

# DECstation 5000 Model 150

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## Operator's Guide

Order Number: EK-4MMIN-OP. A01

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## Preface

This guide explains how to install and test the hardware components of your DECstation 5000 Model 150 workstation. It also describes how to use your system as a server.

**Table 1 Conventions Used in This Guide**

| <b>Convention</b>    | <b>Use</b>   |
|----------------------|--|
| Monospace type       | Anything that appears on your monitor screen is set in monospace type.               |
| <b>Boldface type</b> | Anything that you are asked to type is set in boldface type.                         |
| Caution              | Caution notes provide information that protects your workstation from being damaged. |
| <i>italic type</i>   | Indicates a variable or a complete title of a manual.                                |



# **Part I**

---

## **Introducing Your Workstation**



# 1

---

## Getting Started

This chapter provides an overview of the following topics:

- The DECstation 5000 Model 150 Workstation
- System Unit Components
- Available Options

### 1.1 The DECstation 5000 Model 150 Workstation

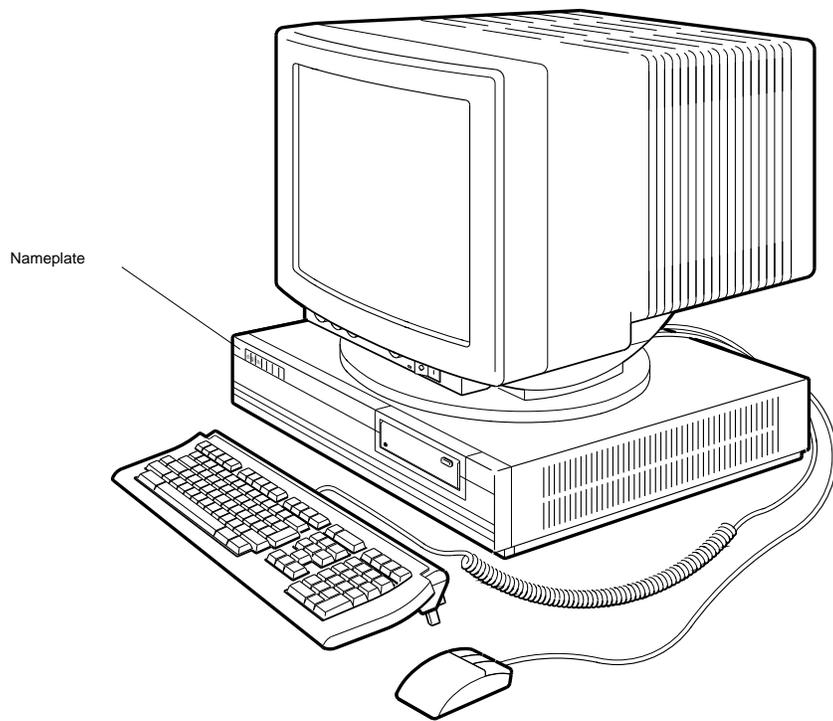
The DECstation 5000 Model 150 workstation features:

- 50 SPECmarks
- Graphics, storage, and expansion options
- On-chip cache of 8 KB instruction and 8 KB data
- 1 MB secondary cache

Figure 1–1 shows a typical DECstation 5000.

## 1.1 The DECstation 5000 Model 150 Workstation

Figure 1-1 Typical DECstation 5000 Workstation



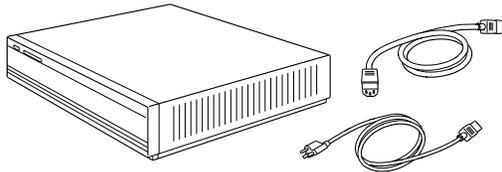
WS330137

In addition to the this manual, you should have the following:

- Any options you ordered
- Any software you ordered
- All the items shown in Figure 1-2, except only one type of video cable assembly: color, monochrome, or gray-scale.

## 1.1 The DECstation 5000 Model 150 Workstation

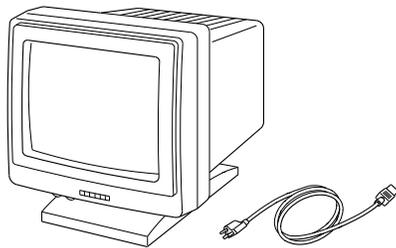
**Figure 1-2 Workstation Components**



System unit, power cord, and  
monitor-to-system-unit power cable



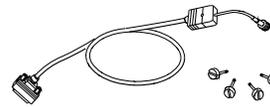
Color video cable assembly



Monitor and monitor power cord



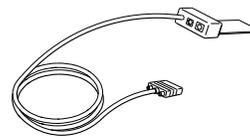
Monochrome video cable assembly



Gray-scale video cable assembly



Keyboard with cable  
(Keyboard ordered may  
vary from the one shown)



Keyboard-mouse cable assembly



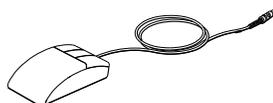
Communication  
connector adapter



SCSI terminator



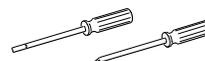
Antistatic wrist strap



Mouse with cable



ThickWire Ethernet  
loopback connector



Screwdrivers

WS330131

## 1.2 System Unit Components

### 1.2 System Unit Components

The system unit sits flat on a level surface with the monitor on top of or next to it.

---

**Caution**

---

Do not stand the system unit on its side. This can block the cooling vents and damage the unit.

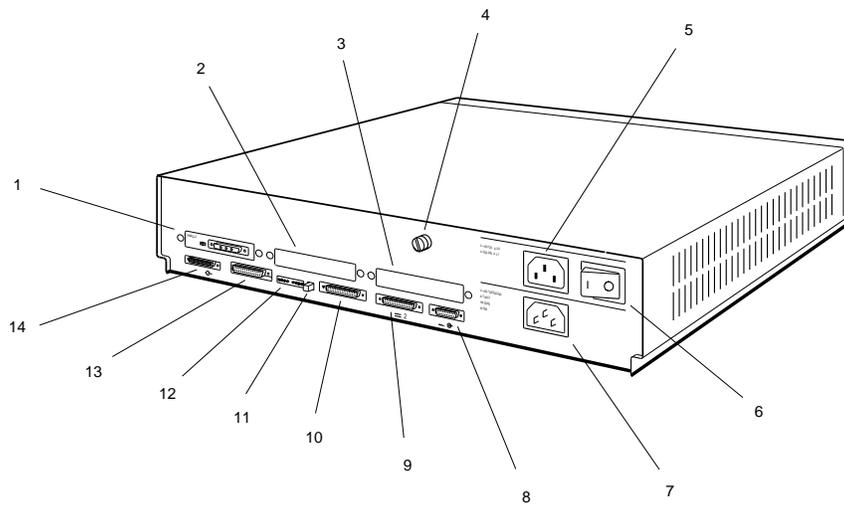
---

#### 1.2.1 Connectors, Controls, and Indicator Lights on System Unit

Figure 1-3 shows the connectors and switches on the back of the system unit. Table 1-1 explains each item.

## 1.2 System Unit Components

Figure 1-3 Back of System Unit



- |   |  |
|---|--|
| 1. TURBOchannel option slot 0.            | 9. Communications connector 2                |
| 2. TURBOchannel option slot 1             | 10. Communications connector 3               |
| 3. TURBOchannel option slot 2             | 11. Halt button                              |
| 4. Cover-release screw                    | 12. Diagnostic indicator lights              |
| 5. Monitor-to-system-unit power connector | 13. Base system ThickWire Ethernet connector |
| 6. On/off switch                          | 14. Base system SCSI connector               |
| 7. System unit power connector            |  |
| 8. Keyboard-mouse connector               |  |

WS33O094

## 1.2 System Unit Components

**Table 1–1 Connectors, Controls, and Indicator Lights on System Unit**

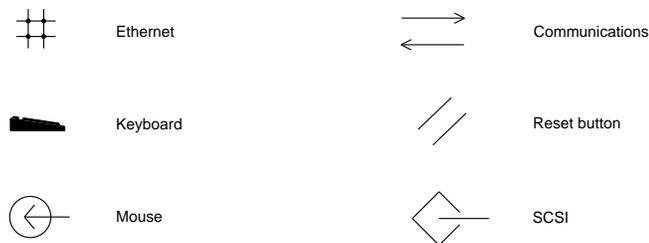
| Item                                     | Function  |
|--|---|
| TURBOchannel option slots 0, 1, and 2    | The points at which optional TURBOchannel hardware can connect to the system unit. (In Figure 1–3, TURBOchannel slot 0 contains a video connector, the point at which a video cable connects the monitor to the system unit.) |
| Cover-release screw                      | A captive screw that allows the cover to be removed from the system unit.   |
| Monitor-to-system-unit power connector   | The point at which power can pass from the system unit to the monitor.  |
| On/Off switch                            | The switch that turns the system unit on and off. Pressing ( I ) turns the system unit on; pressing ( O ) turns it off.   |
| System unit power connector              | The point at which power from the power source reaches the system unit.   |
| Keyboard-mouse connector                 | The point at which the keyboard-mouse cable connects the keyboard and mouse or tablet to the system unit.   |
| Communications connectors                | The points at which communications devices, such as modems and printers, connect to the system unit.  |
| Halt button                              | The switch that stops the worksystem software and puts the workstation in console mode.   |
| Diagnostic indicator lights              | Lights that indicate where system failures occurred; useful when there is no display on the monitor.  |
| Base system ThickWire Ethernet connector | The point at which Ethernet network cables connect to the system unit.  |
| Base system SCSI connector               | The point at which external small computer system interface (SCSI) storage devices connect to the base system.  |

## 1.2 System Unit Components

### 1.2.2 Icons on System Unit and Its Cables

Many of your workstation connectors and cables use icons to remind you of their functions. Figure 1–4 shows the icons used on your workstation system unit.

**Figure 1–4 Icons on the Workstation**



WSE2O003

## 1.3 Available Options

### 1.3 Available Options

Table 1–2 lists the internal and external options for the DECstation 5000 Model 150. Internal options must be installed inside the system unit or in an expansion box. External options, including expansion boxes and peripheral devices such as printers and modems, can be attached by a cable to the system unit.

An “X” in Table 1–2 indicates where the option can be installed; in the system unit, an expansion box, or both.

**Table 1–2 DECstation 5000 Model 150 Devices and Options**

| <b>Option</b>                             | <b>System Unit</b> | <b>Expansion Box</b> |
|---|--------------------|----------------------|
| RZ23L, RZ24L, RZ25, RZ26 hard disk drives | X                  | X                    |
| RZ58 hard disk drive                      |                    | X                    |
| RRD42, RX23, TLZ06, TZK10 drives          | X                  | X                    |
| RX33, TK50, TKZ08, TZ30 drives            |                    | X                    |
| MS01-AA, MS01-CA, MS01L-AB memory modules | X                  |                      |
| TURBOchannel Graphics                     | X                  | X                    |

# 2

---

## The Environment

This chapter describes the following topics:

- Site Requirements
- Power Requirements

### 2.1 Site Requirements

To operate at its best, your workstation must be set up in a place that meets certain requirements.

---

**Caution**

---

Failure to meet these requirements can damage the equipment.

---

#### 2.1.1 Temperature and Humidity

- The temperature around the workstation should be between 50° F (10° C) and 95° F (35° C).

The workstation should be set up away from heaters, photocopiers, and other sources of heat.

Protect your workstation from direct sunlight.

## 2.1 Site Requirements

- Air should flow freely around your workstation to keep heat from building up and damaging the equipment.  
Leave 4 inches (10 centimeters) between system unit vents and other objects.  
Leave 3 inches (7.6 centimeters) between monitor vents and other objects.
- Relative humidity should be between 10 and 90 percent.
- Store supplies (such as tape cartridges) within these same temperature and humidity limits.

### 2.1.2 Cleanliness

- Keep your work area as dust-free as possible.

### 2.1.3 Interference

- Set up your workstation at least 30 inches (76.2 centimeters) from any sources of electrical interference, such as other terminals or monitors, printers, or electric pencil sharpeners.
- To limit its exposure to static electricity and magnetized objects, set up your workstation away from busy corridors and other high-traffic areas and away from filing cabinets and steel beams in walls.

## 2.2 Power Requirements

- Reserve an entire circuit for your workstation power source. The fuse for the circuit must be at least 20 amperes.
- Be sure your electrical circuit is properly grounded and free from electrical noise. If possible, connect a surge-protected power strip to the outlet and plug your workstation power cord into the power strip.

Many of the devices you connect to your workstation, including most monitors, must have voltages that match your power source, which is either 110/120 or 220/240 volts. Devices that require matching voltages have a yellow voltage label covering the power connector. This label tells you that device's power requirements. (See Figure 2-1.)

---

### Caution

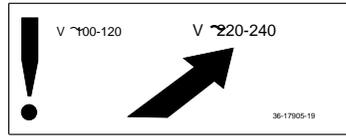
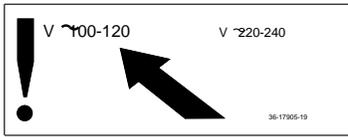
---

Connecting your equipment to a power source with the wrong voltage can damage the equipment.

---

## 2.2 Power Requirements

Figure 2-1 Voltage Labels



WSE21021



# 3

---

## Installing Your DECstation 5000

This chapter explains the following installation steps:

- Connecting the Monitor
- Connecting the Keyboard and the Mouse or Tablet
- Connecting the Dial and Button Box
- Attaching a SCSI Terminator
- Connecting the System Unit to a Power Outlet
- Connecting the Monitor to a Power Outlet

### 3.1 Connecting the Monitor

---

#### Caution

---

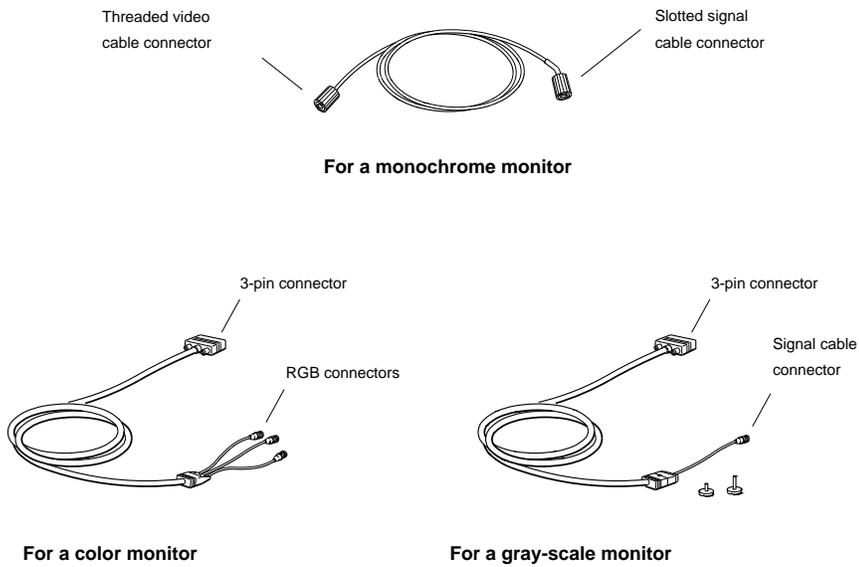
Make sure that both the monitor and system unit are turned off. Connecting or disconnecting your monitor while power is turned on can damage the monitor.

---

1. Select the appropriate video cable assembly for your workstation. (See Figure 3-1.)
  - The video cable assembly for a color monitor has a set of red, green, and blue (RGB) signal cables at one end and a 3-pin connector at the other.
  - The video cable assembly for a gray-scale monitor has a round signal cable connector at one end and a 3-pin connector at the other end.
  - The video cable assembly for a monochrome monitor has a threaded video cable connector on one end and a slotted connector on the other end.

### 3.1 Connecting the Monitor

Figure 3-1 Video Cable Assemblies



WS330040

## 3.1 Connecting the Monitor

2. Place the monitor next to or on top of the system unit.

---

### Caution

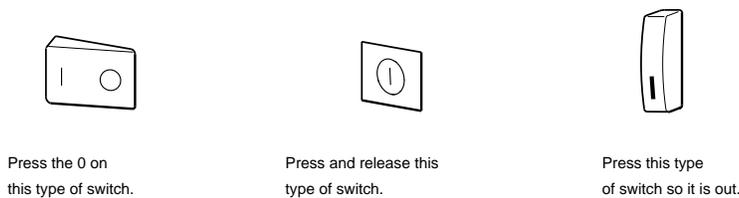
---

Do not place the monitor near an electromagnetic device, such as a printer or an electric pencil sharpener, or near magnetized objects, such as filing cabinets or steel beams in walls. This can interfere with its performance.

---

3. Turn off the monitor. Figure 3-2 illustrates the different switches.

**Figure 3-2 Turning Off the Monitor**



WSE21101

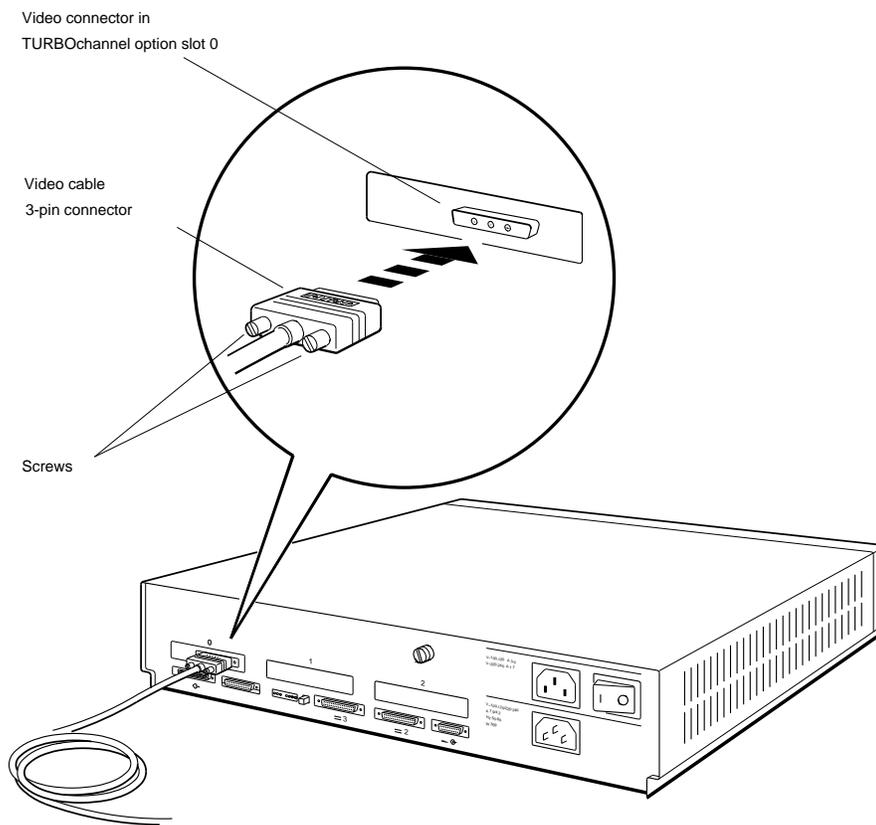
4. Connect the video cable assembly to the system unit and monitor with one of the following procedures.

### 3.1.1 Connecting a Color Monitor

- a. Hold the 3-pin connector of the cable assembly so that the widest part of the connector is on top. See Figure 3-3.
- b. Firmly push the cable connector into the video option connector on the system unit.
- c. Tighten the screws on the 3-pin connector to lock the connector securely in place. Check to see that the connection is correct. If the 3-pin connector is inserted upside down, the colors red and blue are displayed in reverse on color monitors.

### 3.1 Connecting the Monitor

Figure 3-3 Connecting Color or Gray-Scale Video Cable to System Unit



WS330028

- d. Connect the red, green, and blue signal cables to the round connectors on the monitor labeled R, G, and B.

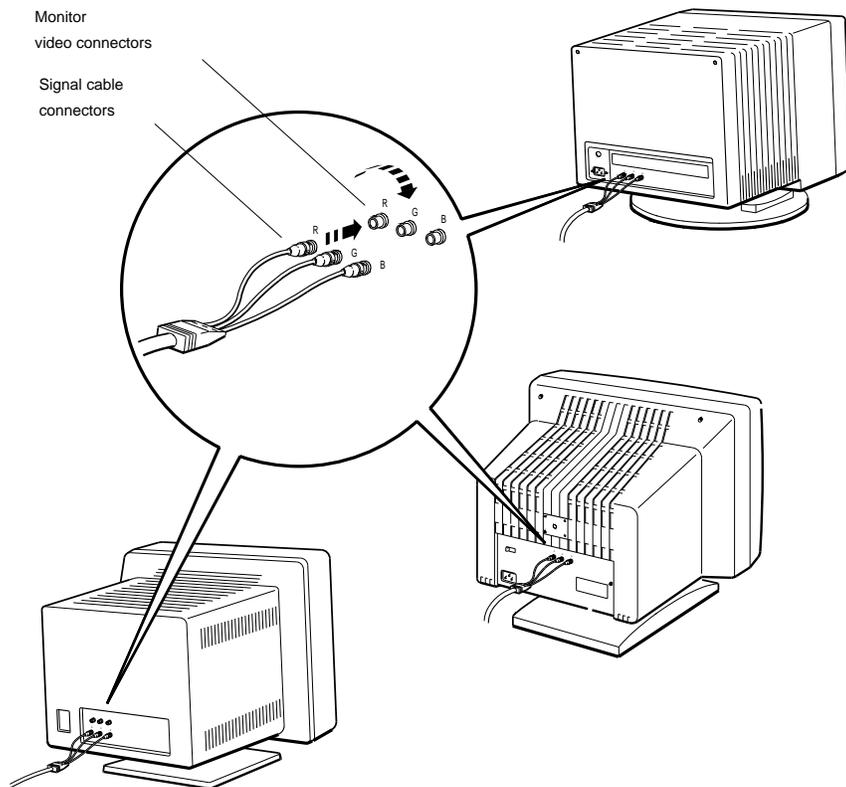
If your monitor has two sets of round RGB connectors, use the ones labeled VIDEO IN. (The monitor will have no display if you use the VIDEO OUT connectors.)

- Align the slots on the collar of the red signal cable connector with the pins on the monitor connector labeled R.
- Push the signal cable connector onto the monitor connector. Then twist the cable connector to the right to lock it.

### 3.1 Connecting the Monitor

Repeat this procedure with the green and blue signal cables. The green signal cable connects to the monitor connector labeled G; the blue signal cable connects to the monitor connector labeled B.

**Figure 3-4 Connecting a Video Cable Assembly to a Color Monitor**



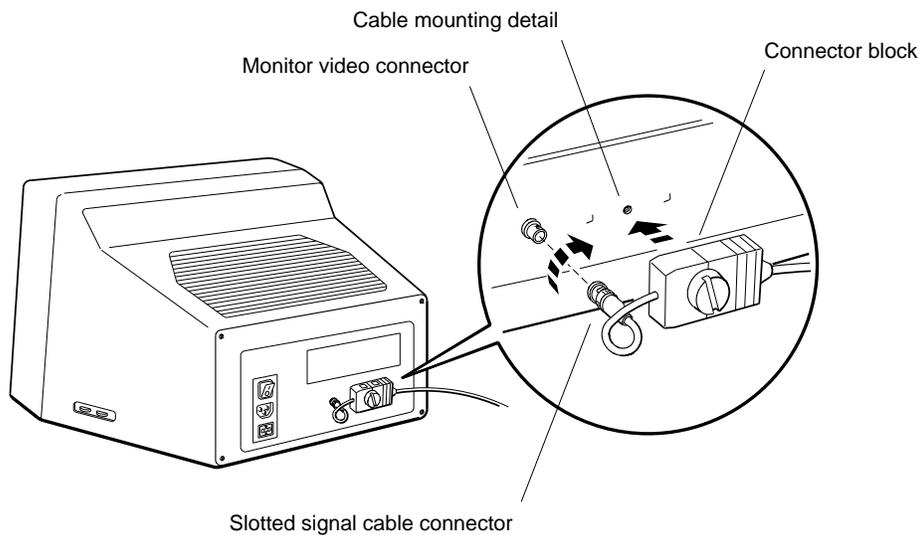
WS330071

## 3.1 Connecting the Monitor

### 3.1.2 Connecting a Gray-scale Monitor

- a. Hold the 3-pin connector of the cable assembly so that the widest part of the connector is on top.
- b. Firmly push the cable connector into the video option connector on the system unit.
- c. Tighten the screws on the 3-pin connector to lock the connector securely in place.
- d. Align the slots on the collar of the signal cable connector with the pins on the monitor video connector.
- e. Push the slotted signal cable connector onto the monitor video connector. Then twist the cable connector to the right to fasten it.

**Figure 3-5 Connecting Video Cable Assembly to 19-Inch Gray-Scale Monitor**



WS33O095

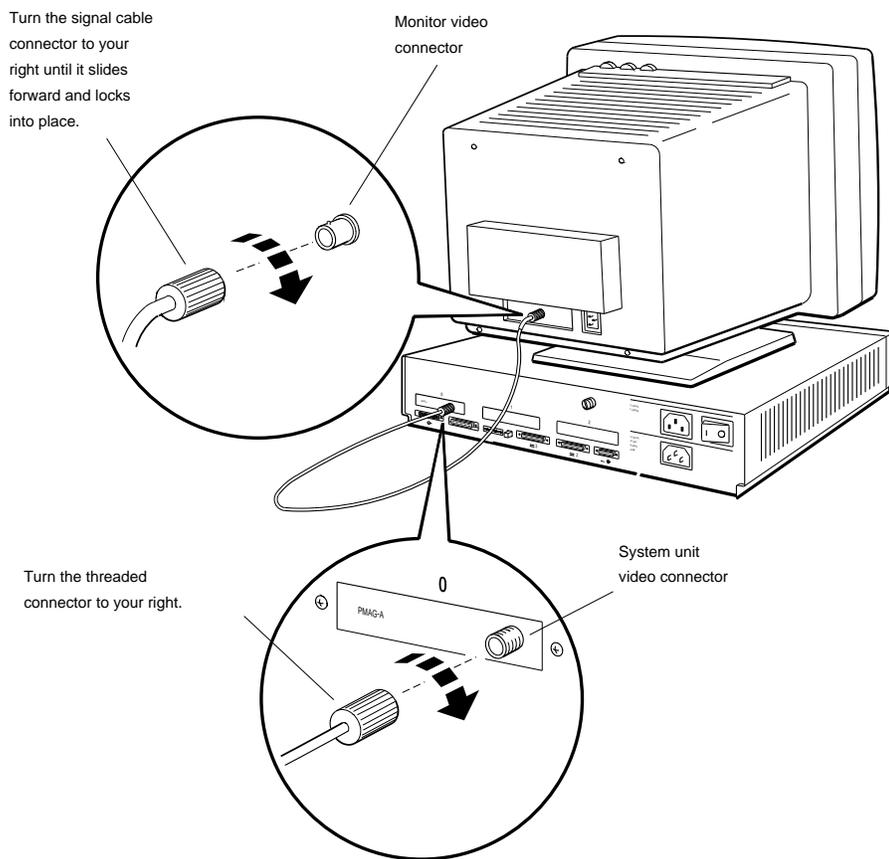
## 3.1 Connecting the Monitor

### 3.1.3 Connecting a Monochrome Monitor

- a. Press the threaded signal cable connector onto the system unit video connector to tighten it. (See Figure 3-6.)
- b. Align the slots on the collar of the signal cable connector with the pins on the monitor video connector.
- c. Push the slotted signal connector onto the monitor video connector. Then twist the connector to the right to lock it.

### 3.1 Connecting the Monitor

Figure 3-6 Connecting Video Cable Assembly to Monochrome Monitor



WS33O075

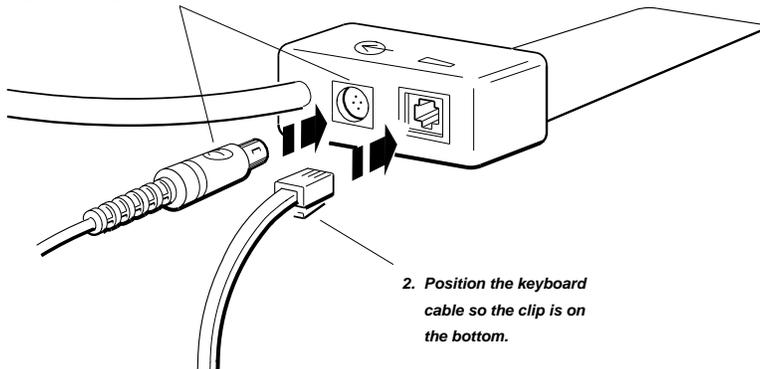
## 3.2 Connecting the Keyboard and the Mouse or Tablet

### 3.2 Connecting the Keyboard and the Mouse or Tablet

1. Insert the mouse cable connector and the keyboard cable connector into the connector block of the keyboard-mouse cable assembly.

**Figure 3–7 Connecting the Keyboard and Mouse**

*1. Position the mouse cable connector so the icon on it is under the mouse icon on the connector block.*



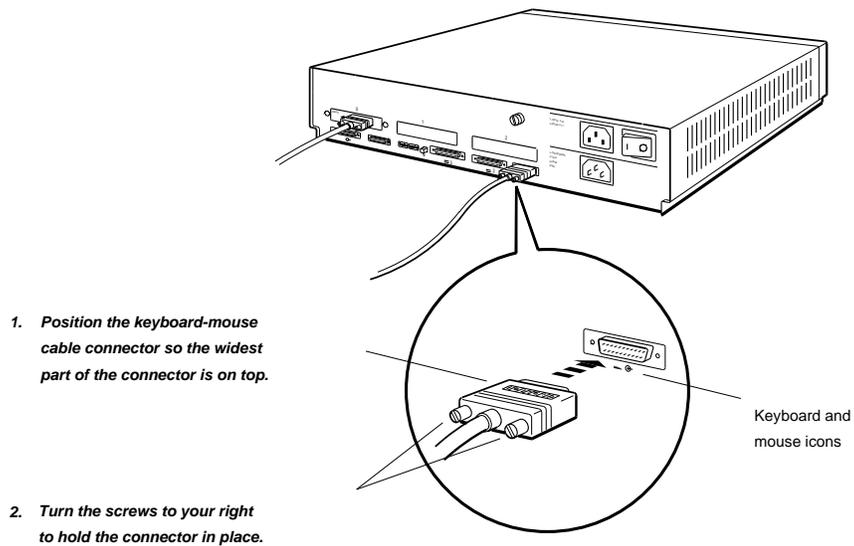
*2. Position the keyboard cable so the clip is on the bottom.*

WS331043

## 3.2 Connecting the Keyboard and the Mouse or Tablet

2. Plug the keyboard-mouse cable assembly connector into the keyboard-mouse connector on the system unit.

**Figure 3–8 Attaching the Keyboard-Mouse Cable Connector**

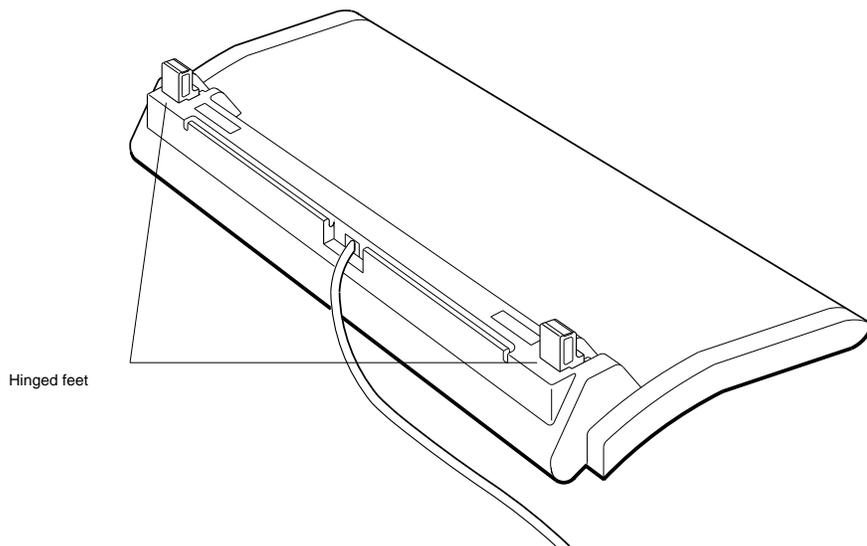


WS331042

## 3.2 Connecting the Keyboard and the Mouse or Tablet

3. You can tilt the keyboard or let it lie flat. To tilt it, press up on the hinged feet.

**Figure 3–9 Hinged Feet on the Keyboard**



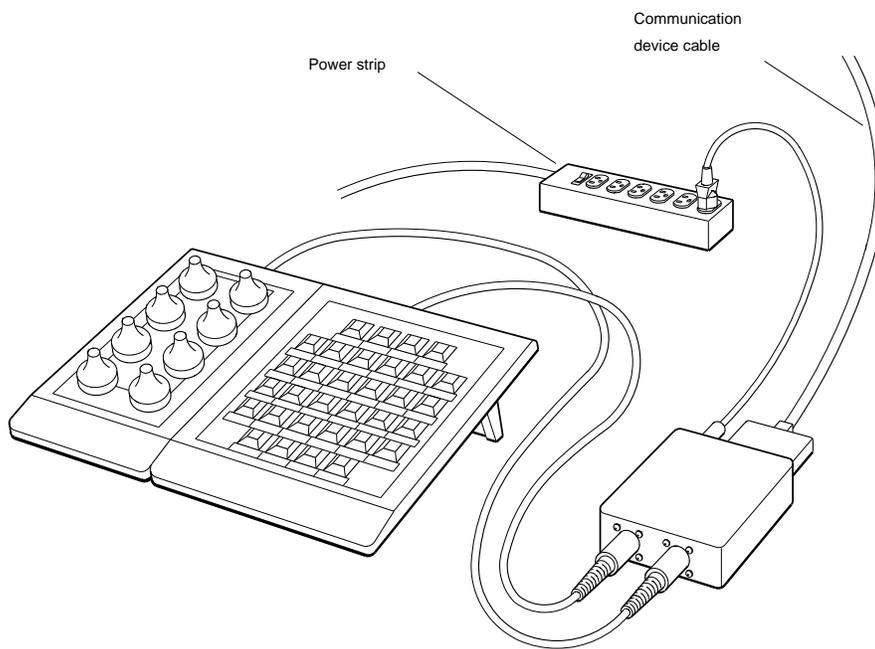
WS330105

### 3.3 Connecting the Dial and Button Box

### 3.3 Connecting the Dial and Button Box

You can use the optional dial and button box with your workstation to move data on the monitor screen. The documentation supplied with these options explains their installation and use.

