

# **TURBOchannel Extender**

## **Operator's Guide**

**digital equipment corporation  
maynard, massachusetts**

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## Using This Guide

This guide for the TURBOchannel extender (TCE) discusses

- Possible hardware configurations for the TCE
- The power indicator light, on/off switch, and connectors on the TCE
- How to connect the TCE to a DECstation 5000
- How to install and remove the TCE option module in a DECstation 5000
- How to install and remove TURBOchannel option modules in the TCE
- How to install and remove drives in the TCE
- How to set drive SCSI IDs
- Specifications for TCE components
- Part numbers for TCE components
- Pin assignments for cables and connectors

### Conventions Used in This Guide

- Monospace type indicates text displayed on the monitor screen.
- **Boldface type** indicates characters that you are to type.

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# The Basic TURBOchannel Extender

**This chapter explains**

- The parts of the basic TURBOchannel extender (TCE)
- What hardware can be installed in the TCE
- Site and voltage requirements

# The TCE Extender

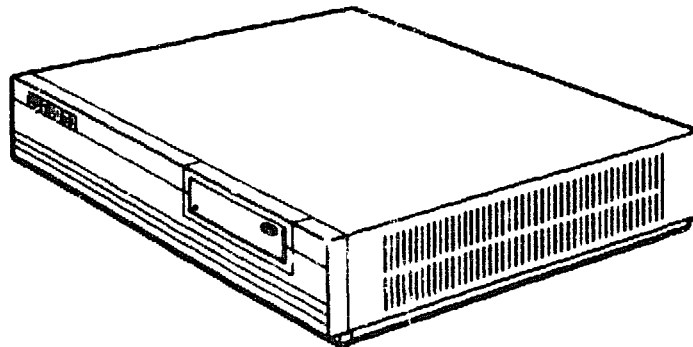
The TCE can contain any combination of the following items:

- One TURBOchannel option module
- Two hard disk drives
- One removable media drive

When the TCE contains a TURBOchannel option module (the extender option), the TCE connects to a TCE option module in the workstation. The TCE option module in the workstation occupies one slot. The option module in the TCE can be one, two, or three slots wide. This allows the other two option slots on the workstation to be used for additional option modules.

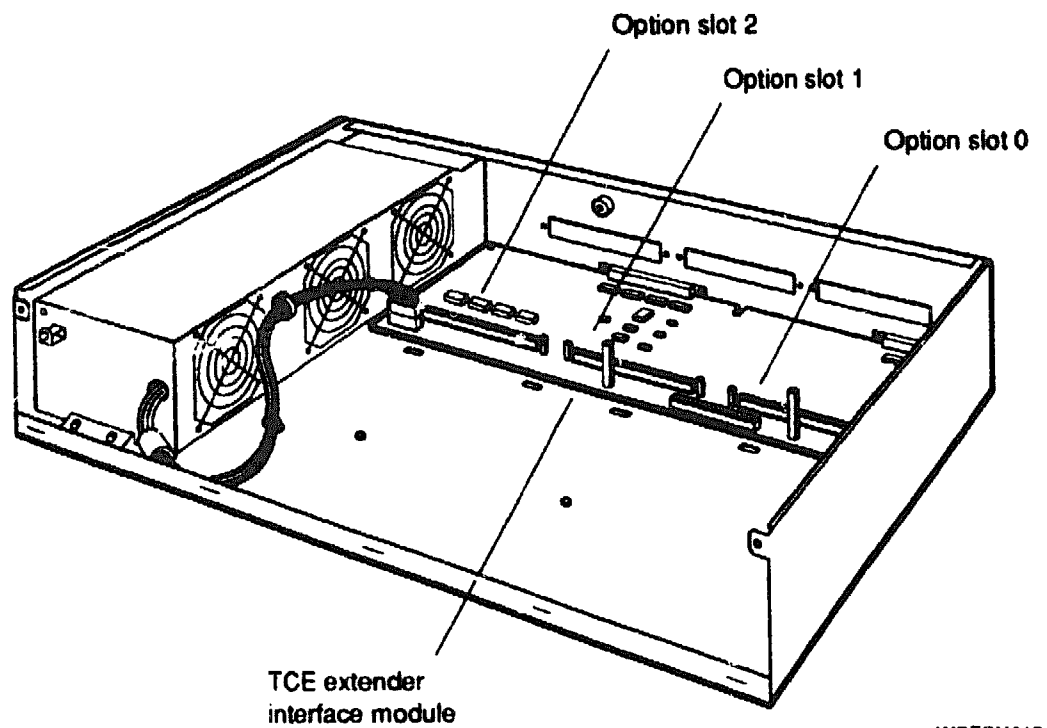
When the TCE is used as a storage expansion box, the TCE can contain two hard disk drives and one removable media drive. The TCE can be connected to either the workstation or an expansion box SCSI.

The TCE connects to any DECstation 5000 workstation.



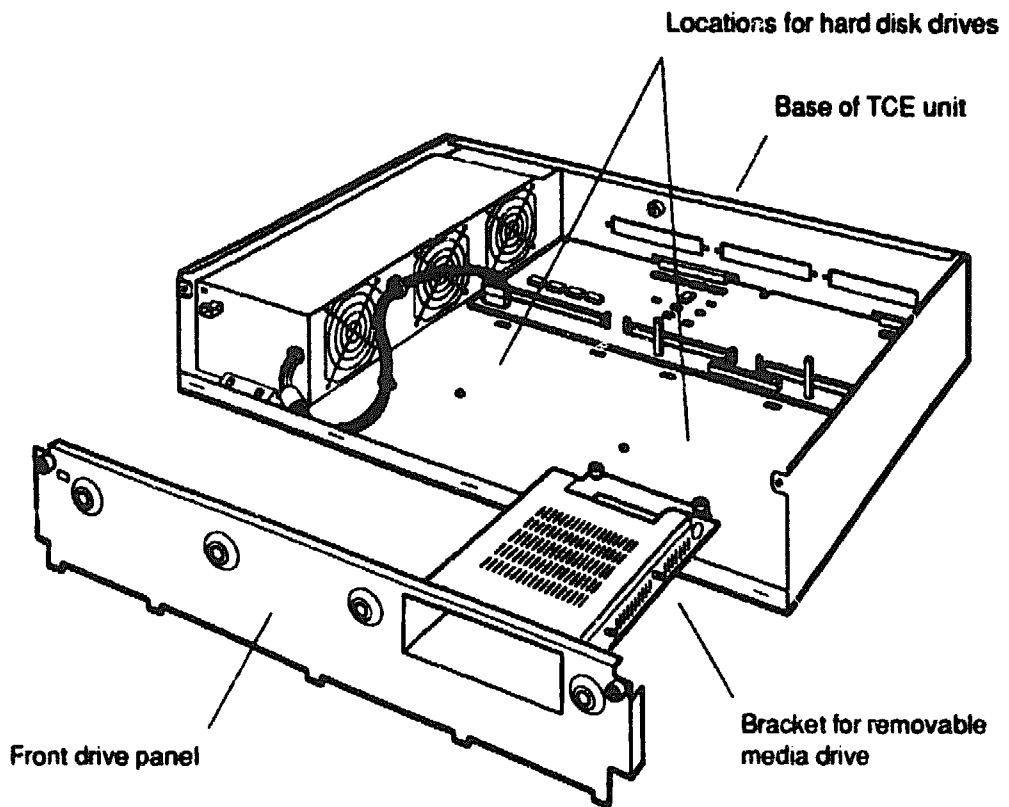
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**Figure 1-1. The TURBOchannel extender**



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**Figure 1-2. Option slots inside the TCE**



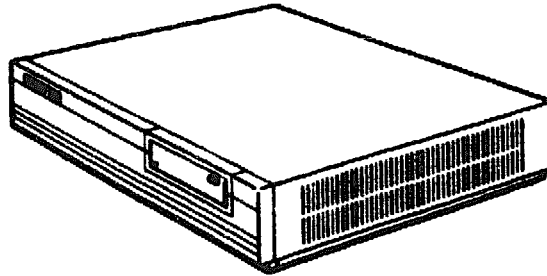
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**Figure 1-3. Locations for drives inside the TCE**

In addition to this guide, you should have

- Any optional hardware you ordered
- All the items shown in Figure 1-4

Save the carton that the TCE is packed in for possible future use.



TURBOchannel extender



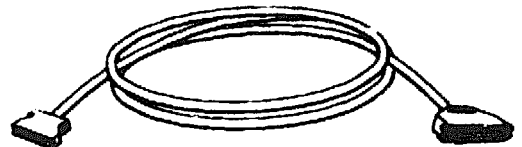
Power cable



TCE - to - system SCSI cable



TCE interface cable



TCE - to - expansion - box SCSI cable

WSTCU007

**Figure 1-4. Parts of a TCE**

## Site and Voltage Requirements

For the TCE to function efficiently, the environment must meet the requirements listed here.

**Caution:** *Failure to meet these requirements can damage the TCE.*

### Temperature

- Keep the temperature around the TCE between 10°C and 40°C (50°F and 104°F).
  - Set up the TCE away from heaters, photocopiers, and other heat sources.
  - Protect the TCE from direct sunlight.
- Allow air to flow freely around the TCE to keep heat from building up and damaging equipment.
  - Leave 4 inches (10 centimeters) of space between system unit vents and other objects.
  - Leave 3 inches (7.6 centimeters) of space between monitor vents and other objects.

### Humidity

- Keep relative humidity between 10 and 80 percent.

### Cleanliness

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

### Power

- Use a power outlet fuse that is at least 15 amperes.
- Ground the electrical circuit. If possible, use a surge-protected power strip to connect the TCE power cord.

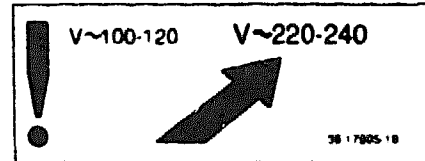
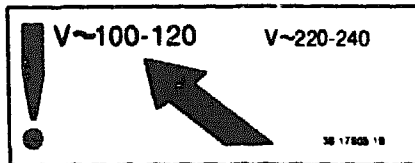
### Supplies

- Store supplies, such as tape cartridges, within the same temperature and humidity limits as those for the TCE.

## Voltage Requirements

The voltage for many devices, including most monitors, must match the voltage of the power source. Power source voltage is either 110/120 or 220/240 volts. Where necessary, a yellow voltage label that covers the power connector on the device shows the voltage requirements for that device.

**Caution:** *Connecting a device to a power source that does not meet the voltage requirements of that device can damage the device.*



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**Figure 1-5. Voltage labels**



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## Quick Installation

This chapter describes the step-by-step quick installation procedure for the TCE. Sections with detailed instructions are referenced.

## **Begin the Installation**

- 1. If your workstation has already been installed:**
  - a. Follow the instructions that came with your worksystem software to shut down the software.**
  - b. Turn off the system unit.**
  - c. Turn off the monitor and any expansion boxes.**
  - d. Unplug the workstation power cord.**

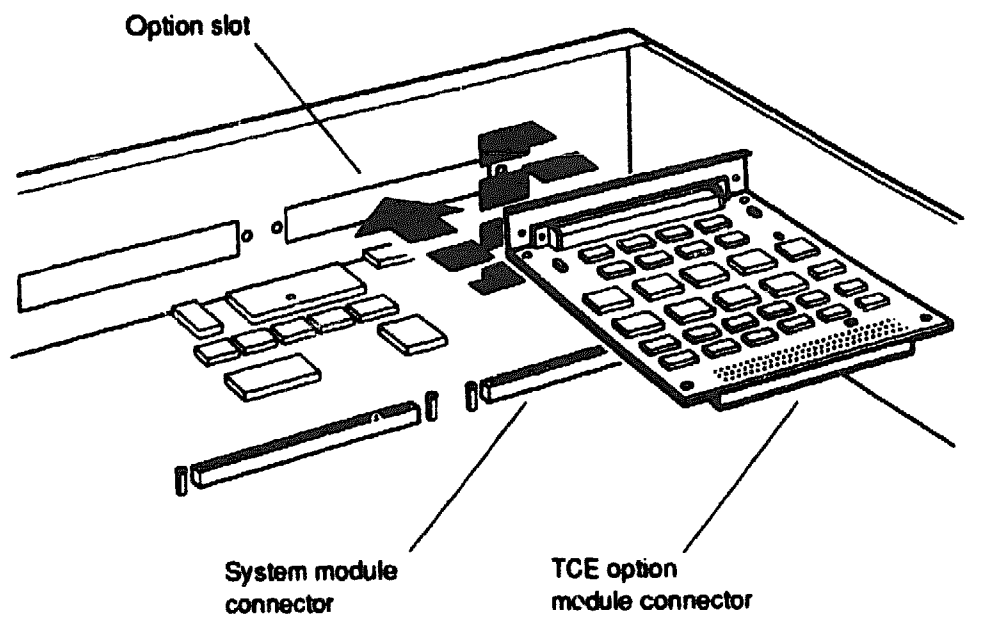
**(See "Shutting Down the Workstation" on page 3-4.)**
- 2. Turn off the TCE by pressing the 0 on the on/off switch on the back of the unit.**
- 3. Remove the TCE cover. (See "To Remove the TCE Cover" on page 3-6.)**
- 4. If you are installing a TCE option module in your workstation and a TURBOchannel option module in the TCE, go to the next section. (When the TCE contains a TURBOchannel option module, the TCE must be connected to a TCE option module in your workstation.)**

**If you are not installing a TURBOchannel option module, go to "Install Drives" on page 2-7.**

## **Install the TCE Option Module in the Workstation**

You will need the medium Phillips screwdriver that came in the accessories kit shipped with your workstation. (See "To Install the TCE Option Module" on page 3-16.)

1. Remove the system unit cover. (Refer to the Operator's Guide for your workstation.)
2. Attach the antistatic wrist strap. (See "Using an Antistatic Wrist Strap" on page 3-5.)
3. Install the TCE option module in the system unit. See Figure 2-1.
  - a. Remove the option slot cover.
  - b. Insert the TCE option module cable connector into the opening on the back of the system unit.
  - c. Press the TCE option slot connector into the connector on the system module.
  - d. Use the screws that came with the TCE option module to attach the module to the support posts and the slot in the back of the system unit.
4. Replace the system unit cover.
5. Continue to the next section.



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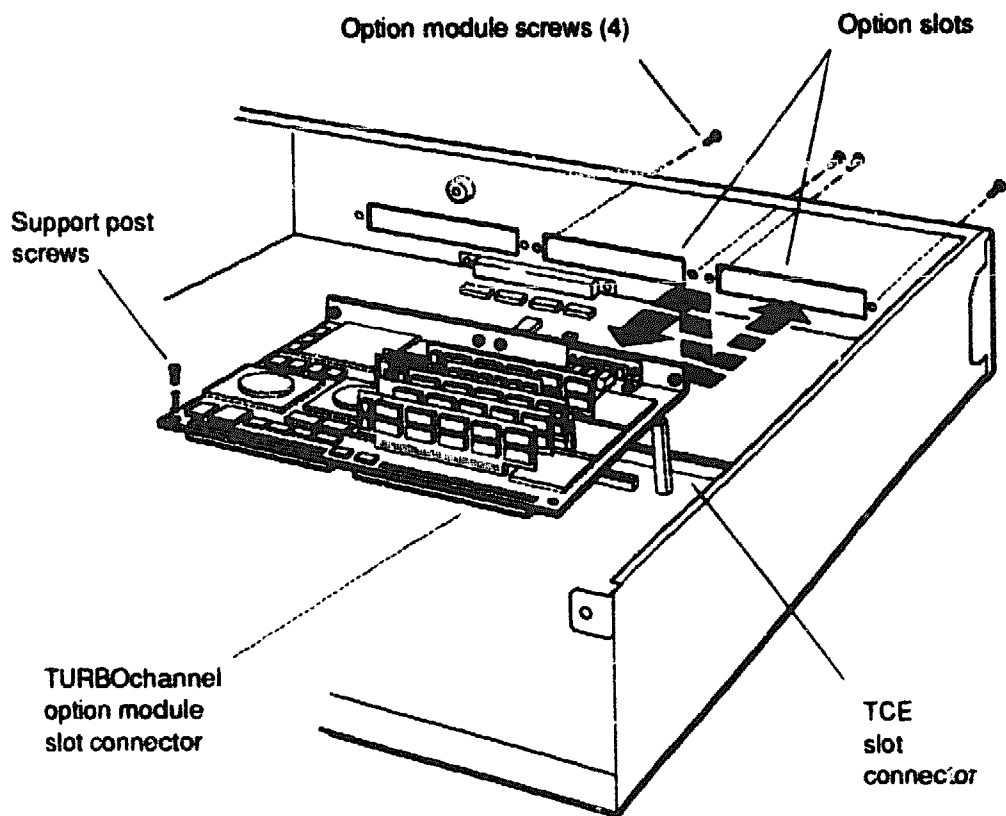
**Figure 2-1. Installing a TCE option module**

## **Install a TURBOchannel Option Module in the TCE Unit**

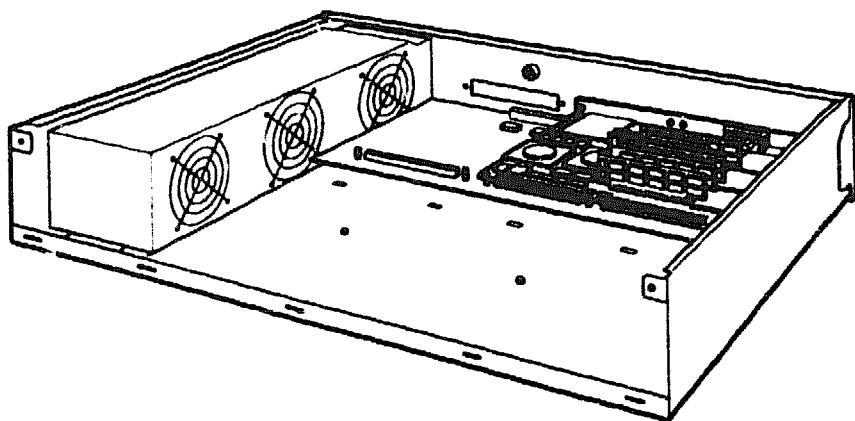
(See "To Install an Option Module on page 3-11.")

1. Remove the TCE cover. (See "To Remove the TCE Cover" on page 3-6.)
2. Attach the antistatic wrist strap. (See "Using an Antistatic Wrist Strap" on page 3-5.)
3. Install the TURBOchannel option module in the TCE unit. See Figure 2-2.
  - a. Remove the option slot cover or covers.
  - b. Insert the TURBOchannel option module cable connector into the opening on the back of the TCE unit.
  - c. Press the TURBOchannel option module connector into the connector on the TCE module.
  - d. Use the screws that came with the option module to attach the module to the support posts and the slot or slots in the back of the TCE unit.
4. If you are installing a drive or drives in the TCE, continue to the next section.

If you are not installing a drive, remove the antistatic wrist strap and go to "Close the TCE" on page 2-12.



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**Figure 2-2. Installing an option module**

## Install Drives

You may need a medium flat-blade and a Phillips screwdriver and small needle-nose pliers.

1. Drive SCSI IDs are set at the factory. (If you need to change the factory setting, see "To Set SCSI IDs" on page 4-4.)
2. If the end of the SCSI cable is fastened to the drive bracket with tie-wrap, cut the tie-wrap.

