05 FFFFFF05 05000001 01000001 FFFFFF03 FFFFFF05
   ❶         ❷        ❸        ❹        ❺        ❻        ❼        ❽
```

The SCSI IDs shown in the example are identified below:

❶ SCSI ID 0 — open

❷ SCSI ID 1 — RZ55

❸ SCSI ID 2 — open

❹ SCSI ID 3 — open

❺ SCSI ID 4 — RRD40

❻ SCSI ID 5 — TK50Z–GA

❼ SCSI ID 6 — SCSI-B controller

❽ SCSI ID 7 — open

### 4.8.4 Inserting a Compact Disc

The RRD40 compact disc expansion box has an opening for a compact disc and two indicator lights, as shown in Figure 4–15.

**Figure 4–15    RRD40 Expansion Box**



Opening for Compact Disc

Activity Light
Power Light
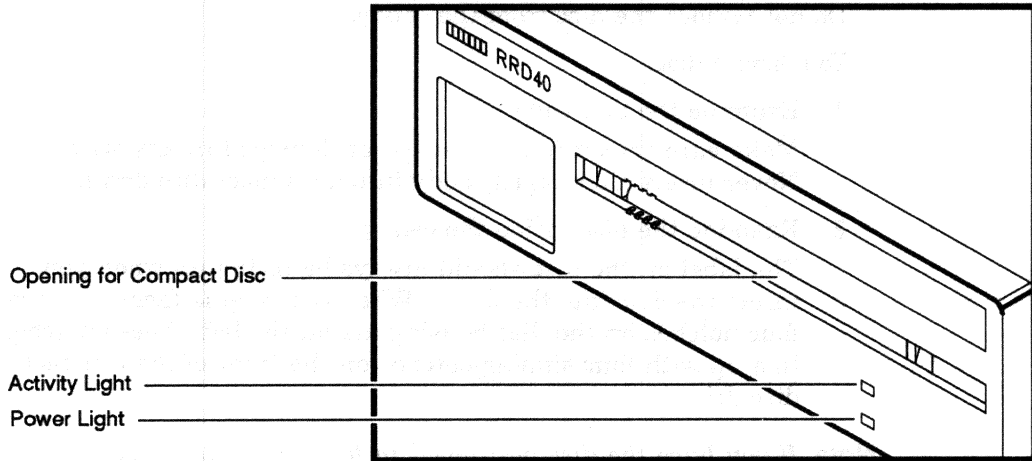
MLO-000971

When you turn on the RRD40 expansion box, the power light comes on. The activity light comes on when you insert and load a compact disc in the drive; it flashes when the disc is transferring information.

Make sure the power light on the front of the compact disc drive is on. Insert the entire disc caddy into the disc opening on the drive. Do not remove the disc from the caddy.

To insert a disc:

1   Examine the disc caddy.

    Make sure that it is not cracked or damaged in any way. Never insert a damaged caddy into a compact disc drive.

2   Examine the disc inside the caddy.

    The label on the disc should always be facing up when you insert the disc into the drive. When the label is facing up, the four notches on the disc housing are on the left. These notches line up with four similar notches on the front of the compact disc drive.

**Note** *If you have the disc positioned in the caddy label side up but the notches are on the right, then the disc is improperly oriented in the caddy. Proceed no further with the loading. See the RRD40 installation/owner's guide for more information.*

**Caution** *Do not write on the disc with any implement. The data area on the disc is easily damaged.*

3   Slide the caddy in as far as it will go and then remove the transparent sleeve. The disc and its housing remain in the drive. Only the transparent sleeve comes out. Figure 4–16 illustrates how to insert a compact disc.

**Figure 4-16    Inserting a Compact Disc**

Housing ——————————

Caddy ——————————

Disc ——————————

Transparent Sleeve ——————————
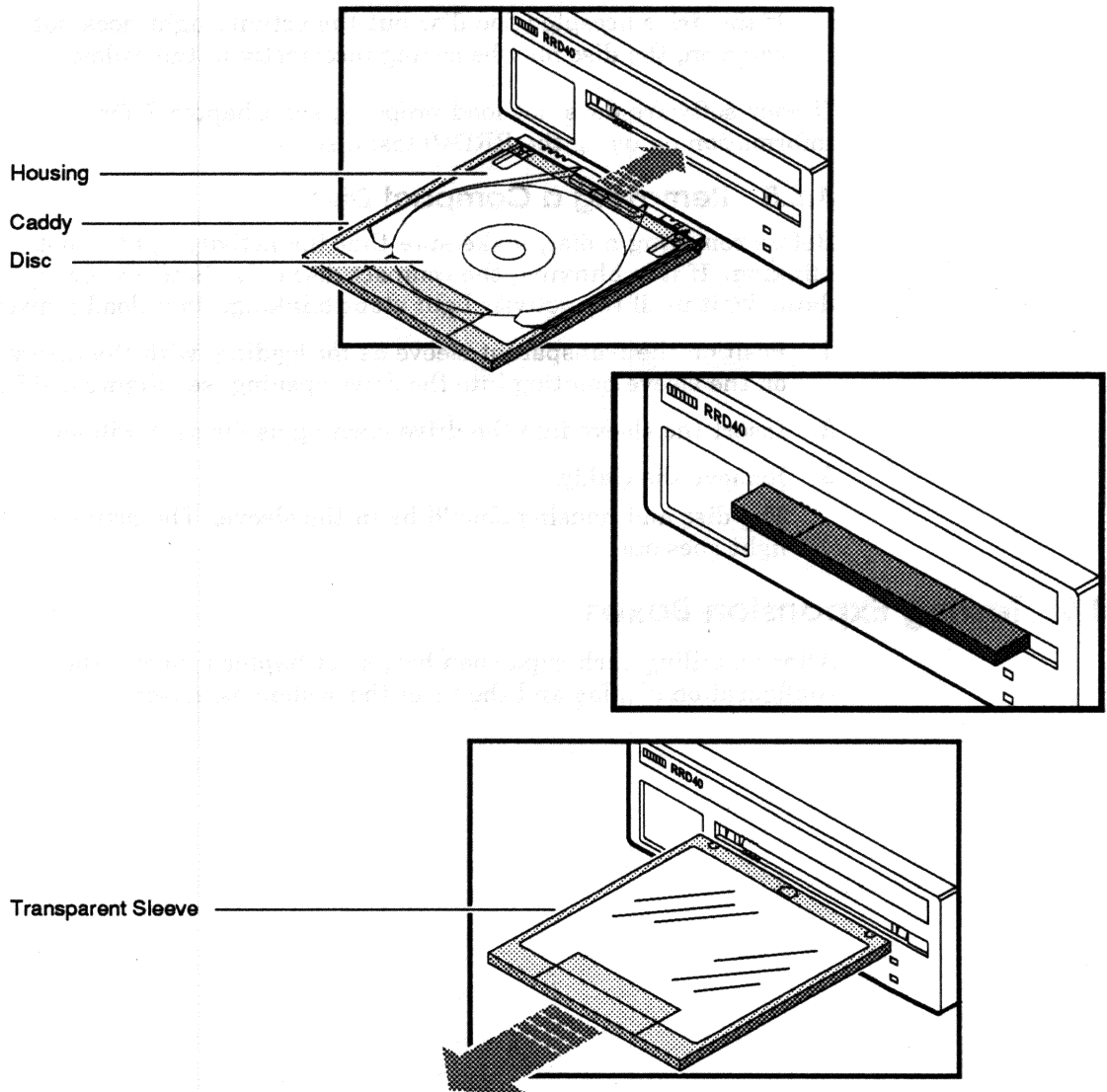
MLO-002339

**4** The activity light should come on within 5 seconds.

If the drive accepted the disc but the activity light does not come on, the disc may be sitting incorrectly in the caddy.

If your software does not load properly, see Chapter 7 for information on using the RRD40 test disc.

### 4.8.5 Removing a Compact Disc

Before removing a disc, make sure that the activity light is not blinking. If it is blinking, the compact disc drive is transferring data. Wait until the activity light stops blinking. To unload a disc:

**1** Position the transparent sleeve as for loading, with the arrow on the sleeve pointing into the drive opening (see Figure 4–16).

**2** Insert the sleeve into the drive opening as far as it will go.

**3** Remove the caddy.

The disc and housing should be in the sleeve. The activity light goes out.

## 4.9 Testing Expansion Boxes

After installing each expansion box, see Chapter 6 to run the configuration display and then run the system exerciser.

# 5
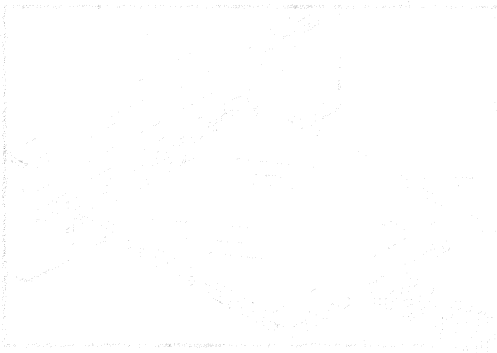
# Connecting to a Network

This chapter discusses connecting your VAXstation 3100 system
to a **network**. Depending on your work environment, you can
connect to a network in one of two ways:

- With ThinWire Ethernet cable

  See Section 5.1 for more information.

- With standard Ethernet cable

  See Section 5.2 for more information.

You can also daisy-chain VAXstation 3100 systems to form a work
group. For additional information, see Section 5.1.4.

All networking cables and connectors must be purchased
separately and must be available in the offices before network
connection.

## 5.1 Connecting to a ThinWire Ethernet Network

Complete the following tasks to connect your VAXstation 3100 to
a ThinWire Ethernet network:

- Verify the network select button position
- Verify the ThinWire Ethernet network installation
- Connect the ThinWire Ethernet cable to your system unit
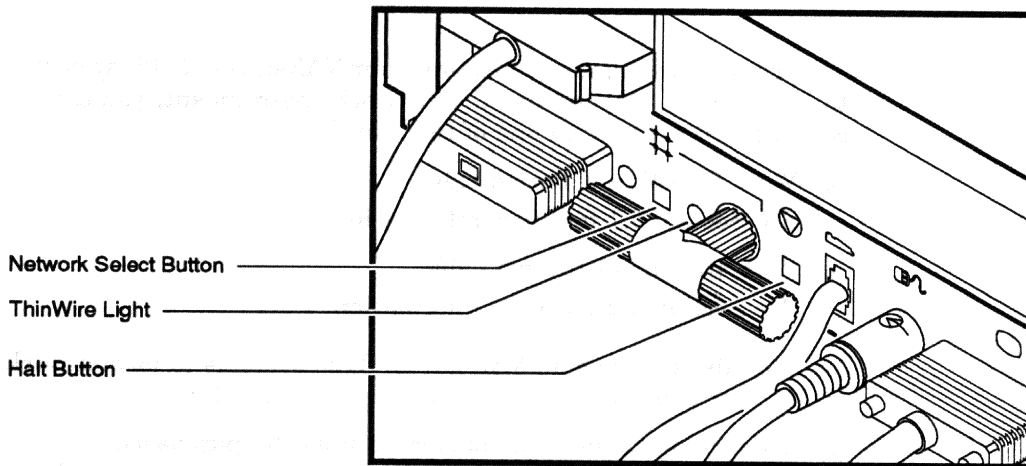
### 5.1.1 Verifying the Network Select Button Position

The ThinWire/standard Ethernet network select button is usually set in the out position when you receive your VAXstation 3100. There are two positions for the network select button:

- Out—standard Ethernet
- In—ThinWire Ethernet

Figure 5–1 shows the network select button in the in position, that is, set for ThinWire Ethernet.

**Figure 5–1    Network Select Button Set for ThinWire Ethernet**



Network Select Button

ThinWire Light

Halt Button

MLO-002341

If your system is set incorrectly, follow these steps:

1  Locate the recessed network select button.

2  Press the network select button so that the light to the right of the network select button comes on.

## 5.1.2 Verifying ThinWire Ethernet Network Installation

To verify your ThinWire Ethernet installation:

1 Turn your VAXstation 3100 on ( I ). The green light to the right of the network select button should come on. The following display appears:

```
KA42-B V1.3

F...E...D...C...B...A...9...8...7...6...5...4...3_..2_..1
>>>
```

If the console prompt (>>>) does not appear on the monitor screen, press the halt button on the back of the system unit. Figure 5–2 shows the location of the halt button.

**Figure 5–2    Halt Button**



Halt Button
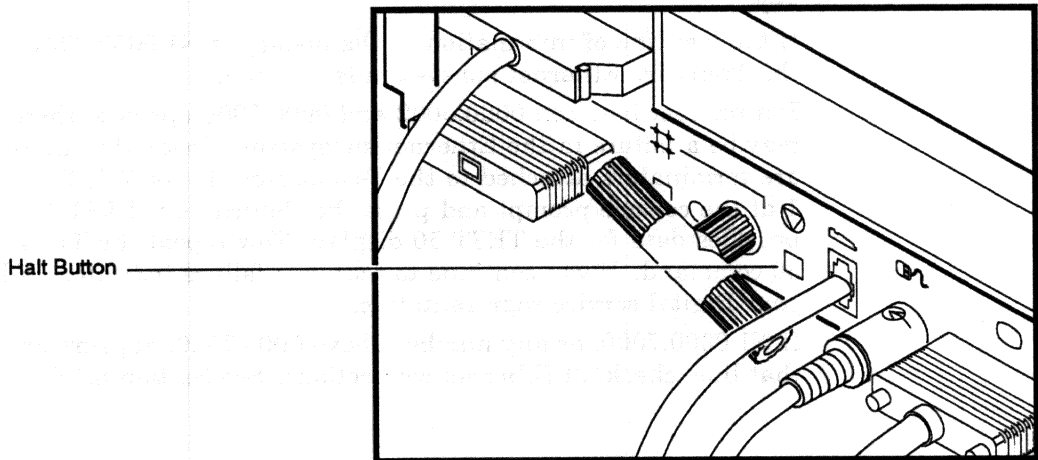
MLO-002330

2  At the console prompt, enter SHOW ETHERNET and press
the Return key. The Ethernet hardware address appears in
the following format:

    ID XX-XX-XX-XX-XX-XX

For example:

    ID 08-00-2B-07-A7-80

**Note**  *The letters ID are not part of the address.*

3  Write your Ethernet hardware address here:

    Ethernet hardware address  _____

You use the Ethernet hardware address as system identifica-
tion during software installation.

4  Enter TEST 50 at the console prompt and press the Return
key.

If the last line of information in the display is NI 0000.0001,
the ThinWire Ethernet subsystem is working.

If a number between 0000.0002 and 0000.7000 appears, there
may be a failure in the Ethernet subsystem. Check that there
are terminators attached to the T-connector. Enter TEST
1 at the console prompt and press the Return key. TEST 1
provides data for the TEST 50 display. Now repeat the TEST
50 command. If you continue to receive a failure indicator, call
your Digital service representative.

If NI 0000.7000, or any number above 0000.7000, appears on
that line, check all Ethernet connections. See Section 5.1.6.
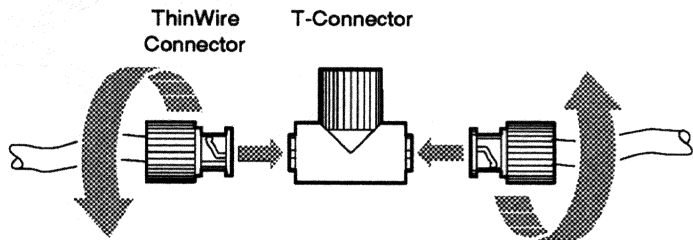
### 5.1.3 Connecting ThinWire Ethernet Cable

Follow these steps to connect a VAXstation 3100 to a ThinWire Ethernet cable.

1   Turn your system off (0).

2   Remove a terminator from one side of the T-connector.

3   Firmly push a ThinWire cable connector into this side of the T-connector and turn it to the right until it locks into place.

   ■ If your system is the first or last system in a single ThinWire **segment**, leave the terminator attached to the other side of the T-connector.

   A segment is a length of cable made up of one or more cable sections connected with barrel connectors or T-connectors.

   ■ If your system is not the first or last system and you want to connect your system between two other systems, replace both terminators with sections of ThinWire cable.

Figure 5–3 shows you how to connect two ThinWire cable segments to a T-connector.

**Figure 5–3   Adding ThinWire Cable**

ThinWire        T-Connector
Connector

MLO-002356

**4** Check that the T-connector is securely attached to the back of your system. Figure 5–4 shows the correct way to connect the first or last workstation in a ThinWire network.

**Note** *Always turn the ribbed portion of a T-connector to the right until it locks in place.*

**Figure 5–4    Checking Cable Connections**
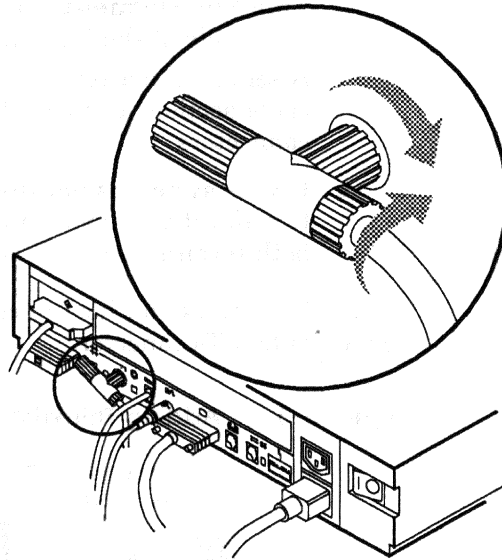


MLO-003412

## 5.1.4  Creating a Daisy-Chain Work Group

A daisy-chain work group is created by serially connecting several workstations together on the same ThinWire cable segment. This cable segment can function as a standalone network or it can be connected to a larger network.

The benefit of a daisy-chain configuration is that it lowers the cost of wiring, but there is a risk that someone might improperly unplug a system and disrupt network connections between systems on the same ThinWire segment. Note that you must always terminate both ends of a ThinWire segment.

Figure 5–5 shows a VAXstation 3100 Model 48 connected to several VAXstation 3100 Model 38s, forming a work group.

**Figure 5–5     VAXstation 3100 Systems in a Daisy-Chain Work Group**
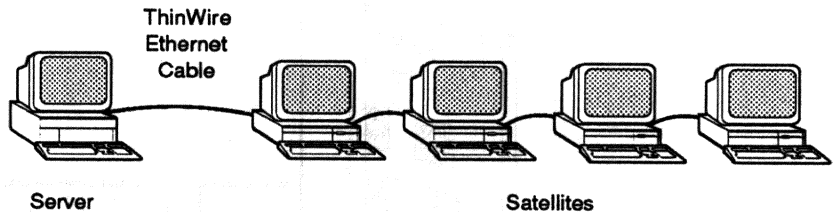


MLO-002334

### 5.1.5 Connecting to a DECconnect Faceplate

If your office has been wired with Digital DECconnect products, you connect your VAXstation 3100 to the DECconnect faceplate in your office. To connect your VAXstation 3100 system to a DECconnect faceplate:

1 Attach one end of the ThinWire cable to the DECconnect faceplate.

2 Check that the other end of the ThinWire cable is firmly attached to the ThinWire port on the back of your system unit. Figure 5–6 shows a VAXstation 3100 plugged into a DECconnect office faceplate.

**Figure 5–6 Connecting to a DECconnect Faceplate**
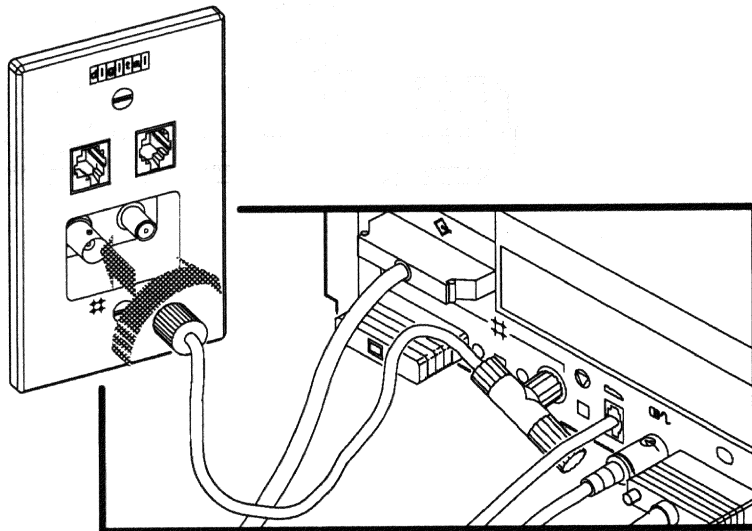
MLO-002333

## 5.1.6  Troubleshooting the ThinWire Ethernet Segment
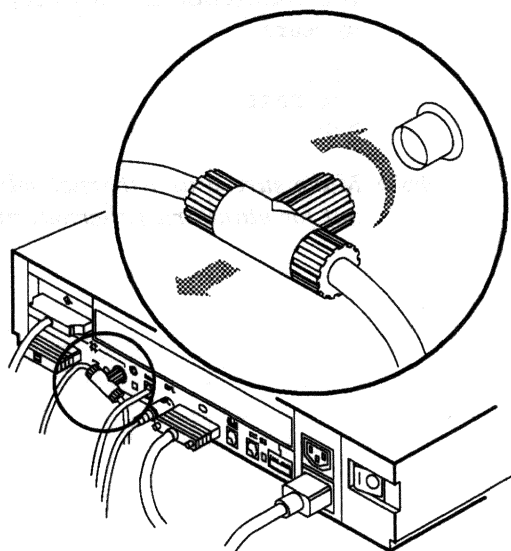
If you have verified your ThinWire Ethernet installation
(Section 5.1.2) and have found problems, use the following
checklist to make sure all connections are correct:

1  Check that the green light to the right of the network select
   button is on.

2  Check that the T-connector has not been disconnected from an
   operating ThinWire Ethernet segment.

**Note**  *If you need to remove a system from an active ThinWire segment,
disconnect the center of the T-connector directly from the system.*

Figure 5–7 shows the correct way to remove a T-connector from an
active ThinWire segment.

**Figure 5–7     Removing a System from an Active ThinWire
Segment**



MLO-003411

**3** Make sure that no more than two ThinWire segments are connected to the T-connector. If you remove a ThinWire cable, replace it with a terminator.

**4** Check that you have not disconnected a **terminator** from either end of an active ThinWire segment. This procedure disrupts network operation.

**5** Check that all connections on the ThinWire Ethernet segment are secure.

**6** After you have checked all ThinWire Ethernet connections, retest the Ethernet. Enter the following command at the console prompt:

```
>>> TEST 1  Return
```

If a connection is established, the following display appears:

```
1...
>>>
```

If a connection is not established, the following message appears:

```
1?..
 84 FAIL
>>>
```

**Note** *Make sure your Ethernet select switch is in the correct position, out for standard Ethernet, and in for ThinWire Ethernet.*

**7** If a connection is not established, perform the following steps to find the source of the failed connection:

■ Remove the T-connector from the ThinWire port on the back of your system unit.

**Note** *If you need to remove a system from an active ThinWire segment, disconnect the center of the T-connector directly from the system.*

■ Take the T-connector and two terminators that shipped with your system and plug the two terminators in place on the T-connector. Plug this T-connector with the terminators attached into the ThinWire port on the back of the system unit.

■ Enter the following command at the console prompt:

```
>>>   TEST 1  Return
```

If **TEST 1** passes, the following display appears:

```
1...
>>>
```

If **TEST 1** fails, you have an internal hardware problem with your VAXstation 3100 and need to call your Digital service representative.

## 5.2 Connecting to a Standard Ethernet Network

Complete the following tasks to connect your system to a standard Ethernet network:

- Put the network select button in the out position for standard Ethernet.

- Verify standard Ethernet network installation.

- Troubleshoot standard Ethernet, if necessary.

- Connect a transceiver cable to your VAXstation 3100 system.

### 5.2.1  Setting the Network Select Button for Standard Ethernet

To use standard Ethernet on your VAXstation 3100:

1   Press the network select button on the back of the system unit (see Figure 5–1) to the standard Ethernet (out) position.

2   When you turn on your system, the green light to the left of the network select button comes on, indicating you are ready to connect to standard Ethernet.

### 5.2.2  Verifying Your Standard Ethernet Network Installation

To verify standard Ethernet installation, follow these steps:

1   Check that the Ethernet loopback connector is attached to your system unit. If you have not attached the loopback connector, see Section 2.3.4.

2   Turn your system on ( | ). The light at the end of the loopback connector should come on. The following display appears:

```
KA42-B V1.3

F...E...D...C...B...A...9...8...7...6...5...4...3_..2_..1
>>>
```

3   At the console prompt, enter the following command:

```
>>> SHOW ETHERNET  Return
```

The Ethernet hardware address appears on the screen in the following format:

```
ID XX-XX-XX-XX-XX-XX
```

**Note** *The letters ID are not part of the address.*

For example:

```
ID 08-00-2B-02-CC-71
```

4  Write down your Ethernet hardware address here. Each Ethernet hardware address is unique.

```
Ethernet hardware address _____
```

You need the Ethernet hardware address as system identification during software installation and VAXcluster configuration.

5  At the console prompt, enter TEST 50 and press the Return key.

If the last line of the display is NI 0100.0001, then the standard Ethernet subsystem is installed and working.

If a number between 0100.0002 and 0100.7000 appears on that line, there is a failure in the Ethernet subsystem. See Section 5.2.3 for troubleshooting.

If NI 0100.7000 or any number above 0100.7000 appears on that line, check all Ethernet connections.

6  After successfully completing the power-up self-test and verifying the network, remove the loopback connector and store it for future diagnostic testing.

7  Proceed to Connecting a Transceiver Cable, Section 5.2.4, later in this chapter.

### 5.2.3 Troubleshooting Standard Ethernet

If data appears on the last line of information above the console prompt (>>>) in your standard Ethernet TEST 50 display, you need to run some diagnostic tests:

1   Make sure the loopback connector is securely connected to the system and the green light is on. Note that if your system is already connected to an active Ethernet segment, your system can be tested in **console mode** without a loopback connector.

2   Turn your system off (0) and then on ( I ) again. Ethernet connection is verified during the power-up sequence.

3   After you have checked all Ethernet connections, retest the Ethernet subsystem. At the console prompt, enter the following command:

```
>>> TEST 1   Return
```

If a connection is established, the following display appears:

```
1...
>>>
```

If a connection is not established, the following message appears:

```
1?..
 84 FAIL
>>>
```

**Note**  *Make sure your Ethernet select switch is in the correct position, out for standard Ethernet, and in for ThinWire Ethernet.*

If TEST 1 fails, you have an internal hardware problem with your VAXstation 3100 and need to call your Digital service representative. Make a note of the code that appears on your screen along with the fail message, and provide this information to your Digital service representative.

## 5.2.4 Connecting a Transceiver Cable
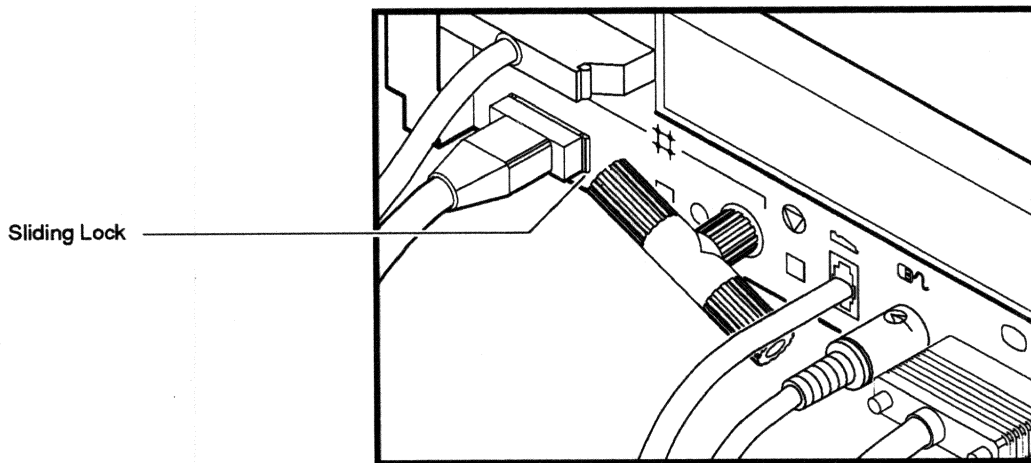
A transceiver cable is the physical connection between a standard Ethernet network interface, the **H4000**, **H4005**, or **DELNI** and a VAXstation 3100.

If your work environment is set up for standard Ethernet, follow these steps to connect the transceiver cable:

1  Turn the system unit off (0).

2  Remove the loopback connector.

3  Attach the 15-pin connector on the standard Ethernet transceiver cable to the back of the system unit.

4  Use the screwdriver included in your shipment to move the sliding lock (part of the standard Ethernet connector) to make the standard Ethernet connection secure.

Figure 5–8 shows the correct connection.

**Figure 5–8    Connecting a Transceiver Cable to the System Unit**
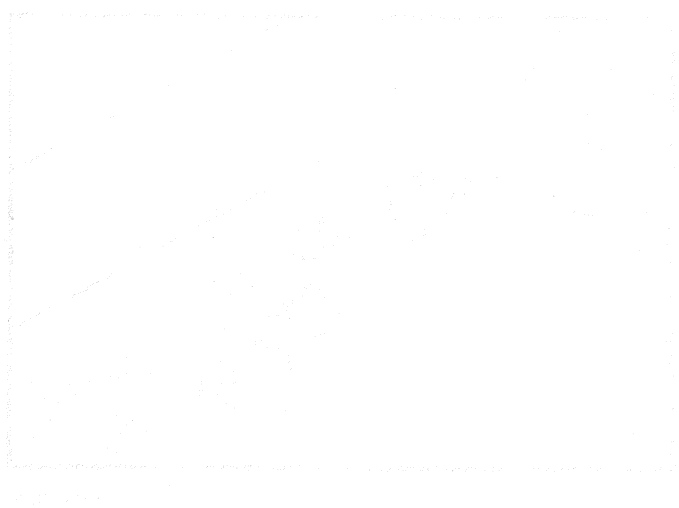
Sliding Lock

MLO-002331

# 6

# Troubleshooting

This chapter provides procedures for

- Identifying a problem with your system

- Using the troubleshooting table

If you know the source of your problem, see Table 6–1 for suggested solutions.

## 6.1  Identifying a Problem

To determine where your problem is, follow these steps:

1  Refer to your operating system documentation for shutdown procedures **before** turning off your VAXstation 3100 system and SCSI devices. Devices may not be added to the SCSI bus, removed from the SCSI bus, or re-cabled while the operating system is running.

**Caution**  *Failure to meet this requirement may cause loss of user data or system failure.*

2  Turn all expansion boxes off (0).

3  Turn the monitor and all peripheral devices such as printers and modems off (0).

4  Turn the system unit off (0).

5  Check that the following cables are correctly connected at both ends:

- Monitor cable

- Monitor power cable

- System unit power cable

- Expansion box connector cable
- Expansion box power cable
- Keyboard cable
- Mouse/tablet cable
- Network cables

At this point, all components should be off.

Now, turn your equipment on ( | ), in the order given in the following list.

1   Turn expansion boxes back on ( | ) in the following order:

- RZ55 hard disk expansion box
- Other hard disk expansion boxes
- TK50Z–GA tape expansion box
- RRD40 compact disc expansion box
- Printer
- System unit
- Monitor

2   Adjust the brightness and contrast on your monitor.

If you still have a problem, refer to Table 6–1.

If you have not found a solution to your problem after checking the troubleshooting tables, run system diagnostic programs, as described in Chapter 7.

## 6.2 Using the Troubleshooting Table
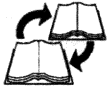
After you have determined the source of your problem, follow these steps:

- For monitor problems, see your monitor guide.

- For network problems, see Chapter 5.

- For problems with the RRD40 compact disc drive, see the diagnostic information in the *RRD40 Disc Drive Owner's Manual*, and in Section 7.8.1.

- For other problems:

  1  Note the symptoms of the problem.

  2  Check the Symptom column in Table 6–1 for a match.

  3  Check the conditions for that symptom in the Possible Cause column. If more than one possible cause is given, check the possible causes and their suggested solutions in the order listed.

  4  Follow the advice in the Suggested Solution column.

  5  Run system diagnostics, as described in Chapter 7.

  6  If the problem persists, call your Digital service representative.

## Table 6–1 Troubleshooting

| Symptom | Possible Cause | Suggested Solution |
|---|---|---|
| **System Unit Problems** | | |
| System unit fan is off. | Power cable not connected. | Check the power cable connections at both ends. |
| | Power supply or system unit fan failure. | Contact your Digital service representative. |
| Power light is off. | Power cable not connected. | Check the power cable connections at both ends. |
| | Wall socket may not be working. | Try a different wall socket, or try an electrical device that you know works in the wall socket. |
| | | Contact your Digital service representative. |
| | | Turn the system off for 10 seconds and then turn it back on. Turn the system off. Unplug the video cable, communications cable, and printer. Then plug all cables back in and turn the system on. |
| Power-up display does not show after 2 minutes. | Monitor cable or video cable not connected. | Check that the monitor cable and video cable are plugged in at both ends. |
| | Alternate console switch in wrong position. | Change alternate console switch to correct position. See Section A.4. |
| | Monitor brightness and contrast controls are too dark to see the screen display. | Adjust monitor brightness and contrast controls. Verify that monitor power switch is on ( I ). |
| | Keyboard cable is not connected. | Check keyboard cable connection. |
| | Monitor fuse is blown. | See your monitor guide for fuse replacement instructions. |
| | Wall socket may not be working. | Try a different wall socket, or try an electrical device that you know works in the wall socket. |
| | | If the problem persists, contact your Digital service representative. |
| | 8-plane graphics processor module is installed but new color cable is not installed. | Install color cable. |

(continued on next page)

## Table 6–1 (Cont.)   Troubleshooting

| Symptom | Possible Cause | Suggested Solution |
|---------|----------------|--------------------|
| **System Unit Problems** | | |
| Power-up display contains question marks or asterisks. | Possible system error. Can be a soft error or a hard error. | If question marks or asterisks appear with any numbers in the power-up display, see Section 7.2, Section 7.1.1, and Section 7.7 for further test instructions. |
| Window display does not appear on the screen. (System does not boot.) | Your software is not installed. | See your software documentation for installation instructions. See Section 7.2, Section 7.3, and Section 7.7 for further test instructions. |
| | Video option failure | See Section 7.2 and Section 7.7 for more information. |
| | Software problem | Call your Digital service representative. |
| | Default recovery action is set to halt. | Change the default recovery action to boot system from system disk. See Appendix A. |
| | Incorrect boot device specified. | Change the default recovery action to boot system from system disk. See Appendix A. |
| **Monitor Problems** | | |
| No display on monitor screen. | Monitor not turned on. | Check monitor on/off switch. Check that monitor power cable is connected at both ends. |
| | Contrast and brightness controls are too dark to see screen display. | Adjust contrast and brightness controls. Refer to your monitor guide for more information. |

**Table 6–1 (Cont.)     Troubleshooting**

| Symptom | Possible Cause | Suggested Solution |
|---|---|---|
| **Mouse/Tablet Problems** | | |
| Pointing device (mouse or optional tablet) pointer does not appear on screen, or monitor does not respond to pointing device commands. | Pointing device cable is installed incorrectly or is loose. | Turn off system. Unplug and then replug the cable to reset the device. |
| | The system is in console mode; no pointer appears on the screen. | Install your windowing software. |
| | Pointing device is faulty. | Replace with another pointing device, or call your Digital service representative. |
| **Keyboard Problems** | | |
| Keys do not work. | Hold Screen key is active. | Press Hold Screen key to release hold on screen. |
| | Keyboard cable loose or not connected. | Check keyboard cable at both ends. |
| | Keyboard failure | Replace with another keyboard. If problem persists, contact your Digital service representative. |
| **RRD40 Compact Disc Drive Problems** | | |

Refer to the *RRD40 Disc Drive Owner's Manual* that comes with your RRD40 compact disc expansion box.

See Section 7.8.1 in Chapter 7 of this manual for additional information.

Table 6-1 (Cont.)    Troubleshooting

| Symptom | Possible Cause | Suggested Solution |
|---------|----------------|--------------------|
| **RZ55 Hard Disk Expansion Box Problems** | | |
| Power light does not come on. | Power cable not connected or loose. | Check power cable connections at both ends. |
| RZ55 fails system exerciser test and power-up self test. | Faulty disk drive assembly. No AC power. Faulty cabling. | Check that all cables are secure at both ends. Check to see if the activity light comes on or if the fan is blowing (AC power is present). Remove defective RZ55 expansion boxes from the system. Call your Digital service representative. |
| | SCSI ID is not set or is set to same ID as another device. | Set SCSI ID, as described in Appendix B. Check all SCSI IDs to ensure no two devices are set to the same ID. |
| **RZ56 Hard Disk Expansion Box Problems** | | |
| Power light does not come on. | Power cable not connected or loose. | Check power cable connections at both ends. |
| RZ56 fails system exerciser test and power-up self-test. | Faulty disk drive assembly. No AC power. Faulty cabling. | Check that all cables are secure at both ends. Check to see if the activity light comes on or if the fan is blowing (AC power is present). |
| | | Remove defective RZ56 expansion box from the system. Call your Digital service representative. |
| | SCSI ID is not set, or is set to same ID as another device on the system. | Set SCSI ID, as described in Appendix B. Check all SCSI IDs to ensure no two devices are set to the same ID. |

## Table 6-1 (Cont.)    Troubleshooting

| Symptom | Possible Cause | Suggested Solution |
|---|---|---|
| **Disk and Diskette Problems** | | |
| Software does not boot from hard disk drive. | A problem exists with the hard disk. | See Section 7.3, Section 7.7, and Section 7.4. |
| | Default boot device is set incorrectly. | See Chapter 2 to set or change the default boot device. |
| | Recovery action may be set to halt. | See Appendix A to change the default recovery action. |
| | A problem exists with the software (if installed) on the hard disk. | Refer to your software documentation for help. |
| Software does not boot from diskette drive, or diskette read or write error message is displayed. | No diskette in the diskette drive. | Insert a diskette with bootable software. Use instructions in software documentation. |
| | Diskette was inserted incorrectly. | Check that the write-protect notch on the diskette is to your left when you insert the diskette and that the label is up. |
| | Diskette is damaged or does not contain bootable software. | Try another diskette that contains bootable software. |

**Table 6–1 (Cont.)    Troubleshooting**

| Symptom | Possible Cause | Suggested Solution |
|---------|----------------|--------------------|
| **TZ30 Tape Drive Problems** | | |
| TZ30 tape drive green light flashes rapidly and tape does not complete loading. | The drive mechanism is faulty or the tape cartridge is damaged. | Slide the lever to the unlock position and remove the cartridge. Check to see if the cartridge is damaged. |
| TZ30 passes power-up test but does not operate. | No cartridge in drive. | Insert the cartridge and slide the lever to the lock position. |
| Cartridge release lever does not slide. | Cartridge is in use. | Wait for green light to come on and try again. If the problem persists, do not use the drive. Call for service. |
| Cartridge release lever does not lock. | Cartridge is not inserted properly. | Reinsert the cartridge. If the problem persists, call for service. |
| Three lights are flashing. | Drive detected a fatal error. | Press and release the unload button to clear the fault. Perform the load operation again. If the condition persists, do not attempt to remove the tape cartridge or use the tape drive. Call your service representative. |
| | | If a tape cartridge cannot be inserted into the TZ30 tape drive, move the cartridge lever to the lock position and back to the unlock position. Do not push a tape cartridge into the TZ30 while moving the cartridge lever between the lock and unlock positions. The TZ30 interprets this movement as an insertion of a tape cartridge. |

## Table 6–1 (Cont.)    Troubleshooting

| Symptom | Possible Cause | Suggested Solution |
|---------|----------------|--------------------|
| **TK50Z–GA Tape Expansion Box Problems** | | |
| TK50Z–GA tape drive red light flashes rapidly. | The drive mechanism is faulty. | Press and release the load/unload button four times to clear the fault. If the condition persists, do not attempt to remove the tape cartridge or use the tape drive. Call your service representative. |
| TK50Z–GA passes power-up test but does not operate. | No cartridge in drive or the cartridge is not loaded. | Insert the cartridge and press the load/unload button. |
| Cartridge release handle does not lift. | Power-up display is still in progress. | Wait for red light to go out and try again. If the problem persists, do not use the drive. Call for service. |
| Cartridge release handle does not lock. | Cartridge is not inserted properly. | Reinsert the cartridge. If the problem persists, call for service. |
| Tape does not load. | The load/unload button is in unload position. | Put load/unload button in load position. Wait for light to go out before removing tape. |
| Unable to access information on tape. | SCSI ID address may be incorrect. | See Chapter 4 and Appendix B for additional information. |
| **Network Problems** | | |
| Refer to Chapter 5 or the *Workstations Network Guide* that comes with your system. | | |

# 7

# Running Diagnostics

This chapter describes some of the diagnostics you can run on your VAXstation 3100 system to check that the system is running correctly. It also describes some of the common messages that are displayed during the power-up of your system.

This section includes information on the following:

- Power-up messages
- Self-test diagnostics
- Displaying your system's configuration
- Displaying devices installed in your system
- Using the system exerciser
- Test utilities
- Changing the keyboard language
- Rebooting your system
- Console command summary
- Password Security Feature
- Help display
- Service information

For information on status and test codes, see Appendix C.

# 7.1 Power-Up Messages

Every time you turn your system on, the system runs power-up tests. These tests check each device installed in your system. As each device is tested, a test number is displayed on the terminal screen. Diagnostic lights on the rear of the system unit indicate the status of the system as it is powering up.

Upon successful completion of the tests, the operating system starts to boot.

**Note** *If your monitor does not display any information on the screen after the power-up test sequence (approximately 1 second), you may have a monitor, video, or system board failure. Check your monitor guide for more information.*

In the following example of a power-up screen display, the elements are numbered and identified below.