**Figure 3-10 Dial and Button Box**



WS33M057

## 3.4 Attaching a SCSI Terminator

### 3.4 Attaching a SCSI Terminator

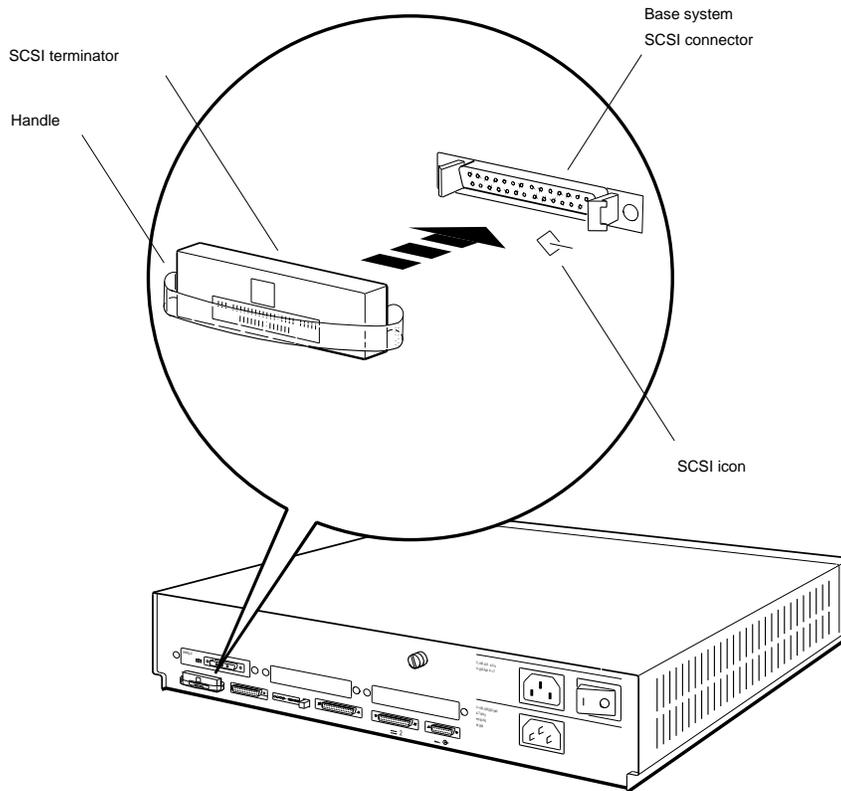
A connector for a small computer system interface (SCSI) is built into the base system hardware, as shown in Figure 3-11. When the connector is not connected to a SCSI device (a disk drive or other device that uses a SCSI interface), it must be terminated with a SCSI terminator to avoid problems on the internal bus.

For the time being, put a SCSI terminator on the SCSI connector on the system unit. You can remove the terminator later if you connect SCSI devices to the system unit.

Your system unit may have additional SCSI connectors in option slots. Do not attach SCSI terminators to these connectors. Option SCSI buses do not interface with the internal devices so failure to terminate these connectors has no effect on internal SCSI performance.

### 3.4 Attaching a SCSI Terminator

Figure 3-11 Attaching a Terminator to the System SCSI Connector



WS330087

### **3.5 Connecting the System Unit to a Power Outlet**

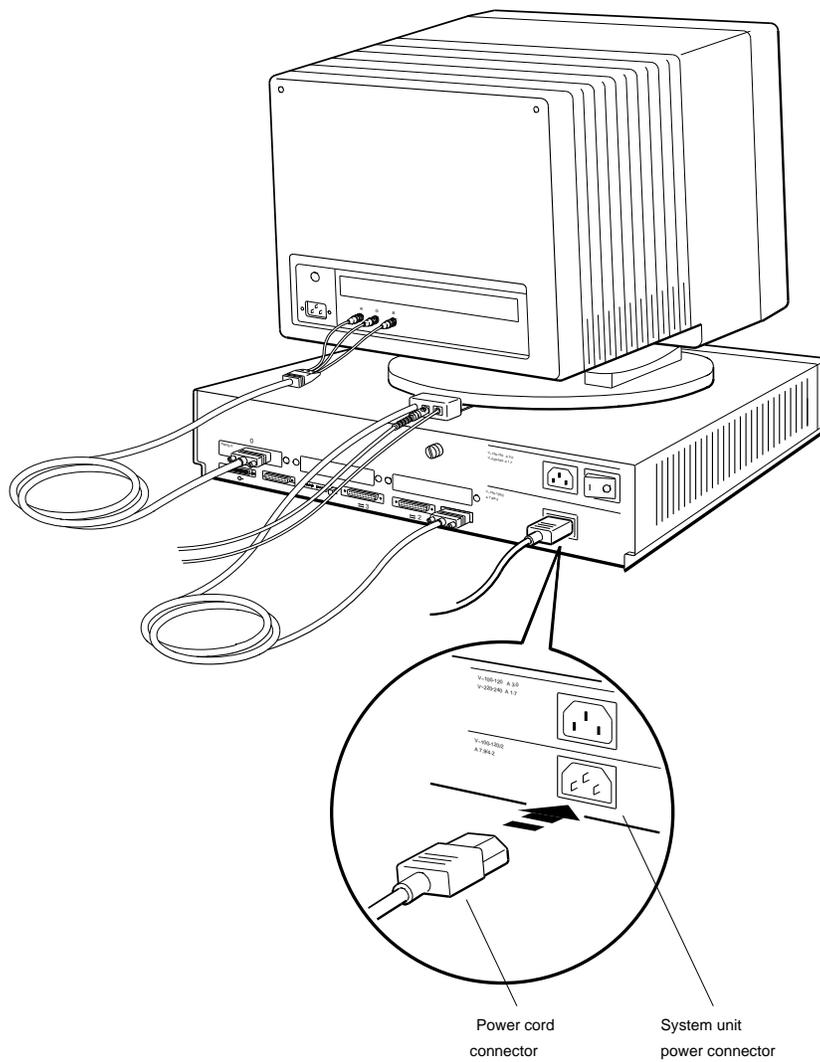
### **3.5 Connecting the System Unit to a Power Outlet**

Follow these instructions to connect the system unit power cables:

1. Plug the connector on the power cord into the system unit power connector on the back of the system unit.
2. Plug the other end of the power cord into a power outlet.

### 3.5 Connecting the System Unit to a Power Outlet

Figure 3-12 Connecting the Power Cord to the System Unit



WS33O113

## 3.6 Connecting the Monitor to a Power Outlet

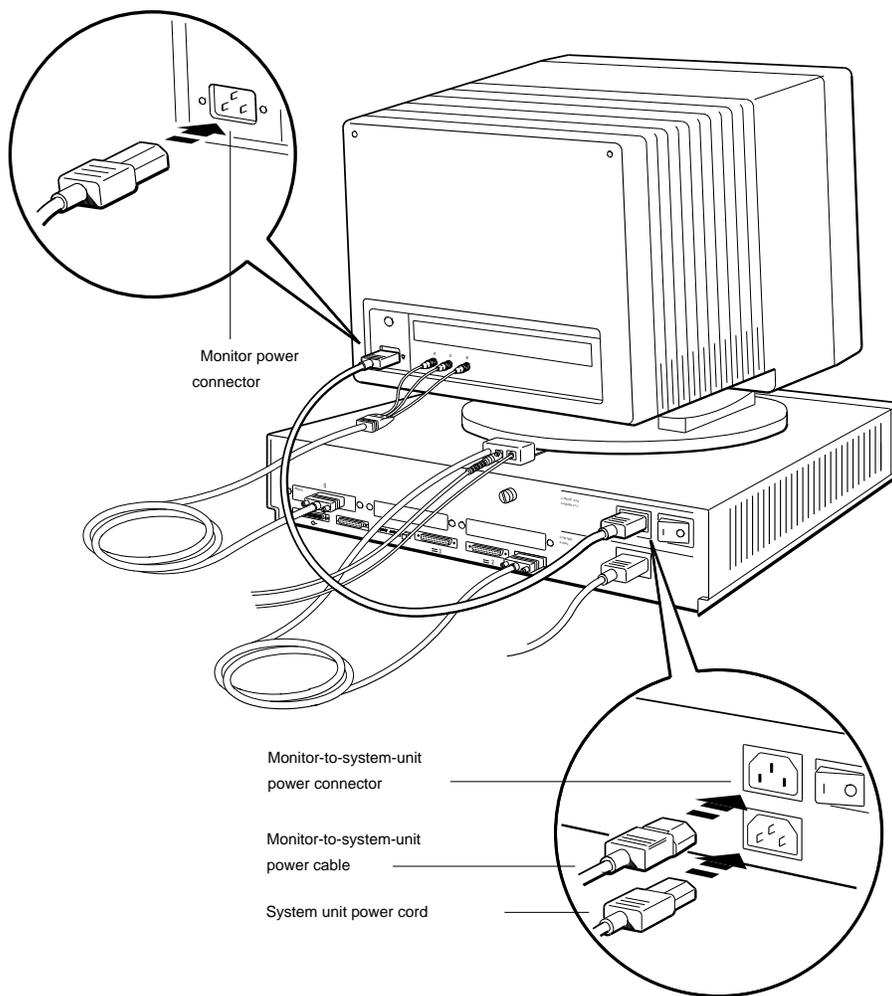
### 3.6 Connecting the Monitor to a Power Outlet

Follow these instructions and refer to Figure 3–13 to connect the monitor to the system unit:

1. Plug the connector on the monitor-to-system-unit power cable into the power connector on the back of the monitor.
2. Plug the other end of the cable into the extra power outlet on the back of the system unit.

### 3.6 Connecting the Monitor to a Power Outlet

Figure 3-13 Connecting the Monitor to the System Unit



WS331001

# 4

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## Starting and Testing Workstation Hardware

This chapter describes the following steps:

- Turning On Your Workstation
- Testing the Workstation
- Stopping the Workstation Without Turning It Off
- Turning Off the Workstation
- Installing Workstation Software

### 4.1 Turning On Your Workstation

Turn on the components of your workstation in the following order:

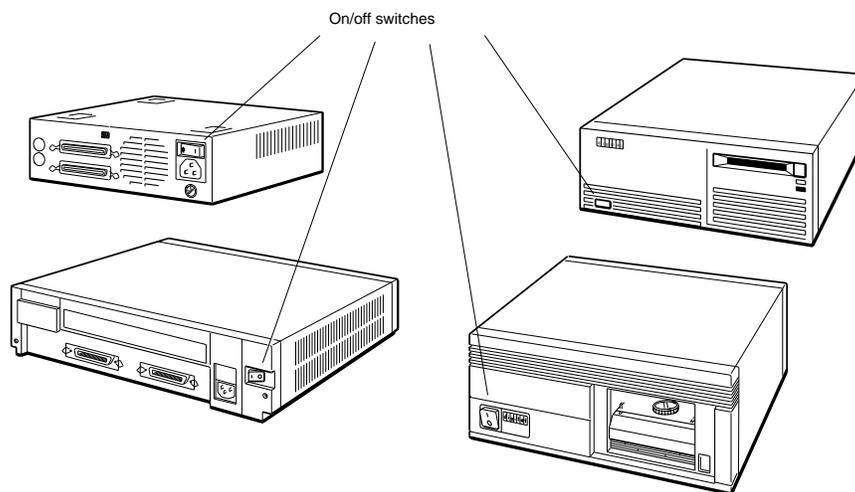
1. External devices
2. Monitor
3. System unit

## 4.1 Turning On Your Workstation

### 4.1.1 Turn On External Devices

1. Turn on each expansion box. Most boxes have rocker switches; some have push switches.
2. Turn on your communications device, if you have one.

**Figure 4–1 Expansion Box On/Off Switches**



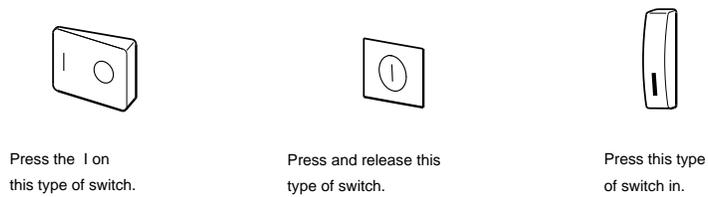
WSE20019

## 4.1 Turning On Your Workstation

### 4.1.2 Turn On the Monitor

Most monitor On/Off switches are rocker switches marked I for on and O for off. Press the I to turn on the power. Some monitors have a push switch instead of a rocker switch. Press the switch in to turn on the power.

**Figure 4–2 Turning on the Monitor**



WSE21142

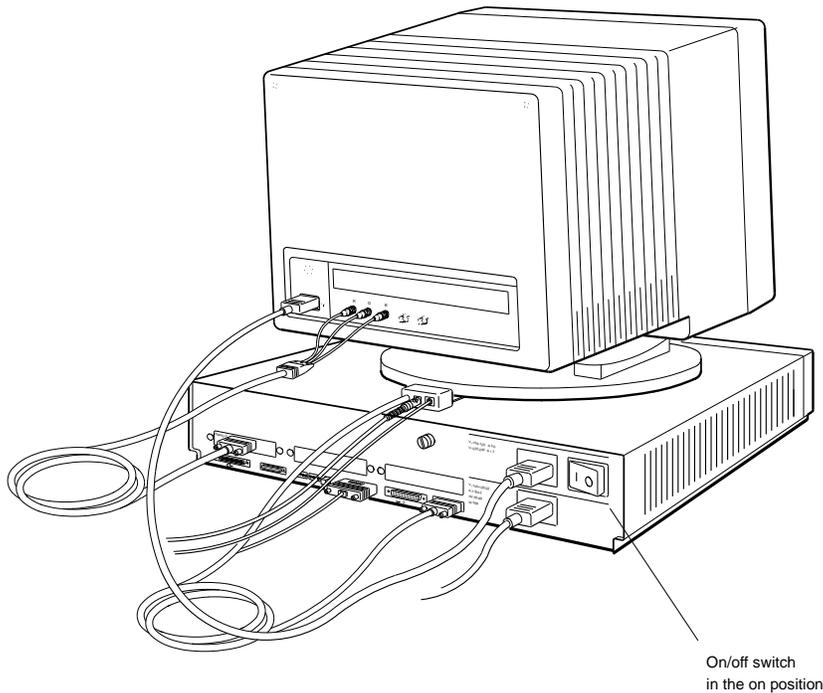
If your monitor receives power from the system unit, the screen remains blank after you turn on the monitor. The system unit must be turned on before the screen can display anything.

## 4.1 Turning On Your Workstation

### 4.1.3 Turn On the System Unit

The system unit On/Off switch is on the back of the system unit. Turn on the system unit by pressing **|** on the On/Off switch.

**Figure 4-3** Turning on the System Unit



WS330037

When the system unit turns on:

- The power indicator light on the front of the system unit glows.
- If the monitor takes power from the system unit, the monitor turns on.
- The system unit runs the automatic power-up self-test. At the bottom of the screen, it displays the names of each subtest that it runs.

## 4.1 Turning On Your Workstation

- If your workstation language has been set, the system unit displays text like the following:

```
KN04 V1.0a
>>
```

If the workstation language has not been set, the system unit displays the following language menu first:

```
1) Dansk                9) Français (Suisse Romande)
2) Deutsch              10) Italiano
3) Deutsch (Schweiz)   11) Nederlands
4) English              12) Norsk
5) English (British/Irish) 13) Português
6) Español              14) Suomi
7) Français            15) Svenska
8) Français (Canadien) 16) Vlaams
```

```
(1..16): _
```

Type the number displayed to the left of the language you want to use. Then press Return.

The console prompt (>>) appears when your language is set.

You can change the workstation language by redisplaying the language menu. Use the `setenv` command (see Section 13.4.14) to set the console environment variable to 0 (zero). The language selection menu will immediately appear, and a new language can be selected.

### 4.1.4 Failure of System Unit to Turn On

If nothing happens when you turn on the system unit, turn it off and check the following:

- Make sure that it is plugged into a live power outlet.
- Determine whether both ends of the power cable are plugged securely into the appropriate connectors.
- If you are using a power strip, make sure it is turned on.
- Determine whether you have pressed the correct On/Off switch.

If the system unit still fails to work, turn to Chapter 14 for troubleshooting instructions.

## 4.2 Testing the Workstation

### 4.2 Testing the Workstation

#### 4.2.1 Run the System Self-Test

Type **test** and press Return to run the system self-test. As the system performs the subtests that make up the self-test, it briefly displays the name of each subtest on the screen. The tests can take 15 minutes or more to run. When all tests have been completed successfully, the system unit displays the console prompt (>>).

#### 4.2.2 If a Self-Test Fails

At the end of the system self-test, error messages that have been generated display above the console prompt (>>). You should also use the **erl** command to look for other messages. Type **erl** at the console prompt and press Return. Chapter 14 explains all the test messages.

#### 4.2.3 Check the Configuration Displays

The configuration test tells you which option modules are in your system unit. It identifies each module in your system unit by slot number and a special option module code.

Use the **cnfg** command to check the workstation configuration (see Section 13.4.4.) Check to be sure that the screen display lists all the modules ordered for your workstation. The packing list for your shipment shows the modules you ordered.

## 4.3 Stopping the Workstation Without Turning It Off

### 4.3 Stopping the Workstation Without Turning It Off

If ULTRIX is your workstation software, you can shut it down by typing **shutdown -h now** at the ULTRIX prompt and pressing Return.

If you are unable to return to console mode using this shutdown command, you can stop your workstation and all workstation software by pressing the halt button on the back of the system unit. The workstation and software stop whatever they were doing, and the monitor displays the console prompt (>>). It may take several seconds after pressing the halt button for your system to respond. Save your work, if you can, before pressing the halt button.

---

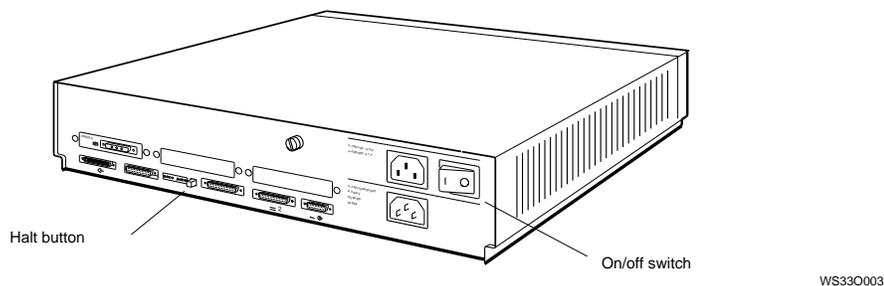
#### Caution

---

Do not press the halt button if your workstation software is running. Doing so can result in the loss or corruption of data.

---

Figure 4-4 Halt Button and System Unit On/Off Switch



The specific result of pressing the halt button is determined by the setting of the haltaction environment variable. (Chapter 13 explains how to set this variable.)

## 4.4 Turning Off the Workstation

### 4.4 Turning Off the Workstation

1. If your workstation software has been installed, follow the instructions that came with that software to shut down the software.
2. Turn off the power.
  - If your workstation takes power from a power strip, turn off the power strip.
  - If your workstation is not on a power strip,
    - Turn off any communications device.
    - Turn off each expansion box.
    - If the monitor receives its power from a separate wall outlet, turn off the monitor.
    - Turn off the system unit.

## 4.5 Installing Workstation Software

The software for your system can be installed by you, or come factory-installed.

If you are installing the software, follow the instructions in the *Guide to Installing ULTRIX*.

If you have factory-installed software, follow these instructions to start the software:

1. At the console prompt (>>) type **setenv boot "3/rz2/vmunix -a"** and press Return.
2. Then type **boot** and press Return.

See the *ULTRIX Guide to Starting the Factory-Installed Software System* for further instructions.

After installing the software, you can start it up in subsequent sessions just by typing **boot** at the console prompt and pressing Return.

You will see some ULTRIX start up messages, and then the log-in screen appears. This is where you type your user name and your password, if you have one. Both your user name and password are given to you by your system manager when you first begin using your workstation.

# 5

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## Moving Your Workstation

This chapter tells you how to disassemble your workstation and pack it for moving.

### 5.1 Dismantling the Workstation

1. If the workstation software is running, type **shutdown -h now** and press Return.
2. Turn off any devices connected to your workstation, such as printers, modems, or external hard disks.
3. Turn off the system unit by pressing the O on the On/Off switch on the back of the system unit.
4. If necessary, turn off the monitor.
  - If the monitor gets its power through the system unit, it will go off when you turn off the system unit.
  - If the monitor is plugged into a wall outlet, press the O on the On/Off switch.
5. Unplug all power cords from their power sources.
6. Disconnect all external devices, including the monitor and the keyboard, from the system unit. If two or more disk drives or other devices are chained together, disconnect them from each other.
7. If the SCSI connector on the back of the system unit contains a terminator, remove the terminator.
8. Disconnect the mouse from the keyboard.
9. If you are on a network, disconnect the Ethernet cable from the system unit. Otherwise, remove the loopback connector.

## 5.2 Packing the Equipment

### 5.2 Packing the Equipment

Pack each piece of equipment in the carton it came in. Use any padding that came in the carton to hold the equipment securely in place.

Be sure to include the following in each carton:

- Any cables, power cords, and terminators that came with that device
- Any documentation that came with that device

# **Part II**

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## **External Additions to Your Workstation**



# 6

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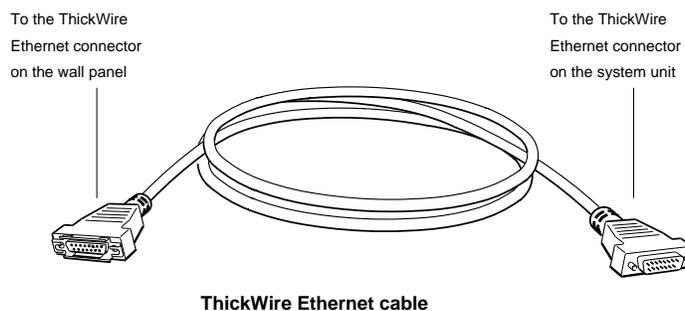
## Connecting Your System to a Network

This chapter describes the following steps:

- Connecting a ThickWire Ethernet Cable
- Connecting a ThinWire Ethernet Cable
- Connecting a Twisted-Pair Ethernet Cable

### 6.1 Connecting a ThickWire Ethernet Cable

Figure 6–1 ThickWire Ethernet Cable

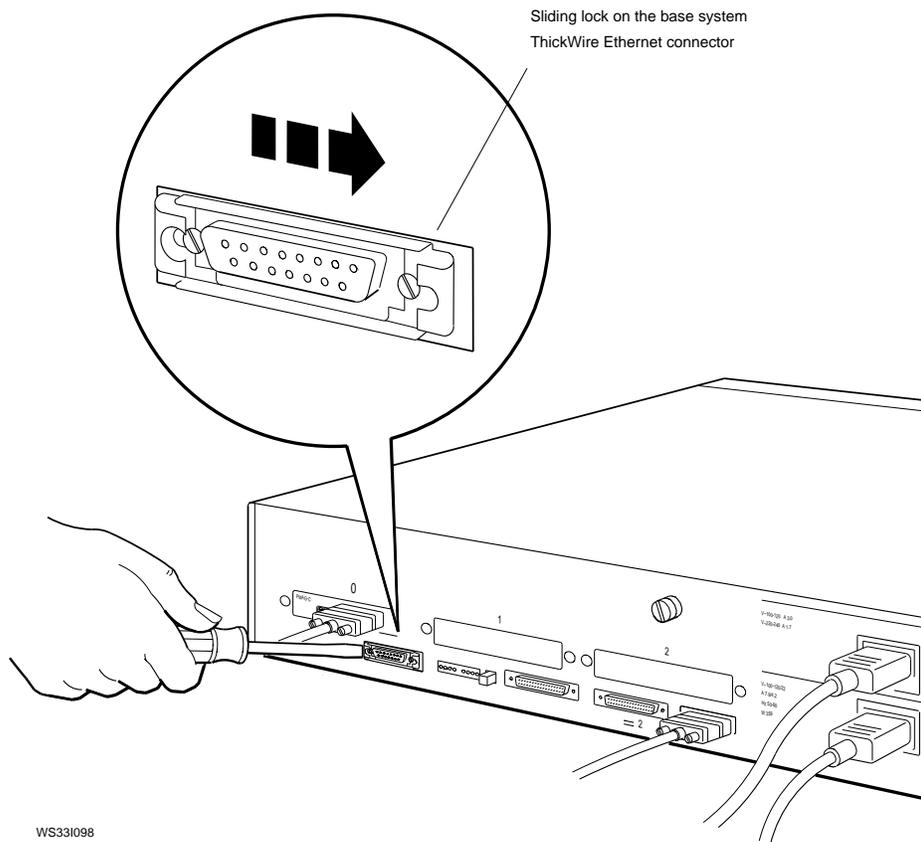


WS331039

## 6.1 Connecting a ThickWire Ethernet Cable

1. Use a simple tool, such as a flat-blade screwdriver, to slide the lock on the base system ThickWire Ethernet connector to the right.

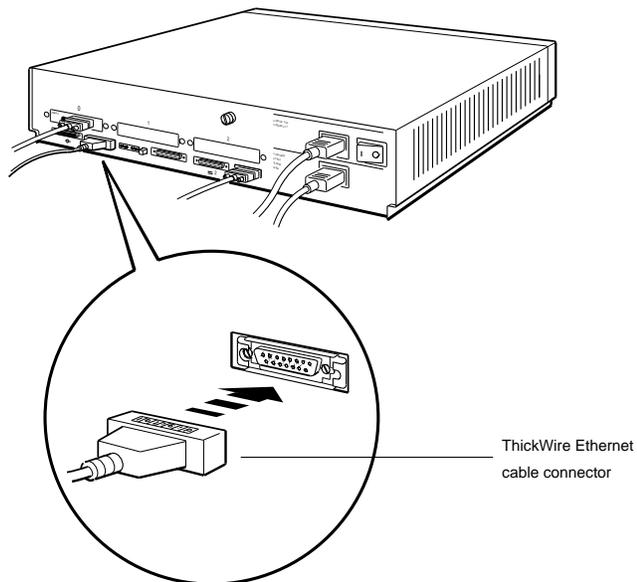
**Figure 6–2 Sliding Lock on ThickWire Ethernet Connector**



## 6.1 Connecting a ThickWire Ethernet Cable

2. Hold the ThickWire Ethernet cable connector so that the widest part is on top and push the connector directly into the base system ThickWire connector.

**Figure 6–3 Attaching the ThickWire Ethernet Cable to the System Unit**

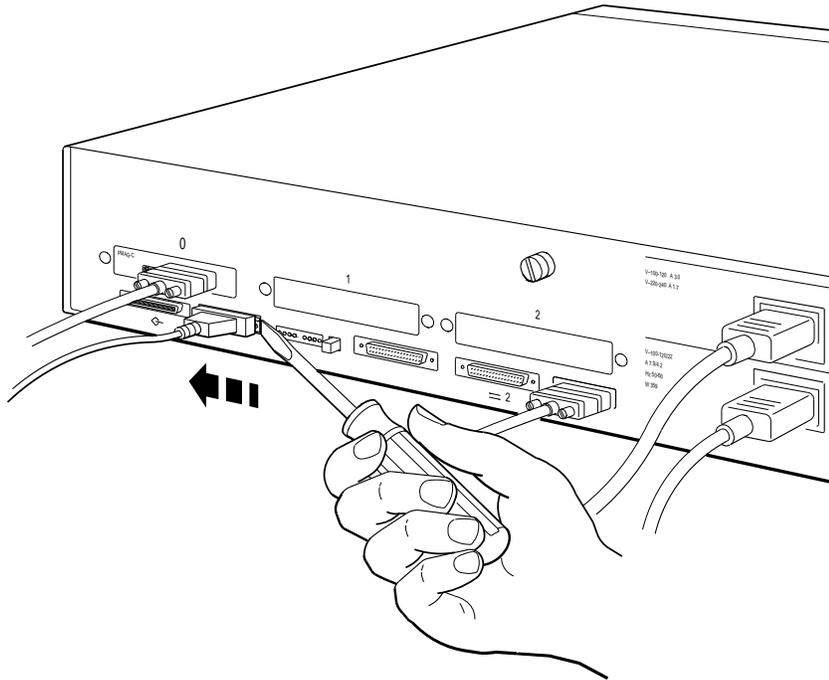


WS331099

## 6.1 Connecting a ThickWire Ethernet Cable

3. Slide the lock on the base system ThickWire Ethernet connector to the left.

**Figure 6–4 Sliding Lock on System Unit ThickWire Ethernet Connector**



WS331100

4. Connect the other end of the ThickWire Ethernet cable to the Ethernet cable coming from the wall.

After you test the workstation, use the config command (see Section 13.4.4) to find the Ethernet station address of your workstation. Give the address to your system manager, and ask the manager to complete the network connection.

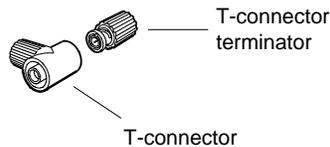
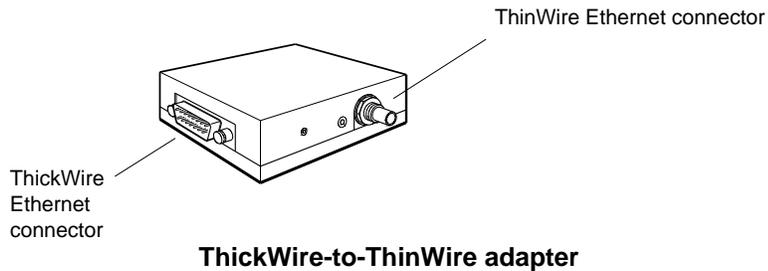
## 6.2 Connecting a ThinWire Ethernet Cable

### 6.2 Connecting a ThinWire Ethernet Cable

Connect the DECstation 5000 Model 150 workstation to the ThinWire Ethernet network cable using the ThickWire-to-ThinWire adapter, as follows:

1. Follow the instructions in Section 6.1 to connect the ThickWire cable to the system unit.
2. Find the ThickWire-to-ThinWire adapter, the T-connector, and the T-connector terminator that you ordered for your workstation.

**Figure 6-5 Parts Used to Connect a ThinWire Network**



**T-connector and terminator**

WS3PO078

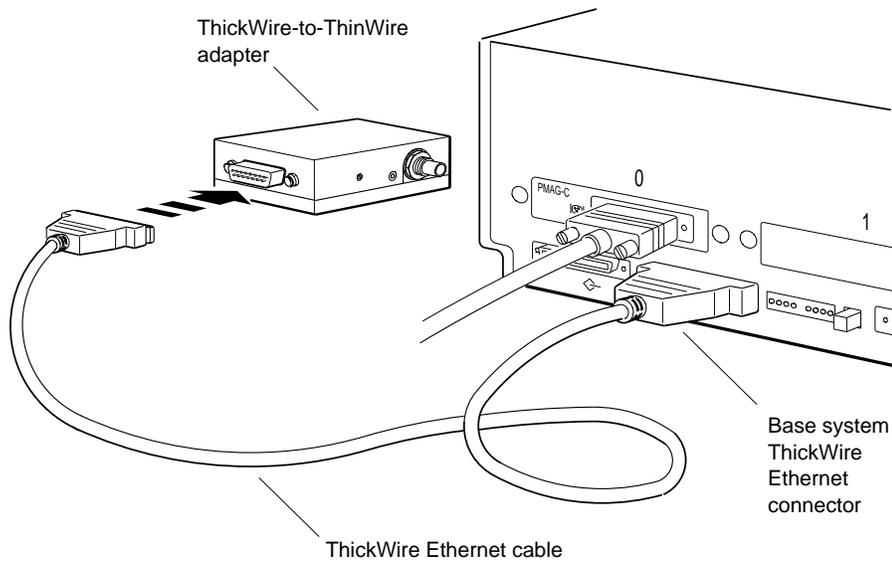
3. Find the connector with the sliding lock on the other end of the ThickWire Ethernet cable you connected to the workstation.

Make sure the sliding lock on the cable connector is in the unlocked position.

## 6.2 Connecting a ThinWire Ethernet Cable

4. Hold the ThickWire-to-ThinWire adapter and the free end of the ThickWire cable so that the connectors match. Push the ThickWire cable connector with the sliding lock onto the ThickWire connector on the adapter.
5. Slide the lock on the cable attached to the adapter to the locked position.

**Figure 6–6 Connecting a ThickWire cable to the ThinWire Adapter**

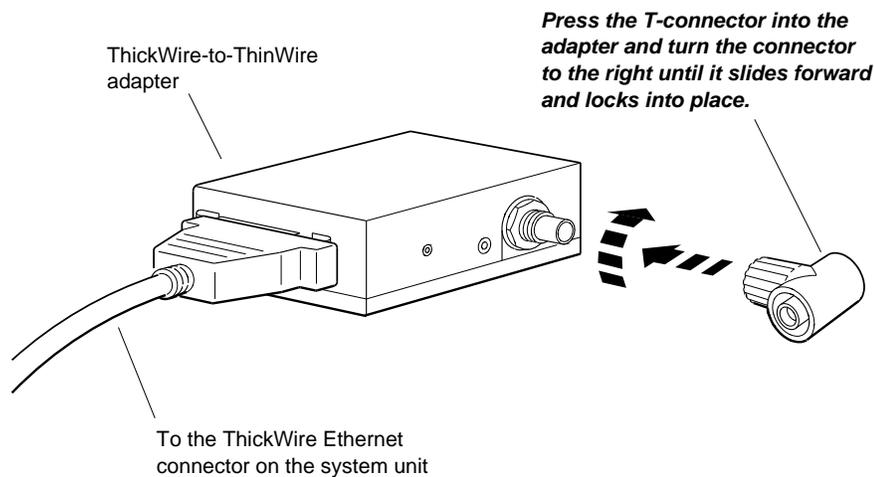


WS3PO089

## 6.2 Connecting a ThinWire Ethernet Cable

6. Attach the T-connector to the ThinWire Ethernet connector on the adapter.

**Figure 6–7 Attaching a T-connector**



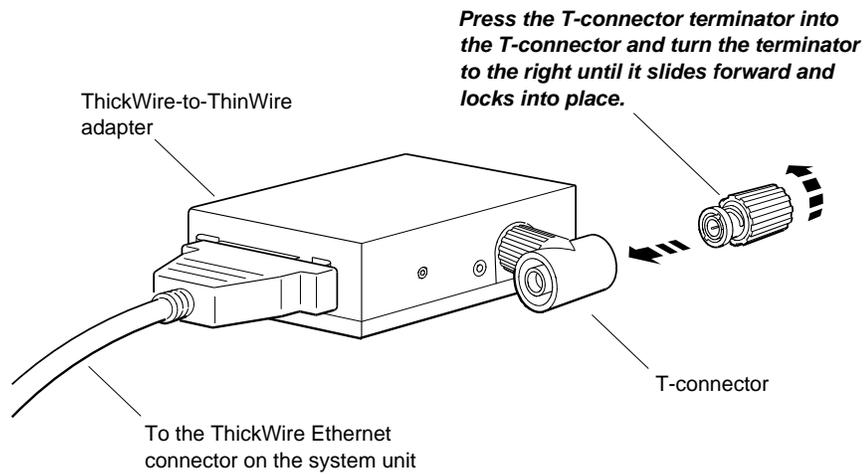
WS3PO074

7. If you are connecting the workstation *within* a network cable segment, leave both ends of the T-connector free to attach your in-house network cables.