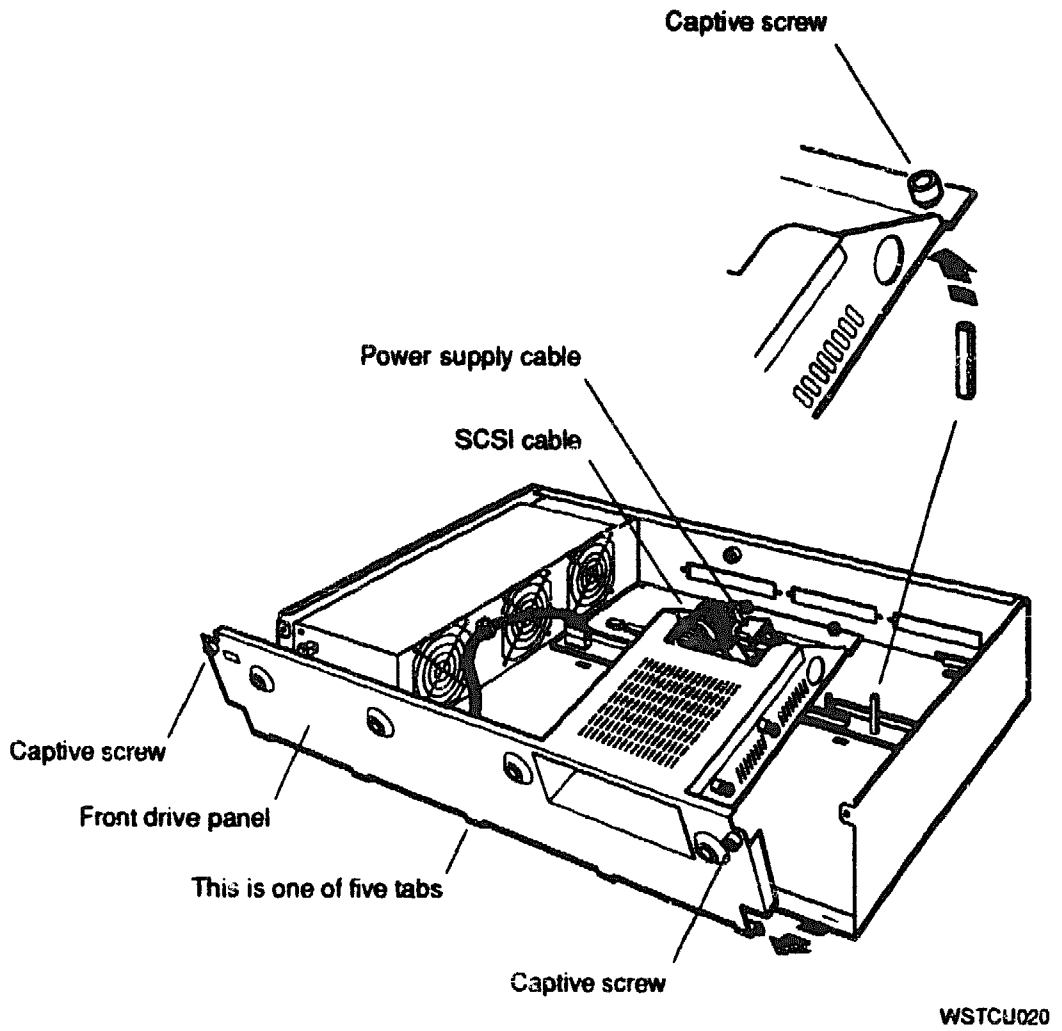
**Caution:** When you cut the tie-wrap be careful not to cut the SCSI cable.

3. If the power supply cable and SCSI cable are tucked inside the drive bracket, pull them out.
4. Loosen the screws that hold the drive bracket in place and pull up the end of the drive bracket.

If the power supply and SCSI cables are threaded through the cutout in the end of the drive bracket, ease them through the cutout as you pull up.

5. Remove the front drive panel from the system unit as shown in Figure 2-3.
6. If you are installing a hard disk drive or drives, continue to the next section.

If you are installing a removable media drive only, go to "Install a Removable Media Drive" on page 2-11.



**Figure 2-3. Removing the front drive panel**



## **Install a Hard Disk Drive**

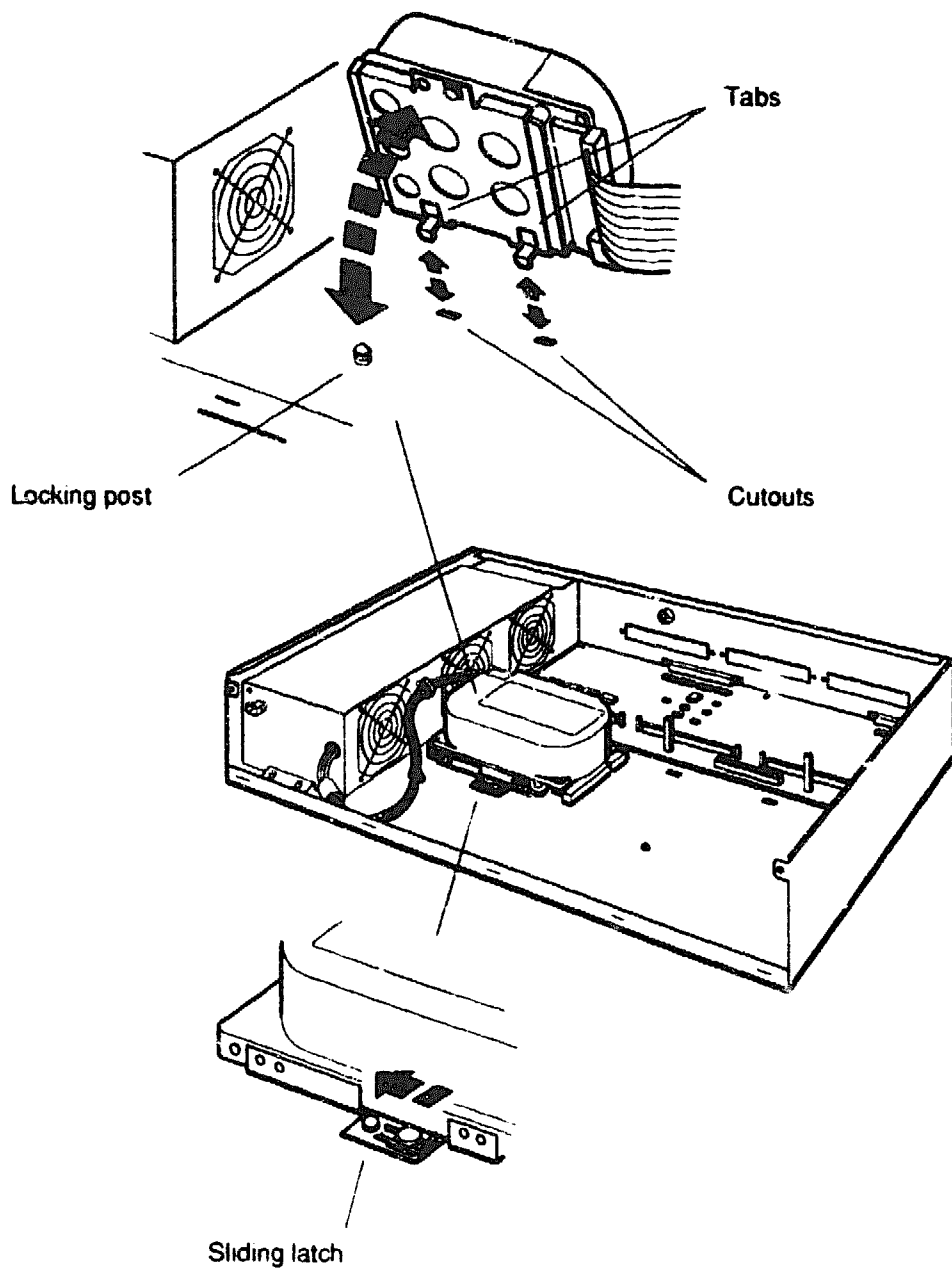
Two hard disk drives can be installed in the TCE base. If you are installing one drive, it is more convenient to install the drive next to the power supply. If you are installing two drives, install the one further away from the power supply first. (See "To Install a Hard Disk Drive" on page 4-5.)

1. Plug the power supply cable connector into the power supply connector on the hard disk drive. (See Figure 4-8 on page 4-12.)

(Note that only the last connector is long enough to attach to a removable media drive in the front drive panel.)

2. Plug the SCSI cable connector into the SCSI connector on the hard disk drive. (See Figure 4-9 on page 4-13.)
3. Insert the hard disk drive. See Figure 2-4.
  - a. Insert the tabs on the hard disk drive into the cutouts on the bottom of the chassis.
  - b. Move the SCSI and power cables aside and swing the drive down onto the locking post.
  - c. Press the sliding latch firmly onto the post.
4. If you are installing two hard disk drives, connect the power supply cable and SCSI cable to the second drive and insert the drive in the second location. (See Figure 4-5 on page 4-9.)
5. If you are installing a removable media drive, continue to the next section.

If you are not installing a removable media drive, go to "Replace the Front Drive Panel" on page 2-12.



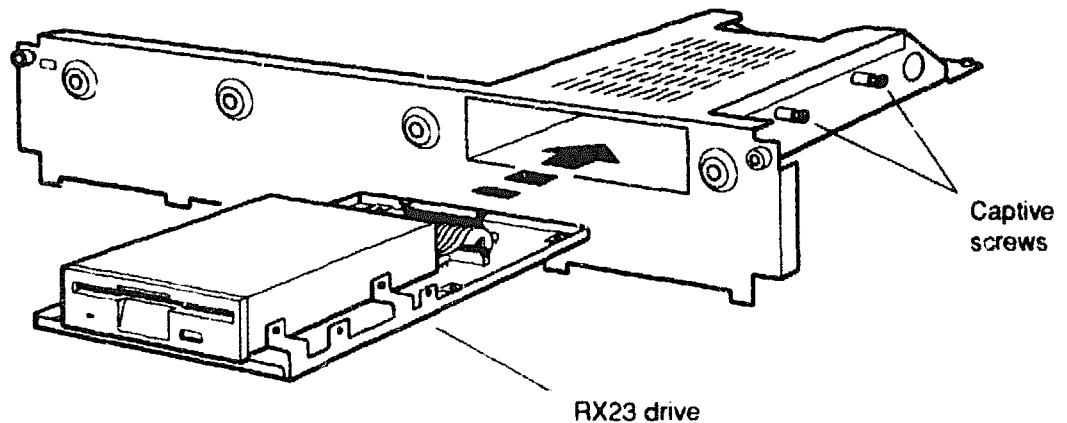
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**Figure 2-4. Installing and removing the hard disk drive**

## Install a Removable Media Drive

One removable media drive can be installed in the front drive panel. (See "To Install a Removable Media Drive" on page 4-18.)

1. Slide the drive that you are installing into the drive bracket from the front of the front drive panel.
2. Tighten the screws on each side of the drive bracket. Figure 2-5 shows a typical removable media drive.



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**Figure 2-5. Inserting a drive into the drive bracket**

3. Thread the loose ends of the power supply cable and SCSI cable through the cutout in the end of the drive bracket.
4. Plug the power supply cable connector into the power supply connector on the removable media drive.  
Note that only the last connector is long enough to attach to the removable media drive in the front drive panel.
5. Plug the SCSI cable connector into the SCSI connector on the removable media drive.
6. Continue to the next section.

## **Replace the Front Drive Panel**

1. Insert the front drive panel as shown previously in Figure 2-3.
2. Move the power supply and SCSI cables aside and lower the end of the bracket onto the two support posts. (See "Replace the front drive panel" on page 4-16.)
3. Tighten the screws on the drive panel. Figure 4-12 on page 4-19 shows the location of the screws.
4. Remove the antistatic wrist strap.
5. If you installed a removable media drive:
  - a. Turn the TCE cover upside down.
  - b. Remove the existing bezel by pressing the tabs toward the center of the bezel. Then push on the back of the bezel to remove it. (See Figure 4-17 on page 4-25.)
  - c. Press the bezel for the drive that you installed into the opening in the TCE cover. (See Figure 4-18 on page 4-26.)
6. Continue to the next section.

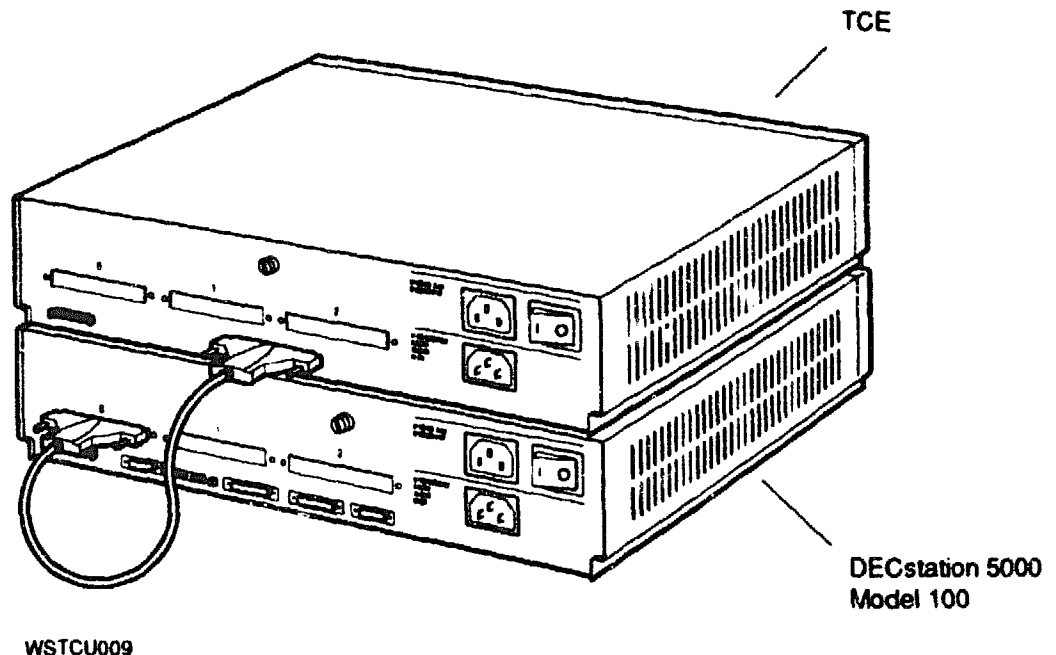
## **Close the TCE**

1. Replace the TCE cover and connect the TCE power cord. (See "To Connect the TCE to a Power Source" on page 3-21.)
2. If you installed the TCE option module in your workstation and a TURBOchannel option module in the TCE, go to the next section.

If you did not install a TURBOchannel option module, go to "Install Drives" on page 2-7.

## Connect the TCE to the TCE Option Module in the Workstation

1. To connect the TCE interface cable, the TCE must be placed on top of or beneath the system unit. Figure 2-6 shows the TCE connected to a typical DECstation 5000.



**Figure 2-6. Connecting the TCE to the TCE option module in the workstation**

2. Connect the TURBOchannel option module cable. (See the *TURBOchannel Operator's Guide* for more information.)
3. If you installed a drive or drives in the TCE, go to the next section.

If you did not install a drive, go to "Turn on the TCE" on page 2-16.

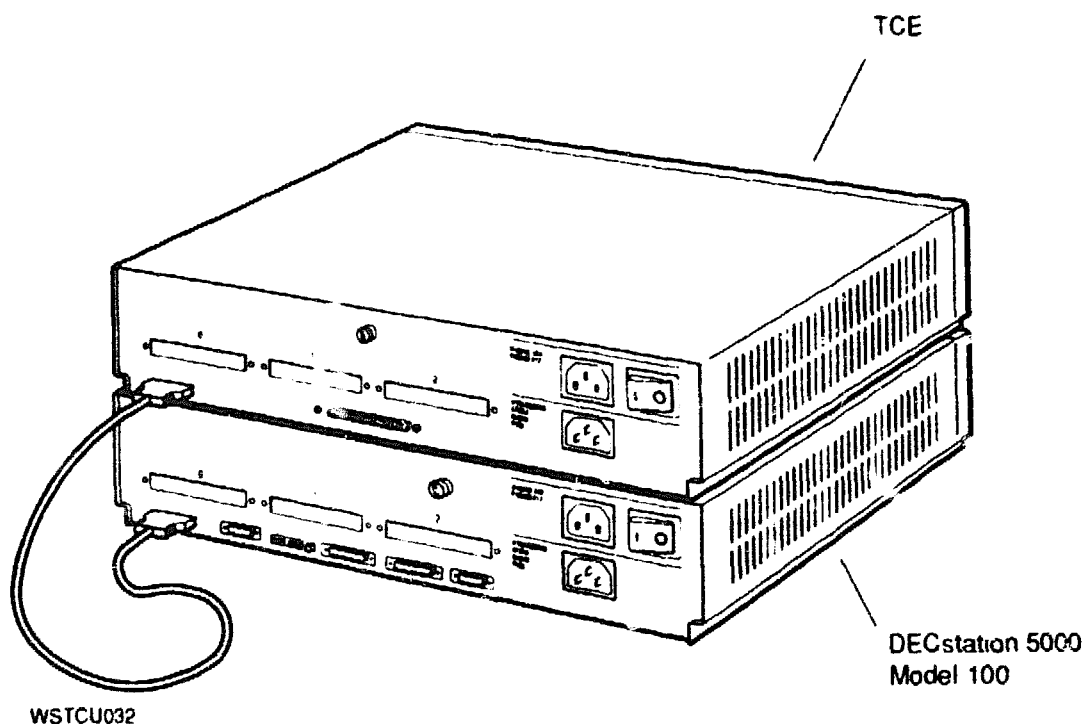
## Connect SCSI cables

If you are connecting the TCE to the workstation SCSI connector, continue to the next section. If you are connecting the TCE to an expansion box SCSI connector, go to "Connect the TCE-to-Expansion-Box SCSI Cable" on page 2-15.

### Connect the TCE-to-System-Unit SCSI cable

Use the TCE-to-system-unit SCSI cable to connect the TCE SCSI connector to the SCSI connector on the system unit. The cable has a metal 50-pin connector at each end.

Figure 2-7 shows the TCE connected to the SCSI connector on a typical DECstation 5000. (See "To Connect the TCE to the System Unit SCSI Connector" on page 4-28.)



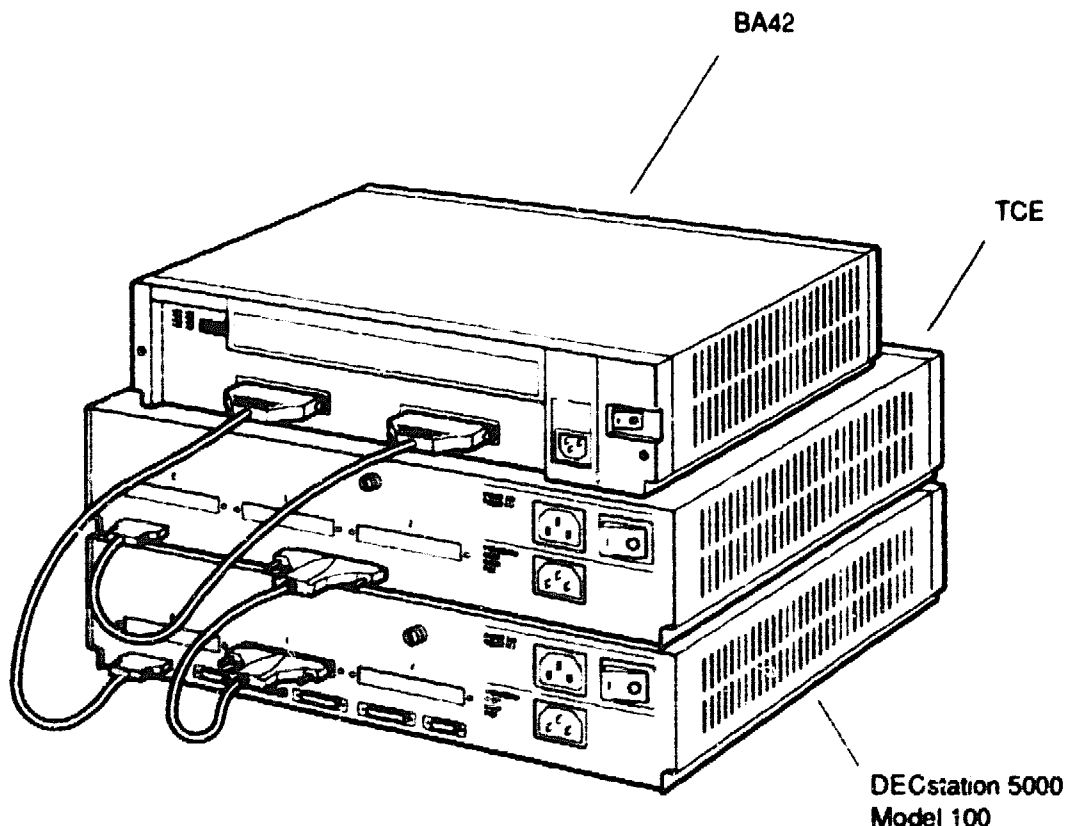
**Figure 2-7. Connecting the TCE to the workstation SCSI connector**

## Connect the TCE-to-Expansion-Box SCSI Cable

Use the TCE-to-expansion-box SCSI cable to connect the TCE SCSI connector to a SCSI connector on an expansion box. The cable has a plastic connector at one end and a metal connector at the other. Attach the metal connector to the TCE and the plastic connector to the expansion box.