```
KA42-B V1.3      ❶

F...E...D...C...B...A...9...8...7...6...5...4_..3_..2_..1...  ❷
```

❶  The CPU name (KA42–B) and the ROM version (V 1.0)

❷  Test numbers for each device in system. See Table 7–1. Three dots (...) after a test number indicate that the device tested successfully. An underscore and two dots (_..) indicate that the optional device is not installed or the device has not been tested.

The Model 38 displays important information during its power-up test sequence. If the sequence displayed during power up contains question marks or asterisks, failures may exist in the system. Use Table 7–1 to identify the faulty device.

To look at the status of a device, display the configuration table by running TEST 50 as described in Section 7.3.

**Table 7-1    Device Identifiers in Power-Up and Self-Tests**

| Identifier | Mnemonic | Device |
|------------|----------|--------|
| F | MONO | Base video |
| E | CLK | System clock |
| D | NVR | Nonvolatile RAM |
| C | DZ | Serial line controller |
| B | MEM | Memory |
| A | MM | Memory-management unit |
| 9 | FP | Floating point unit |
| 8 | IT | Interval timer |
| 7 | SCSI-A | SCSI-A bus controller |
| 6 | SCSI-B | SCSI-B bus controller |
| 5 | SYS | Interrupt controller and Ethernet ID ROM |
| 4 | 8PLN | Optional 8-plane graphics coprocessor |
| 3 | | Reserved |
| 2 | | Reserved |
| 1 | NI | Ethernet network interconnect |

If you see question marks (?) or asterisks (*) after a test number, an error has been detected. See Section 7.1.1.

## 7.1.1   Power-Up Error Messages

If an error is detected during power-up, the power-up sequence contains single question marks or asterisks next to the identifier for which the error was detected.

For example:

```
F...E...D...C...B...A...9...8...7...6?..5...4*..3...2...1...
```

A single question mark (?) next to a device identifier indicates a minor problem that probably will not interfere with the system power-up. See Section 7.1.2 for examples of problems flagged with a single question mark.

A double question mark (??) indicates a serious problem that will affect normal operation and use of the system. The device may need to be replaced. Contact your Digital service representative.

An asterisk (*) means the option device is installed, but its ROM code is not executed. Only device identifiers 7, 6, 4, 3, or 2 can have an asterisk (*).

Use Table 7–1 to identify the faulty or corrupted device. Then run a self-test on that device.

To look at the status of a device, display the configuration table by running TEST 50 (see Section 7.3).

## 7.1.2  Power-Up Status Messages

Some common power-up status messages are shown and explained here:

1  System clock not set

```
?   E   0040   0000.0005
```

System clock has not been set. Setting the clock is a normal part of software installation. The clock cannot be set while the system is in console mode. Once you set the clock, this code will clear the next time the system is powered up.

2  Low battery

```
?   D   0050   0000.0005
```

The system battery's charge is low or completely discharged. Run the system for about 17 hours to fully recharge the battery.

3  No devices connected to internal SCSI-A bus

```
?  7   00A0   0000.4001
```

4  No devices connected to external SCSI-B bus

```
?  6   00A0   0000.4001
```

5  No Ethernet cable (ThinWire)

```
??  1   00C0   0000.7004
```

This message indicates one or more of the following:

- No cable is installed on the ThinWire Ethernet connectors.
- No terminator on the ThinWire Ethernet port, or no terminator present at one or both ends of the segment.
- Network select button is set to wrong position (in for ThinWire Ethernet; out for standard Ethernet).
- Faulty cable or loose connection.

**6** No Ethernet cable (standard)

```
?? 1 00C0 0011.700E
```

This message indicates one or more of the following:

- No cable is installed on the standard Ethernet connectors.

- No loopback connector is installed on the standard Ethernet port.

- Network select button is set to wrong position (in for ThinWire Ethernet; out for standard Ethernet).

- Faulty cable or loose connection.

To correct the problem, turn the system off (0), and then turn the system back on ( I ). If you still get the same error message, you may have a hardware problem with your Ethernet module.

**Note** *See operating system documentation for shutdown procedures before turning your system off. Also, you should not turn off, halt, or restart the system without notifying work group members.*

See Section 6.1 for the correct order in which to turn your system components off (0) and on ( I ).

## 7.2 Running Self-Tests

This section describes how to run self-tests on your system. Self-tests are used to display the status of the devices installed on your system. Self-test diagnostic programs reside permanently in the Model 38 read-only memory (ROM).

To test a device in your Model 38 system, follow these steps:

**1** Use Table 7–1 to find the number or letter identifier for the device you want to test.

**2** Put the Model 38 in console mode by pressing the halt button on the back of the system. Use a pen or a small pointed object to press the button. Figure 7–1 shows the location of the halt button.

**Note** *See operating system documentation for shutdown procedures before turning your system off. Also, you should not turn off, halt, or restart the system without notifying work group members.*

**Figure 7-1   Halt Button**



Halt Button ——————————
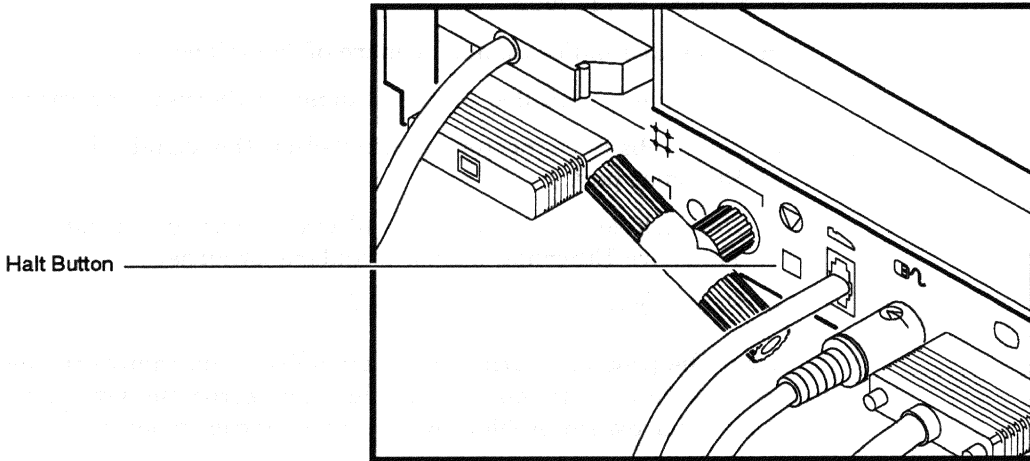
MLO-002330

**3**   Enter TEST and a space followed by the device identifier, and press the Return key.

>>> TEST 7 [Return]

In this example, you are testing the SCSI-A bus controller.

If you want to test a consecutive series of devices, enter TEST followed by the first and last numbers of the series, as shown in Table 7-1 and press the Return key.

>>> TEST F 7 [Return]

In the above example, the system tests device F, then E, D, C, B, A, 9, 8, and 7.

The system displays the number of each device as it is tested, followed by three periods (...). If the self-test is successful, no question mark or error message is displayed, and the console prompt appears:

7...
>>>

If the device is not installed, or is not tested, an underscore and two dots (_..) is displayed before the console prompt appears:

7_..
>>>

If a device fails the self-test, a question mark (?) follows the device identifier and a failure message is displayed before the console prompt appears:

```
7?..
84 FAIL
>>>
```

If a self-test results in a failure, enter the TEST 50 command to display your system configuration (no need to press the halt button).

Call your Digital service representative.

## 7.3  Configuration Display

The configuration display is a table that lists the status of each device installed in your system. The configuration table holds the results of the self-tests and power-up tests and is updated each time the self-test is run.

To display your system configuration, perform the following steps:

1   Put the Model 38 in console mode by pressing the halt button on the rear of the system.

**Note** *See operating system documentation for shutdown procedures before turning your system off. Also, you should not turn off, halt, or restart the system without notifying work group members.*

2   Enter the following:

```
>>>  TEST 50  Return
```

This procedure displays the system configuration, Ethernet hardware ID, ROM revision levels, and status information.

Error information in the configuration display is valuable to your service representative. See Appendix C for additional information about the status and error codes in the configuration display.

In the following example of a configuration display, the elements are numbered for identification below.

```
>>> TEST 50  Return

KA42-B   V1.3       ❶
ID 08-00-2B-07-E3-83   ❷
    MONO        0000.0001  ❸
    CLK         0000.0001
    NVR         0000.0001
    DZ          0000.0001
        00000001 00000001 00000001 00000001 00000001 000012A0  ❹
    MEM         0010.0001
        01000000         ❺
    MM          0000.0001
    FP          0000.0001
    IT          0000.0001

    SCSI-A      2828.0001  V1.30  ❻
    FFFFFF05 FFFFFF05 FFFFFF05 00000001 FFFFFF05 01000001 FFFFFF03 FFFFFF05

    SCSI-B      1C1C.0001  V1.30
    FFFFFF05 FFFFFF05 00000001 00000001 05000001 FFFFFF05 FFFFFF03 FFFFFF05

    SYS         0000.0001
    8PLN        0000.0001  V1.3
    NI          0000.0001
    >>>
```

❶ CPU (KA42–B) and ROM (V1.3) version

❷ Ethernet hardware address

❸ Status codes for devices. See Appendix C.

❹ DZ status codes. See Section 7.3.1.

❺ Represents 16 megabytes of memory. See Section 7.5 for more information.

❻ SCSI status codes. See Section 7.4.

Table 7–1 gives the mnemonics for devices that may be part of your configuration.

Any code in the configuration table other than 0000.0001 on the lines for MONO, DZ, MM, FP, IT or SYS devices indicates a **hard error**. If you observe a different code, contact your Digital service representative.

The other devices such as CLK, NVR, MEM, SCSI-A, SCSI-B, 8PLN, and NI may have a code other than 0000.0001 and still operate normally.

The following sections describe TEST 50 codes for DZ and SCSI-A and SCSI-B. For more information, see Appendix C.

**Note** *To update the information in the configuration display after making a change to the system configuration, you can either power up the system or enter the following command:*

```
>>> TEST F 1  Return
```

*Reenter the TEST 50 command to view the current configuration status.*

### 7.3.1 DZ Status Codes

The DZ status codes contain the status of the four serial lines, the keyboard, and the mouse or tablet. The DZ lines from the previous example are described in this example.

```
DZ        0000.0001
      00000001  00000001  00000001  00000001 00000001 000012A0
          ❶         ❷         ❸         ❹        ❺        ❻
```

❶ Keyboard port status

❷ Video port status

❸ Communication port status

❹ Printer port status

❺ Keyboard self-test

❻ Mouse or tablet self-test

Any status code other than 00000001 for the four ports and keyboard indicates a failure on that line. A status code of 00000000 for the keyboard indicates that the keyboard is disconnected. The sixth status code is for the mouse or tablet, and code other than 000012A0 (good) or 00000000 (nothing connected) indicates a failure in the device connected.

## 7.3.2 Diskless System

If you have a diskless system, you will see a configuration display similar to the following:

```
KA42-B   V1.3
ID 08-00-2B-07-05-02
    MONO          0000.0001
    CLK           0000.0001
    NVR           0000.0001
    DZ            0000.0001
        00000001 00000001 00000001 00000001 00000001 000012A0
    MEM           0008.0001
        00800000
    MM            0000.0001
    FP            0000.0001
    IT            0000.0001
    SYS           0000.0000
    8PLN          0000.0001  V1.3
    NI            0000.0001
    >>>
```

## 7.4 Testing Internal Storage Devices

You can use TEST 50 to check the status of hard disk drives, a tape drive, and a diskette drive installed in your system unit.

To determine the status of a device using the TEST 50 configuration display, you first

- Ascertain the device's SCSI ID setting. Use the address column in the device display, explained in Section 7.6, to determine a device's SCSI ID setting.

- Find the SCSI-A line in the TEST 50 display.

Here is an example of the SCSI-A line. In this example, the eight alphanumeric SCSI-A codes are numbered 1 through 8 for your reference. These codes tell the functional status of each device and correspond to SCSI IDs 0 through 7.

```
?? SCSI-A     2828.0001    V1.3
   FFFFFF05 FFFFFF05 FFFFFF05 00000001 FFFFFF05 01000001 FFFFFF03 FFFFFF05
     ❶        ❷        ❸        ❹        ❺        ❻        ❼        ❽
```

The SCSI IDs shown in the example are identified below:

❶ SCSI ID 0 — open

❷ SCSI ID 1 — open

❸ SCSI ID 2 — open

❹ SCSI ID 3 — RZ22/RZ23/RZ24 hard disk

❺ SCSI ID 4 — open

❻ SCSI ID 5 — TZ30 tape drive (shown) or RX23 diskette drive

❼ SCSI ID 6 — SCSI–A controller

❽ SCSI ID 7 — open

An easy way to determine if any device errors are detected is by looking for double question marks in the left column as shown in the example. Two question marks indicate that one or more of the drives are faulty. To determine which device is faulty, examine the status codes. If you see a status code different from those listed in Table 7–2, the device may be faulty.

**Table 7–2    SCSI Status Codes Indicating Good Devices**

| Status Code | Device |
|---|---|
| FFFFFF03 | SCSI bus controller |
| 00000001 | RZ22, RZ23, RZ24, RX23, or RZ55 disk drive |
| 01000001 | TZ30 tape drive |

The status codes in Table 7–3 may indicate faulty devices or open SCSI IDs.

**Table 7–3    SCSI Status Codes Indicating Possible Problems**

| Status Code | Device |
|---|---|
| FFFFFF05 | Device is offline or not installed at this address |
| FFFFFFFF | Device not tested—possible SCSI bus controller error |

If a device is set to a SCSI ID that indicates FFFFFF05 in the SCSI-A line, the device's SCSI ID may be set incorrectly or its cabling may be disconnected. Check the device's cabling and SCSI ID setting, and then retest it. If the code is still FFFFFF05 after retesting, call your Digital service representative.

If you see any code different from those listed in Table 7–2 or Table 7–3, make sure that no two devices are set to the same SCSI ID. If you still have problems, call your Digital service representative.

For more information on SCSI status codes, see Appendix C.

## 7.5  Testing Memory Modules

To check the functional condition of memory modules, find the
MEM line in the configuration display. If a system's memory is
good, a line similar to the one below appears:

```
MEM          0008.0001 ❶
        00800000 ❷
```

The 8-digit decimal code following MEM, (❶) indicates the
amount of error-free memory available, as follows:

- 0004.0001 means the system has 4 megabytes of memory

- 0008.0001 means the system has 8 megabytes of memory

- 0010.0001 means the system has 16 megabytes of memory

- 0014.0001 means the system has 20 megabytes of memory

- 0018.0001 means the system has 24 megabytes of memory

- 0020.0001 means the system has 32 megabytes of memory

When the first three digits in the second line of code (❷) match
the three digits preceding the decimal in the first line (❶) all the
memory in the system is good. For example, in the example MEM
display, the matching 008s indicate that there are 8 megabytes of
good memory.

When the system detects a memory error, you see double question
marks and a second, 8-digit error code in line two. For example:

```
?? MEM          0008.0020
        01000000    00000023
```

The second error code in line two indicates the module or modules
containing failed memory. A digit other than 0 in the first seven
digits indicates an error in a memory module. For example, the 2
in the example error code indicates there is an error in a memory
module. A digit other than 0 in the last digit indicates failing
memory on the system module. For example, the 3 in the last
digit of the error code indicates failing memory on the system
module.

To use the error code to determine the failing modules, do the
following:

1   Find the nonzero digits in the error code.

**2** Refer to Table 7–4 and find the line that shows your system's total memory module configuration.

**3** In that line, locate the position of each nonzero digit in the error code. The nonzero digit positions, numbered 1 to 8 from left to right, correspond to the digits in the error code.

The entry at each position indicates a failing module as follows:

- S indicates an error in the system module memory.
- 4 indicates an error in the 4-megabyte module.
- 8 indicates an error in the 8-megabyte module.
- 12 indicates an error in the 12-megabyte module.
- 16 indicates an error in the 16-megabyte module.

Suppose, for example, that a system with a 4-megabyte memory module produces a 00000023 error code. The nonzeros in digits 7 and 8 show a "4" and an "S" in the 4 MByte module line in Table 7–4. This means that the 4-megabyte memory module and the system module have failing memory and you should replace them.

### Table 7–4  8-Digit Memory Error Code

| Installed Modules | Modules with Failing Memory Nonzero Digits | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| System module | 0 | 0 | 0 | 0 | 0 | 0 | 0 | S |
| 4 MByte module | 0 | 0 | 0 | 0 | 0 | 0 | 4 | S |
| 4 and 8 MByte modules | 0 | 0 | 0 | 0 | 0 | 8 | 8 | S |
| 12 MByte module | 0 | 0 | 0 | 0 | 12 | 12 | 12 | S |
| 16 MByte module | 0 | 0 | 0 | 16 | 16 | 16 | 16 | S |
| 4 and 16 MByte modules | 0 | 0 | 16 | 16 | 16 | 16 | 4 | S |
| 12 and 8 MByte module | 0 | 0 | 12 | 12 | 12 | 8 | 8 | S |
| 12 and 16 MByte modules | 16 | 16 | 16 | 16 | 12 | 12 | 12 | S |

In Table 7–4, each digit contains the status of 4 banks of memory (1 bank = 1 megabyte of memory).

## 7.6 Device Display

You use the SHOW DEVICE command to show the devices installed in your system and where they are located on the SCSI bus.

```
>>>  SHOW DEVICE  [Return]
```

In the following example display, elements are numbered for identification below.

| VMS/VMB | ULTRIX | ADDR | DEVTYP | NUMBYTES | RM/FX | WP | DEVNAM |
|---------|--------|------|--------|----------|-------|-----|--------|
| ESA0 | SE0 | 08-00-2B-07-E3-83 ❶ | | | | | |
| DKA300 | RZ3 | A/3/0/00 | DISK | 104 MB | FX | | RZ23 |
| MKA500 | TZ5 | A/5/0/00 | TAPE | ....... | RM | WP | |
| ...HostID.... | | A/6 | INITR | | | | |
| DKB100 | RZ9 | B/1/00 | DISK | 332 MB | FX | | RZ55 |
| DKB200 | RZ10 | B/2/0/00 | DISK | 104 MB | FX | | RZ23 |
| DKB300 | RZ11 | B/3/0/00 | DISK | 104 MB | FX | | RZ23 |
| DKB400 | RZ12 | B/4/0/00 | RODISK | 205 MB | RM | WP | RRD40 |
| DKB500 | RZ13 | B/5/0/00 | DISK | 665 MB | FX | | RZ56 |
| ...HostID.... | | B/6 | INITR | | | | |

```
>>>
   ❷         ❸         ❹         ❺         ❻         ❼         ❽         ❾
```

❶ Ethernet device and Ethernet hardware address

❷ Device numbers for VMS operating system

❸ Device numbers for ULTRIX operating system

❹ Address — Tells which SCSI bus (A or B) a device is on and the device's SCSI ID setting.

❺ Device type (disk, tape, or RODISK (read-only disk)). INITR (initiator) is the host Model 38.

❻ Number of megabytes available

**Note** *RRD40 is a read-only device. The MB display will vary, depending on the number of files that are loaded on the CD by the manufacturer.*

❼ Removable (RM) or fixed (FX) disk

❽ Write-protected

❾ Device name

Consider, for example, the following line from the previous display:

```
DKB400  RZ12   B/4/0/00  RODISK  205 MB  RM   WP   RRD40
```

This line indicates an RRD40 compact disc drive, located at address ID 4 on the SCSI-B bus. The RRD40 compact disc is a read-only, removable disc and is write-protected.

Table 7–5 explains the mnemonics used in the SHOW DEVICE display.

**Table 7–5    SHOW DEVICE Display Column Heads**

| Identifier | Definition |
|------------|------------|
| VMS/VMB | Device name for VMS operating system software |
| ULTRIX | Device name for ULTRIX operating system software |
| ADDR | Address |
| DEVTYP | Device type |
| NUMBYTES | Number of megabytes |
| RM/FX | Removable or fixed device |
| WP | Write protected |
| DEVNAM | Device name |

## 7.7 Using the System Exerciser

If you suspect problems, use the system exerciser to check the quality of your software media.

The system exerciser emulates an operating system through interaction among devices within the system. The system exerciser tests all internal and external devices. Use the system exerciser if your system has intermittent problems. It exercises each device once sequentially, then exercises them simultaneously. The system exerciser takes as long as 11 minutes to complete. It will not write on any medium.

**Note** *See operating system documentation for shutdown procedures before turning your system off. Also, you should not turn off, halt, or restart the system without notifying work group members.*

To test your system, run the system exerciser:

1   Insert media in all devices. Put the RRD40 test disc in the compact disc drive, blank tape cartridges in the TK50Z–GA or TZ30 tape drives, and a blank diskette in the RX23 diskette drive.

2   Put the system in console mode by pressing the halt button on the back of the system unit.

3   Enter the following command:

```
>>>   TEST 0   Return
```

The following example shows the display that appears after the system exerciser has run all tests. Numbered display elements are explained below.

```
KA42-B  V1.3          01     CU
    F   00B0   MONO    0000.0001   11 1005    0 00:00:35
    C   0080   DZ      0000.0001   14         0 00:01:12
    B   0010   MEM     0010.0001    5 00A7    0 00:02:02
    7   0090   SCSI-A  6000.0001   22 0002    0 00:02:23
                       3200.0001 ❶
    6   00A0   SCSI-B  6000.0001   15 0002    0 00:02:56
                       2200.0001 ❷
                       3200.0001 ❸
                       4100.0001 ❹
                       7200.0001 ❺
    1   00C0   NI      0000.0001    9         0 00:04:01

    ❻    ❼      ❽         ❾

   00   0.00:08:14
   ?06  HLT INST
        PC - 00005A0F
  >>>
```

❶ RZ23 disk drive (user disk)

❷ RZ23 disk drive (system disk)

❸ RZ23 disk drive (user disk)

❹ RRD40 compact disc drive

❺ TK50Z–GA expansion box

❻ Column of test numbers of the device identifiers (see Table 7–1)

❼ Column of device identifiers

❽ Column of device mnemonics (see Table 7–1)

❾ Status and error information for each device

Various graphics tests display on the screen during the system exerciser. Single question marks provide status information and do not interfere with the operation of the system. Double question marks in the final display indicate errors.

If you see double question marks next to the tape drive mnemonic on SCSI-A or SCSI-B bus, and you ran the system exerciser with test cartridges in the drives, try different cartridges. Your cartridge may be the source of the problem.

If you see any other double question marks, call your service representative for assistance. Know the mnemonic associated with the double question marks. Table 7–1 identifies the device that corresponds to each mnemonic. Have this information ready when you call your service representative.

## 7.8  Test Utilities

This section discusses the RRD40 test disc utility and the erase disk utility for SCSI hard disks.

**Note** *If an expansion box fails, first check all cable connections.*

### 7.8.1  RRD40 Test Disc Utility

The RRD40 compact disc drive is shipped with a test disc to use when you suspect RRD40 compact disc drive problems. Follow these steps to test your RRD40 compact disc drive.

**Note** *See operating system documentation for shutdown procedures before turning your system off. Also, you should not turn off, halt, or restart the system without notifying work group members.*

1  Press the halt button on the back of your system unit. The console prompt (>>>) is displayed on your screen.

2  Insert the test disc in the RRD40 compact disc drive, following the instructions in Section 4.8.4.

3  Enter TEST 0 and press the Return key. The system exerciser display appears on your screen.

4  The numbers 4100.0001 as part of the system exerciser display indicate a normal response code.

5  A 4101.0471 error code on the screen display indicates a problem with the RRD40 compact disc drive. A 4104.0A71 error code on the screen display indicates that the RRD40 compact disc drive has failed the test. Do not use the drive. Call your Digital service representative for assistance.

### 7.8.2  Erase Disk Utility for SCSI Hard Disks

The erase disk utility erases all data on a specified hard disk.

**Caution** *This utility destroys all data on the hard disk.*

**Note** *See operating system documentation for shutdown procedures before turning your system off. Also, you should not turn off, halt, or restart the system without notifying work group members.*

1   Press the halt button on the back of your system unit. The
    console prompt (>>>) is displayed on your screen.

2   Enter SHOW DEVICE and press the Return key.

3   Enter TEST 50 and press the Return key. See Section 7.3 for
    an example of the TEST 50 screen display.

4   Identify the SCSI ID of the hard disk you wish to erase. See
    Appendix B for additional information.

5   Enter the TEST 75 command and press the Return key.

    The following example shows the erase disk utility erasing the
    hard disk in an RZ55 expansion box. The hard disk in this
    example is located on SCSI-B bus address ID 1. The erasing
    procedure completes successfully.

**Note:** *The output below is common to both formatting and erasing
programs. When you run TEST 75 ScsHDerase program, the
formatting portion will not be activated. Successful erasure will be
indicated by the readout on line* ❻.

**Caution** *This utility destroys all data on the hard disk.*

```
>>> TEST 75  Return

ScsHDerase
PV_SCS_FMT_CHN   (0=SCSIA, 1=SCSIB)?   1  Return        ❶
PV_SCS_FMT_ID    (0,1,2,3,4,5,6,7)?    1  Return        ❷
PV_SCS_FMT_RUSURE (1/0)?    1  Return                   ❸

PV_SCS_FMTING.........................                  ❹
PV_SCS_FMT_BBrepl=0                                     ❺

PV_SCS_FMT_SUCC                                         ❻

>>>
```

❶  Select the SCSI-A bus or SCSI-B bus. SCSI-B bus is selected
    in the example.

❷  Specify the SCSI ID. SCSI ID 1 is selected in the example.

❸  Provide verification of your action: 1 = yes; 0 = no.

❹  Your hard disk is being erased.

❺  The number of bad blocks is listed.

❻  Your hard disk has been successfully erased.

Running the erase disk utility on the hard disk located at SCSI
address ID 3, SCSI-B bus, produces a screen display like the one
below, which includes an error.

```
>>> TEST 75 Return

ScsHDerase
PV_SCS_FMT_CHN (0=SCSIA, 1=SCSIB)?   1 Return
PV_SCS_FMT_ID (0,1,2,3,4,5,6,7)?   3 Return
PV_SCS_FMT_RUsure (1/0)?   1 Return

PV_SCS_FMTing....................?

PV_SCS_FMT_ERR#3

>>>
```

Table 7–6 lists the error messages that can appear for the erase
disk utility and gives an explanation for each message.

**Table 7–6    Error Messages for Erase Disk Utility**

| Code | Meaning |
|------|---------|
| 1 | Illegal unit number entered |
| 2 | Error occurred during a SCSI bus command |
| 3 | Reassign blocks failed (no more replacement blocks available) |
| 4 | Unit not ready |
| 5 | Illegal device type for operation |
| 6 | SCSI bus hung after reset attempts |
| 7 | Data compare error |

## 7.9 Changing the Keyboard Language

To change the language of your keyboard, make sure your system is in console mode by pressing the halt button on the back of your system unit.

**Note** *See your operating system documentation for shutdown procedures before turning your system off. Also, you should not turn off, halt, or restart the system without notifying work group members.*

1   At the console prompt (>>>), enter TEST 54 and press the Return key. The Keyboard Language Menu appears.

2   Select a language from the keyboard language menu.

In the following example, the keyboard language is changed from English (3) to Italiano (9).

```
>>>   TEST 54  Return

0) Dansk                         8) Français (Suisse Romande)
1) Deutsch                       9) Italiano
2) Deutsch (Schweiz)            10) Nederlands
3) English                      11) Norsk
4) English (British/Irish)      12) Português
5) Español                      13) Suomi
6) Français                     14) Svenska
7) Français (Canadien)          15) Vlaams

3? >>>   9  Return
```

# 7.10 Console Commands

Console commands, and the tests or utility programs they execute, are listed in Table 7–7, Table 7–8, and Table 7–9.

To see a list of these commands, enter HELP at the console prompt and press the Return key.

**Table 7–7      SHOW Commands**

| Command | Information Displayed |
| --- | --- |
| HELP | All commands |
| SHOW BFLG | Default boot flag |
| SHOW BOOT | Default boot device (see Section A.3.) |
| SHOW DEVICE | Boot devices available (see Section A.1.) |
| SHOW ETHER | Hardware Ethernet address |
| SHOW HALT | Default action after your system halts (see Section A.2.) |
| SHOW KBD | Keyboard type selected (see Section 7.9.) |
| SHOW MEMORY | Memory for your system unit |
| SHOW PSE | Password enable bit |
| SHOW SCSIA | SCSI-A bus host ID number |
| SHOW SCSIB | SCSI-B bus host ID number |
| SHOW VER | Version of ROM |

**Table 7–8      SET Commands**

| Command | Default Set |
| --- | --- |
| SET BFLG | Default boot flags |
| SET BOOT | Default boot device |
| SET HALT | Default recovery action |
| SET KBD | Keyboard language |
| SET PSE | Password enable bit |
| SET PSWD | Password Security Feature |
| SET SCSIA | SCSI-A bus host ID number |
| SET SCSIB | SCSI-B bus host ID number |

**Table 7-9    TEST Commands**

| Command | Test or Utility Program |
|---------|-------------------------|
| TEST F | Self-test on base video (MONO) |
| TEST E | Self-test on system clock (CLK) |
| TEST D | Self-test on nonvolatile RAM (NVR) |
| TEST C | Self-test on serial line controller (DZ) |
| TEST B | Self-test on system memory (MEM) |
| TEST A | Self-test on memory-management unit (MM) |
| TEST 9 | Self-test on floating point unit (FP) |
| TEST 8 | Self-test on interval timer (IT) |
| TEST 7 | Device controller—SCSI-A |
| TEST 6 | Device controller—SCSI-B |
| TEST 5 | Self-test on interrupt controller and Ethernet ID ROM (SYS) |
| TEST 4 | Self-test on 8-plane graphics coprocessor option (8PLN) |
| TEST 3 | Reserved |
| TEST 2 | Reserved |
| TEST 1 | Self-test on the Ethernet circuits (NI) |
| TEST 0 | System exerciser |
| TEST 50 | Configuration display |
| TEST 54 | Language inquiry menu |
| TEST 75 | SCSI disk data eraser (erase disk utility) |
| TEST 76 | Floppy diskette formatter |

## 7.11  Password Security Feature

In normal operation, your VAXstation 3100 allows all console
operator privileges, such as HALT, SET, DEPOSIT, EXAMINE,
etc. Some customers require that direct access to memory and
kernel system operation be restricted to authorized personnel only.
To implement this restricted access, a password security feature is
available in console access and operation.

A password security feature can be initiated by using the console
command LOGIN, which is not the same as the VMS LOGIN
command. The system will ask for a password, after which access

to privileged console commands will be allowed only to users possessing the password code.

**Note** *This password must be a character string of exactly 16 hexadecimal characters (0 through 9, A through F). It is important that you make a note of your password and store it in a secure place. If you forget your password, you must call your Digital service representative to regain access to the privileged console mode of your system.*

Examples of how to set and enable the password feature appear in Section 7.11.1.

The privileged console commands are:

 BOOT (with parameters)
 DEPOSIT
 EXAMINE
 FIND
 HALT
 INITIALIZE
 LOAD
 MICROSTEP
 NEXT
 REPEAT
 SET
 SHOW
 START
 UNJAM
 X
 @

Any commands which modify memory and registers, or commands which transfer control of the CPU from the console monitor to another program such as BOOT or START.

This privileged state will continue until such time as the user leaves the console state by using the BOOT, CONTINUE, HALT or START commands. Subsequent entries into the privileged state can only be gained by use of the 16-character password.

Console commands accepted in nonprivileged mode (secure) include:

 LOGIN (to allow password entry to the privileged state)
 BOOT (with no parameters)

CONTINUE (if the user inadvertently pushes the HALT
button, this command allows them to continue operations in a
non-privileged mode)

! (to enter optional text not to be acted upon by the computer)

### 7.11.1 Enabling the Password Security Feature

Your VAXstation 3100 arrives from the factory with the password
security feature disabled, and the password set to 0. Follow these
steps to initialize the password security feature on your system.

1   At the console prompt (>>>) type in SET PSWD and press the
    Return key.

2   The console responds with the prompt (1 >>>). Type in your
    password and press the Return key. As you type in the
    password, it will not echo on the screen.

**Note** *This password must be a character string of exactly 16*
*hexadecimal characters (0 through 9, A through F). It is*
*important that you make a note of your password and store*
*it in a secure place. If you forget your password, you must*
*call your Digital service representative to regain access to the*
*privileged console mode of your system.*

3   The console will respond with the prompt (2 >>>). Type in
    your password a second time for verification, and press the
    Return key. Again, as you type in the password, it will not
    echo on the screen.

4   If the two passwords that you have typed in do not match,
    then the console will abort the command and the following
    error message will be displayed:

    ?31 ILL PSWD

5   If the two passwords that you have typed in match, your
    password is preserved in nonvolatile memory, preserving the
    password value, even if power is removed from the system
    unit.

Now your password is ready for use. If you wish to change the
password, this can be done in the privileged mode using the SET
PSWD command. To reset your password, follow these steps.

1   At the console prompt (>>>) type in SET PSWD and press the
    Return key.

**2** The console responds with the prompt (0 >>>). Type in your old password and press the Return key. As you type in the password, it will not echo on the screen.

**3** If you have correctly entered the old password, the console will respond with the prompt (1 >>>). Type in your new password and press the Return key. Again, as you type in the password, it will not echo on the screen.

**Note** *This password must be a character string of exactly 16 hexadecimal characters (0 through 9, A through F). It is important that you make a note of your password and store it in a secure place. If you forget your password, you must call Digital customer service to regain access to the privileged console commands.*

**4** The console will respond with the console prompt (2 >>>). Type in your new password again, for verification, and press the Return key. Again, as you type in the password, it will not echo on the screen.

**5** If the two passwords that you have typed in do not match, then the console will abort the command and the following error message will be displayed:

```
?31 ILL PSWD
```

**6** If the two passwords that you have typed in match, your new password is preserved in nonvolatile memory, preserving the password value, even if power is removed from the system unit.

Once your password is correctly entered, the password feature can be enabled by setting the password enable bit (PSE) to a one. Follow these steps to enable the password feature.

**1** At the console prompt (>>>) type in SHOW PSE and press the Return key.

**2** The console will respond with a 0 on the next line.

**3** At the console prompt (>>>) type in SET PSE 1 and press the Return key.

**4** The password security feature is now enabled. You will no longer be able to use the privileged commands without logging in.

**5** To test this, type in SHOW PSE at the console prompt (>>>) and press the Return key.

**6** The console will respond with the following code:

?23 ILL CMD

**7** You must now log in at the console prompt to use SHOW or other privileged commands. At the console prompt (>>>) type in LOGIN and press the Return key.

**8** The console will respond with the prompt (? >>>). Type in your 16-character password and press the Return key.

**9** If the password you type in is not correct, the console responds with the following code:

?23 ILL CMD

**10** If the password was accepted, you may now proceed to use privileged commands or you may disable the password feature by typing the command SET PSE 0 at the console prompt (>>>) and pressing the Return key.. As you perform any of the commands in the privileged state (except for SET PSE 0) and leave the console mode, the console will be left in a secure state. Use of the password will once again be required to perform privileged commands once you return to the console mode.

## 7.12 Rebooting the System After Running Tests

While you are running any of the tests or procedures in this chapter, you are in console mode. To resume normal operation of the Model 38, you must reenter **program mode**. There are two ways to enter program mode:

**1** Enter BOOT at the console prompt and press the Return key. The system then searches each device in turn for the operating system software.

**2** Enter BOOT followed by a space and the name of the device that contains your software, as shown in the following example:

>>> BOOT DKA300   [Return]

This procedure lets the system boot the software immediately, without searching.

See Appendix A for information on setting your system parameters.

## 7.13 Service Information

If you followed the corrective actions listed in Chapter 6 and Chapter 7 and you continue to have problems with your Model 38, call your Digital service representative. Before you call:

1   Write down the serial and model numbers of your system. Your service representative may need these numbers when you call. Your system is identified on the back of the system unit with a label: Model: VS42A–xx is a VAXstation 3100 Model 38 system. The numbers in place of xx identify the contents of the system unit.

2   Make notes based on Table 6–1. This information helps your service representative know the state of your system when the problem occurred.

3   Be prepared to read information from the screen and to enter commands at the keyboard while you talk to your service representative on the telephone.

4   Eight recessed diagnostic lights on the back of the system unit come on when you turn on the system. Write down the status of these lights. Your service representative may ask you to describe which lights are on. Figure 7–2 shows that lights 7, 4, 2, 1, and 0 are on.

**Figure 7–2    Diagnostic Lights**



MLO-002326

# 8
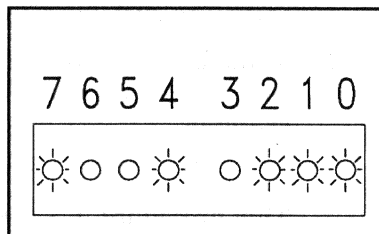
# Available Options

This chapter describes the hardware options available for your
VAXstation 3100 system. You can add many of these hardware
options inside your system unit yourself using instructions
provided in Chapter 9.

## 8.1 Hard Disk Drives

A hard disk drive stores information on a nonremovable disk.
Internal hard disks available for the VAXstation 3100 system are
the RZ22, RZ23, and RZ24. You can add one, two, or three hard
disks inside the system unit as described in Chapter 9. The RZ55
hard disk is available in an external expansion box. To purchase
a hard disk, call DECdirect by dialing 1–800–DIGITAL, or consult
your Digital sales representative.

Table 8–1 lists the internal and external hard disks available for
your system.

**Table 8–1    Hard Disk Drives**

| Disk Type | Storage Available | Location |
|-----------|-------------------|----------|
| RZ22 | 55.5 MB | Internal |
| RZ23 | 104 MB | Internal |
| RZ24 | 209 MB | Internal |
| RZ55 | 332 MB | Expansion box |

**Note** *If you currently have a diskless system, you must add a drive plate
with a SCSI mass controller to your system. Contact your Digital
sales representative for information on ordering a SCSI/SCSI
Disk Drive Plate Controller Kit (VS42D–JH).*

## 8.2 Memory

The VAXstation 3100 system can have up to 32 megabytes of memory. The additional memory expansion modules are shown in Table 8–2.

**Table 8–2    Optional Memory Expansion Modules**

| Module Number | Description |
|---|---|
| MS42–AB | 4-megabyte memory expansion module |
| MS42–KA | 8-megabyte memory expansion module |
| MS42–BA | 12-megabyte memory expansion module |
| MS42–CA | 16-megabyte memory expansion module |

You can add memory modules inside the system unit to form various configurations as described in Section 9.3. To purchase memory modules, call DECdirect by dialing 1–800–DIGITAL, or consult your Digital sales representative.

## 8.3 Tape Drive

The TZ30 tape drive allows you to load additional software from a tape cartridge. You can add the TZ30 tape drive inside the system unit as described in Chapter 9. To purchase a TZ30 tape drive, call DECdirect by dialing 1–800–DIGITAL, or consult your Digital sales representative.

## 8.4 Diskette Drive

The RX23 diskette drive allows you to load additional software from a floppy diskette. You can add an RX23 inside the system unit as described in Chapter 9. To purchase an RX23 diskette drive, call DECdirect by dialing 1–800–DIGITAL, or consult your Digital sales representative.

## 8.5 Graphics Coprocessor Module/Color Option

The graphics coprocessor module/color option allows you to run color graphics software applications. You can add a graphics coprocessor module/color option inside your system unit as described in Chapter 9. To purchase a graphics coprocessor module/color option, call DECdirect by dialing 1–800–DIGITAL, or consult your Digital sales representative.

## 8.6 SPX Color Graphics Accelerator

The SPX Color Graphics Accelerator option allows you to run
color graphics software applications. You can add a SPX Color
Graphics Accelerator inside your system unit by following
the documentation that ships with the product. To purchase
a SPX Color Graphics Accelerator, call DECdirect by dialing
1–800–DIGITAL, or consult your Digital sales representative.

## 8.7 Guidelines for Adding Internal Devices

Your VAXstation 3100 Model 38 system unit has a maximum
configuration for devices:
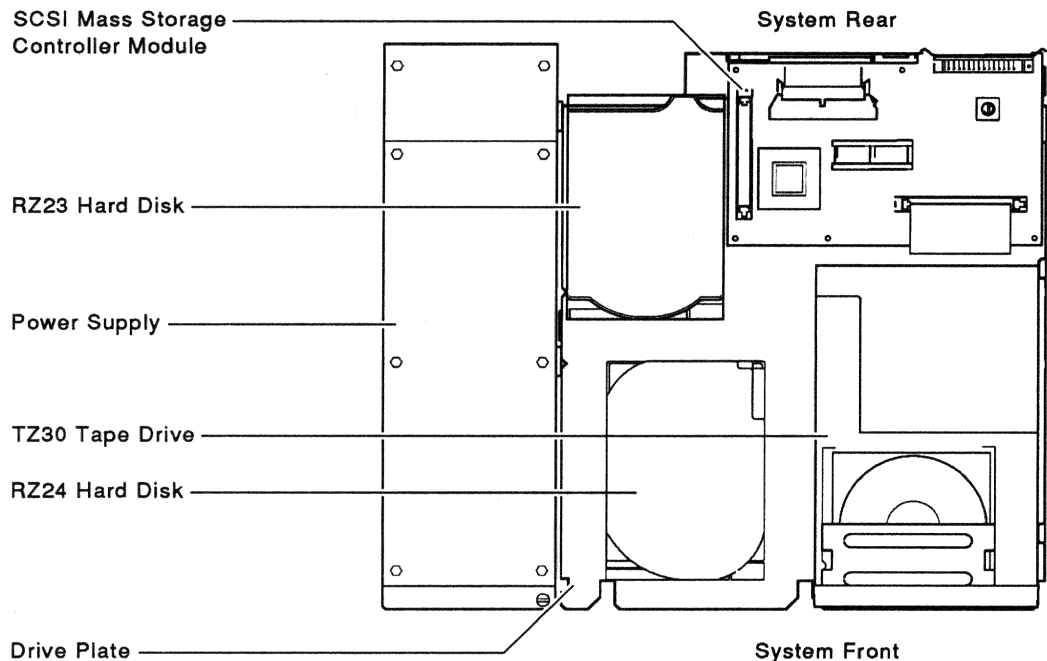
- 32 megabytes of memory including the 4 megabytes that come
  with the system.

- One graphics coprocessor module/color option

- One SCSI mass storage controller module mounted on a drive
  plate

- Three storage devices. For instance,

  – Three RZ24 hard disks, or
  – Two hard disks with the TZ30 tape drive, or
  – Two hard disks with the RX23 diskette drive

Use the following guidelines when adding storage devices inside a
system unit.

- Digital recommends choosing one of the following
  configurations:

  – One to three RZ23 or RZ24 hard disks
  – One RZ22 hard disk
  – One RZ22 hard disk and one or two RZ23 or RZ24 hard
  disks
  – One RX23 diskette drive and one or two RZ23 or RZ24
  hard disks
  – One RX23 diskette drive and one RZ22 hard disk
  – One TZ30 tape drive and one or two RZ23 or RZ24 hard
  disks
  – One TZ30 tape drive and one RZ22 hard disk

Figure 8–1 shows a configuration with one TZ30 tape drive
and two RZ23 hard disks.

**Figure 8–1    Typical Internal Storage Device Configuration**

SCSI Mass Storage
Controller Module

System Rear

RZ23 Hard Disk

Power Supply

TZ30 Tape Drive

RZ24 Hard Disk

Drive Plate

System Front

MLO-004579

■  If you have a system without a hard disk, diskette drive, or a
   tape drive, you must add a drive plate with an attached SCSI
   mass storage controller module in order to support a storage
   device.

## 8.8 Printers

Table 8–3 lists the printers available for the VAXstation 3100 system.

**Table 8–3    Printers**

| Printer | Description |
|---------|-------------|
| LN03 | Desktop laser printer |
| LN03 PLUS | Enhanced LN03; prints text and graphics |
| LN03R ScriptPrinter | Nonimpact page printer; prints POSTSCRIPT text and graphics |
| LA100 | Desktop dot-matrix printing terminal |
| LA75 Companion Printer | Desktop dot-matrix printer; sixel graphics |
| LPS20 PrintServer | Networked POSTSCRIPT printer |
| LPS40 PrintServer | Networked POSTSCRIPT printer |

### 8.8.1  Connecting a Printer

When you order a printer, you need to order a DEC 423 serial line cable and the appropriate adapter to connect the printer to your VAXstation 3100 system. Consult your Digital sales representative to determine the correct adapter to order for your printer.

To connect a printer:

1   Use the documentation that comes with the printer

   ■  Unpack and set up the printer

   ■  Set the **baud rate** on your printer to 4800 baud before connecting it to your VAXstation 3100 system.

2   Make sure that the printer and all equipment, including expansion boxes and the system unit, are off.

3   Attach one end of the printer cable to the back of the printer. (Check the printer documentation.)

4   Attach the serial line cable to the other end of the printer cable.

**5** Attach the free end of the serial line cable to the printer port on the back of the system unit, as shown in Figure 8–2.

**Figure 8–2 Connecting a Printer**



Printer Cable
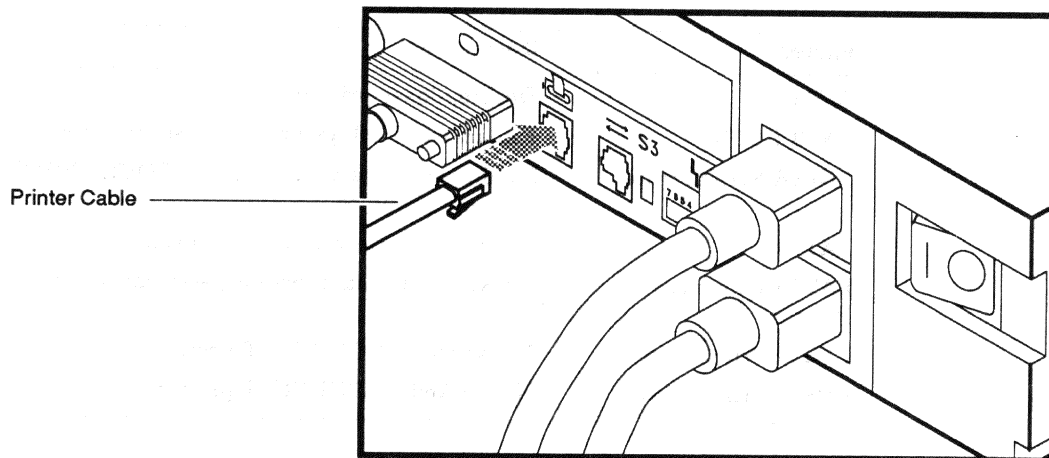
MLO-003417

When building your software, you will need the following information to set up a printer port for your VAXstation 3100. Table 8–4 lists the device names that are specific for your operating system.

**Table 8–4    Device Names for Your Operating System**

| Operating System | Device Name |
| --- | --- |
| VMS | TTA3: |
| ULTRIX | /dev/tty03 |

In addition to the device-specific information found in Table 8–4 you will find important information on connecting a printer to your operating system in the following documentation:

- For VMS:

    *System Management Volume 1A, Guide to Setting Up a VMS System*
    *General User Volume 4, DCL Dictionary*

- For ULTRIX:

    *System Manager Binder 3A, System Environment Setup*

# 8.9 Modems

A modem is a device that converts computer signals to signals that can be sent over a telephone line. Modems are typically used for communications in large networks, for instance **wide area networks (WANs)**.

Table 8–5 lists the modems available for the VAXstation 3100. You need to order a DEC 423 serial line cable and a 25-pin D-sub/DECconnect passive adapter to connect a modem to your system.

The communications port on the back of the system unit comes set at 1200 baud. Refer to your modem documentation for the correct baud for your modem. Autoanswer is not available; data leads only are connected.

See Section 8.9.1 for instructions on connecting your modem.

**Table 8–5    Modems**

| Modem | Description |
|-------|-------------|
| DF242 Scholar Plus | 300, 1200, and 2400 bps (bits per second) full duplex asynchronous |
| DF224 | 300, 1200, and 2400 bps full-duplex asynchronous |
| DF212 | 300, 600, and 1200 bps full-duplex asynchronous |
| DF112 | 300 and 1200 bps full-duplex asynchronous |
| DF03 | 300 and 1200 bps full-duplex asynchronous |

**Note** *Full modem support is not available on the communication port of the VAXstation 3100 Model 38. The 6-pin MMJ connector is for data-leads only and is recommended for local interconnects only.*
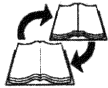
When building your software, you will need the following information to set up a modem port for your VAXstation 3100. Table 8–6 lists the device names that are specific for your operating system.

**Table 8–6    Device Names for Your Operating System**

| Operating System | Device Name |
| --- | --- |
| VMS | TTA2: |
| ULTRIX | /dev/tty02 |
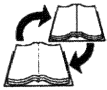
It is important that along with the device-specific information found in Table 8–6, you consult the following documentation for important information on connecting a modem to your operating system:

- For VMS:

  *System Management Volume 1A, Guide to Setting Up a VMS System*
  *System Management Volume 5A: Networking, Guide to DECNET VAX Networking*

- For ULTRIX:

  *System Manager Binder 3A, System Environment Setup*

### 8.9.1 Connecting a Modem

To connect your modem:

1  Make sure that the modem and other equipment, including the system unit, are off.

2  Follow the directions that come with your modem to set it up.

3  Use your modem guide to clear the Force DSR attribute on your modem. (By clearing the Force DSR attribute, your system will recognize the loss of modem connection, should it occur.)

4  Attach the 25-pin D-sub/DECconnect passive adapter to the back of the modem.

5  Attach one end of the DEC 423 serial line cable to the 25-pin D-sub/DECconnect passive adapter.

6  Attach the free end of the serial line cable to the communications port on the back of the system unit, as shown in Figure 8–3.

**Figure 8–3    Connecting a Modem**

Modem Cable
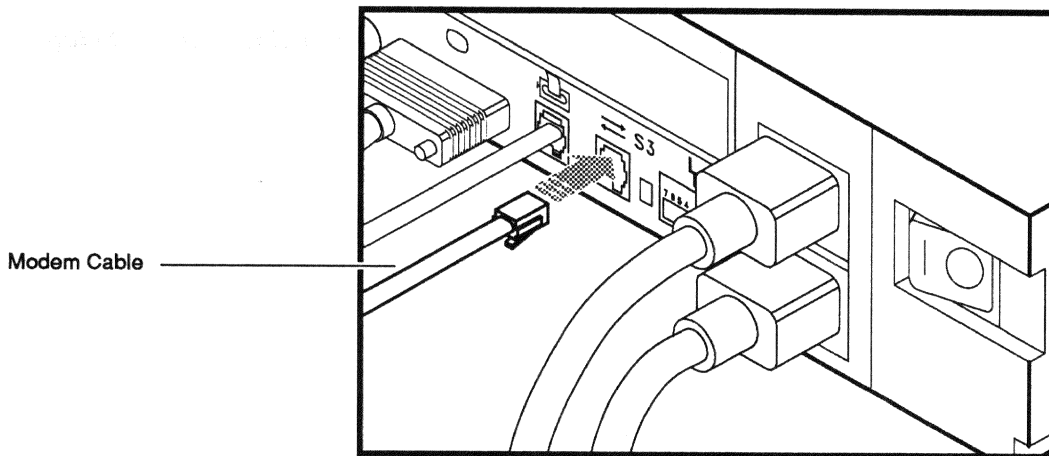
MLO-003416

## 8.10 Tablet

The tablet with the puck or stylus may be used as a pointing device instead of the mouse for menu selection, graphics entry, and pointer control. The VSXXX–AB tablet system consists of a digitizing tablet, a 4-button **puck**, a 2-button **stylus**, and a 1.5-meter (5-foot) power/signal cable.

To connect your tablet, follow the directions for connecting a mouse in Chapter 2.

## 8.11 Monitors

Several monitors are available for the VAXstation 3100. Contact your Digital sales representative for more information.

## 8.12 Color Option/Graphics Coprocessor Module

To add color to your system, you can order an 8-plane graphics coprocessor module/color option and color monitor. To purchase this option, call DECdirect by dialing 1–800–DIGITAL, or consult your Digital sales representative.

The graphics coprocessor module/color option supports monitors with a **resolution** of 1024 by 864 **pixels** and displays up to 256 colors from a palette of 16.7 million.

## 8.13 SPX Color Graphics Accelerator

The SPX Color Graphics Accelerator is a higher performance graphics option which supports both monitors with a high resolution 1280 by 1024 pixels and monitors with a lower resolution of 1024 by 864 pixels. The SPX Color Graphics Accelerator displays up to 256 colors from a palette of 16.7 million.

## 8.14 Cable Option

There are short 1-meter (3-foot) cables and long 3-meter (10-foot) cables available for your VAXstation 3100. The short cable comes standard with your VAXstation 3100, while a long cable is available for some options. Before ordering cables, verify that a long cable is available for your configuration, especially for the SPX Color Graphics Accelerator.

To connect a long monitor cable to your monitor, follow the directions in your monitor guide. Do not connect the keyboard and mouse to the monitor cable as shown in the monitor book. Connect them to the back of the system unit as shown in Section 2.3.

# 9

# Adding Optional Devices Inside Your System Unit

You can choose one of two ways to add optional devices inside your system unit. You can either add the devices yourself or you can have a Digital service representative add the devices for you. If you choose to add devices yourself, note the following:

- Additions may take from 2 to 4 hours.

- The instructions in this chapter assume you are familiar with the VAXstation 3100 system and the following diagnostic test displays:

  - System power-up messages

  - Configuration display resulting from the TEST 50 console command

  - System exerciser display resulting from the TEST 0 console command

  - SHOW DEVICE console command display

- Improper addition of a device or module could lead to a device or module failure. The VAXstation 3100 warrantee may not cover such a failure.
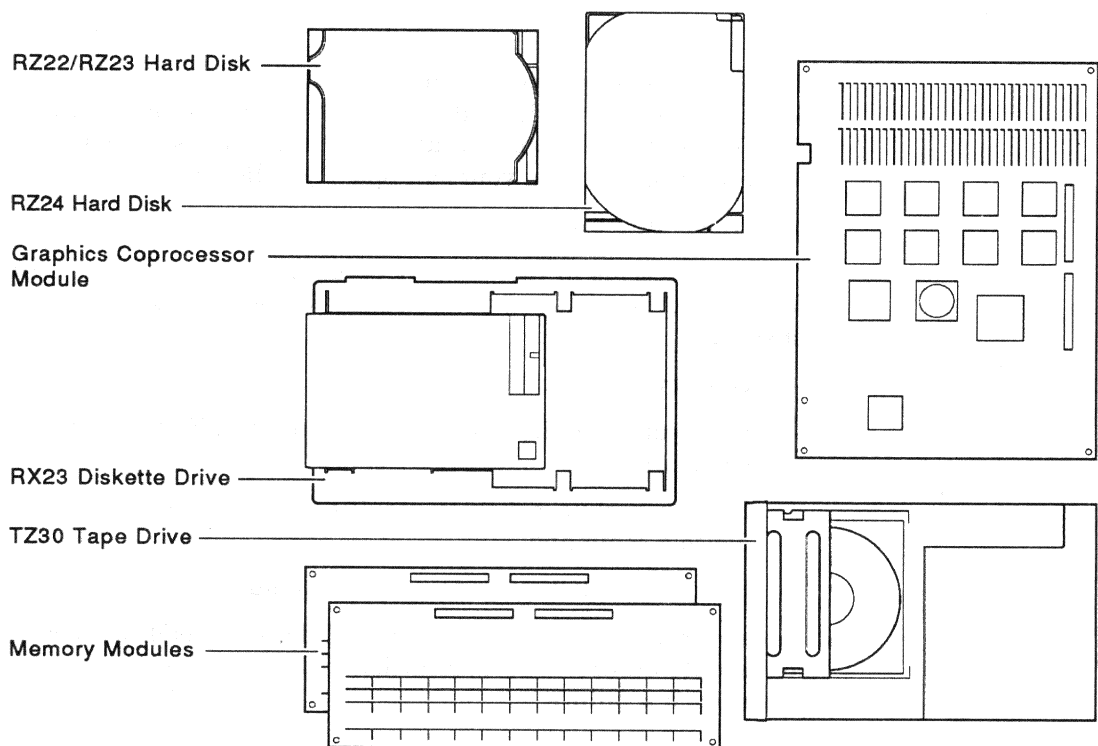
Devices you can add include:

- Memory modules (Section 9.3)

- Graphics coprocessor module/color option (Section 9.4)

- SPX color graphics accelerator (see documentation that ships with the SPX color graphics accelerator)

- SCSI mass storage controller module mounted on a drive plate. Required for the addition of storage devices. (Section 9.5)

- TZ30 tape drive (Section 9.9)

- RX23 diskette drive (Section 9.8)

- RZ23 or RZ22 hard disks (Section 9.10)

- RZ24 hard disks (Section 9.11)

Figure 9–1 shows the types of devices and modules you can add to upgrade your system unit.

**Figure 9–1    Modules and Devices You Can Add**



RZ22/RZ23 Hard Disk

RZ24 Hard Disk

Graphics Coprocessor Module

RX23 Diskette Drive

TZ30 Tape Drive

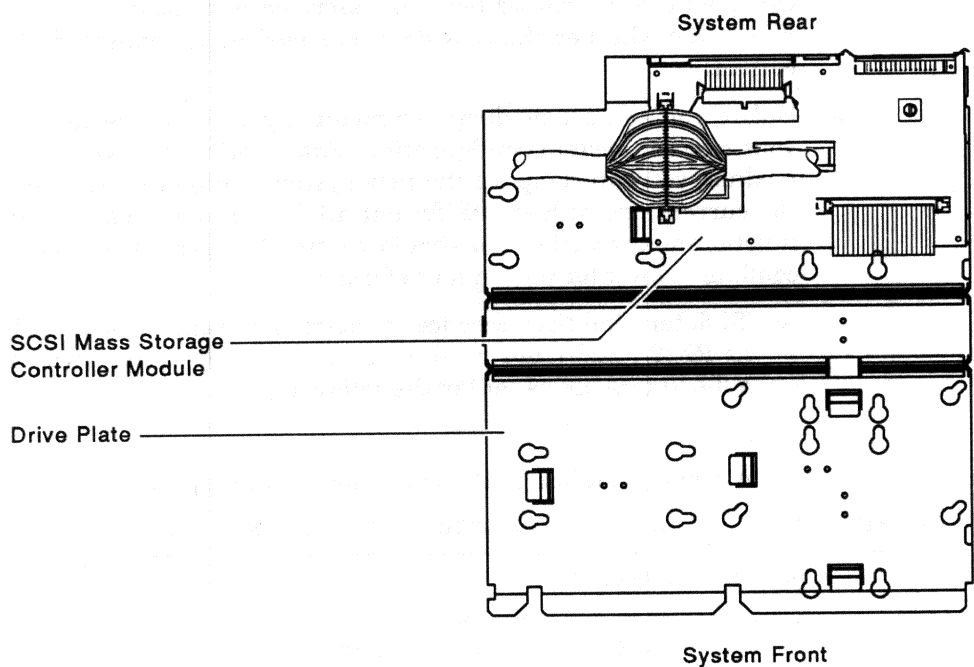Memory Modules

MLO-004594

Figure 9–2 shows the SCSI mass storage module and drive plate assembly you must add to the system unit to support internal storage devices and external expansion boxes.

**Figure 9-2    SCSI Mass Storage Controller Module and Drive Plate**

System Rear

SCSI Mass Storage
Controller Module

Drive Plate

System Front

MLO-004583

## 9.1  Preparing Your System

To prepare the system unit:

1    If you have files stored on a system disk, make a back-up copy following the instructions in your software documentation.

**Note** *See operating system documentation for shutdown procedures before turning your system off. Also, you should not turn off, halt, or restart the system without notifying work group members.*

2    Put your system into console mode by pressing the halt button on the rear of the system. (The halt button is shown in Figure 7-1.) Enter the following command:

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

After you have added the new device or module, your system will halt at the console prompt when you first turn it on. You can then use diagnostic tests as described in Section 9.16 to determine whether the new device or module is connected correctly.

3 Before you add a new device or module, you should review your current system configuration. After adding a device or module, you can compare the new system configuration with the current one to help verify that all devices are present and functioning correctly. You should record the current system configuration information for reference.

- To determine the presence of internal storage devices such as RZ22/RZ23/RZ24 hard disks, an RX23 diskette drive, or a TZ30 tape drive, enter the following command:

>>> SHOW DEVICE [Return]

A display similar to the one below should appear:

| VMS/VMB | ULTRIX | ADDR | DEVTYP | NUMBYTES | RM/FX | WP | DEVNAM |
|---------|--------|------|--------|----------|-------|----|--------|
| ESA0 | SE0 | 08-00-2B-07-E3-83 | | | | | |
| DKA300 | RZ3 | A/3/0/00 | DISK | 104 MB | FX | | RZ23 |
| MKA500 | TZ5 | A/5/0/00 | TAPE | ........ | RM | | TZ30 |
| ...HostID.... | | A/6 | INITR | | | | |
| ...HostID.... | | B/6 | INITR | | | | |

>>>

The above display shows the mnemonic RZ23 in the DEVNAM column, indicating one hard disk is present in the system. The RZ23 or RZ22 mnemonic will appear for each hard disk present in the system.

TZ30 in the DEVNAM column shows a TZ30 tape drive is in the system.

If your system has an RX23 diskette drive, its device line will look like the one below:

| DKA500 | RZ5 | A/5/0/00 | | ........ | RM | | RX23 |

- To determine the presence of other devices and the quantity of memory inside your system unit, enter the following command:

>>> TEST 50 [Return]

In the following sample configuration display, elements are numbered for identification below.