If you are connecting the workstation at the end of a network cable segment, attach a T-connector terminator to the open end of the T-connector on the adapter.

## 6.2 Connecting a ThinWire Ethernet Cable

Figure 6-8 Attaching a T-connector Terminator



WS3PO093

8. Put an Ethernet loopback connector on any unused Ethernet connectors in the TURBOchannel slots.

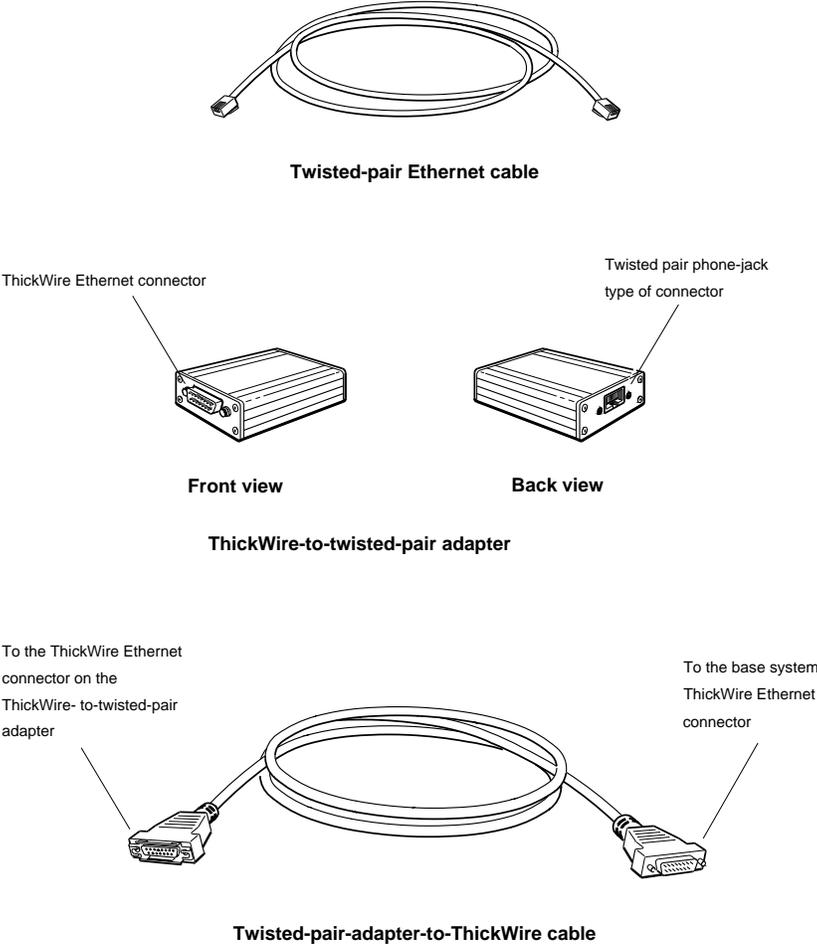
After you test the workstation, use the config command (see Section 13.4.4) to find the Ethernet station address of your workstation. Give the address to your system manager, and ask the manager to complete the network connection.

### 6.3 Connecting a Twisted-Pair Ethernet Cable

## 6.3 Connecting a Twisted-Pair Ethernet Cable

Figure 6-9 shows the Twisted-Pair Ethernet cables and adapter.

Figure 6-9 Twisted-Pair Ethernet Cables and Adapter

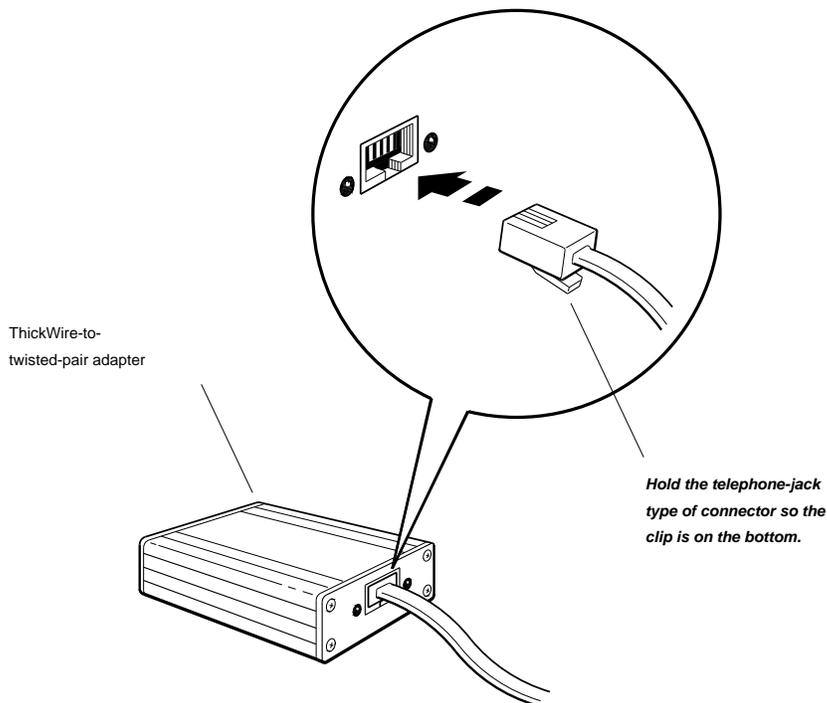


WS331048

### 6.3 Connecting a Twisted-Pair Ethernet Cable

1. Plug one end of the twisted-pair Ethernet cable into the twisted-pair phone-jack type of connector on the ThickWire-to-twisted-pair adapter. Plug the other end of the twisted-pair Ethernet cable into the phone-jack type of connector on the wall panel.

**Figure 6–10 Attaching the Twisted-pair Ethernet Cable to the Adapter**

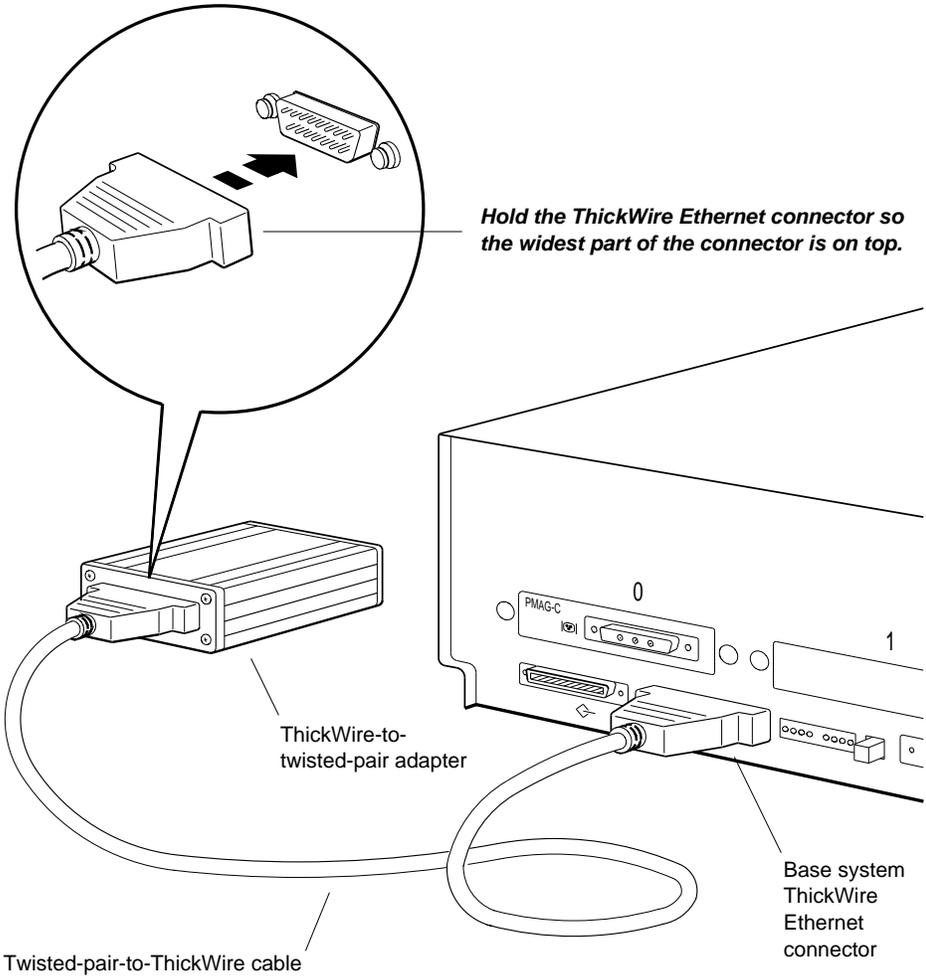


WS331065

2. Plug the ThickWire connector on the twisted-pair-adapter-to-ThickWire cable into the base system ThickWire Ethernet connector.
3. Plug the other end of the ThickWire connector on the twisted-pair-adapter-to-ThickWire cable into the ThickWire Ethernet connector on the ThickWire-to-twisted-pair adapter.

### 6.3 Connecting a Twisted-Pair Ethernet Cable

Figure 6–11 Attaching the ThickWire Ethernet Cable to the Adapter and System Unit



WS331064

After you test the workstation, use the config command (see Section 13.4.4) to find the Ethernet station address of your workstation. Give the address to your system manager, and ask the manager to complete the network connection.



---

## Connecting External Options

This chapter describes the following steps:

- Setting Up Storage Expansion Boxes and Cables
- Connecting the Expansion Box to the System Unit
- Connecting to One Expansion Box
- Connecting to Multiple Expansion Boxes
- Connecting Communication Devices

### 7.1 Setting Up Storage Expansion Boxes and Cables

Some storage expansion boxes, such as a tape drive box or a floppy disk drive box have only one drive inside. The BA42 expansion box can have up to two drives preinstalled at the factory. For a list of those types of drives, see the *BA42 Storage Expansion Box Installation Guide*.

You install SCSI devices, such as storage expansion boxes, in chains, connecting each chain of devices to a separate SCSI connector on the system unit: one chain to the base system SCSI connector and a chain to each of the three connectors you may have in TURBOchannel option slots 0, 1, and 2.

Arrange the storage expansion boxes and cables as follows:

1. Set up your expansion boxes so that the drives inside them are distributed evenly among the SCSI connectors on the system unit.

For example, if you have seven drives and two SCSI connectors, plan to install four drives on one connector and three drives on the other connector. If your workstation has internal drives, count them as drives connected to the base system SCSI connector.

2. Lay out your expansion box cables.

## 7.1 Setting Up Storage Expansion Boxes and Cables

Use Table 7–1 to compute the total cable length for each chain. If any chain length exceeds 236 inches (6 meters), put some of the devices on another chain or check the possibility of shorter cables.

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### Caution

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If the chain length on one SCSI connector exceeds 236 inches (6 meters), the drives attached to that connector will be unreliable.

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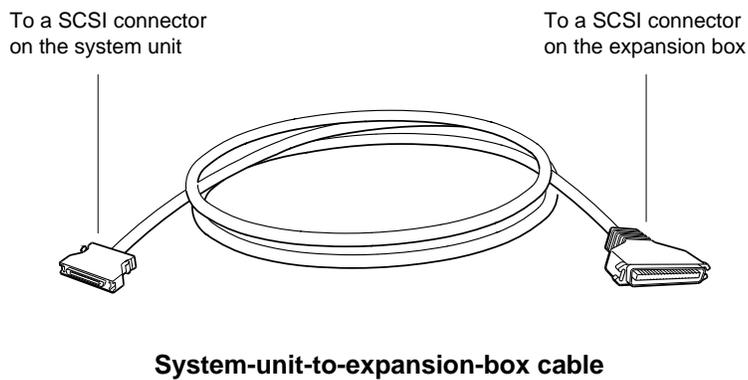
**Table 7–1 Expansion Box Cables**

| Cable   | Length                           |
|---|----------------------------------|
| Internal cable for the base system SCSI connector | 52 inches<br>(132.1 centimeters) |
| BA42 (SZ12) expansion box internal cable          | 31 inches<br>(78.7 centimeters)  |
| BA40 expansion box internal cable                 |                                  |
| - For TK50Z tape/drive                            | 14 inches<br>(35.6 centimeters)  |
| - For RRD42 optical compact disk drive            | 2.5 inches<br>(6.4 centimeters)  |
| - For TLZ04 tape drive                            | 38 inches<br>(96.5 centimeters)  |
| Box-to-box expansion cable                        | 26 inches<br>(66.0 centimeters)  |
| System-unit-to-expansion-box cable                | 74 inches<br>(188.0 centimeters) |
| TZK08 tape drive external butterfly cable         | 10 inches<br>(25.4 centimeters)  |

## 7.2 Connecting the Expansion Box to the System Unit

### 7.2 Connecting the Expansion Box to the System Unit

Figure 7-1 System-Unit-to-Expansion-Box Cable

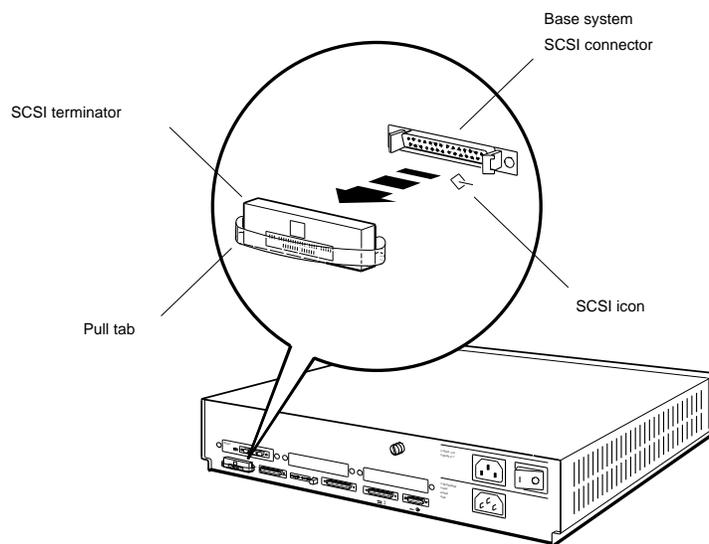


WS331046

1. Remove the SCSI terminator from the base system SCSI connector if you previously terminated the connector. (See Figure 7-2.)

## 7.2 Connecting the Expansion Box to the System Unit

Figure 7-2 Removing the SCSI Terminator

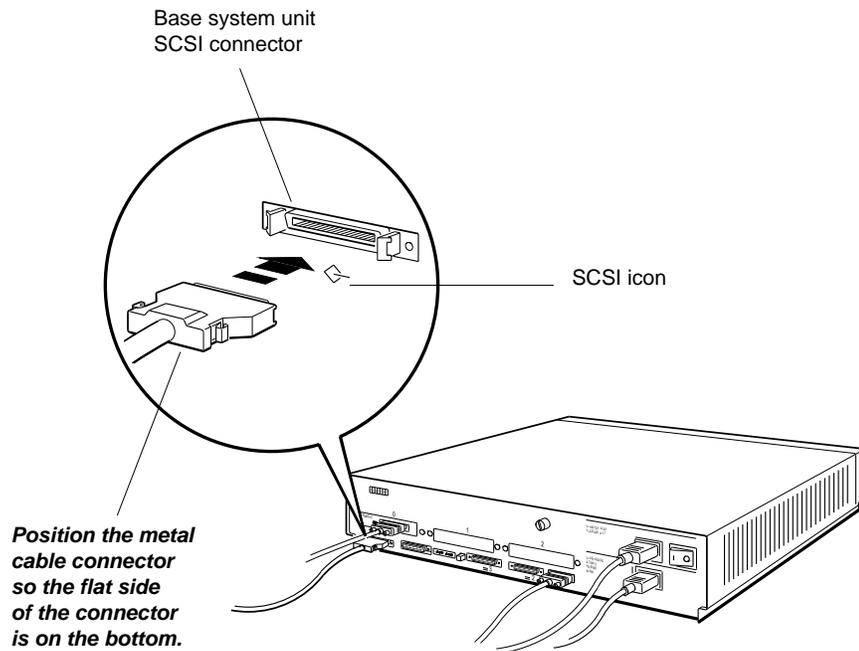


WS331094

## 7.2 Connecting the Expansion Box to the System Unit

2. Connect the system-unit-to-expansion-box cable to the base system SCSI connector on the system unit.

**Figure 7-3 Connecting the System-Unit-to-Expansion-Box Cable to the System Unit**



WS331049

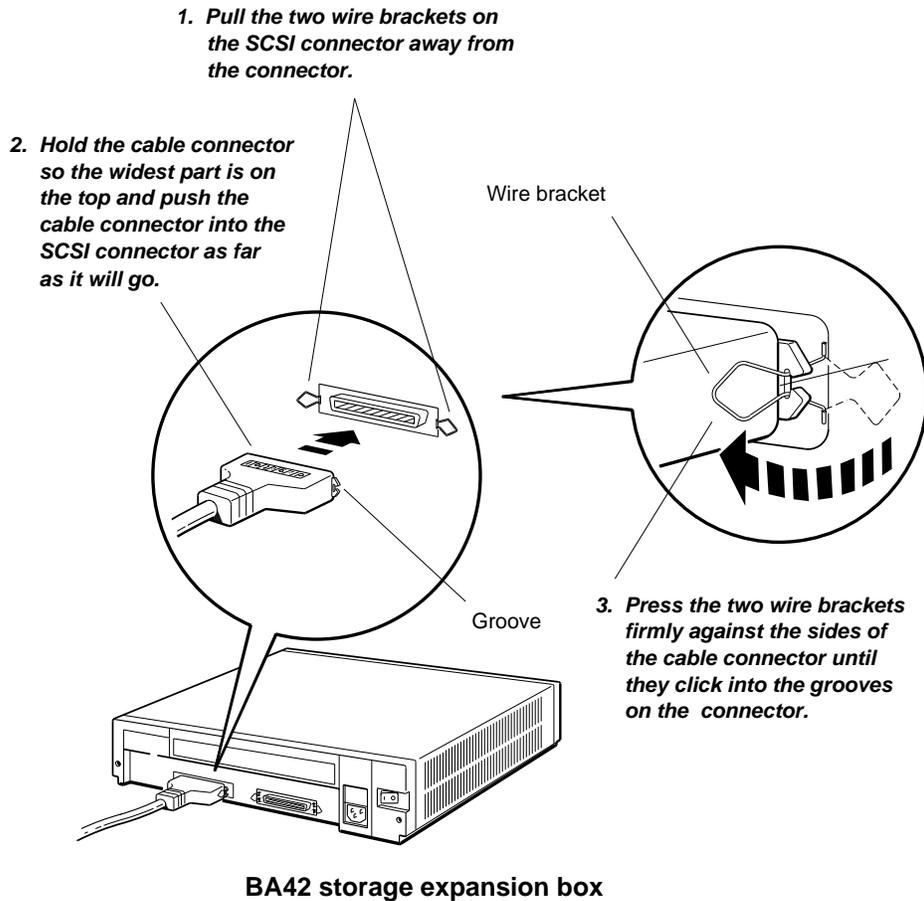
### **7.3 Connecting to One Expansion Box**

### **7.3 Connecting to One Expansion Box**

1. Connect the appropriate end of the system-unit-to-expansion-box cable to one of the SCSI connectors on the back of the expansion box.

## 7.3 Connecting to One Expansion Box

**Figure 7-4 Connecting the System-Unit-to-Expansion-Box Cable to the Expansion Box**

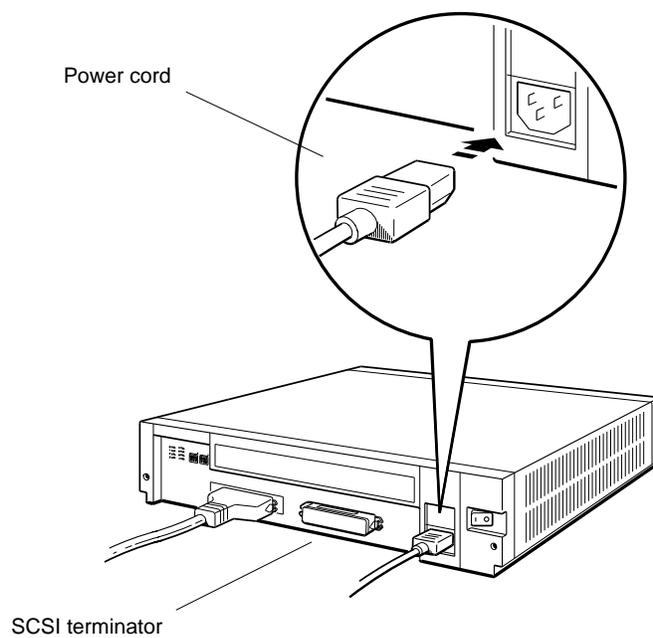


WS331053

### 7.3 Connecting to One Expansion Box

2. Put an expansion box SCSI terminator on the empty SCSI connector on the expansion box. The location of the SCSI connector is shown in Figure 7-5
3. Connect a power cord to the expansion box and to a power outlet.

**Figure 7-5 Connecting the Expansion Box Power Cord**



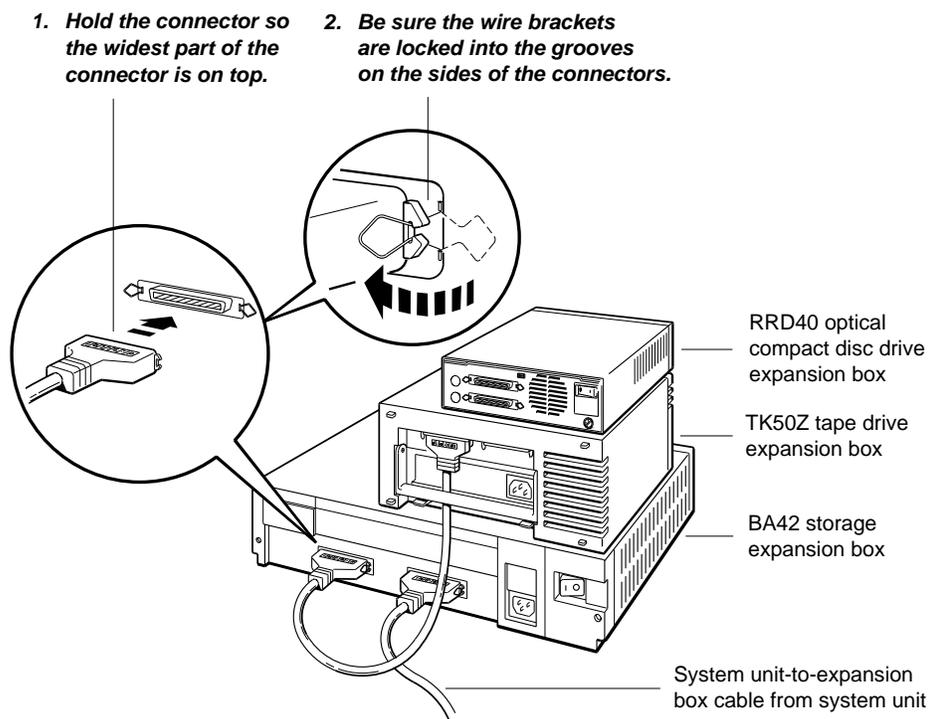
WS331097

## 7.4 Connecting to Multiple Expansion Boxes

### 7.4 Connecting to Multiple Expansion Boxes

1. Connect the system-unit-to-expansion-box cable to one of the SCSI connectors on the back of the first box.
2. Connect a SCSI box-to-box expansion cable to the other SCSI connector on the first box and connect the other end of the cable to one of the SCSI connectors on the second box.

Figure 7-6 Connecting Multiple Expansion Boxes

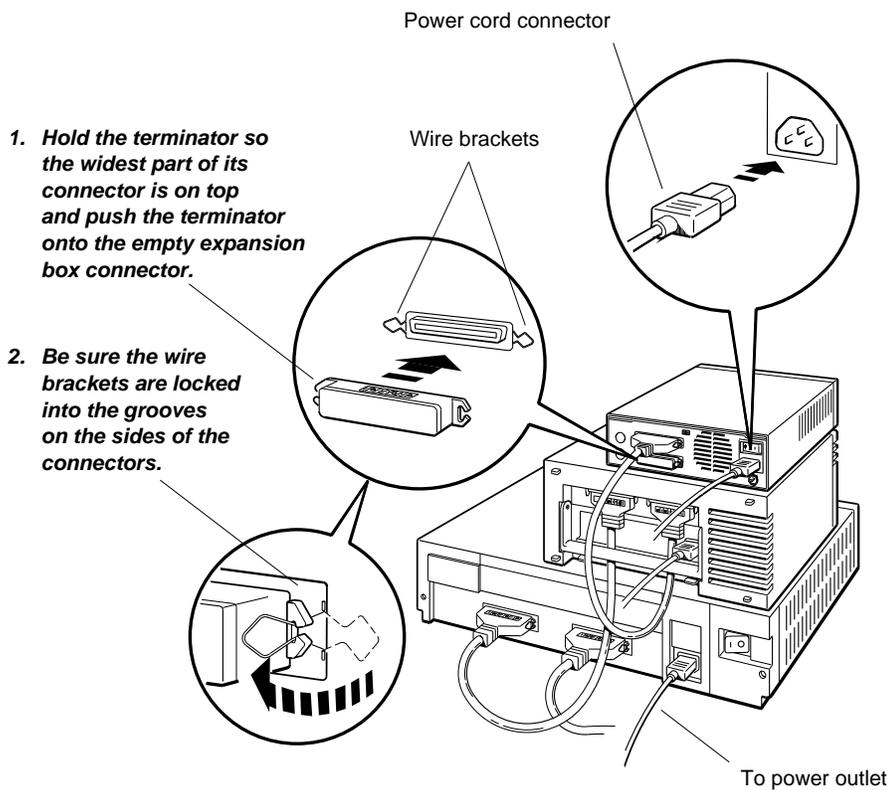


WS331083

## 7.4 Connecting to Multiple Expansion Boxes

3. Connect each of the remaining boxes with SCSI box-to-box expansion cables as described in step 2.
4. Put an expansion box SCSI terminator on the unused SCSI connector on the last box as shown in Figure 7-7.
5. Connect power cables to the boxes and to power outlets.

**Figure 7-7 Attaching the SCSI Terminator to the Last Expansion Box**



WS331084

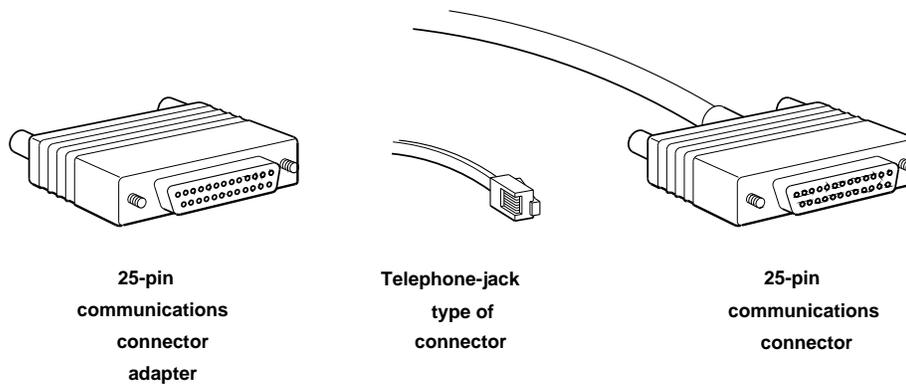
## 7.5 Connecting Communication Devices

### 7.5 Connecting Communication Devices

Communication devices, such as printers, modems, and plotters, connect to your system unit by means of one of these types of connectors:

- A 25-pin communications connector, which attaches directly to the communications connector on the system unit.
- A telephone-jack type connector (MMJ, modified modular jack), which requires a 25-pin communications connector adapter to connect it to the system unit.

**Figure 7–8 Communication Device Adapter and Connectors**



WS331061

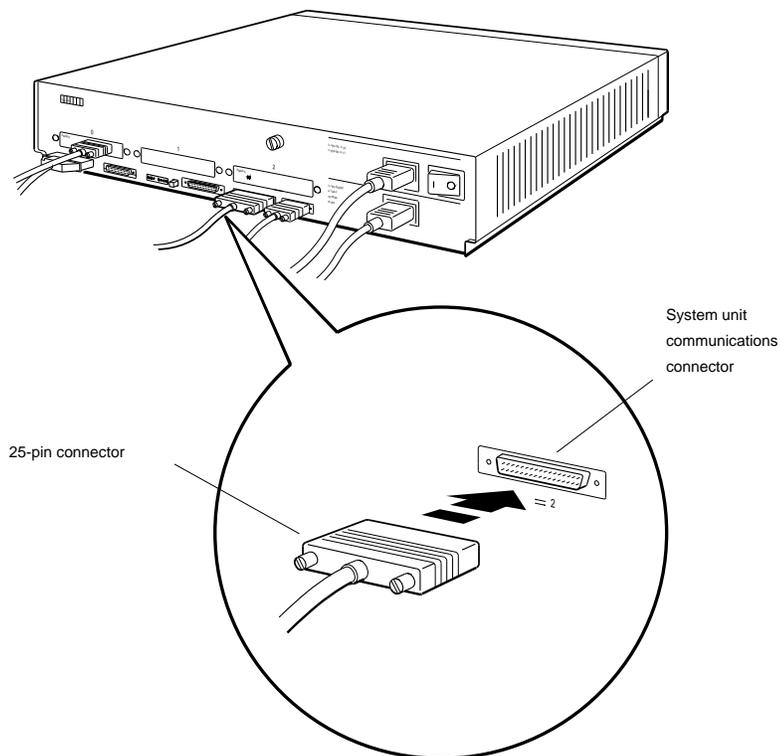
#### 7.5.1 To Connect a Device with a 25-Pin Connector

1. Prepare your printer, plotter, or modem according to the instructions that came with the device:
  - Set the proper baud rate, if necessary, and other controls.
  - Set up the device and attach its cable and power cord.

## 7.5 Connecting Communication Devices

2. Connect the free end of the device cable to the communications connector on the back of the system unit:
  - a. Align the widest part of the cable connector with the widest part of the connector on the system unit.
  - b. Press the cable connector all the way into the system unit connector.

**Figure 7-9 Connecting a 25-pin Connector**



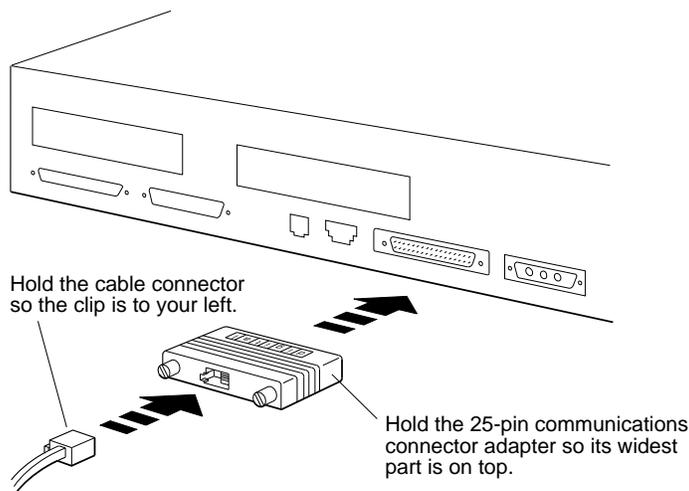
WS331008

## 7.5 Connecting Communication Devices

### 7.5.2 To Connect a Device with a Telephone-Jack Type of Connector

1. Find the communications connector adapter that came with your workstation. Hold it so that the widest part of the 25-pin connector is on top.
2. Press the adapter connector all the way into the communications connector on the system unit and tighten the screws until they hold the adapter firmly in place.
3. Hold the jack connector on your device cable so that the clip is on your left, and push the jack connector into the connector on the adapter until the jack clicks into place.

**Figure 7-10** Using an Adapter to Connect a Communications Device to the System Unit



WSMXS044

If your printer, plotter, or modem fails to work, see the troubleshooting instructions in Chapter 14, or ask your system manager for help.



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## The Server Configuration

The DECstation 5000 Model 150 can be configured as either a workstation or a server. (A server is used to provide other client systems in a network with distributed services such as filing, computation, and printing.)

This chapter explains how to use a terminal or the workstation monitor as the system console.

### 8.1 Installing a Terminal as an Alternate System Console

The system console displays error messages and other system messages from the workstation, from networks, and from the worksystem software. You also use the system console to enter console commands, such as the `cnfg` command.

You generally use your workstation monitor in console mode as the system console. If a monitor is not available, you can use a terminal as an alternate system console. A terminal can display text only; it cannot display illustrations, DECwindows, or DECwindows applications; therefore, you cannot use a terminal as a standard workstation monitor.

Some users prefer to connect both a monitor and a terminal to their worksystems. In console mode, with both a monitor and a terminal configured, the monitor screen displays graphics tests while the terminal screen displays other tests and text input. (See Section 13.4.14 for information on selecting the system console.)

The following instructions describe how to install a terminal and keyboard as a system console.

Contact your Digital service representative if you have questions about using a terminal.

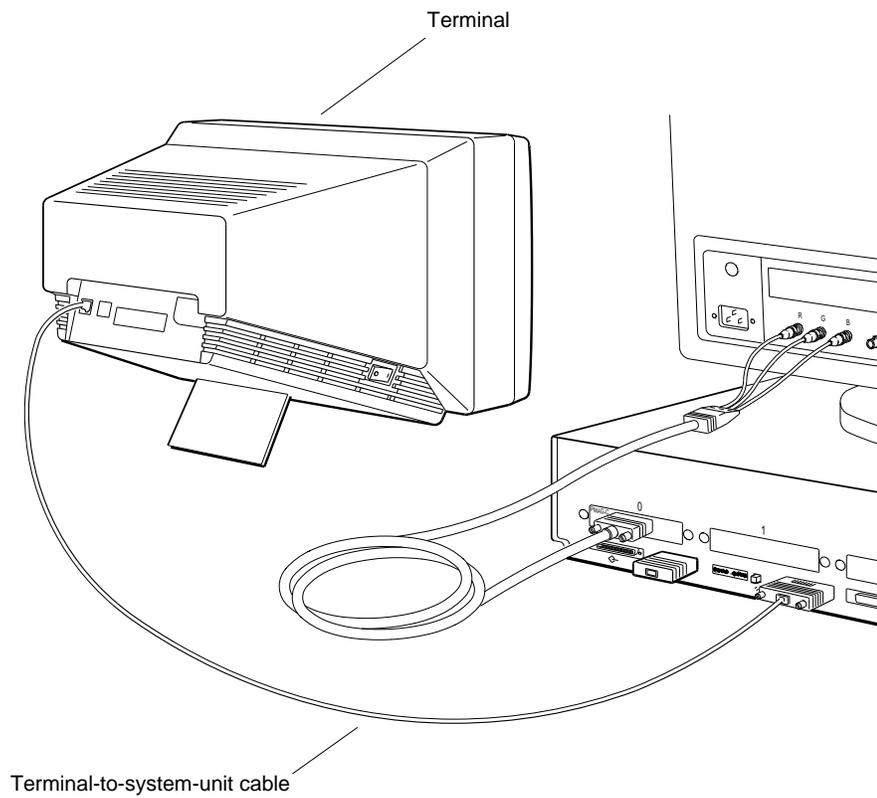
## 8.1 Installing a Terminal as an Alternate System Console

### 8.1.1 To Install a Terminal as a System Console

1. Follow the instructions that came with your worksystem software to shut down the software.
2. Turn off the system unit by pressing the O on the On/Off switch on the back of the system unit.
3. Plug a communications connector adapter into one of the serial communications connectors on the system unit (communications port 3 is preferred).
4. Find the terminal-to-system-unit cable that came with your terminal. Notice that it has telephone-jack-type connectors on both ends.  
Plug one end of the terminal-to-system-unit cable into the communications connector adapter (see Figure 8–1).
5. Plug the other end of the terminal-to-system-unit cable into the modular connector on the back of the terminal.