When the TCE is connected to an expansion box or boxes, the TCE must be the last box in the chain. The TCE contains an internal SCSI terminator.

Figure 2-8 shows the TCE connected to the SCSI connector on a typical expansion box. (See "To Connect the TCE to an Expansion Box SCSI Connector" on page 4-30.)



WSTCU037

**Figure 2-8.** Connecting the TCE to an expansion box SCSI connector

## Turn on the TCE

Turn on the monitor, the TCE and any other expansion boxes, and your system unit.

If the power indicator light does not glow when you turn on the TCE, turn off the system unit and then the TCE and any other hardware and check that

1. Power cords are connected properly and the power strip, if there is one, is plugged in and turned on.
2. If the TCE still does not work, contact your Digital service representative.

If the green power indicator light on the TCE option module does not glow when you turn on the system unit

1. Check that the system unit and TCE unit are on and receiving power.
2. Turn off the system unit, then the TCE and any other hardware, and check that
  - a. The TCE option module is inserted tightly in the TURBOchannel slot.
  - b. The TCE interface cable is connected correctly to the TCE option module and the TCE.
3. If the TCE option module still does not work, move the TCE module to another TURBOchannel slot and try again.
4. If the problem persists, contact your Digital service representative.

## Check the Installation

If you installed the TCE extender option module and a TURBOchannel option module, continue to the next section. If you installed a drive or drives only, go to "Check Drive Installation" on page 2-18.



## Check Option Module Installation

Use the configuration display (the **cnfg** command) to check the installation. Then press Return. The configuration display will not show the TCE option module installed in the workstation. The display will show the TURBOchannel option module installed in the TCE as though this module is in the option slot on the workstation that contains the TCE option module.

Type **cnfg** at the console prompt. Then press Return. This is a sample configuration display for the DECstation 5000 Model 100:

```
3:  KN02-BA  DEC  V5.2c  TCF0  ( 24 MB)
                                     (enet:08-00-2b-0c-e3-d1)
                                     (scsi = 7)
2:  PMAD-AA  DEC  V5.1f  TCF0  (enet: 08-00-2b-0f-43-31)
1:  PMAZ-AA  DEC  V5.3a  TCF0  (scsi=7)
0:  PMAG-DA  DEC  V5.3a  TCF0  (EA: PXG -- D=8, Z=24)
```

The number at the beginning of each line is the slot number. The code in the parentheses at the end of each line shows the type of hardware installed in the slot.

If the configuration display does not show the slot that contains the TCE option module, turn off your workstation and the TCE and check that

- The TCE option module in the system unit is inserted tightly in the slot.
- The TURBOchannel option module in the TCE is inserted tightly in the slot.
- The TCE interface cable is connected correctly to the TCE option module and the TCE.

If the TURBOchannel option module is still not shown in the display, move the TCE option module to another TURBOchannel slot and try again. If the problem persists, contact your Digital service representative.

## Check Drive Installation

The display will list drives installed in the TCE in the workstation slot that contains the SCSI connector to which they are attached.

Use a detailed configuration display to check drive installation. Type **cnfg** and the workstation slot number for the drive at the console prompt (>>). This example shows the detailed configuration display for slot 3.

```
>>cnfg 3
3:  KN02-BA    DEC      V5.3d    TCF0    ( 24 MB)
                                     (er.et: 08-00-2b-0f-45-72)
                                     (SCSI = 7)
-----
DEV  PID                      VID          REV      SCSI DEV
-----
tz1
rz2  RZ24          (C) DEC  DEC          0700      SEQ
                                     DIR
dcache ( 64 KB), icache ( 64 KB)
mem( 0):  a0000000:a03ffffff ( 4 MB)
mem( 1):  a0400000:a07ffffff ( 4 MB)
mem( 2):  a0800000:a0bffffff ( 4 MB)
mem( 3):  a0c00000:a0fffffff ( 4 MB)
mem( 4):  a1000000:a13ffffff ( 4 MB)
mem( 5):  a1400000:a17ffffff ( 4 MB)
```

In this example, the SCSI ID number of the new hard disk drive is 2. The number is part of the device code in the **DEV** column: **rz2**. The tape drive that was already connected to base slot 3 is also shown: **tz1**.

If a drive is not shown in the configuration display, turn off the workstation and the TCE and check that

- The SCSI ID setting for the drive is not already assigned to another drive.
- The internal power and SCSI cables to the drive are plugged in firmly.
- The drive is firmly in place in the TCE unit.

Test the drive again. If the drive is still not shown in the display, contact your Digital service representative.

---

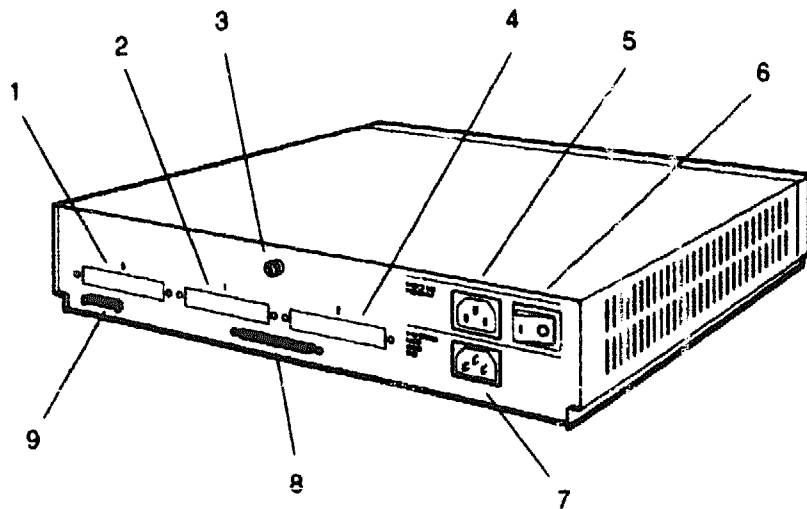
## Installing the TURBOchannel Extender

This chapter explains

- The power indicator light, on/off switch, and connectors on the TCE
- How to remove and replace the cover of the TCE
- How to use the antistatic wrist strap
- How to install and remove TURBOchannel option modules in the TCE
- The TCE option module hardware
- How to install and remove the TCE interface option module in the system unit
- How to connect the TCE to a power source
- How to turn the TCE on and off
- How to check the installation

# The Power Indicator Light, On/Off switch, and Connectors

Figure 3-1 shows the back of the TCE. Table 3-1, on page 3-3, explains each item.



- |                              |                            |
|------------------------------|----------------------------|
| 1. Option slot 0             | 6. On/off switch           |
| 2. Option slot 1             | 7. Power connector         |
| 3. Cover-release screw       | 8. TCE interface connector |
| 4. Option slot 2             | 9. TCE SCSI connector      |
| 5. Accessory power connector |                            |

WSTCU008

**Figure 3-1. The back of the TCE**

**Table 3-1. The Power Indicator Light, On/Off Switch, and Connectors**

<b>Item</b>	<b>Function</b>
<b>TURBOchannel option slots 0, 1, and 2</b>	Where a TURBOchannel option module inside the TCE connects to optional hardware. For example, if the TCE contained a high 3D option module, the high 3D connector in option slot 0 would be connected to a monitor video cable.
<b>Cover-release screw</b>	A captive screw that fastens the cover to the TCE box
<b>On/off switch</b>	A toggle switch that turns the TCE on and off. Pressing the 1 turns the TCE on. Pressing the 0 turns the TCE off.
<b>Power indicator light</b>	A green LED (light-emitting diode) that glows when the TCE is turned on
<b>Power connector</b>	Connects the TCE to a power source
<b>Accessory power connector</b>	Connects a monitor power cord to the TCE
<b>TCE interface connector</b>	Connects the TCE unit to the TCE option module in a DECstation 5000 workstation
<b>TCE SCSI connector</b>	Connects the TCE to the external small computer system interface (SCSI) port on a DECstation 5000 workstation or an expansion box

## Shutting Down the Workstation

If your workstation has already been installed, follow these steps before removing the TCE cover or performing any installation procedure:

1. Follow the instructions that came with your worksystem software to shut down the software.
2. Turn off workstation components in the following order:
  - a. Turn off the system unit
  - b. Turn off the TCE and any other expansion boxes
  - c. Turn off the monitor. If the monitor is connected to the TCE accessory power connector or to the workstation, the monitor will turn off when the TCE or workstation are turned off.

*Caution: The workstation, the TCE, and any expansion boxes must be turned off during installation. Connecting or disconnecting equipment while power is turned on can damage equipment.*

## Turning On the Workstation

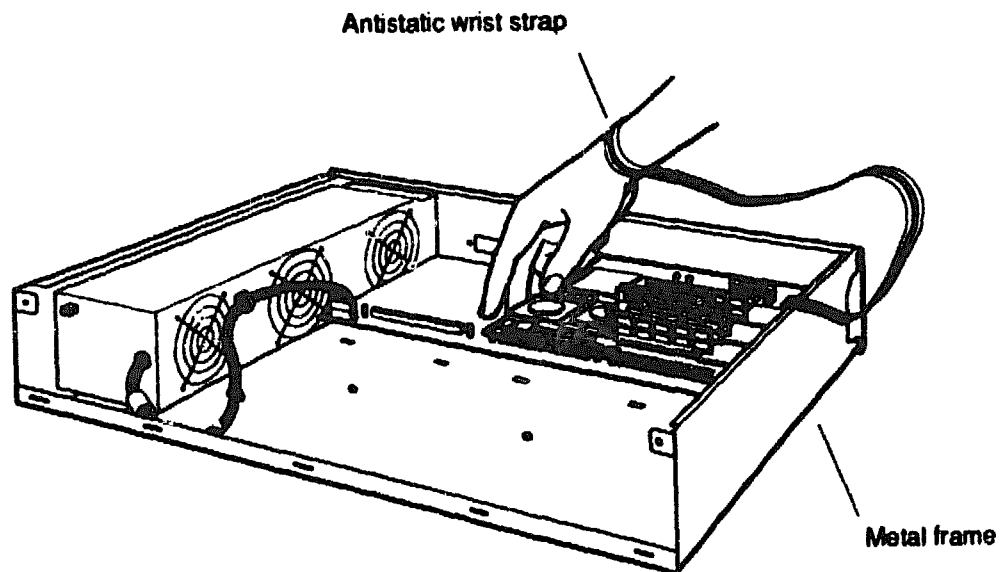
Follow these steps to turn on your workstation and its components:

1. Turn on the monitor. If the monitor is connected to the TCE accessory power connector or to the workstation, the monitor will not turn on until the TCE or workstation have also been turned on.
2. Turn on the TCE and any other expansion boxes
3. Turn on the system unit

## Using an Antistatic Wrist Strap

**Caution:** Always use the antistatic wrist strap that came in the accessories kit for your workstation when working inside the TCE or system unit or handling items stored in antistatic bags. Failure to use the antistatic wrist strap can result in damage to equipment.

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 TCE.



WSTCU012

**Figure 3-2. Using an antistatic wrist strap**

## Removing and Replacing the TCE Cover

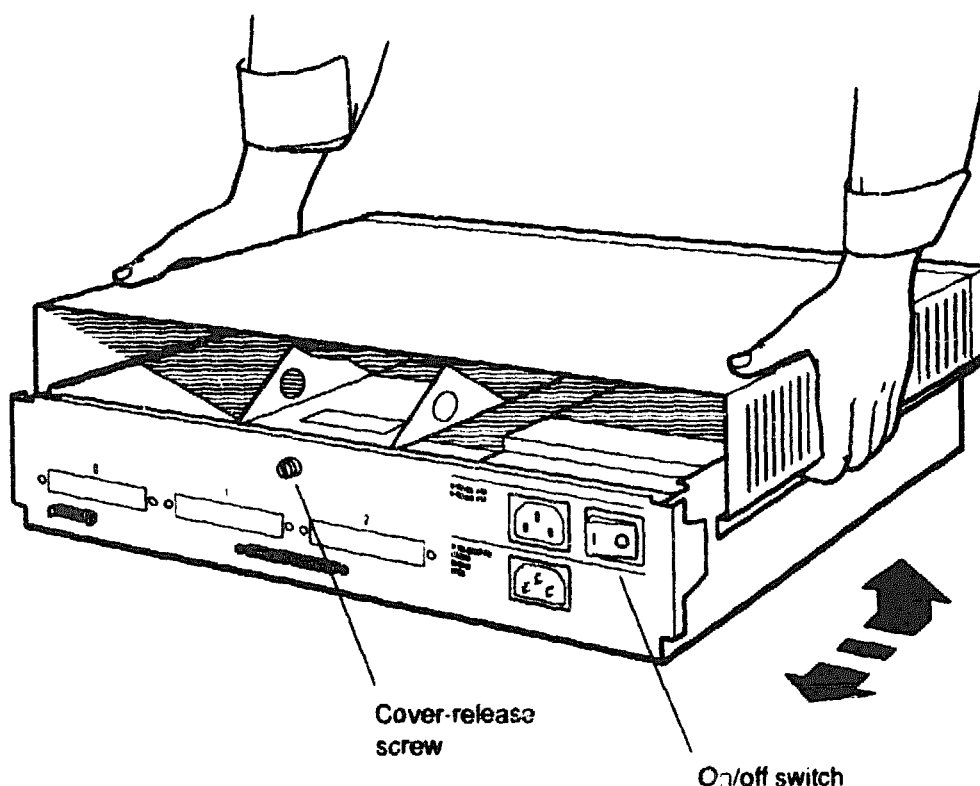
The following sections describe removing and replacing the TCE cover. You will need the medium Phillips screwdriver that came in the accessories kit shipped with your workstation.

### To Remove the TCE Cover

1. Shut down your workstation. See "Shutting Down the Workstation" on page 3-4.

Turn off the TCE by pressing the 0 on the on/off switch on the back of the unit. Leave the power cord plugged in.

2. Loosen the cover-release screw on the back of the TCE. This is a captive screw; you can loosen it, but you cannot remove it.
3. Grasp each side of the cover and pull it straight toward the front of the unit about 2 inches. Then pull the cover up.



WSTCU013

**Figure 3-3. Removing the TCE cover**



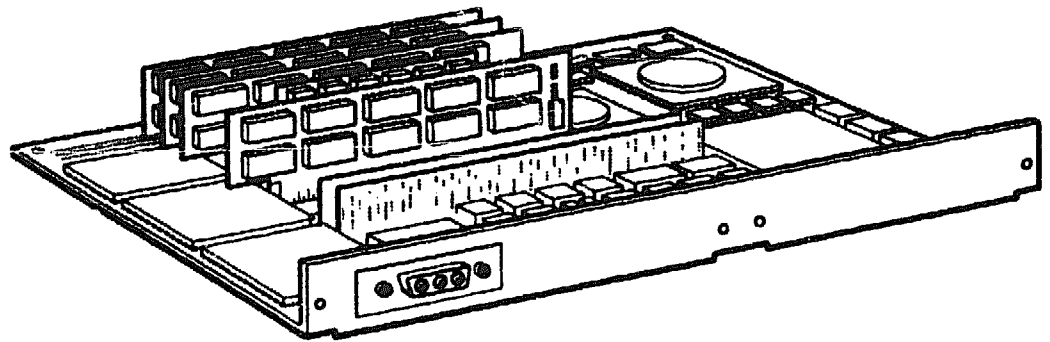
## **To Replace the TCE Cover**

- 1. Position the cover as shown in Figure 3-3, slightly above the unit about 2 inches from the back.**
- 2. Rest the cover on the TCE then slide it all the way back.**
- 3. Tighten the cover-release screw on the back of the unit.**
- 4. Turn on your workstation. See "Turning On the Workstation" on page 3-4.**

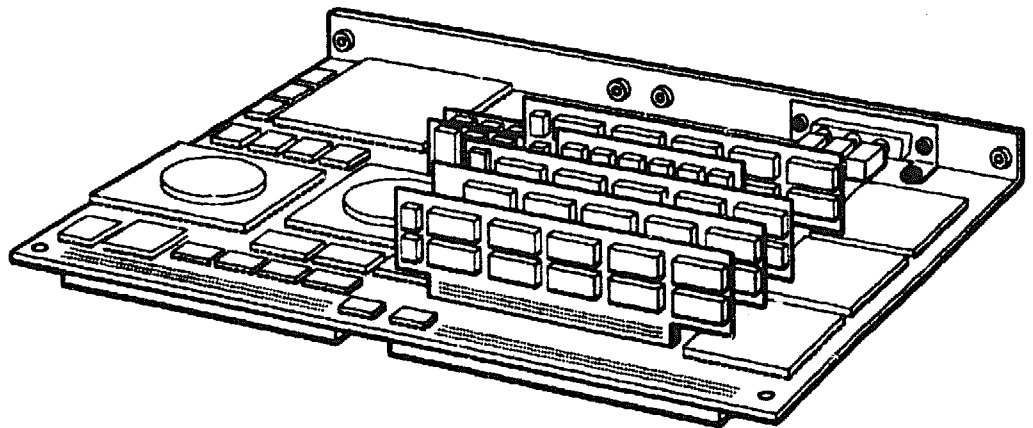
## Installing and Removing a TURBOchannel Option Module in the TCE

The TCE can support one TURBOchannel option module that can be one, two, or three slots wide. When the TCE contains an option module, the TCE must be connected to a TCE option module in the workstation.

Figure 3-4 shows a typical double-width option module. Figure 3-5 shows the slots inside the TCE where you can install an option module. For more information about specific TURBOchannel option modules, refer to the *TURBOchannel Options User's Guide* that came with the option module. The option modules supported by the TCE use the Digital TURBOchannel.