```
KA42-B  V1.3
ID 08-00-2B-07-05-02
    MONO        0000.0001
    CLK         0000.0001
    NVR         0000.0001
    DZ          0000.0001
        00000001 00000001 00000001 00000001 00000001 000012A0
    MEM         0008.0001 ❶
        00800000
    MM          0000.0001
    FP          0000.0001
    IT          0000.0001
    SCSI-A      0808.0001  V1.3 ❷
     FFFFFF05 FFFFFF05 FFFFFF05 00000001 FFFFFF05 FFFFFF05 FFFFFF03 FFFFFF05
    SCSI-B      1818.0001  V1.3 ❸
     FFFFFF05 FFFFFF05 FFFFFF05 00000001 05000001 FFFFFF05 FFFFFF03 FFFFFF05
    SYS         0000.0000
    8PLN        0000.0001  V1.3 ❹
    NI          0000.0001
    >>>
```

- To determine the quantity of memory in your system, look at the MEM (memory) line. The 8-digit decimal number following MEM (❶) represents the quantity of memory in the system as follows:

  - 0004.0001 means the system has 4 megabytes of memory.

  - 0008.0001 means the system has 8 megabytes of memory.

  - 000C.0001 means the system has 12 megabytes of memory.

  - 0010.0001 means the system has 16 megabytes of memory.

  - 0014.0001 means the system has 20 megabytes of memory.

  - 0018.0001 means the system has 24 megabytes of memory.

  - 0020.0001 means the system has 32 megabytes of memory.

- To determine whether your system has a SCSI mass storage controller, note whether SCSI–A and SCSI–B lines (❷ and ❸) appear in the configuration display.

- To determine if your system has a graphics coprocessor module/color option, note whether an 8PLN (8-plane graphics coprocessor) line (❹) appears in the configuration display.

4   Turn the system unit off (0).

5   Disconnect the system power cord first from the wall and then from the system unit.

6   Before removing the system cover, disconnect the following cords from the system unit in the order given (see Figure 9–3):

   - The monitor power cord

   - The keyboard cable

   - The mouse cable

**Figure 9–3    Disconnecting the System Unit and Monitor Cables**



Monitor Power Cord

ThinWire T-Connector

Monitor Cable

Keyboard Cable

Mouse Cable

System Power Cord
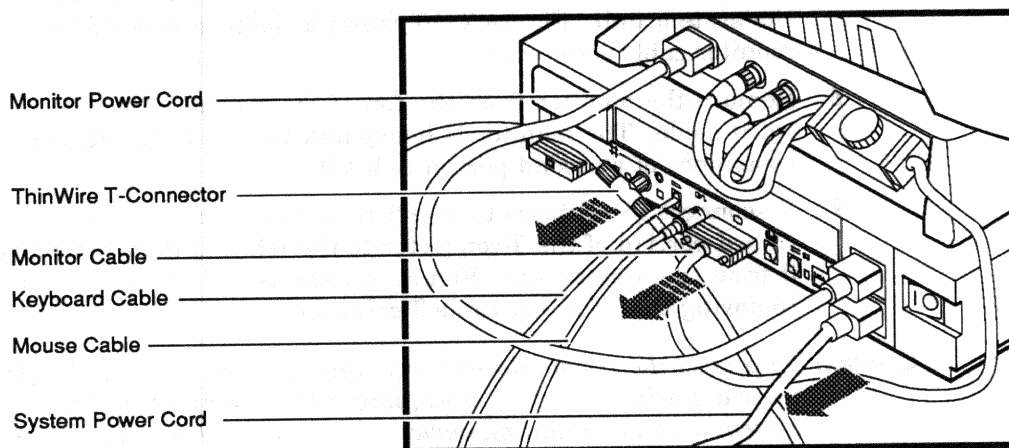
MLO-002883

**7** Disconnect the monitor cable by turning the connector thumbscrews to the left and then removing the cable from the system unit. Figure 2–10 shows a close-up view of the monitor cable connector.

**8** Remove the monitor from the top of the system unit and set it aside. The monitor is heavy and you may require the assistance of a second person to lift it.

**9** Disconnect the Ethernet cable T-connector by turning the ribbed portion of the T-connector to the left and then removing it from the system unit. Figure 5–7 shows a close-up view of removing the Ethernet cable T-connector.

**Caution** *To protect the system devices from damage due to static charge, wear a static wrist strap and place a static mat under the system unit when adding devices inside the system unit.*

**10** Remove the system cover as follows:

- Unscrew the two captive cover screws located at the back of the system on the outside edges of the system unit until the screws are very loose. Do not remove the screws. Figure 9–4 shows the captive screw positions.

- Slide the system unit cover forward toward the front of the system unit and then lift it up and away from the system unit.

**Figure 9–4    Removing the System Unit Cover**
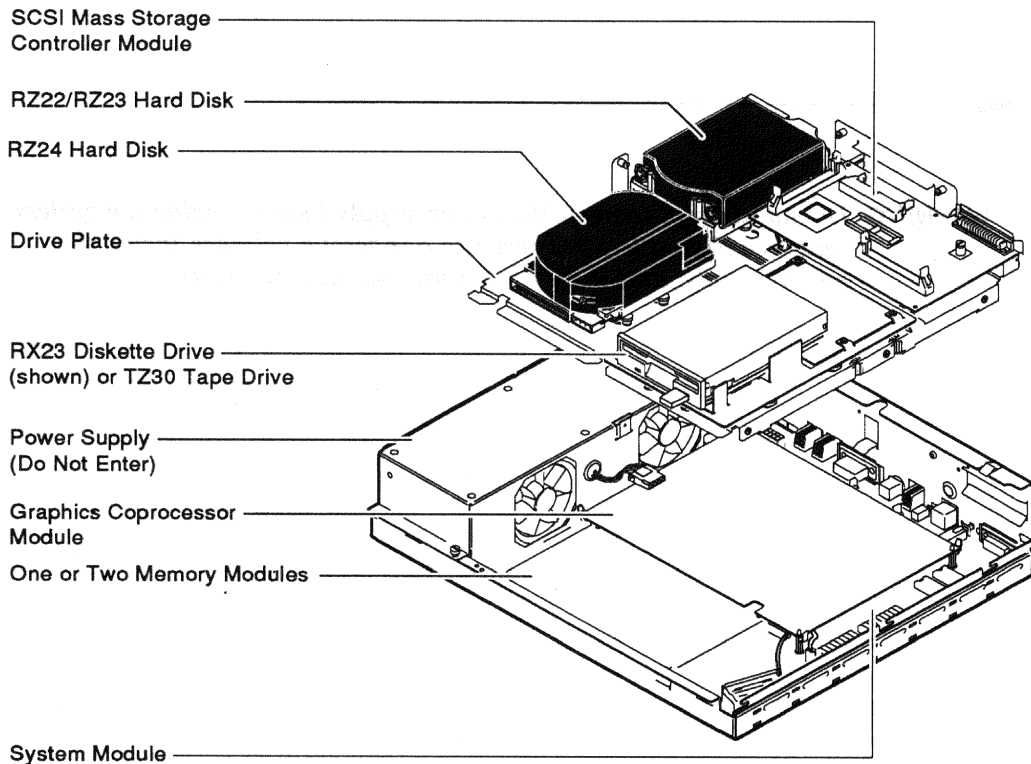
System Unit Cover

Cover Screws
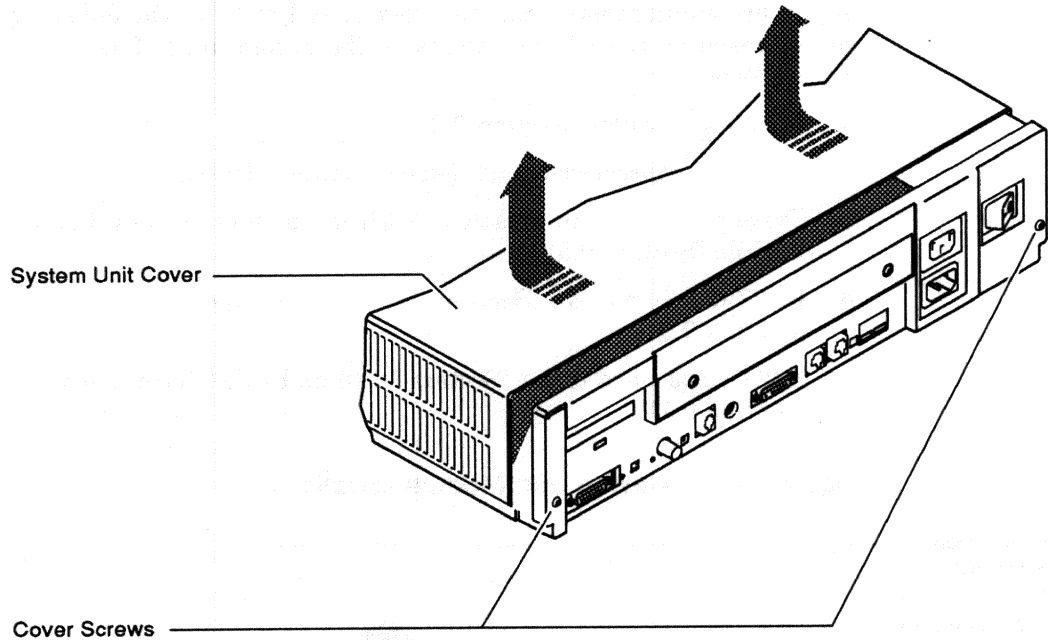
MLO-002884

**WARNING** *Do not attempt to open the power supply located inside the system unit (see Figure 9–5.) There are dangerous voltages inside the power supply, and there are no user serviceable parts.*

## 9.2 Sequence for Adding Devices

If you are adding more than one device, add them in the following order, based on their locations inside the system unit. See Figure 9–5.

1   Memory modules (Section 9.3)

2   Graphics coprocessor module/color option (Section 9.4)

3   Drive plate with an attached SCSI mass storage controller module (Section 9.5)

4   RX23 diskette drive (Section 9.8) or TZ30 tape drive (Section 9.9)

5   RZ22/RZ23 hard disks (Section 9.10) and RZ24 hard disks (Section 9.11)

**Figure 9–5   Device and Module Locations**



SCSI Mass Storage Controller Module

RZ22/RZ23 Hard Disk

RZ24 Hard Disk

Drive Plate

RX23 Diskette Drive (shown) or TZ30 Tape Drive

Power Supply (Do Not Enter)

Graphics Coprocessor Module

One or Two Memory Modules

System Module

MLO-004584

## 9.3 Adding One or More Memory Modules

Your system has 4 megabytes of memory on the system module. You can add memory to your system to a maximum configuration of 32 megabytes. The following memory module sizes are available:

- 4 megabytes
- 8 megabytes
- 12 megabytes
- 16 megabytes

To increase your system's memory capacity to 8, 12, 16, 20, 24, or 32 megabytes, use the appropriate configuration as follows:

- For a total of 8 megabytes, add a 4-megabyte memory module onto the system module.

- For a total of 12 megabytes, add an 8-megabyte memory module onto the system module.

- For a total of 16 megabytes, you can add a 12-megabyte memory module onto the system module or you can add an 8-megabyte memory module onto a 4-megabyte memory module.

- For a total of 20 megabytes, add a 16-megabyte module onto the system module.

- For a total of 24 megabytes, you can add a 16-megabyte module onto a 4-megabyte module or you can add an 8-megabyte module onto a 12-megabyte module. You then add the two modules onto the system module.

- For a total of 32 megabytes, add a 12-megabyte memory module onto a 16-megabyte module and then add the two modules onto the system module.

If your configuration requires one memory module, follow the procedure in Section 9.3.1. If your configuration requires two memory modules, use the procedure in Section 9.3.2.

Take precautions to protect the memory modules from damage due to static charge. This is particularly important when you work with memory modules.

**Caution** *Wear a static wrist strap and place a static mat under the system unit when adding devices inside the system unit.*

### 9.3.1 Single Memory Module

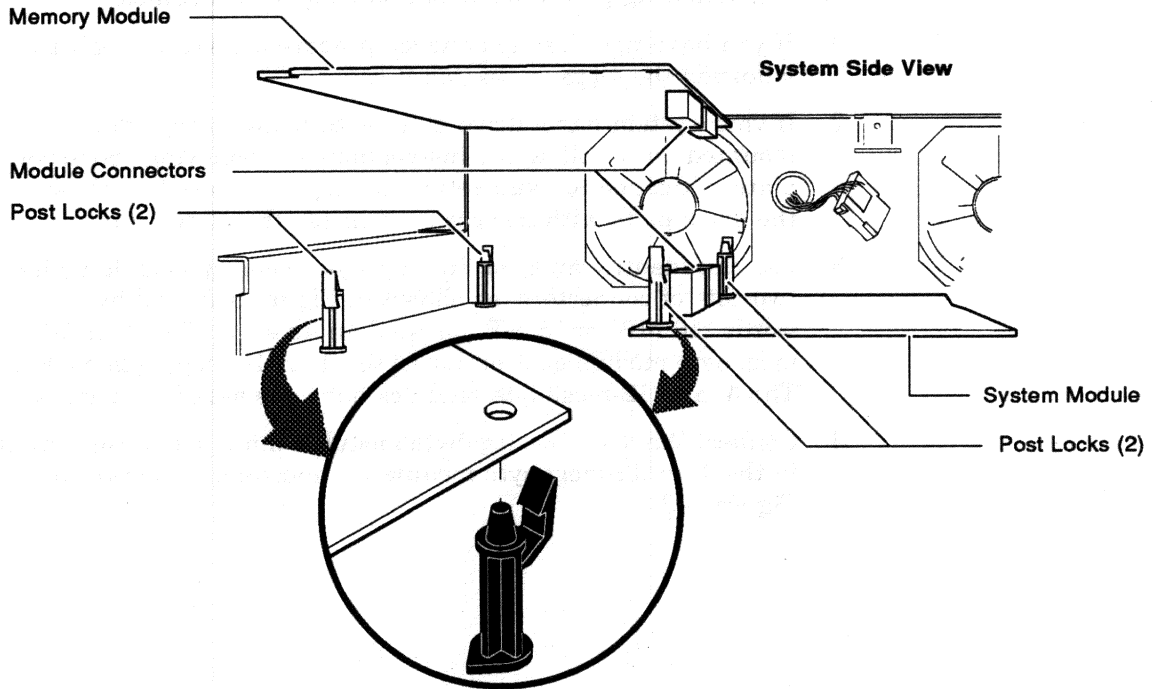To add a single memory module, complete the following steps:

1   If you have not already done so, prepare the system unit by following the steps in Section 9.1.

2   If you are adding multiple devices, review Section 9.2.

3   If your system has a drive plate with mass storage devices mounted on it, follow the instructions for removing the drive plate in Section 9.6 and return to step 4. Figure 9–5 shows the drive plate with devices on it inside the system unit.

4   To add the memory module, press the module down into position so that the two connectors on the memory module plug into the two connectors on the system module. Figure 9–6 shows a top view of the memory module installed inside the system unit. Figure 9–7 shows a side view of the memory module in relation to the connectors and post locks.

**Figure 9–6   Adding Memory Modules—Top View**



Post Locks (2)

Connectors Underneath Module

Memory Module
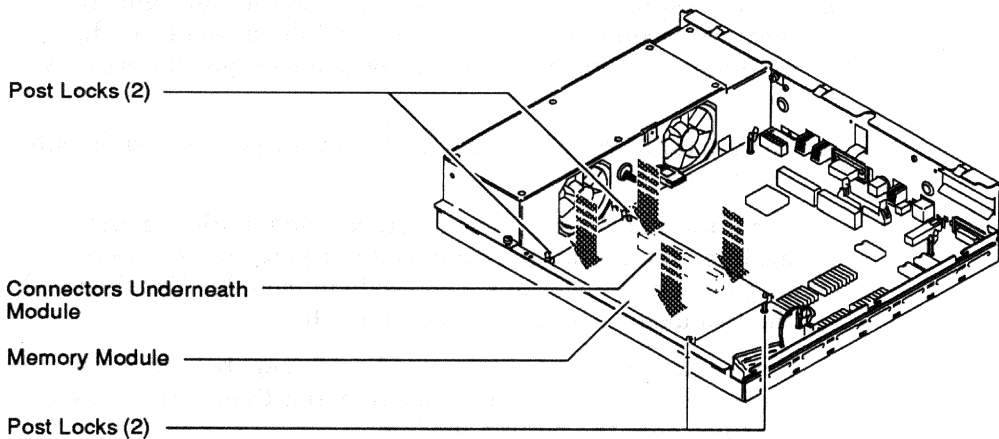
Post Locks (2)

MLO-003532

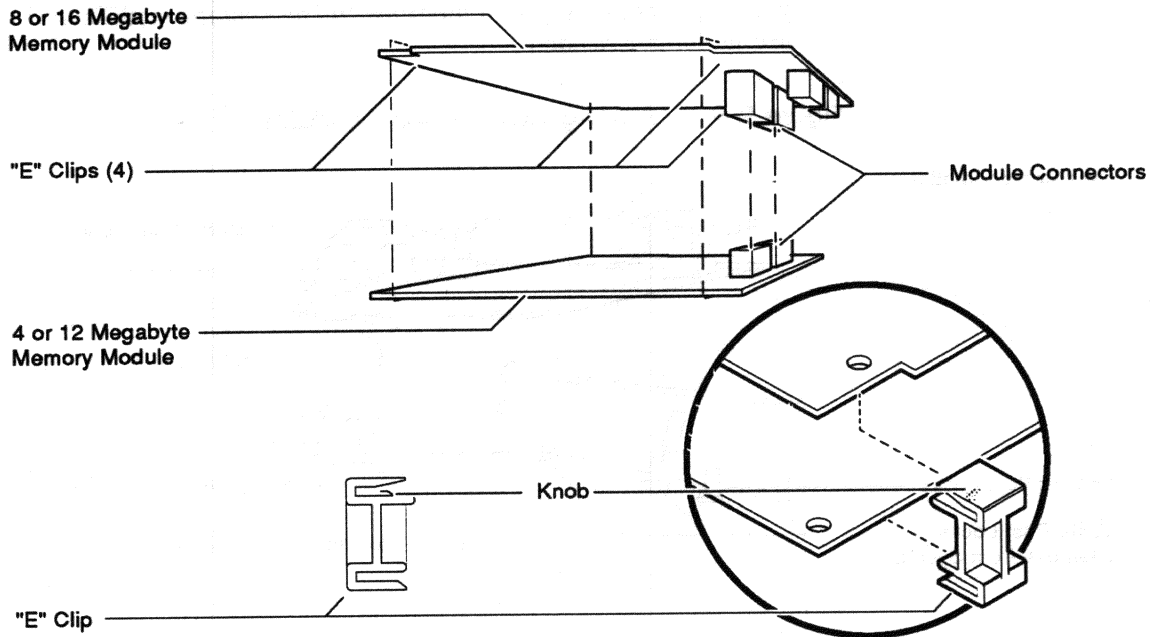**Figure 9–7   Adding a Single Memory Module—Side View**



MLO-002903

5   Press the memory module down until it locks onto the four post locks. Two post locks are on the system module and two are on the bottom of the system unit.

6   Press the memory module down firmly above the memory module connectors to insure a good connection. Figure 9–6 shows where to press the memory module over the connectors underneath it.

7   If you removed the drive plate and you are not adding any further modules under the drive plate, follow the procedure for replacing the drive plate in Section 9.7. Then return to step 8.

8   If you have further additions to make inside the system unit, turn to the appropriate sections in this chapter. Otherwise, proceed to Section 9.14.

### 9.3.2 Two Memory Modules

Use the following procedure to add two memory modules:

1    If you have not already done so, prepare the system unit by
     following the steps in Section 9.1.

2    If your system has a drive plate with mass storage devices
     mounted on it, follow the instructions for removing the drive
     plate in Section 9.6 and return to step 3. Figure 9–5 shows
     the drive plate with devices on it inside the system unit.

3    You can identify an 8- or 16-megabyte memory module by its
     two sets of connectors, as shown in Figure 9–8, and by the
     words "16 MB" or "8 MB" printed on its edge. The 8- or 16-
     megabyte module goes on top of the 4- or 12-megabyte module.
     The 4- and 12-megabyte modules have one set of connectors.

4    Connect the 8- or 16-megabyte module's inner set of connectors
     to the 4- or 12-megabyte module's connectors, as shown in
     Figure 9–8.

**Figure 9–8    Joining Two Memory Modules**



8 or 16 Megabyte Memory Module

"E" Clips (4)

Module Connectors

4 or 12 Megabyte Memory Module

Knob

"E" Clip

MLO-005079

5    Locate the knob on one opening of each of the four E-clips. Slide an E-clip onto each corner of the two modules so that the knob fits into the hole on the upper module.

**6** Locate the two taller post locks at the front of the system unit and break them off, as shown in Figure 9–9. (They prevent you from connecting two modules to the system module and are no longer needed.)

**Figure 9–9    Adding Two Memory Modules**

Two Memory Modules

System Side View

Shorter Post Locks

Taller Post Locks
(Remove from System)
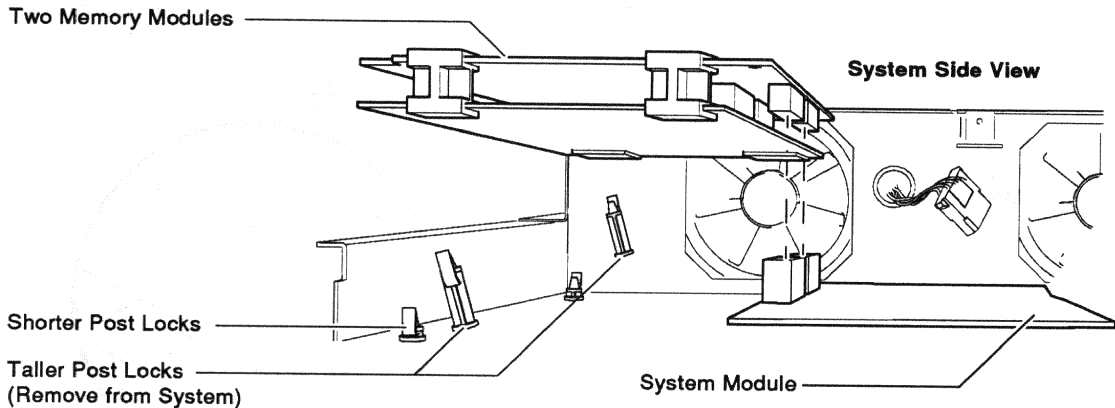
System Module

MLO-003470

**7** To mount the modules on the system module, connect the unused set of connectors on the outer edge of the upper module to the connectors on the system module. Press the modules downward until they lock onto the four post locks. Two lock posts are on the system module and two are on the bottom of the system unit. Figure 9–6 shows the top view of memory module placement inside the system unit.

**8** Press the memory modules firmly down above the memory module connectors to insure a good connection. Figure 9–6 shows where to press the memory modules over the connectors underneath them.

**9** If you have further additions to make inside the system unit, turn to the appropriate sections.

**10** If you removed the drive plate, follow the procedure for replacing the drive plate in Section 9.7. Then return to step 11.

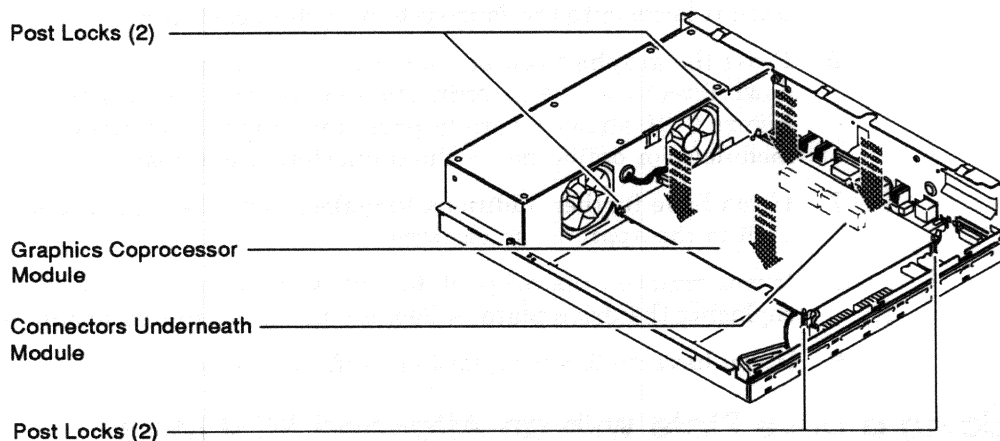**11** If you have no further additions, refer to Section 9.14.

## 9.4 Adding a Graphics Coprocessor Module/Color Option

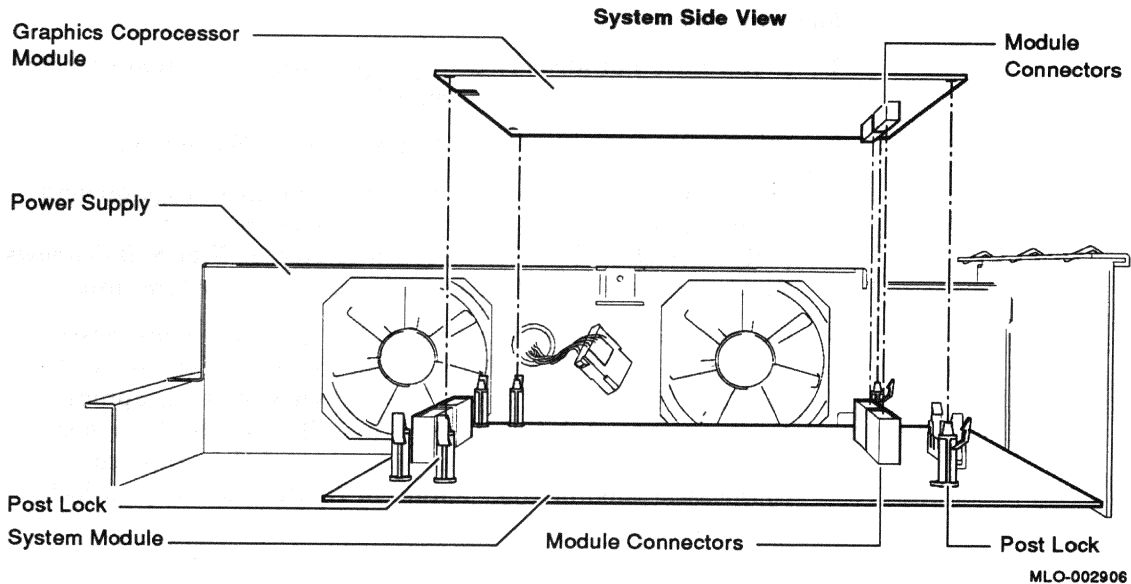To add a graphics coprocessor module/color option, complete the following steps:

1 If you have not already done so, prepare the system unit by following the steps in Section 9.1.

2 If you are adding multiple devices, review Section 9.2.

3 If your system has a drive plate with mass storage devices mounted on it, follow the instructions for removing the drive plate in Section 9.6. Then return to step 4. Figure 9–5 shows the drive plate with devices on it inside the system unit.

4 Connect the set of connectors on the graphics coprocessor module/color option with the set of connectors on the system module. Figure 9–10 shows the top view of the graphics coprocessor module/color option installed inside the system unit. Figure 9–11 shows the side view of the graphics coprocessor module/color option in relation to the post locks and connectors.

**Figure 9–10 Adding a Graphics Coprocessor Module/Color Option—Top View**



Post Locks (2)

Graphics Coprocessor Module

Connectors Underneath Module

Post Locks (2)

MLO-003533

**Figure 9–11   Adding a Graphics Coprocessor Module/Color Option—Side View**

**System Side View**

Graphics Coprocessor Module

Module Connectors

Power Supply

Post Lock

System Module

Module Connectors

Post Lock

MLO-002906

**5**  Press the graphics coprocessor module/color option downward until it locks onto the four system module post locks.

**6**  Press the graphics coprocessor module/color option firmly down directly above its connectors to insure a good connection. Figure 9–10 shows where to press the graphics coprocessor module/color option above the connectors underneath it.

**7**  If you have further additions to make inside the system unit, turn to the appropriate sections.

**8**  If you removed the drive plate, follow the procedure for replacing the drive plate in Section 9.7. Then return to step 9.

**9**  If you have no further additions, refer to Section 9.14.

## 9.5  Adding a Drive Plate with an Attached SCSI Mass Storage Controller Module

The SCSI mass storage controller module comes mounted on the drive plate. To add the drive plate and SCSI mass storage controller module, complete the following steps:

**1**  If you have not already done so, prepare the system unit by following the steps in Section 9.1 and then return to step 2.

**2**  Open the latches on each side of the system module SCSI connector by pushing them outward, as shown in Figure 9–12.

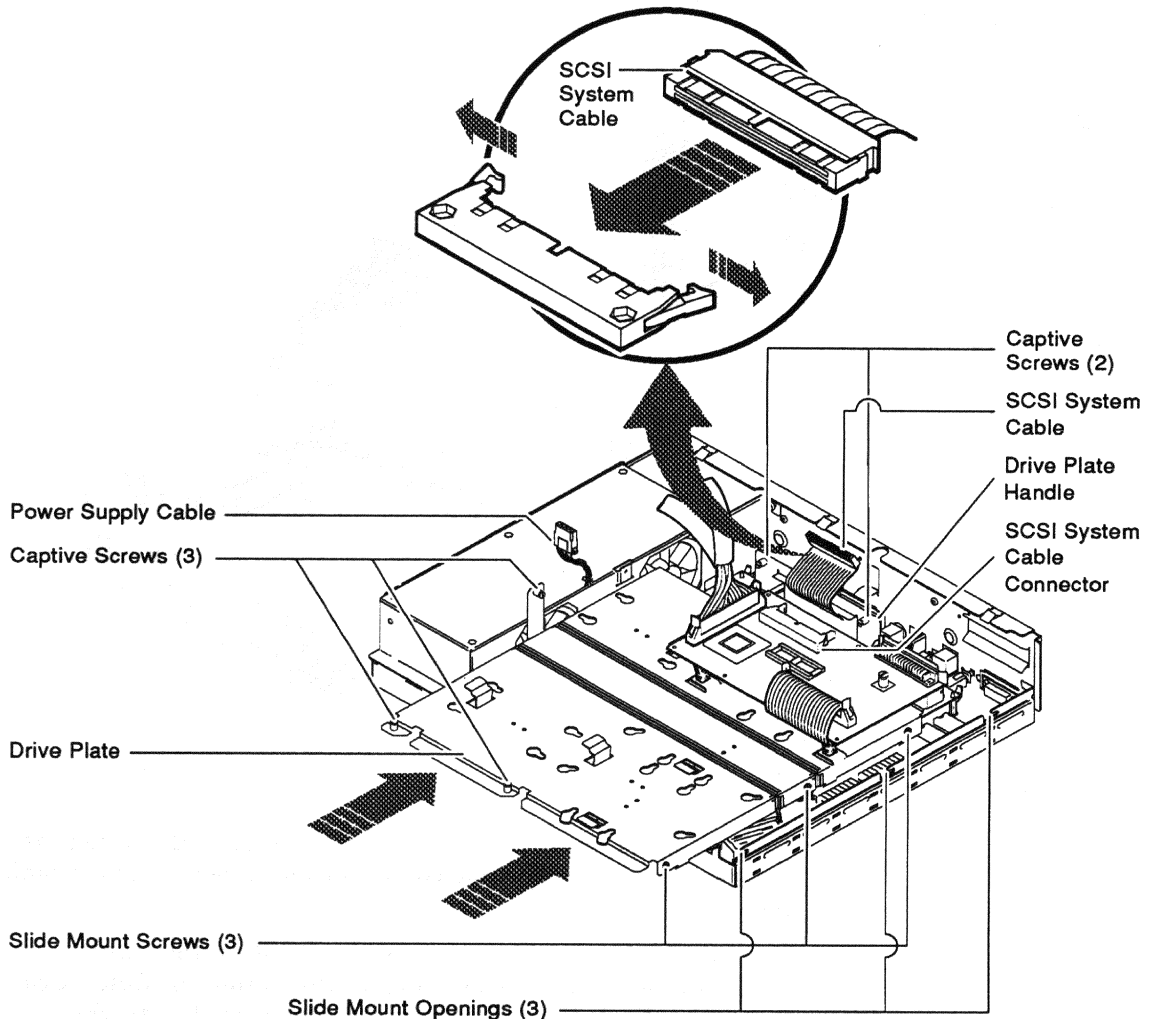**Figure 9–12    Attaching the SCSI Cable to the System Module**



SCSI System Cable

Cable Key

Connector Latch

Connector Key

System Module

System Module SCSI Connector
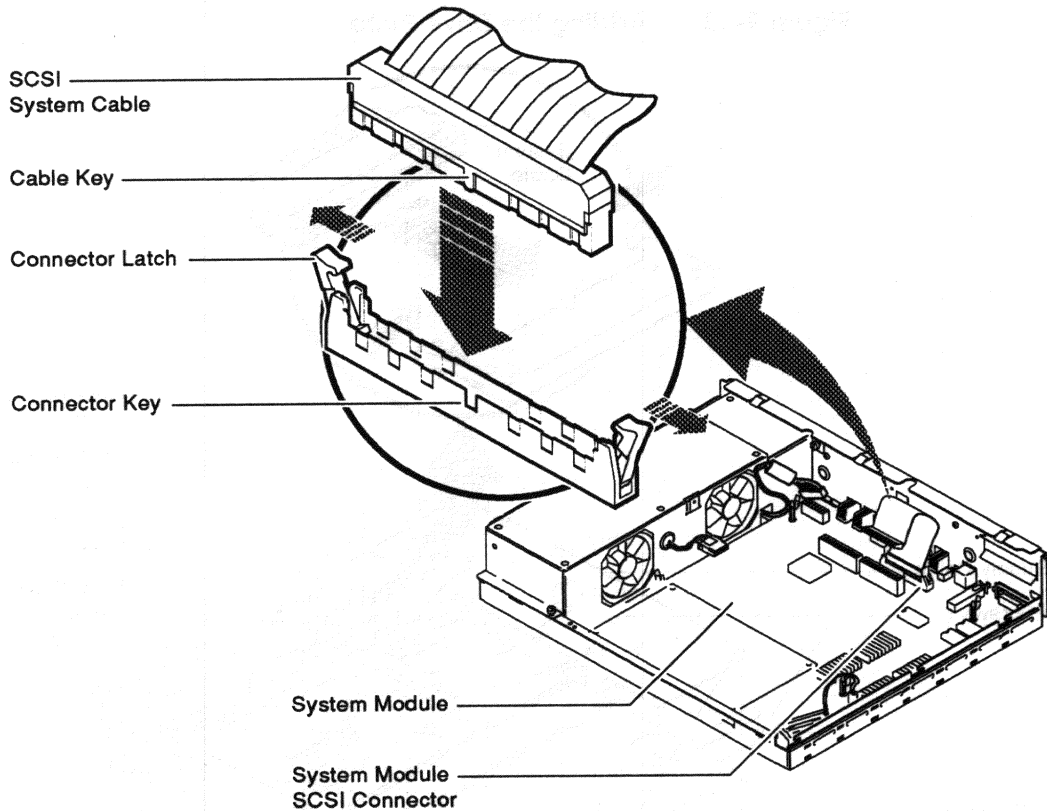
MLO-002899

**3**  Find the SCSI system cable labeled 17–02223–01. Note that one side of each SCSI cable connector has a raised center cable key.

**4**  Connect the keyed side of one of the SCSI system cable connectors with the key opening on the system module SCSI connector. Push the cable connector downward until the latches snap to a vertical (closed) position.

**5** Place the drive plate inside the system unit so that the SCSI system cable comes through the drive plate handle and the drive plate rests on the bracket under the handle, as shown in Figure 9–13. Make sure the power supply cable remains above the drive plate.
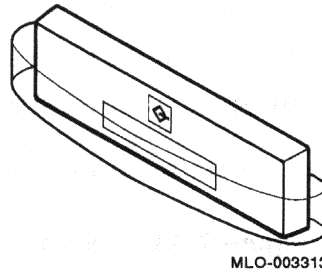
**Figure 9–13    Adding the Drive Plate**



Captive
Screws (2)

SCSI System
Cable

Drive Plate
Handle

SCSI System
Cable
Connector

Power Supply Cable

Captive Screws (3)

Drive Plate

Slide Mount Screws (3)

Slide Mount Openings (3)

SCSI
System
Cable

MLO-004593

**6** Connect the free connector of the SCSI system cable to the connector on the SCSI controller. (See Figure 9–13.)

**7** Slide the drive plate toward the back of the system. Make sure that the three screws on the right side of the drive plate go inside the slide mount openings on the side of the system unit.

**8** Tighten the five captive screws on the drive plate with a screwdriver.

**9** Tighten the three slide mount screws with a screwdriver.

**10** Remove the SCSI cover from the back panel of the system unit by placing your fingers under the locking tab and lifting the cover to release it as shown in Figure 9–14.

**Figure 9–14    Removing the SCSI Cover**

SCSI Cover

Lift Locking Tab
to Release

External SCSI
Port Connector

MLO-003468
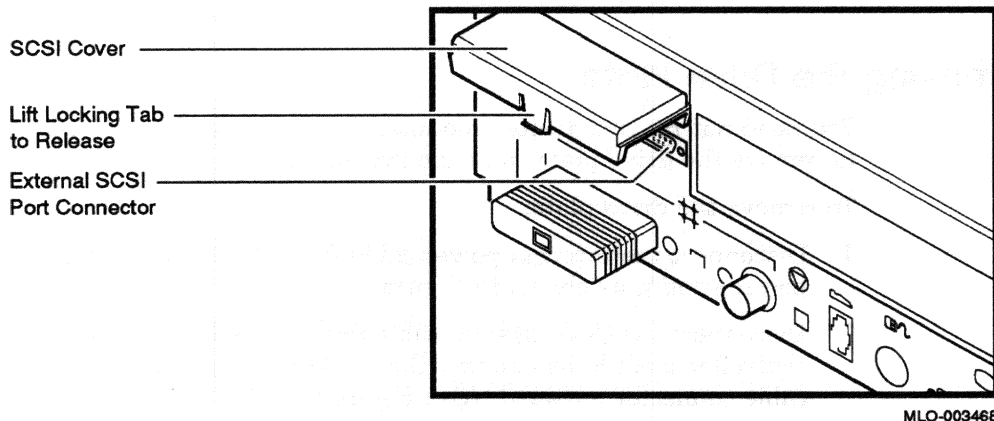
11 You are now ready to add internal storage devices or external expansion boxes. You will add a SCSI terminator if you will be installing internal storage devices, or you will add a connector cable for an expansion box to the external SCSI port connector. Figure 9–15 shows the external SCSI port terminator.

**Figure 9–15     External SCSI Port Terminator**

MLO-003313
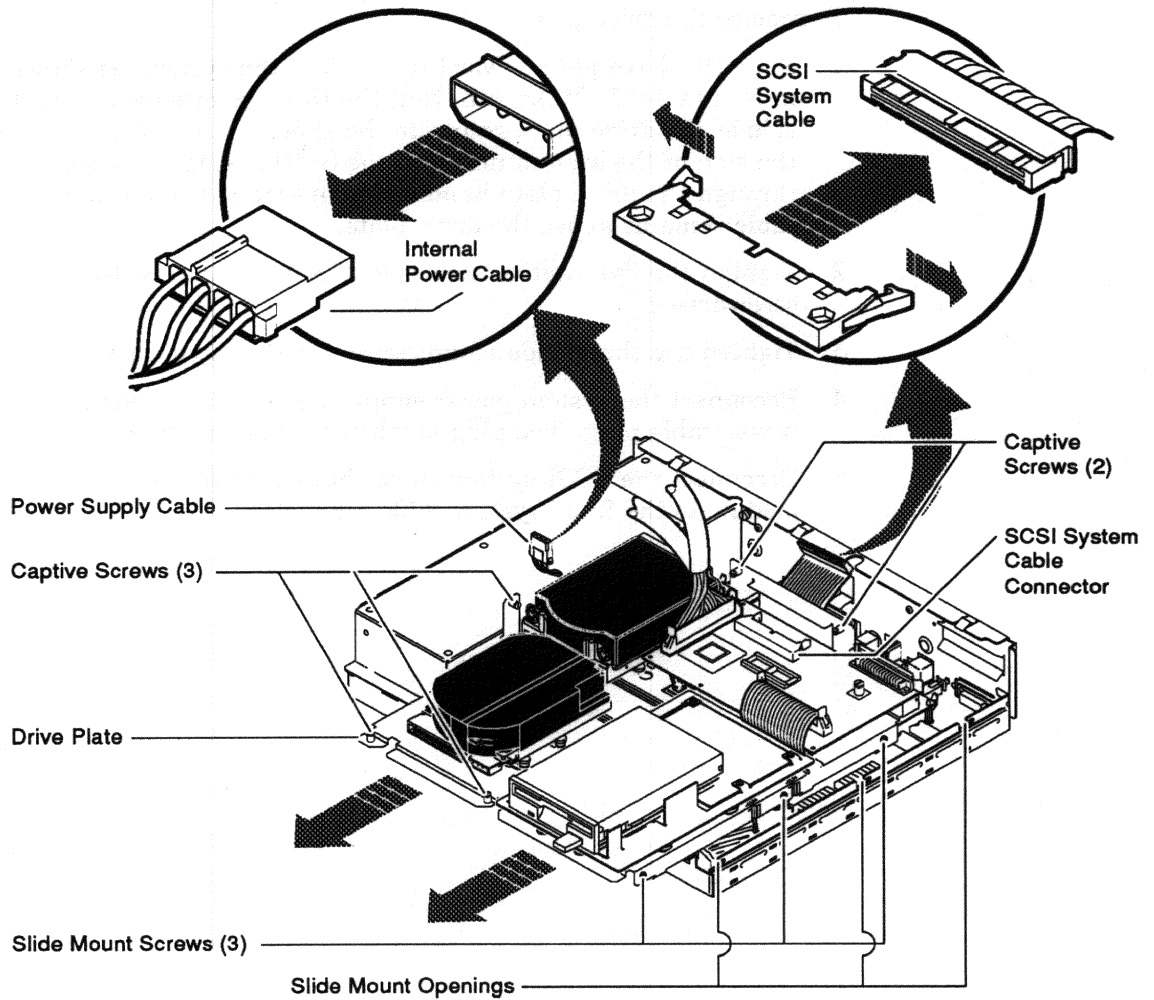
## 9.6  Removing the Drive Plate

You need not remove devices mounted on the drive plate in order to remove the drive plate from the system unit.

To remove the drive plate:

1   Disconnect the internal power cable from the internal system power supply, as shown in Figure 9–16.

2   Disconnect the SCSI system cable from the SCSI mass storage controller module by opening the latches on the SCSI system cable connector outward. (See Figure 9–16.)

3   Disconnect either the SCSI terminator or the external SCSI cable from the SCSI port. Figure 9–15 shows a closeup of the SCSI terminator and Figure 4–6 shows a SCSI cabling scheme.

4   Loosen the eight drive plate mounting screws. Figure 9–16 shows the screw positions. Do not remove the five captive screws or the three slide mount screws from their mountings.

5   Slide the drive plate (with the drives) forward and up out of the system unit. Set the plate aside.

**Figure 9–16    Removing the Drive Plate**



SCSI
System
Cable

Internal
Power Cable

Captive
Screws (2)

Power Supply Cable

SCSI System
Cable
Connector

Captive Screws (3)

Drive Plate
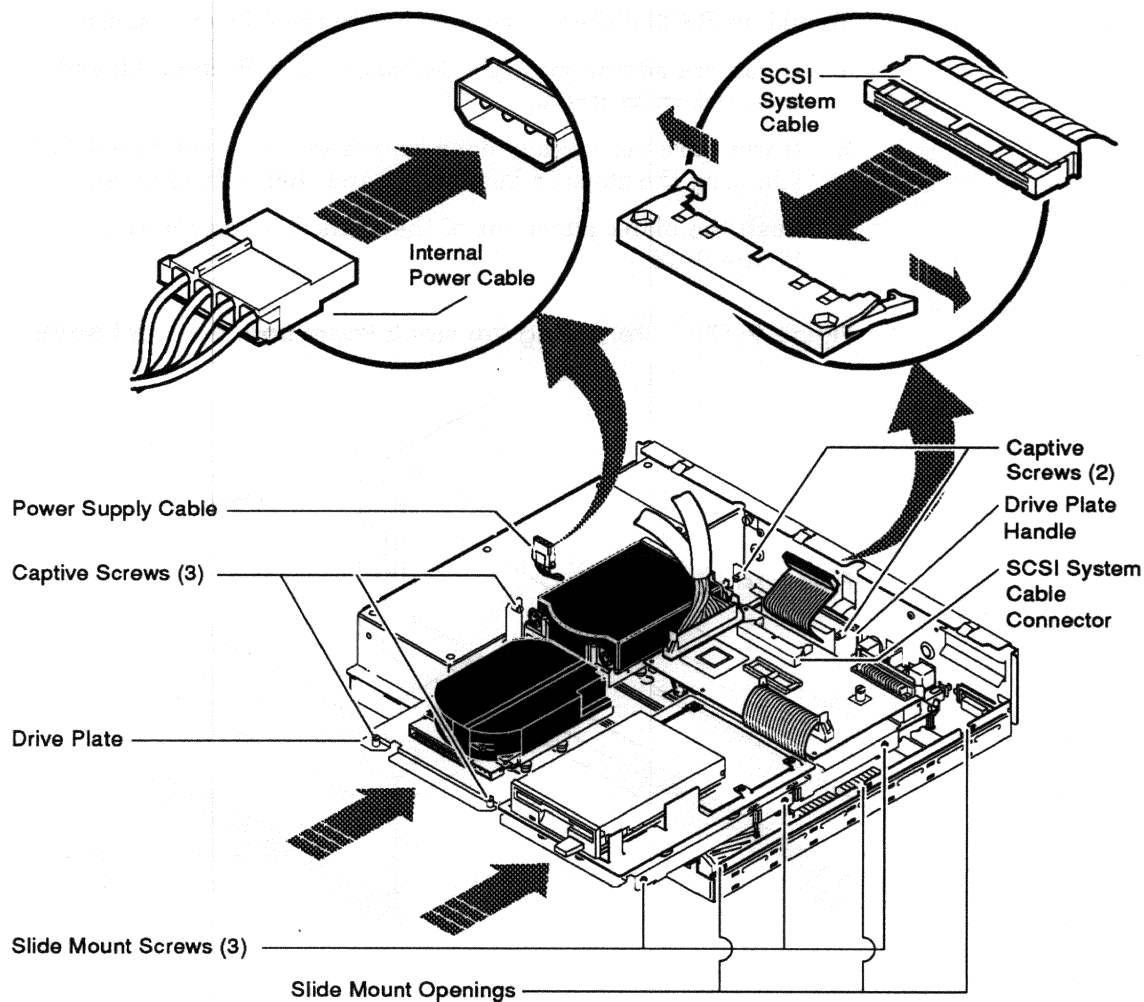
Slide Mount Screws (3)

Slide Mount Openings

MLO-004585

## 9.7 Replacing the Drive Plate

To replace the drive plate:

1 Slide the drive plate toward the back of the system, as shown in Figure 9–17. Make sure that the three screws on the right side of the drive plate go inside the slide mount openings on the side of the system unit and the SCSI system cable goes through the drive plate handle. Make sure the power supply cable remains above the drive plate.

2 Tighten the five captive screws on the drive plate with a screwdriver.

3 Tighten the three slide mount screws with a screwdriver.

4 Reconnect the system power supply cable to the internal power cable plug. The plug is labeled (2) in Figure 9–23.

5 Reconnect the SCSI system cable that goes from the system module to the SCSI system cable connector.

**Figure 9–17    Replacing the Drive Plate**



SCSI
System
Cable

Internal
Power Cable

Power Supply Cable

Captive Screws (3)

Drive Plate

Slide Mount Screws (3)

Slide Mount Openings

Captive
Screws (2)

Drive Plate
Handle

SCSI System
Cable
Connector

MLO-004586

6    If you have further additions to make inside the system
     unit, turn to the appropriate sections. Otherwise, proceed to
     Section 9.14.

## 9.8 Adding an RX23 Diskette Drive

To add an RX23 diskette drive, complete the following steps:

1 If you are adding multiple devices, review Section 9.2 and then return to step 2.

2 If you have not already done so, prepare the system unit by following the steps in Section 9.1 and then return to step 3.

3 Push the blank panel out of the front bezel as shown in Figure 9–18.

**Figure 9–18    Removing the Blank Panel from the Front Bezel**



Blank Panel

Front Bezel

Connector Posts
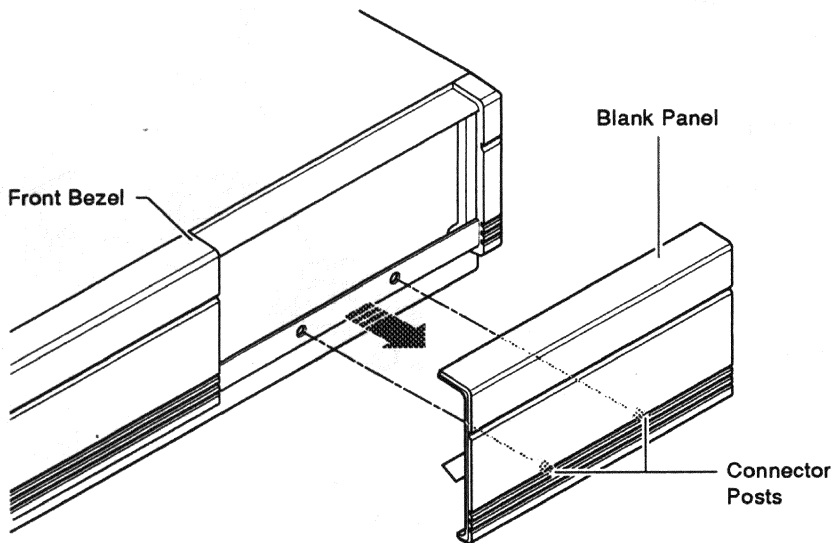
MLO-003525

**4** Add the RX23 panel, as shown in Figure 9–19.

**Figure 9–19    Adding the RX23 Diskette Drive Panel to the Front Bezel**
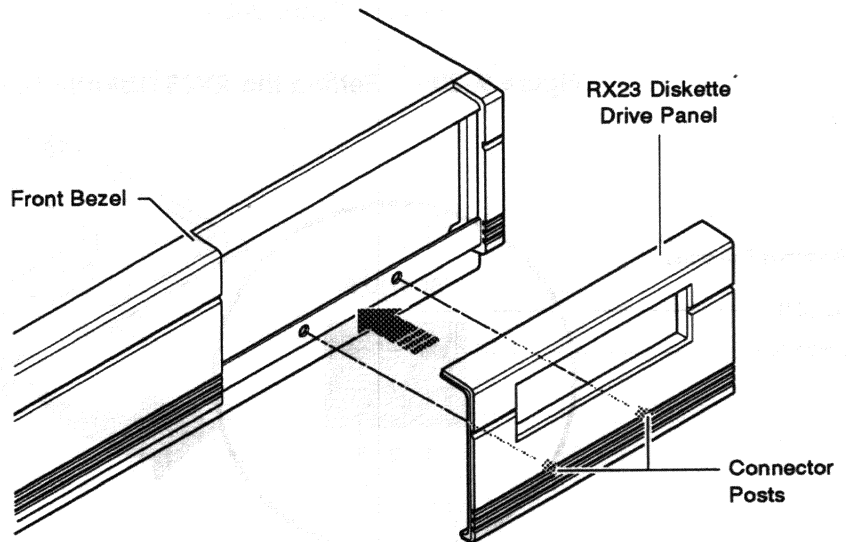


MLO-003526

**5** If you have a diskless machine, your system has no drive plate with an attached SCSI mass storage controller module. You must add a drive plate and controller module before an RX23 diskette can be installed on your system. Contact your Digital sales representative for information on ordering a SCSI/SCSI Disk Drive Plate Controller Kit (VS42D–JH). Once you have a drive plate with an attached SCSI mass storage controller module, follow the directions in Section 9.5 and then return to step 6.

**6** You are ready to set the SCSI ID on the RX23. (Appendix B gives complete background information on SCSI ID settings.)

**7** Set the SCSI ID on the RX23 using the following steps:

- Locate SCSI ID switches 1, 2, and 3 on the RX23, as shown in Figure 9–20.

**Figure 9–20    Setting the RX23 Diskette Drive SCSI ID**
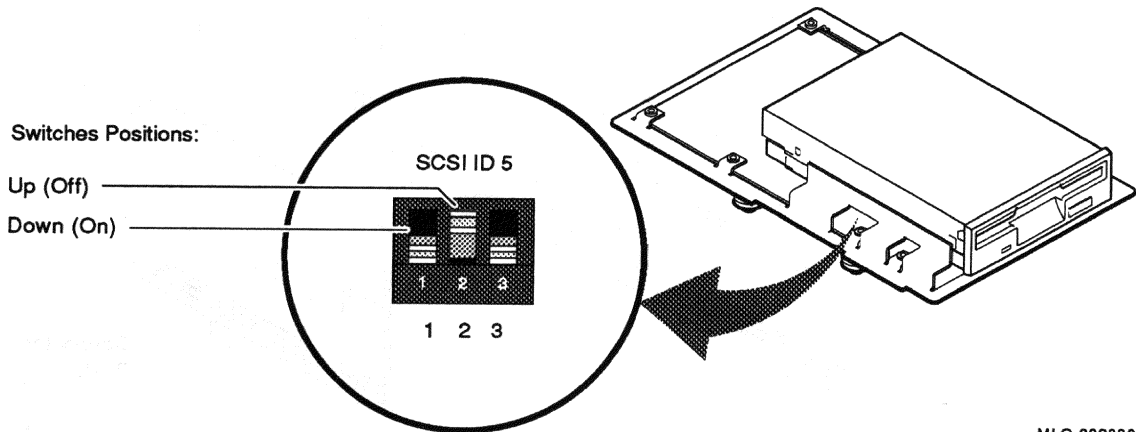


MLO-002886

- Use a pen or small pointed object to move the switches up or down. Do not use a pencil; graphite particles can damage the SCSI switches.

  Digital recommends that you set the RX23 SCSI ID code number to 5:

  Switch 1 = down position (on)
  Switch 2 = up position (off)
  Switch 3 = down position (on)
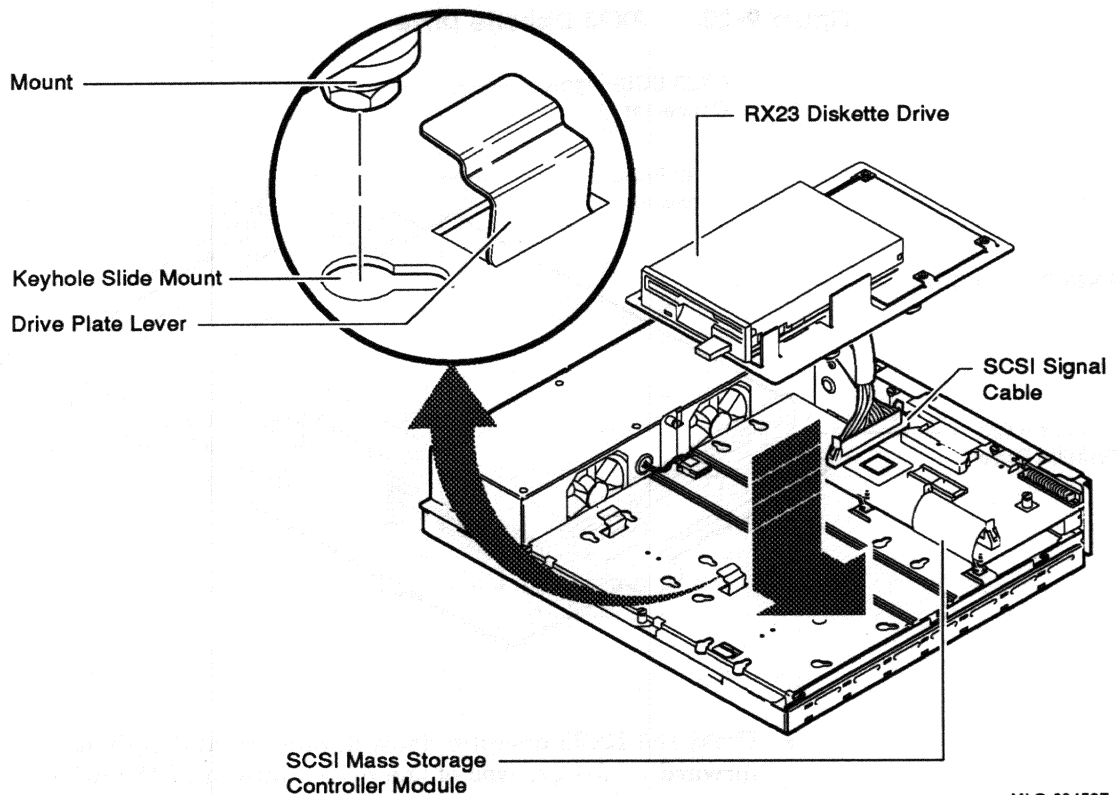
  Table B–3 in Appendix B gives all possible SCSI ID settings for the RX23.

**Caution** *Never set two or more devices to the same SCSI ID; the system will not be able to service the devices.*

**8** Mount the diskette drive on the drive plate as follows:

   ▪ Locate the position for the diskette drive in front of the SCSI mass storage controller module, as shown in Figure 9–21.

**Figure 9–21    Mounting the RX23 Diskette Drive on the Drive Plate**



Mount

Keyhole Slide Mount

Drive Plate Lever

RX23 Diskette Drive

SCSI Signal Cable

SCSI Mass Storage Controller Module

MLO-004587

- Position the diskette drive so that the front of the diskette drive faces the front of the system unit. Figure 9–22 shows an enlarged view of the front of the RX23 diskette drive.

- Insert the four mounts on the bottom of the RX23 diskette drive inside the four keyhole slide mount openings in the drive plate. See Figure 9–21.

**Figure 9–22    RX23 Diskette Drive**
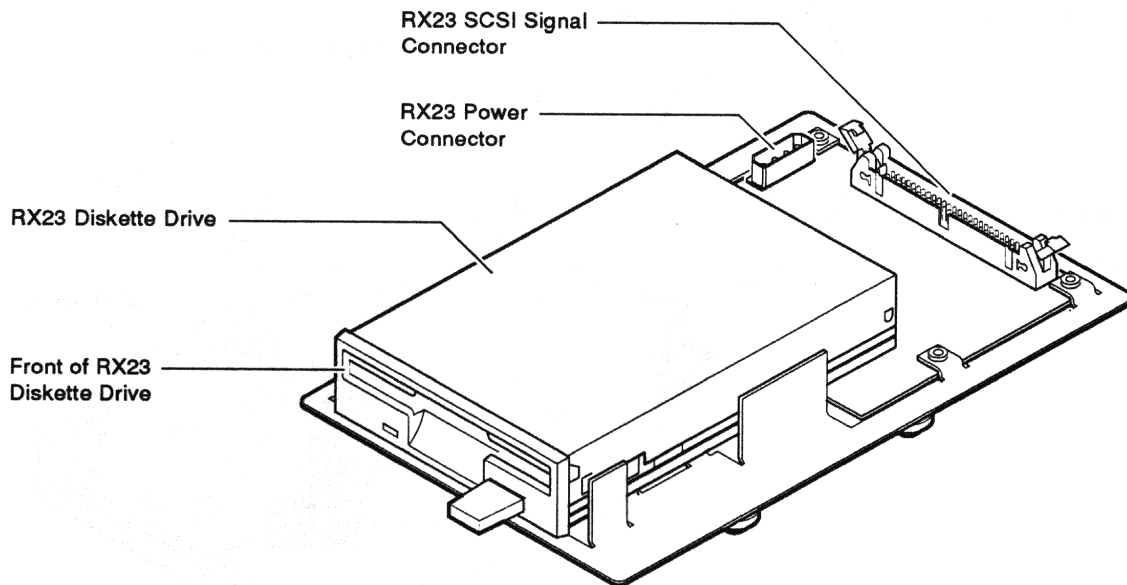
MLO-003527

- Press the RX23 diskette drive downward and slide it forward in the grooves of the drive plate until the drive plate lever pops up, locking the drive in place. When the RX23 is correctly mounted, the drive plate lever will make firm contact with the side of the diskette drive, and the drive will not move on the drive plate.

9  Locate the two power cables, as shown in Figure 9–23:

- The power cable fixed to the power supply

- The 4-connector internal power cable, labeled 17–02440–01.

Note that every cable connector has a raised, off-center key on one side.

**10** Connect the internal power cable plug (2) to the system power supply connector with the raised keys aligned on the same side of the connection. Figure 9–23 shows the five power cable connectors numbered for reference.

**Figure 9–23    RX23 Diskette Drive Power Cable Connections**



Internal Power Cable

Internal Power Cable

Power Supply Cable

SCSI Mass Storage Controller Module

RX23 Diskette Drive

MLO-002888
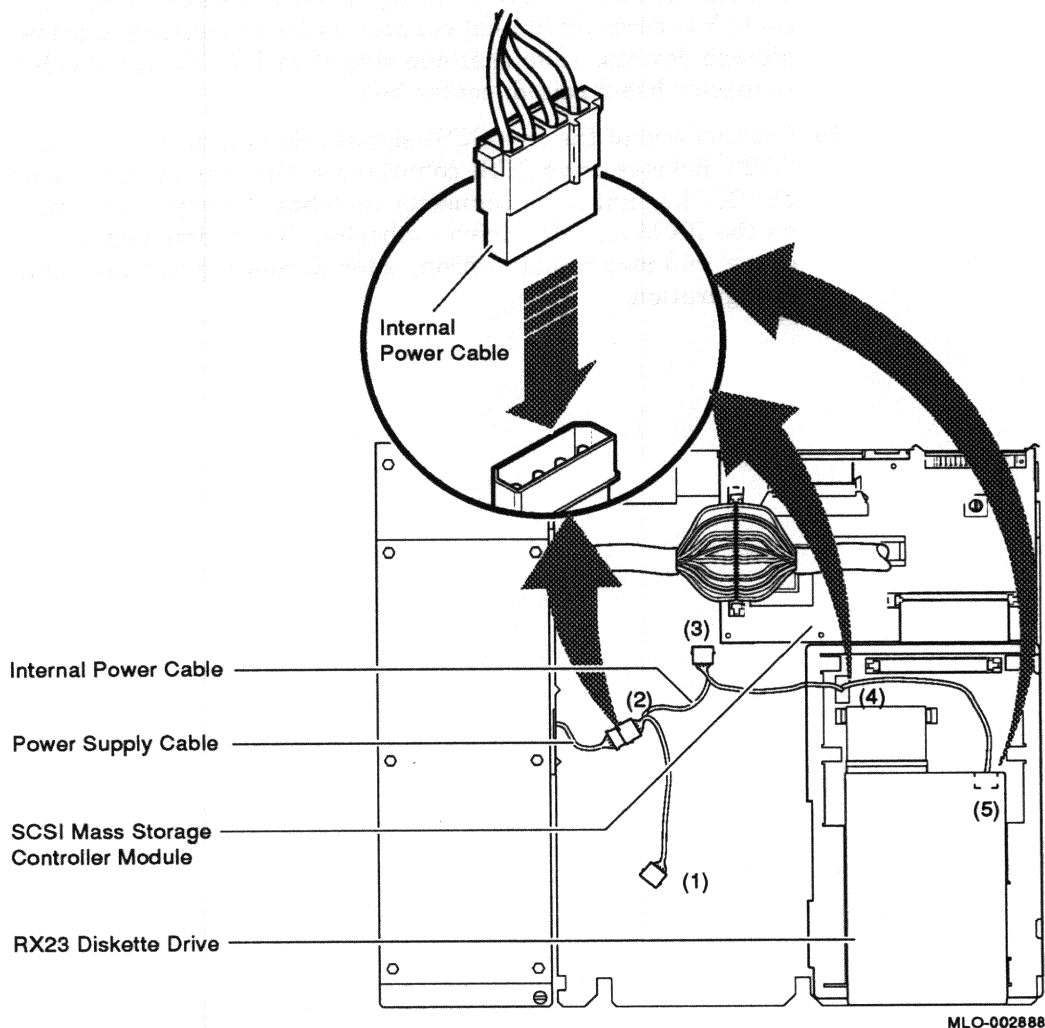
**11** Connect the smaller power cable connector (5) to the RX23 diskette drive so that its off-center key faces upward.

**12** The remaining three power cable connectors are identical. Connect an available power cable connector (4) to the RX23 diskette drive so that its off-center key faces the inside of the drive. Some connectors may remain unconnected depending on your system configuration.

**13** Locate the SCSI signal cable attached to the SCSI mass storage module as shown in Figure 9–24. The SCSI signal cable has three additional connectors for connecting to mass storage devices. Note that one side of each SCSI signal cable connector has a raised, center key.

**14** Connect one of the free SCSI signal cable connectors to the RX23 diskette drive SCSI connector so that the center key on the SCSI signal cable connector matches the keyed opening on the RX23 diskette drive connector. Some signal cable connectors may remain unconnected depending on your system configuration.

**Figure 9–24    RX23 Diskette Drive SCSI Signal Cable Connections**

SCSI Signal
Cable Connector

Cable Key

SCSI Port A

SCSI Signal Cable

RX23 Diskette Drive

MLO-002889
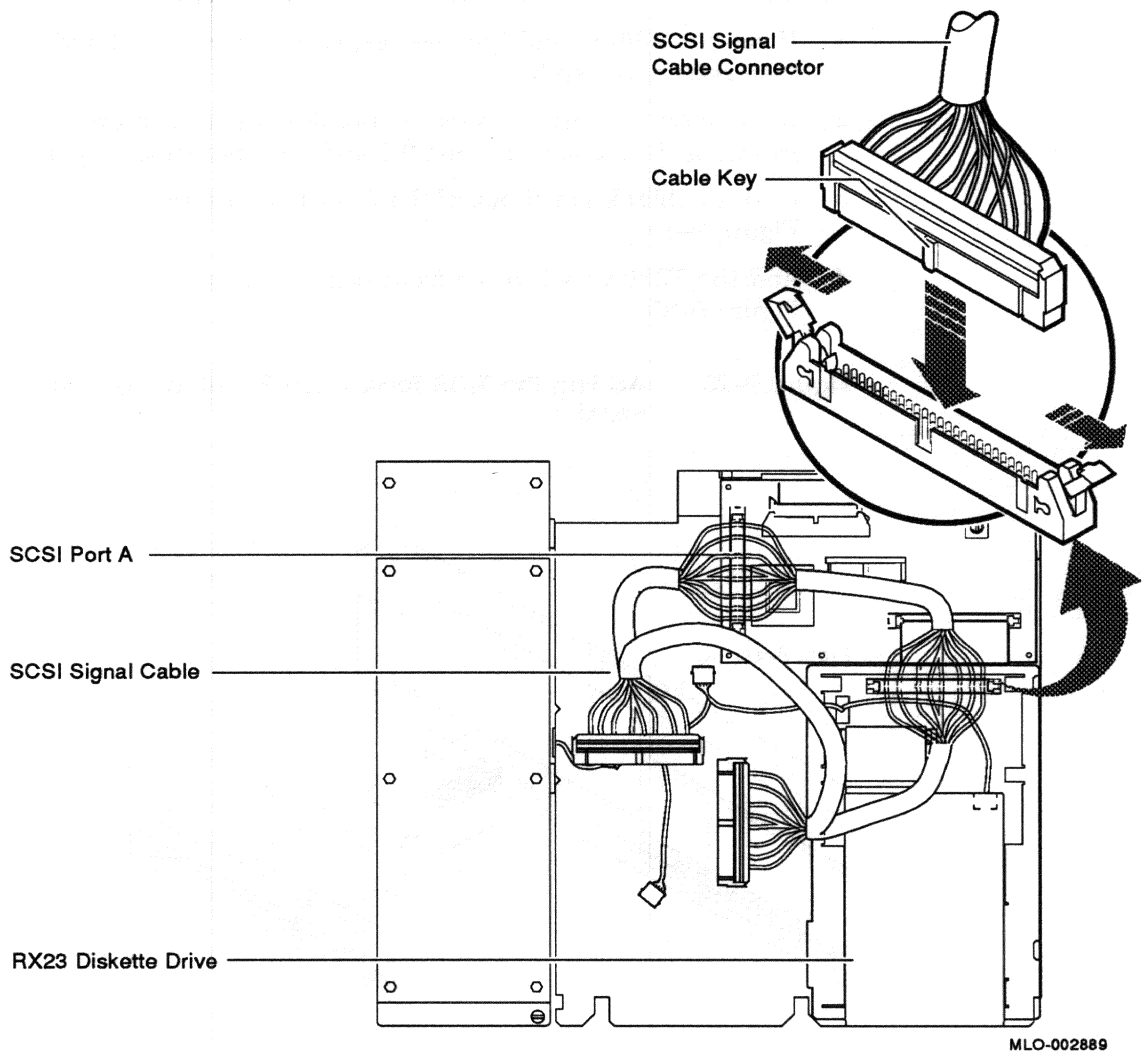
**15** If you have further additions to make inside the system unit, turn to the appropriate sections. Otherwise, proceed to Section 9.14.

## 9.9  Adding a TZ30 Tape Drive

To add a TZ30 tape drive, complete the following steps:

1   If you are adding multiple devices, review Section 9.2 and then return to step 2.

2   If you have not already done so, prepare the system unit by following the steps in Section 9.1 and then return to step 3.

3   Push the blank panel out of the front bezel as shown in Figure 9–18.

4   Add the TZ30 panel to the front bezel, as shown in Figure 9–25.

**Figure 9–25    Adding the TZ30 Tape Drive Panel to the Front Bezel**
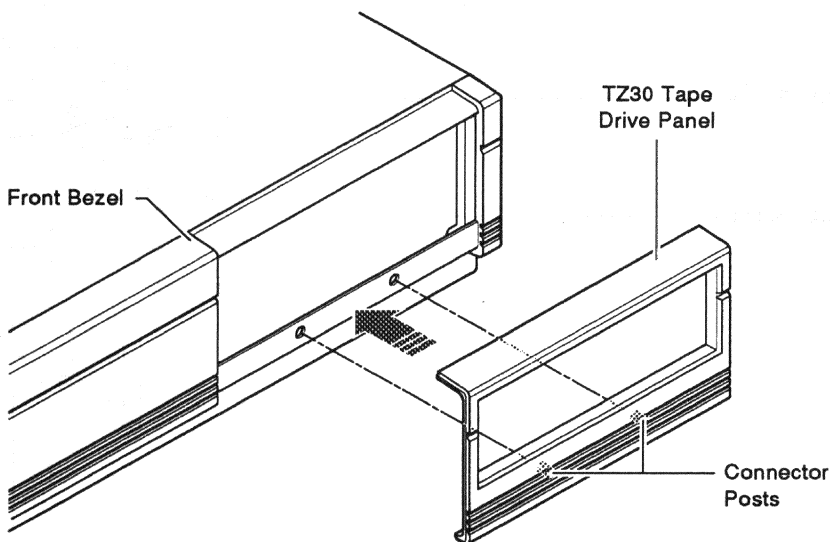


MLO-003528

5   If you have a diskless machine, your system has no drive plate with an attached SCSI mass storage controller module. You must add a drive plate and controller module before a TZ30 tape drive can be installed on your system. Contact your Digital sales representative for information on ordering a SCSI/SCSI Disk Drive Plate Controller Kit (VS42D–JH). Once you have a drive plate with an attached SCSI mass storage controller module, follow the directions in Section 9.5 and then return to step 6.

**6**  Screw the four mounts into the bottom of the TZ30, as shown in Figure 9–26.
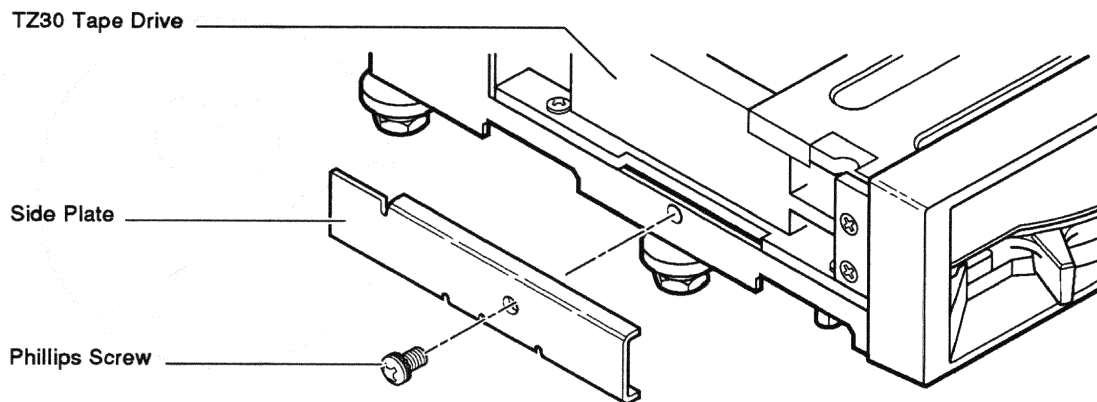
**Figure 9–26    Adding Mounts to the TZ30 Tape Drive**

Mount

Bottom View

Mounts (2)

Mounts (2)
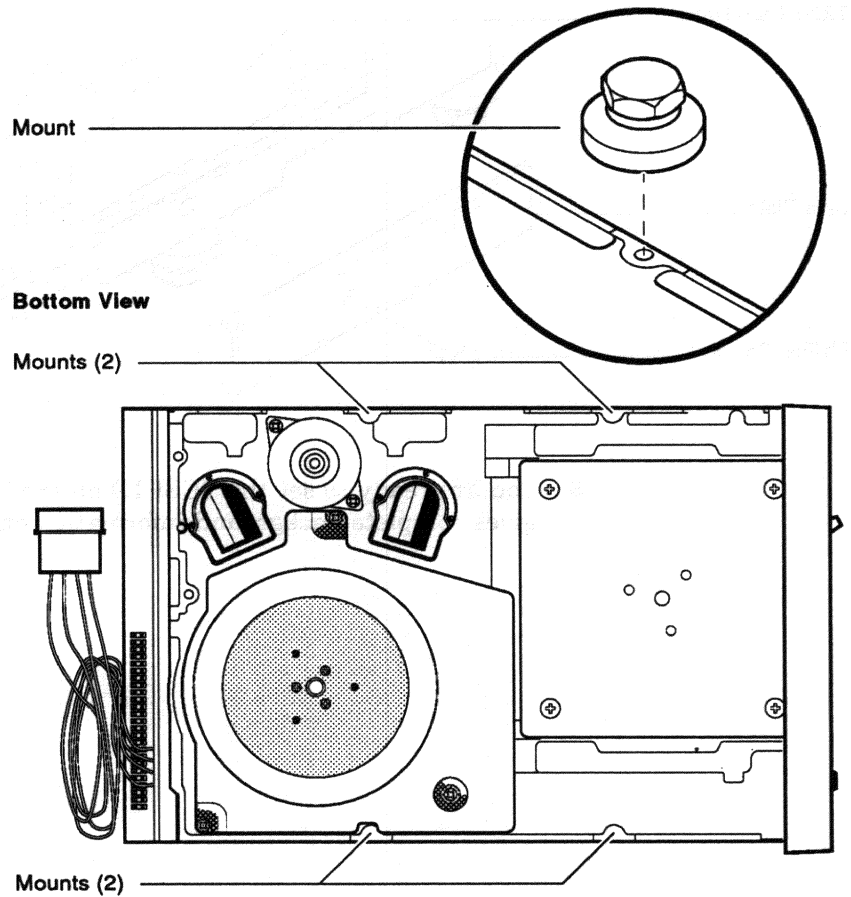
MLO-003476

**7** Screw the metal side plate onto the side of the TZ30, as shown in Figure 9–27.

**Figure 9–27    Adding the Side Plate to the TZ30 Tape Drive**

TZ30 Tape Drive

Side Plate

Phillips Screw

MLO-003477

**8** You are ready to set the SCSI ID on the TZ30. Appendix B gives complete background information on SCSI ID settings.

**9** Set the SCSI ID on the TZ30 using the following steps:

- Locate SCSI ID switches 1, 2, 3, and 4 on the tape drive, as shown in Figure 9–28.

**Figure 9–28    Setting the TZ30 Tape Drive SCSI ID**
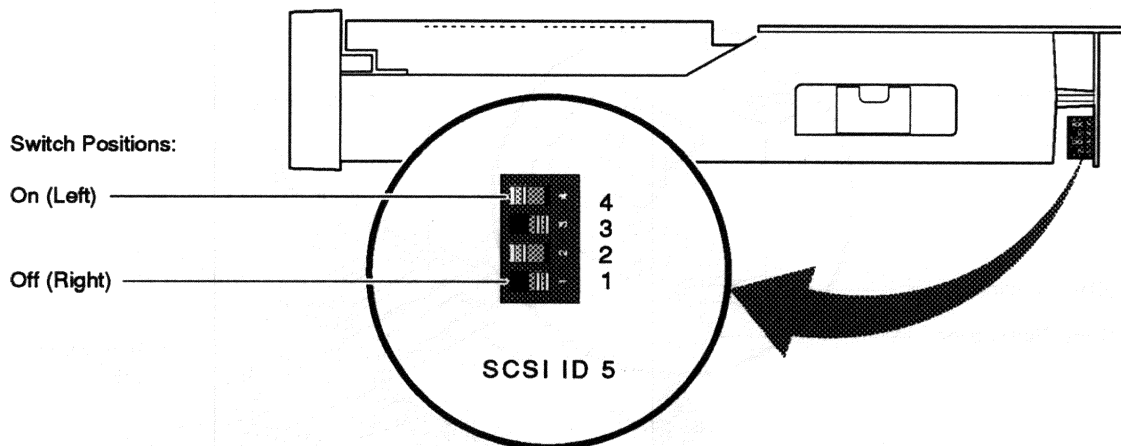


MLO-002890

- Digital recommends that you set the TZ30 SCSI ID code number to 5. Move the switches to the on or off position using a pen or small pointed object as follows:

      Switch 4 = left position (on)
      Switch 3 = right position (off)
      Switch 2 = left position (on)
      Switch 1 = right position (off)
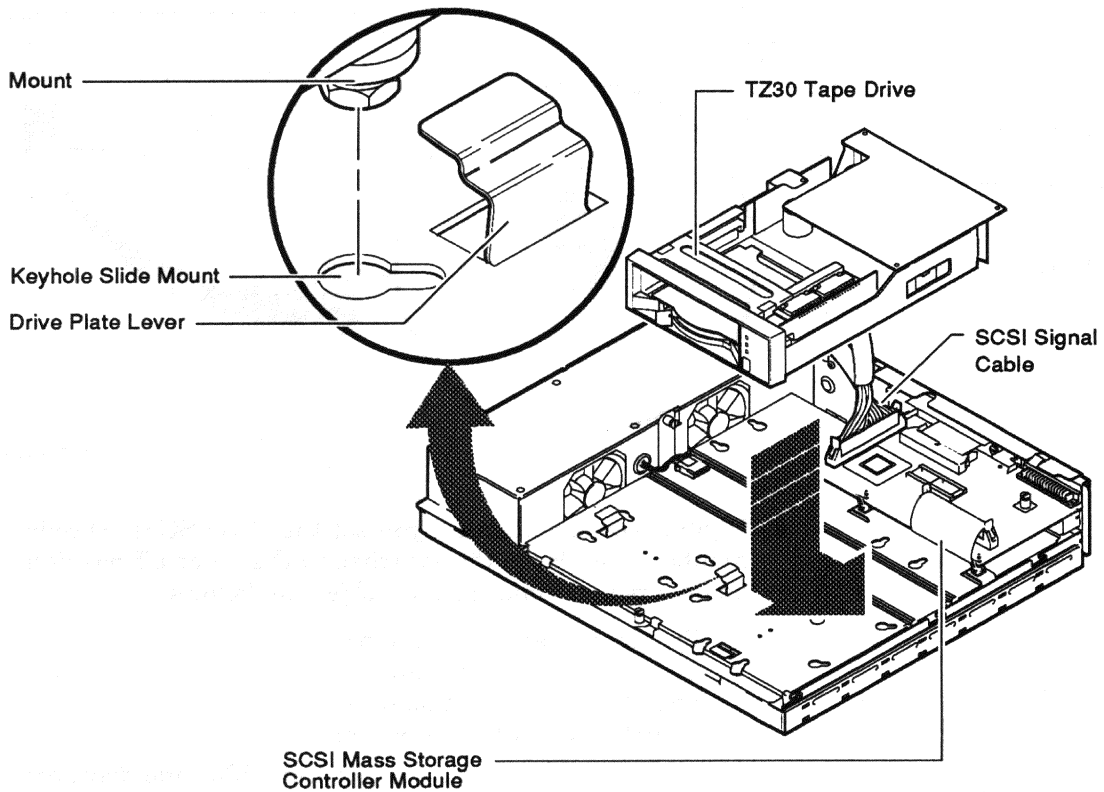
    All possible SCSI ID settings for the TZ30 tape drive are in Table B–4.

**Caution** *Never set two devices to the same SCSI ID; the system will not be able to service the devices.*

**10** Mount the TZ30 on the drive plate as follows:

- Locate the TZ30 drive plate position in front of the SCSI mass storage controller module, as shown in Figure 9–29.

**Figure 9–29    Mounting the TZ30 Tape Drive on the Drive Plate**



Mount

Keyhole Slide Mount

Drive Plate Lever

TZ30 Tape Drive

SCSI Signal Cable

SCSI Mass Storage Controller Module

MLO-004588

- Position the TZ30 so that the front of the tape drive faces the front of the system unit. Figure 9–30 shows an enlarged view of the front of the TZ30 tape drive.

- Insert the four mounts on the bottom of the tape drive inside the four keyhole slide mount openings in the drive plate. (See Figure 9–29.)

**Figure 9–30    TZ30 Tape Drive**
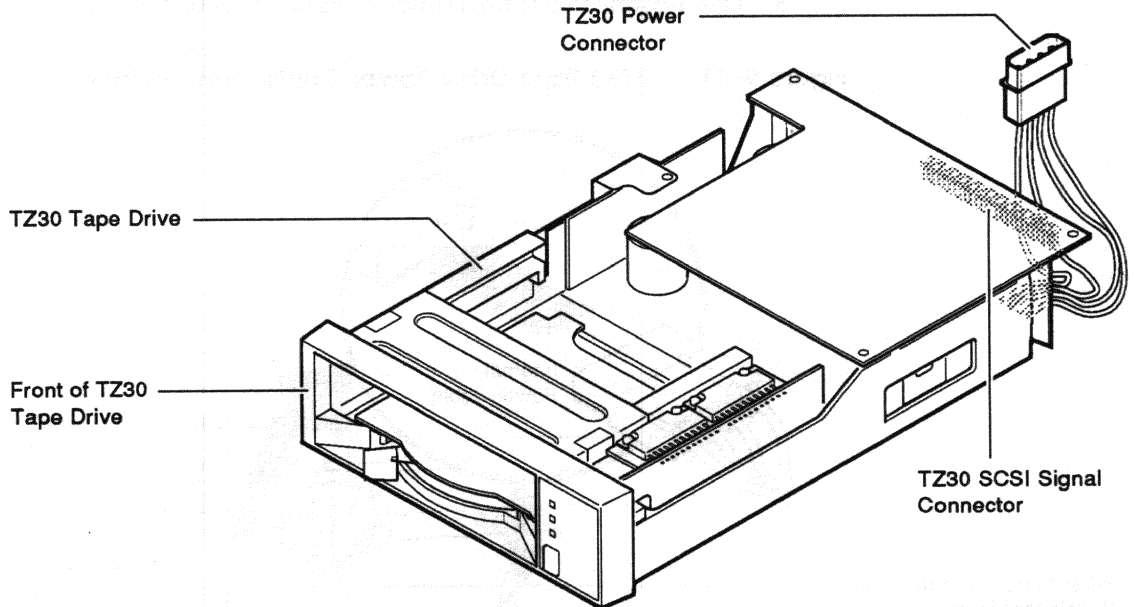


MLO-003529

- Press the TZ30 tape drive downward and slide it forward in the grooves of the drive plate until the drive plate lever pops up, locking the tape drive in place. When the TZ30 is correctly mounted, the drive plate lever will make firm contact with the side of the tape drive, and the drive will not move on the drive plate.

11  Locate the two power cables, as shown in Figure 9–31:

- The power cable fixed to the power supply

- The 4-connector internal power cable, (17–02440–01).

**Figure 9–31    TZ30 Tape Drive Power Cable Connections**



MLO-002892
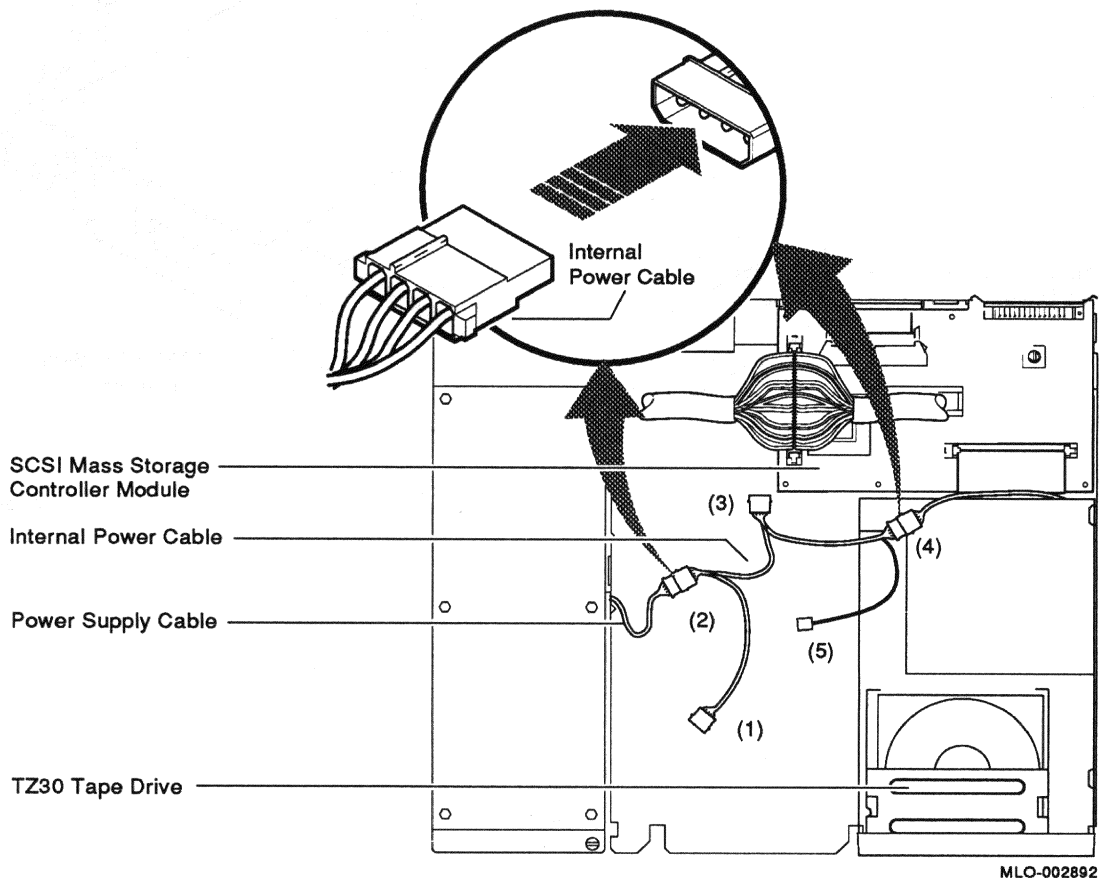
Note that every cable connector has a raised, off-center key on one side.

**12** Connect the 4-connector internal power cable plug (2) to the system power supply connector so that the raised keys are aligned. Figure 9–31 shows the connectors numbered for reference.

**13** The remaining four power cable connectors are identical. Connect the power cable connector (4) to the tape drive so that the raised keys are aligned. Some of the power cable connectors may remain unconnected depending on your system configuration.

**14** Locate the SCSI signal cable attached to the SCSI mass storage module, as shown in Figure 9–32. The SCSI signal cable has three additional connectors for connecting to mass storage devices. Note that one side of each SCSI signal cable connector has a raised center key.

**15** Connect one of the free SCSI signal cable connectors to the tape drive so that the keyed side of the SCSI signal cable connector faces upward, away from the tape drive. Some signal cable connectors may remain unconnected depending on your system configuration.

**Figure 9–32    TZ30 Tape Drive SCSI Signal Cable Connections**



SCSI Signal
Cable Connector

SCSI Port A

SCSI Signal Cable

SCSI Mass Storage
Controller Module

TZ30 Tape Drive

MLO-002893
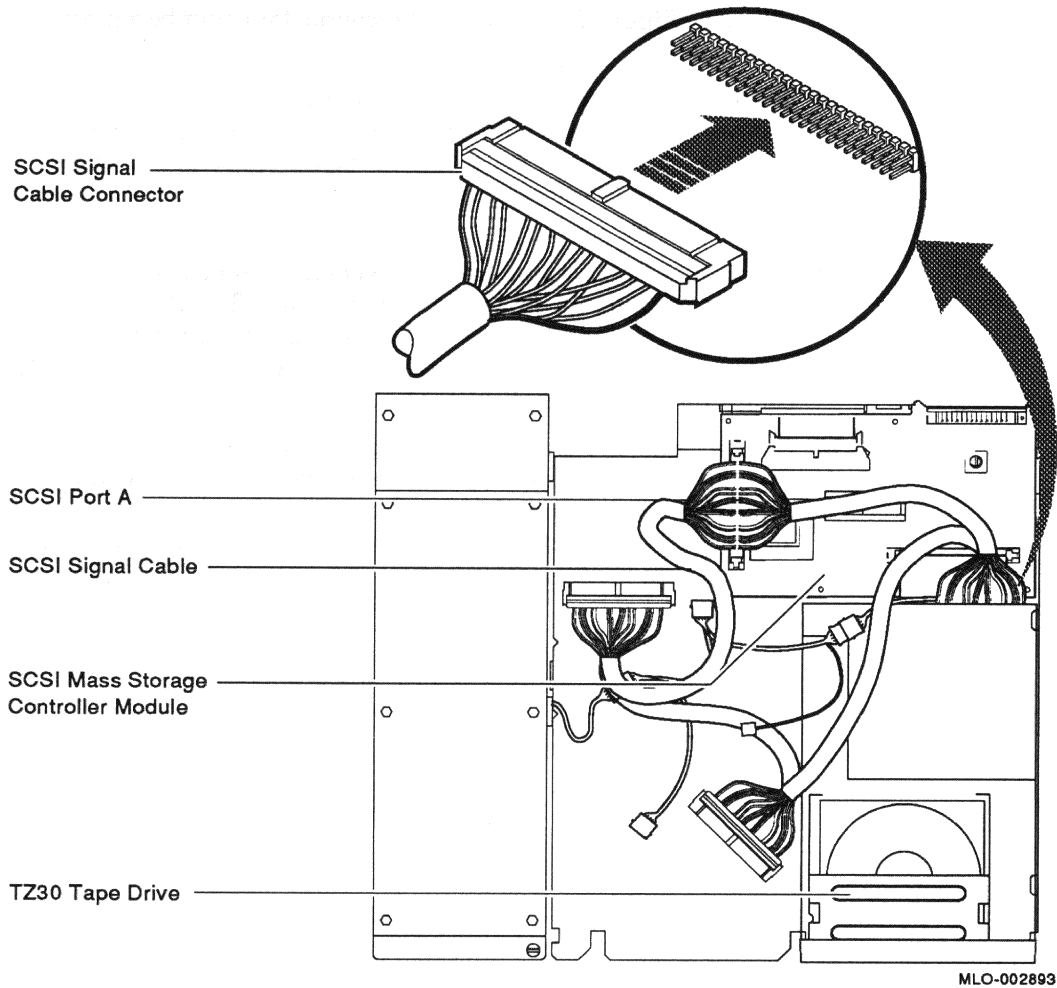
**16** If you have further additions to make inside the system
unit, turn to the appropriate sections. Otherwise, proceed to
Section 9.14.

## 9.10 Adding RZ23 or RZ22 Hard Disks

To add an RZ23 or RZ22 hard disk, complete the following steps:

1  If you have not already done so, prepare the system unit by following the steps in Section 9.1 and then return to step 2.

2  If you are adding multiple device types, review Section 9.2 and then return to step 3.

3  If you have a diskless machine, your system has no drive plate with an attached SCSI mass storage controller module. You must add a drive plate and controller module before an RZ22 or RZ23 hard disk can be installed on your system. Contact your Digital sales representative for information on ordering a SCSI/SCSI Disk Drive Plate Controller Kit (VS42D–JH). Once you have a drive plate with an attached SCSI mass storage controller module, follow the directions in Section 9.5 and then return to step 4.

4  Locate the positions on the drive plate where hard disks can be added:

   ■ If you have a TZ30 tape drive or an RX23 diskette drive already in place on the drive plate, the first and second hard disks go on the drive plate in positions 4 and 3, in that order, as shown in Figure 9–33.
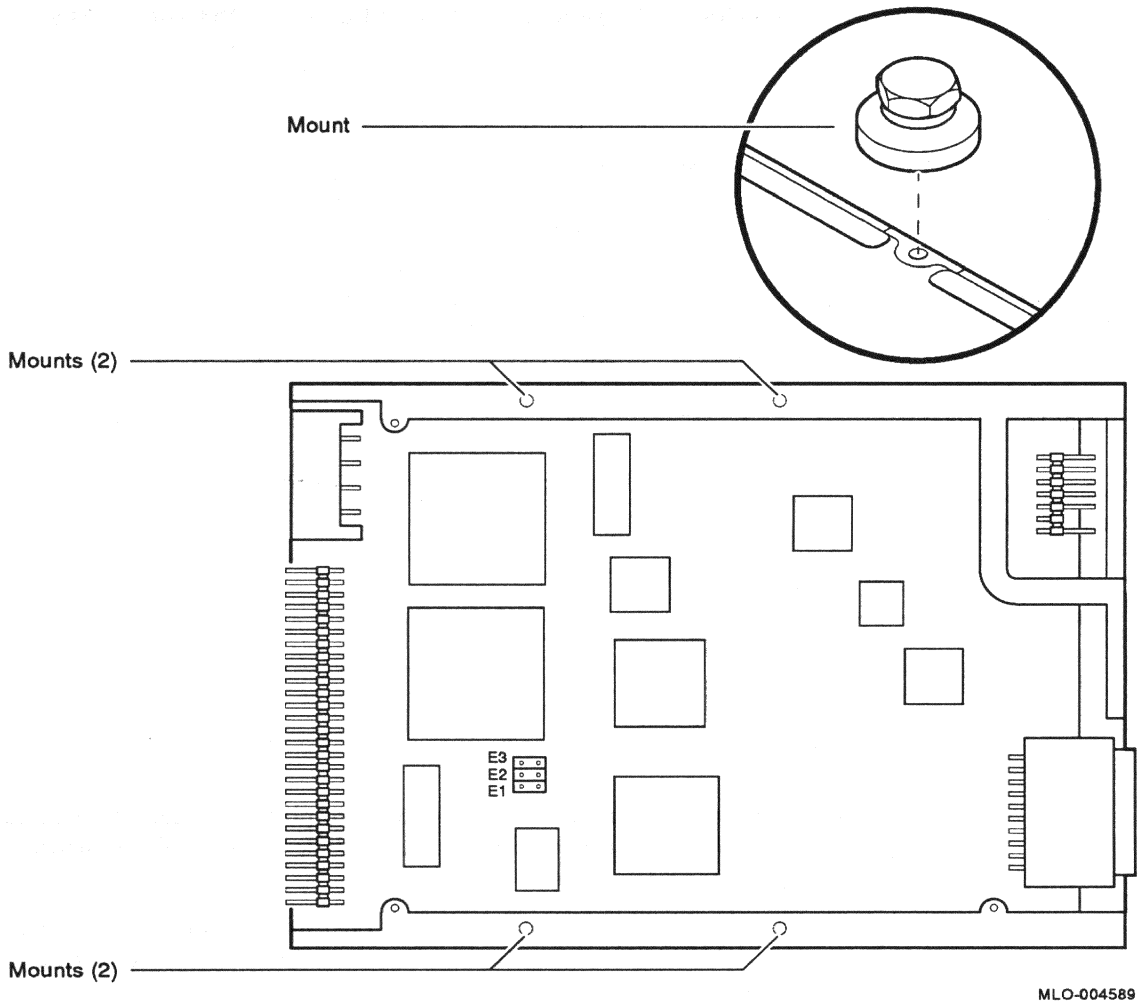
**Figure 9–33  Two RZ22/RZ23 Hard Disks with a Tape or Diskette Drive on the Drive Plate**

System Back

Position 1 —————— SCSI Mass Storage Controller Module

Position 4 —————— RZ22/RZ23 Hard Disk

Position 2 —————— TZ30 Tape Drive, RX23 Diskette Drive

Position 3 —————— RZ22/RZ23 Hard Disk

System Front
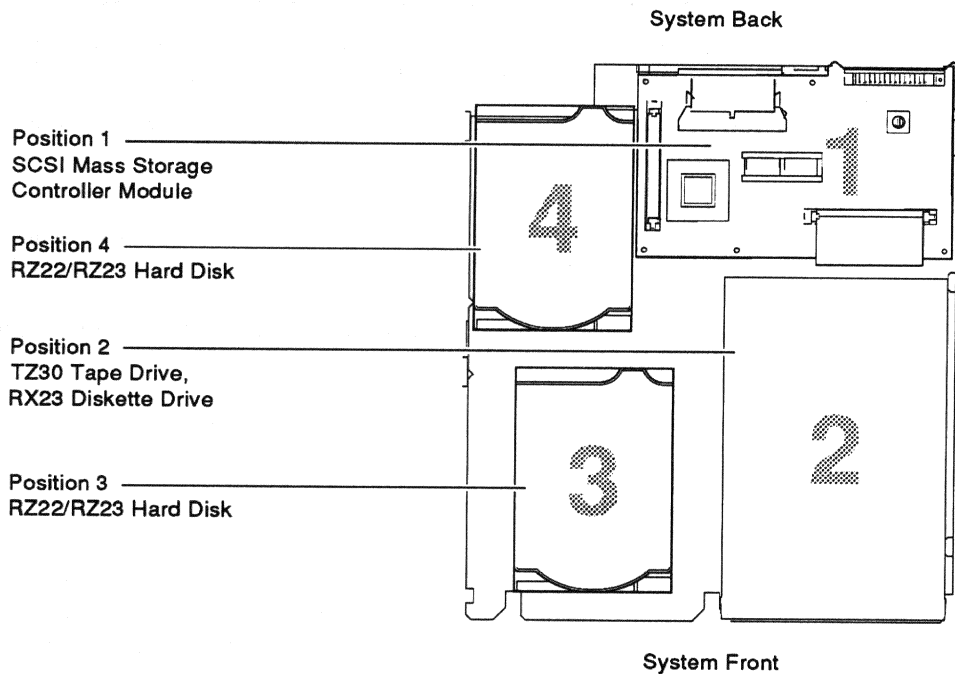
MLO-005081

- If you do not have a tape or a diskette drive already in place, the first, second, and third hard disks go on the drive plate in positions 4, 3, and 2, in that order, as shown in Figure 9–34.

**Figure 9–34    Three RZ22/RZ23 Hard Disks on the Drive Plate**

System Back

Position 1
SCSI Mass Storage
Controller Module

Position 4
RZ22/RZ23 Hard Disk

Position 2
RZ22/RZ23 Hard Disk

Position 3
RZ22/RZ23 Hard Disk

Screw

Lever

System Front

MLO-005082
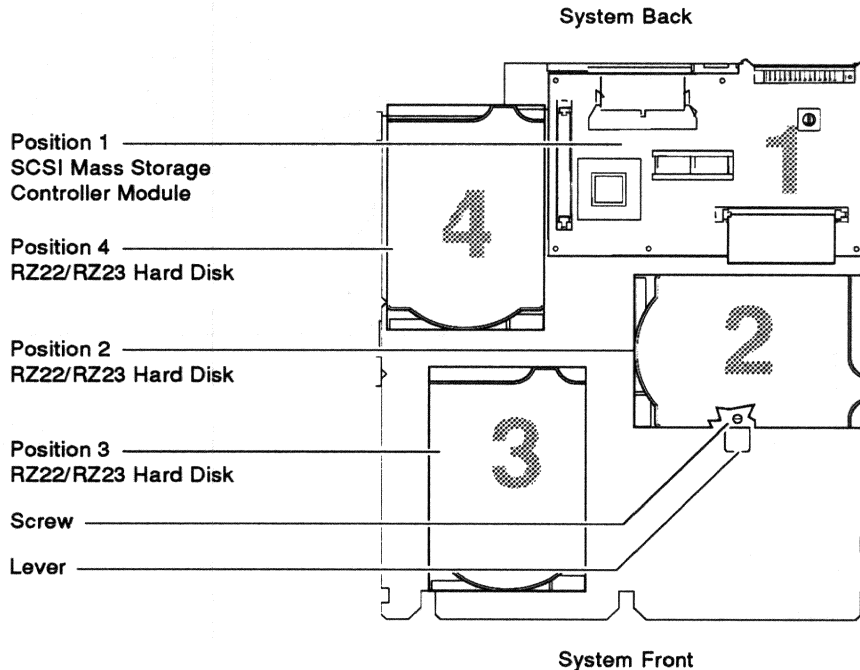
5   If you are adding a hard disk to drive plate positions 2 or 3, go to step 7. If you are adding a hard disk to drive plate position 4, continue to step 6.

6   To add a hard disk to drive plate position 4, you must remove the SCSI mass storage controller module. Use the following procedure:

- Follow the steps in Section 9.12 to remove the SCSI mass storage controller module.

- Return to step 7 and follow the remaining steps to add the hard disk.

**7** Screw the four mounts into the bottom of the hard disk, as shown in Figure 9–35.

**Figure 9–35    Adding Mounts to an RZ22/RZ23 Hard Disk**

Mount

Mounts (2)

E3
E2
E1

Mounts (2)

MLO-004589

**8** You are ready to set the SCSI ID on the hard disk. Appendix B gives complete background information on SCSI ID settings.
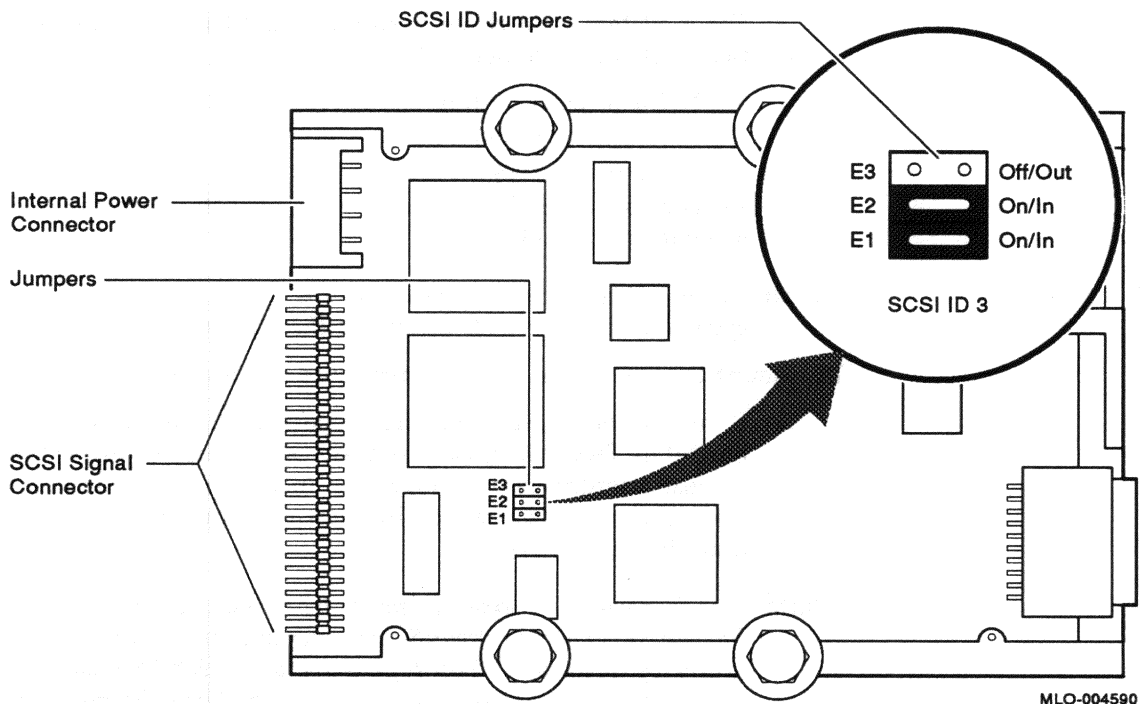
**9** Locate SCSI ID jumpers E1, E2, and E3 on the underside of the hard disk, as shown in Figure 9–36.

Jumpers are removable electrical connectors on the ID seatings. To set the SCSI ID in the off position, remove a jumper from its seating by pulling the jumper out. To set a jumper in the on position, leave it in place. (See Figure 9–36.)

**Note** *You must use the SCSI ID code numbers 0 through 7 to reflect the operating system device parameters.*

**Note** *It is important that you save any SCSI ID jumpers that you remove. You may need to reconfigure your system unit at a later time and change the ID setting on the hard disk.*

**Figure 9–36    Setting the SCSI ID on the RZ22/RZ23 Hard Disk**



MLO-004590

**10** Set the SCSI ID based on the total number of hard disks you will have inside the system unit. Digital recommends the following guidelines:

- For a system with one hard disk, set the SCSI ID code number to 3:

  E 1 = out position (off)
  E 2 = in position (on)
  E 3 = in position (on)

- For a system with two hard disks, designate one to be a system disk for the operating system software and the other to be a user disk for applications software. Set the system disk SCSI ID code number to 3 and the user disk SCSI ID code number to 2:

  E 1 = out position (off)
  E 2 = in position (on)
  E 3 = out position (off)

- For a system with three hard disks, set the third disk's SCSI ID code number to 1:

  E 1 = in position (on)
  E 2 = out position (off)
  E 3 = out position (off)

  All possible SCSI ID jumper settings for the hard disks are shown in Table B–5.

**Caution** *Never set two or more devices to the same SCSI ID; the system will not be able to service the devices.*

**11** Mount the hard disk on the drive plate as follows:
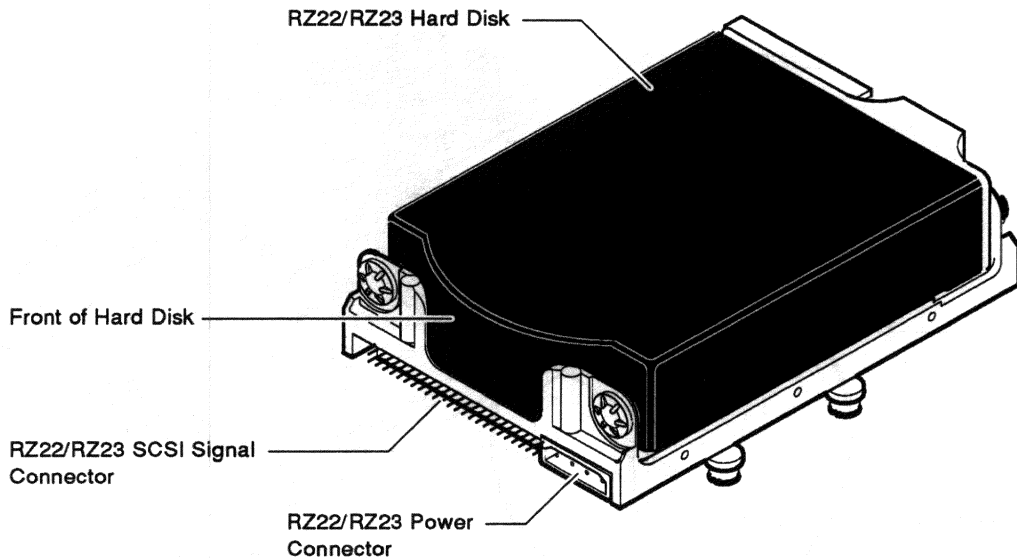
- If you are adding a hard disk to position 2, the front of the hard disk faces the power supply. See Figure 9–34 for the correct orientation of a hard disk in position 2. Unscrew and remove the screw holding down the position 2 drive plate lever, if present.

**Note** *It is important to save the screw from the drive plate lever. Should you wish to reconfigure your system unit in the future by adding a TZ30 tape drive or an RX23 diskette drive, you will need this screw to fasten down the position 2 drive plate lever.*

If you are adding the hard disk to position 3 or to position 4, the front of the hard disk faces the front of the system unit as shown in Figure 9–38. Figure 9–37 shows an enlarged view of the front of the hard disk and the cable connectors.
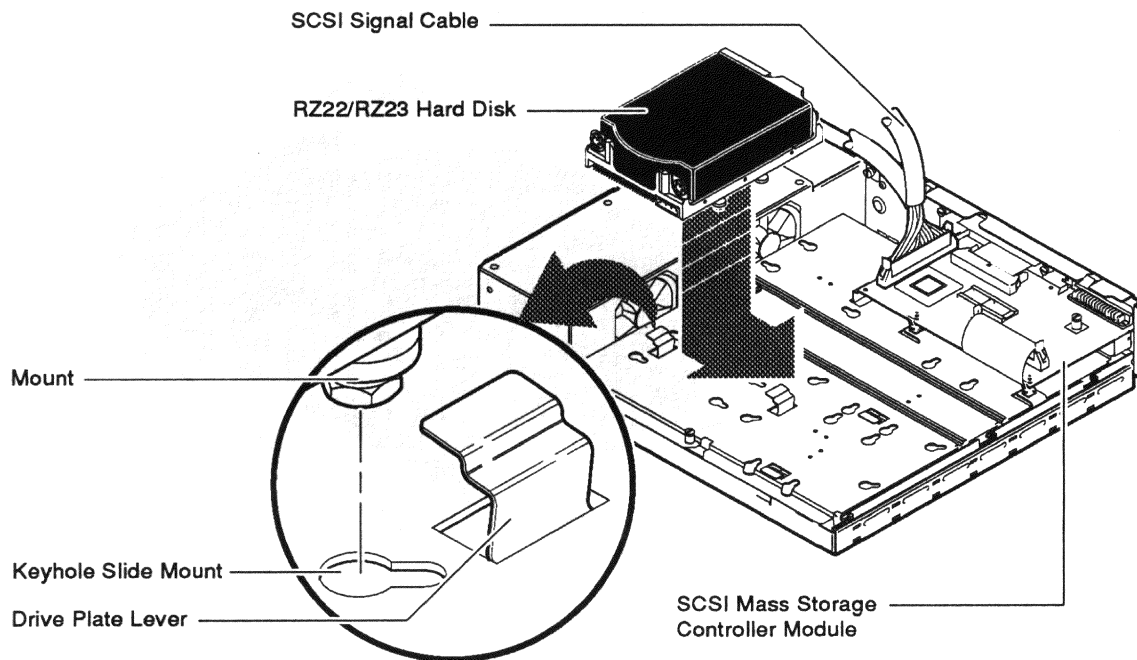
**Figure 9–37     RZ22/RZ23 Hard Disk**



RZ22/RZ23 Hard Disk

Front of Hard Disk

RZ22/RZ23 SCSI Signal Connector

RZ22/RZ23 Power Connector

MLO-005083

- Insert the four mounts on the bottom of the hard disk inside the four keyhole slide mount openings in the drive plate, as shown in Figure 9–38.

**Figure 9–38    Mounting an RZ22/RZ23 Hard Disk on the Drive Plate**
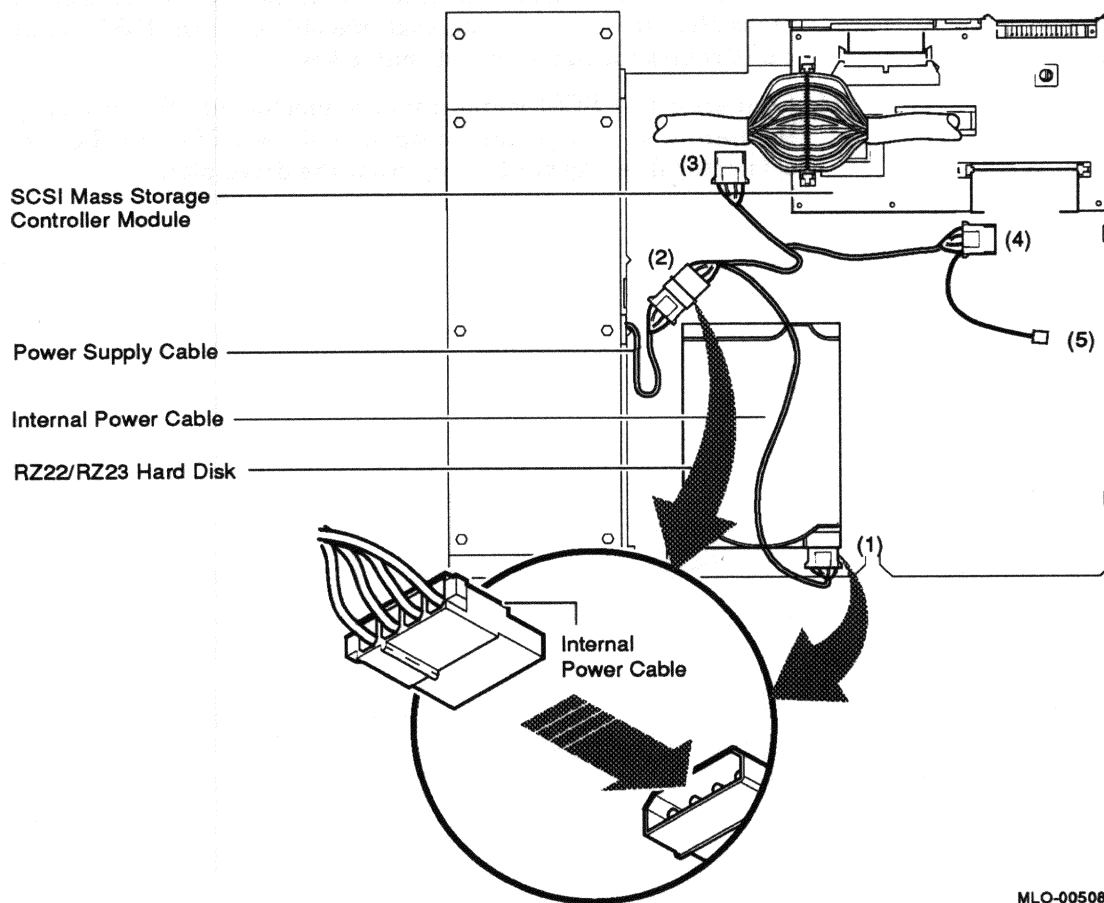


MLO-004591

- Press the hard disk downward and slide it forward in the grooves of the drive plate until the drive plate lever pops up, locking the hard disk in place. When the hard disk is correctly mounted, the drive plate lever will make firm contact with the side of the hard disk, and the hard disk will not move on the drive plate.

**12** Locate the two power cables, shown in Figure 9–39:

- The power cable fixed to the power supply

- The 4-connector internal power cable, labeled 17–02440–01.

**Figure 9–39    RZ22/RZ23 Hard Disk Power Cable Connections**



SCSI Mass Storage
Controller Module

Power Supply Cable

Internal Power Cable

RZ22/RZ23 Hard Disk

Internal
Power Cable

(1) (2) (3) (4) (5)
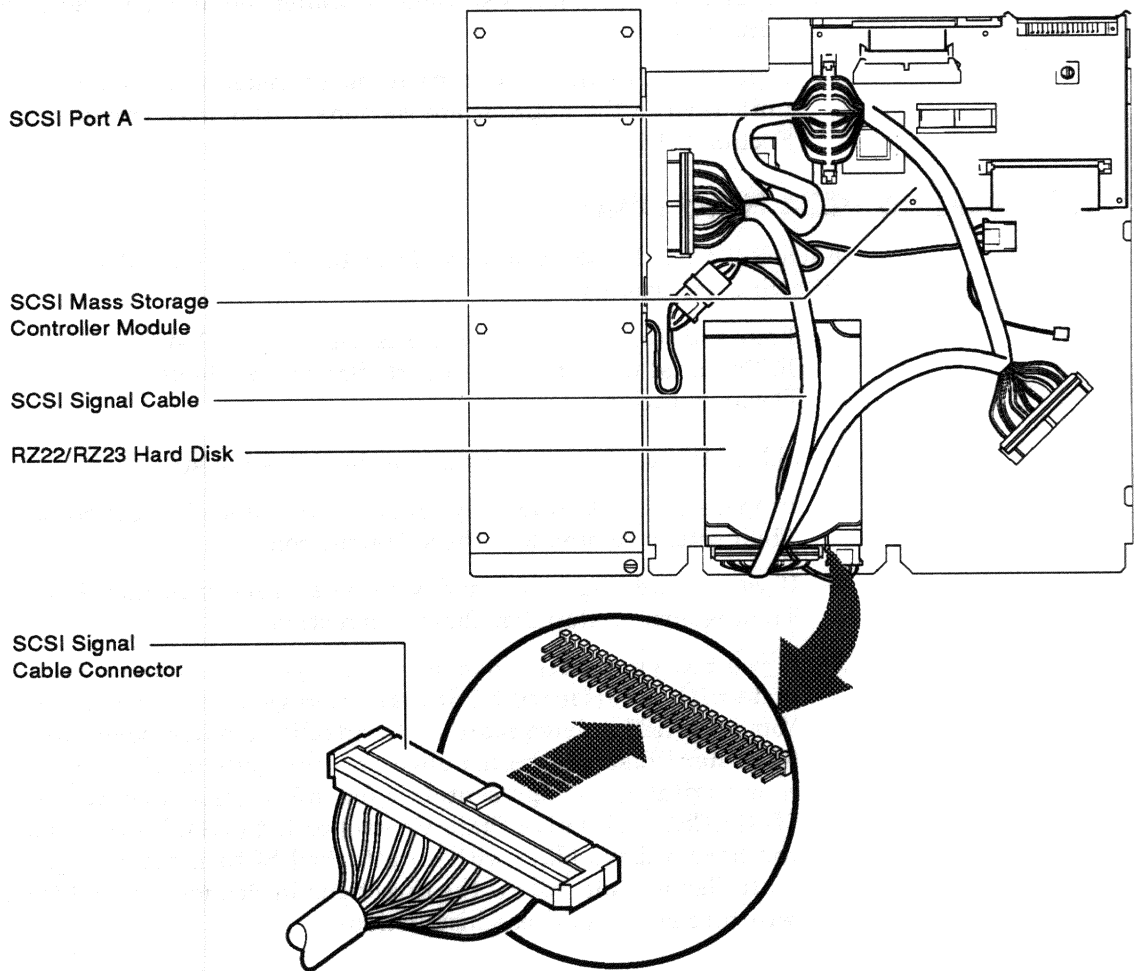
MLO-005084

Note that every power cable connector has a raised, off-center key on one side. The one smaller cable connector (5) is not used with hard disks. Figure 9–39 shows the cable connectors numbered for reference.

**13** Connect the 4-connector internal power cable plug (2) to the system power supply connector so that the raised keys are aligned.

**14** The remaining three power cable connectors are identical. Connect one of the power cable connectors into the front of the hard disk so that its off-center key faces downward. Some connectors may remain unconnected depending on your system configuration.

**15** Locate the SCSI signal cable attached to the SCSI mass storage controller module, as shown in Figure 9–40. The SCSI signal cable has three additional connectors for connecting to mass storage devices. Note that one side of each SCSI signal cable connector has a raised center key.

**16** Connect a free SCSI signal cable connector into the front of the hard disk so that the keyed side of the SCSI signal cable connector faces upward, away from the drive plate.

**Figure 9-40    RZ22/RZ23 Hard Disk SCSI Signal Cable Connections**

SCSI Port A

SCSI Mass Storage Controller Module

SCSI Signal Cable

RZ22/RZ23 Hard Disk

SCSI Signal Cable Connector

MLO-005085

**17** If you had to remove the SCSI mass storage controller module in order to add a hard disk to position 4 on the drive plate, replace the SCSI mass storage controller module now. Refer to Section 9.13.

**18** If you have further additions to make inside the system unit, turn to the appropriate sections. Otherwise, proceed to Section 9.14.

## 9.11 Adding RZ24 Hard Disks

Each RZ24 hard disk is shipped from the factory with the following accessories:

Four Phillips head screw mounts (See Figure 9–43)
RZ24 metal drive frame support (See Figure 9–43)
Documentation
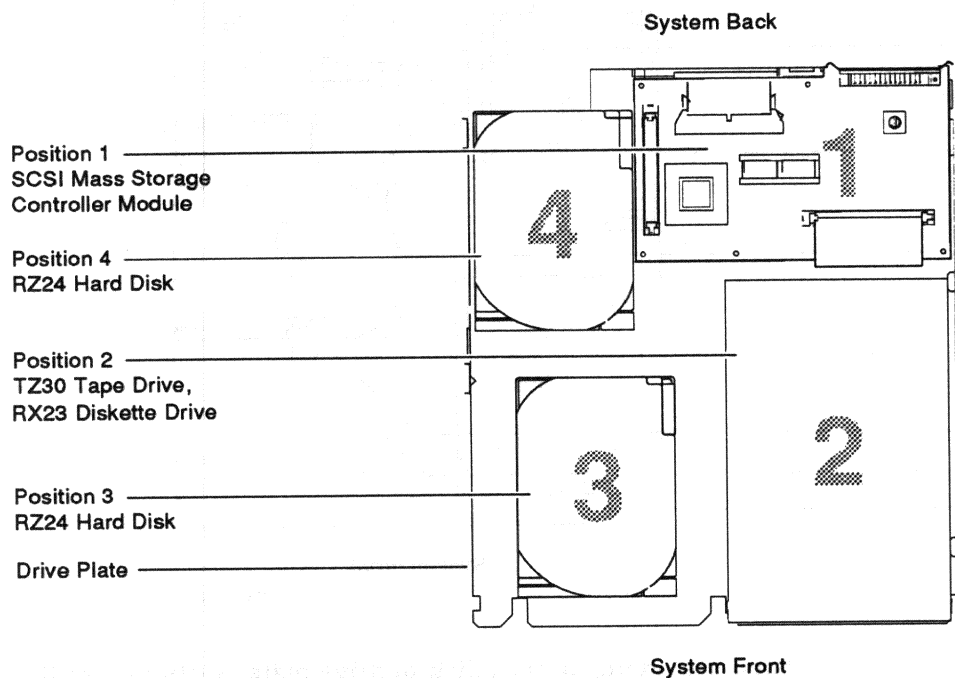
To add an RZ24 hard disk, complete the following steps:

**1** Prepare the system unit by following the steps in Section 9.1. Then return to step 2 of these instructions.

**2** If you are adding multiple device types, review Section 9.2. Then return to step 3 of these instructions.

**3** If you have a diskless machine, your system has no drive plate with an attached SCSI mass storage controller module. You must add a drive plate and controller module before an RZ24 hard disk can be installed on your system. Contact your Digital sales representative for information on ordering a SCSI/SCSI Disk Drive Plate Controller Kit (VS42D–JH). Once you have a drive plate with an attached SCSI mass storage controller module, follow the directions in Section 9.5 and then return to step 4 of these instructions.

**4** Locate the positions on the drive plate where hard disks can be added:

- If you have a TZ30 tape drive or an RX23 diskette drive already in place on the drive plate, the first hard disk that you add will go on the drive plate in position 4, and the second hard disk will go in position 3, as shown in Figure 9–41.

**Figure 9–41    Adding Two Hard Disks with a Tape or Diskette Drive Already on the Drive Plate**

System Back

Position 1
SCSI Mass Storage
Controller Module

Position 4
RZ24 Hard Disk

Position 2
TZ30 Tape Drive,
RX23 Diskette Drive

Position 3
RZ24 Hard Disk

Drive Plate

System Front

MLO-005086

- If you do not have a tape or a diskette drive already in place on the drive plate, you can add up to three hard disks to positions 4, 3, and 2 of the drive plate, in that order. Figure 9–42 shows you the positions for adding three hard disks.

**Figure 9–42    Adding Three Hard Disks to the Drive Plate**



System Back

Position 1
SCSI Mass Storage
Controller Module

Position 4
RZ24 Hard Disk

Position 2
RZ24 Hard Disk

Position 3
RZ24 Hard Disk

Screw

Lever

Drive Plate

System Front

MLO-004328
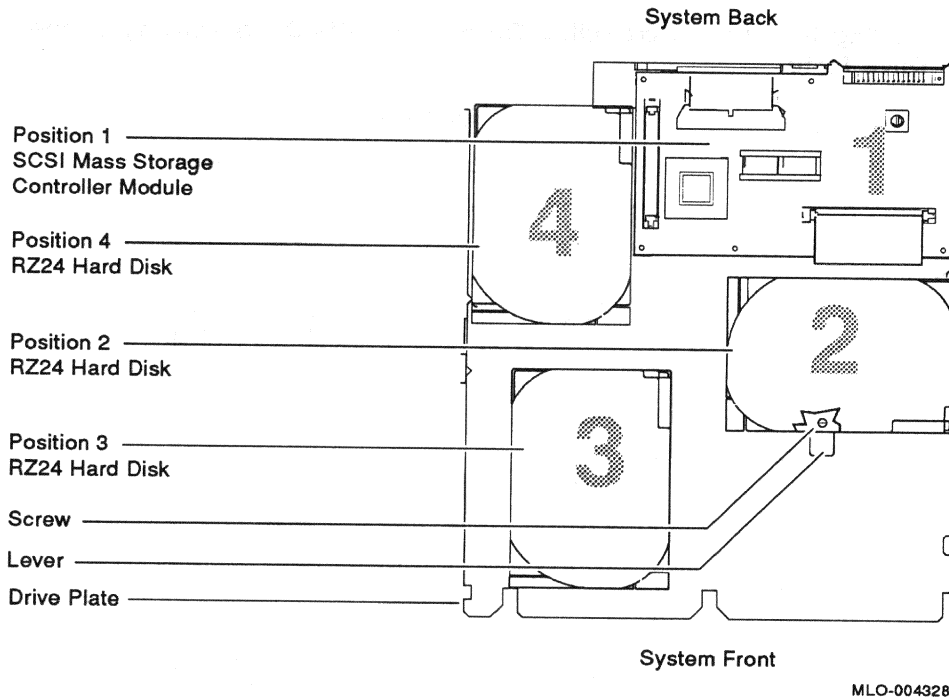
5    If you are adding a hard disk to drive plate positions 2 or 3, go to to step 7. If you are adding a hard disk to drive plate position 4, continue to step 6.

6    To add a hard disk to drive plate position 4, you must remove the SCSI mass storage controller module. Use the following procedure:

- Follow the steps in Section 9.12 to remove the SCSI mass storage controller module.

- Return to step 7 of these instructions and follow steps 7 through 19 to add the hard disk.

**7** Place the RZ24 metal drive frame support on the bottom of the RZ24 hard disk, aligning the four mount holes of the metal support with the four mount holes of the hard disk. Screw the four Phillips head screw mounts into the bottom of the hard disk, as shown in Figure 9–43.

**Note** *Make sure the two raised ridges on the face of the RZ24 metal stiffener are facing up when you are attaching it to the RZ24 hard disk.*

**Figure 9–43    Attaching Metal Drive Frame Support to an RZ24 Hard Disk**
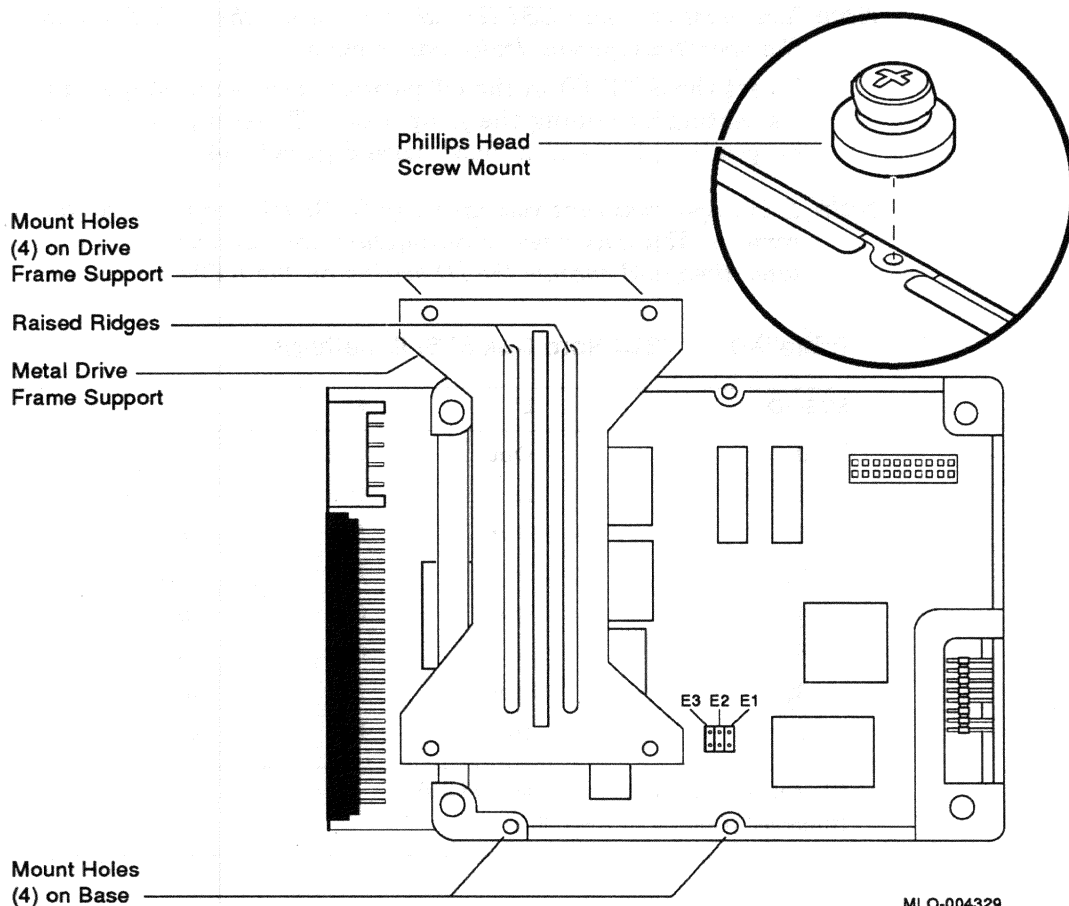
**8**   You are ready to set the SCSI ID on the RZ24 hard disk.
Please refer to Appendix B for background information on
SCSI ID settings.

**9**   Locate SCSI ID jumpers E1, E2, and E3 on the underside of
the hard disk, as shown in Figure 9–44.

SCSI ID jumpers are removable electrical connectors on the
ID seatings.

Table 9–1 in these instructions gives you the correct ID jumper
positions (E1, E2, and E3) to set SCSI ID code numbers 0
through 7 for the RZ24 hard disk.

**Note** *You must use the SCSI ID code numbers 0 through 7 to reflect
the operating system device parameters.*

To set the SCSI ID in the off position, remove a jumper from
its seating by pulling the jumper out. To set a jumper in the
on position, leave it in place. (See Figure 9–44.)

**Note** *It is important that you save any SCSI ID jumpers that you
remove. You may need to reconfigure your system unit at a
later time and change the ID setting on the RZ24 hard disk.*
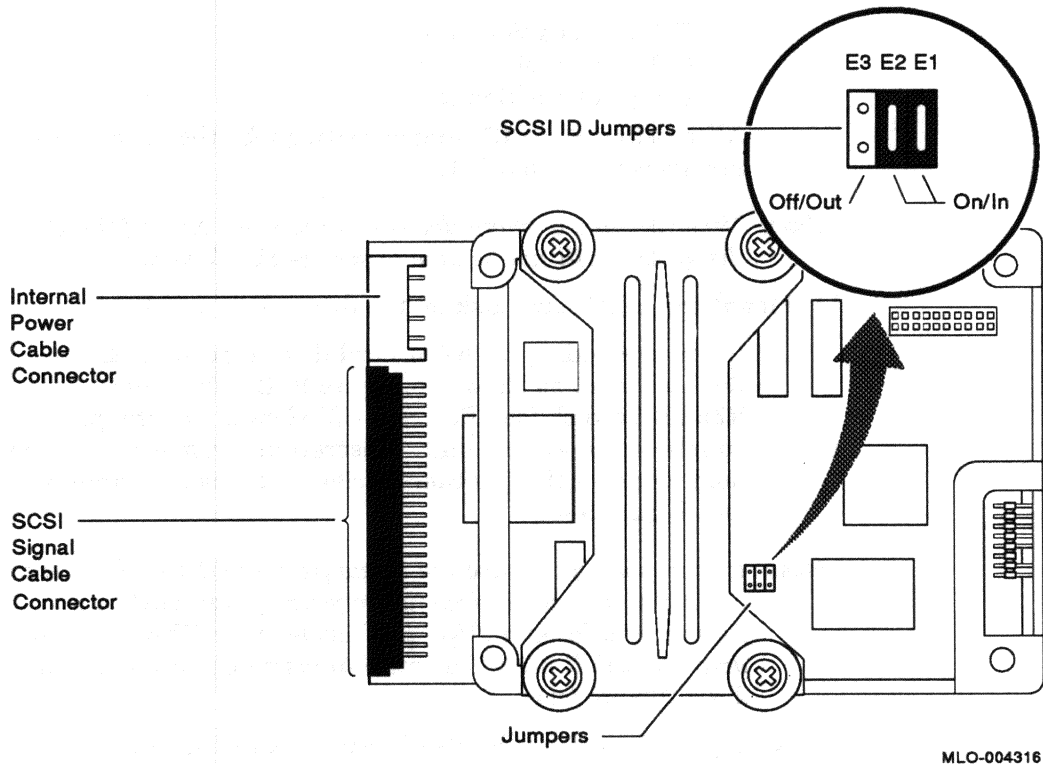
**Table 9–1   RZ24 Hard Disk SCSI ID Settings**

| SCSI ID | E1 | E2 | E3 |
|---------|-----|-----|-----|
| 0 | Out | Out | Out |
| 1† | In | Out | Out |
| 2† | Out | In | Out |
| 3† | In | In | Out |
| 4 | Out | Out | In |
| 5 | In | Out | In |
| 6‡ | Out | In | In |
| 7 | In | In | In |

†Recommended IDs for the RZ24 hard disk
‡Reserved ID for SCSI controller

**Figure 9-44    Setting the SCSI ID Codes on the RZ24 Hard Disk**



MLO-004316

**10** Set the SCSI ID code number based on the total number of hard disks you will have inside the system unit. Digital recommends the following guidelines:

- For a system with one hard disk, set the SCSI ID code number to 3:

    E 1 = in position (on)
    E 2 = in position (on)
    E 3 = out position (off)

- For a system with two hard disks, set the second hard disk's SCSI ID code number to 2:

    E 1 = out position (off)
    E 2 = in position (on)
    E 3 = out position (off)

- For a system with three hard disks, set the third disk's SCSI ID code number to 1:

  E 1 = in position (on)
  E 2 = out position (off)
  E 3 = out position (off)

  All possible SCSI ID jumper settings for the hard disks are shown in Table 9–1.

**Caution:** *Never set two or more devices to the same SCSI ID code; the system will not be able to service the devices.*

11 Mount the RZ24 hard disk on the drive plate as follows:

- If you are adding an RZ24 hard disk to position 2, place the hard disk as shown in Figure 9–42. The front of the RZ24 hard disk (see Figure 9–45) should face the power supply of the system unit. Unscrew and remove the screw holding down the position 2 drive plate lever, if present (see Figure 9–42).

**Note** *It is important to save the screw from the drive plate lever. Should you wish to reconfigure your system unit in the future, by adding a TZ30 tape drive or an RX23 diskette drive, you will need this screw to fasten down the position 2 drive plate lever.*

- If you are adding the RZ24 hard disk to position 3 or to position 4, the front of the hard disk faces the front of the system unit, as shown in Figure 9–42.

- Figure 9–45 shows a view of the front of the RZ24 hard disk and the cable connectors.

**Figure 9–45    RZ24 Hard Disk**

RZ24 Hard Disk ————

Front of Hard Disk ————

SCSI Signal ————
Cable Connector

Internal Power ————
Cable Connector
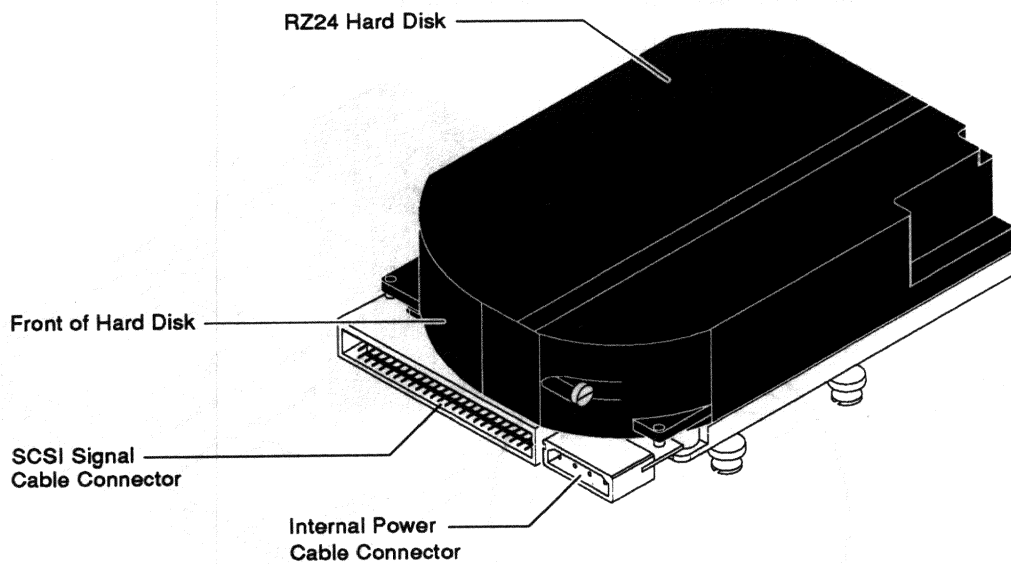
MLO-004317

■ Insert the four Phillips head screw mounts on the bottom of the RZ24 hard disk inside the four keyhole slide mount openings in the drive plate, as shown in Figure 9–46.

**Figure 9–46    Mounting an RZ24 Hard Disk on the Drive Plate**



SCSI Signal Cable

RZ24 Hard Disk

Phillips Head
Screw Mount

Keyhole Slide Mount

Drive Plate Lever

SCSI Mass Storage
Controller Module
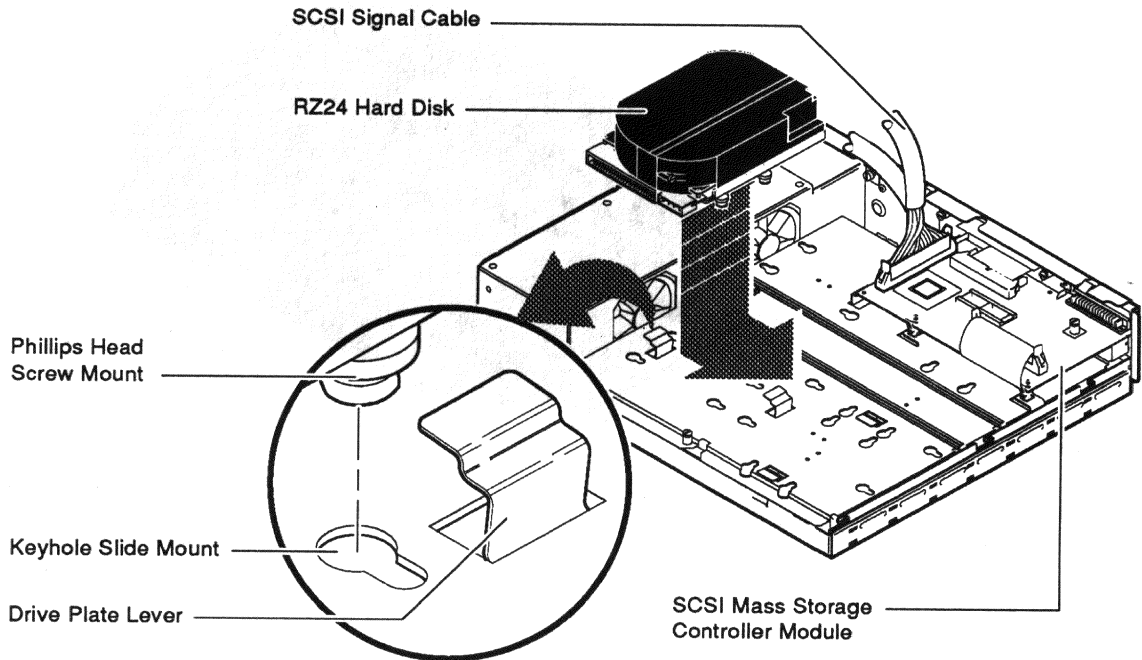
MLO-004330

■ Press the RZ24 hard disk downward and slide it forward in the grooves of the drive plate until the drive plate lever pops up, locking the hard disk in place. When the RZ24 is correctly mounted, the drive plate lever will make firm contact with the side of the hard disk, and the hard disk will not move on the drive plate.

**12** Locate the two power cables: the power cable fixed to the power supply and the 4-connector internal power cable (labeled 17–02440–01). Figure 9–47 shows the cables with the cable connectors numbered for reference. Note that every power cable connector has a raised, off-center key on one side. The one smaller cable ( 5 ) is not used with hard disks.

**Figure 9–47  RZ24 Hard Disk Power Cable Connections**
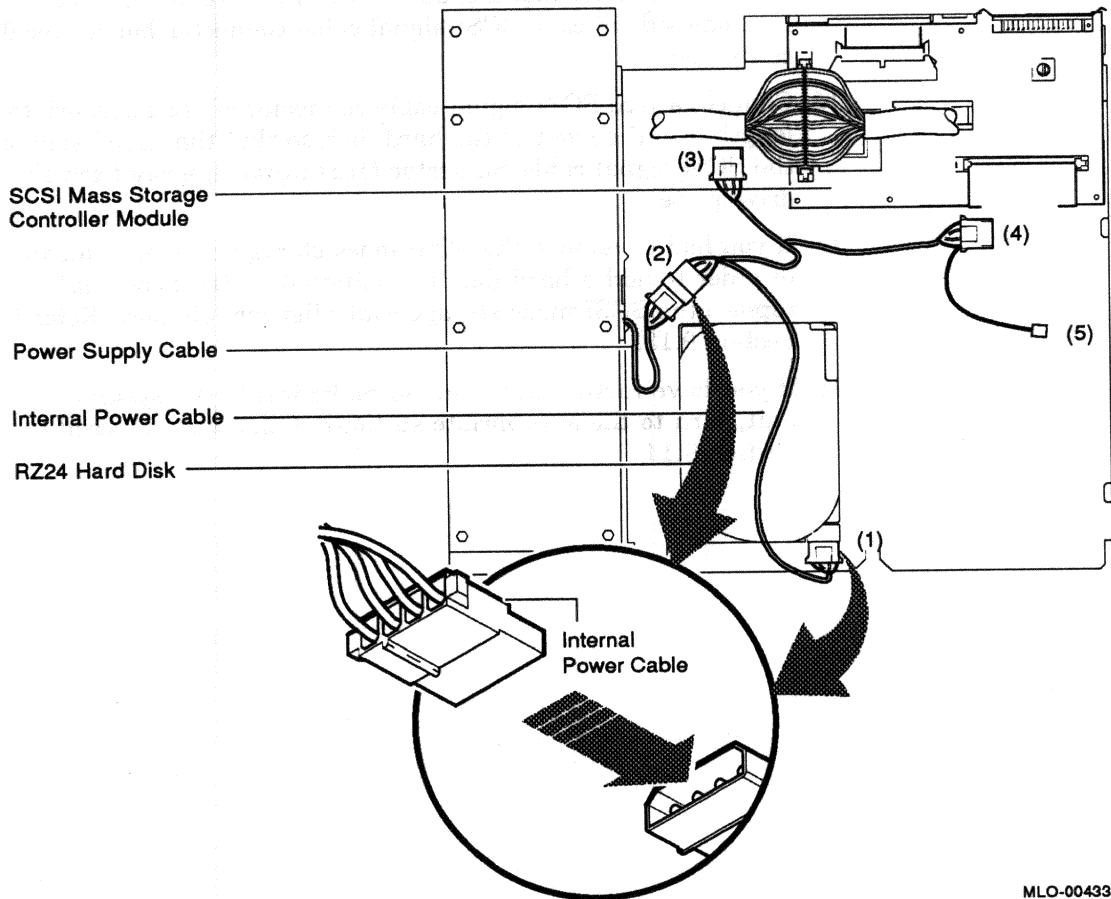


MLO-004331

**13** Connect the internal power cable plug (2) to the system power supply's socket so that the raised keys are aligned.
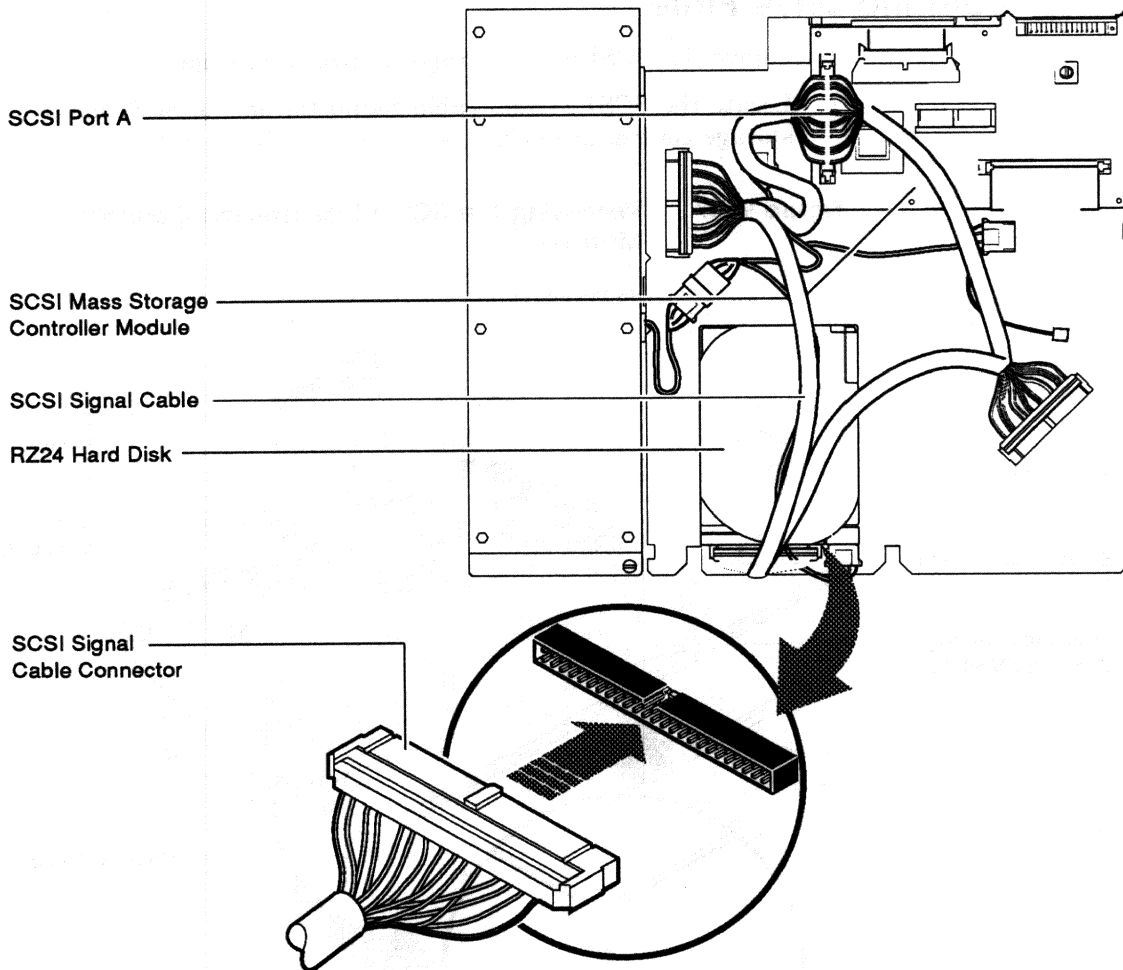
**14** The remaining three power cable sockets are identical. Connect one of the power cable sockets into the power cable connector on the front of the hard disk (see Figure 9–45) so that the off-center key on the socket faces downward.

**Note** *Some connectors may remain unconnected depending on your system configuration.*

**15** Locate the SCSI signal cable attached to the SCSI mass storage controller module, as shown in Figure 9–48. Note that one side of each SCSI signal cable connector has a raised center key.

**16** Connect a free SCSI signal cable connector of the appropriate length into the front of the hard disk so that the keyed side of the SCSI signal cable connector faces upward, away from the drive plate.

**17** If you had to remove the SCSI mass storage controller module in order to add a hard disk to position 4 on the drive plate, replace the SCSI mass storage controller module now. Refer to Section 9.13.

**18** If you have further additions to make inside the system unit, turn to the appropriate sections. Otherwise, proceed to Section 9.14.

**Figure 9–48    RZ24 Hard Disk SCSI Signal Cable Connections**

SCSI Port A ─────────

SCSI Mass Storage ─────────
Controller Module

SCSI Signal Cable ─────────

RZ24 Hard Disk ─────────

SCSI Signal ─────────
Cable Connector

MLO-004332

## 9.12 Removing the SCSI Mass Storage Controller Module from the Drive Plate

To remove the SCSI mass storage controller module:

1 Locate the SCSI system cable connector on the SCSI mass storage controller module, as shown in Figure 9–49.

**Figure 9–49   Removing the SCSI Mass Storage Controller Module**
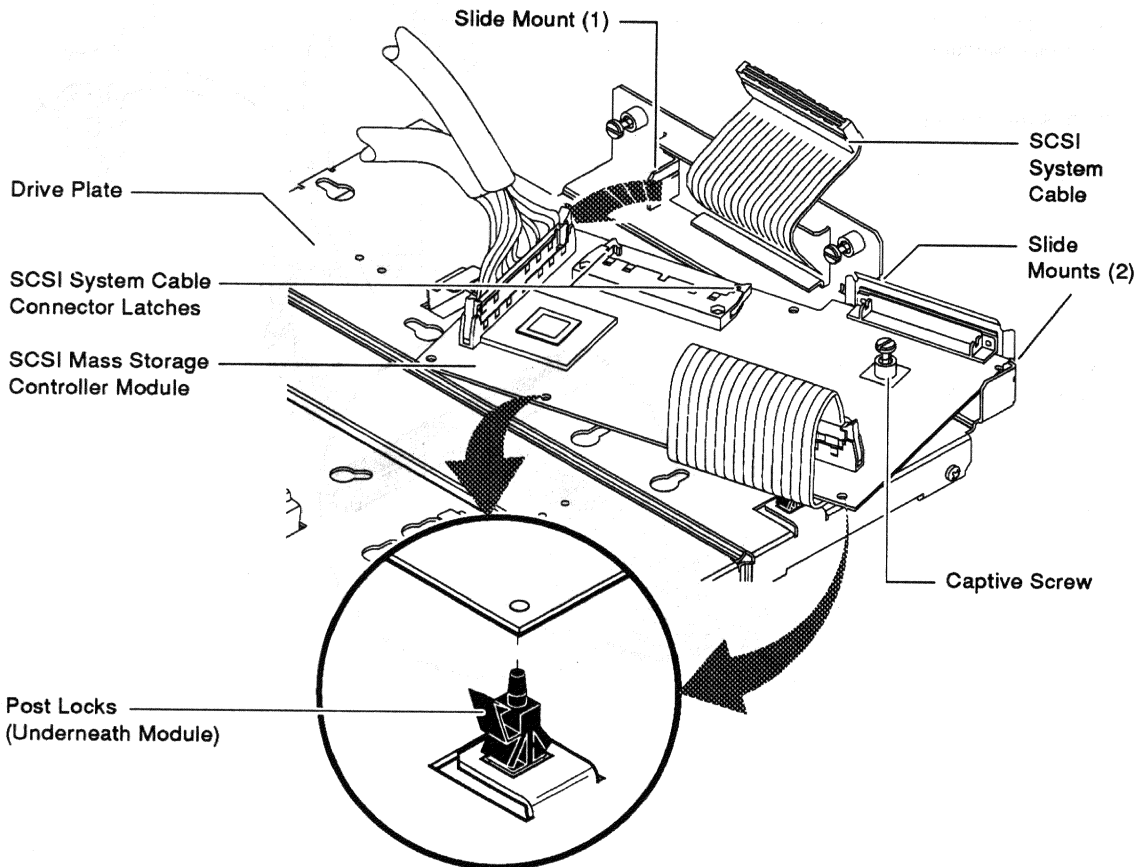


MLO-004592

**2** Disconnect either the external SCSI connector cable or the terminator from the external SCSI port located on the back panel of the system unit. Figure 4–4 shows the SCSI terminator on the SCSI port and Figure 4–6 shows the SCSI connector cable.

**3** Unscrew the captive screw on the SCSI mass storage controller module.

**4** Locate the post locks under the front edge of the SCSI mass storage controller module. Pull the post lock latches outward and lift the front of the SCSI mass storage controller module upward until it is free.

**5** Disconnect the SCSI system cable from the SCSI mass storage controller module by opening the latches on the SCSI system cable connector outward and removing the SCSI system cable.

**6** Remove the SCSI mass storage controller module from the drive plate by rotating it to the right (as shown in Figure 9–49) and sliding it forward away from the back of the drive plate. Set the SCSI mass storage controller module aside.

## 9.13  Replacing the SCSI Mass Storage Controller Module

To replace the SCSI mass storage controller module:

**1** Locate the three slide mounts at the back of the drive plate, as shown in Figure 9–49. Slide the SCSI mass storage controller module inside the slide mounts so that the module's right corner goes inside the right slide mount first. Two holes in the side of the module opposite the drive mounts should be above the two post locks on the drive plate.

**2** Press the SCSI mass storage controller module downward to the locked position.

**3** Tighten the screw on the SCSI mass storage controller module with a screwdriver.

**4**  Tuck the unused connector on the SCSI Port B signal cable under the SCSI mass storage controller module, as shown in Figure 9–50.

**Figure 9–50    SCSI Mass Storage Controller Module**



SCSI System
Cable Connector

SCSI Signal Cable
Port A

External SCSI Connector

SCSI Signal Cable
Port B

Captive Screw
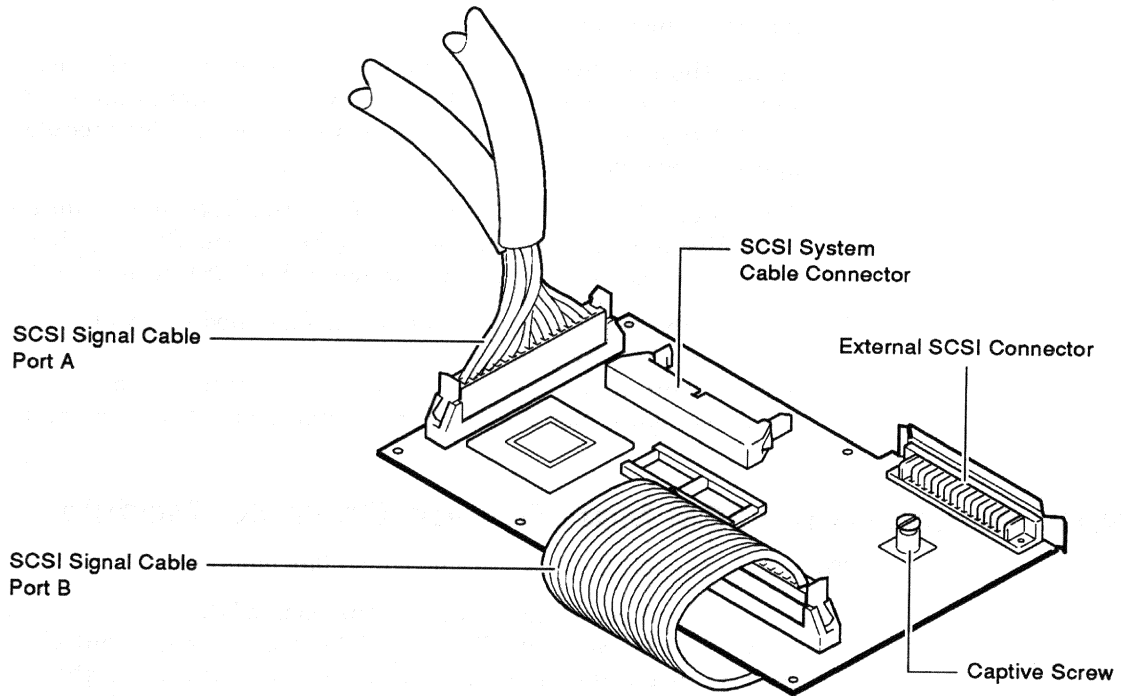
MLO-003531

## 9.14 Restoring the System Unit

To restore the system:

1. Replace the system cover and tighten the two cover screws, as shown in Figure 9–51.

**Warning** *As with any electrical system, failure to replace the system cover before turning on the system may result in a fire hazard.*

**Figure 9–51    Replacing the System Unit Cover**



System Unit Cover

Cover Screws
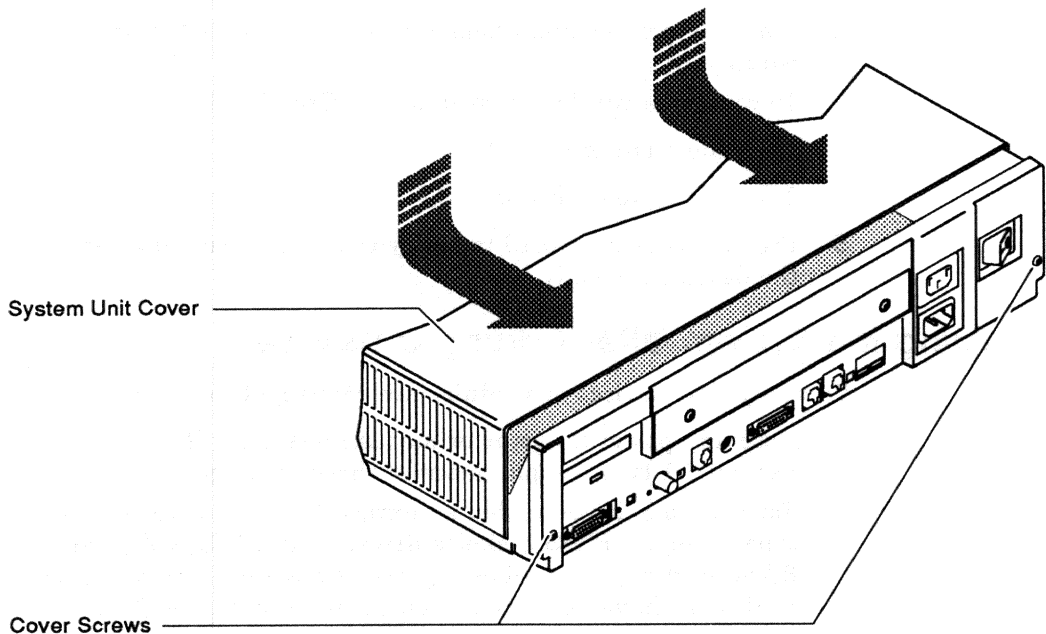
MLO-002915

2. Reconnect the following cables to the system unit:

- Keyboard cable (Figure 2–4)
- Mouse cable (Figure 2–5)
- Monitor cable (Figure 2–10)
- Ethernet cable T-connector (Figure 2–7)
- Monitor power cord (Figure 2–11)
- System power cord (Figure 2–12)

## 9.15 Starting Your System

To start your system, turn your equipment on ( | ) in the order given.

1  Turn expansion boxes on ( | ) in the following order:

■ RZ55 hard disk expansion box

■ Other hard disk expansion boxes

■ TK50Z–GA tape expansion box

■ RRD40 compact disc expansion box

2  Turn the printer and modem on ( | ), if you have this equipment.

To connect a printer, or modem, see Chapter 8.

3  Turn the monitor on ( | ).

4  Turn the system unit on ( | ).

5  Proceed to Section 9.16 to verify that you added and replaced the devices correctly.

## 9.16 Testing the System after Adding a Device

To verify that devices or modules are connected correctly:

1  Note any power-up error or status messages. Refer to Section 7.1 for an explanation of these messages.

For example, if you added a storage device such as a TZ30 tape drive, an RX23 diskette drive, or an RZ22, RZ23, or RZ24 hard disk, the following status message, indicating that no devices have been connected to the internal SCSI–A bus, should not appear on the screen.