## 8.1 Installing a Terminal as an Alternate System Console

Figure 8–1 Connecting a VT320 Terminal to the System Unit



WS3PO056

## 8.1 Installing a Terminal as an Alternate System Console

6. Find the coiled keyboard cable that came with your terminal. Notice that it has telephone-jack-type connectors at both ends, and that one end has a keyboard icon.

Plug the end of the keyboard cable with the keyboard icon into the connector on the side of the terminal.

7. Plug the other end of the keyboard cable into the modular connector on the end of the terminal keyboard.
8. Connect a power cord to the terminal and to a power outlet.
9. Turn on the terminal and the system unit and wait for the system self-test to finish before proceeding. The workstation monitor, rather than the terminal, is still acting as the system console at this point.

### 8.1.2 To Activate the Terminal as the System Console

You must set the console environment variable to `s` to make the terminal your system console. The operating system will then be under the control of the terminal each time you boot the system, until you change the console environment variable again.

If you are using a terminal and have no graphics monitor, you need not set the variable to `s` because the system will default to the terminal.

1. Follow the instructions that came with your worksystem software to shut down the software.
2. To activate the terminal as the system console, type **setenv console s** at the workstation monitor console prompt and press Return.

## 8.1 Installing a Terminal as an Alternate System Console

### 8.1.3 To Make Your Workstation Monitor the System Console

The workstation monitor is the system console by default. If you have set the console environment variable to `s`, your terminal is currently the system console. To make your monitor the system console again,

1. Follow the instructions that came with your worksystem software to shut down the software.
2. Type **setenv console \*** at the console prompt on the terminal and press Return.
3. Turn off the terminal if you are using the monitor as the system console. (You need not turn off the terminal in console mode and turn it on again to boot ULTRIX.)



# **Part III**

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## **Internal Additions to Your Workstation**



# 9

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## Opening and Closing the System Unit

This chapter covers the following topics:

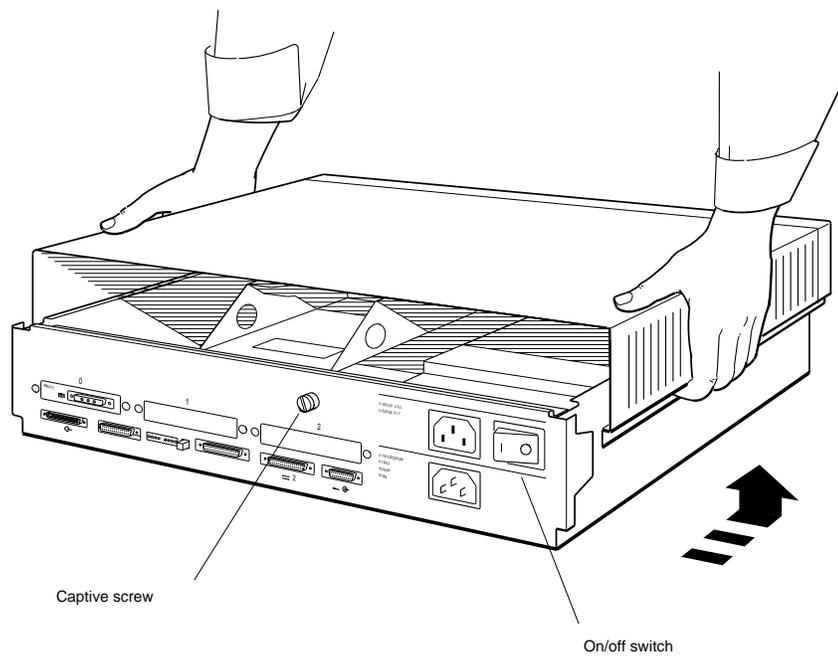
- Removing the System Unit Cover
- Attaching the Antistatic Wrist Strap
- Removing the Front Drive Panel
- Replacing the Front Drive Panel
- Replacing the System Unit Cover

### 9.1 Removing the System Unit Cover

1. Follow the instructions that came with your workstation software to shut down the software.
2. Turn off the system unit off by pressing O on the On/Off switch on the back of the system unit.
3. Remove the system unit cover. Using a medium Phillips screwdriver, loosen the cover-release screw on the back of the system unit. This is a captive screw; it can be loosened but not removed.
4. Grasp each side of the cover with your hands, and pull the cover toward the front, about 2 inches (5.5 cm). Then pull up, as shown in Figure 9–1.

## 9.1 Removing the System Unit Cover

Figure 9-1 Removing the Cover From the System Unit



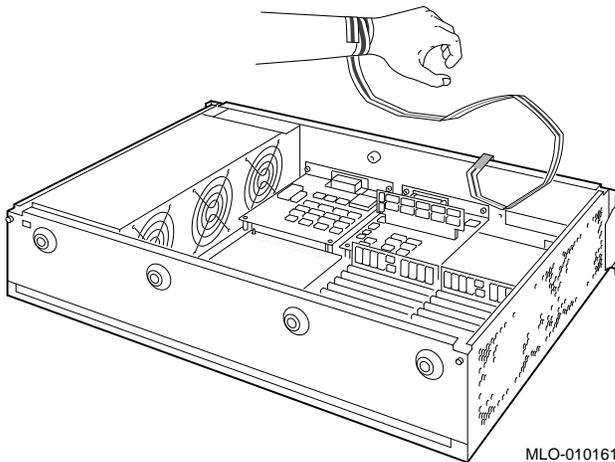
WS33O102

## 9.2 Attaching the Antistatic Wrist Strap

### 9.2 Attaching the Antistatic Wrist Strap

Follow these instructions to attach the antistatic wrist strap that came in the workstation accessories kit.

**Figure 9–2 Using an Antistatic Wrist Strap**



MLO-010161

1. Unwrap the first section of the antistatic wrist strap and wrap the adhesive side firmly around your wrist.
2. Peel the liner from the copper foil at the opposite end and attach the copper foil to the metal frame that encloses the unit.

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#### Caution

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Always use the antistatic wrist strap when working inside the system unit or handling items stored in antistatic bags. Failure to use the antistatic wrist strap can result in damage to equipment.

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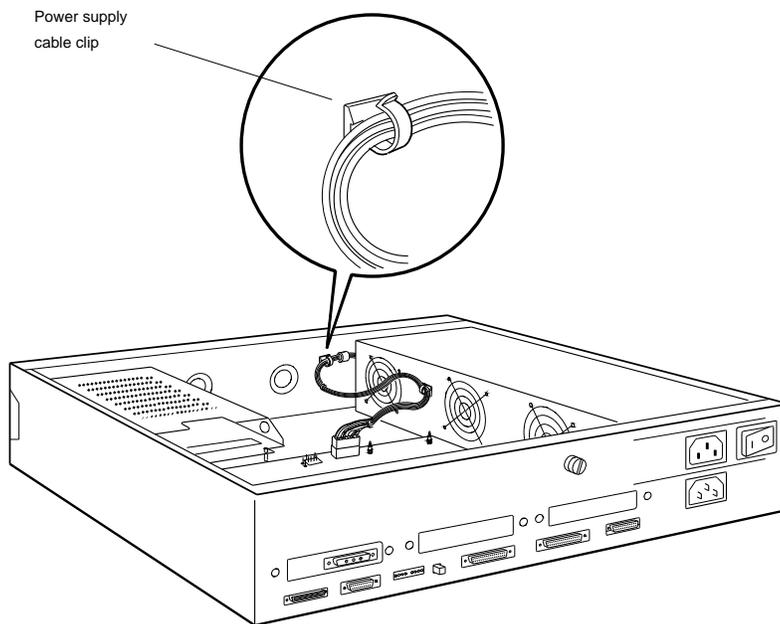
### 9.3 Removing the Front Drive Panel

### 9.3 Removing the Front Drive Panel

Follow these steps to remove the front drive panel:

1. Unhook the power supply cable from the white loop on the inside of the front drive panel, as shown in Figure 9-3.

**Figure 9-3 Inside the System Unit**



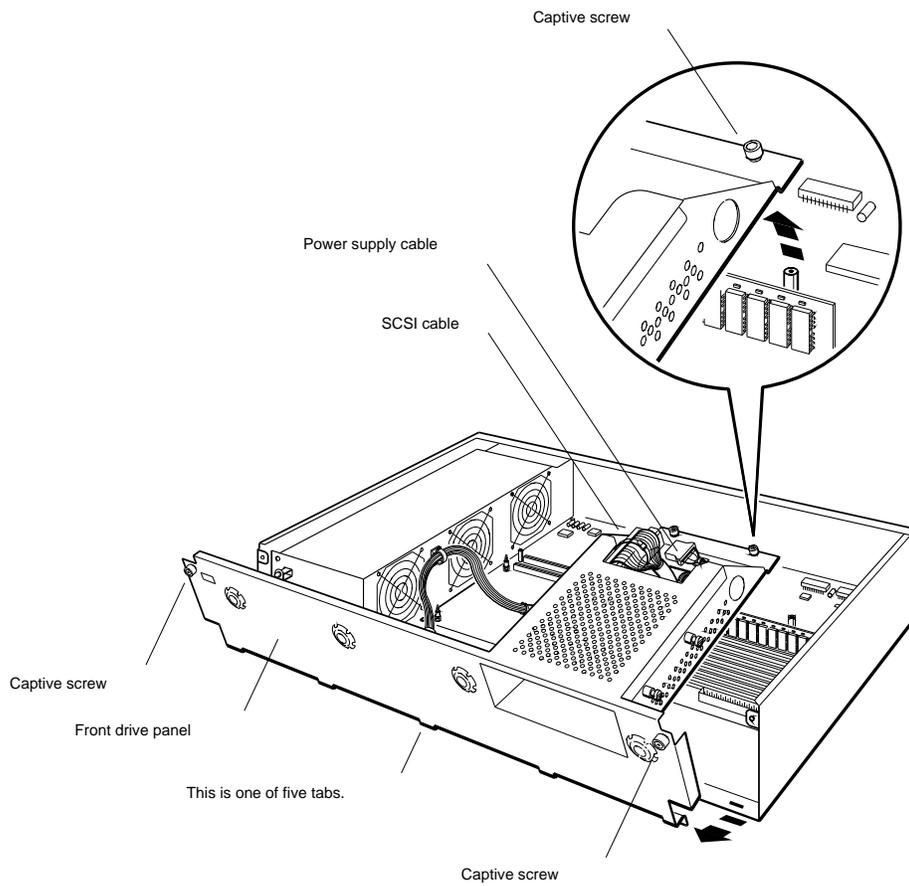
WS330101

2. Loosen the two screws on the end of the drive bracket. They are captive screws and cannot be removed.
3. Loosen the two captive screws that hold the front drive panel on the system unit.
4. Pull up carefully on the end of the drive bracket, as shown in Figure 9-4. As you raise the end of the bracket, be sure not to damage any SCSI and power supply cables that pass through the cutout in the end of the bracket.

### 9.3 Removing the Front Drive Panel

Set the front drive panel aside. Handle it carefully if a drive is in the bracket.

Figure 9-4 Removing the Front Drive Panel



WS330107

## 9.4 Replacing the Front Drive Panel

### 9.4 Replacing the Front Drive Panel

Follow these instructions to replace the front drive panel:

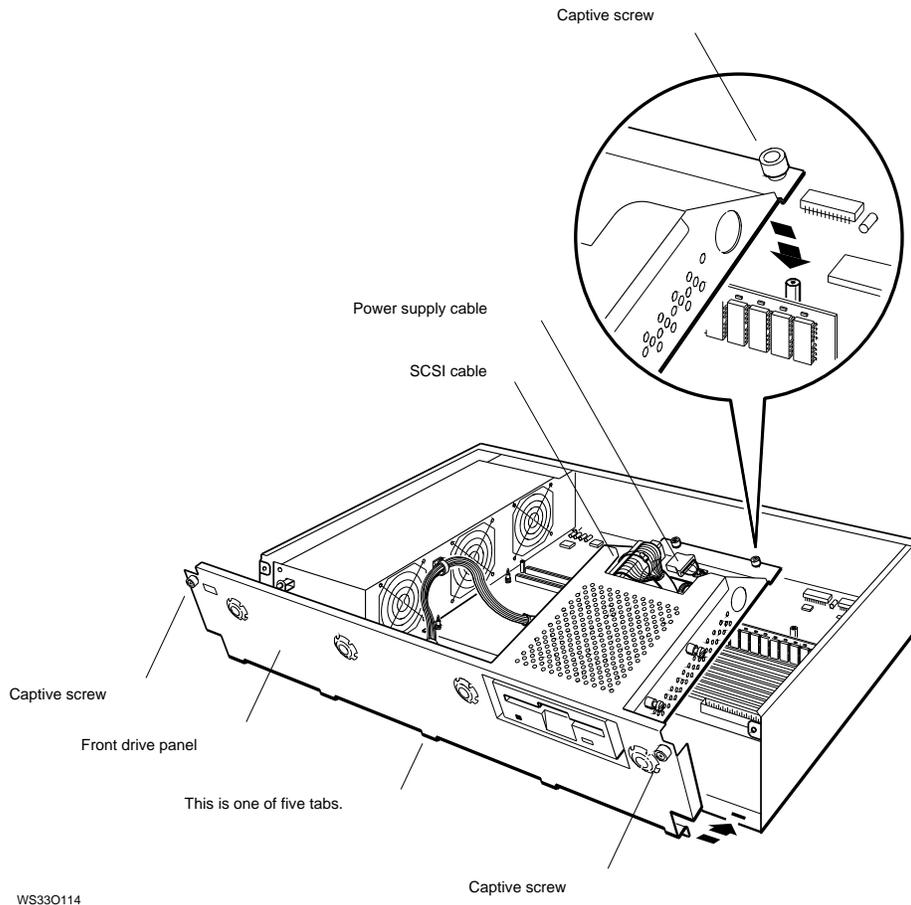
1. Insert the tabs on the front drive panel into the cutouts on the system unit and tilt the panel halfway down into the system unit.
2. If you disconnected cables from a drive in the drive bracket, hold the panel while you pass the loose ends of the cables through the large cutout in the end of the drive bracket. Plug the ends of the cables into the connectors on the drive.

If there is no drive in the drive bracket, pass the cables through the large cutout and tuck the ends of the cables into the bracket.

3. Carefully lower the end of the bracket onto the two posts that support it.  
If you cannot seat the drive bracket on the two posts, lift the end of the bracket and rearrange the cables. Then lower the bracket again.

## 9.4 Replacing the Front Drive Panel

Figure 9-5 Replacing the Front Drive Panel



4. Tighten the two captive screws on the end of the bracket until they are tight.
5. Tighten the two captive screws that hold the front drive panel on the system unit.
6. Remove the antistatic wrist strap from your wrist and from the system unit.

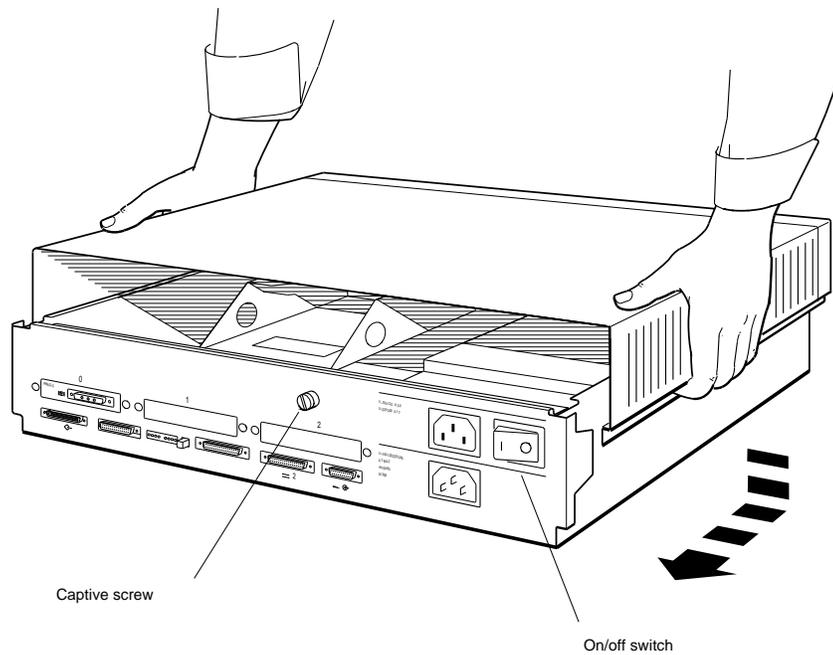
## 9.5 Replacing the System Unit Cover

### 9.5 Replacing the System Unit Cover

Follow these instructions to replace the system unit cover:

1. Position the cover slightly above the system unit about 2 inches (5.5 cm) from the back of the unit.
2. Rest the cover on the system unit. Then slide it all the way to the back of the unit, as shown in Figure 9–6.
3. Press the cover-release screw on the back of the unit and tighten it.

**Figure 9–6 Replacing the Cover on the System Unit**



WS330122

# 10

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## Installing and Removing Memory Modules

This chapter describes the following topics:

- Memory Configurations
- Installing Memory Modules
- Testing Memory Modules
- Removing Memory Modules

### 10.1 Memory Configurations

DECstation 5000 Model 150 workstations use pairs of 2-MB and 8-MB memory modules. Your workstation can hold up to eight pairs of memory modules.

The system unit comes with at least 8 MB in place.

- With pairs of 2-MB memory modules, you can install up to 32 MB of memory.
- With pairs of 8-MB memory modules, you can install up to 128 MB of memory.

The `cnfg` command shows how much memory is installed in your workstation. Chapter 13 explains how to use the `cnfg` command.

### 10.2 Installing Memory Modules

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**Caution**

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Do not mix 2 MB and 8 MB memory modules in the same system. This will result in your system not recognizing some of your memory modules.

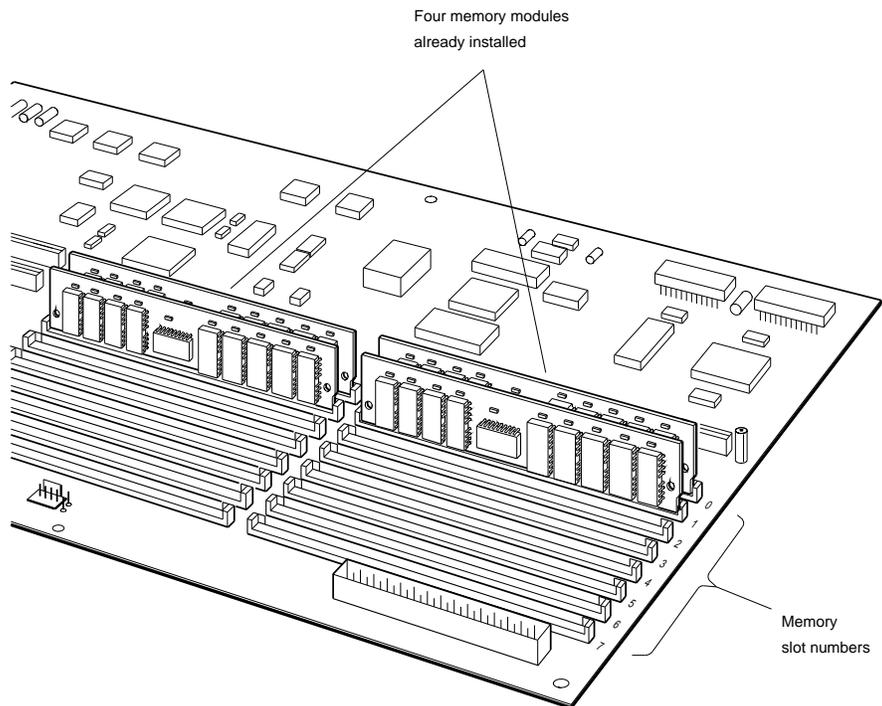
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## 10.2 Installing Memory Modules

1. Look at the numbers printed beside the memory slots inside the system unit. Find the empty slot with the lowest number.

Notice that each memory slot has two connectors. You must install memory modules in pairs, one in each connector of a slot.

**Figure 10–1 Memory Slots Inside the System Unit**



WS330033

2. Hold the memory module so that the notched end faces right and the contacts face down.

---

### Caution

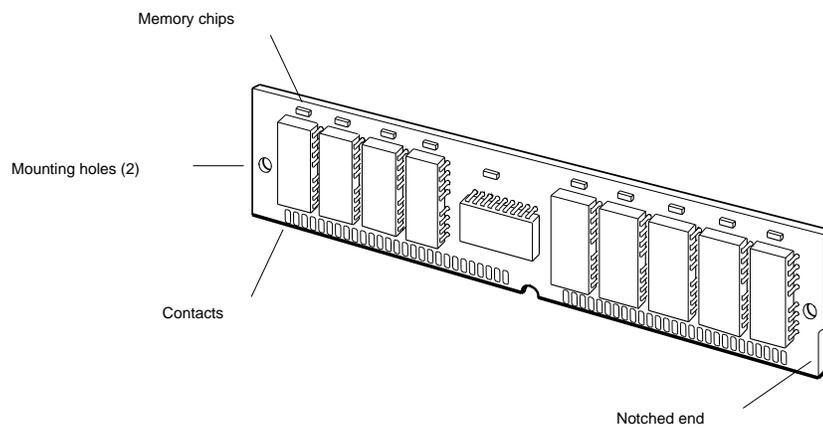
---

Do not touch the contacts on the memory modules. A static charge could cause damage.

---

## 10.2 Installing Memory Modules

Figure 10–2 Memory Module

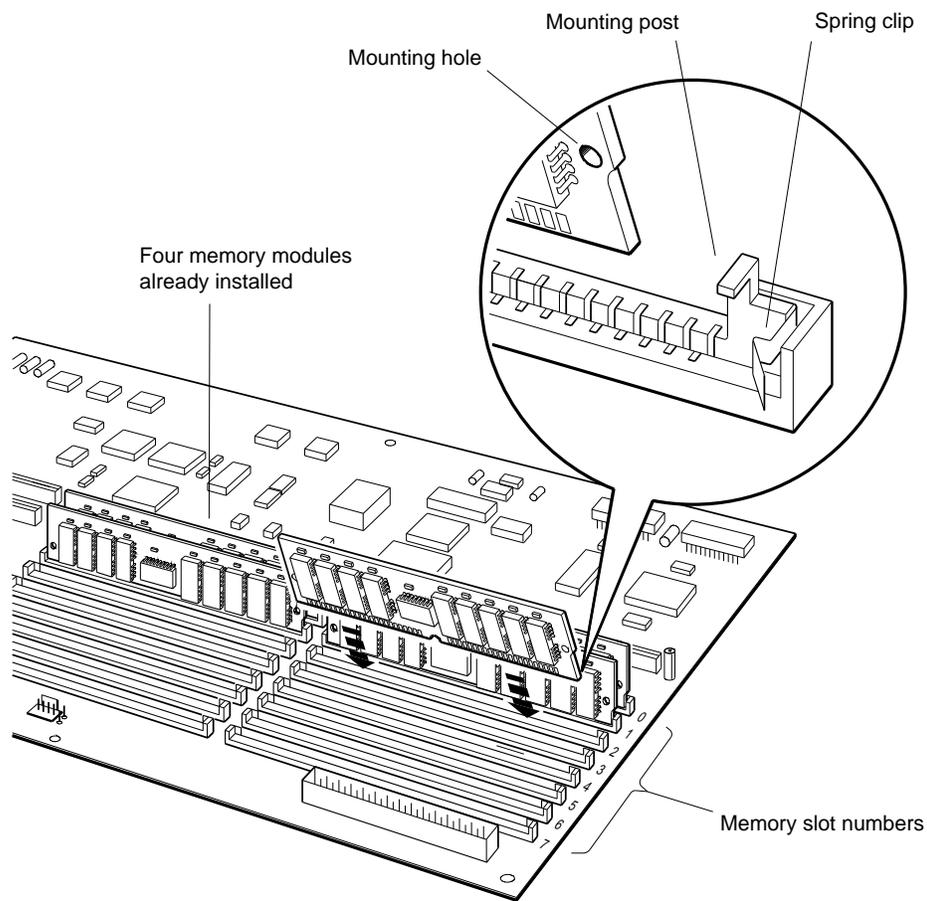


WS330103

3. Tilt the top of the memory module toward the front of the system unit and insert the memory module into the empty connector.
4. Make sure the mounting holes in the module line up with the mounting posts at the ends of the connector, as shown in Figure 10–3.

## 10.2 Installing Memory Modules

Figure 10–3 Inserting a Memory Module



WS331104

5. Tilt the top of the memory module up and press the module against the mounting posts until the module snaps past the spring clips. These clips lock the memory module onto the mounting posts.
6. Repeat steps 1 to 5 to install another memory module in the other empty connector of the same slot.

## 10.2 Installing Memory Modules

Repeat the installation for every pair of memory modules that you are installing. Be sure to install each pair of modules in the slot with the lowest number.

## 10.3 Testing Memory Modules

1. Turn on the monitor. Then turn on the system unit.

When the system unit completes the power-up self-test successfully, the console prompt (>>) appears on the screen.

2. Type **t 3/mem** followed by a space and the number of the memory slot into which you installed the modules. Then press Return. For example, to test the modules in memory slot 2, type **t 3/mem 2**.

A display similar to the following appears on your screen as the memory test progresses:

```
**\
```

When the test is done, the console prompt (>>) appears. If something other than the console prompt appears, turn to Chapter 14 for troubleshooting instructions.

3. Type **cnfg** at the console prompt and press Return to see the total amount of memory in the workstation. A display like the following appears on your screen:

```
>>cnfg
3: KN04    DEC      V1.0a          TCF0 ( 4 MB)
                                     (enet: 08-00-2b-30-14-df)
                                     (SCSI = 7)
```

This example shows a workstation with 4 megabytes (4 MB) of memory.

The display shows the total amount of memory in your workstation. If it does not, turn to Chapter 14 for troubleshooting instructions.

## 10.4 Removing Memory Modules

Follow these rules when you remove memory modules:

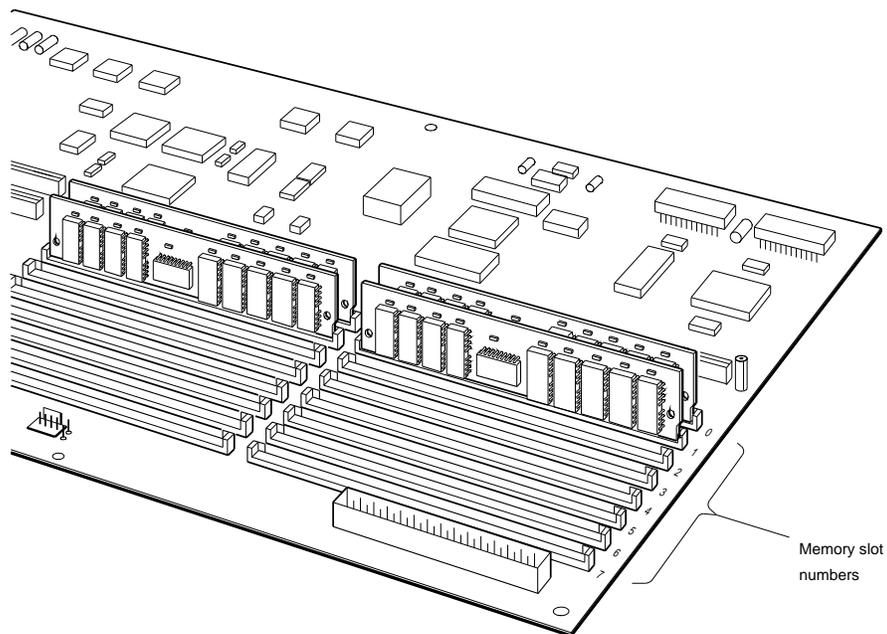
- Remove memory modules from one memory slot at a time, starting with the highest-numbered slot.
- Remove *both* memory modules from a slot.
- You need at least 8 megabytes of memory to use your workstation.

## 10.4 Removing Memory Modules

Remove memory modules by following these steps:

1. Locate the memory modules in the highest numbered memory slot.

**Figure 10–4 Memory Modules in Memory Slots 0 and 1**



WS330090

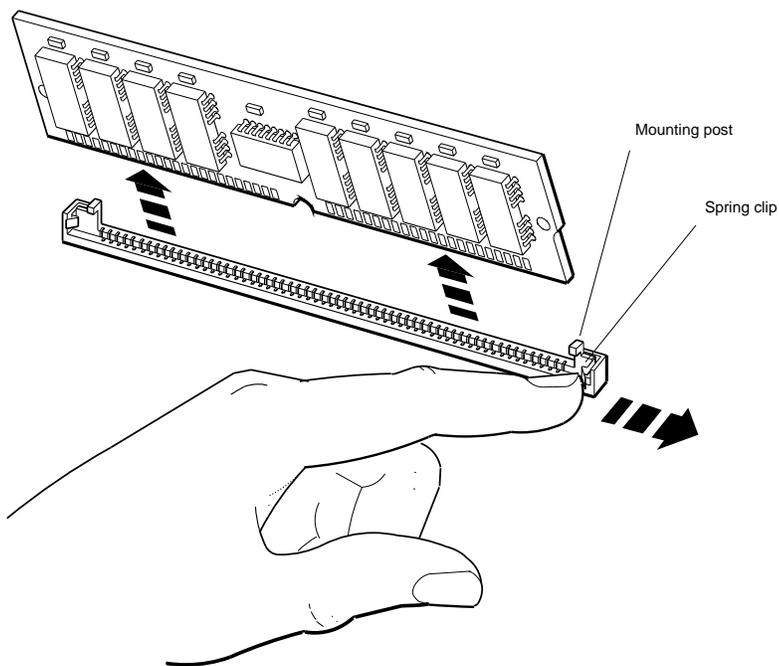
2. Release, but do not remove, one of the two memory modules in the highest-numbered memory slot.

Press the spring clip on one end of the memory slot connector away from the mounting post on the connector (see Figure 10–5.) At the same time, press the memory module toward the front of the system unit.

## 10.4 Removing Memory Modules

Release the other end of the memory module the same way.

**Figure 10–5 Removing a Memory Module**



WS33O099

3. Lift the memory module out of the connector. Store the module in an antistatic bag.
4. Remove the other memory module from the same slot.
5. Keep removing memory modules two at a time until you have removed all that you intend to. Always remove memory modules from the highest-numbered memory slots first.



# 11

---

## Installing and Removing Drives in the System Unit

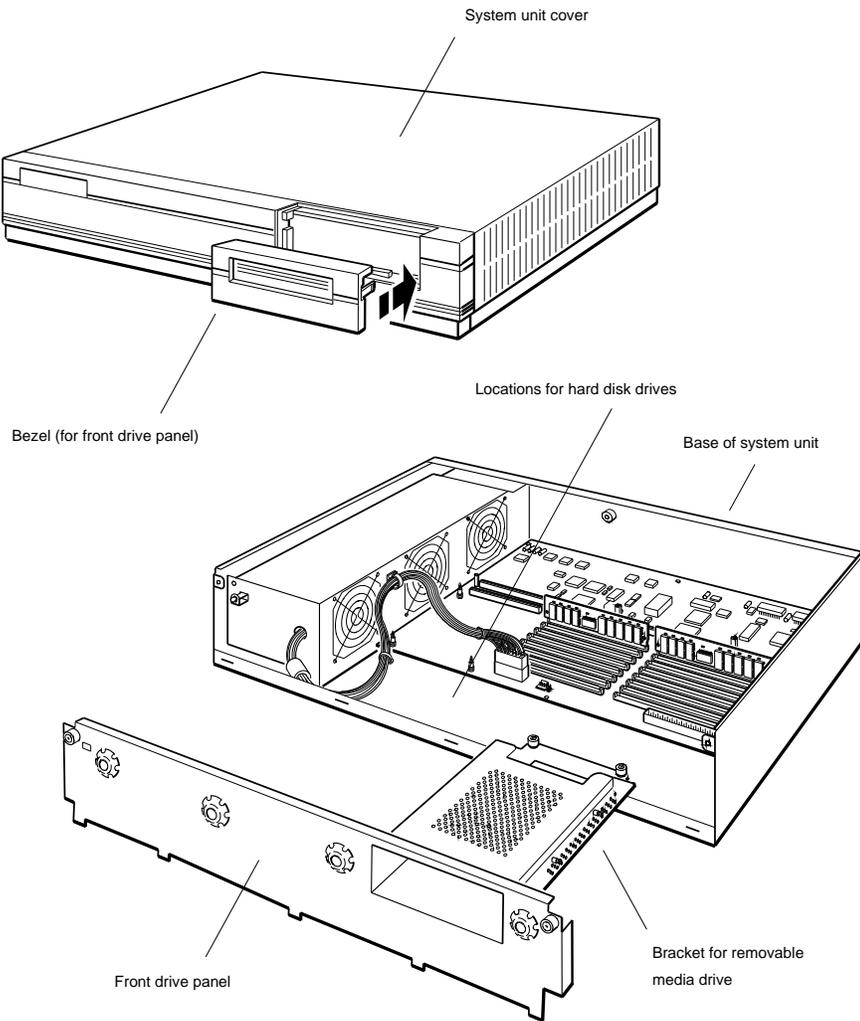
You can install drives in three places:

- In the base of the system unit (hard disk drives)
- In the front drive panel of the system unit (removable media drives)
- In expansion boxes that can be connected to the system unit (see Chapter 7)

Hard disk drives are drives in which the recording media are disks fastened permanently inside the drive. To install hard disk drives in the base of the system unit, see Section 11.3.

Removable media drives are drives where the recording media are disks and tapes that you can remove and insert as you need them. Diskette drives and tape drives are examples of removable media drives. To install removable media drives in the front drive panel, see Section 11.6.

**Figure 11–1 Where to Install Drives in the System Unit**



WS33O088

## 11.1 Preparing for an Installation

### 11.1 Preparing for an Installation

The workstation distinguishes each internal and external drive connected to a small computer system interface (SCSI) connector by the SCSI ID number (0 to 6) assigned to that drive. Before you begin an installation, you must check your configuration to see which SCSI ID numbers are unavailable, as follows:

1. Shut down the software by following the instructions that came with your worksystem software.
2. Type **cnfg 3** at the console prompt and press Return. The workstation displays the configuration for the base system hardware and any previously installed SCSI drives.