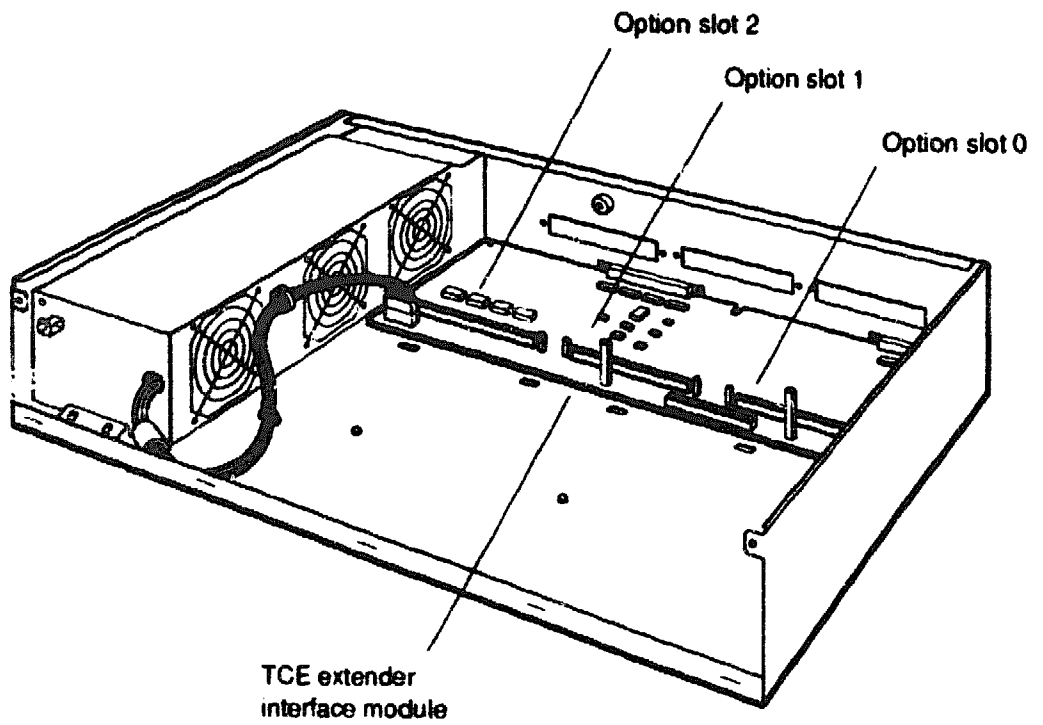
**Front view**



**Back view**

WSTCU014

**Figure 3-4. A mid 3D graphics double-width option module**



WSTCU015

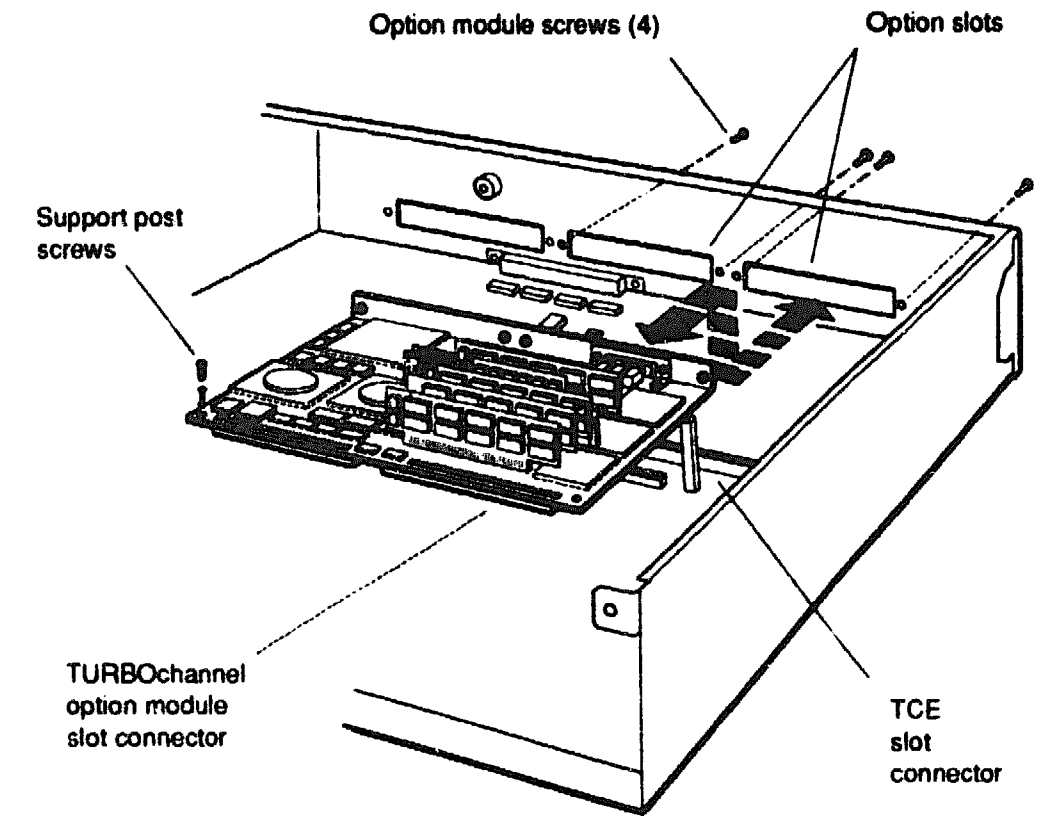
**Figure 3-5. Option slots inside the TCE**

## **To Install an Option Module**

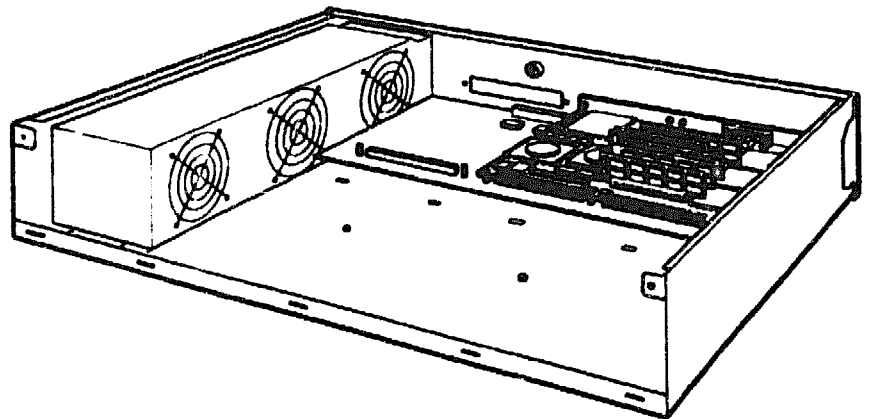
Follow the same procedure to install all option modules.

1. Shut down your workstation. See "Shutting Down the Workstation" on page 3-4.
2. Turn off the TCE by pressing the 0 on the on/off switch on the back of the unit.
3. Unplug the TCE power cord.
4. Remove the TCE cover. See "To Remove the TCE Cover" on page 3-6.
5. Attach the antistatic wrist strap. See "Using an Antistatic Wrist Strap" on page 3-5.
6. If the option slot you want to use has a cover, remove the two screws that hold each cover in place and then remove the cover. Remove two covers for a double-width option module and three covers for a triple-width option module. Save the cover and screws.
7. Position the option module as shown in Figure 3-6, with its TCE connector facing down and its cable connector facing the back of the TCE unit.
8. Insert the option module cable connector into the opening in the back of the TCE.
9. Press the option module slot connector into the connector on the TCE interface module.
10. Use the screws that came with the option module to fasten the module to the support posts. There are two support post holes for a single-width option module, four for a double-width option module, and six for a triple-width option module.
11. Use the screws that held the metal plate over the option slot to attach the back of the option module to the slot in the back of the TCE.
12. Remove the antistatic wrist strap.
13. Replace the TCE cover. See "To Replace the TCE Cover" on page 3-7.
14. Connect the TCE power cord.

15. Connect the option module cable. For detailed information refer to the *TURBOchannel Options User's Guide* that came with the option module.
16. If the TCE option module is not installed in the system unit, see "To Install the TCE Option Module" on page 3-16.
17. Connect the TCE interface cable. See "To Connect the TCE to the TCE Option Module in the Workstation" on page 3-19.
18. Turn on your workstation. See "Turning On the Workstation" on page 3-4.
19. Use the **cnfg** command to check the installation. See "Checking the Installation" on page 3-24.



WSTCU034



WSTCU033

**Figure 3-6. Installing an option module**

## **To Remove an Option Module**

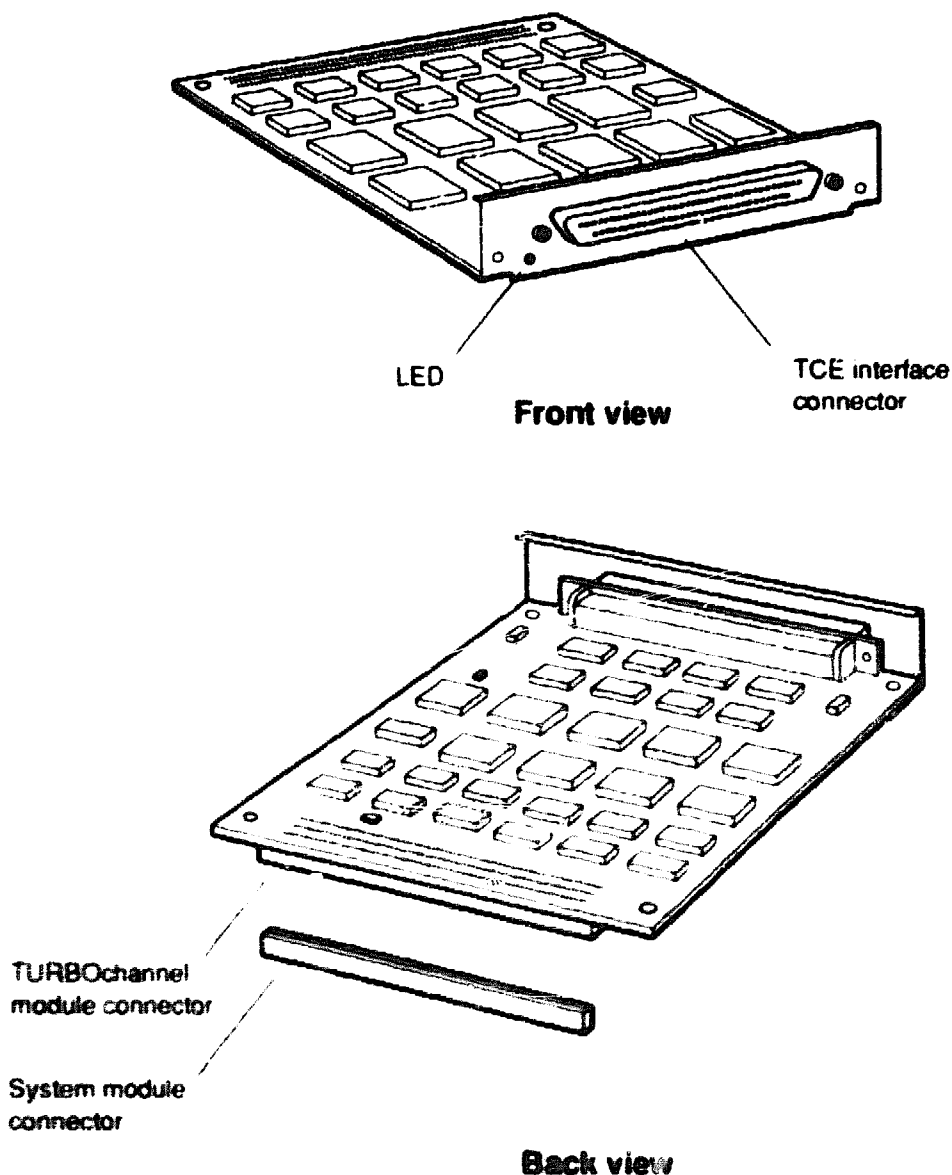
Follow the same procedure to remove all option modules. Refer to the detailed instructions for installing the option module for more information when following these steps:

1. Shut down your workstation.
2. Turn off the TCE.
3. Unplug the TCE power cord.
4. Disconnect the cable that is plugged into the option module.
5. Remove the TCE cover.
6. Attach the antistatic wrist strap.
7. Remove the two screws on either side of the slot or slots in the back of the TCE.
8. Remove the two screws that hold the option module on each of its support posts.
9. Pull the option module up from the support posts and TCE slot connector.
10. Pull the module out of the slot in the back of the TCE.
11. Place the module in an antistatic bag.
12. If you are not going to put an option module back into the slot, install a cover in the cutout in the back of the TCE. Use two of the screws that held the option module in place.
13. Remove the antistatic wrist strap.
14. Replace the TCE cover.
15. Turn on your workstation.



## Installing and Removing the TCE Option Module in the Workstation

When the TCE contains a TURBOchannel option module, a TCE option module is installed in the workstation to connect the TCE to the workstation.



WSTCU001

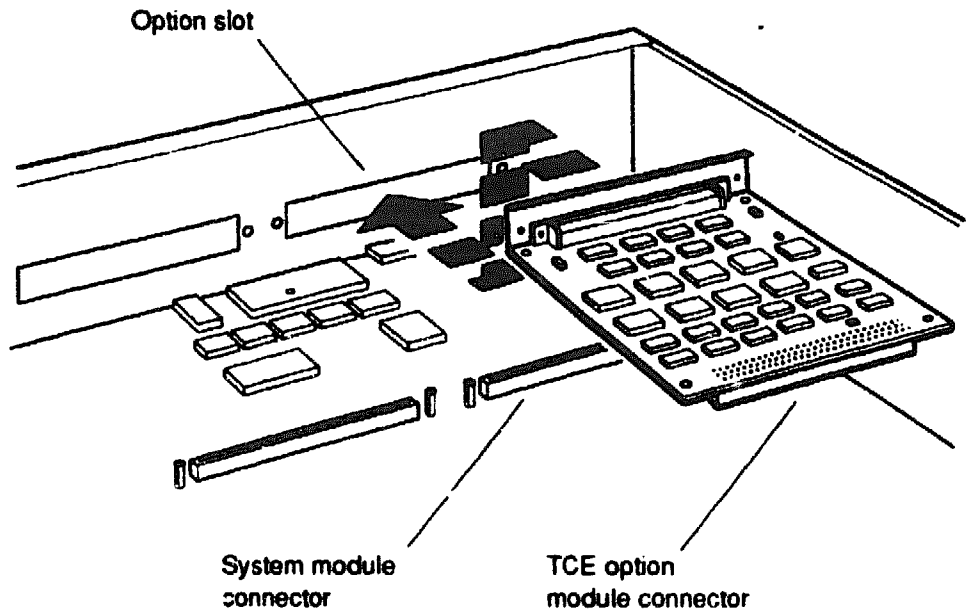
**Figure 3-7. TCE option module**

## **To Install the TCE Option Module**

The TCE option module connects the workstation to the TCE when the TCE contains an option module. For specific information about your workstation refer to the Operator's Guide for your workstation.

1. Shut down your workstation. See "Shutting Down the Workstation" on page 3-4.
2. Unplug the workstation power cord.
3. Remove the workstation cover.
4. Attach the antistatic wrist strap. See "Using an Antistatic Wrist Strap" on page 3-5.
5. If the option slot that you want to use has a cover, remove the two screws that hold each cover in place and then remove the cover. Save the cover and screws.
6. Position the TCE option module as shown in Figure 3-8, with its TCE connector facing down and its cable connector facing the back of the TCE unit.
7. Insert the option module cable connector into the opening in the back of the TCE.
8. Press the option module slot connector into the connector on the system module.
9. Use the screws that came with the module to fasten the TCE option module to the support posts.
10. Use the screws that held the cover over the option slot to attach the back of the TCE option module to the slot in the back of the system unit.
11. Remove the antistatic wrist strap.
12. Replace the system unit cover.
13. Connect the system unit power cord.
14. If a TURBOchannel option module is not installed in the TCE unit, see "To Install an Option Module" on page 3-11.
15. Connect the TCE interface cable. See "To Connect the TCE to the TCE Option Module in the Workstation" on page 3-19.

16. Turn on your workstation. See "Turning On the Workstation" on page 3-4.
17. Use the `cnfg` command to check the installation. See "Checking the Installation" on page 3-24.



WSTCU005

**Figure 3-8. Installing a TCE option module**

## **To Remove a TCE Option Module**

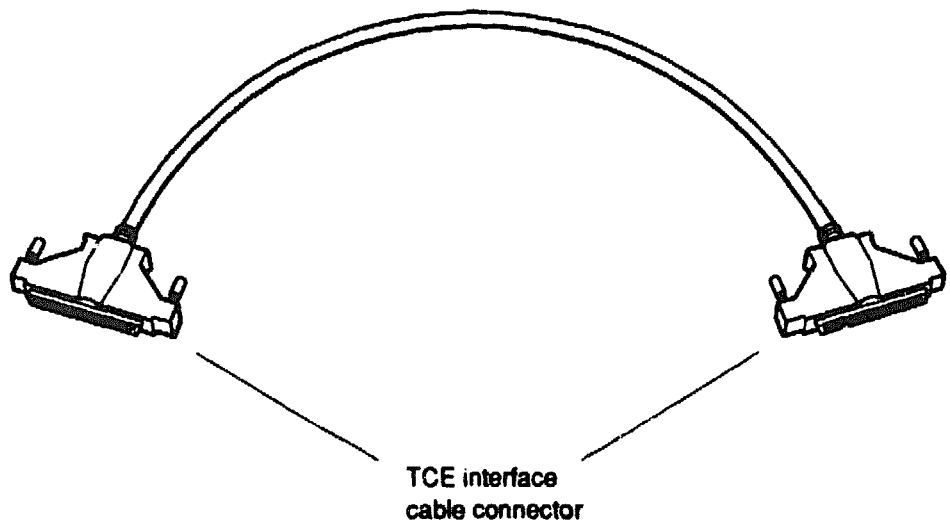
Refer to the detailed instructions for installing the TCE option module for more information when following these steps:

1. Shut down your workstation.
2. Turn off the TCE.
3. Unplug the workstation power cord.
4. Disconnect the TCE interface cable.
5. Remove the workstation cover.
6. Attach the antistatic wrist strap.
7. Remove the two screws on either side of the slot in the back of the system unit.
8. Remove the two screws that hold the TCE option module on its support posts.
9. Pull the option module up off the support posts and system slot connector.
10. Pull the module out of the slot in the back of the system unit.
11. Place the module in an antistatic bag.
12. If you are not going to put an option module back into the slot, install a cover in the opening in the back of the system unit. Use the two screws that held the TCE option module in place.
13. Remove the antistatic wrist strap.
14. Replace the system unit cover.
15. Turn on your workstation.

## To Connect the TCE to the TCE Option Module in the Workstation

**Caution:** *The workstation, the TCE, and any expansion boxes must be turned off during installation. Connecting or disconnecting equipment while power is turned on can damage equipment.*

The TCE interface cable connects the TCE to the TCE option module in the system unit. The TCE interface cable has a black plastic 100-pin connector at both ends.



WSTCU002

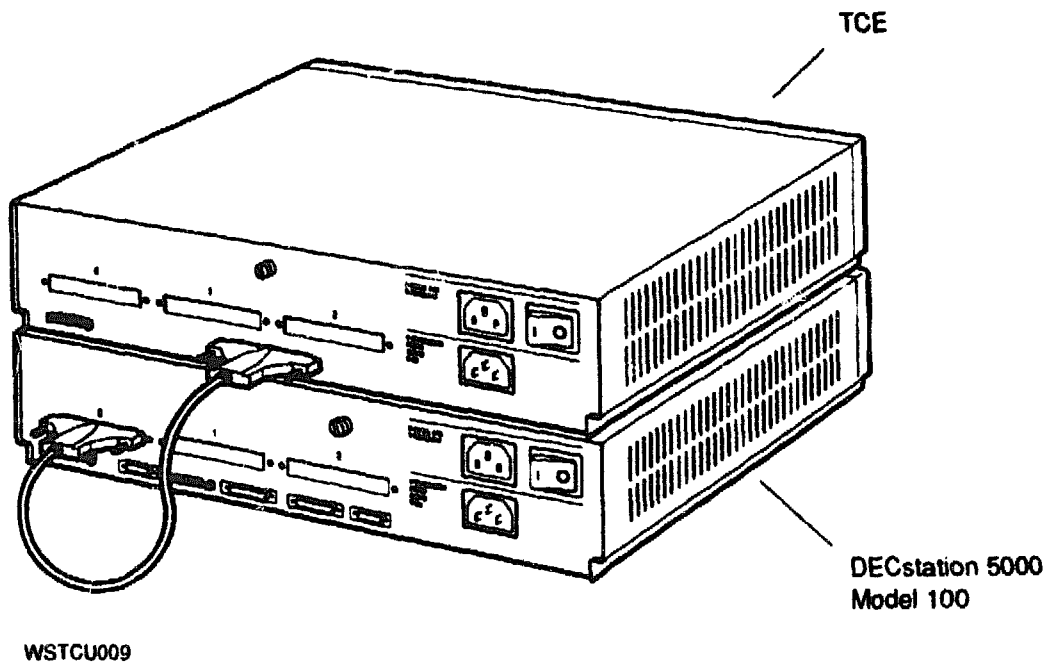
**Figure 3-9.** The TCE interface cable

To connect the TCE interface cable, the TCE must be placed on top of or beneath the system unit. The TCE must be placed flat on a level surface.