```
? 7   00A0   0000.4001
```

2  Display the system device configuration by using the TEST 50 command as explained in Section 7.3. Compare the latest configuration display with the configuration display you viewed when you prepared the system to add a device. You should see the new device and all the devices present in the system before you made the addition. Make sure no error messages appear.

3  Verify that devices are interacting correctly by using the TEST 0 command to run the system exerciser, as explained in Section 7.7.

**4** Verify that devices are set to the correct SCSI IDs using the SHOW DEVICE command, as explained in Section 7.6.

**5** If you have problems, check the following:

- Are all cables inside and outside the system unit reconnected?

- Are all modules fully seated in their connectors?

- Are SCSI IDs set correctly? For example, there should be no devices with duplicate SCSI IDs.

**6** If you continue to have problems, contact your Digital service representative.

# A

# Startup Procedures

This appendix describes how to

- Set the hardware to boot the operating system software automatically from a particular device

- Set your system to have a particular mode of action should the system power down

- Set the default boot flags for your software

For more information on setting your startup procedures, see your operating system installation guide.

## A.1 Automatic Booting

Set the default boot device to the disk drive where you installed your operating system software. The VAXstation 3100 will boot from that device at startup. The operating system software should reside in one of the following places:

- On a hard disk in the system unit

- On a hard disk in an expansion box

- On a compact disc drive in an expansion box

- On a remote system that you access through the Ethernet

Table A–1 shows the names assigned to each of the possible devices. The default boot device should be set to one of these.

**Table A-1    SCSI Boot Device Names**

| Device and Location | VMS Device Name | ULTRIX Device Name |
|---|---|---|
| Hard disk in system unit (SCSI-A bus at ID 0–7) | DKAx00 | RZx |
| Hard disk in expansion box (SCSI-B bus at ID 0–7) | DKBx00 | RZx |
| Mass storage on remote system | ESA0 | SE0 |
| Tape (SCSI-A bus at ID 0–7) | MKAx00 | TZx |
| Tape (SCSI-B bus at ID 0–7) | MKBx00 | TZx |

To change the default boot device, follow these steps.

**Note** *Check your software documentation for shutdown procedures before halting your system.*

1    Check that the system is in console mode. To get the console prompt (>>>), press the halt button on the rear of the system unit.

2    At the console prompt, enter SET BOOT and the name of the default boot device where the software will reside and press the Return key. For example,

>>>  SET BOOT DKA300  [Return]

# A.2  Changing the Default Recovery Action

When you receive your system, it automatically starts up the operating system software every time you power up or in the event of an operating system software failure. The options you have for setting the default recovery action are listed and explained in Table A–2.

**Table A-2    Values for Recovery Action**

| Value | Recovery Action | Result | Action |
|-------|-----------------|--------|--------|
| 1 | Automatic restart | Console mode | None |
| 2 | Automatic reboot | Operating system software reboots automatically | None |
| 3 | Automatic halt | Console prompt appears | Enter BOOT[1] |

[1]Enter BOOT or BOOT and the device name, for example, BOOT DKAx00, where the operating system software resides.

If you want to change the default recovery action, follow these steps:

**Note** *Check your software documentation for shutdown procedures before halting your system.*

1   Put the VAXstation 3100 in console mode by pressing the halt button on the back of the system unit.

2   At the console prompt, enter the following:

>>>   SHOW HALT   [Return]

The value for the default recovery action displays:

2
>>>

3   To change to automatic reboot, at the console prompt enter:

>>>   SET HALT 2   [Return]

4   If you want your system to halt after every power up, at the console prompt, enter:

>>>   SET HALT 3   [Return]

## A.3   Setting the Default Boot Flags

The default boot flags should be set for the operating system installed on your VAXstation 3100. Consult your operating system documentation for more information.

To set the default boot flags:

**Note** *Check your software documentation for shutdown procedures before halting your system.*

1 Check to be sure the system is in console mode. If the console prompt does not appear on the screen, press the halt button on the back of the system unit.

2 Get the default boot flag number (a hexadecimal number of up to 8 characters) from your operating system software documentation.

3 At the console prompt, enter:

```
>>> SET BFLG default-bootflag-number Return
```

Default-bootflag-number is a number you enter for your system. See your software documentation for more information.

4 Set the default boot flags for your operating system.

## A.4 Using an Alternate Console with Your System

The VAXstation 3100 Model 38 has a serial port to which you usually attach a printer. A picture of a small printer appears above this port. You can also attach a video terminal to this port and use it as an alternate (operator) console. You may want to add a terminal to this port if you want a printout of a software installation. In this instance, add a supported hardcopy terminal or video terminal to the printer port. You can connect a printer to the video terminal.

To attach a video terminal to the serial port in order to use it as an alternate console terminal, you must set the alternate console switch on the back of the system unit. Perform the following steps:

1 Shut down your system. See your software documentation for proper shutdown procedures before turning your system off. Also, you should not turn off, halt, or restart the system without notifying work group members.

2 Turn the expansion boxes, monitor, and system unit to the off (0) position.

**S3**

3 On the back of the system unit, find the S3 icon over the alternate console slide-switch. Down is the normal position.

4 Set the alternate console switch to the up (on) position. Use a small pointed object (do **NOT** use a pencil, as the graphite will damage the switch) to set the switch. When the switch is in the up position, you enable a video terminal as an alternate console. The serial port is now a terminal port.

5   Attach one end of a DEC 423 serial cable to the serial port (printer port) on the Model 38 system unit and the other end of the serial cable to the serial port on the alternate console terminal.

6   Turn the alternate console terminal on ( I ).

7   Check the baud rate. The baud rate should be set to 9600 baud. See your monitor documentation for additional information.

8   Turn all expansion boxes and the VAXstation 3100 Model 38 system unit on ( I ).

9   If the console prompt (>>>) does not appear on the alternate console screen, press the Break key on the alternate console terminal keyboard.

   ■ At the alternate console keyboard, enter DTE at the console prompt (>>>) and press the Return key.

This command converts the system from console mode to terminal emulation mode. An asterisk is added to the console prompt after you enter the DTE command. The new prompt (*>>>) indicates that you are working in alternate console mode. All information displayed on the screen comes from the Model 38 system.

To exit terminal emulation mode, press Ctrl/p and press the Return key. The Model 38 system returns to local console mode (>>>).

The Model 38 system (with the S3 switch in the up position) will always attempt to use the serial line. The alternate console only uses the information after you enter the DTE command. The state of the S3 switch is only read at power-up.

# B

# SCSI IDs

This information is for technical users who wish to do custom configurations. SCSI is the acronym for Small Computer Systems Interface. SCSI is an interface designed for connecting disks and other peripheral devices to computer systems. SCSI is defined by an American National Standards Institute (ANSI) standard and is used by many computer and peripheral vendors throughout the industry.

Up to eight SCSI devices can share a SCSI bus (a cable). All data is sent back and forth on the cable. Each SCSI device attached to the cable looks at all the data, but only takes the data that has the proper device identification. Each of the eight devices is identified by a number from 0 to 7, called a SCSI ID.

## B.1 SCSI ID Default Settings

You are responsible for the SCSI ID settings on your equipment. Digital Equipment Corporation sets each SCSI device to a default SCSI ID before the equipment leaves the factory. You may never need to change a default setting. Default settings should only be changed when a system is configured with more than one of a particular device.

The number 7 is used by devices requiring the highest priority on the SCSI bus. The number 6 is reserved for the controller. The remaining ID numbers (0 through 5) are available for custom configuration.

SCSI default settings for each VAXstation 3100 system are listed in Table B–1. The settings listed give optimal performance on most systems. However, if you have special performance needs, you can set the identification number on each SCSI device

manually. For most applications, SCSI IDs can be set arbitrarily as long as no two devices share the same ID.

Each SCSI device has a set of switches or jumpers that can be set to a specific ID. The TK50Z-GA tape drive, the RZ55 hard disk drive, and the RRD40 compact disc drive are mounted in expansion boxes. Each of these devices has external switches that you can set.

## B.2 Setting SCSI IDs

To see status information about each SCSI ID on your system, enter TEST 50 at the console prompt (>>>), then press the Return key. Your system configuration appears on the screen in a display similar to the one below:

```
SCSI-A      1C1C.0001    V1.3
FFFFFF05 FFFFFF05 FFFFFF05 00000001 01000001 01000000 FFFFFF03 FFFFFF05
   ❶        ❷        ❸        ❹        ❺        ❻        ❼        ❽
SCSI-B      1C1C.0001    V1.3
FFFFFF05 FFFFFF05 FFFFFF05 00000001 05000001 FFFFFF05 FFFFFF03 FFFFFF05
```

Included in the system configuration display are a SCSI-A bus line and a SCSI-B bus line as shown in the example above. The 16 alphanumeric SCSI-A and SCSI-B codes, numbered ❶ through ❽ for your reference, correspond to SCSI ID numbers 0 through 7 in each line. For example, ❶ refers to SCSI ID 0 in the SCSI-A line and SCSI ID 0 in the SCSI-B line. The alphanumeric SCSI codes in the display show the presence or absence of a device at an ID, and tell the functional status of a connected device. Table B–1 shows each SCSI-A and SCSI-B ID number and its recommended use. Table B–2 tells the meanings of the SCSI codes.

**Table B–1    SCSI IDs for VAXstation 3100 Model 38 with Expansion Box**

| SCSI-A | | | SCSI-B | |
|---|---|---|---|---|
| | ID | Device | ID | Device |
| ❶ | 0 | Open | 0 | Reserved for expansion |
| ❷ | 1 | RZ22, RZ23, or RZ24[1] | 1 | Reserved for expansion |
| ❸ | 2 | RZ22, RZ23, or RZ24[1] | 2 | Reserved for expansion |

[1]Normally used for applications disk.

**Table B–1 (Cont.)      SCSI IDs for VAXstation 3100 Model 38 with Expansion Box**

| SCSI-A | | | SCSI-B | |
|---|---|---|---|---|
| | ID | Device | ID | Device |
| ❹ | 3 | RZ22, RZ23, or RZ24[2] | 3 | Reserved for expansion |
| ❺ | 4 | Open | 4 | RRD40 expansion box |
| ❻ | 5 | TZ30 or RX23 | 5 | TK50Z–GA expansion box |
| ❼ | 6 | SCSI-A adapter | 6 | SCSI-B adapter |
| ❽ | 7 | Open | 7 | Reserved for expansion |

[2]Normally used for system disk.

**Table B–2      SCSI Codes**

| Code | Meaning |
|---|---|
| FFFFFF05 | Device is off-line or is not installed at this ID |
| FFFFFF03 | SCSI bus controller is functional at this ID |
| FFFFFFFF | Possible SCSI bus controller error |
| 00000001 | RZ22, RZ23, RZ24, or RZ55 disk drive is functional at this ID |
| 01000001 | TZ30 or TK50 tape drive is functional at this ID |
| 05000001 | RRD40 compact disc drive is functional at this ID |

If you see a code other than one listed in Table B–2, the code indicates a malfunction in the device connected at that ID.

Follow these rules when you set SCSI IDs:

- You can connect up to seven devices on one bus.

- Each device must have its own unique SCSI ID.

- SCSI-A is an internal bus for internal devices.

- SCSI-B is an external bus for external devices.

**Note**  *Proper operation of the SCSI bus requires that you use high-quality, properly configured cables and connectors to connect all devices. Digital recommends that you use Digital-supplied cable assemblies intended for interconnecting SCSI devices. This ensures that the impedance characteristics, signal propagation*

*velocity, inductance, capacitance, cross-talk, grounding, conductor pairing, and shielding meet the requirements for proper operation of the bus. Digital also recommends that you power all units on the SCSI bus from a common AC power source. The proper operation of any SCSI bus that uses cable assemblies not supplied by Digital, or that are not configured in accordance with Digital's recommendations, is not guaranteed.*

## B.3 Setting SCSI Switches for Devices Inside the System Unit

As mentioned previously, you set all devices located inside the system unit to open IDs on the SCSI-A bus. Tables B–3, B–4, and B–5 give all the possible switch positions for each storage device inside the system unit.

### Table B–3    RX23 SCSI ID Settings

| SCSI ID | Switch Positions — Switches 1, 2, and 3 | | |
|---|---|---|---|
| | 1 | 2 | 3 |
| 0 | Off | Off | Off |
| 1 | On | Off | Off |
| 2 | Off | On | Off |
| 3 | On | On | Off |
| 4 | Off | Off | On |
| 5† | On | Off | On |
| 6‡ | Off | On | On |
| 7 | On | On | On |

†Recommended ID for the RX23 diskette drive
‡Reserved ID for SCSI controller

## Table B-4    TZ30 SCSI ID Settings

| SCSI ID on SCSI-B Bus | Switch Positions — Switches 1, 2, 3, and 4 | | | |
|---|---|---|---|---|
| | 1 | 2 | 3 | 4 |
| 0 | Off | Off | Off | Off |
| 1 | On | Off | Off | Off |
| 2 | Off | On | Off | Off |
| 3 | On | On | Off | Off |
| 4 | Off | Off | On | Off |
| 5† | On | Off | On | Off |
| 6‡ | Off | On | On | Off |
| 7 | On | On | On | Off |

†Recommended ID for the TZ30 tape drive

‡Reserved ID for SCSI controller

## Table B-5    RZ22/RZ23 Hard Disk SCSI ID Settings

| SCSI ID | Switch Positions — Switches 1, 2, and 3 | | |
|---|---|---|---|
| | 1 | 2 | 3 |
| 0 | Out | Out | Out |
| 1† | In | Out | Out |
| 2† | Out | In | Out |
| 3† | In | In | Out |
| 4 | Out | Out | In |
| 5 | In | Out | In |
| 6‡ | Out | In | In |
| 7 | In | In | In |

†Recommended IDs for the RZ22 or RZ23 hard disks

‡Reserved ID for SCSI controller

## Table B–6   RZ24 Hard Disk SCSI ID Settings

| SCSI ID | Switch Positions — Switches 1, 2, and 3 | | |
|---------|------|------|------|
|         | 1    | 2    | 3    |
| 0       | Out  | Out  | Out  |
| 1†      | In   | Out  | Out  |
| 2†      | Out  | In   | Out  |
| 3†      | In   | In   | Out  |
| 4       | Out  | Out  | In   |
| 5       | In   | Out  | In   |
| 6‡      | Out  | In   | In   |
| 7       | In   | In   | In   |

†Recommended IDs for the RZ24 hard disk

‡Reserved ID for SCSI controller

# B.4  Setting SCSI Switches on the Expansion Box

Set external devices to open ID code numbers on the SCSI-B bus. Tables B–7, B–8, and B–9 give all the possible switch positions for each external device housed in an expansion box.

## Table B–7   RRD40 Expansion Box SCSI ID Settings

| SCSI ID on SCSI-B Bus | Switch Positions — Switches 1, 2, 3, and 4 | | | |
|-----------------------|------|------|------|-------------------|
|                       | 1    | 2    | 3    | 4[1]              |
| 0                     | Down | Down | Down | Down              |
| 1                     | Down | Down | Up   | Down              |
| 2                     | Down | Up   | Down | Down              |
| 3                     | Down | Up   | Up   | Down              |
| 4                     | Up   | Down | Down | Down              |
| 5                     | Up   | Down | Up   | Down              |
| 6                     | Up   | Up   | Down | Down              |
| 7                     | Up   | Up   | Up   | Down              |

[1]Switch 4 is unused, leave in down position.

**Table B–8    RZ55/RZ56 Expansion Box SCSI ID Settings**

| SCSI ID on SCSI-B Bus | Switch Positions — Switches 1, 2, and 3 | | |
|---|---|---|---|
| | 1 | 2 | 3 |
| 0 | Down | Down | Down |
| 1 | Down | Down | Up |
| 2 | Down | Up | Down |
| 3 | Down | Up | Up |
| 4 | Up | Down | Down |
| 5 | Up | Down | Up |
| 6 | Up | Up | Down |
| 7 | Up | Up | Up |

**Table B–9    TK50Z–GA Expansion Box SCSI ID Settings**

| SCSI ID Address on SCSI-B Bus | Switch Positions — Switches 1, 2, and 3 | | |
|---|---|---|---|
| | 1 | 2 | 3 |
| 0 | Up | Up | Up |
| 1 | Up | Up | Down |
| 2 | Up | Down | Up |
| 3 | Up | Down | Down |
| 4 | Down | Up | Up |
| 5 | Down | Up | Down |
| 6 | Down | Up | Down |
| 7 | Down | Down | Down |

# C

# Power-Up, Self-Test, and Test 50 Status and Error Codes

This appendix lists some of the error codes and status codes for the power-up test, self-test and Test 50. The error and status codes are the same for each of these tests. For quick reference, use this table to find the codes for each device.

| Failing Test/Device | Section |
|---|---|
| Test F - Monochrome video circuits (MONO) | C.1 |
| Test E - Time-of-year clock (CLK) | C.2 |
| Test D - Nonvolatile RAM (NVR) | C.3 |
| Test C - Serial line controller (DZ) | C.4 |
| Test B - System memory (MEM) | C.5 |
| Test A - Memory management (MM) | C.6 |
| Test 9 - Floating point (FP) | C.7 |
| Test 8 - Interval timer (IT) | C.8 |
| Tests 6 and 7 - SCSI bus controller (SCSI-A and SCSI-B) | C.9 |
| Test 5 - Interrupt controller and Ethernet ID ROM (SYS) | C.10 |
| Test 4 - graphics coprocessor module/color option (8PLN) | C.11 |
| Test 3 - Not supported | |
| Test 2 - Not supported | |
| Test 1 - Ethernet network circuits (NI) | C.12 |

# C.1 Monochrome Video Circuits (MONO)

Error code format: 0000.XXXX

where XXXX is one of the codes listed in Table C-1.

**Table C-1    Monochrome Video Error Codes (0000.XXXX)**

| Error Codes | Definition |
|---|---|
| 0001 | No error. |
| 0010 | End of frame bit not set in interrupt pending register. |
| 0020 | End of frame failed to set for second time. |
| 0040 | End of frame failed to set for third time. |
| 0080 | No end of frame interrupt seen. |
| 0100 | Wrong IPL level for EOF interrupt. |
| 0200 | Interrupt request failed to clear interrupt pending register bit. |
| 0400 | End of frame interrupt did not occur. |
| 0800 | Error during cursor test. |

# C.2 Time-of-Year Clock (CLK)

Error code format: 0000.XXXX

where XXXX is one of the error codes listed in Table C-2.

**Table C-2    Time-of-Year Clock Error Codes (0000.XXXX)**

| Error Codes | Definition |
|---|---|
| 0001 | No error |
| 0003 | Tell dispatcher to check time at the end of testing. |
| 0004 | Invalid time set. |
| 0005 | Clock has not been reset since the last time battery voltage level was low. |
| 0010 | Failure in time-of-year test. |
| 0020 | Vrt bit failed to set after it was read the first time. |
| 0040 | Battery voltage level was down during the clock test. |

## C.3 Nonvolatile RAM (NVR)

Error code format: 0000.XXXX

where XXXX is one of the codes listed in Table C–3. An error code of 5 indicates that the battery voltage is below an acceptable level for data in the NVR to be valid.

**Table C–3     Nonvolatile RAM Error Codes (0000.XXXX)**

| Error Codes | Definition |
|---|---|
| 0001 | No error. |
| 0004 | Battery was down at last entry. |
| 0008 | NVR failed. |
| 0080 | The battery check code in the NVR did not aggree with the expected check code. |

## C.4 Serial Line Controller (DZ)

First line error code format: 0000.XXXX

where the XXXX is one of the error conditions listed in Table C–4.

**Table C–4     Serial Line Controller Error Codes (0000.XXXX)**

| Error Codes | Definition |
|---|---|
| 0001 | No error. |
| 0002 | Master reset failed. |
| 0004 | Failure in basic CSR test. |
| 0008 | Failure in CSR read-write test. |
| 0010 | Basic test of TCR failed. |
| 0020 | Read write test of TCR failed. |
| 0040 | Transmitter ready test failed. |
| 0080 | Receiver ready test failed. |
| 0100 | Transmitter interrupt timeout. |
| 0200 | Receiver interrupt timeout. |

## Table C–4 (Cont.)   Serial Line Controller Error Codes (0000.XXXX)

| Error Codes | Definition |
|---|---|
| 0400 | Either transmitter or receiver interrupted at the wrong priority. |
| 0800 | Receiver interrupt occurred when the receiver was not enabled. |
| 1000 | Data comparison error. |
| 2000 | Overrun error did not happen. |
| 4000 | This line is untested. |
| 8000 | Error in the modem control logic test. |

The second line of six codes under the DZ error code contains the status of each serial line as well as the status of the keyboard and mouse (or tablet). This second line of status codes is provided so you can isolate a failing serial line. The status codes in the second line appear in the following format:

```
0000WWWW 0000WWWW 0000WWWW 0000WWWW YYYYYYYY ZZZZZZZZ
  line 0   line 1   line 2   line 3  keyboard  mouse
```

where WWWW is a status code from Table C–5, YYYYYYYY is a keyboard internal self-test code listed in Table C–6, and ZZZZZZZZ is a mouse or tablet internal self-test code listed in Table C–7.

## Table C–5   Serial Line Status Codes (0000WWWW)

| Status Code | Definition |
|---|---|
| 0001 | Serial line tested successfully. |
| 4000 | Serial line is untested. |

### Table C–6     Keyboard Self-Test Codes (YYYYYYYY)

| Status Code | Definition |
|---|---|
| 00000000 | No keyboard is connected. |
| 00000001 | Keyboard connected and tested successfully. |
| 000000FD | Loopback connected and tested successfully. |

### Table C–7     Mouse or Tablet Self-Test Codes (ZZZZZZZZ)

| Status Code | Definition |
|---|---|
| 00000000 | No mouse or tablet is connected. |
| 000012A0 | Mouse or tablet is connected and tested successfully. |
| 00000054 | Loopback is connected and tested successfully. |

## C.5  System Memory (MEM)

First line error code format: 0000.XXXX

where XXXX is one of the codes listed in Table C–8. These codes show the error/status information for the memory on the system module and also the option memory module.

### Table C–8     System Memory Error Codes (0000.XXXX)

| Error Codes | Definitions |
|---|---|
| 0001 | No error |
| 0002 | Failure in test address routine |
| 0004 | Byte mask failure |
| 0008 | Data/address test failure |
| 0010 | No memory found during sizing |
| 0020 | Unexpected parity error |

The second line under the MEM code contains additional information on the memory in the system. These additional codes have the following format:

Second line status code format: YYYYYYYY ZZZZZZZZ

where YYYYYYYY is the total number of bytes of good memory found in the system. If this field is not an even megabyte value (for instance, 00020000), then the second field, ZZZZZZZZ, will be displayed to indicate the failing megabyte bank. Each bit in the ZZZZZZZZ status code indicates the status for one bank of memory. In some cases, where a parity error is detected, the error may be on both the system module and the option memory module.

## C.6 Memory Management (MM)

Error code format: 0000.000X

where X is one of the codes listed in Table C–9.

**Table C–9    Memory Management Error Codes (0000.000X)**

| Error Codes | Definition |
|---|---|
| 1 | No error |
| 4 | Memory management error |
| 8 | Illegal vector during MM test |

## C.7 Floating Point (FP)

Error code format: 0000.000

where X is one of the error codes listed in Table C–10.

**Table C–10    Floating Point Error Codes (0000.000X)**

| Error Codes | Definition |
|---|---|
| 0002 | Floating point error |
| 0004 | Invalid floating point exception |

## C.8 Interval Timer (IT)

Error code format: 0000.000X

where X = 2 for a fatal error or 1 for success.

## C.9 SCSI Bus Controllers (SCSI-A and SCSI-B)

This section includes the codes for all SCSI bus controllers on all VAXstation 3100 systems.

**Note** *A soft error occurs if nothing is connected to the SCSI-B bus.*

First line error code format: WWXX.YYZZ

where WW is the binary mask field of the devices selected successfully on the SCSI bus (Table C–11), XX is the binary mask field of the devices tested successfully on the SCSI bus (Table C–11), YY is a set of binary error flags (Table C–12), and ZZ is the status code and error code of the SCSI controller on the SCSI mass storage controller module (Table C–13).

Second line error code format: DDMMSSTT

where the DD is the status of the data in phase of the INQUIRY command, MM is the status of the message in phase of the INQUIRY command, SS is the status of the status phase of the INQUIRY command, and TT is the status of the devices on the SCSI bus. All these status codes are identical and are listed in Table C–14.

The second line of the error code indicates the status of the eight possible devices on the SCSI bus, including the controller on the SCSI mass storage controller module. The first code in this second line is reserved for the SCSI controller on the SCSI mass storage controller module. Codes 2 through 8 are for the devices connected to the SCSI bus. See Table C–14.

**Table C–11    Binary Mask of Selected Devices (WWXX.0000)**

| Binary Mask | Device ID | Screen Display |
|-------------|-----------|----------------|
| 0000 0001   | 0         | 01             |
| 0000 0010   | 1         | 02             |
| 0000 0100   | 2         | 04             |
| 0000 1000   | 3         | 08             |
| 0001 0000   | 4         | 10             |
| 0010 0000   | 5         | 20             |
| 0100 0000   | 6         | 40             |

### Table C-11 (Cont.)  Binary Mask of Selected Devices (WWXX.0000)

| Binary Mask | Device ID | Screen Display |
|---|---|---|
| 1000 0000 | 7 | 80 |

### Table C-12  Binary Mask of Error Flags (0000.YY00)

| Binary Mask | Definition | Display |
|---|---|---|
| 0000 0001 | Problem is on the system module. | 01 |
| 0000 0010 | Problem is not on the system module. | 02 |
| 0001 0000 | Reset is required to free SCSI bus. | 10 |
| 0010 0000 | Not all selected devices are operating properly. | 20 |
| 0100 0000 | DMA and interrupts are untested. | 40 |

### Table C-13  SCSI Controller Error Codes (0000.00ZZ)

| Error Codes | Definition |
|---|---|
| 01 | No error. |
| 02 | Data buffer RAM addressing failure. |
| 04 | Data buffer RAM byte mask failure. |
| 06 | Data buffer data path failure. |
| 10 | Error in SCSI controller registers during reset. |
| 12 | Error in SCSI controller registers after reset. |
| 20 | Unexpected interrupt after reset, IPL = 1F. |
| 22 | No interrupt request after reset. |
| 24 | No interrupt after reset when IPL has been lowered. |
| 26 | Interrupt request not cleared following ISR (after reset). |
| 28 | Multiple interrupts following reset. |
| 2A | Unknown interrupt following reset. |
| 2C | Wrong interrupt following reset. |
| 30 | Phase not bus free at start of test. |
| 40 | First attempt to read SCSI controller's registers failed. |

## Table C-13 (Cont.)  SCSI Controller Error Codes (0000.00ZZ)

| Error Codes | Definition |
|---|---|
| 42 | SCSI controller register address test failed at ini_cmd. |
| 44 | SCSI controller register address test failed at mode. |
| 46 | SCSI controller register address test failed at tar_cmd. |
| 48 | SCSI controller register address test failed at scd_cnt. |
| 4A | Mode (DMA) found set after being cleared when ini_cmd(bsy) clear. |
| 4C | Mode (DMA) found set after being set when ini_cmd(bsy) clear. |
| 4E | Mode (DMA) found set after being cleared when ini_cmd(bsy) set. |
| 50 | Mode (DMA) found clear after being set when ini_cmd(bsy) set. |
| 60 | Data output to bus with ini_cmd(enout) clear. |
| 62 | No data to bus with ini_cmd(enout) set. |
| 64 | Parity bit cur_stat(dbp) did not match data on bus. |
| 66 | With bus free, data in did not match data out. |
| 68 | ini_cmd(sel) to cur_stat(sel) mismatch. |
| 6A | ini_cmd(ack) to status(ack) or ini_cmd(atn) to status(atn) mismatch. |
| 6C | Tar_cmd(req) to cur_stat(req) or tar_cmd(msg) to cur_stat(msg) or tar_cmd(cd) to cur_stat(cd) or tar_cmd(io) to cur_stat(io) mismatch with mode(targ) set. |
| 6E | Clearing mode(targ) does not prevent tar_cmd bits from appearing on the bus. |
| 70 | ISR hit with IPL = 1F and int_msk(sc) clear. |
| 72 | Interrupt request int_req(sc) set for no reason. |
| 74 | SCSI bus status(intreq) set for no reason. |
| 80 | SCSI bus busy at start if interrupt test—no test done. |
| 82 | ISR hit following bus free with IPL = 1F and int_msk(sc) clear. |
| 84 | Interrupt request int_req(sc) not set following bus free. |
| 86 | SCSI bus status(intreq) not set following bus free. |
| 88 | Status(bsyerr) not set after it caused an interrupt. |

## Table C-13 (Cont.)    SCSI Controller Error Codes (0000.00ZZ)

| Error Codes | Definition |
| --- | --- |
| 90 | SCSI bus busy during interrupt test—no test done. |
| 92 | ISR hit following bus free with IPL = 1F and int_ msk(sc) set. |
| 94 | Interrupt request int_req(sc) not set following bus free. |
| 96 | SCSI bus status(intreq) not set following bus free. |
| 98 | Status(bsyerr) not set following bus free. |
| A0 | SCSI bus busy during interrupt test—no test done. |
| A2 | Timeout waiting for bus free interrupt. |
| A4 | ISR not hit following bus free. |
| A6 | Interrupt request int_req(sc) not cleared following ISR after bus free. |
| A8 | SCSI bus status(intreq) not set following bus free. |
| AA | Multiple interrupts from bus free. |
| AC | Unknown interrupt from bus free. |
| AE | Wrong interrupt from bus free. |
| B0 | SCSI bus busy during interrupt test—no test done. |
| B2 | Timeout waiting for parity interrupt. |
| B4 | ISR not hit following parity. |
| B6 | Interrupt request int_req(SC) not cleared following ISR after parity. |
| B8 | SCSI bus status(intreq) not set following parity. |
| BA | Multiple interrupts from parity. |
| BC | Unknown interrupt from parity. |
| BE | Wrong interrupt from parity. |
| C0 | Phase not bus free before arbitration. |
| C2 | Ini_cmd(aip) bit failed to set. |
| C4 | Lost arbitration (first check of ini_cmd(la)). |
| C6 | Higher priority device in bus. |
| C8 | Lost arbitration (second check of ini_cmd(la)). |
| D0 | Not all selected targets tested satisfactory. |

**Table C–14    Device Status Codes (DDMMSSTT)**

| Status Codes | Definition |
|---|---|
| FF | Device is untested. |
| 01 | No error. |
| 03 | This device is reserved by the host (SCSI controller). |
| 05 | Device did not respond to selection. |
| 10 | Device did not set cur_stat(req) soon enough when changing phase. |
| 12 | Jitter on the phase lines when changing phase. |
| 20 | Device set command phase twice. |
| 22 | Device changed phase before command complete. |
| 24 | Device failed to set cur_stat(req) when getting command. |
| 26 | Device failed to clear cur_stat(req) when getting command. |
| 28 | Command phase out of sequence. |
| 2A | Stuck in command phase. |
| 30 | Device set data in phase twice. |
| 32 | Device failed to set cur_stat(req) when returning data. |
| 34 | Device failed to clear cur_stat(req) when returning data. |
| 36 | Device changed data in phase before transferring any data. |
| 38 | Data in phase out of sequence. |
| 3A | Stuck in data in phase. |
| 40 | Target set status phase twice. |
| 42 | Target failed to set cur_stat(req) when returning data. |
| 44 | Target failed to clear cur_stat(req) when returning data. |
| 46 | Target changed status phase before transferring any data. |
| 48 | Status phase out of sequence. |
| 4A | Stuck in status phase. |
| 50 | Target set message in phase twice. |
| 52 | Target failed to set cur_stat(req) when returning data. |
| 54 | Target failed to clear cur_stat(req) when returning data. |

(continued on next page)

**Table C–14 (Cont.)    Device Status Codes (DDMMSSTT)**

| Status Codes | Definition |
|---|---|
| 56 | Target changed message_in phase before transferring any data. |
| 58 | Message in phase out of sequence. |
| 5A | Stuck in message in phase. |
| 60 | Target set data out phase (unexpectedly). |
| 62 | Target set phase to 100b (reserved phase). |
| 64 | Target set phase to 101b (reserved phase). |
| 66 | Target set message out phase. |
| 68 | Selected target did not set any phase before releasing bus. |
| 70 | Target not following expected phase sequence. |
| 72 | Parity error detected during programmed I/O transfer. |
| 80 | Unexpected interrupt at start of DMA test. |
| 90 | Target failed to set command phase. |
| 92 | Unexpected interrupt at start of command phase in DMS test. |
| 94 | Timeout waiting for DMA complete in command phase in DMA test. |
| 96 | No DMA end following command phase in DMA test. |
| 98 | Wrong interrupt following command in DMA test. |
| 9A | Scd_cnt not zero following command in DMA test. |
| 9C | DMA not complete after EOP command phase (ACK not clear soon enough). |
| A0 | status(demand) bit not cleared by clearing mode(dma) at start of data in phase in DMA test. |
| A2 | Target failed to set data in phase in DMA test. |
| A4 | Timeout waiting for DMA complete in data in phase in DMA test. |
| A6 | No status(demand) following data in phase in DMA test. |
| A8 | Wrong interrupt following data in phase in DMA test. |
| AA | Scd_cnt not zero following data in phase in DMA test. |

## Table C-14 (Cont.)    Device Status Codes (DDMMSSTT)

| Status Codes | Definition |
|---|---|
| AC | DMA not complete after EOP in data in phase (ACK not clear soon enough). |
| B0 | status(demand) not cleared by clearing mode(dma) at start of status phase in DMA test. |
| B2 | Target failed to set status phase in DMA test. |
| B4 | Timeout waiting for DMA complete in status phase in DMA test. |
| B6 | No status(demand) following status phase in DMA test. |
| B8 | Wrong interrupt following status in DMA test. |
| BA | Scd_cnt not zero following status in DMA test. |
| BC | DMA not complete after EOP in status phase (ACK not clear soon enough). |
| C0 | status(demand) not cleared by clearing mode(dma) at start of message in phase in DMA test. |
| C2 | Target failed to set message in phase in DMA test. |
| C4 | Timeout waiting for DMA complete in message in phase in DMA test. |
| C6 | No status(demand) following message in phase in DMA test. |
| C8 | Wrong interrupt following message in phase in DMA test. |
| CA | Scd_cnt not zero following message in phase in DMA test. |
| CC | DMA not complete after EOP in message in phase (ACK not clear soon enough). |
| D0 | Status(demand) not cleared by clearing mode(dma) at end of DMA test. |
| D2 | SCSI bus not free soon enough at end of DMA test. |

## C.10 Interrupt Controller and Ethernet ID ROM (SYS)

Error code format: 0000.XXXX

where XXXX is one of the codes listed in Table C–15.

**Table C–15    Interrupt Controller and Ethernet ID ROM Error Codes (0000.XXXX)**

| Error Codes | Definition |
|---|---|
| 0001 | No error. |
| 0002 | System ROM failed checksum. |
| 0004 | Ethernet ROM failed checksum. |
| 0008 | No interrupts pending. |
| 0010 | All of the expected interrupts did not occur. |
| 0020 | Unexpected interrupt. |
| 0040 | Improper priority. |
| 0080 | Default interrupt service routine was called. An interrupt that was not enabled occurred. |
| 0100 | No keyboard found in the configuration. |

# C.11 Graphics Coprocessor Module/Color Option

Error code format: XXXX.YYYZ

where XXXX is the status of the failing test (ignore this field), YYY one of the codes listed in Table C-16, and Z is 1 to indicate no error, 2 to indicate a **fatal error**, or 3 to indicate a status message.

**Table C-16    Graphics Coprocessor Module/Color Option Module Error Codes (0000.YYY0)**

| Error Code | Failing Test | Error Code | Failing Test |
|---|---|---|---|
| 0001 | No error | 012Z | Packing/ unpacking |
| 001Z | Initialization | 013Z | Compression/ decompression |
| 002Z | Chip select | 014Z | Adder interrupt |
| 003Z | Long memory | 015Z | FCC interrupt |
| 004Z | Memory | 016Z | VDAC |
| 005Z | ID data bus | 017Z | Cursor |
| 006Z | Scrolling | 018Z | Sync readback |
| 007Z | FCC initialization | 019Z | Left edge detect readback |
| 008Z | FCC RAM counters | 020Z | Right edge detect readback |
| 009Z | FCC RAM | 021Z | Video readback |
| 010Z | Display list commands | 022Z | Cursor readback |
| 011Z | Short display list | 03AZ | Memory data path |

## C.12  Ethernet Circuits (NI)

Error code format: 0WXX.YYYY

where W = 1 if no heartbeat present (0 = heartbeat present), XX is the number of retries over the Ethernet cable before a success, and YYYY is one of the codes listed in Table C–17. If your transceiver is not designed to provide a heartbeat (an H4001, for example), this condition will not apply to your situation. If your transceiver is designed to provide a heartbeat (an H4000, for example) and this bit is set to 1, you have an external hardware problem with your transceiver.

**Table C–17    Ethernet Circuits Error Codes (0000.YYYY)**

| Error Codes | Definition | Error Codes | Definition |
|---|---|---|---|
| 0001 | No error. | 4008 | Bad filter value. |
| 1002 | Failed initialization. | 400A | Initialization failed. |
| 1004 | RX not enabled. | 400C | Failed loopback. |
| 1006 | TX enabled. | 400E | Initialization failed. |
| 1008 | Initialization failed. | 4010 | Failed loopback. |
| 100A | RX enabled. | 5002 | Initialization failed. |
| 100C | TX not enabled. | 5004 | OWN not toggled. |
| 2002 | Initialization failed. | 5006 | No RTRY error. |
| 2004 | Failed loop. | 5008 | TX turned off. |
| 3002 | Initialization failed. | 500A | Initialization failed. |
| 3004 | Failed loop. | 500C | TX failed. |
| 3006 | No CRC match. | 500E | No RCV MISS. |
| 3008 | Initialization failed. | 6002 | Initialization failed. |
| 300A | Failed TX. | 6004 | Loopback failed. |
| 300C | Failed RX. | 6006 | Bad CSR0. |
| 300E | Initialization failed. | 6008 | No NI interrupt. |

**Table C-17 (Cont.)      Ethernet Circuits Error Codes (0000.YYYY)**

| Error Codes | Definition | Error Codes | Definition |
|---|---|---|---|
| 3010 | Failed TX. | 600A | Initialization failed. |
| 3012 | OWN not toggled. | 600C | Loopback failed. |
| 3014 | No RX error. | 600E | Wrong number of interrupts. |
| 3016 | No STP. | 6010 | NI interrupts bits set. |
| 3018 | No ENP. | 7002 | Initialization failed. |
| 301A | No CRC error. | 7004 | OWN not toggled. |
| 301C | No FRAM error. | 7006 | No BUFF error. |
| 301E | No RINT. | 7008 | TX still on. |
| 4002 | Initialization failed. | 700A | Initialization failed. |
| 4004 | Failed TX. | 700C | TX failed. |
| 4006 | Packet received. | 700E | RX failed. |

# D

# Hardware Specifications

- For VAXstation 3100 Model 38 system dimensions, see Table D–1.

- For VAXstation 3100 Model 38 system specifications, see Table D–2.

- For VAXstation 3100 Model 38 system storage conditions, see Table D–3.

- For VAXstation 3100 Model 38 operating and nonoperating conditions, see Table D–4.

- For VAXstation 3100 Model 38 system electrical specifications, see Table D–5.

- For RZ22 and RZ23 hard disk drive specifications, see Table D–6.

- For RZ24 hard disk drive specifications, see Table D–7.

- For RX23 diskette drive specifications, see Table D–8.

- For RZ55 hard disk drive dimensions, see Table D–9.

- For RZ55 hard disk drive specifications, see Table D–10.

- For RZ55 hard disk drive environmental RZ55 hard disk drive environmental, see Table D–11.
- For TZ30 tape drive specifications, see Table D–12.
- For TK50Z–GA tape drive specifications, see Table D–13.

**Table D–1    System Unit Dimensions (Diskless System)**

| Weight | Height | Width | Depth |
|---|---|---|---|
| 7.7 kg | 10.3 cm | 46.2 cm | 40 cm |
| (17 lb) | (4 in) | (18.12 in) | (15.5 in) |

**Table D–2    System Specifications**

| | |
|---|---|
| Processor | KA42–BA 60 ns CPU and 32 KB cache |
| DRAM memory | 4 MB on board |
| ROM memory | 256 KB |
| Optional coprocessor | 8-plane graphics coprocessor |
| Optional hard disks | One or two 52 MB integral hard disks, one or two 104 MB integral hard disks, and 332 MB hard disk expansion box |
| Optional expansion boxes | RZ55, TK50Z–GA, and RRD40 |
| Monitor | Options include 38 cm (15 in) monochrome or color, 1024-by-864-pixel; 48 cm (19 in) monochrome or color, 1024-by-864-pixel |
| | For hardware specifications, see monitor guide. |
| Interfaces | 1 SCSI port, 1 ThinWire Ethernet port, 1 standard Ethernet port and serial lines |

**Table D–3    System Storage Conditions**

| | |
|---|---|
| Temperature range | 5°C to 50°C (41°F to 122°F) |
| Relative humidity | 10% to 95% (noncondensing) |
| Altitude | 0 to 2400 m (0 to 8000 ft) |
| Maximum wet bulb temperature | 32 °C (90°F) |
| Minimum dew point | 2°C (36°F) |

## Table D-4    System Operating and Nonoperating Conditions

### Operating Conditions

| | |
|---|---|
| Temperature range | 10°C to 40°C (50°F to 104°F) |
| Temperature change rate | 11°C/hr (20°F/hr) maximum |
| Relative humidity | 10% to 90% (noncondensing, no diskette) |
| Altitude | 2400 m (8000 ft) |
| Maximum wet bulb temperature | 28°C (82°F) |
| Minimum dew point | 2°C (36°F) |

### Nonoperating Conditions

| | |
|---|---|
| Temperature range | –40°C to 66°C (–40°F to 151°F) |
| Relative humidity | 95% @ 66°C (may condense) |
| Altitude | 4900 m (16,000 ft) |
| Maximum wet bulb temperature | 28°C (82°F) |
| Minimum dew point | 2°C (36°F) |

## Table D-5    System Electrical Specifications

| | |
|---|---|
| Input voltage | Automatically adjusting AC input from 120 VAC to 240 VAC |
| Frequency range | 47 to 63 Hz |

**Note** *For additional information about system electrical specifications, refer to the* VAXstation 3100 Planning and Preparation *guide.*

## Table D–6    RZ22/23 Hard Disk Drive Specifications

| Physical Dimensions | RZ22 | RZ23 |
| --- | --- | --- |
| Weight | .780 kg (1.72 lbs) | .826 kg (1.82 lbs) |
| Height | 41.28 mm (1.625 in) | 41.28 mm (1.625 in) |
| Width | 101.6 mm (4.00 in) | 101.6 mm (4.00 in) |
| Depth | 146.05 mm (5.75 in) | 146.05 mm (5.75 in) |

| Formatted Storage Capacity | RZ22 | RZ23 |
| --- | --- | --- |
| Per drive | 52 MB | 104 MB |
| Per surface | 13 MB | 13 MB |
| Bytes per track | 16,896 | 16,896 |
| Bytes per block | 512 | 512 |
| Blocks per track | 33 | 33 |
| Blocks per drive | 102,432 | 204,864 |
| Spare blocks per track | 1 | 1 |
| Spare blocks per drive | 3104 | 6208 |

| Performance | RZ22 | RZ23 |
| --- | --- | --- |
| Transfer rate to/from media | 1.25 MB/sec | 1.25 MB/sec |
| Transfer rate to/from buffer | 1.25 MB/sec | 1.25 MB/sec |
| Seek time track to track | $\leq$ 8 msec | $\leq$ 8 msec |
| Seek time average | $\leq$ 25 msec | $\leq$ 25 msec |
| Seek time maximum (full stroke) | $\leq$ 45 msec | $\leq$ 45 msec |
| Average latency | 8.4 msec | 8.4 msec |
| Rotational speed | 3575 RPM $\pm$0.1% | 3575 RPM $\pm$0.1% |
| Start time (maximum) | 20 sec | 20 sec |
| Stop time (maximum) | 20 sec | 20 sec |
| Interleave | 1:1 | 1:1 |

## Table D-6 (Cont.)    RZ22/23 Hard Disk Drive Specifications

| Environmental Specifications | Operating | Nonoperating |
|---|---|---|
| Ambient temperature | 10°C to 60°C (50°F to 110°F) | −40°C to 66°C (−40°F to 150°F) |
| Relative humidity | 8% to 80% | 8% to 95% (packaged) |
| Altitude | −1000 ft to 10,000 ft (−304 m to 3048 m) | −1000 ft to 40,000 ft (−304 m to 12192 m) |
| Maximum wet bulb (noncondensing) | 25.6°C (78°F) | 46°C (115°F) |
| Heat dissipation | 8 W (typical) (27.36 Btu/hr) 9 W max. (30.8 Btu/hr) | — |
| Temperature gradient | 11°C/hr (20°F/hr) | 20°C/hr (36°F/hr) |

## Table D-7    RZ24 Hard Disk Drive Specifications

| Physical Dimensions | RZ4 |
|---|---|
| Weight | .780 kg (1.72 lbs) |
| Height | 41.28 mm (1.625 in) |
| Width | 101.6 mm (4.00 in) |
| Depth | 146.05 mm (5.75 in) |

| Formatted Storage Capacity | RZ24 |
|---|---|
| Per drive | 209.7 MB |
| Per surface | 26.2 MB |
| Bytes per track | 19,456 |
| Bytes per block | 512 |
| Blocks per track | 38 |
| Blocks per drive | 409,792 |
| Spare blocks per track | 1 |
| Spare blocks per drive | 10,944 |

**Table D–7 (Cont.)    RZ24 Hard Disk Drive Specifications**

| Performance | RZ24 |
| --- | --- |
| Transfer rate to/from media | 1.5 MB/sec |
| Transfer rate to/from buffer | 1.25 MB/sec |
| Seek time track to track | $\leq$ 5 msec |
| Seek time average | $\leq$ 16 msec |
| Seek time maximum (full stroke) | $\leq$ 35 msec |
| Average latency | 8.3 msec |
| Rotational speed | 3497 RPM $\pm$0.5% |
| Start time (maximum) | 20 sec |
| Stop time (maximum) | 20 sec |
| Interleave | 1:1 |

| Environmental Specifications | Operating |
| --- | --- |
| Ambient temperature | 10°C to 55°C (50°F to 99°F) |
| Relative humidity | 8% to 80% |
| Altitude | –1000 ft to 15,000 ft (–304 m to 4573 m) |
| Maximum wet bulb (noncondensing) | 25.6°C (78°F) |
| Heat dissipation | 6.6 W (seeking) (22.57 Btu/hr) 6.8 W (read/write mode) (23.26 Btu/hr) |
| Temperature gradient | 11°C/hr (20°F/hr) |

| Environmental Specifications | Nonoperating |
| --- | --- |
| Ambient temperature | –40°C to 66°C (–40°F to 150°F) |
| Relative humidity | 8% to 95% (packaged) |
| Altitude | –1000 ft to 40,000 ft (–304 m to 12192 m) |
| Maximum wet bulb (noncondensing) | 46°C (115°F) |
| Heat dissipation | – |
| Temperature gradient | 20°C/hr (36°F/hr) |

## Table D-7 (Cont.)    RZ24 Hard Disk Drive Specifications

### Functional Specifications

| | |
|---|---|
| Recording density (bpi at ID) | 23,441 |
| Flux density (fci at ID) | 15,627 |
| Track density (tpi) | 1150 |
| Tracks/surface | 776 |
| R/W heads | 8 |
| Disks | 8 |
| Time to process ECC (512 bytes) | <100 msec |

## Table D-8    RX23 Diskette Drive Specifications

| Subject | Description |
|---|---|
| Diskette size | 9 cm (3.5 in) |
| Diskettes/diskette drive | 1 |
| Data capacity | 1.2 MB (RX23K) |
| Track density | 135 TPI |
| Storage capacity (high density) | 600 KB |

## Table D-9    RZ55 Hard Disk Drive Dimensions

| Weight | Height | Width | Depth |
|---|---|---|---|
| 13.2 kg | 14 cm | 33 cm | 29 cm |
| (29 lb) | (5.5 in) | (12.75 in) | (11.25 in) |

## Table D-10    RZ55 Hard Disk Drive Specifications

| Subject | Description |
|---|---|
| Formatted capacity per drive | 332.30 MB |
| Formatted capacity per surface | 22.48 MB |
| Formatted capacity per track | 18,432 |
| Formatted capacity per block | 512 bytes |
| Formatted blocks per track | 36 |
| Formatted blocks per drive | 649,040 |
| Formatted capacity spare blocks per cylinder | 8 |
| Formatted capacity spare blocks per drive | 10300 MB |
| Transfer rate to/from media | 1.25 MB/sec |
| Performance bus asynchronous mode | 1.50 MB/sec |
| Performance bus synchronous mode | 4 MB/sec |
| Performance seek time track to track | $\leq$ 4 milliseconds |
| Performance seek time average | $\leq$ 16 milliseconds |
| Performance seek time maximum | $\leq$ 35 milliseconds |
| Average rotational latency | 8.3 milliseconds |
| Rotational speed | 3600 RPM |
| Start time (maximum) | 20 sec |
| Stop time (maximum) | 20 sec |
| Interleave | 1:1 |
| Bus latency | 600 microseconds |
| Input current | 2.4 Amps @ 100–120 VAC |
| Frequency | 50–60 Hz |
| Power | 160 watts |

## Table D-11    RZ55 Hard Disk Drive Environmental Specifications

| | Operating | Nonoperating |
|---|---|---|
| Ambient temperature | 10°C to 50°C (50°F to 122°F) | –40°C to 66°C (–40°F to 150°F) |
| Relative humidity | 8% to 80% (noncondensing) | 8% to 95% |
| Altitude | –300 to 4600 m (–1000 to 15000 ft) | –300 to 12200 m (–1000 ft to 40000 ft) |
| Maximum wet bulb | 25.6°C (46°F) | 46°C (82.8°F) |

## Table D–12    TZ30 Tape Drive Specifications

| Subject | Description |
| --- | --- |
| Mode of operation | Streaming |
| Media | 12.77 mm (0.5 in) magnetic tape |
| Bit density | 2624 bits/cm (6667 bits/in) |
| Number of tracks | 22 |
| Transfer rate (at host) | 62.5 KB/sec at average streaming mode |
| Tape speed | 190 cm/sec (75 in/sec) |
| Track format | Multiple track serpentine recording |
| Cartridge capacity | 95 MB, formatted (approx.) |
| Power requirements | 1.0 A (2.0 A surge) at +12 V |
| | 1.2 A (1.8 A surge) at +5 V |
| | 20 watts nominal |
| | 33 watts peak |

## Table D–13    TK50Z–GA Tape Drive Specifications

| Subject | Description |
| --- | --- |
| Mode of operation | Streaming |
| Media | 1.2 cm (0.5 in.) unformatted magnetic tape |
| Bit density | 2624 B/cm (6667 B/in.) |
| Number of tracks | 22 |
| Tape speed | 190 cm/sec (75 in/sec) |
| Capacity | 94.5 MB (formatted) |

# E

## Associated Documents

For option and system hardware part numbers, consult your Digital sales representative.

Not all the following documents are available in every country. Check with your Digital sales representative for availability.

Table E–1 lists the associated documents.

**Table E–1    Associated Documents**

| Titles | Order Numbers |
| --- | --- |
| **VAXstation 3100 Family** | |
| *VAXstation 3100 Planning and Preparation* | EK–VS315–RC |
| *Workstations Network Guide* | EK–VS315–GO–001 |
| *VAXstation 3100 Maintenance Guide* | EK–285AA–MG |
| *VAXstation 3100 Maintenance Guide Addendum VAXstation 3100 Models* | EK–344AA–AD–001 |
| *VAXstation 3100 Illustrated Parts Breakdown* | EK–M3150–IP–001 |
| *VAXstation 3100 Model 30 Desktop-VMS Basic System Guide* | EK–259AA–UG |
| *VAXstation 3100 Model 30 Desktop-VMS Advanced System Guide* | EK–260AA–OM |
| *VAXstation 3100 Model 40 Desktop-VMS Management Guide* | EK–261AA–OM |

**Table E-1 (Cont.)     Associated Documents**

| Titles | Order Numbers |
|---|---|
| **VAXstation 3100 Family** | |
| *VAXserver 3400 Model 640QS Desktop-VMS Management Guide* | EK-263AA-OM |
| **Handbook Series** | |
| *A Technical Summary of Digital's Workstation Family with Application Listing* | EB-32975-51 |
| **RRD40 Disc Drive** | |
| *RRD40 Disc Drive Owner's Manual* | EK-RRD40-OM |
| **TZ30 Tape Drive** | |
| *TZ30 Cartridge Tape Drive Subsystem Owner's Manual* | EK-OTZ30-OM |
| *TZ30 Cartridge Tape Drive Subsystem Service Manual* | EK-OTZ30-SM |
| *TZ30 Cartridge Tape Drive Subsystem Reference Card* | EK-OTZ30-RC |
| **TK50Z Tape Drive** | |
| *TK50Z Tape Drive Subsystem Owner's Manual* | EK-LEP05-OM |
| *TK50Z User's Guide* | EK-OTK50-UG |
| *TK50Z Technical Manual* | EK-OTK50-TM |

**Table E–1 (Cont.)    Associated Documents**

| Titles | Order Numbers |
|---|---|
| **DECconnect System** | |
| *DECconnect System General Description* | EK–DECSY–GD |
| *DECconnect System Requirements Evaluation Workbook* | EK–DECSY–EG |
| *DECconnect System Installation and Verification Guide* | EK–DECSY–VG |
| *DECconnect System Stand-alone ThinWire Networks: Planning and Installation Guide* | EK–DECSY–TG |
| *DECconnect System Planning and Configuration Guide* | EK–DECSY–CG |
| **Printers** | |
| *System Management Volume 1A, Guide to Setting Up a VMS System* | AA–LA25A–TE |
| *General User Volume 4, DCL Dictionary* | AA–LA12A–TE |
| *System Manager Binder 3A, System Environment Setup* | AA–KS85A–TE |
| **Modems** | |
| *System Management Volume 1A, Guide to Setting Up a VMS System* | AA–LA25A–TE |
| *System Management Volume 5A: Networking, Guide to DECNET VAX Networking* | AA–LA47A–TE |
| *System Management Binder 3A, System Environment Setup* | AA–KS85A–TE |
| **SCSI** | |
| *Small Computer System Interface: An Overview and a Developer's Guide* | EK–SCSIS–DK |

# Glossary

**applications**

Programs, such as a financial spreadsheet program, that perform end-user tasks.

**architecture**

The internal configuration of a computer (processor) including its registers, instruction set, and input/output structure.

**ANSI**

American National Standards Institute.

**ASCII**

American Standard Code for Information Interchange. A set of 7- or 8-bit binary numbers representing the alphabet, punctuation, numerals, and other special symbols used in text representation and communications protocol.

**backup**

A copy of files or software made for safekeeping in a backup operation.

**backup process**

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 backup copies on tape cartridges, or over a network using the Remote System Manager.

**bad blocks**

A damaged block on a disk that the system cannot access. Blocks become damaged from wear or abuse.

**barrel connector**

A female connector for connecting two sections of ThinWire cable.

**batch queue**

A series of tasks that the computer processes in a certain order, without user interaction.

**baud rate**

The speed at which signals are serially transmitted along a communications line. One baud equals 1 bit per second.

**bezel**

The molded panels on the front and back of the system unit.

**binary**

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

**bit**

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

**block**

A standard unit of storage space on a disk or tape surface; 512 bytes. Although a drive writes data to the disk or tape 1 byte at a time, a block is the smallest amount of space on a disk or tape that the system can access.

**BNC connector**

See **connector**.

**boot**

To bring a device or system to a defined state where it can operate on its own.

**bootable medium**

A fixed disk, an optical disk, or magnetic tape cartridge containing operating system software that can be loaded into memory and executed.

**boot device**

The device on which the operating system is loaded.

**boot node**

The management center for a work group and its major resource provider.

**bootstrap**

See **boot**.

**BOT**

Beginning of tape. See **drive leader**.

**bus**

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

**byte**

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

**cable**

A sheathed group of electrical conductors.

**caddy**

The holder for the compact disc.

**cartridge insert/release lever**

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

**cartridge leader**

See **drive leader**.

## CD

See **compact disc**.

## central processing unit (CPU)

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

## client

Hardware or software that obtains a specific set of services from a server.

## cluster

A group of computers networked together that share disk storage, application programs, and other computer resources. Also called a VAXcluster.

## coaxial cable

A two-conductor, concentric, constant impedance transmission cable.

## command

A request you make to the operating system to perform a specific function. For example, a request to run a program.

## 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.

## compact disc

A flat circular plate on which read-only optical data is stored. A laser optical reader, also called a compact disc, retrieves this information.

## computer system

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

## configuration

See **system configuration**.

**connector**

A BNC-style connector that connects a section of ThinWire cable to a T-connector, to a system, or to a barrel connector.

**console**

A device through which an operator communicates with the computer.

**console mode**

The state in which the computer is controlled from the console terminal. Your system can be put in console mode by pressing the halt button on the rear panel of the system unit. Console mode is indicated by the console prompt (>>>) on the monitor screen. Compare **program mode**.

**console prompt**

A prompt used for communication between the user and the computer.

**controller**

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

**CPU**

See **central processing unit**.

**cursor**

A blinking line or figure on the screen that indicates where the next character the user types will appear.

**daisy-chain**

To link computers or expansion boxes sequentially.

**data**

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

**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 hardware or software.

## DECconnect

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

## DECconnect faceplate

See **faceplate**.

## DECnet software

Digital networking software that runs on nodes in both **local** and **wide area networks**.

## DECwindows

An interface to the VMS operating system that allows a workstation screen to be divided into windows where several application programs can appear simultaneously.

## default

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

## DEMPR

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

## device

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

## device icon

An icon on the back of the system unit that identifies the device that can be plugged into the connector.

## device name

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

**diagnostics**

Programs, located in read-only memory, that detect and identify abnormal system hardware operation.

**disc**

See **compact disc**.

**disk**

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

**disk drive**

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

**diskette**

A flexible disk contained in a square jacket. Diskettes can be inserted and removed from diskette drives.

**diskette drive**

A disk drive that only reads or writes on removable diskettes.

**diskless system**

A VAXstation 3100 Model 38 system that has no storage capacity of its own.

**disk server**

A hardware system designed to provide operating system and data storage for other users.

**display screen**

See **monitor**.

**down-line load**

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

## drive leader

A plastic leader inside the TZ30 tape drive. The cartridge leader on the magnetic tape and the drive leader on the tape drive mate. The drive leader draws the magnetic tape out of the tape cartridge and onto a take-up reel inside the drive. As the tape is wound onto the take-up reel, it passes the magnetic read and write heads.

## error message

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

## Ethernet

A type of local area network based on Carrier Sense Multiple Access with Collision Detection (CSMA/CD). A communications concept for local communication networks that use coaxial cable.

## faceplate

A wall receptacle that provides a single network connection for your workstation.

## fatal error

An error from which a process cannot recover. Fatal errors are those that cause the CPU to stop, or are disk write errors not caused by the disk drive being powered down or write-locked. Errors that a process can recover from are not fatal.

## firmware

Software that is stored in a fixed or wired-in way, usually in read-only memory.

## fixed disk

See **disk**.

## floppy disk

See **diskette**.

## footprint

The amount of physical space needed for a computer and its devices.

## format

To prepare a diskette to accept data.

**formatted data**

Data structured in a pattern understood by the system software.

**formatting**

An operation that divides a disk's magnetic surface into segments in a specific pattern. Formatting allows the drive to read and write useful data to the disk.

**graphics**

Computer output of drawings, charts, and graphs.

**graphics coprocessor**

A special-purpose CPU, with its own set of commands, data formats, and an instruction counter, which executes a sequence of display instructions to create a drawing or graph on the display device.

**ground**

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

**H4000**

An Ethernet transceiver used to connect standard Ethernet communications equipment to standard Ethernet. The H4000 supports a heartbeat signal used in network diagnostics.

**hard disk**

A hard disk resides permanently inside a disk drive. Compare to diskette.

**hard error**

A non-recoverable error.

**hardware**

The physical equipment—mechanical and electrical—that make up a system. Compare to software.

**hardware Ethernet address**

The unique Ethernet physical address associated with a particular Ethernet communications controller.

## head

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

## heartbeat

A signal generated at the end of every message transmission by some of the older Digital Ethernet transceivers, such as the H4000 Transceiver. Some peripheral devices are sensitive to this signal in order to confirm that the controller is still functioning. The absence of a heartbeat does not necessarily mean there is an error.

## Help Menu

A pull-down menu that allows you to access a help facility associated with a specific application.

## host system

The primary or controlling computer in a multiple computer network.

## housing

The plastic case in which a compact disc sits.

## I/O device

See input/output (I/O) device.

## icon

A graphic representation of an object, application, or window.

## IEEE

Institute of Electrical and Electronics Engineers.

## initialize

To prepare a new disk or diskette for use. Initializing erases any files stored on the disk or diskette.

## 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.

### interactive

A method of communicating with the system. In an interactive session, you enter a command at the keyboard and the system executes the command and responds with a prompt character for another command.

### interface

An electronic circuit board that links an external device to a computer. Or a device or piece of software that allows the components of the system to communicate with each other.

### kilobyte (KB)

When referring to memory or secondary storage capacity, 1024 bytes.

### LED

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

### link

A communication path between two nodes. A physical link is the electrical connection between two nodes. A logical link implies that two nodes are able to communicate whether or not they have a direct physical link.

### load

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

### load device

The drive that holds the distribution media during software installation.

### local

In close proximity to the computer. Compare **remote**.

### local area network (LAN)

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

**local area VAXcluster**

A group of two or more computers connected by an Ethernet cable or computer-interconnect. In a local area VAXcluster, one computer serves the other computers (the server), and starts the other computers and manages the resources that they share.

**local device**

A disk drive, tape drive, or other device that is only available to the computer to which it is connected.

**log in**

To identify yourself to the operating system. When you log in, you type an account name and password. If the name and password match an account on the system, you are allowed access to that account.

**magnetic tape**

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

**megabyte (MB)**

A unit of measure equal to 1,000 kilobytes or 1,048,576 bytes.

**memory**

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

**memory module**

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

**modem**

A device that converts computer signals to signals that can be sent over a telephone line.

**module**

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

**monitor**

A video device that displays data.

**mouse**

A hand-held input device that is moved across the desktop to move the pointer or mouse cursor on the monitor screen and that is used to select menu options and draw graphics. The mouse is palm-sized and contains three buttons (function keys).

**multiport repeater**

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

**multitasking**

Declaring parts of an application to execute concurrently with each other and with the main program.

**network**

Two or more computers linked by communication lines to share information and resources.

**network coordinator**

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

**node**

A computer, workstation, or peripheral device that is connected to a network, and can communicate with other members of the network.

**operating system**

An integrated collection of programs that controls the execution of computer programs and that performs system functions.

**optical disc**

See **compact disc.**

**output device**

A device that accepts data from the system. For example, a printer.

**paging**

The separation of a program and data into fixed blocks, often 1,000 words, so that transfers between disk and core can take place in page units rather than as entire programs.

**password**

A unique string of characters and/or numbers that identifies you to the computer.

**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.

**pixel**

A picture element. A location on the monitor screen that can be selectively turned on or off. The basic unit of a graphic display.

**plotter**

A device to construct visual representations of data by an automatic pen or pencil. Plotters can also receive plotting coordinates from digital computers.

**pointing device**

A terminal input device that allows you to make a selection from a menu or to draw graphics. See **mouse** and **tablet**.

**port**

The name of the socket at the back of the computer to which a terminal, printer, or other communication device is connected.

**power-up sequence (power up)**

A series of ordered events that occur when you supply power by turning on the system.

**print queue**

A group of items waiting to be printed by a printer. The arrangement of items determines the processing priority.

**process**

A program currently using memory and running on the system.

**program**

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

**program mode**

The state in which the computer is controlled by the operating system. After the operating system is installed, the system will always operate in program mode unless you put it into console mode. Compare **console mode**.

**prompt**

A brief message printed or displayed by a program or an operating system, asking you to provide input.

**public device**

A disk drive, tape drive, or other device available to computers that are not directly connected to it. In a VAXcluster, computers access public devices across a local area network.

**puck**

A palm-sized device that slides on a tablet's surface. The puck and tablet together function as a pointing device. See **pointing device** and **tablet**.

**queue**

A list of items or tasks to be processed in a certain order. See **batch queue** and **print queue**.

**RAM**

See **random-access memory**.

**random-access memory (RAM)**

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

**read-only memory (ROM)**

Memory that cannot be modified. The system can use (read) the data contained in ROM but cannot change it.

**remote**

Linked to a computer by communication lines. Compare **local**.

**remote install**

See **down-line load**.

**resolution**

A measure of the precision or sharpness of a graphic image. Often a function of the number of pixels on a screen.

**restore**

To recover files or software that has been backed up, copying the material from the backup medium (such as a tape or diskette) to the medium you normally use.

**RMS**

See **record management services**.

**record management services (RMS)**

Software used to open and close files, read from files, write to files, and extend and delete files.

**ROM**

See **read-only memory (ROM)**.

**run**

A single continuous execution of a program (noun). To execute a program (verb).

**runtime**

The amount of computing time a program requires to be carried out.

**satellite node**

A node that is booted remotely from the system disk on the boot node. A computer system that obtains a specific set of services from a server system.

**SCSI**

See **Small Computer System Interface**.

**section**

A single length of ThinWire Ethernet cable terminated at each end with a connector.

**segment**

A length of ThinWire Ethernet cable made up of one or more cable sections connected with barrel connectors or T-connectors.

**server**

Hardware or software that provides a specific set of services to a satellite or client.

**server node**

In a VAXcluster, a computer that is used to start the satellite nodes and to manage their use of common resources.

**Small Computer System Interface (SCSI)**

An interface designed for connecting disks and other peripheral devices to computer systems. SCSI, pronounced "skuh-zee," is defined by an ANSI standard and is used by many computer and peripheral vendors throughout the industry.

**soft error**

A recoverable error.

**software**

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

**standalone workstation**

A workstation that starts and operates alone without being connected to another computer.

**standard Ethernet network**

An IEEE standard 802.3 compliant Ethernet network connected with standard Ethernet cable. Compare **ThinWire Ethernet network**. Also known as ThickWire Ethernet.

**storage medium**

A device, such as a diskette or tape, capable of recording information.

**store**

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

**stylus**

A penlike device that draws on the surface of a tablet and functions as a pointing device.

**swapping**

A process that transfers the contents of an area of main storage to or from auxiliary storage.

**system**

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

**system configuration**

The layout of the hardware in a particular computer system.

**system disk**

The disk that stores the operating system, and which starts the system and allows it to run properly.

**system image**

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

**system management tasks**

Tasks performed by an assigned person (usually the system manager) to operate and maintain the system.

**tablet**

An absolute-positioning input device composed of a flat-surfaced digitizing tablet and a puck or stylus. The tablet is a drawing surface. The puck and stylus are pointing devices that move the cursor on the monitor screen, draw graphics, and make selections from the menu.

**tape drive**

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

**T-connector**

Connector used to join ThinWire Ethernet cable sections.

**TCP/IP**

Transmission Control Protocol/Internet Protocol. Networking protocols standard with ULTRIX software.

**terminator**

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

**ThinWire Ethernet network**

A Digital trademark used to describe its 10base2 (IEEE standard 802.3 compliant) Ethernet products used for local distribution of data.

**ThinWire connector**

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

**timesharing**

A system in which two or more programs are allotted, in turn, equal time or use of a computer or computer device.

**transceiver**

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

**turbo system**

A VAXstation 3100 Model 38 with a hard disk for paging and swapping.

**ULTRIX operating system**

Digital Equipment Corporation's implementation of the UNIX ® operating system.

## user interface

The interaction style between the computer and the user of that computer.

## VAXcluster configuration

A group of two or more computers connected by an Ethernet cable. In a VAXcluster, one computer (the server) serves the other computers: it is required to start the other computers, and it manages the resources that they share.

## VMS operating system

Digital Equipment Corporation's proprietary operating system.

## window

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

## workstation

A single-user system that offers high-performance, high-resolution graphics, and can function in a network environment.

## write-protect notch

The small notch on the side of a 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 move on a TK50 tape cartridge or an RX23 diskette to prevent loss of data by accidental overwriting.

## X Window System

A windowing system architecture that allows the execution and display of applications to be independent. Specific components of the architecture control the display of applications. Different components determine how applications run. Since its introduction by MIT, the X Window System has become an industry standard.

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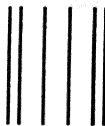
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