The following example of a cnfg 3 display shows no drives or other options connected to the base system unit. (The 3 following >>cnfg 3 and 3: on the next line represents the base system unit.)

```
>>cnfg 3
3: KN04      DEC      V1.0a      TCF0      ( 4 MB)
              (enet: 08-00-2b-30-14-df)
              (SCSI = 7)

-----
DEV  PID              VID      REV      SCSI DEV
=====
cache: I(8 KB), D(8 KB), S(1024 KB); Scache line (32 bytes)
R4000 revision (3.0)
mem( 0): a0000000:a03ffffff ( 4 MB)
```

## 11.1 Preparing for an Installation

This example shows a previously installed internal tape drive (tz1) connected to the system unit or base slot 3. Note that in this second example tz1 appears in column 1 (DEV). Write down any device codes that appear in that column of your display.

```
>>cnfg 3
3: KN04      DEC      V1.0a      TCF0      ( 4 MB)
              (enet: 08-00-2b-30-14-df)
              (SCSI = 7)
-----
DEV  PID              VID      REV      SCSI DEV
=====
tz1  TZK10             (C) DEC  00AA    SEQ
cache: I(8 KB), D(8 KB), S(1024 KB); Scache line (32 bytes)
R4000 revision (3.0)
mem( 0): a0000000:a03ffffff ( 4 MB)
```

## 11.2 Setting SCSI ID Numbers

Each drive comes from the factory with a SCSI ID number already set. These factory settings, called default settings, are listed in Table 11–1.

**Table 11–1 Default SCSI ID Numbers for Internal Drives**

| Drive | Type               | Default Setting        |
|-------|--------------------|------------------------|
| RZ23L | Hard disk          | 2 (and 3) <sup>1</sup> |
| RZ24L | Hard disk          | 2 (and 3) <sup>1</sup> |
| RZ25  | Hard disk          | 2 (and 3) <sup>1</sup> |
| RZ26  | Hard disk          | 2 (and 3) <sup>1</sup> |
| RRD42 | Compact disc drive | 4                      |
| RX23  | Diskette drive     | 5                      |
| RX33  | Diskette drive     | 5                      |
| TLZ04 | Tape drive         | 5                      |
| TLZ06 | Tape drive         | 5                      |
| TZK10 | Tape drive         | 5                      |

<sup>1</sup>If the system contains two RZ23L, RZ24L RZ25, or RZ26 drives, the ID numbers are preset to 2 and 3 at the factory.

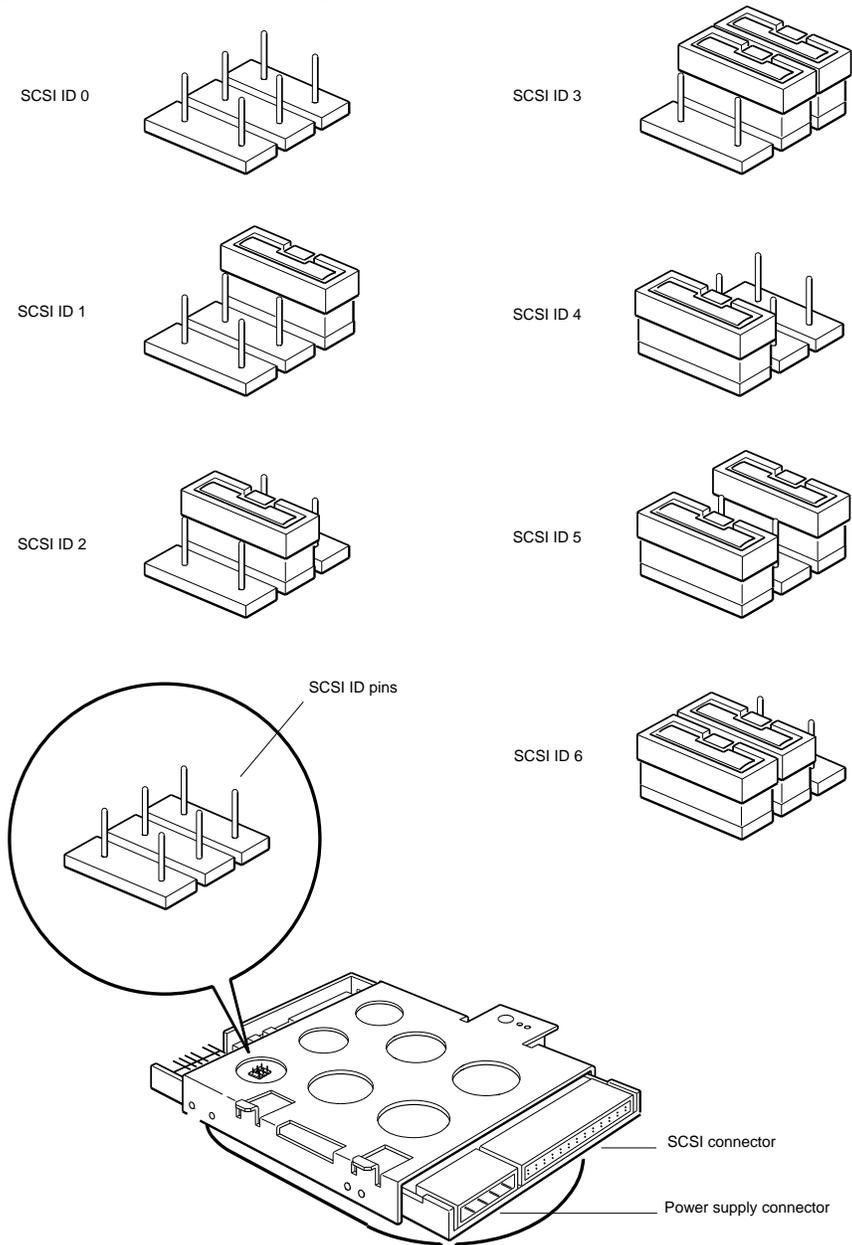
## 11.2 Setting SCSI ID Numbers

If you are changing the SCSI ID numbers on your drives, follow these steps:

- Choose a SCSI ID number (0 to 6) for the drive. Be sure to choose a number that is different from any SCSI ID numbers noted in the DEV column of the display. (In the example, tz1 displays, thus 0, 2, 3, 4, 5, or 6, are available.)
- Write down the new number on the same paper where you wrote the device codes.
- Use a pair of needle-nose pliers to set the SCSI ID on the drive that you are installing. Set the ID to the new number that you chose by arranging the SCSI switches or jumpers to indicate the number. Jumpers are small rectangular collars that fit over the ID pins on drives and other components. If your drive uses jumpers, the jumpers are already on the pins, and you have to arrange them appropriately. Figures 11–2 through 11–10 show the jumper settings for each internal drive.

## 11.2 Setting SCSI ID Numbers

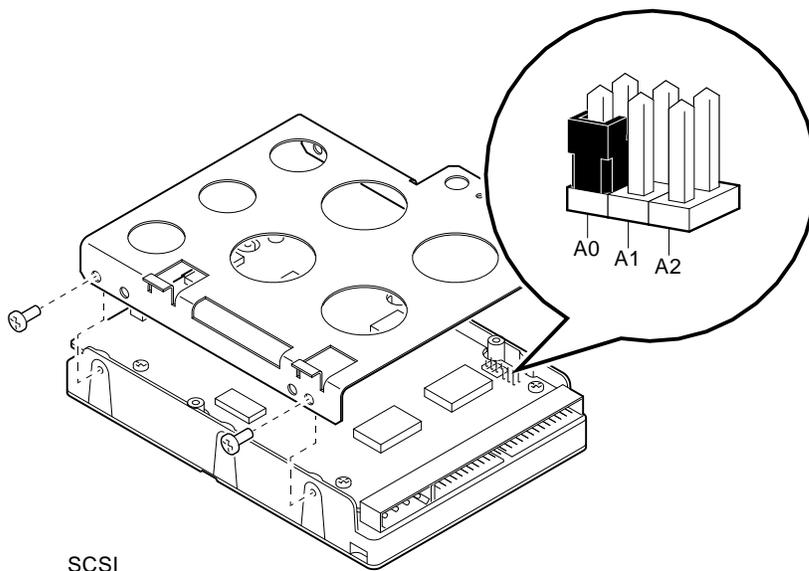
Figure 11–2 Jumper Settings for an RZ23L Hard Disk Drive



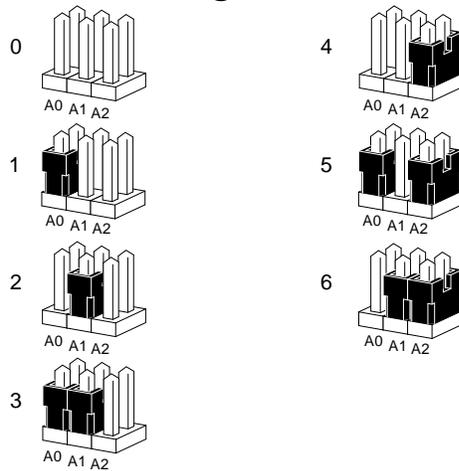
WS330078

## 11.2 Setting SCSI ID Numbers

Figure 11-3 Jumper Settings for the RZ24L Hard Disk Drive



SCSI  
Address  
Settings:



MLO-010264

## 11.2 Setting SCSI ID Numbers

The RZ25 drive has two sets of pins, one on the side of the drive and one at the front.

---

### Note

---

The drive ships with a jumper on pin 4 on the front of the drive. This jumper does not affect the SCSI ID number of the drive and must not be removed. If the jumper is removed, the drive will not function correctly.

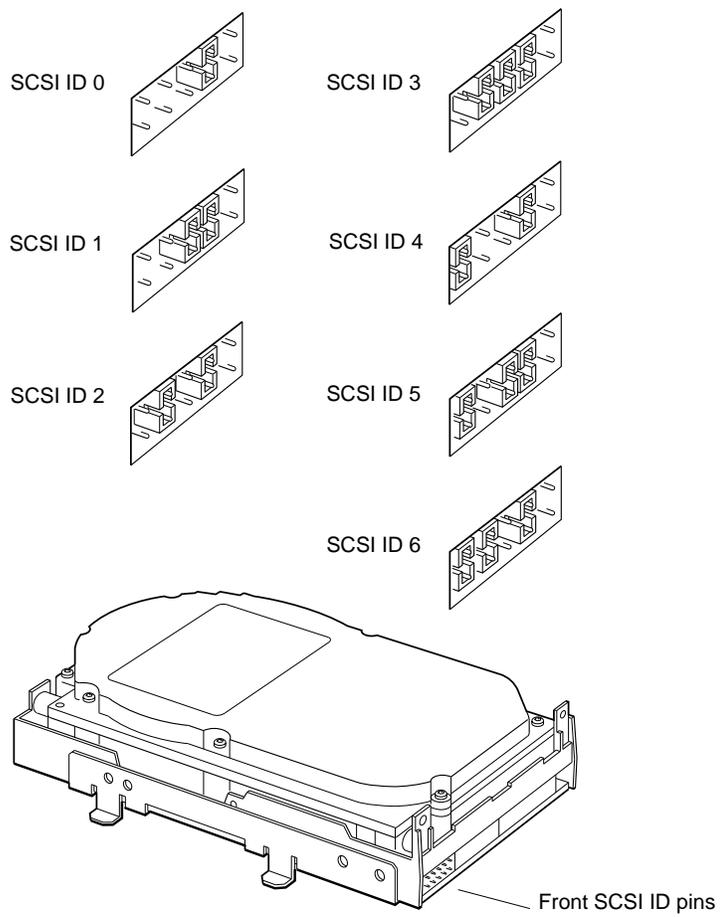
---

The SCSI ID is factory-set at 2. If you need to change the setting, you can use either set of pins. To set the ID, do the following:

- If you use the pins on the side of the drive, remove all jumpers from the pins on the front of the drive except for the jumper located on pin 4.
- If you use the pins on the front of the drive, remove all jumpers from the pins on the side of the drive before setting the ID.

## 11.2 Setting SCSI ID Numbers

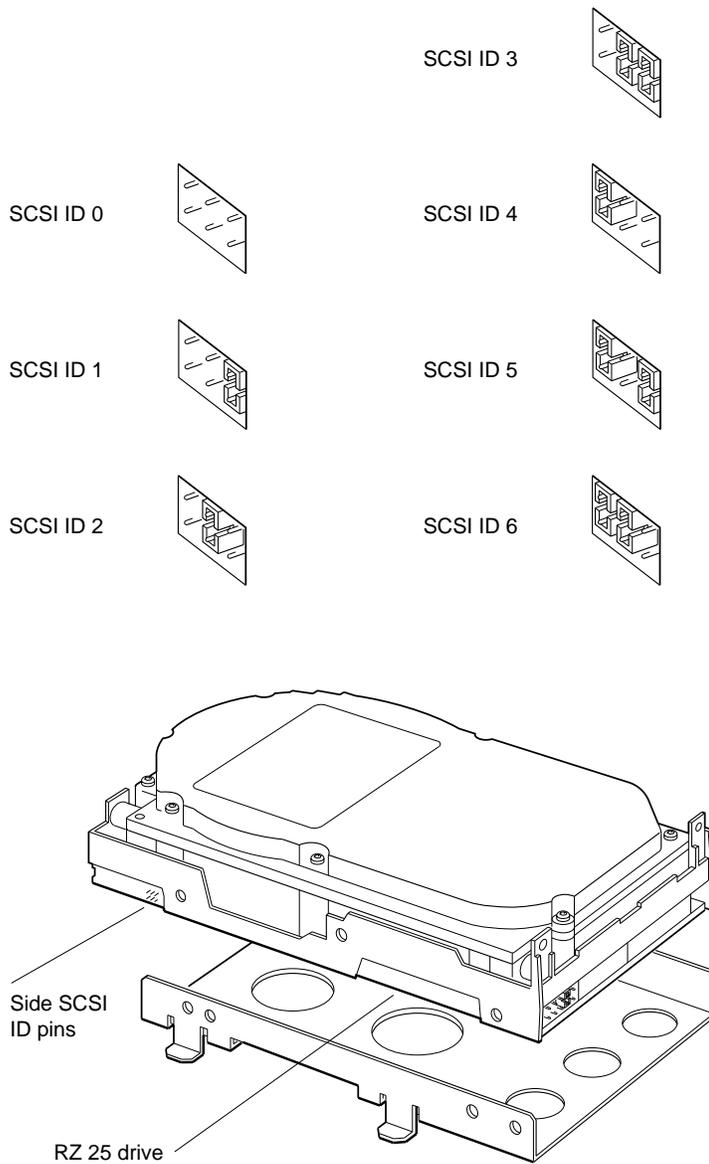
Figure 11–4 Jumper Settings Using the Pins on the Front of the RZ25 Drive



WSMXS058

## 11.2 Setting SCSI ID Numbers

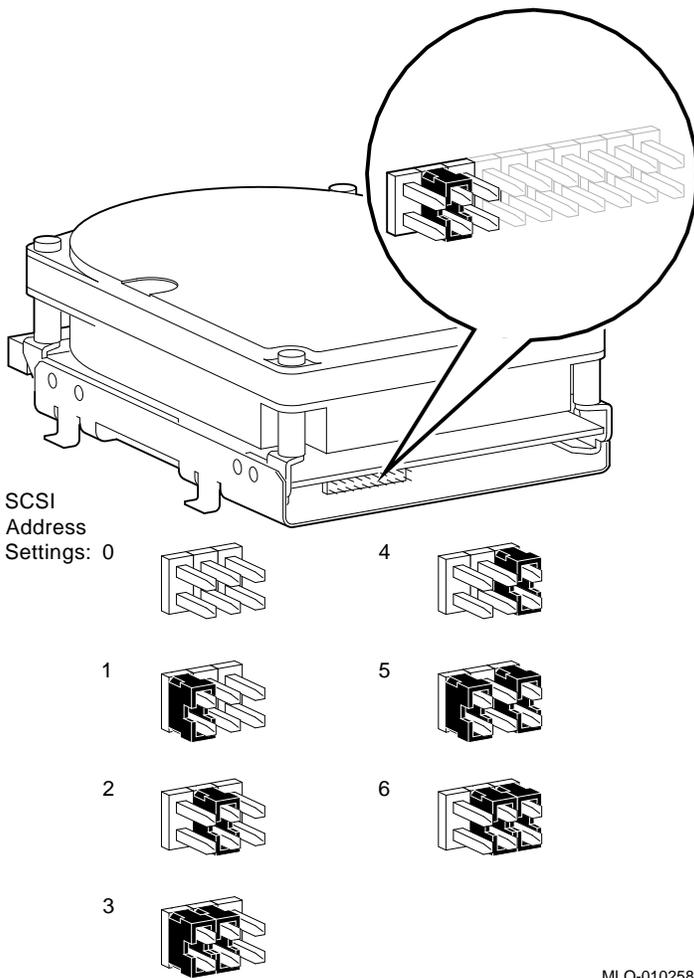
Figure 11–5 Jumper Settings Using the Pins on the Side of the RZ25 Drive



WSMXS108

## 11.2 Setting SCSI ID Numbers

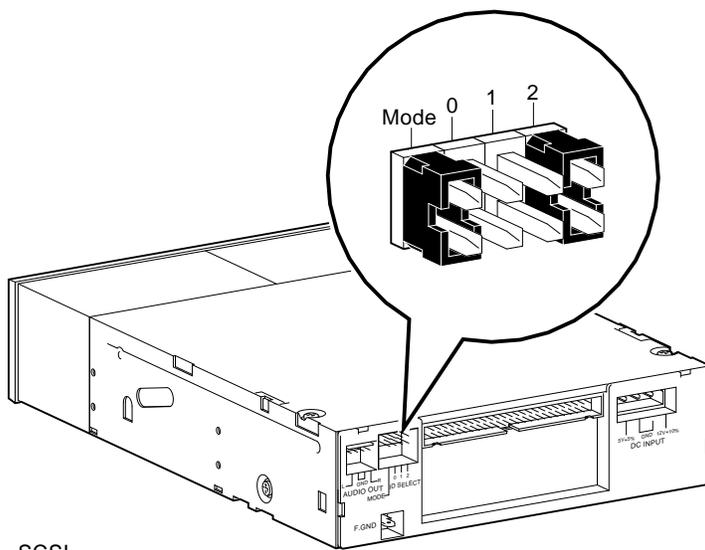
Figure 11–6 Jumper Settings for an RZ26 Hard Disk Drive



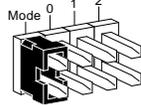
MLO-010258

## 11.2 Setting SCSI ID Numbers

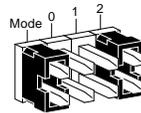
Figure 11–7 Jumper Settings for an RRD42 Optical Compact Disc drive



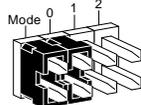
SCSI  
Address  
Settings: 0



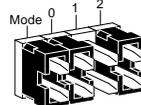
4



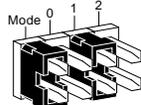
1



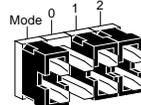
5



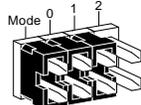
2



6



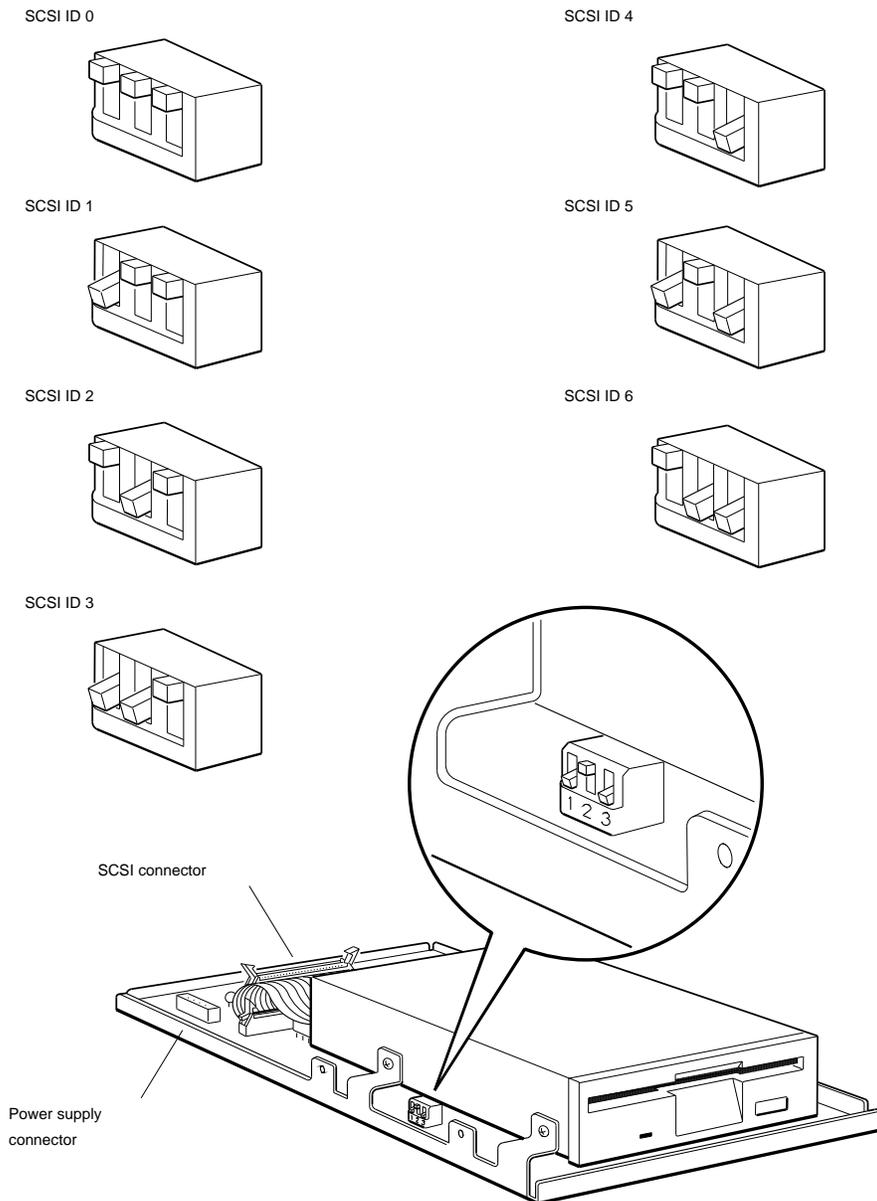
3



MLO-010275

## 11.2 Setting SCSI ID Numbers

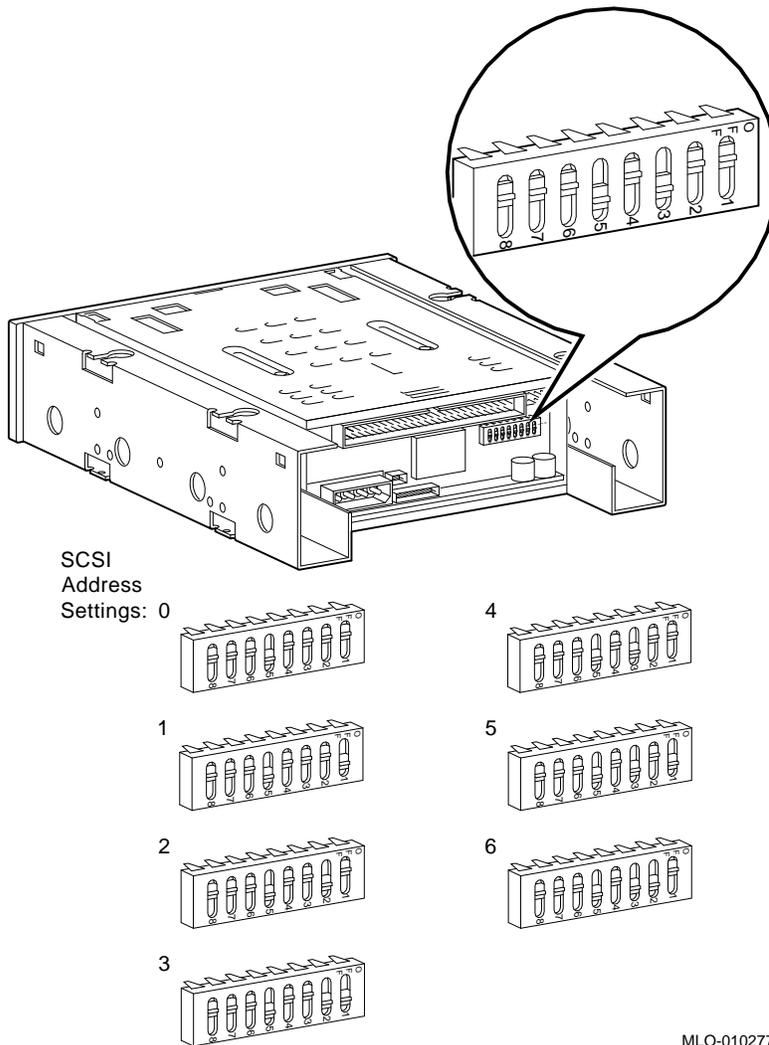
**Figure 11–8 Switch Settings for RX23 and RX33 Floppy Disk Drives**



WS330065

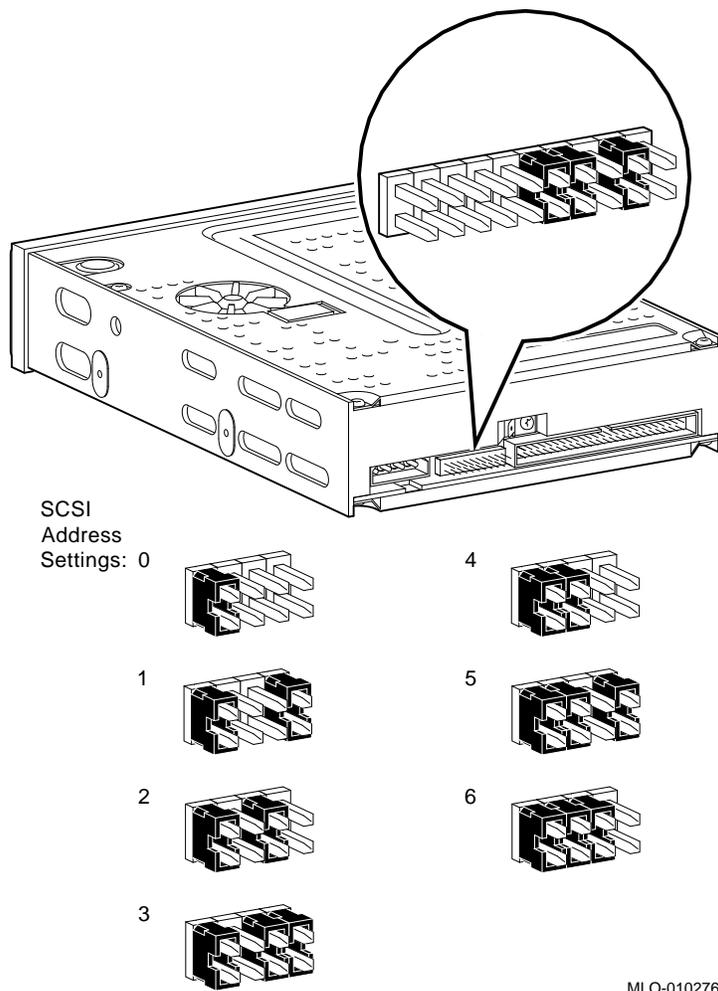
## 11.2 Setting SCSI ID Numbers

Figure 11–9 TLZ06 Mode and SCSI Address Switches



## 11.2 Setting SCSI ID Numbers

Figure 11–10 Jumper Settings for a TZK10 QIC Tape Drive



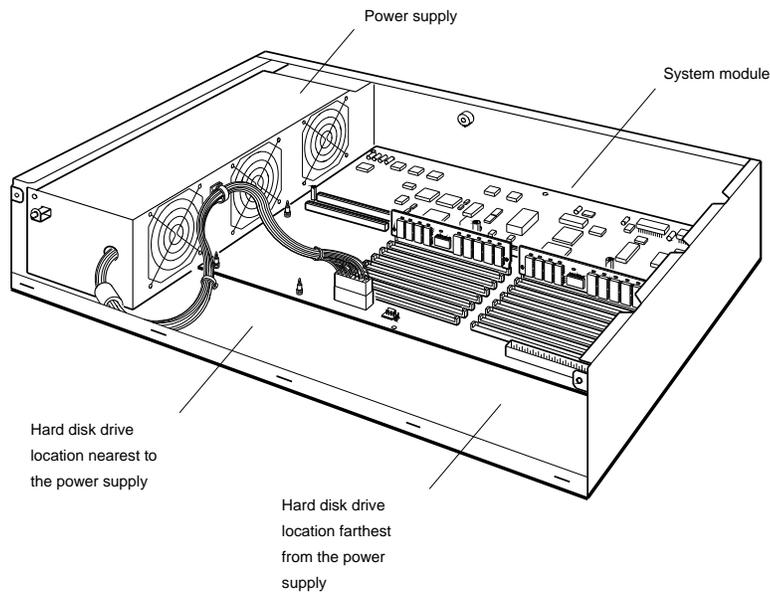
## 11.3 Installing a Hard Disk Drive

1. Follow the instructions in Chapter 9 to remove the front drive panel.
2. Choose the location for the hard disk drive that you are installing.

### 11.3 Installing a Hard Disk Drive

If you are installing one drive, it is usually convenient to install it next to the power supply. If you are installing two drives, install the one farthest from the power supply first.

**Figure 11–11 Locations for Internal Hard Disk Drives**



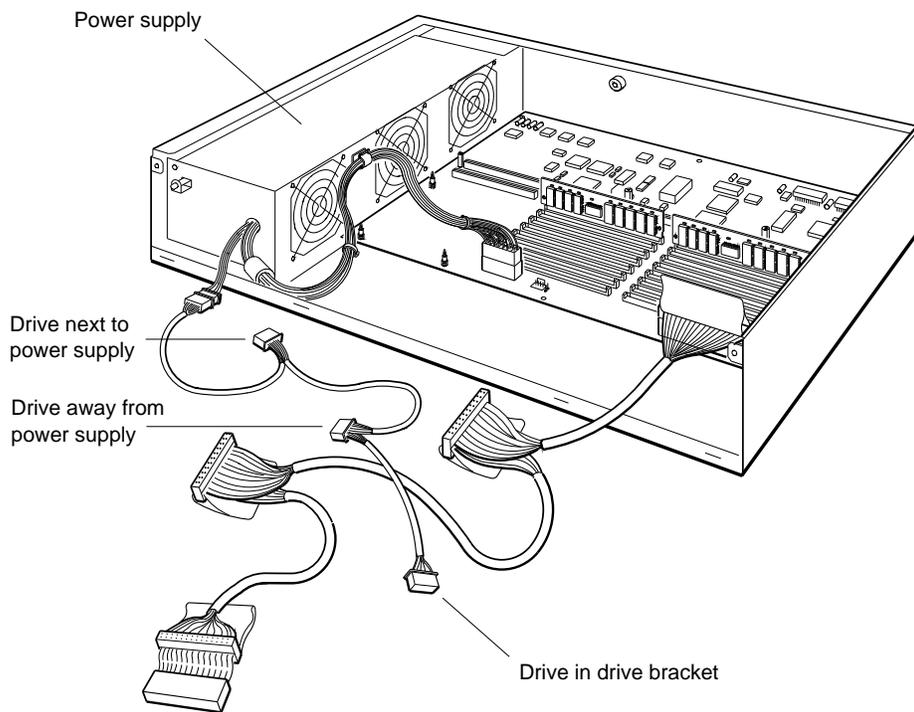
WS330111

3. Find the connectors on the power supply and SCSI cables that correspond to the drive location that you chose.

Figures 11–12 and 11–13 show the power supply and the SCSI cables and their connectors. Figures 11–14 and 11–15 show close-up views of the connectors.

## 11.3 Installing a Hard Disk Drive

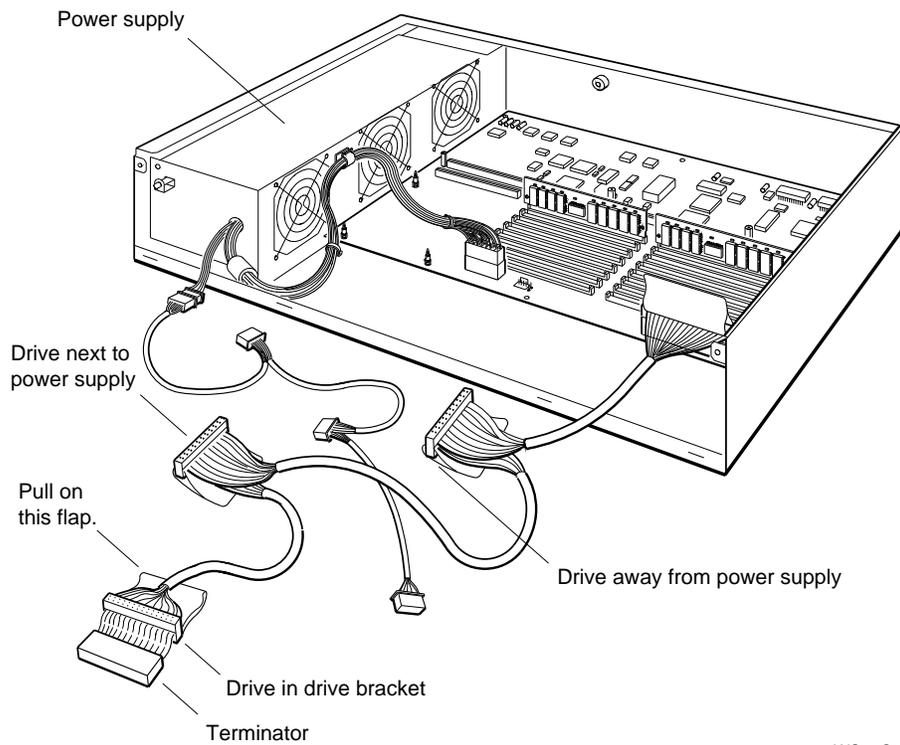
Figure 11–12 Power Supply Cable in the System Unit



WS33O050

## 11.3 Installing a Hard Disk Drive

Figure 11–13 SCSI Cable in the System Unit

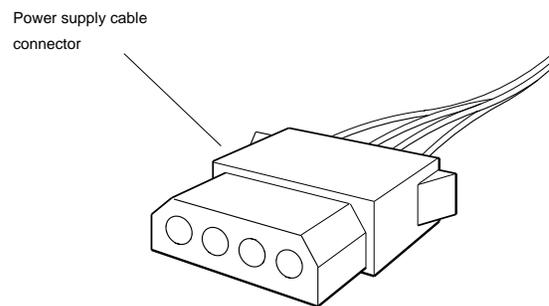


WS33O110

4. Plug the power supply cable connector into the power supply connector on your hard disk drive. The connectors are shaped so that they fit together only one way.