**Caution:** *Standing the TCE on its side blocks the cooling vents and can damage the unit.*

Follow these steps to connect the TCE interface cable.  
Figure 3-10 shows the TCE connected to the TCE option module in a typical DECstation 5000 workstation.

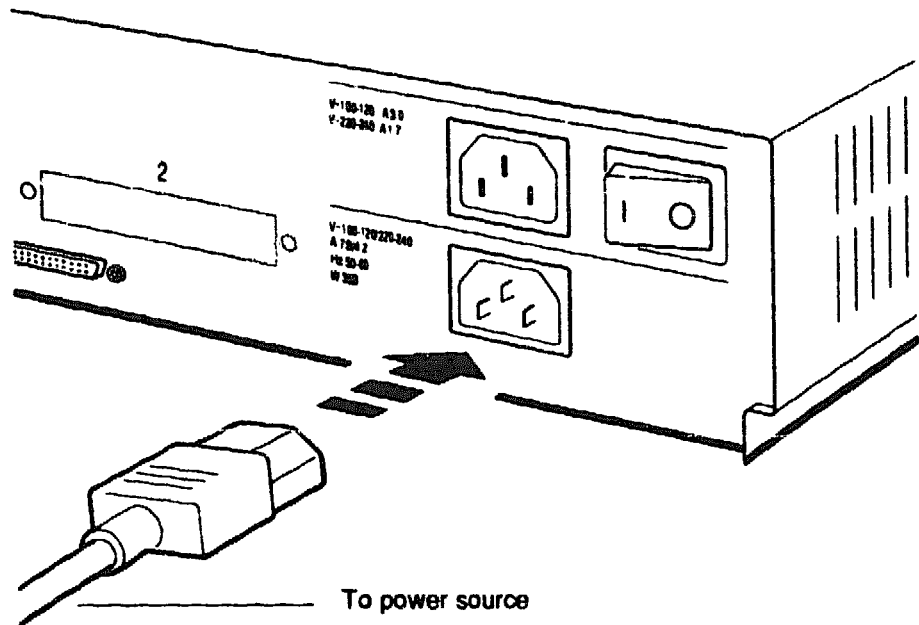
1. Hold the cable connector on one end of the interface cable with the widest part on top.
2. Push the connector firmly onto the TCE interface connector on the back of the TCE unit.
3. Tighten the connector screws.
4. Follow the same steps to attach the connector on the other end of the interface cable to the TCE option module connector on the back of the system unit.



**Figure 3-10. Connecting the TCE to the TCE option module in the workstation**

## To Connect the TCE to a Power Source

1. Plug one end of the power cord into the power connector on the back of the TCE.
2. Plug the other end of the power cord into a power source.



WSTCUG10

**Figure 3-11. Connecting the TCE power cord**

The TCE power cord can also be plugged into the accessory power connector on the back of the workstation unless a monitor is connected to the TCE accessory power connector.

**Caution:** Do not connect the TCE to the accessory power connector on the back of the workstation if a monitor is connected to the TCE. This could exceed the current rating of the workstation accessory power connector.

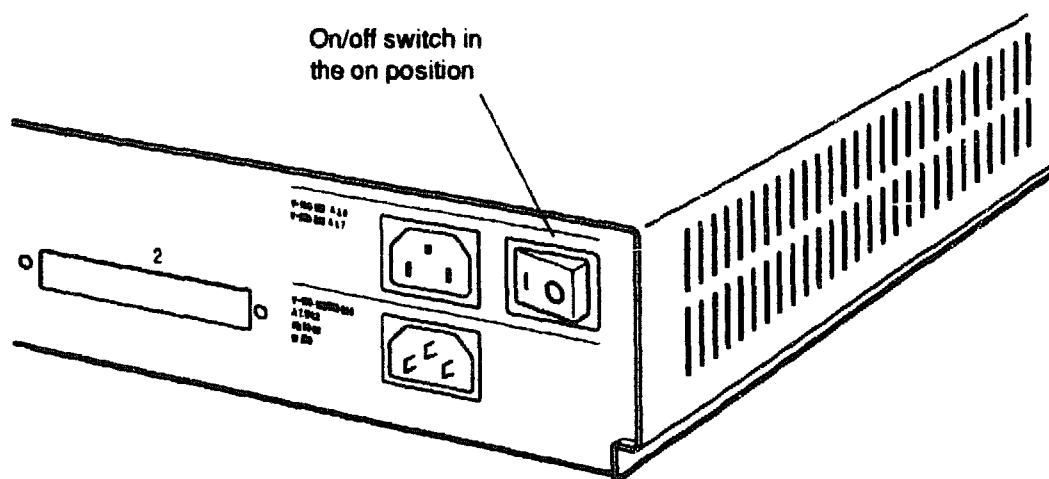
Do not connect hardware other than a monitor to the TCE accessory power connector. This could exceed the current rating of the TCE accessory power connector.

## Turning On the TCE

Turn on workstation components in the following order:

1. Turn on the monitor. If the monitor is connected to the TCE accessory power connector or to the system unit, the monitor will not turn on until the TCE or system unit have also been turned on.
2. Turn on the TCE and any other expansion boxes
3. Turn on the system unit

Turn on the TCE by pressing the 1 on the on/off switch on the back of the unit. When you turn on the TCE the green power indicator light on the front of the TCE unit glows.



WSTCU011

Figure 3-12. Turning on the TCE



## **If the TCE Does Not Turn On**

If the power indicator light does not glow when you turn on the TCE, turn off the workstation, then the TCE and any other hardware, and check that power cords are connected properly and the power strip, if there is one, is plugged in and turned on.

If the TCE still does not work, contact your Digital service representative.

## **If the TCE Option Module Does Not Work**

The green power indicator light on the back of the TCE option module glows when the following conditions are met:

- The TCE option module is connected to the TCE unit.
- A TURBOchannel option module is installed in the TCE unit.
- The workstation and TCE are turned on.

If the indicator light does not glow, check that the system unit and TCE are on and receiving power. If the indicator light still does not glow, turn off the workstation and the TCE and check that

- The TCE module is inserted tightly in the TURBOchannel slot.
- The TCE interface cable is connected correctly to the TCE option module and the TCE box.

If the TCE option module indicator light still does not glow, move the TCE module to another option slot and try again. If the problem persists, contact your Digital service representative.

## Checking the Installation

Use the configuration **cnfg** command to check the installation of the TCE and any optional hardware. The configuration display will not show the TCE option module installed in the workstation. The display will show the TURBOchannel option module installed in the TCE as though this module is in the option slot on the workstation that contains the TCE option module.

Type **cnfg** at the console prompt. Then press Return. This is a sample configuration display for the DECstation 5000 Model 100:

```
3:  KN02-BA  DEC  V5.2c  TCF0  ( 24 MB)
                                     (enet:08-00-2b-0c-e0-d1)
                                     (scsi = 7)
2:  PMAD-AA  DEC  V5.1f  TCF0  (enet: 08-00-2b-0f-43-31)
1:  PMAZ-AA  DEC  V5.3a  TCF0  (scsi=7)
0:  PMAG-DA  DEC  V5.3a  TCF0  (EA: FXG -- D=8, Z=24)
```

Numbers in the first column are the slot numbers for the modules in your system. If the configuration display has no line for the slot that contains the TCE option module, turn off the workstation and the TCE and check that

- The TCE option module in the system unit is inserted tightly in the slot.
- The TURBOchannel option module in the TCE is inserted tightly in the slot.
- The TCE interface cable is connected correctly to the TCE option module and the TCE box.

If the TCE option module still does not work move the TCE module to another option slot and try again. If this does not resolve the problem try installing another TURBOchannel option module in the TCE unit, if you have one available.

If the problem persists, contact your Digital service representative.

---

## Installing Drives in the TCE

This chapter explains

- How to install and remove hard disk drives and removable media drives in the TCE
- How to connect the TCE to the workstation SCSI connector
- How to connect the TCE to an expansion box SCSI connector

## **Installing and Removing Drives in the TCE**

**You can install drives in two places in the TCE: in the base and in the front drive panel.**

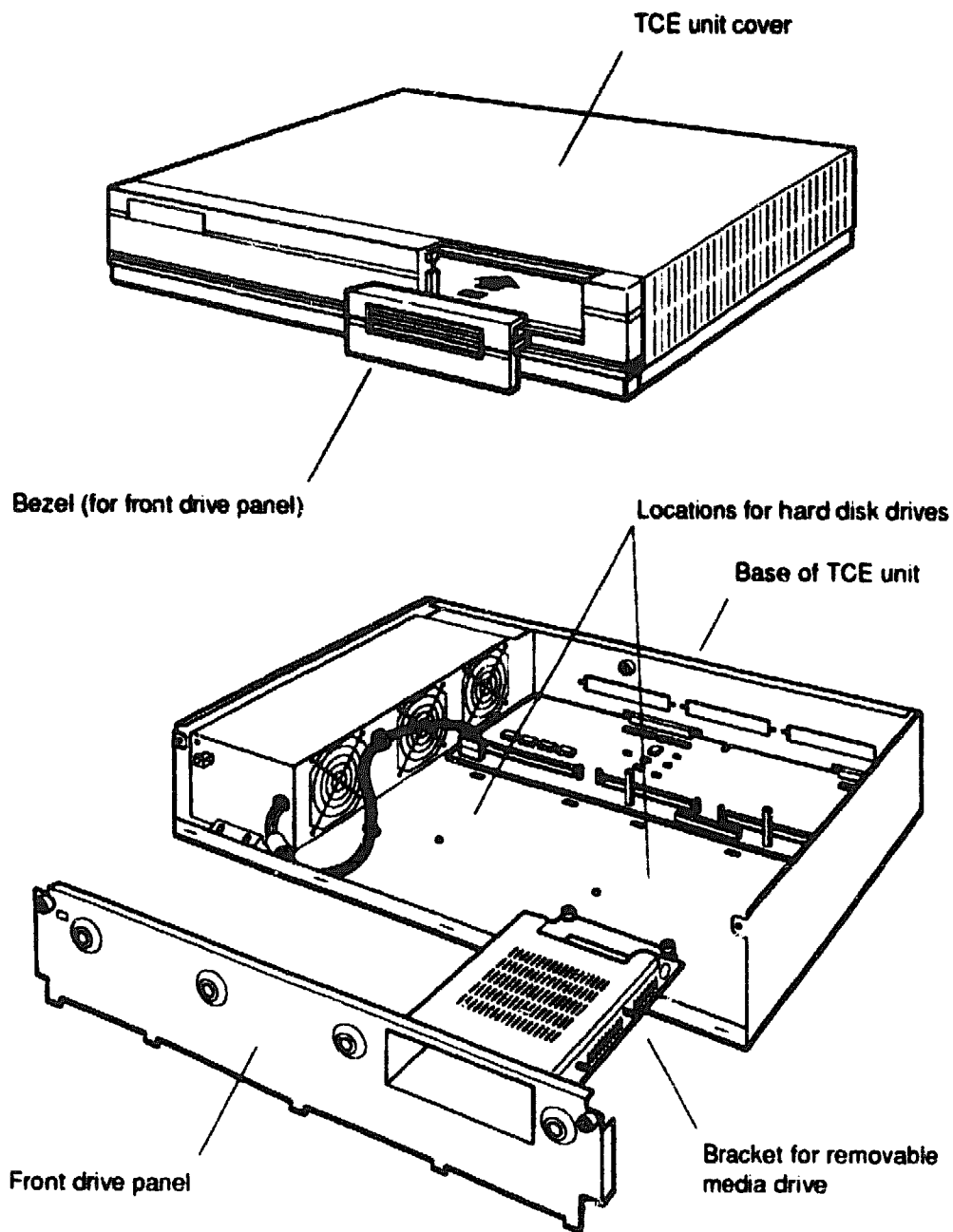
- **Install hard disk drives in the base of the TCE.**
- **Install removable media drives in the front drive panel.**

**The TCE can support two of the following hard disk drives:**

- **RZ23L hard disk drive**
- **RZ24 hard disk drive**
- **RZ25 hard disk drive**

**The TCE can support one of the following removable media drives:**

- **RX23 diskette drive**
- **RRD42 optical compact disk drive**
- **TZK10 QIC tape drive**



WSTCU017

**Figure 4-1. Where to install drives in the TCE**

## To Set SCSI IDs

Drive SCSI IDs are set at the factory. If you need to change the factory setting on a drive, use the configuration display to check what SCSI ID numbers are assigned (see "To Check the Drive Installation" on page 4-32). Choose any number from 0 to 6 that is not the same as a SCSI ID number in the display.

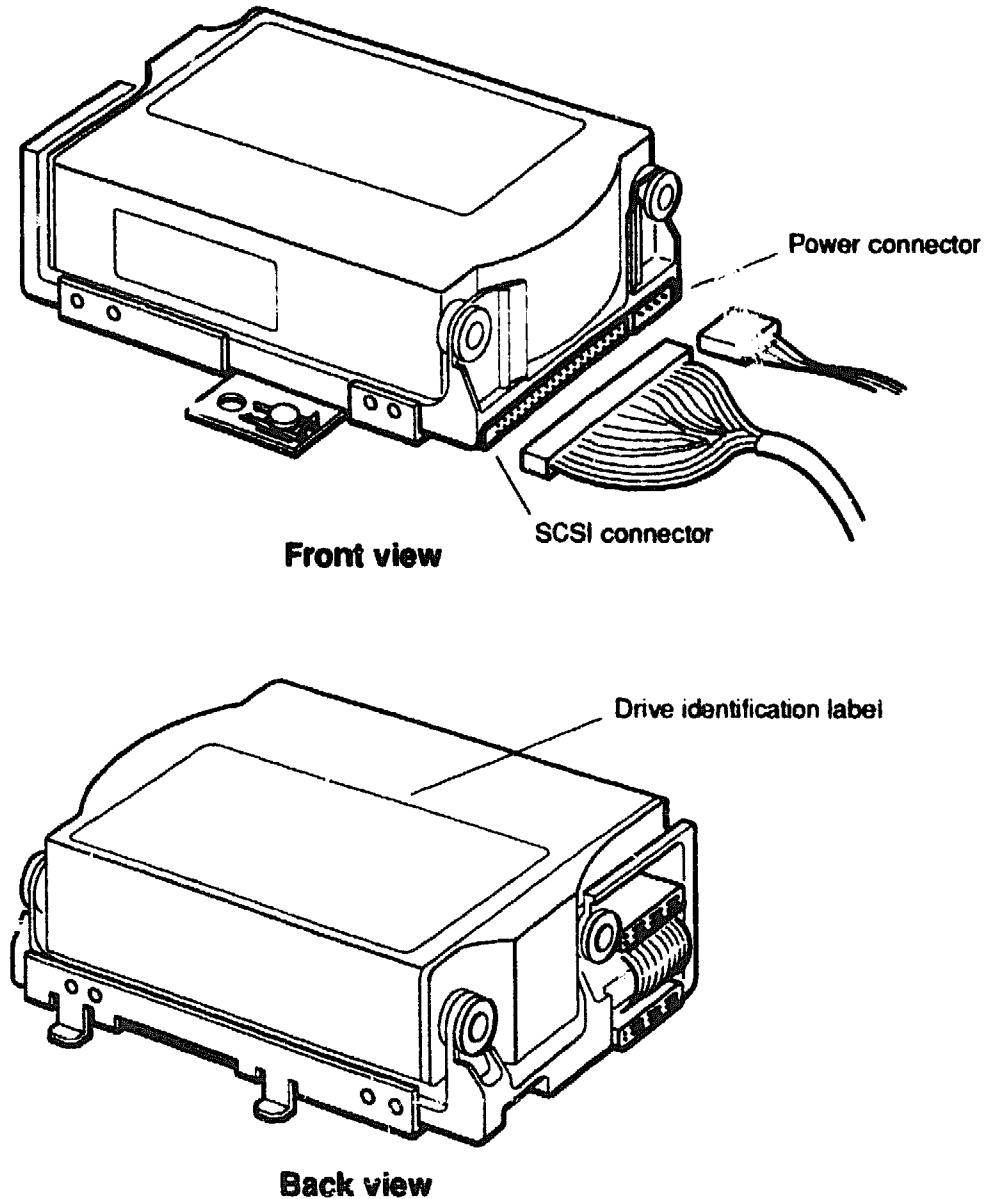
To set the SCSI ID to a new number, arrange the SCSI switches or jumpers on the drive. Jumpers are small rectangular collars that fit over the ID pins on drives and other components. You will need needle-nose pliers. Appendix D shows SCSI jumper settings and the connectors for the power supply and SCSI cables for drives supported by the TCE.

**Caution:** *Some drives have extra switches and pins that should not be changed. For example, for the RRD42 optical compact disc drive, the pin on the left adjusts the drive for your worksystem operating system. The drive is shipped with a jumper on the pin, and this jumper should not be moved.*

## To Install a Hard Disk Drive

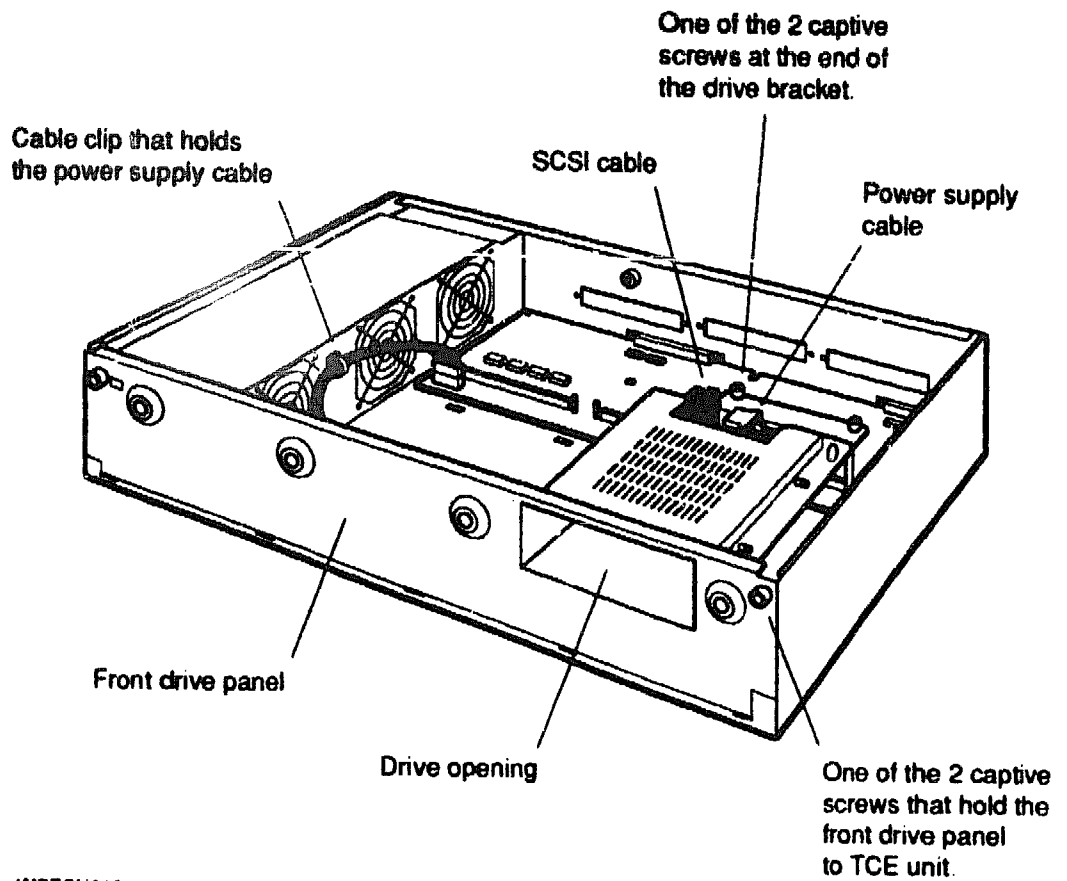
Two hard disk drives can be installed in the TCE base. Follow the same procedure to install all internal hard disk drives. You may need a medium flat-blade and a Phillips screwdriver and small needle-nose pliers.