## 11.3 Installing a Hard Disk Drive

**Figure 11–14 Power Supply Cable Connector**

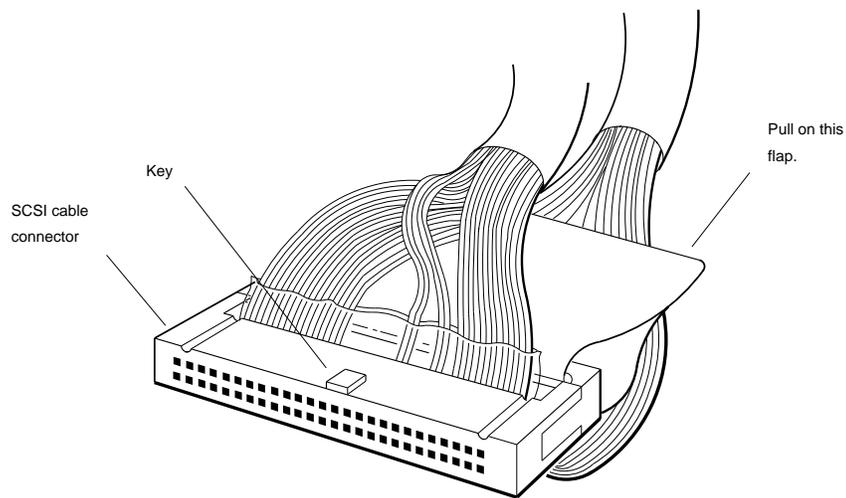


WS330012

5. Position the SCSI cable connector so the key is on top, as shown in Figure 11–15.
6. Plug the cable connector into the SCSI connector on the hard disk drive.

## 11.3 Installing a Hard Disk Drive

Figure 11–15 SCSI Connector

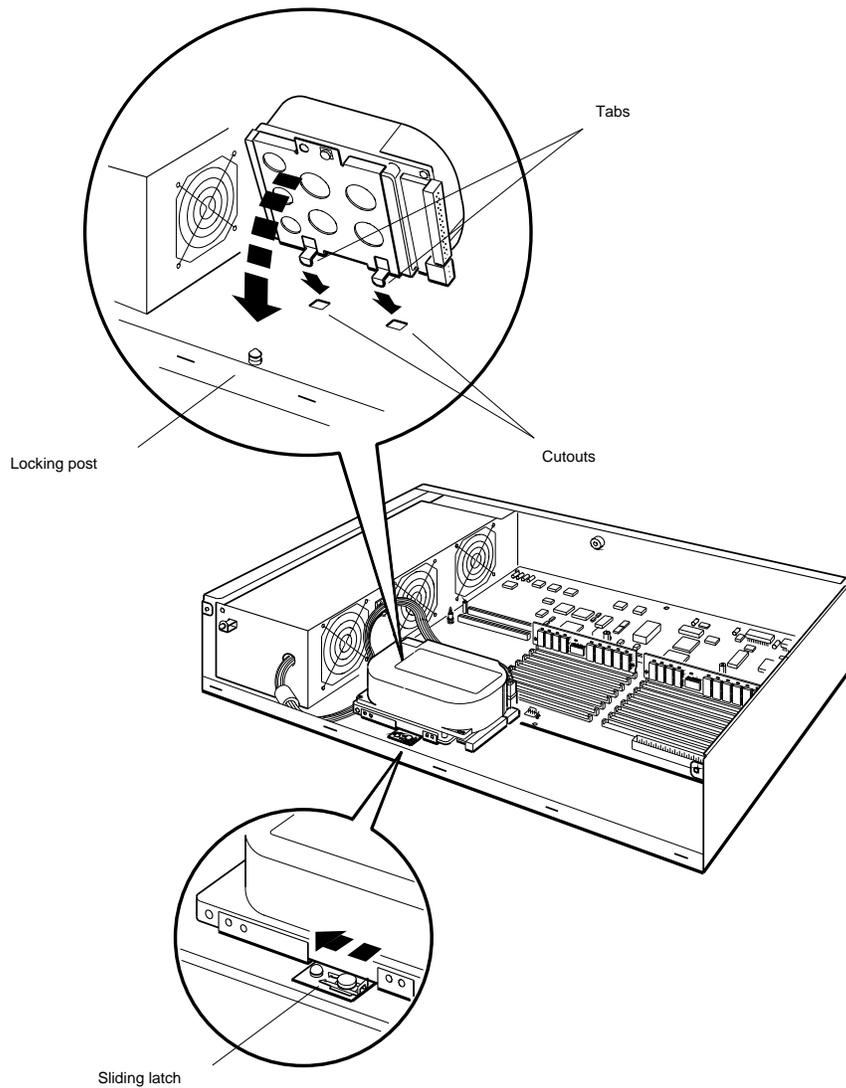


WS330106

7. If you are installing two hard disk drives, unpack the second drive, and connect the appropriate power supply cable and SCSI cable to it.
8. Tilt the hard disk drive as shown in the large circle in Figure 11–16.

## 11.3 Installing a Hard Disk Drive

Figure 11–16 Inserting the Hard Disk Drive



WS330051

9. Insert the tabs on the hard disk drive into the cutouts in the bottom of the system unit. Then carefully swing the drive down onto the locking post. Move the cables so that they are not underneath the drive.

### 11.3 Installing a Hard Disk Drive

The drive should rest flat in the system unit, and the locking post should stick up through the mounting hole on the drive mounting bracket.

10. Press the sliding latch so that it snaps firmly onto the post.
11. If you are installing two hard disk drives, insert the tabs on the second drive into the system unit cutouts and lock the drive onto the mounting post.
12. Press all the cables carefully around the hard disk drive or drives, so that there is room for the drive bracket on the front drive panel.
13. Follow the instructions in Chapter 9 to replace the front drive panel and the system unit cover.

### 11.4 Testing a Hard Disk Drive Installation

At the console prompt (>>), type **cnfg 3** and press Return. The screen shows the configuration of components in your system unit (also called base slot 3). Column 1 (DEV) lists the disk drive numbers. The drive that you installed should be listed in this column with the SCSI ID number that you gave it, as in this sample display:

```
>>cnfg 3
3: KN04          DEC      V1.0a          TCF0  ( 4 MB)
                               (enet: 08-00-2b-30-14-df)
                               (SCSI = 7)
-----
DEV  PID          VID      REV    SCSI DEV
=====
tz1  TZK10         (C) DEC   00AA  SEQ
rz2  RZ24         (C) DEC   0700  DIR

cache: I(8 KB), D(8 KB), S(1024 KB); Scache line (32 bytes)
R4000 revision (3.0)
mem( 0): a0000000:a03fffff ( 4 MB)
```

In this example, the new hard disk drive was given an ID number of 2. The number is in the device code in the DEV column: rz2. The tape drive that was already connected to the system unit is also shown: tz1.

If the drive is not listed at all,

- The cables to the drive might not be plugged in all the way.
- You might have set a SCSI ID number that was already set on another drive inside the system unit.

## 11.4 Testing a Hard Disk Drive Installation

Open the system unit and check for these two possibilities. Then use the `cnfg` command to test the drive again. If your new drive is still not listed properly, tell your system manager or call your Digital service representative.

## 11.5 Removing a Hard Disk Drive

Removing a hard disk drive from the system unit involves much of the same procedure as installing one. Refer to the previous detailed instructions for installing the drive (Section 11.3) when removing a hard disk drive.

1. Follow the instructions in Chapter 9 to:
  - a. Remove the system unit cover.
  - b. Attach the antistatic wrist strap.
  - c. Remove the front drive panel.
2. Move the sliding latch to unlock the drive. (Sliding latch is shown in Figure 11–16).
3. Remove the power connector and SCSI connector. Pull on the SCSI connector flap to remove the connector.
4. Set the drive aside carefully. Store it in an antistatic bag.
5. Press all the cables back into the system unit.
6. Remove the antistatic wrist strap.
7. Follow the instructions in Chapter 9 to replace the front drive panel and the system unit cover.
8. Turn on the system unit and monitor and check the workstation with the `cnfg` command.

## 11.6 Installing a Removable Media Drive

To install a removable media drive in the front drive panel, you need medium flat-blade and Phillips screwdrivers.

Follow the instructions in Chapter 9 to:

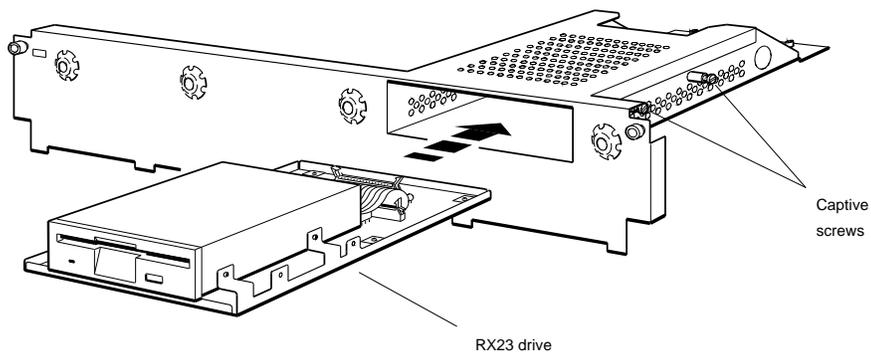
- Remove the system unit cover.
- Attach the antistatic wrist strap.
- Remove the front drive panel.

## 11.6 Installing a Removable Media Drive

Follow these instructions to insert the drive into the drive bracket:

1. Slide the removable media drive that you are installing into the drive bracket from the front of the front drive panel.

**Figure 11–17 Inserting a Removable Media Drive into the Drive Bracket**

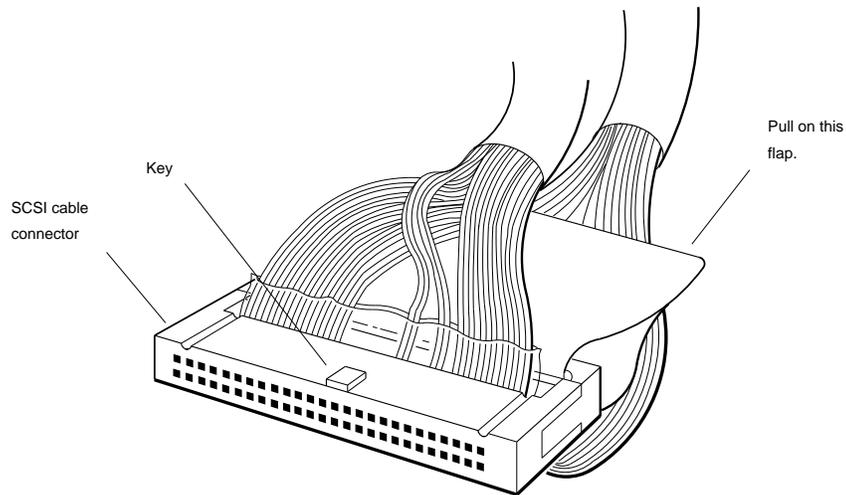


WS330059

2. Use a flat-blade screwdriver to tighten the screws on both sides of the drive bracket. There are two screws on each side. You may have to push the screws in first, so that they fit into the threaded holes in the drive.

## 11.6 Installing a Removable Media Drive

Figure 11–18 SCSI Cable Connector

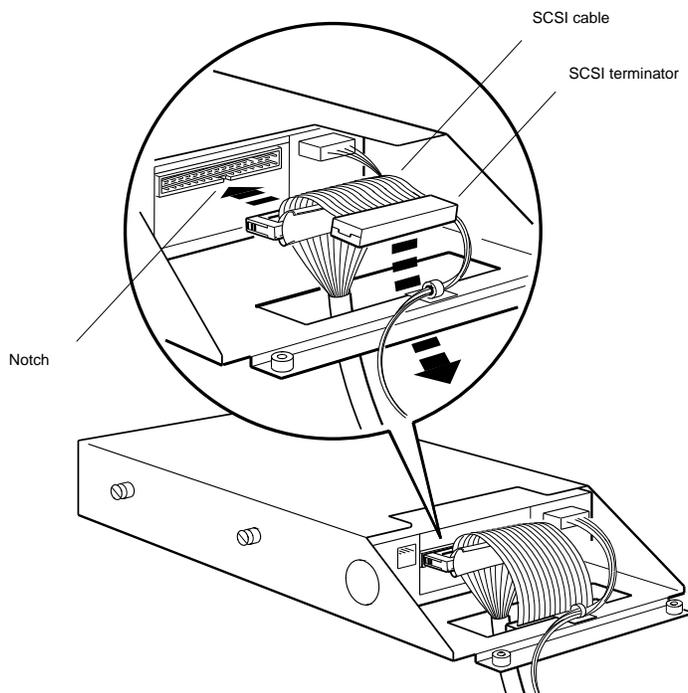


WS330106

3. Plug the SCSI cable connector into the drive.
  - a. If the notch on the connector on the drive is on the bottom edge, plug the SCSI cable straight into the connector.
  - b. If the notch on the connector on the drive is on the top edge, roll the end of the SCSI cable around the terminator. Then plug the SCSI cable into the connector on the drive.

## 11.6 Installing a Removable Media Drive

Figure 11–19 Plugging the Cable Straight into the Connector

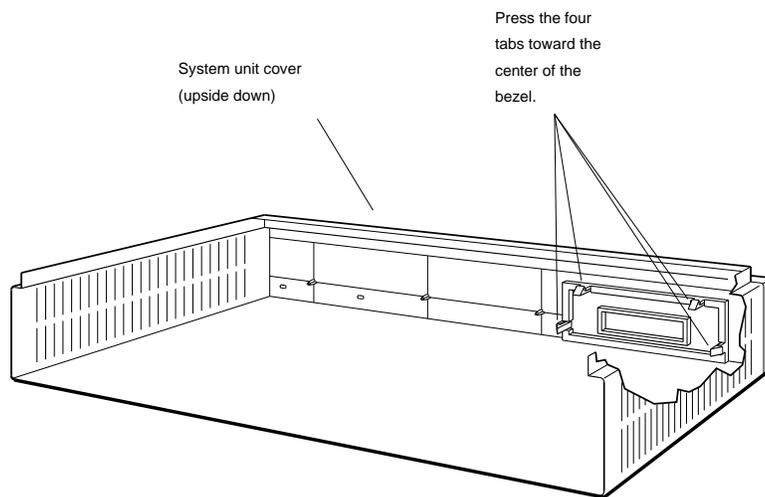


WS330121

4. Plug the power supply cable connector into the power supply connector on the drive. The connectors are shaped so that they fit together only one way.
5. Remove the antistatic wrist strap from your wrist and from the system unit.
6. Turn the system unit cover upside down, press the tabs that lock the bezel toward the center of the bezel, then push on the back of the bezel to remove it from the cover.

## 11.6 Installing a Removable Media Drive

**Figure 11–20 Removing the Existing Bezel**

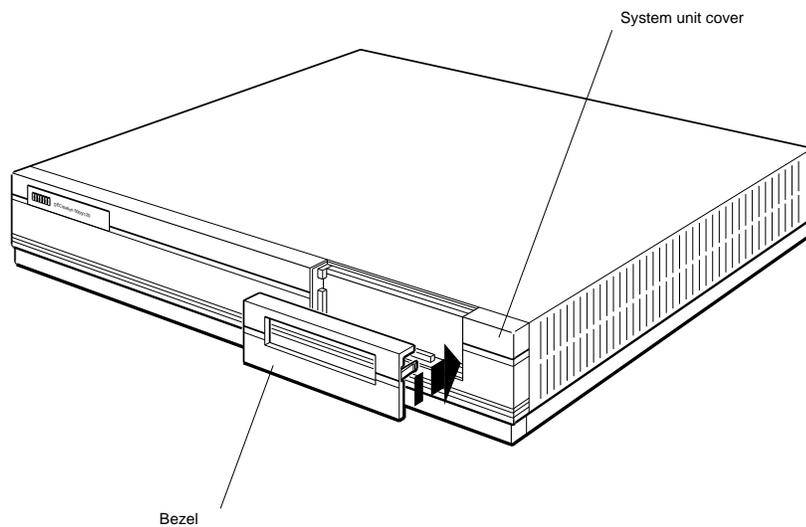


WS330091

7. Find the bezel for the drive that you installed and press the new bezel into the opening in the system unit cover from the front of the cover.

## 11.6 Installing a Removable Media Drive

Figure 11–21 Installing a New Bezel



WS33M023

8. Follow the instructions in Chapter 9 to:
  - Replace the front drive panel.
  - Replace the system unit cover.

---

**Caution**

---

If you install the SCSI cable as shown in Figure 11–19, be careful when you replace the system unit cover. The cover can catch the end of the cable and disconnect the cable from the drive. To avoid catching the cover, tuck the SCSI terminator into the large rectangular cutout in the drive bracket.

---

9. Turn on the system unit and monitor.

## 11.7 Testing a Removable Media Drive Installation

### 11.7 Testing a Removable Media Drive Installation

Follow these instructions to test the removable media drive installation:

1. At the console prompt (>>), type **cnfg 3** and press Return. The screen shows the detailed configuration (or list of components in your system unit, or base slot 3). The display should list the drive that you installed along with the SCSI number that you gave it. Here is a sample display:

```
>cnfg 3
3: KN04          DEC      V1.0a          TCF0   ( 4 MB)
                                     (enet: 08-00-2b-30-14-df)
                                     (SCSI = 7)
-----
DEV  PID          VID      REV      SCSI DEV
=====
tz1
rz4  RX23          (C) DEC  DEC      0700   DIR
cache: I(8 KB), D(8 KB), S(1024 KB); Scache line (32 bytes)
R4000 revision (3.0)
mem( 0): a0000000:a03ffffff ( 4 MB)
```

In this example, the new drive is an RX23 floppy disk drive. It was given a SCSI ID number of 4; therefore rz4 is listed in the DEV column.

If the new drive is not listed:

- The cables to the drive may not be plugged in all the way.
- You may have set a SCSI ID number that was already set on another drive inside the system unit.

Open the system unit and check for these two possibilities. Then use the **cnfg** command to test the drive again. If your new drive is still not listed properly, tell your system manager or call your Digital customer support center.

### 11.8 Removing a Drive from the Front Drive Panel

Follow the instructions in Chapter 9 to:

- Remove the system unit cover.
- Attach the antistatic wrist strap.
- Remove the front drive panel.

## 11.8 Removing a Drive from the Front Drive Panel

Remove a drive as follows:

1. Unplug the power supply cable and SCSI cable from the drive. Pull on the SCSI connector flap to remove the connector.
2. Loosen the captive screws on each side of the drive bracket.
3. Slide the drive out of the bracket through the opening in the front drive panel.
4. Set the drive aside carefully. Store it in an antistatic bag.
5. Replace the drive bezel in the front panel with a blank bezel.
6. Remove the antistatic wrist strap.
7. Follow the instructions in Chapter 9 to:
  - Replace the front drive panel.
  - Replace the system unit cover.

# 12

---

## Removing and Replacing the CPU Module

### 12.1 Removing CPU Modules

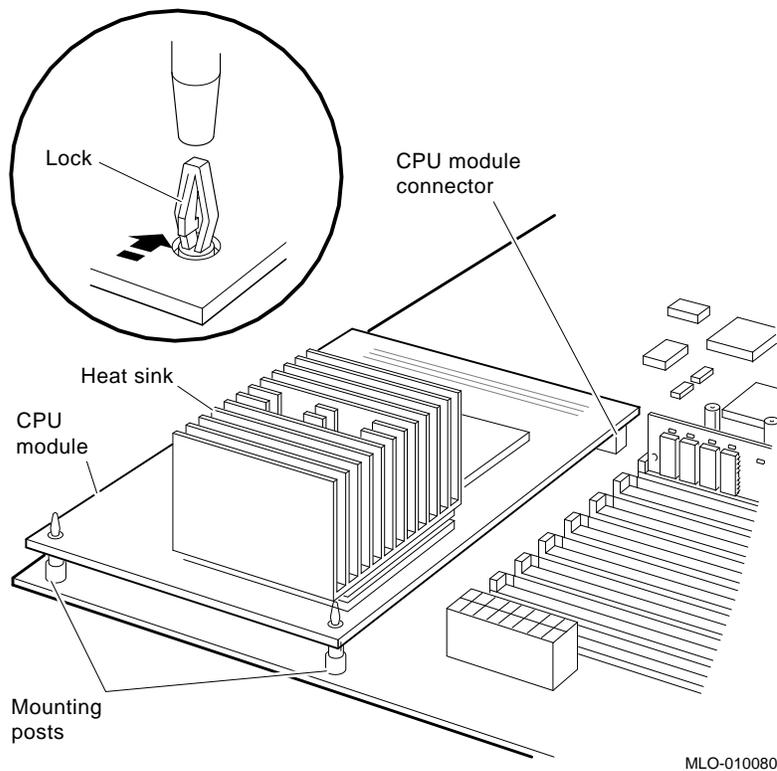
To change CPU modules, you will need the PC removal tool that comes with your new central processing unit (CPU) module.

Follow these steps to remove a CPU module:

1. Follow the instructions in Chapter 9 to:
  - Remove the system unit cover.
  - Attach your antistatic wrist strap.
2. Find the CPU module inside the system unit, as shown in Figure 12–1.
3. Press the PC removal tool over each mounting post to unlock them.

## 12.1 Removing CPU Modules

Figure 12–1 CPU Module



---

### Caution

---

Do not pull on the heat sinks. You can damage the CPU module if you do.

---

4. Remove the CPU module from the system unit.
5. Set the CPU module aside carefully. Put it in an antistatic bag, if you have one, or use the bag from the new CPU module after you unpack it.

## 12.2 Replacing a CPU Module

### 12.2 Replacing a CPU Module

Follow these instructions to install a CPU module:

1. Remove the new CPU module from the antistatic bag.

---

**Caution**

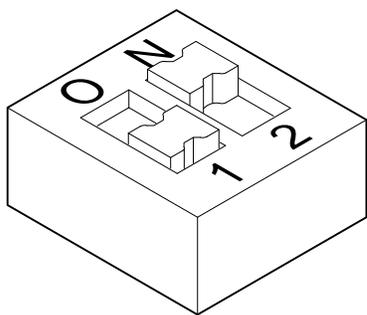
---

Be sure to use the antistatic wrist strap when installing a new CPU module. Do not touch the pins in the module connector. A static charge could damage the CPU module components.

---

2. Check the switch packet on the CPU module to make sure the switches are set as shown in Figure 12–2. (Switch 1 in the Off position, and switch 2 in the On position.)

**Figure 12–2 R4000 CPU Module Switch Packet Settings**

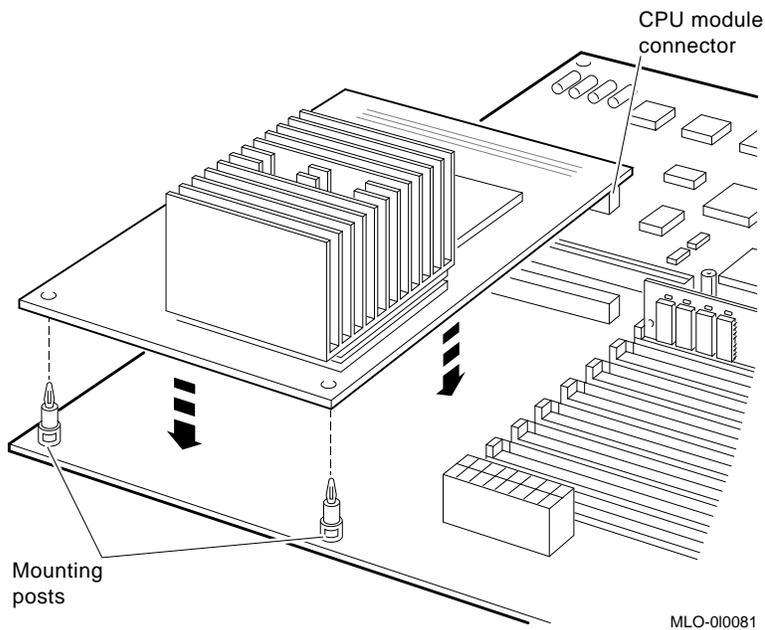


MLO-010465

3. Align the mounting holes on the CPU module with the mounting posts in the system unit. (See Figure 12–3.)
4. Press the CPU module carefully onto the mounting posts. Do not seat the module fully.

## 12.2 Replacing a CPU Module

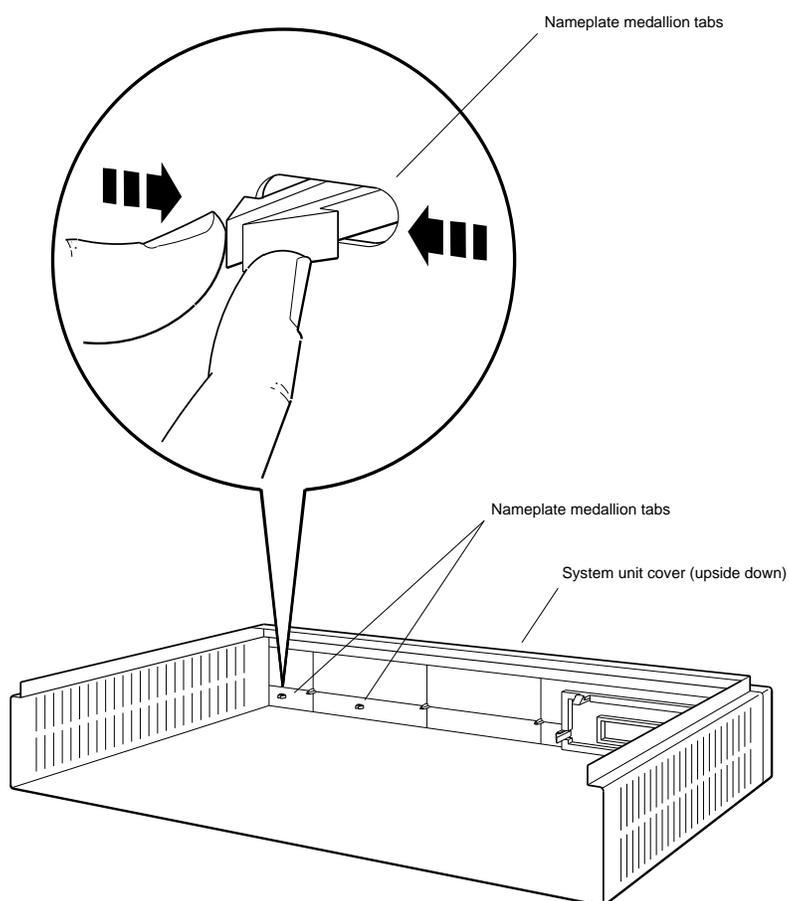
Figure 12–3 Installing a CPU Module



5. Press the other end of the CPU module firmly into the CPU module connector.
6. Secure the mounting posts.
7. If you installed a different model CPU module than the old one, turn the system unit cover upside down and remove the nameplate medallion.

## 12.2 Replacing a CPU Module

Figure 12–4 Removing the Nameplate



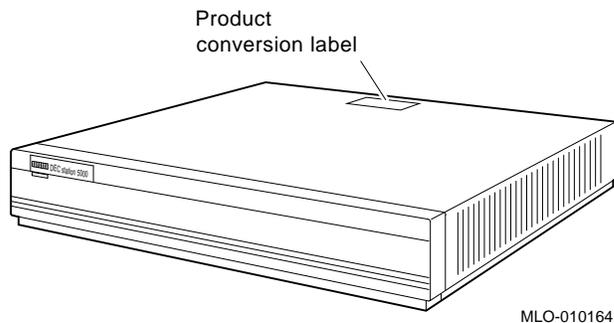
WS330104

8. Squeeze the tabs on the back of the medallion and push them through the holes. Then press the medallion for the new CPU module onto the cover from the front.
9. Follow the instructions in Chapter 9 to replace the cover on the system unit.

## 12.2 Replacing a CPU Module

10. Place the product conversion label on the top of your system unit cover.

**Figure 12–5 Attaching the Product Conversion Label**



## 12.3 Testing the CPU Module

Follow these steps to test the installation of a CPU module:

1. Turn on the monitor. Then turn on the system unit.
2. The workstation runs the power-up self-test. When the system completes the power-up self-test successfully, the console prompt (>>) appears on the screen.
3. Type the following command and press Return:

```
t 3/misc/cpu-type
```

4. When the system recognizes a CPU module, it displays the following message:

```
3/misc/cpu-type's code: NDX-64A
```

If you install the CPU module incorrectly, the system will not come up. Check the following:

- Make sure that the connector on the CPU module is pressed all the way into the connector on the base system module.
- Make sure that the connector pins are not bent. If you still have problems, call your system manager or your Digital service representative.

# **Part IV**

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## **Workstation Management**



# 13

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## Using the Console Program

This chapter covers the following topics:

- Operating and Console Modes
- Entering Console Mode
- Console Command Conventions and Terms
- Summary of Console Commands

### 13.1 Operating and Console Modes

Most of the time, you use your workstation in operating mode—that is, you will use the workstation software for tasks like these:

- Creating and revising files (letters, charts, spreadsheets, and so on)
- Backing up files
- Sending and receiving electronic mail

At certain other times you will need to use console mode for communicating directly with your workstation to perform tasks like these:

- Running workstation self-tests
- Displaying workstation hardware configurations

## 13.1 Operating and Console Modes

- Displaying the list of available console commands and their formats
- Setting workstation environment variables

When using console mode, you see one of these two prompts on the screen:

- `>>` When this prompt appears, anyone can enter console commands.
- `R >` When this prompt appears, full console use is restricted to users who know the password.

If you do not know the password, you can use only two console commands: the boot command (type **boot** and press Return) and the password command (type **passwd** and press Return). If the operating system software has been installed on your hard disk or another storage drive, and if the boot path is correctly set, the boot command will start up the workstation software.

For information about setting the password, see Section 13.4.10.

## 13.2 Entering Console Mode

You can enter console mode in any of these ways:

- If the operating system software is running, shut it down by typing **shutdown -h now** and pressing Return.

---

### Note

---

You must be in superuser mode in order to shut down the system. This requires that you obtain superuser privileges from your system manager. Enter superuser mode by typing **su**, pressing Return, and entering your password.) Once you have shut down the software, the system enters console mode automatically. This is the most orderly way to enter console mode; it keeps your data from being lost or damaged.

---

- If the operating system software is hung up and you cannot shut it down, press the halt button on the back of the system unit.
- If the system is off, turn it on by pressing **I** on the On/Off switch on the back of the system unit. The system will enter console mode unless it has been set to start the system software automatically. (See Section 13.4.2.)

## 13.3 Console Command Conventions and Terms

### 13.3 Console Command Conventions and Terms

Be sure to follow these guidelines when you type console commands:

- Type uppercase and lowercase letters exactly as they appear in command lines. The system treats uppercase and lowercase letters as different input.
- Press Return after you type a command.
- Enter number values as follows:
  - Enter decimal values as a string of decimal digits with no leading zeros (for example, 123).
  - Enter octal values as a string of octal digits with a leading zero (for example, 0177).
  - Enter hexadecimal values as a string of hexadecimal digits preceded by a zero and a lowercase letter (for example, 0xFE04).
- When reading or writing to memory, you have a choice of data sizes: byte, halfword, or word. Because a word is 4 bytes, successive addresses referenced by a word are successive multiples of 4. For example, the address following 0x80000004 is 0x80000008. You must specify an address that is on a boundary for the data size you are using.

## 13.3 Console Command Conventions and Terms

- The following key combinations have an immediate effect in console mode:
  - **Ctrl-s** freezes the screen display.
  - **Ctrl-q** releases a frozen screen display.
  - **Ctrl-c** aborts a command.
  - **Ctrl-u** erases a partially typed command line.

### 13.3.1 Console Command Conventions Used

- **Letters in bold face type** are to be typed exactly as they appear.
- *Letters in italic type* are variables that you replace with actual values. (Note that the help and menu screens display these variables in all capital letters.)
- Arguments enclosed in square brackets ([ ]) are optional.
- Ellipses (...) follow an argument that can be repeated.
- A vertical bar ( | ) separates choices. You can think of the bar as a symbol meaning *or*.
- Parentheses enclose a group of values from which you must select one value. For example, -(b | h | w) means enter -b or -h or -w.

### 13.3.2 Definition of Terms

- **Controller**  
A hardware device that directs the operation and communications flow to and from other devices or other controllers. Each system controller has a unique controller ID.

### 13.3 Console Command Conventions and Terms

- **Script**  
A collection of console commands that run in a set order. Test scripts, which are collections of individual tests and may also contain other test scripts, are commonly used for troubleshooting the system.
- **Slot**  
The physical location of a module or modules.
  - TURBOchannel option modules occupy slots 0, 1, and 2.
  - The base system occupies slot 3. Base system hardware includes the system module, CPU module, and memory modules. The system module contains the base system SCSI and Ethernet controllers.

## 13.4 Summary of Console Commands

### 13.4 Summary of Console Commands

Table 13–1 gives a brief explanation of the function of each of the console commands. A more detailed explanation of each command follows the table.

**Table 13–1 Console Commands**

| <b>Command</b> | <b>Description</b>                             | <b>Type</b>               |
|----------------|--|---------------------------|
| ?              | Displays list of console commands and formats. | Displays system info      |
| boot           | Boots system.                                  | Operational commands      |
| cat Script     | Lists test contained in script.                | Lists Diagnostic routines |
| cnfg           | Shows HW configuration.                        | Displays system info      |
| d              | Deposits data into memory.                     | Miscellaneous commands    |
| e              | Examines memory locations.                     | Miscellaneous commands    |
| erl            | Shows error history.                           | Displays system info      |
| go             | Goto an address.                               |                           |
| init           | Initializes system.                            | Operational commands      |
| ls #           | Lists scripts.                                 | Lists Diagnostic routines |
| passwd         | Sets console password.                         | Sets system parameters    |
| printenv       | Shows environmental variables.                 | Displays system info      |
| restart        | Restarts the system software.                  | Restarts software         |
| script_name    | Executes script.                               | Runs Diagnostics          |
| setenv         | Sets environmental variables.                  | Sets system parameters    |
| sh             | Executes script with options.                  | Runs Diagnostics          |
| t #/?          | Lists test for slot #.                         | Lists Diagnostic routines |
| t #/t_name     | Executes test on slot #.                       | Runs Diagnostics          |
| unsetenv       | Removes environmental variables.               | Sets system parameters    |

## 13.4 Summary of Console Commands

### 13.4.1 ? Command

Use the ? command to display a list of available console commands and their formats.

The ? command format is

? [*cmd*]

Keep the following points in mind about the ? command:

- To display the format for all available console commands, omit the optional *cmd* parameter.
- To display the format for a single command, replace the optional *cmd* parameter with the name of the command for which you want the format displayed.

### 13.4.2 boot Command

Use the boot command to start up the system software.

The boot command format is

**boot** [-z *seconds*] [-n] [*bootpath*] [-a] [*args...*]

Keep the following points in mind about the boot command:

- Include the optional -z *seconds* parameter if you want the system to wait a certain number of seconds before starting. Replace *seconds* with the number of seconds the system should wait before starting.
- Include the optional -n parameter to have the boot command load, but not execute, the specified file.
- Replace the optional *bootpath* parameter with the specification for the file you are using to boot. The file specification form depends on the type of boot device you use.
- To boot from Ethernet, use this form:  
*slot number/protocol[/file]*.
  - *slot number* is the slot number of the Ethernet controller you are using to boot.
  - *protocol* is the name of the network protocol that performs the boot operation—either mop or tftp.
  - *file* represents a specific file that you use to boot.

For example, to use the protocol named mop to boot from the base system Ethernet, which uses slot number 3, type **boot 3/mop** and press Return.

## 13.4 Summary of Console Commands

- To boot from a drive, use this form:  
*slot number/(rz | tz) scsi id/filename.*
  - *slot number* is the SCSI controller slot number.
  - Use **rz** to boot from a hard disk or compact disc drive; use **tz** to boot from a tape drive.
  - *scsi id* is the SCSI ID for the drive you are using to boot.
  - *file name* is the name of the specific file you want to boot.

To boot the file called **vmunix** from a tape drive that has SCSI ID 5 and is connected to a SCSI option module in slot 1, type **boot 1/tz5/vmunix** and press Return.

- To perform a multiuser boot operation, include the **-a** argument. If you omit the **-a** argument, the system performs a single-user boot. For example, to boot the file named **vmunix** in multiuser mode from a hard disk drive with SCSI ID 2 that is connected to the SCSI connector on the back of the system unit, type **boot 3/rz2/vmunix -a** and press Return.
- The TURBOchannel option in the lowest numbered slot will be your console device. To use a TURBOchannel graphics option as an additional video display in part of a multi-screen graphics configuration, include the **-mg** argument in the boot command. For example, type **boot 3/rz2/vmunix -a -mg**. The **-mg** argument can also be saved as a boot environment variable—for example: **setenv "boot/rz2/ -a -mg"**.
- If you do not include a bootpath in the boot command, the system uses the boot environment variable.
- If you include any additional arguments, you must type the entire boot command. The system ignores the boot environment variable whenever you specify any arguments in the boot command.

## 13.4 Summary of Console Commands

- If you use any spaces or tabs in the boot environment variable, you must surround the entire value with double quotation marks. For example, to set the boot environment variable to use the mop protocol to perform a multiuser boot from the base system Ethernet controller in slot 3, type **setenv boot "3/mop -a"**.

For details about the boot command parameters for each TURBOchannel option module, refer to the *TURBOchannel Options User's Guide*.

### 13.4.3 cat Command

Use the cat command to display the contents of a script.

The cat command format is

**cat** *slot-number/script-name*

- *slot-number* is the number of the module that has the contents you want to display. (The base system module is slot 3.)
- *script-name* is the name of the script for which you want to display the contents.

### 13.4.4 cnfg Command

Use the cnfg command to display hardware configuration information.

The cnfg command format is

**cnfg** [*slot-number*]

- To display general system configuration information, type the cnfg command without the *slot-number* parameter.
- To display detailed configuration information for an individual module, replace the optional *slot-number* parameter with the slot number of the module for which you want a configuration display.

This example shows a previously installed internal tape drive (tz1) connected to the system unit or base slot 3: The numbers in black circles are explained in the text that follows the example.

### 13.4 Summary of Console Commands

```

>>cnfg 3
❶ ❷          DEC      V1.0a          TCF0 ( 4 MB)          ❸
3:  KN04          (enet: 08-00-2b-30-14-df)❹
          (SCSI = 7)
          ❺  ❻          ❹
          -----
          DEV  PID          VID  REV  SCSI DEV
          =====
          tz1          SEQ
          cache: I(8 KB), D(8 KB), S(1024 KB); Scache line (32 bytes)
          R4000 revision (3.0)
          ❽  ❾          ❾
          mem( 0):  a0000000:a03ffffff ( 4 MB)
  
```

- ❶ Slot number.
- ❷ Model code of the hardware item. For example, KN04 is the model code of the system module.
- ❸ Module code. This code shows what kind of module is installed in the slot. Table 13–2 explains the codes.
- ❹ Ethernet address number.
- ❺ Device code with SCSI ID number of the device. For example, the entry of tz1 means that 1 is the SCSI ID number. Table 13–3 explains each device code.
- ❻ Product ID. Some devices have an entry in this column, but others do not.
- ❼ Device descriptor. This is a general description of the device. There are three device descriptors: DIR for direct access drives, such as hard disk and floppy drives; SEQ for sequential access drives, such as tape drives; and CD--ROM, for optical compact disc drives.
- ❽ Memory slot number.
- ❾ Amount of memory in the slot.

Table 13–2 show module codes, including examples of codes for some TURBOchannel option modules. For more information about specific option modules, refer to the documentation that came with the module.

## 13.4 Summary of Console Commands

**Table 13–2 Module Codes**

| Code      | Description  |
|-----------|--|
| MX        | Monochrome frame buffer.   |
| CX        | Color frame buffer.  |
| PX        | 2D graphics accelerator.   |
| DA: PXG   | Low 3D graphics accelerator. Installed in two adjacent slots, but shown as being installed in the lower-numbered slot.   |
| EA: PXG   | Mid 3D graphics accelerator. Installed in two adjacent slots, but shown as being installed in the lower-numbered slot.   |
| FA: PXG_T | High 3D graphics accelerator. Installed in all three slots, but shown as being installed in slot 1.  |
| SCSI      | SCSI module. Base slot 3 always has a SCSI module.   |
| enet :    | Ethernet module. Base slot 3 always has a ThickWire Ethernet module. Every Ethernet module has a unique Ethernet station address which identifies the module for the network software. The number after <code>enet :</code> is the Ethernet station address. |
| 4 MB      | Memory module. Base slot 3 always contains a memory module. The number indicates how many megabytes of memory are installed.   |

Table 13–3 describes each SCSI device code.

**Table 13–3 SCSI Device Codes**

| Device Code | Device Descriptor | Type of Drive            |
|-------------|-------------------|--------------------------|
| rx          | DIR               | Floppy disk and diskette |
| rz          | CD-ROM            | Optical compact disc     |
| rz          | DIR               | Hard disk                |
| tz          | SEQ               | Tape                     |

### 13.4.5 d Command

Use the `d` command to deposit values in memory.

The `d` command format is

```
d [-(b | h | w)] [-S count] rng
```

## 13.4 Summary of Console Commands

- Use one of the optional parameters `-(b | h | w)` to specify whether to deposit the contents as bytes (-b), halfwords (-h), or words (-w).
- Include the optional `-S count` parameter to store the same value more than once. Replace *count* with the number of times that you want the value to be stored.
- Use the *rng* parameter to set the range of addresses across which the values are stored.
  - To deposit values at a single address, replace *rng* with that address.
  - To deposit a number of values across a range of addresses, replace *rng* with the address range. Use the form *address-low:address-high* to define the range.

When you enter the address range, replace *address-low* with the starting address for storing values and replace *address-high* with the ending address for storing values.
- To examine values at a series of addresses, replace *rng* with the starting address and the number of successive addresses you want to examine.

Use the form *address-low # count* to specify the addresses where you store values. When you type this address range format, replace *address-low* with the starting address for storing values. Replace *count* with the number of addresses at which you want to store values.
- To specify more than one address range, separate each range specification with commas. Leave no spaces between the specifications.

### 13.4.6 erl Command

Use the `erl` command to display or clear the log of the errors that occurred since the most recent power-up or reset operation.

The `erl` command format is

**erl [-c]**

- To display the current error log, use the `erl` command without the `-c` option.
- To clear the error log, include the `-c` option. When the error log buffer is full, no more messages are added until the buffer is cleared by the `erl -c` command.

## 13.4 Summary of Console Commands

### 13.4.7 go Command

Use the go command to transfer system control to a specific system address.

The go command format is

**go** [*address*]

- To transfer system control to the address specified in the last boot -n command, type the go command without the *address* parameter. If you omit the *address* parameter, and if no previous boot -n command has been issued, the system ignores the go command.
- To transfer system control to the contents of a specific address, include the *address* parameter. Replace the *address* parameter with the address to which you want to transfer control.

### 13.4.8 init Command

Use the init command to initialize module hardware.

The init command format is

**init** [*slot-number*] [-m]

- To initialize the entire system, specify the init command with no additional arguments.
- To initialize an individual module, replace the optional *slot-number* parameter with the slot number of the module that you want to initialize.
- If you perform an init operation on the system module (slot 3), include the optional -m parameter to zero all memory modules in the system module.

### 13.4.9 ls Command

Use the ls command to list the scripts and other objects that are in system ROM.

The ls command format is

**ls** [*slot-number*]

- To display a list of scripts or other objects that are available in an individual module, replace the optional *slot number* parameter with the slot number of the module that contains the files you want to display.

## 13.4 Summary of Console Commands

### 13.4.10 passwd Command

Use the `passwd` command to enter, set, or clear a password.

The `passwd` command format is

**passwd** [-c] [-s]

- If the console prompt is `R>`, you can use only the `boot` and `passwd` commands until you enter the correct password.
- To enter an existing password, type **passwd** without any additional parameters. At the `pwd:` prompt, enter the password. Then press Return.
- After you enter the correct password, or if the system does not require a password, the system displays the console prompt (`>>`). You can use all console commands whenever the console prompt is `>>`.
- To clear an existing password, include the `-c` parameter when you type the `passwd` command. First use the `passwd` command to enter the existing password. After the console prompt `>>` appears, type **passwd -c** and press Return. The system then removes the password requirement.
- To set a new password, include the `-s` parameter. Enter the new password at the `pwd:` prompt. When the `pwd:` prompt appears a second time, type the password again. If the two password entries match, the system sets the new value as the password.
- The password must have between 6 and 32 characters. The system is case-sensitive and treats uppercase and lowercase letters as different characters.

### 13.4.11 printenv Command

Environment variables set system operating conditions. You can display (using `printenv`), set or change (using `setenv`), and remove (using `unsetenv`) environment variables with console commands. Table 13–4 later in this appendix lists the environment variables you can set.

The `printenv` command format is

**printenv** [*variable*]

- To display the entire list of environment variables, omit the optional *variable* parameter.
- To display an individual environment variable, replace *variable* with the name of the environment variable you want to display.

## 13.4 Summary of Console Commands

### 13.4.12 restart Command

Use the restart command to restart the system software. For the restart operation to succeed, the operating system software must have a restart block set up in memory.

The restart command format is

**restart**

### 13.4.13 script Command

Use the script command to create a temporary set of console commands that run in an order you specify.

The script command format is

**script** *name*

- When you type the script command, replace *name* with the name you are giving the script. Then press Return.  
After you press Return, type the commands you want to include in the script. Press Return after each command you type. Commands can be `t` or `sh` commands. Enter one command per line. When you finish typing the commands, press `Ctrl-d` or press Return twice to complete the script.
- To run the script, use the `sh` command. When you run the script, the commands execute in the order in which you entered them when you created the script.

### 13.4.14 setenv Command

Environment variables set system operating conditions. You can display (using `printenv`), set or change (using `setenv`), and remove (using `unsetenv`) environment variables with console commands. Table 13–4 lists the environment variables you can set.

The `setenv` command format is

**setenv** *variable value*

- Replace *variable* with the name of the environment variable you want to set.
- Replace *value* with the new value you want to assign to the environment variable. Note that if the new value contains blank spaces or tabs, you must use double quotation marks (") at the beginning and end of the value.

## 13.4 Summary of Console Commands

**Table 13–4 Environment Variables**

| Environment Variable | Description  |
|----------------------|--|
| boot                 | Sets the default boot path.  |
| console              | Selects the system console. <ul style="list-style-type: none"><li>• Set the console variable to <code>s</code> to enable the terminal connected to the communications connector as the active console.<br/>If the console variable is set to anything other than <code>s</code>, the monitor connected to the graphics module in the lowest-numbered slot is enabled.</li></ul>  |
| haltaction           | Specifies how the system responds if it halts. <ul style="list-style-type: none"><li>• Set the haltaction variable to <code>b</code> to cause the console to boot after the console performs the appropriate initialization and self-tests.</li><li>• Set the haltaction variable to <code>h</code> to cause the console to halt and attempt no other action.</li><li>• Set the haltaction variable to <code>r</code> to cause the console to restart and then attempt to boot if the restart operation fails.</li></ul> |
| more                 | Sets the way in which the screen scrolls lines of text. <ul style="list-style-type: none"><li>• Set the more variable to <code>0</code> to have text scroll to the end before stopping.</li><li>• Set the more variable to a number other than zero to have scrolling pause after that number of lines has been displayed.</li></ul>   |
| osconsole            | Contains the slot numbers of the console drivers. If a TTY driver from slot <code>x</code> serves as the console, <code>osconsole</code> is set to <code>x</code> . If a CRT driver from slot <code>y</code> and a kbd driver from slot <code>z</code> serve as the console, <code>osconsole</code> is set to <code>y,z</code> .<br>Although the environment variable <code>display</code> includes the <code>osconsole</code> setting, you cannot set this variable. It is automatically set by the system.             |
| testaction           | Specifies the type of power-up self-test the system runs. <ul style="list-style-type: none"><li>• Specify <code>q</code> to run a quick test when the power-up self-test runs.</li><li>• Specify <code>t</code> to run a thorough test when the power-up self-test runs.</li></ul>   |

(continued on next page)

## 13.4 Summary of Console Commands

Table 13–4 (Cont.) Environment Variables

| Environment Variable | Description   |
|----------------------|---|
| #                    | <p>Specifies the slot number of the module that contains the current script. If no script is active, the system specifies the base system module, which uses slot number 3.</p> <p>Although the environment variable display includes the # setting, you cannot set this variable. It is automatically set by the system.</p> |

### 13.4.15 sh Command

Use the sh command to run a script.

The sh command format is

**sh** [-b] [-e] [-l] [-v] [-S] [*slot-number/script*] [*arg...*]

- Include the optional -b parameter to execute the script directly, instead of through a subshell.
- Include the optional -e parameter to stop the script if an error occurs.
- Include the optional -l parameter to have the script loop until you press Ctrl-c.
- Include the optional -v parameter to echo the script to the console as the test runs.
- Include the optional -S parameter to suppress any error messages if the script is not found.
- Include the optional *slot number/script* parameter to run a specific script.
  - *slot number* is the slot number of the module that has the script you want to run.
  - *script* is the name of the script you want to run.
- You can also run a script by typing *slot number/script*.
  - *slot number* is the slot number of the module that contains the script you want to run.
  - *script* is the name of the script you want to run.

For example, to run the thorough power-up self-test script for a SCSI controller and drives in slot 2, type **sh 2/pst-t** and press Return.

## 13.4 Summary of Console Commands

### 13.4.16 t Command

Use the `t` command to run individual tests.

The `t` command format is

`t [-l] slot name / test name [arg...]`

- Include the optional `-l` parameter to have the test loop until you press Ctrl-c or reset the system.
- Replace *slot number* with the slot number of the module you want to test.
- Replace *test name* with the name of the individual test you want to run.

To display the name and format of all individual tests for a module, type `t slot number / ?`, (replacing *slot number* with the slot number of the module for which you want to display tests) and press Return.

### 13.4.17 test Command

Use the `test` command to run a thorough test of all system hardware.

The `test` command format is

`test`

### 13.4.18 unsetenv Command

Environment variables set system operating conditions. You can display (using `printenv`), set or change (using `setenv`), and remove (using `unsetenv`) environment variables with console commands. Table 13–4, earlier in this appendix, lists the environment variables you can set.

The `unsetenv` command removes a standard environment variable (except `osconsole` and `#`) during the current session only. When the system is reset, reinitialized, or powered up, the values of the standard environment variables revert to their previously set values.

The `unsetenv` command format is

`unsetenv variable`

When you type the `unsetenv` command, replace *variable* with the name of the environment variable you want to remove.

# 14

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## Troubleshooting

This chapter describes the following topics:

- Where to Look for Troubleshooting Information
- Checking the Diagnostic Lights
- Solving Common Problems
- Running a Self-Test
- Interpreting Self-Test Messages
- Contacting Your Digital Service Representative

### 14.1 Where to Look for Troubleshooting Information

- If some part of your workstation fails to turn on, see Section 14.2.
- If the workstation turns on, but a component does not function properly, see Section 14.3.
- If the workstation turns on and everything is connected, but the workstation still does not function properly, see Section 14.4 and Section 14.5.
- If you need to contact your Digital service representative, see Section 14.6.

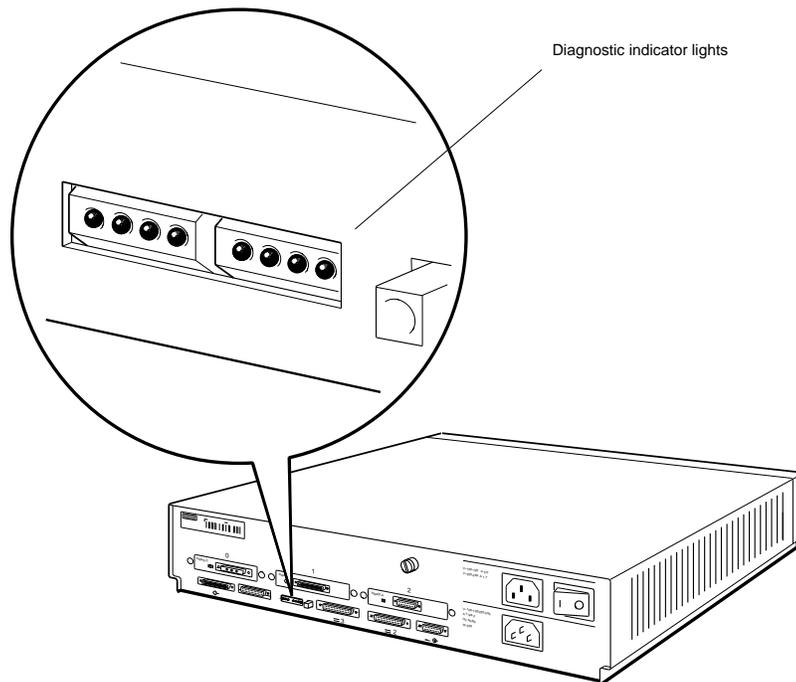
## 14.2 Checking the Diagnostic Lights

### 14.2 Checking the Diagnostic Lights

The diagnostic indicator lights are eight small lights on the back of the system unit. They show whether the basic components of the workstation are turned on and ready for use.

If the workstation does not turn on and no error message appears on the monitor, the pattern of the indicator lights indicates which portion of the power-up self-test failed.

**Figure 14–1 Diagnostic Indicator Lights**



WS331010

Table 14–1 explains how to interpret the diagnostic indicator lights. If you have a problem, call your system manager or Digital service representative. This information will be useful in diagnosing the problem.

## 14.2 Checking the Diagnostic Lights

**Table 14–1 Interpreting Diagnostic Indicator Lights**

| Lights <sup>1</sup> | Meaning  |
|---------------------|--|
| • • • •             | Workstation hardware initialization could not begin.   |
| ○ ○ • •             | The firmware could not calculate the cache size.   |
| ○ ○ • •             | The firmware could not calibrate the millisecond delay loop.   |
| ○ ○ • •             | The firmware could not start the power-up vs. reset code.  |
| ○ ○ • •             | Memory bank 0 could not be initialized.  |
| ○ ○ • •             | The firmware could not initialize the IO ASIC to a known state.  |
| ○ ○ • •             | The read-only memory (ROM) in the system module or in one of the option modules could not be initialized.  |
| ○ ○ • •             | The system console programs could not be initialized.  |
| ○ ○ ○ ○             | The system module or one of the option modules could not be initialized. The lights on the left show the slot number of the module. This table shows slot numbers 0 (○ ○ ○ ○) to 3 (○ ○ • •).  |
| ○ ○ ○ •             |  |
| ○ ○ • ○             |  |
| ○ ○ • •             |  |
| ○ ○ ○ ○             | The workstation was initialized, but there is a problem in the system module or one of the option modules. The lights on the left show the slot number of the module with the problem. This table shows slot numbers 0 (○ ○ ○ ○) to 3 (○ ○ • •). |
| ○ ○ ○ •             |  |
| ○ ○ • ○             |  |
| ○ ○ • •             |  |
| ○ ○ ○ ○             | The workstation software could not be loaded. The lights on the left show the slot number of the module where the software is stored. This table shows slot numbers 0 (○ ○ ○ ○) to 3 (○ ○ • •).  |
| ○ ○ ○ •             |  |
| ○ ○ • ○             |  |
| ○ ○ • •             |  |

<sup>1</sup>Light on = ○ off = •

## 14.3 Solving Common Problems

### 14.3 Solving Common Problems

Many problems that you might have can be solved easily. Table 14–2 lists some problems and gives some solutions. If these solutions do not work, call your system manager or Digital service representative.

**Table 14–2 Solutions to Common Problems**

| <b>Problem</b>                               | <b>Solution</b>   |
|--|---|
| The screen is blank.                         | <ul style="list-style-type: none"><li>• Press any key on your keyboard. If your screen saver was active, the display will reappear (if the operating system is up and in multi-user).</li><li>• Make sure the system unit and monitor are turned on.</li><li>• Adjust the brightness and contrast controls.</li><li>• Turn off the system unit and monitor.</li><li>• Make sure the system unit power cord and the monitor-to-system-unit power cable or the monitor power cord are connected correctly.</li><li>• Make sure the video cable is securely connected to the monitor and system unit.</li><li>• Turn on the system unit and monitor.</li></ul> |
| The screen display is distorted or unstable. | <ul style="list-style-type: none"><li>• Shut down your workstation software, if necessary, and turn off the system unit and monitor.</li><li>• Make sure the video cable connectors are correctly attached to the monitor and system unit.</li><li>• Turn on the system unit and monitor.</li></ul>   |

(continued on next page)

## 14.3 Solving Common Problems

**Table 14–2 (Cont.) Solutions to Common Problems**

| <b>Problem</b>   | <b>Solution</b>   |
|--|---|
| Color is distorted or unclear.   | <ul style="list-style-type: none"><li>• Move electromechanical devices, such as magnetic paper clip holders and electric pencil sharpeners, away from the monitor.</li><li>• If your monitor has a degauss button, press it for 5 seconds. If the monitor has no degauss button, turn the monitor off and then on again.</li><li>• See the manuals for your monitor for further troubleshooting instructions.</li></ul>                       |
| Red or blue is missing from the display on your color monitor.                     | <ul style="list-style-type: none"><li>• Shut down your workstation software and turn off the system unit and monitor.</li><li>• Make sure that the video cable connectors are attached correctly to the monitor. (Chapter 3 explains how to connect the monitors.)</li><li>• Turn on the system unit and monitor.</li></ul>   |
| The DIGITAL logo is red instead of blue on the login screen on your color monitor. | <ul style="list-style-type: none"><li>• Shut down your workstation software and turn off the system unit and monitor.</li><li>• Remove the video cable connector from the video connector on the system unit.</li><li>• Unplug the cable connector. Holding the cable connector so that the widest part of the connector is on top, reattach the cable connector to the system unit.</li><li>• Turn on the system unit and monitor.</li></ul> |

(continued on next page)

## 14.3 Solving Common Problems

**Table 14–2 (Cont.) Solutions to Common Problems**

| <b>Problem</b>  | <b>Solution</b>   |
|---|---|
| Nothing happens on the screen when you type.  | <ul style="list-style-type: none"><li>• Check the Hold Screen indicator light on the keyboard. If the light glows green, press the Hold Screen key. If you are in console mode, press Ctrl/Q to release the Hold Screen.</li><li>• Turn your system off, and back on.</li><li>• Disconnect the keyboard cable from its connector on the keyboard-mouse connector block and then reconnect it.</li><li>• Make sure that the keyboard-mouse cable is firmly attached to the system unit and turn on the system unit.</li><li>• Turn off the system unit and monitor, connect another keyboard, and turn on the system unit and monitor again.</li></ul> |
| You cannot connect to your networks, and you know the workstation and network software are functioning. | <ul style="list-style-type: none"><li>• Shut down your workstation software and turn off the system unit.</li><li>• Make sure that the Ethernet connectors on the system unit are attached correctly (see Chapter 6). If you are using adapters to connect ThinWire or twisted-pair Ethernet cable to your workstation, check those connectors, too.</li><li>• Turn on the system unit.</li></ul>   |

(continued on next page)

## 14.3 Solving Common Problems

**Table 14–2 (Cont.) Solutions to Common Problems**

| <b>Problem</b>  | <b>Solution</b>  |
|---|--|
| No cursor appears on the screen.  | <ul style="list-style-type: none"><li>• Check the Hold Screen indicator light on the keyboard. If the light glows green, press the Hold Screen key.</li><li>• Move the mouse around on your desktop, or move the puck or stylus around on your tablet, to see if you accidentally moved the cursor off the screen.</li><li>• Shut down your workstation software and turn off the system unit.</li><li>• Make sure that the mouse cable is correctly connected to the keyboard-mouse connector blocks and the keyboard-mouse cable is correctly connected to the system unit.</li><li>• Turn on the system unit.</li><li>• If the problem is not fixed, install another mouse or tablet.</li></ul> |
| The cursor on the screen fails to follow the movement of your pointing device (mouse, puck, or stylus). | <ul style="list-style-type: none"><li>• Shut down your workstation software and turn off the system unit.</li><li>• Make sure that the cable for the device is connected securely to the keyboard-mouse connector block and to the device itself.</li><li>• Turn on the system unit.</li><li>• If the problem is not fixed, install another pointing device.</li></ul>   |

(continued on next page)

## 14.3 Solving Common Problems

**Table 14–2 (Cont.) Solutions to Common Problems**

| <b>Problem</b>   | <b>Solution</b>  |
|--|--|
| You cannot install workstation software from an external storage device. | <p><i>If you have only one external storage device,</i></p> <ul style="list-style-type: none"><li>• Make sure that the device is turned on, and that the power outlet it is plugged into has power.</li><li>• Use the <code>cnfg</code> command to determine whether the workstation is configured for the device.</li><li>• If the device is missing from the display, turn off the device and the system unit.</li><li>• Make sure that the system unit expansion cable is correctly connected to the device and the system unit.</li><li>• Make sure that a terminator is correctly attached to the second SCSI connector on the device.</li><li>• Turn on the device and the system unit.</li><li>• If the problem is still not fixed, look in the manuals for the devices and the installation guide for your workstation software.</li></ul> |

(continued on next page)

## 14.3 Solving Common Problems

**Table 14–2 (Cont.) Solutions to Common Problems**

| Problem  | Solution  |
|--|---|
| <p>A red light blinks rapidly on the front of your TK50Z tape drive.</p> | <p><i>If you have more than one external storage device,</i></p> <ul style="list-style-type: none"> <li>• Make sure that all the devices are turned on, and that the power outlets they are plugged into have power.</li> <li>• Type <b>cnfg</b> and the number of the slot in which the device is connected.<br/>If the device does not appear in the configuration display on the screen, turn off all devices connected to the system unit and then turn off the system unit. Then see the instructions for installing the device in Chapter 11. (For a discussion of configuration displays, see Section 13.4.4.)</li> <li>• If the device is listed properly in the configuration display and it is an external device, make sure the SCSI and power cables are connected to all the devices in the chain and to the system unit. The SCSI cables between devices should be 18-inch Digital cables. Make sure that a terminator is firmly attached to the second connector on the last device in the chain.</li> <li>• Make sure that the total length of all internal and external SCSI cable does not exceed 236 inches (6 meters). (See Table 7–1 for a list of SCSI cable lengths.) Remember that cable length calculations <i>must</i> include the length of the cable in each device box and in the base system.</li> <li>• Turn on the system unit and the devices.</li> <li>• If the problem is not fixed, look in the manuals for the devices and in the installation guide for your workstation software.</li> </ul> |
|  | <ul style="list-style-type: none"> <li>• Push the load/unload button four times.</li> <li>• Turn the tape drive off and then on once.</li> </ul>  |

(continued on next page)

## 14.3 Solving Common Problems

**Table 14–2 (Cont.) Solutions to Common Problems**

| Problem   | Solution  |
|---|---|
| Nothing happens when you try to use your printer. | <ul style="list-style-type: none"><li>• Make sure the printer is turned on.</li><li>• Check your workstation and communications software to be sure that the device is installed and enabled properly.</li><li>• Check your system software to be sure that the printer is installed in the software.</li><li>• Shut down your workstation software, if necessary, and turn off the printer and the system unit.</li><li>• Make sure that the printer power cord is connected to an active power source.</li><li>• Make sure that the printer cable connector is correctly attached to one of the communications connectors on the system unit.</li><li>• Turn on the system unit and the printer.</li><li>• If the problem is not fixed, see the manuals for your printer.</li></ul> |

(continued on next page)

## 14.3 Solving Common Problems

**Table 14–2 (Cont.) Solutions to Common Problems**

| <b>Problem</b>   | <b>Solution</b>  |
|--|--|
| Nothing happens when you try to use a communications device. | <ul style="list-style-type: none"><li>• Make sure that the device is turned on.</li><li>• Shut down your workstation software, if necessary, and turn off the device and the system unit.</li><li>• Make sure that the device power cord is connected to an active power source.</li><li>• Make sure that the connector on the communications device cable is correctly attached to the communications connector or the communications connector adapter on the system unit.</li><li>• Make sure that the right type of cable is connected to the device. Check the guide that came with the device to determine the proper cables.</li><li>• Verify that the proper type of cable is being used.</li><li>• Turn on the system unit and the device.</li><li>• If the problem is not fixed, see the manuals for the device.</li></ul> |

## 14.4 Running a Self-Test

### 14.4 Running a Self-Test

Self-tests are programs that check your workstation hardware to be sure that it is functioning properly.

The workstation runs a set of power-up self-tests automatically when you turn on the power. It can run two versions of the set, depending on the setting of the testaction environment variable. (Section 13.4.14 explains how to set environment variables.)

You can run the full set of self-tests, collectively called the system self-test, at any time. However, you must shut down your ULTRIX workstation software first. To do so, type **shutdown -h now** at the ULTRIX prompt and press Return. Then, at the console prompt (>>), type **test** and press Return.

Self-tests have numerous subtests that examine specific workstation components. When a subtest discovers a problem, it displays a coded error message on the screen. When all the tests are done, the workstation displays the console prompt (>>).



## 14.5 Interpreting Self-Test Messages

**Table 14–3 Self-Test Error Messages for the Base System Slot**

| Message   | Explanation   |
|---|---|
| cache/data<br>cache/fill<br>cache/isol<br>cache/reload<br>cache/seg | The RAM cache in the CPU module is faulty. Copy the entire message and call your system manager or Digital service representative.  |
| fpu   | The math coprocessor in the CPU module is faulty. Copy the entire message and call your system manager or Digital service representative.   |
| mem   | <p>RAM is faulty. Make sure that all memory modules are firmly seated in their connectors in the system unit. Then run the memory test. Type <b>t 3/mem *</b> and press Return. The memory test checks every memory module, taking several minutes for each one. If it finds a problem, it displays one of two types of message. The first type of message has this format:</p> <pre>?TFL: 3/mem (PER, cause=0000001C, DBE = 004000c, Bank 1, D16-31, d23-d16)</pre> <p>The message identifies the faulty memory modules. The bank number is the number of the memory slot. Bank 1 is the bank number in the example. Bank numbers can be 0 to 7. Bank 0 is the memory slot nearest the back of the system unit; bank 7 is the slot nearest the front. The SIMM number is the memory module in the slot. D16-31 is the SIMM number in the example. SIMM numbers can be D0-15 or D16-31. D0-15 is the memory module next to the power supply; D16-31 is the memory module farthest away from the power supply.</p> <p>You should replace every memory module for which an error message appears. (Chapter 5 explains how to replace memory modules.)</p> <p>If the messages show that all memory modules are faulty, remove all of them. Then install at least 8 megabytes of memory with new memory modules and run the system memory test again. If the test still reports a problem, copy the entire message and call your system manager or Digital service representative.</p> <p>The second type of message that the memory test displays has this format:</p> <pre>?TFL: 3/mem (@ A04000000=55550055, sb 55555555)</pre> <p>The message indicates that a memory module does not read and write values correctly. If this type of message appears, copy the entire message and call your system manager or Digital service representative.</p> |

(continued on next page)

## 14.5 Interpreting Self-Test Messages

**Table 14–3 (Cont.) Self-Test Error Messages for the Base System Slot**

| Message     | Explanation   |
|-------------|---|
| mem/float10 | A part of the memory module failed to read and write a one and zero pattern. Copy the entire message and call your system manager or Digital service representative.  |
| mem/init    | The system could not write a pattern of zeros to the memory module. Copy the entire message and call your system manager or Digital service representative.   |
| mem/select  | The workstation could not read and write a pattern to a memory module correctly. Copy the entire message and call your system manager or Digital service representative.  |
| misc/halt   | The halt button or the built-in halt program is faulty. Copy the entire message and call your system manager or Digital service representative.   |
| misc/kbd    | The keyboard, keyboard cable, or keyboard connectors are faulty. Make sure that the cable is connected properly (see Chapter 3). Then turn the system unit off and on again. If the message appears again, try replacing first the keyboard cable and then the keyboard. If the message still appears, copy the entire message and call your system manager or Digital service representative.  |
| misc/mouse  | The mouse, mouse cable, or mouse connector is faulty. Make sure that the cable is connected properly (see Chapter 3). Then turn the system unit off and on again. If the message appears again, replace the mouse. If your workstation is connected to a network, disconnect from the network, attach the loopback connector, and retry the test. If the message still appears, copy the entire message and call your system manager or Digital service representative. |
| misc/pstemp | The flow of air through the system unit is inadequate, or the temperature in your office is more than 104°F (40°C). Make sure that there is at least 4 inches (10 cm) between the vents in the system unit cover and other items on your worktable. Then turn the system unit off, wait a moment, and turn it on. If the message still appears, turn off the system unit, copy the entire message, and call your system manager or Digital service representative.      |
| misc/wbpart | The CPU module or system memory is faulty. Copy the entire message and call your system manager or Digital service representative.  |

(continued on next page)

## 14.5 Interpreting Self-Test Messages

**Table 14–3 (Cont.) Self-Test Error Messages for the Base System Slot**

| Message  | Explanation  |
|--|--|
| ni/cllsn<br>ni/common<br>ni/crc<br>ni/ctrs<br>ni/dma1<br>ni/dma2<br>ni/int<br>ni/int-lb<br>ni/m-cst<br>ni/promisc<br>ni/regs<br>ni/setup | The Ethernet controller in the base system slot is faulty. Copy the entire message and call your system manager or Digital service representative.   |
| ni/esar  | The Ethernet address chip is faulty. Copy the entire message and call your system manager or Digital service representative.   |
| ni/ext-lb  | The built-in Ethernet connector in the base system slot or the loopback connector attached to the Ethernet connector is faulty. Replace the loopback connector, if there is one, or make sure that the network cable is connected properly (see Chapter 6). If this message still appears, copy the entire message and call your system manager or Digital service representative. |
| rtc/nvr<br>rtc/period<br>rtc/regs<br>rtc/time  | Interrupt handling or timekeeping in the system module is faulty. Copy the entire message and call your system manager or Digital service representative.  |
| scache/data  | The secondary cache on the CPU daughter card is faulty. Copy the entire message and call your system manager or Digital service representative.  |
| scc/access<br>scc/dma  | The controller for a communications connector is faulty. Copy the entire message and call your system manager or Digital service representative.   |
| scc/int  | The controller for a communications device fails to interrupt the communications signals when appropriate. Copy the entire message and call your system manager or Digital service representative.   |

(continued on next page)

## 14.5 Interpreting Self-Test Messages

**Table 14–3 (Cont.) Self-Test Error Messages for the Base System Slot**

| Message            | Explanation  |
|--------------------|--|
| scc/io             | The controller for one of the communications connectors, the connector itself, or a cable attached to the connector is faulty. Make sure that the cables to all your communications devices are plugged in. Then turn the system unit off and on. If the message still appears, copy the entire message and call your system manager or Digital service representative.  |
| scc/pins           | One of the communications connectors is faulty. Copy the entire message and call your system manager or Digital service representative.  |
| scc/tx-rx          | The controller for one of the communications connectors, the connector itself, or a cable attached to the connector is faulty. Make sure that the cables to all your communications devices are plugged in. Then turn the system unit off and on. If the message still appears, copy the entire message and call your system manager or Digital service representative.  |
| scsi/cntl          | The controller for the built-in SCSI connector in the base system slot is faulty. Turn the system unit off and on. If the test message still appears, copy the entire message and call your system manager or Digital service representative. Note that you can still use SCSI connectors in the option slots.   |
| scsi/sdiag         | A SCSI device connected to the built-in SCSI connector in the base system slot is faulty, or one of the SCSI cables that is connected to a device in that slot is faulty. Make sure that all SCSI cables are plugged in securely. If you connected a chain of external devices to the slot, make sure that the last device has a SCSI terminator on the unused SCSI connector. Then turn the system unit off and on. If the test message still appears, copy the entire message and call your system manager or Digital service representative. Note that you can still use SCSI connectors in the option slots. |
| tlb/prb<br>tlb/reg | The CPU module is faulty. Copy the entire message and call your system manager or Digital service representative.  |

## 14.6 Contacting Your Digital Service Representative

### 14.6 Contacting Your Digital Service Representative

If you follow the recommendations in this chapter and your system problem continues, call your Digital service representative.