Figure 4-2 shows a typical hard disk drive. Figure 4-3 shows the inside of the TCE without drives.



WSTCU018

**Figure 4-2. An RZ24 hard disk drive**



WSTCU019

**Figure 4-3. Inside the TCE before drives are installed**



## **Install the hard disk drive**

1. Shut down your workstation. See "Shutting Down the Workstation" on page 3-4.
2. Turn off the TCE by pressing the 0 on the on/off switch on the back of the unit.
3. Unplug the TCE power cord.
4. Remove the TCE cover. See "To Remove the TCE Cover" on page 3-6.
5. Attach the antistatic wrist strap. See "Using an Antistatic Wrist Strap" on page 3-5.
6. If the drive bracket contains a removable media drive, leave the SCSI and power supply cables attached to the drive.

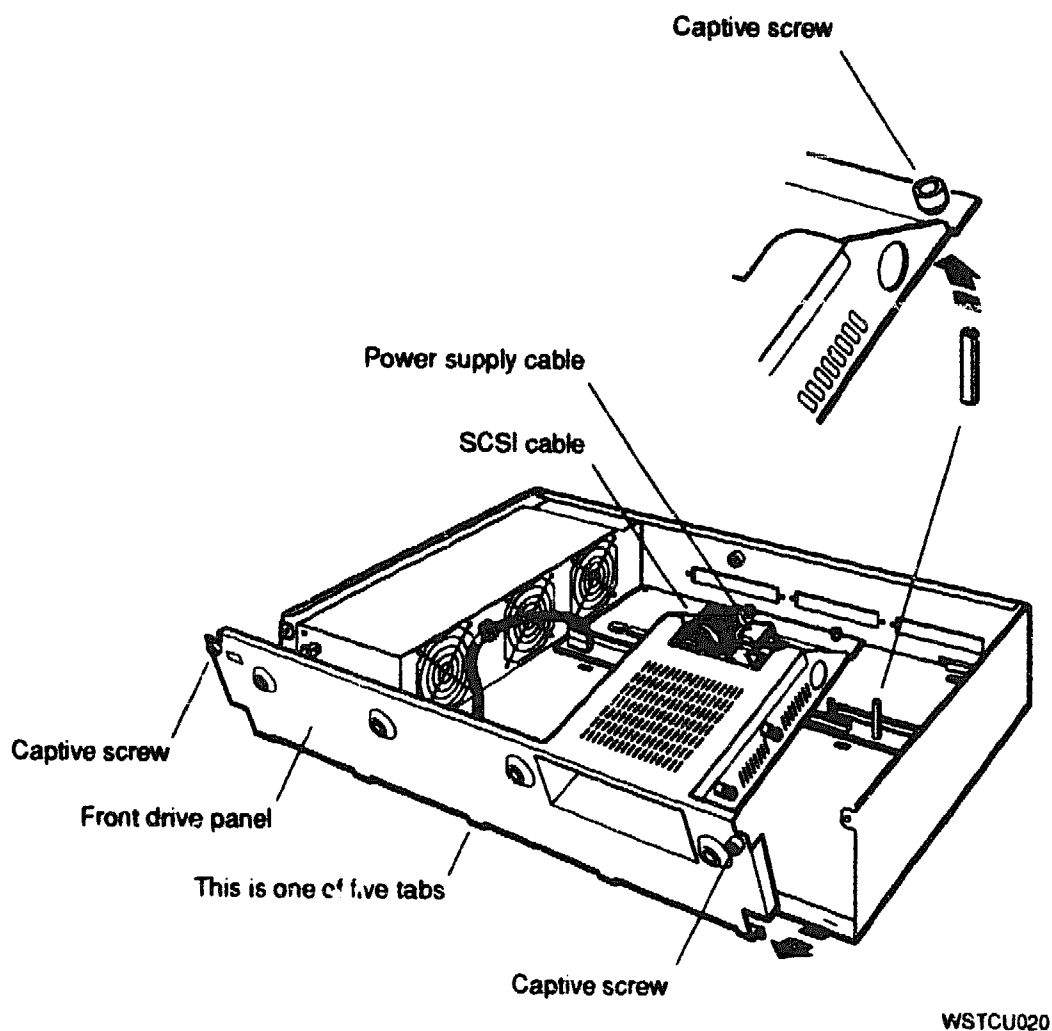
*Caution: Handle the drive bracket carefully if it contains a removable media drive.*

7. If the end of the SCSI cable is fastened to the drive bracket with tie-wrap, cut the tie-wrap.

*Caution: When you cut the tie-wrap be careful not to cut the SCSI cable.*

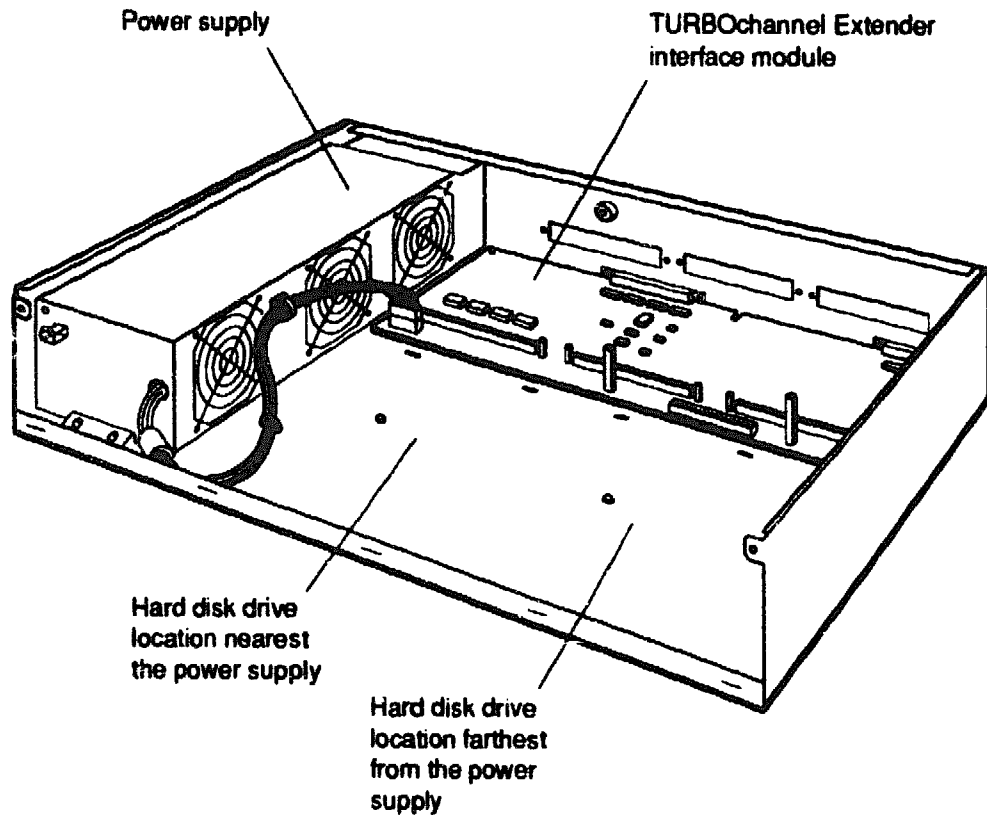
8. If the power supply and SCSI cables are tucked inside the drive bracket, pull them out.
9. Loosen the two captive screws at the end of the drive bracket.
10. Loosen the two captive screws that hold the front drive panel to the TCE.
11. Pull up the end of the drive bracket. If the power supply and SCSI cables are threaded through the cutout in the end of the drive bracket, ease them through the cutout as you pull up.

12. Remove the front drive panel from the system unit. See Figure 4-4.



**Figure 4-4. Removing the front drive panel**

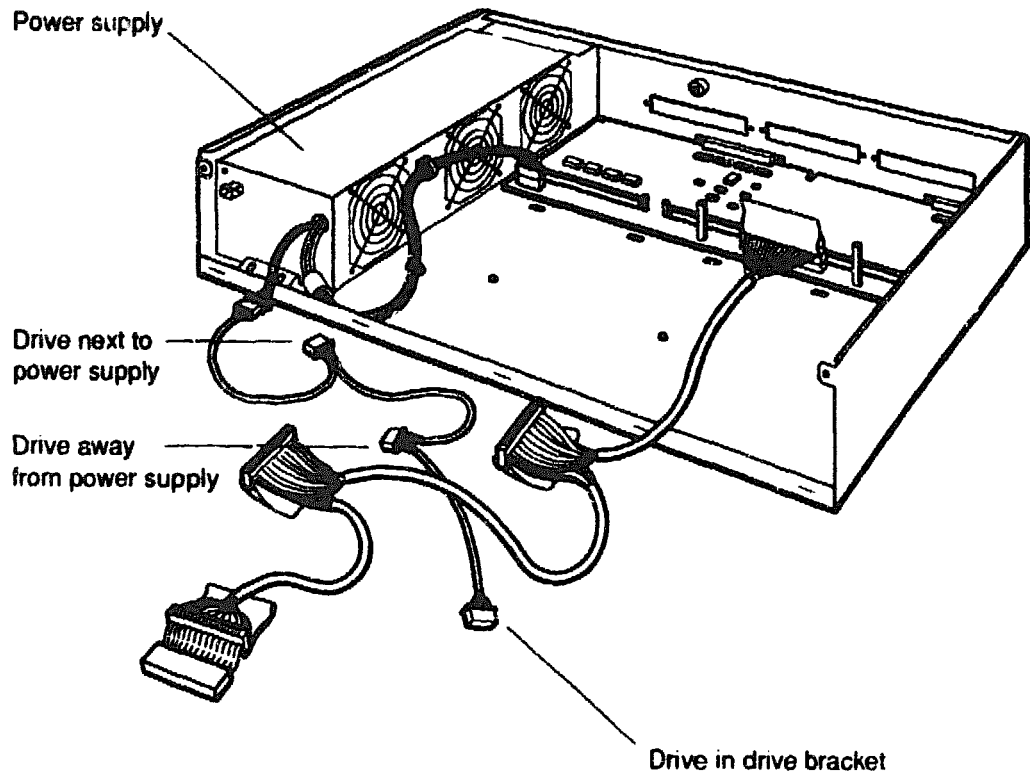
13. Figure 4-5 shows locations for hard disk drives in the TCE. If you are installing one drive, it is more convenient to install the drive next to the power supply. If you are installing two drives, install the one further away from the power supply first.



WSTCU021

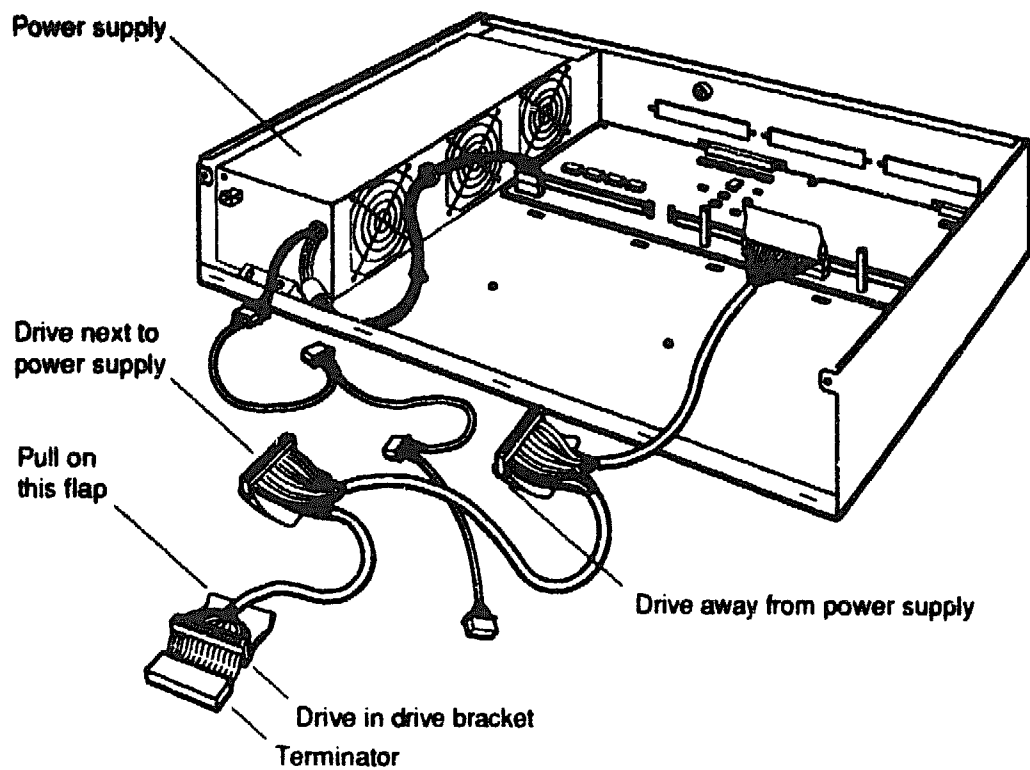
**Figure 4-5. Locations for internal hard disk drives**

14. Figures 4-6 and 4-7 show the connectors on the power supply and SCSI cables that correspond to the drive locations. Note that these figures show the connectors with no drives installed. You should be able to connect the cables to the new drive without removing them from drives that are already installed in the TCE or front drive panel.



WSTCU022

**Figure 4-6. Power supply cable in the TCE**



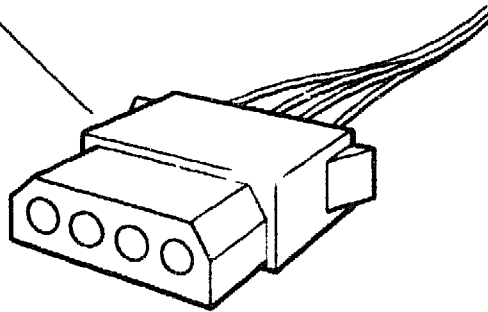
WSTCU023

**Figure 4-7. SCSI cable in the TCE**

15. Plug the power supply cable connector into the power supply connector on the hard disk drive. Match the slanted corners of the connector plug with the slanted corners of the power supply connector.

Note that the last power supply cable connector is longer than the other connectors. Only the last connector is long enough to attach to a removable media drive in the front drive panel.

Power supply cable  
connector



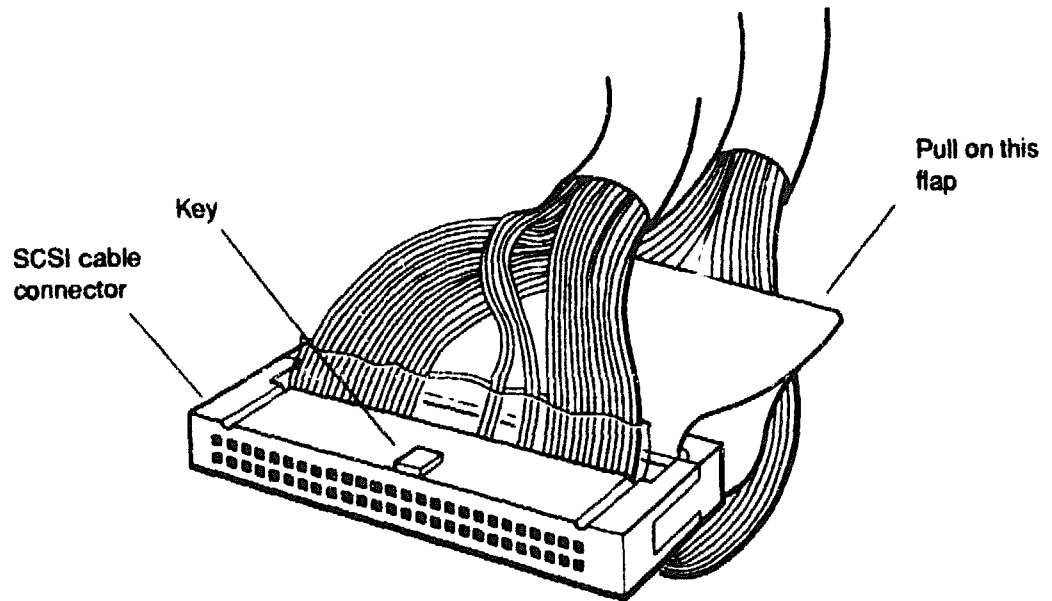
WSTCU024

**Figure 4-8. Power supply connector**

16. Plug the SCSI cable connector into the SCSI connector on the hard disk drive.

The SCSI connector on some drives has a slot for the key or the cable connector. Match the key on the connector plug with the slot on the drive connector. If the connector on the drive does not have a slot, hold the cable connector so that the key faces up.

**Important:** Always pull on the flap when removing SCSI connectors.



WSTCU025

Figure 4-9. SCSI connector

17. Tilt the hard disk drive as shown in Figure 4-10.
18. Insert the tabs on the hard disk drive into the cutouts in the bottom of the chassis. Move the cables so that they are not underneath the drive then swing the drive down onto the locking post.

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

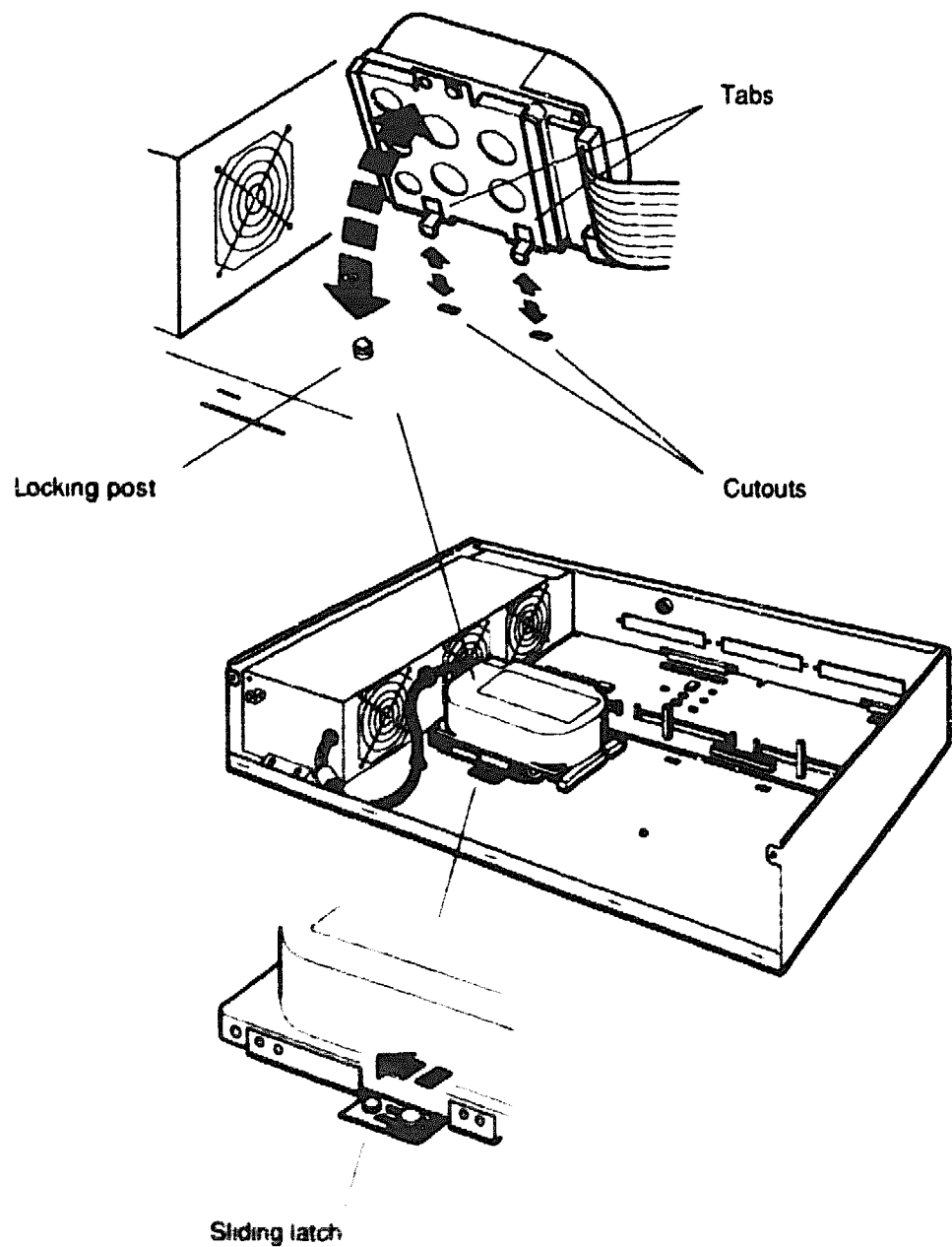
19. Press the sliding latch firmly onto the post.

If the latch does not snap into place, remove the drive and check to be sure no cables were under the drive.

20. If you are installing two hard disk drives, connect the power supply cable and SCSI cable to the second drive and insert the tabs on the drive into the chassis cutouts. Then lock the drive onto the mounting post.
21. Check to be sure that the end of the SCSI cable is still plugged into the system module connector on the TCE, as shown earlier in Figure 4-7.

Press all the cables around the hard disk drive or drives, so that there is room for the drive bracket on the front drive panel.





WS1CU026

**Figure 4-10. Installing and removing the hard disk drive**

## **Replace the front drive panel**

1. Insert the tabs on the front drive panel into the chassis cutouts on the TCE and tilt the panel halfway down into the TCE, as shown earlier in Figure 4-4.
2. Thread the loose ends of the power supply cable and SCSI cable through the large cutout in the end of the drive bracket.
3. If the bracket contains a drive, plug the ends of the cables into the connectors on the drive.  
  
If the bracket does not contains a drive, tuck the ends of the cables into the bracket.
4. Lower the end of the bracket onto the two support posts.  
  
If you cannot seat the bracket on the locking posts, lift the end of the bracket and press the cables down around the internal hard disk drive or drives.
5. Tighten the two captive screws on the end of the bracket as shown earlier in Figure 4-4.
6. Tighten the two captive screws that hold the front drive panel on the TCE as shown earlier in Figure 4-4.
7. Remove the antistatic wrist strap.
8. Replace the TCE cover.
9. Turn on your workstation. See "Turning On the Workstation" on page 3-4.
10. Test the drive with the `cnfg` command. See "To Check the Drive Installation" on page 4-32.

## **To Remove a Hard Disk Drive**

Follow the same procedure to remove all hard disk drives. Refer to the detailed instructions for installing the drive for more information when following these steps:

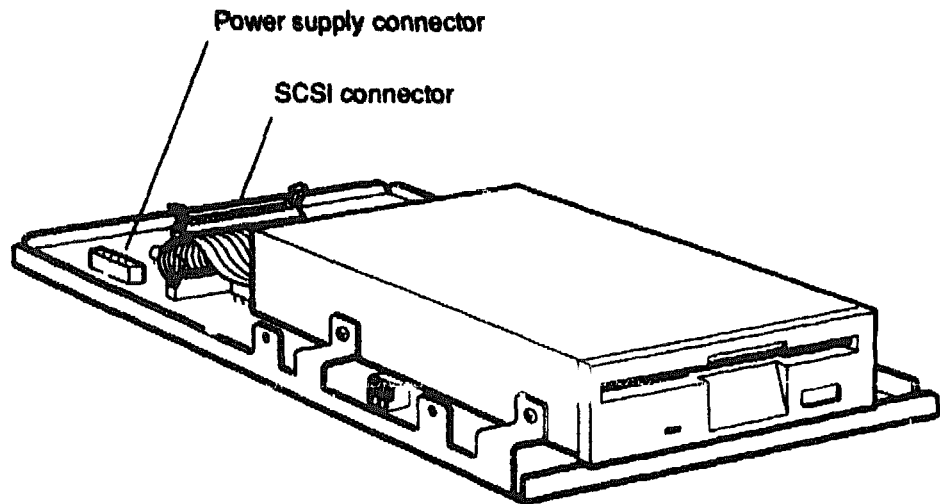
1. Shut down your workstation.
2. Turn off the TCE.
3. Unplug the TCE power cord.
4. Remove the TCE cover.
5. Attach the antistatic wrist strap.

6. Unhook the power supply cable from the white loop on the front drive panel.
7. Loosen the two captive screws that hold the front drive panel in place.
8. Loosen the two screws at the end of the bracket for the drive bracket.
9. Remove the front drive panel and the drive bracket attached to it. If a drive is installed in the front drive panel bracket, unplug the power supply cable and SCSI cable from the drive.
10. Unplug the power supply cable and SCSI cable from the drive. Pull on the flap to unplug the SCSI connector.
11. Unlock the sliding latch on the hard disk drive that you are removing.
12. Lift the drive off the mounting post and out of the chassis cutouts.
13. Place the drive in an antistatic bag.
14. Insert the tabs on the front drive panel into the chassis cutouts.
15. Thread the loose ends of the power supply cable and SCSI cable through the large cutout in the end of the drive bracket.
16. If the bracket contains a drive, plug the ends of the cables into the connectors on the drive.  
  
If the bracket does not contain a drive, tuck the ends of the cables into the bracket.
17. Lower the end of the bracket onto the two support posts.
18. Tighten the two captive screws on the end of the bracket.
19. Tighten the two captive screws that hold the front drive panel.
20. Remove the antistatic wrist strap.
21. Replace the TCE cover.
22. Turn on your workstation.

## To Install a Removable Media Drive

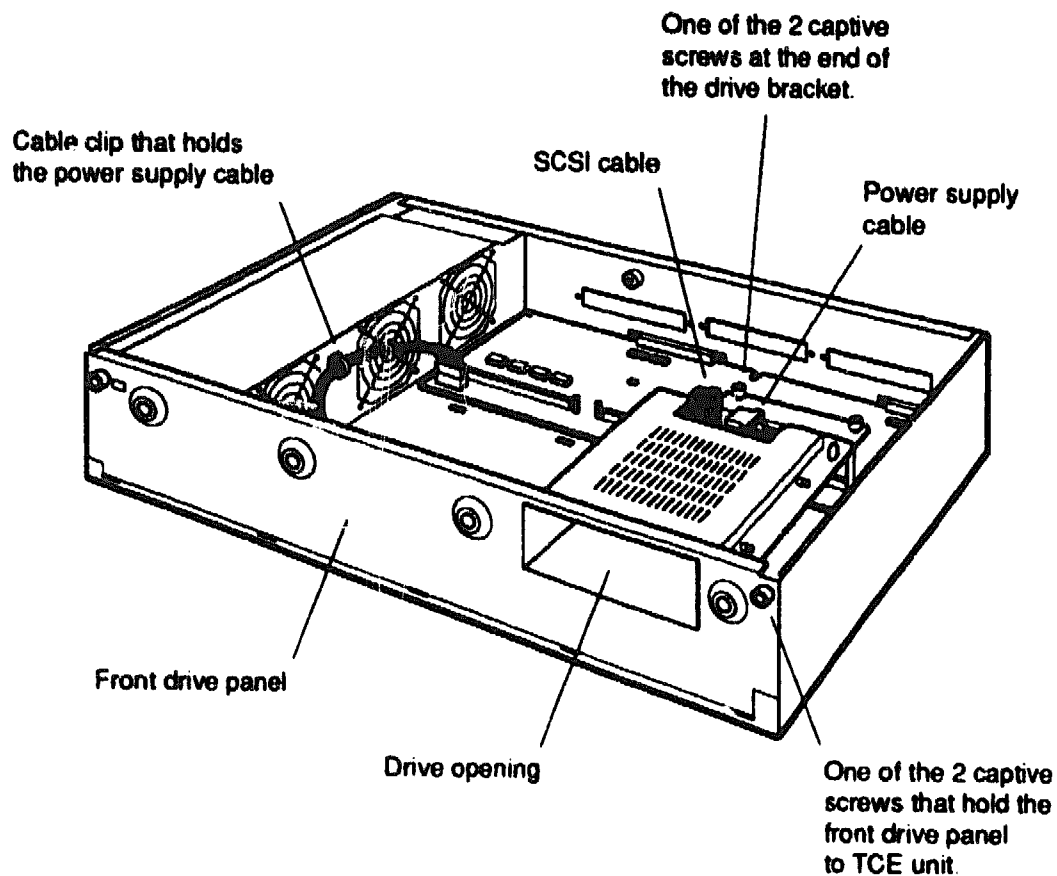
One removable media drive can be installed in the front drive panel. Follow the same procedure to install all removable media drives. You may need a medium flat-blade and a Phillips screwdriver and small needle-nose pliers.

Figure 4-11 shows a typical removable media drive. Figure 4-12 shows the inside of the TCE without drives.



WSTCU030

**Figure 4-11. An RX23 diskette drive**



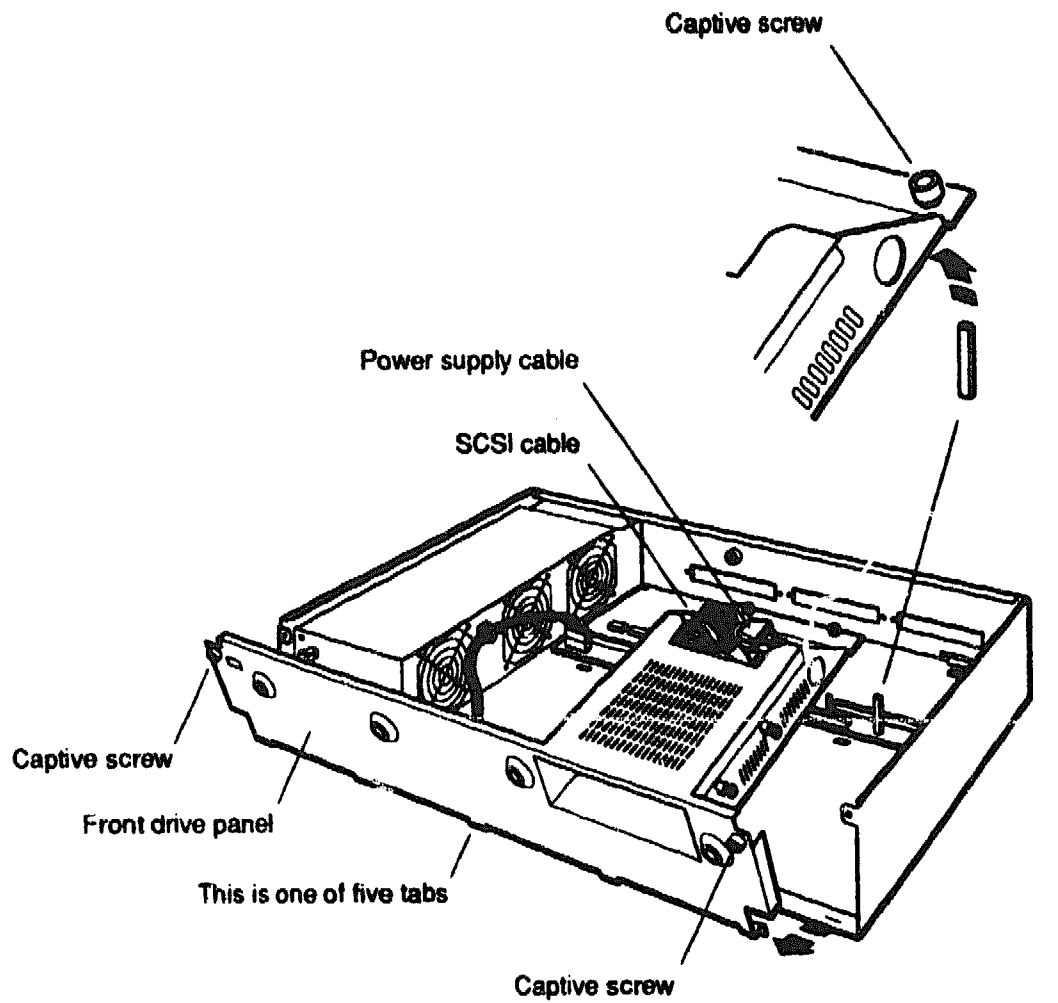
WSTCU019

**Figure 4-12. Inside the TCE before drives are installed**

### **Install the removable media drive**

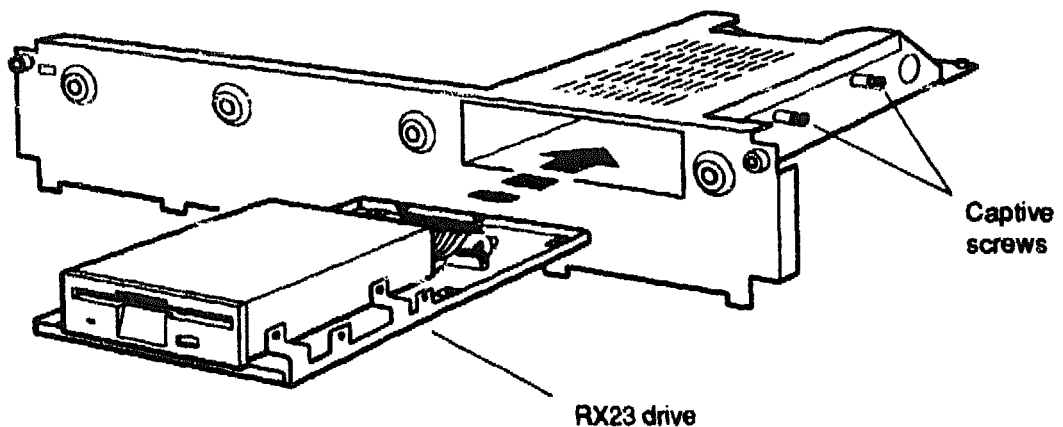
1. Shut down your workstation. See "Shutting Down the Workstation" on page 3-4.
2. Turn off the TCE by pressing the 0 on the on/off switch on the back of the unit.
3. Unplug the TCE power cord.
4. Remove the TCE cover. See "To Remove the TCE Cover" on page 3-6.
5. Attach the antistatic wrist strap. See "Using an Antistatic Wrist Strap" on page 3-5.
6. If the end of the SCSI cable is fastened to the drive bracket with a tie-wrap, cut the tie-wrap.
7. If the power supply cable and SCSI cable are tucked inside the drive bracket, pull them out.
8. Loosen the two captive screws at the end of the drive bracket.
9. Loosen the two captive screws that hold the front drive panel to the TCE.
10. Pull up the end of the drive bracket. If the power supply and SCSI cables are threaded through the cutout in the end of the drive bracket, ease them through the cutout as you pull up.
11. Remove the front drive panel from the system unit. See Figure 4-13 on page 4-21.
12. If the drive bracket already contains a removable media drive, remove the old drive. See "To Remove a Removable Media Drive" on page 4-26.

**Caution:** *Handle the drive bracket carefully if it contains a removable media drive.*



**Figure 4-13. Removing the front drive panel**

13. Slide the drive that you are installing into the drive bracket from the front of the front drive panel, as shown in Figure 4-14.
14. Tighten the four screws on each side of the drive bracket.



WSTCU027

**Figure 4-14. Inserting a drive into the drive bracket**

#### **Replace the front drive panel**

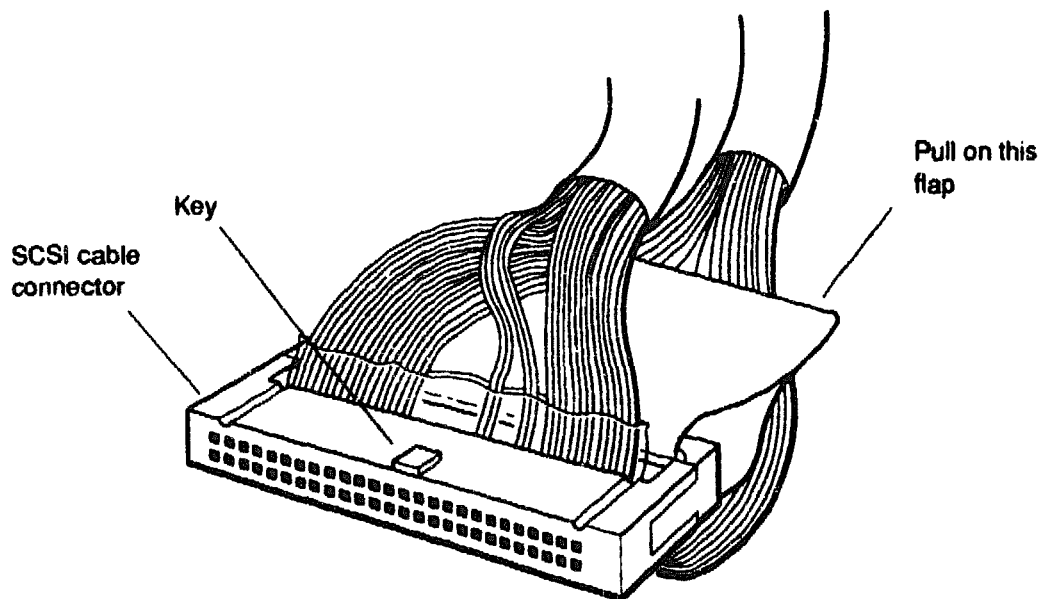
1. Insert the tabs on the front drive panel into the chassis cutouts on the TCE and tilt the panel halfway down into the TCE, as shown earlier in Figure 4-13.
2. Thread the loose ends of the power supply cable and SCSI cable through the large cutout in the end of the drive bracket.
3. Press the power supply and SCSI cables down so that they will not interfere with the drive bracket when you lower it. If the TCE contains internal hard disk drives, press the cables around the drives.
4. Lower the end of the bracket onto the two support posts.  
If you cannot seat the bracket on the locking posts, lift the end of the bracket and press the cables down around the internal hard disk drive or drives.
5. Tighten the two captive screws on the end of the drive bracket as shown earlier in Figure 4-12.



6. Tighten the two captive screws that hold the front drive panel to the TCE as shown earlier in Figure 4-12.
7. Plug the SCSI cable connector into the SCSI connector on the drive.

The SCSI connector on the drive has a slot for the key on the cable connector. Match the key on the connector plug with the slot on the drive connector.

**Important:** Always pull on the flap when removing SCSI connectors.



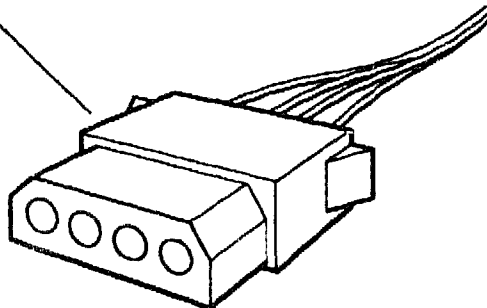
WSTCU025

Figure 4-15. SCSI cable connector

8. Plug the power supply cable connector into the power supply connector on the drive. Match the slanted corners of the connector plug with the slanted corners of the power supply connector.

Note that the last power supply cable connector is longer than the other connectors. Only the last connector is long enough to attach to a removable media drive in the front drive panel.