The service representative at the center will ask the following questions, so be prepared with the answers.

- What kind of workstation do you have?
- What is its serial number?
- How much memory does it have?
- What kind of monitor is connected to it?
- What internal drives does it have?
- What external storage devices and other options does it have?
- What is wrong?
- What error messages were displayed? What diagnostic indicator lights were on?
- Did you try to fix the problem yourself? What did you do?

The service representative will try to help you fix the problem while you are on the telephone, so make your call from a telephone near the workstation.

# **Part V**

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## **Appendixes**



# A

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## Regulatory Information for the UK

This appendix provides information on the DECstation 5000 Model 150 workstation that is required by the United Kingdom.

- Service Requirements
- Approvals for Digital Circuits
- Host Independent Approvals
- Host Power Rating
- Environmental Conditions
- Apparatus Between the Approved Apparatus and a Digital Circuit (PTT)

The DECstation 5000 Model 150 workstation is manufactured by Digital Equipment Corporation. The model number of the communication option is PMBA-AA.

## A.1 Service Requirements

### A.1 Service Requirements

Table A–1 describes the service category, interface type, data rate, physical and electrical requirements, and PTO for the PMBA-AA.

**Table A–1 PMBA-AA Service Requirements**

| Service Category | Interface Type | Data Rate | Physical Requirements | Electrical Requirements | PTO BT <sup>1</sup> /Hull <sup>2</sup> /MCL <sup>3</sup> |
|------------------|----------------|-----------|-----------------------|-------------------------|--|
| 1                | CCITT          | 2400      | ISO 2110              | V.24/V.28               | Yes/Yes/Yes  |
|                  | Recommend      | 4800      |                       |                         | Yes/Yes/Yes  |
|                  | X.21bis        | 9600      | BS.6623:              | Cable:                  | Yes/Yes/Yes  |
|                  |                | 19200     | Part 1<br>1985        | BC22F-10<br>BC22F-25    | No/No/Yes  |

<sup>1</sup>BT - British Telecommunications plc

<sup>2</sup>Hull - Kingston Communications (Hull) plc

<sup>3</sup>MCL - Mercury Communications Limited

The maximum approved cable length is 25 feet, comprising:

Cat 1    V.24    25 feet for extension    BC22F-25

### A.2 Approvals for Digital Circuits

The PMBA-AA is approved for direct connection to a particular digital circuit. This approval includes interconnecting cable with mating connectors conforming to BS6623 part 1 and part 4.

If the product is connected to the service with anything other than its own approved cables, those cables must benefit from the relevant general approval and/or conform with any other applicable requirements.

Interconnection directly, or by way of other apparatus, of ports marked by the safety warning label with other ports that are marked or not so marked, may produce hazardous conditions on the network. Seek advice from a competent engineer before making any such connection.

## A.3 Host Independent Approvals

### A.3 Host Independent Approvals

The PMBA-AA is approved only for installation in an approved host with approved attachments. For approval, the host and host attachments must be either:

- Type-approved (meaning the equipment is built exactly like the models that were originally approved)
- Marked with or supplied with a statement that the host is supplied under General Approval Number NS/G/1234/J/100003, if the equipment was supplied after 1st March 1989.

Except at the edge connector which plugs into the host's expansion slot, clearance and creepage distances of Xmm and Ymm, as listed in Table A-2 must be maintained between the PMBA-AA and other parts of the host, including any other expansion cards fitted.

**Table A-2 Clearance and Creepage Specs for PMBA-AA**

| Clearance<br>Xmm | Creepage<br>Ymm | Voltage <sup>1</sup> |
|------------------|-----------------|----------------------|
| 2.0              | 2.4 (3.8)       | up to 50             |
| 2.6              | 3.0 (4.8)       | up to 125            |
| 4.0              | 5.0 (8.0)       | up to 250            |
| 4.0              | 6.4 (10.0)      | up to 300            |

<sup>1</sup>Used or generated by other parts of the host or expansion card (Vrms or Vdc)

Clearance is the shortest distance in air between two points. Creepage is the shortest distance along continuous solid parts between the same two points. The creepage distances apply when installed in a normal office environment. The creepage distance shown in parentheses apply where the local environment within the Host Computer is subject to conductive pollution or dry non-conductive pollution which could become conductive due to condensation. These distances can be checked by measuring between the adjacent parts.

If in doubt, advice should be obtained from a competent telecom safety engineer. Failure to install the PMBA-AA in accordance with these instructions will invalidate the approval.

## A.4 Host Power Rating

### A.4 Host Power Rating

The user must ensure that the power drawn by the PMBA-AA, together with the host and other auxiliary apparatus drawing power from the host, is within the rating of the host power supply.

Digital has designed all permutations of the host configuration to operate within the limits of the host power rating.

**Table A-3 Module Power Rating for PMBA-AA**

| Supply (+/- 4%)<br>(Volts) | Maximum Current<br>( Amps) | Typical Current<br>(Amps) |
|----------------------------|----------------------------|---------------------------|
| +5.1                       | 16                         | 4.0                       |
| +12.1                      | 3.0                        | 0.4                       |

## A.5 Environmental Conditions

See Appendix B for environmental information.

### A.6 Apparatus Between the Approved Apparatus and a Digital Circuit (PTT)

If any apparatus, including cable or wiring, is to be connected between the approved apparatus and the point of connection to any particular digital circuit, all the other apparatus must conform as follows:

1. The overall transmission characteristics of all the other apparatus shall be such as to introduce no material effect upon the electrical conditions presented to one another by the apparatus and the particular digital circuit.
2. All the other apparatus shall comprise only:
  - Apparatus approved (such apparatus may be subject to limitations on its use) for the purpose of connection between the apparatus and a particular digital circuit.
  - Cable or wiring complying with a code of practice for the installation of apparatus covered by this standard or such other requirements as may be applicable.

# B

---

## Equipment Specifications

This appendix lists the physical specifications, operating conditions, and nonoperating conditions for the following equipment:

- DECstation 5000 Model 150 System Unit
- RZ23L Hard Disk Drive
- RZ24L Hard Disk Drive
- RZ25 Hard Disk Drive
- RZ26 Hard Disk Drive
- RX23 Diskette Drive
- RRD42 Compact Disc Drive
- TZK10 Tape Drive
- TLZ06 Tape Drive

## B.1 DECstation 5000 Model 150 System Unit

## B.1 DECstation 5000 Model 150 System Unit

**Table B-1 System Unit Description**

---

|                    |  |
|--------------------|--|
| Dimensions         |  |
| – Weight           | 12.70 to 22.70 kg (28.00 to 50.00 lb)        |
| – Height           | 10.16 cm (4.00 in)                           |
| – Width            | 51.03 cm (20.09 in)                          |
| – Depth            | 43.48 cm (17.12 in)                          |
| Input voltage      | Auto adjust 100–120 Vac or 220–240 Vac       |
| Input current      | 4.2 A at 100–120 Vac<br>2.3 A at 220–240 Vac |
| Power              |  |
| – Frequency        | 50 to 60 Hz                                  |
| – Heat dissipation | 302 W, maximum                               |

---

**Table B-2 System Unit Operating Conditions**

---

|                                |                               |
|--------------------------------|-------------------------------|
| Temperature range <sup>1</sup> | 10°C to 35°C (50°F to 95°F)   |
| Temperature change rate        | 11°C (20°F) per hour, maximum |
| Relative humidity              | 10% to 90%, noncondensing     |
| Maximum wet-bulb temperature   | 28°C (82°F)                   |
| Minimum dew-point temperature  | 2°C (36°F)                    |
| Altitude                       | 2438 m (8000 ft) maximum      |

---

<sup>1</sup>Reduce maximum temperature by 1.8°C for each 1000 meter (1.0°F for each 1000 ft) increase in altitude.

---

**Table B-3 System Unit Nonoperating Conditions**

---

|                              |                                |
|------------------------------|--------------------------------|
| Temperature range            | –40°C to 66°C (–40°F to 151°F) |
| Relative humidity            | 10% to 95%, noncondensing      |
| Maximum wet-bulb temperature | 46°C (115°F), packaged         |
| Altitude                     | 4977 m (16,000 ft) maximum     |

---

## B.1 DECstation 5000 Model 150 System Unit

**Table B-4 Acoustics—Preliminary Declared Values per ISO 9296 and ISO 7779**

|           | $L_{WA,d}$ | $L_{pAm}$ (operator position) |
|-----------|------------|-------------------------------|
| Idle      | 4.8 bels   | 32 dBA                        |
| Operating | 4.8 bels   | 32 dBA                        |

## B.2 RZ23L Hard Disk Drive

**Table B-5 RZ23L Hard Disk Drive Description**

|                         |                    |
|-------------------------|--------------------|
| Internal drive          |                    |
| – Weight                | 0.54 kg (1.20 lb)  |
| – Height                | 2.54 cm (1.00 in)  |
| – Width                 | 10.16 cm (4.00 in) |
| – Depth                 | 14.61 cm (5.75 in) |
| Capacity                |                    |
| – Bytes per drive       | 121.65 M           |
| – Blocks per drive      | 237,588            |
| – Block size            | 512 bytes          |
| Data transfer rate      |                    |
| – Bus asynchronous mode | 3.0 MB/s           |
| – Bus synchronous mode  | 4.0 MB/s           |
| – To and from media     | 1.5 MB/s           |
| Seek time               |                    |
| – Track-to-track        | 8 ms               |
| – Average               | 19 ms              |
| – Maximum               | 35 ms              |
| Average latency         | 8.8 ms             |
| Interface               | SCSI               |

## B.2 RZ23L Hard Disk Drive

**Table B–6 RZ23L Hard Disk Drive Operating Conditions**

---

|                                |                                     |
|--------------------------------|-------------------------------------|
| Temperature range <sup>1</sup> | 10°C to 55°C (50°F to 131°F)        |
| Temperature change rate        | 11°C (20°F) per hour, maximum       |
| Relative humidity              | 8% to 80% noncondensing             |
| Maximum wet-bulb temperature   | 26°C (78°F)                         |
| Minimum dew-point temperature  | 2°C (36°F)                          |
| Altitude                       | –300 to 4600 m (–1000 to 15,000 ft) |

---

<sup>1</sup>Reduce maximum temperature by 1.8°C for each 1000 meter (1.0°F for each 1000 ft) increase in altitude.

---

**Table B–7 RZ23L Hard Disk Drive Nonoperating Conditions**

---

|                              |                                       |
|------------------------------|---------------------------------------|
| Temperature range            | –40°C to 66°C (–40°F to 151°F)        |
| Temperature change rate      | 20°C (36°F) per hour, maximum         |
| Relative humidity            | 8% to 95% packaged, noncondensing     |
| Maximum wet-bulb temperature | 46°C (115°F) packaged                 |
| Altitude                     | –300 to 12,200 m (–1000 to 40,000 ft) |

---

## B.3 RZ24L Hard Disk Drive

### B.3 RZ24L Hard Disk Drive

**Table B–8 RZ24L Hard Disk Drive Description**

---

|                         |           |
|-------------------------|-----------|
| Capacity                |           |
| – Bytes per drive       | 245.4 M   |
| – Blocks per drive      | 479,350   |
| – Block size            | 512 bytes |
| Data transfer rate      |           |
| – Bus asynchronous mode | 3.0 MB/s  |
| – Bus synchronous mode  | 4.0 MB/s  |
| – To and from media     | 1.5 MB/s  |
| Seek time               |           |
| – Track-to-track        | 5 ms      |
| – Average               | 16 ms     |
| – Maximum               | 35 ms     |
| Average latency         | 8.3 ms    |
| Interface               | SCSI      |

---

**Table B–9 RZ24L Hard Disk Drive Operating Conditions**

---

|                                |                                     |
|--------------------------------|-------------------------------------|
| Temperature range <sup>1</sup> | 10°C to 55°C (50°F to 131°F)        |
| Relative humidity              | 8% to 80% noncondensing             |
| Maximum wet-bulb temperature   | 26°C (78°F)                         |
| Altitude                       | –300 to 4600 m (–1000 to 15,000 ft) |

---

<sup>1</sup>Reduce maximum temperature by 1.8°C for each 1000 meter (1.0°F for each 1000 ft) increase in altitude.

---

**Table B–10 RZ24L Hard Disk Drive Nonoperating Conditions**

---

|                              |  |
|------------------------------|--|
| Temperature range            | –40°C to 66°C (–40°F to 151°F)             |
| Relative humidity            | 8% to 95% packaged, noncondensing          |
| Maximum wet-bulb temperature | 46°C (115°F) packaged                      |
| Altitude                     | –300 m to 12,200 m (–1000 ft to 40,000 ft) |

---

## B.4 RZ25 Hard Disk Drive

## B.4 RZ25 Hard Disk Drive

**Table B-11 RZ25 Hard Disk Drive Description**

---

|                         |                    |
|-------------------------|--------------------|
| Internal drive          |                    |
| – Weight                | 0.82 kg (1.8 lb)   |
| – Height                | 4.14 cm (1.63 in)  |
| – Width                 | 10.16 cm (4.00 in) |
| – Depth                 | 14.61 cm (5.75 in) |
| Capacity                |                    |
| – Bytes per drive       | 426 M              |
| – Blocks per drive      | 832,527            |
| – Block size            | 512 bytes          |
| Data transfer rate      |                    |
| – Bus asynchronous mode | 3.0 MB/s           |
| – Bus synchronous mode  | 4.0 MB/s           |
| – To and from media     | 2.1–3.2 MB/s       |
| Seek time               |                    |
| – Track-to-track        | 2.5 ms             |
| – Average               | 14 ms              |
| – Maximum               | 26 ms              |
| Average latency         | 6.8 ms             |
| Interface               | SCSI               |

---

## B.4 RZ25 Hard Disk Drive

**Table B–12 RZ25 Hard Disk Drive Operating Conditions**

---

|                                |                                     |
|--------------------------------|-------------------------------------|
| Temperature range <sup>1</sup> | 10°C to 55°C (50°F to 131°F)        |
| Temperature change rate        | 11°C (20°F) per hour, maximum       |
| Relative humidity              | 8% to 80% noncondensing             |
| Maximum wet-bulb temperature   | 26°C (78°F)                         |
| Altitude                       | –300 to 3050 m (–1000 to 10,000 ft) |

---

<sup>1</sup>Reduce maximum temperature by 1.8°C for each 1000 meter (1.0°F for each 1000 ft) increase in altitude.

---

**Table B–13 RZ25 Hard Disk Drive Nonoperating Conditions**

---

|                              |  |
|------------------------------|--|
| Temperature range            | –40°C to 66°C (–40°F to 151°F)             |
| Temperature change rate      | 20°C (36°F) per hour, maximum              |
| Relative humidity            | 8% to 95% packaged, noncondensing          |
| Maximum wet-bulb temperature | 46°C (115°F) packaged                      |
| Altitude                     | –300 m to 12,200 m (–1000 ft to 40,000 ft) |

---

## B.5 RZ26 Hard Disk Drive

**Table B–14 RZ26 Hard Disk Drive Description**

---

|                     |                    |
|---------------------|--------------------|
| Dimensions          |                    |
| – Weight            | 0.9 kg (1.9 lb)    |
| – Height            | 4.13 cm (1.625 in) |
| – Width             | 10.2 cm (4.00 in)  |
| – Depth             | 14.6 cm (5.75 in)  |
| Capacity            |                    |
| – Bytes per drive   | 1050 M             |
| – Bytes per surface | 75 M               |
| – Bytes per track   | 29,640             |

(continued on next page)

## B.5 RZ26 Hard Disk Drive

**Table B–14 (Cont.) RZ26 Hard Disk Drive Description**

---

|                                   |          |
|-----------------------------------|----------|
| – Buffer size                     | 512 KB   |
| Data transfer rate                |          |
| – To/from media                   | 2.6 MB/s |
| – Seek time track to track        | 1 ms     |
| – Seek time average               | 10 ms    |
| – Seek time maximum (full stroke) | ≤ 20 ms  |
| Average latency                   | 5.6 ms   |
| Rotational speed                  | 5363 rpm |

---

**Table B–15 RZ26 Drive Operating Conditions**

---

|                     |                              |
|---------------------|------------------------------|
| Ambient temperature | 10°C to 50°C (50°F to 122°F) |
| Relative humidity   | 10%–90%                      |

---

**Table B–16 RZ26 Drive Nonoperating Conditions**

---

|                     |                                |
|---------------------|--------------------------------|
| Ambient temperature | –40°C to 66°C (–40°F to 151°F) |
| Relative humidity   | 8%–95% (non-condensing)        |

---

## B.6 RX23 Diskette Drive

### B.6 RX23 Diskette Drive

**Table B-17 RX23 Diskette Disk Drive Description**

---

|                                 |  |
|---------------------------------|--|
| Dimensions                      |  |
| – Weight                        | 0.48 kg (1.06 lb)  |
| – Height                        | 3.00 cm (1.18 in)  |
| – Width                         | 10.16 cm (4.00 in)   |
| – Depth                         | 15.01 cm (5.91 in)   |
| Number of cylinders             | 80   |
| Number of heads                 | 2  |
| Diskette size                   | 8.9 cm (3.5 in)  |
| Recording surfaces per diskette | 2  |
| Sectors per track               | 9 double-density<br>18 high-density  |
| Capacity                        | 2.88 KB  |
| – Bytes per drive               | 737,280 double-density<br>1,474,560 high-density                                     |
| Data transfer rate              | 250 Kbits/s double-density<br>500 Kbits/s high-density<br>1000 Kbits/s extra-density |
| Seek time                       |  |
| – Minimum                       | 3 ms   |
| – Average                       | 15 ms  |

---

**Table B-18 RX23 Diskette Drive Operating Conditions**

---

|                                |  |
|--------------------------------|--|
| Temperature range <sup>1</sup> | °5C to 50°C (40°F to 122°F)                    |
| Temperature change rate        | 11°C (20°F) per hour, maximum                  |
| Relative humidity              | 8% to 80%, noncondensing                       |
| Maximum wet-bulb temperature   | 25.6°C (78°F)                                  |
| Altitude                       | –300 to 3050 m (–1000 to 10,000 ft)<br>maximum |

---

<sup>1</sup>Reduce maximum temperature by 1.8°C for each 1000 meter (1.0°F for each 1000 ft.) increase in altitude.

---

## B.6 RX23 Diskette Drive

**Table B–19 RX23 Diskette Drive Nonoperating Conditions**

|                              |  |
|------------------------------|--|
| Temperature range            | –40°C to 66°C (–40°F to 151°F)                   |
| Relative humidity            | 5% to 95%, noncondensing                         |
| Maximum wet-bulb temperature | 46°C (115°F), packaged                           |
| Altitude                     | –300 to 12,200 m (–1000 to 40,000 ft)<br>maximum |

## B.7 RRD42 Compact Disc Drive

**Table B–20 RRD42 Compact Disc Drive Description**

| Drive Feature          | Specification    |
|------------------------|------------------|
| Capacity per disc      | 600 MB           |
| Access time            |                  |
| – Full stroke          | 650 ms (typical) |
| – Average (1/4 stroke) | 380 ms (typical) |
| Data transfer rate     |                  |
| – Sustained rate       | 150 KB/s         |
| – Burst rate           | 1½ MB/s          |

## B.7 RRD42 Compact Disc Drive

**Table B–21 RRD42 Compact Disc Drive Operating Conditions**

| Environmental Variable        | Operating Conditions            |
|-------------------------------|---------------------------------|
| Temperature range             | 5°C to 50°C (41°F to 122°F)     |
| Relative humidity             | 10% to 90%, noncondensing       |
| Altitude                      | 2500 m (8000 ft) at 36°C (96°F) |
| Maximum wet bulb temperature  | 29°C (84°F)                     |
| Minimum dew point temperature | 2°C (36°F)                      |

**Table B–22 RRD42 Compact Disc Drive Nonoperating Conditions**

| Environmental Variable        | Nonoperating Conditions             |
|-------------------------------|-------------------------------------|
| Temperature range             | –30°C to 55°C (–22°F to 131°F)      |
| Relative humidity             | 10% to 90%, noncondensing           |
| Altitude                      | 13,600 m (44,600 ft) at 36°C (96°F) |
| Maximum wet bulb temperature  | 46°C (115°F)                        |
| Minimum dew point temperature | 2°C (36°F)                          |

## B.8 TZK10 Tape Drive

**Table B–23 TZK10 Cartridge Tape Drive Description**

| Operating Variable           | Specification      |
|------------------------------|--------------------|
| Mode of operation            | Streaming          |
| Drive interface              | SCSI-2             |
| Dimensions                   |                    |
| – Weight (without cartridge) | 1.1 kg (2.4 lb)    |
| – Height                     | 4.39 cm (1.732 in) |

(continued on next page)

## B.8 TZK10 Tape Drive

**Table B–23 (Cont.) TZK10 Cartridge Tape Drive Description**

| Operating Variable       | Specification   |
|--------------------------|---|
| – Width                  | 146.05 mm (5.75 in)   |
| – Depth                  | 208.28 mm (8.20 in)   |
| Media                    | DC6320/DC6525 tape cartridge or Digital approved equivalent   |
| Track width, write       | 0.1778 mm +0.0000/–0.0127 mm (0.0070 in +.0000 in/–0.0005 in)   |
| Track width, read        | 0.1270 mm +0.0127/–0.0000 mm (0.0050 in +.0005 in/–0.0000 in)   |
| Data density             | 16,000 bpi  |
| Number of tracks         | 26  |
| Data transfer rate       |   |
| – Average streaming mode | 200 KB  |
| – SCSI maximum           | 1½ MB   |
| Tape speed               | 305 cm/s (120 ips)  |
| Track format             | Multiple track serpentine recording   |
| Storage capacity         | 320 MB, formatted (approx. DC6320 cartridge)<br>525 MB, formatted (approx. DC6525 cartridge)  |
| Power requirements       | +12 V ± 5% @ 1.0 A (2.0 A surge),<br>150 mV ripple peak-to-peak<br><br>+5 V ± 5% @ 1.2 A (1.8 A surge),<br>150 mV ripple peak-to-peak |
| Power consumption        |   |
| – Nominal                | 20 W  |
| – Peak                   | 33 W  |

**Table B–24 TZK10 Operating Conditions**

| Environmental Variable | Operating Conditions        |
|------------------------|-----------------------------|
| Temperature range      | 5°C to 40°C (41°F to 104°F) |

(continued on next page)

## B.8 TZK10 Tape Drive

**Table B–24 (Cont.) TZK10 Operating Conditions**

| <b>Environmental Variable</b> | <b>Operating Conditions</b> |
|-------------------------------|-----------------------------|
| Relative humidity             | 20% to 80% maximum          |
| Altitude                      | 3962 m (13,000 ft)          |

**Table B–25 TZK10 Nonoperating Conditions**

| <b>Environmental Variable</b> | <b>Nonoperating Conditions</b> |
|-------------------------------|--------------------------------|
| Temperature range             | –30°C to 60°C (–22°F to 140°F) |
| Relative humidity             | 10% to 90% maximum             |
| Altitude                      | 12192 m (40,000 ft)            |

## B.9 TLZ06 Tape Drive

## B.9 TLZ06 Tape Drive

**Table B–26 TLZ06 Drive Description**

---

|                   |                                      |
|-------------------|--------------------------------------|
| Dimensions        |                                      |
| – Weight          | 2.2 kg (4.7 lb)                      |
| – Height          | 4.1 cm (1.6 in)                      |
| – Width           | 14.6 cm (5.75 in)                    |
| – Depth           | 17.8 cm (7.0 in)                     |
| Capacity          |                                      |
| –Per drive        | 320 MB, approximate DC6320 cartridge |
| –Per drive        | 525 MB, approximate DC6525 cartridge |
| –Per surface      | 2.48 MB                              |
| –Blocks per drive | 649,040                              |

---

**Table B–27 TLZ06 Drive Operating Conditions**

---

|                       |                                   |
|-----------------------|-----------------------------------|
| Operating temperature | 10°C to 40°C (50°F to 104°F)      |
| Operating humidity    | 20% to 80%, noncondensing         |
| Altitude              | 0 m to 4572 m (0 ft to 15,000 ft) |

---

**Table B–28 TLZ06 Drive Nonoperating Conditions**

---

|                          |                                     |
|--------------------------|-------------------------------------|
| Nonoperating temperature | –40°C to 70°C (–40°F to 158°F)      |
| Operating humidity       | 5% to 95%, noncondensing            |
| Altitude                 | 0 m to 15,240 m (0 ft to 50,000 ft) |

---

**Table B–29 TLZ06 Cassettes**

---

| Cassette              | Size      | Capacity      |
|-----------------------|-----------|---------------|
| TLZ04-CA <sup>1</sup> | 4mm x 60m | 1.3 or 2.6 GB |
| TLZ06-CA              | 4mm x 90m | 2 or 4 GB     |

---

<sup>1</sup>Can read only if compression is not enabled

---

# C

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## Connector Pin Assignments

This appendix lists pin assignments for the following:

- SCSI Connector
- ThickWire Ethernet Connector
- EIA RS232 Communications Connectors
- Power Supply
- Loopback Connector

### C.1 SCSI Connector

## C.1 SCSI Connector

**Table C-1 SCSI Connector Pin Assignments**

| Pin | Signal    | Pin | Signal |
|-----|-----------|-----|--------|
| 50  | ~ I/O     | 49  | GND    |
| 48  | ~ REQ     | 47  | GND    |
| 46  | ~ C/D     | 45  | GND    |
| 44  | ~ SEL     | 43  | GND    |
| 42  | ~ MSG     | 41  | GND    |
| 40  | ~ RST     | 39  | GND    |
| 38  | ~ ACK     | 37  | GND    |
| 36  | ~ BSY     | 35  | GND    |
| 34  | GND       | 33  | GND    |
| 32  | ~ ATN     | 31  | GND    |
| 30  | GND       | 29  | GND    |
| 28  | RSVD      | 27  | RSVD   |
| 26  | TERMPWR   | 25  | NC     |
| 24  | RSVD      | 23  | RSVD   |
| 22  | GND       | 21  | GND    |
| 20  | GND       | 19  | GND    |
| 18  | ~ PARITY  | 17  | GND    |
| 16  | ~ DATA<7> | 15  | GND    |
| 14  | ~ DATA<6> | 13  | GND    |
| 12  | ~ DATA<5> | 11  | GND    |
| 10  | ~ DATA<4> | 9   | GND    |
| 8   | ~ DATA<3> | 7   | GND    |
| 6   | ~ DATA<2> | 5   | GND    |
| 4   | ~ DATA<1> | 3   | GND    |
| 2   | ~ DATA<0> | 1   | GND    |

## C.2 ThickWire Ethernet Connector

### C.2 ThickWire Ethernet Connector

**Table C–2 ThickWire Ethernet Connector Pin Assignments**

| Pin | Source | Signal         | Description        |
|-----|--------|----------------|--------------------|
| 1   |        |                | Shield             |
| 2   | XCVR   | ACOL+          | Collision presence |
| 3   | KNO2   | ATX+           | Transmission       |
| 4   | GND    | Ground         |                    |
| 5   | XCVR   | ARX+           | Reception          |
| 6   | XCVR   | GND            | Power return       |
| 7   | CTL+   | Control output |                    |
| 8   | GND    | Ground         |                    |
| 9   | XCVR   | ACOL–          | Collision presence |
| 10  | KNO2   | ATX–           | Transmission       |
| 11  | GND    | Ground         |                    |
| 12  | XCVR   | ARX–           | Reception          |
| 13  | KNO2   | +12V           | Power              |
| 14  | GND    | Ground         |                    |
| 15  | CTL–   | Control output |                    |

### C.3 EIA RS232 Communications Connectors

### C.3 EIA RS232 Communications Connectors

Data Terminal Equipment (DTE) refers to signals whose source is the system unit.

Data Communications Equipment (DCE) refers to signals whose source is a peripheral, like a modem or printer, which is attached to the system.

**Table C-3 EIA RS232 Communications Connectors Pin Assignments**

| Pin | Source | Signal  | CCITT <sup>1</sup> | EIA <sup>2</sup> | Description                    |
|-----|--------|---------|--------------------|------------------|--------------------------------|
| 1   |        | GND     | 101                | AB               | Protective ground              |
| 2   | DTE    | TxD     | 103                | BA               | Transmitted data               |
| 3   | DCE    | RxD     | 104                | BB               | Received data                  |
| 4   | DTE    | RTS     | 105                | CA               | Request to send                |
| 5   | DCE    | CTS     | 106                | CB               | Clear to send                  |
| 6   | DCE    | DSR     | 107                | CC               | Data set ready                 |
| 7   |        | GND     | 102                | AB               | Signal ground                  |
| 8   | DCE    | CD      | 109                | CF               | Carrier detect                 |
| 9   |        |         |                    |                  | Unconnected                    |
| 10  |        |         |                    |                  | Unconnected                    |
| 11  |        |         |                    |                  | Unconnected                    |
| 12  | DCE    | SPDMI   | 112                | CI               | Speed mode indicator           |
| 13  |        |         |                    |                  | Unconnected                    |
| 14  |        |         |                    |                  | Unconnected                    |
| 15  | DCE    | TxClock | 114                | DB               | Transmit signal element timing |
| 16  |        |         |                    |                  | Unconnected                    |
| 17  | DCE    | RxClock | 115                | DD               | Receive signal element timing  |
| 18  |        |         |                    |                  | Unconnected                    |
| 19  |        |         |                    |                  | Unconnected                    |
| 20  | DTE    | DTR     | 108.2              | CD               | Data terminal ready            |
| 21  |        |         |                    |                  | Unconnected                    |

<sup>1</sup>Comite Consultatif International Telegraphique et Telephonique, an international consultative committee that sets international communications standards

<sup>2</sup>Electronic Industries Association

(continued on next page)

### C.3 EIA RS232 Communications Connectors

**Table C–3 (Cont.) EIA RS232 Communications Connectors Pin Assignments**

| Pin | Source | Signal | CCITT <sup>1</sup> | EIA <sup>2</sup> | Description             |
|-----|--------|--------|--------------------|------------------|-------------------------|
| 22  | DCE    | RI     | 125                | CE               | Ring indicator          |
| 23  | DTE    | DSRS   | 111                | CH               | Data signal rate select |
| 24  |        |        |                    |                  | Unconnected             |
| 25  |        |        |                    |                  | Unconnected             |

<sup>1</sup>Comite Consultatif International Telegraphique et Telephonique, an international consultative committee that sets international communications standards

<sup>2</sup>Electronic Industries Association

### C.4 Power Supply

**Table C–4 Power Supply Pin Assignments**

| Pin | Signal        |
|-----|---------------|
| 1   | Speaker [1]   |
| 2   | DCOK          |
| 3   | +5.1 V        |
| 4   | GND           |
| 5   | +5.1 V        |
| 6   | GND           |
| 7   | +12.1 V       |
| 8   | Speaker [2]   |
| 9   | System-OK LED |
| 10  | GND           |
| 11  | +5.1 V        |
| 12  | GND           |
| 13  | +5.1 V        |
| 14  | GND           |

## C.5 Loopback Connector

### C.5 Loopback Connector

**Table C–5 Summary of Loopback Connectors**

| Function                          | Standard/<br>Unique | Part Number | Option Number |
|-----------------------------------|---------------------|-------------|---------------|
| Communications loopback connector | Standard            | 12-15336-13 | H3200         |
| ThickWire loopback connector      | Standard            | 12-22196-02 | NA            |
| ThinWire T-connector              | Standard            | 12-25869-01 | H8223         |
| ThinWire terminator               | Standard            | 12-26318-01 | H8225         |

**Table C–6 Ethernet Loopback Connector**

| From<br>Pin No. | Signal | To<br>Pin No. | Signal | Description              |
|-----------------|--------|---------------|--------|--------------------------|
| P6-3            | TRA+   | P6-5          | REC+   | Through capacitor        |
| P6-10           | TRA–   | P6-12         | REC–   | Through capacitor        |
| P6-13           | PWR    | P6-6          | RET    | Through resistor and LED |

**Table C–7 Modem Loopback Connector**

| From<br>Pin No. | Signal | To<br>Pin No. | Signal |
|-----------------|--------|---------------|--------|
| P4-2            | TX2    | P4-3          | RX2    |
| P4-4            | RTS2   | P4-5          | CTS2   |
| P4-6            | DSR2   | P4-20         | DTR2   |
| P4-12           | SPDMI2 | P4-23         | DSRS2  |
| P4-18           | LLPBK2 | P4-8          | CI2    |
| P4-18           | LLPBK2 | P4-22         | RI2    |
| P4-18           | LLPBK2 | P4-25         | TMI2   |

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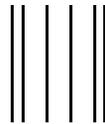
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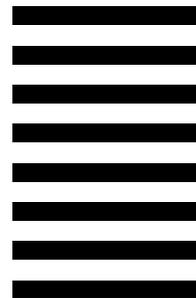
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