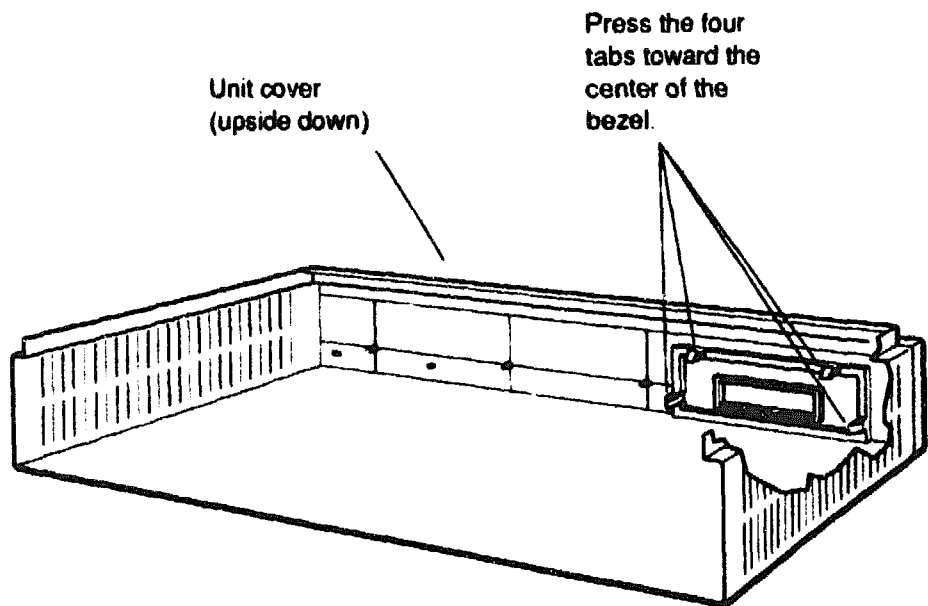
Power supply cable  
connector



WSTCU024

**Figure 4-16. Power supply cable connector**

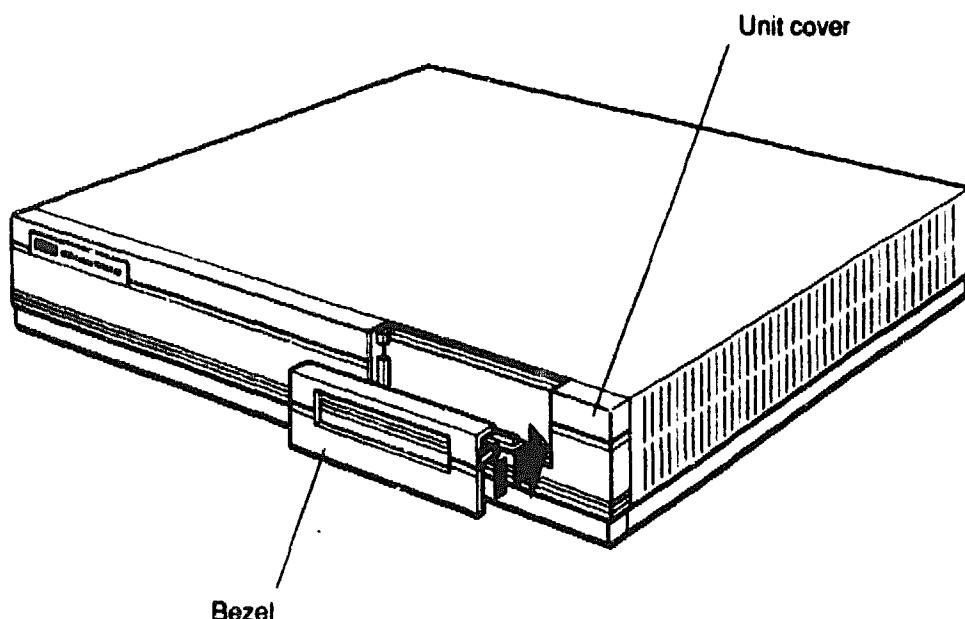
9. Remove the antistatic wrist strap.
10. Turn the TCE cover upside down.
11. Remove the existing bezel by pressing the tabs that lock the bezel in place. Press the tabs toward the center of the bezel then push on the back of the bezel to remove it.



WSTCU028

**Figure 4-17. Removing the existing bezel**

12. Press the bezel for the drive that you installed into the opening in the TCE cover as shown in Figure 4-18.



WSTCU029

**Figure 4-18. Installing a new bezel**

13. Replace the TCE cover.

***Caution:** Be careful not to catch the end of the SCSI cable with the cover.*

14. Turn on your workstation. See "Turning On the Workstation" on page 3-4.
15. Test the drive with the **cnfg** command. See "To Check the Drive Installation" on page 4-32.

### **To Remove a Removable Media Drive**

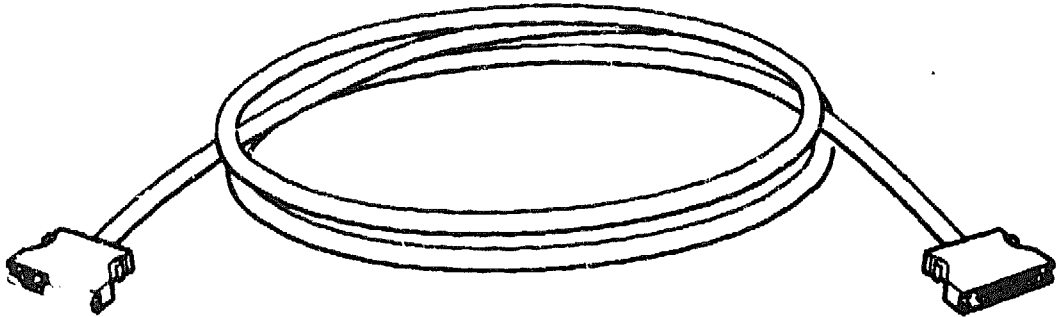
Follow the same procedure to remove all removable media drives. Refer to the detailed instructions for installing the drive for more information when following these steps:

1. Shut down your workstation.
2. Turn off the TCE.
3. Unplug the TCE power cord.
4. Remove the TCE cover.

5. Attach the antistatic wrist strap.
6. Unplug the power supply cable and SCSI cable from the drive. Pull on the flap to unplug the SCSI connector.
7. Loosen the two captive screws that hold the front drive panel in place.
8. Remove the front drive panel and the drive bracket attached to it.
9. Loosen the two screws at the end of the bracket for the drive bracket.
10. Slide the drive out of the bracket through the opening in the front drive panel.
11. Place the drive in an antistatic bag.
12. Insert the tabs on the front drive panel into the chassis cutouts.
13. Thread the loose ends of the power supply cable and SCSI cable through the large cutout in the end of the drive bracket.
14. Lower the end of the bracket onto the two support posts.
15. Tighten the two captive screws on the end of the bracket.
16. Tighten the two captive screws that hold the front drive panel.
17. Remove the antistatic wrist strap.
18. Replace the TCE cover.
19. Replace the drive bezel in the front panel with a blank bezel.
20. Turn on your workstation.

## **To Connect the TCE to the System Unit SCSI Connector**

The TCE-to-system-unit SCSI cable connects the TCE SCSI connector to the SCSI connector on the system unit. The TCE-to-system-unit cable has a metal 50-pin connector at each end.

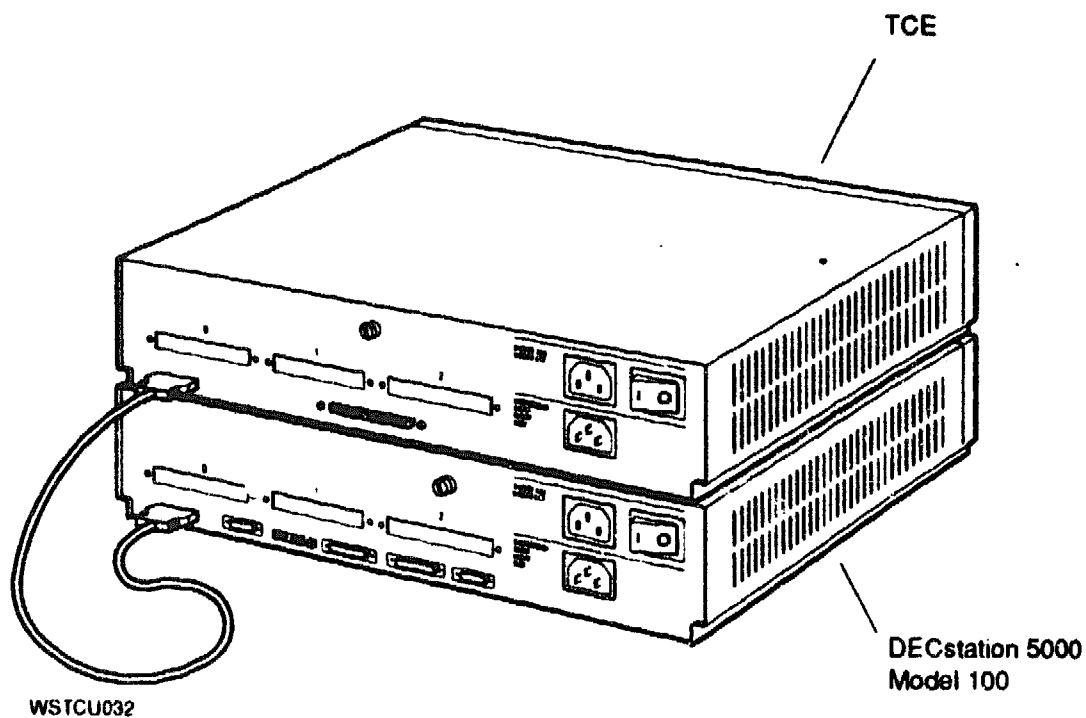


WSTCU036

**Figure 4-19. TCE-to-system-unit SCSI cable**

Follow these steps to connect the TCE-to-system-unit SCSI cable. Figure 4-20 on page 4-29 shows the TCE connected to the SCSI connector on a typical DECstation 5000.

1. Hold the cable connector at one end of the SCSI cable with the widest part on top.
2. Push the connector firmly onto the SCSI connector on the back of the TCE unit.
3. Follow the same steps to connect the other SCSI cable connector to the SCSI connector on the back of the system unit.

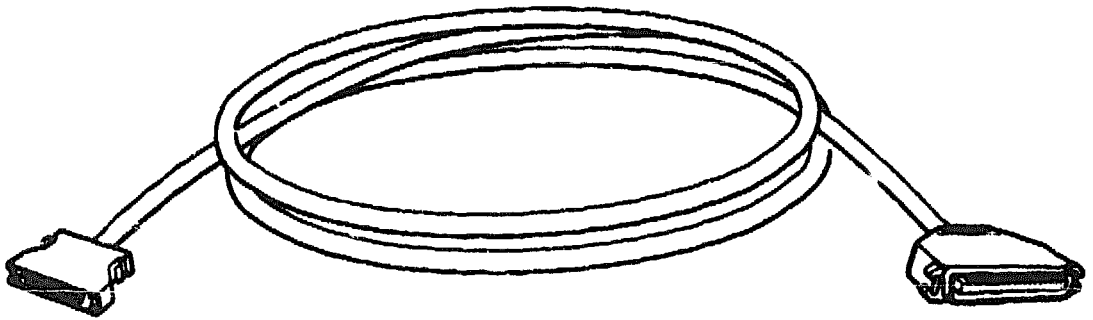


**Figure 4-20. Connecting the TCE to the workstation SCSi connector**

## **To Connect the TCE to an Expansion Box SCSI Connector**

The TCE-to-expansion-box SCSI cable connects the TCE SCSI connector to a SCSI connector on an expansion box. The TCE-to-expansion-box cable has a plastic 50-pin connector at one end and a metal 50-pin connector at the other.

When the TCE is connected to an expansion box or boxes, the TCE must be the last box in the chain. The TCE contains an internal SCSI terminator.



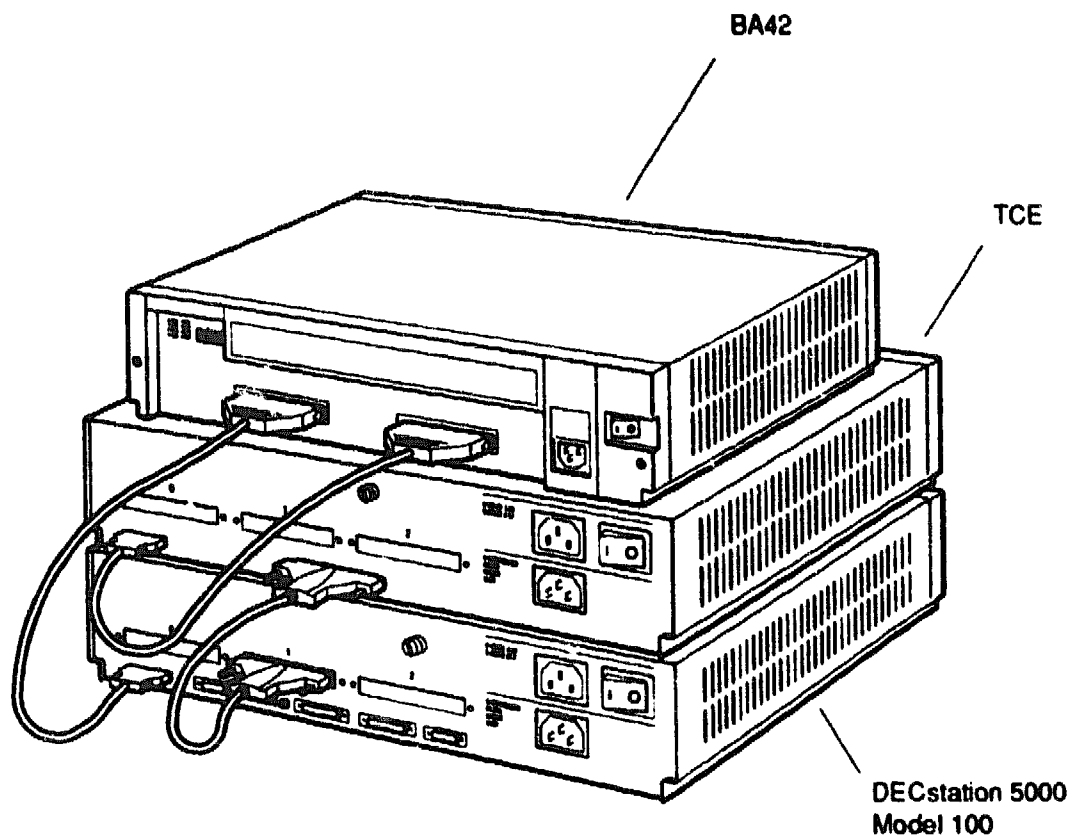
WSTOU035

**Figure 4-21. TCE-to-expansion-box SCSI cable**

Follow these steps to connect the TCE-to-expansion-box SCSI cable. Figure 4-22 on page 4-31 shows the TCE connected to the SCSI connector on a typical expansion box. The expansion box is connected to a DECstation 5000.

1. Hold the metal cable connector on the SCSI cable with the widest part on top.
2. Push the connector firmly onto the SCSI connector on the back of the TCE unit.
3. Hold the plastic connector on the SCSI cable with the widest part on top.
4. Push the connector firmly onto the SCSI connector on the back of the expansion box.





WSTCU037

**Figure 4-22. Connecting the TCE to an expansion box SCSI connector**

## To Check the Drive Installation

Use the **cnfg** display to check that the drive is installed correctly. The display lists drives installed in the TCE in the workstation slot that contains the SCSI connector to which they are connected. The sample display is from a DECstation 5000 Model 100. Refer to the Operator's Guide for your workstation for specific display information. Type **cnfg** at the console prompt (**>>**) and press Return. A display similar to the following appears on the screen:

```
>>cnfg
3:  KN02-BA    DEC      V5.3d    TCF0    ( 24 MB)
                                     (enet: 08-00-2b-0f-45-72)
                                     (SCSI = 7)
0:  PMAG-DA    DEC      V5.3d    TCF0    (DA:PXG -- D=8, z=24)
1:  PMAD-AA    DEC      V5.3d    TCF0    (enet: 08-00-2b-0f-45-31)
```

The number at the beginning of each line is the slot number. The code in the parentheses at the end of each line shows the type of hardware installed in the slot.

For a detailed configuration display, at the console prompt (**>>**), type **cnfg** and the workstation slot number that contains the SCSI connector to which the drive is connected. The screen shows the detailed configuration display for slot 3.

```
>>cnfg 3
3:  KN02-BA    DEC      V5.3d    TCF0    ( 24 MB)
                                     (enet: 08-00-2b-0f-45-72)
                                     (SCSI = 7)
-----
DEV  PID                      VID          REV          SCSI DEV
=====
tz1
rz2  RZ24          (C) DEC  DEC          0700      SEQ
                                     DIR
dcache ( 64 KB), icache ( 64 KB)
mem( 0):  a0000000:a03fffff ( 4 MB)
mem( 1):  a0400000:a07fffff ( 4 MB)
mem( 2):  a0800000:a0bfffff ( 4 MB)
mem( 3):  a0c00000:a0ffffff ( 4 MB)
mem( 4):  a1000000:a13fffff ( 4 MB)
mem( 5):  a1400000:a17fffff ( 4 MB)
```

In this example, the SCSI ID number of the new hard disk drive is 2. The number is part of the device code in the **DEV** column: **rz2**. The tape drive that was already connected to base slot 3 is also shown: **tz1**.

If the drive is not listed, check that the SCSI ID for the drive has not already been assigned to another drive. See "To Set SCSI IDs" on page 4-4. If this does not resolve the problem, turn off the workstation and the TCE and check that

- The cables to the drive are plugged in firmly
- The drive is firmly in place in the TCE unit

Test the drive again. If the drive is still not listed, contact your Digital service representative.

---

## **Equipment Specifications**

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

- **TURBOchannel extender**
- **RZ23L hard disk drive**
- **RZ24 hard disk drive**
- **RZ25 hard disk drive**
- **TZK10 QIC tape drive**
- **RRD42 optical compact disc drive**
- **RX23 diskette drive**

# TURBOchannel Extender Equipment Specifications

**Table A-1. TCE Extender Description**

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 or 220–240 Vac
Input current	7.7 A at 100–120 Vac 4.1 A at 220–240 Vac
Power	
– Frequency	50 to 60 Hz
– Heat dissipation	302 watts maximum

**Table A-2. TCE Extender Operating Conditions**

Temperature range <sup>1</sup>	10°C to 40°C (50°F to 104°F)
Temperature change rate	11°C (20°F) per hour maximum
Relative humidity	10% to 90% noncondensing
Maximum wet-bulb temperature	28°C (82°F)
Minimum dew-point temperature	2°C (36°F)
Altitude	2,400 m (8,000 ft) maximum

<sup>1</sup>Reduce maximum temperature by 1.8°C for each 1,000 meter (1.0°F for each 1,000 ft) increase in altitude.

**Table A-3. TCE Extender 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	4,900 m (16,000 ft) maximum

# RZ23L SCSI Hard Disk Drive Equipment Specifications

**Table A-4. RZ23L SCSI Hard Disk Drive Description**

---

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

---

**Table A-5. RZ23L SCSI Hard Disk Drive Operating Conditions**

---

<b>Temperature range<sup>1</sup></b>	<b>10°C to 55°C (50°F to 128°F)</b>
<b>Temperature change rate per hour, maximum)</b>	<b>11°C (20°F)</b>
<b>Relative humidity</b>	<b>8% to 80% noncondensing</b>
<b>Maximum wet-bulb temperature</b>	<b>26°C (78°F)</b>
<b>Minimum dew-point temperature</b>	<b>2°C (36°F)</b>
<b>Altitude</b>	<b>–300 to 4600 m ( –1000 to 15,000 ft)</b>

---

<sup>1</sup>Reduce maximum temperature by 1.8°C for each 1,000 meter (1.0°F for each 1,000 ft) increase in altitude.

---

**Table A-6. RZ23L SCSI Hard Disk Drive Nonoperating Conditions**

---

Temperature range	-40°C to 66°C ( -40°F to 151°F)
Temperature change rate per hour, maximum)	20°C (36°F)
Relative humidity	8% to 95% packaged, noncondensing
Maximum wet-bulb temperature	46°C (115°F) packaged
Altitude	-300 to 12,200 m ( -1,000 to 40,000 ft)

---

# RZ24 SCSI Hard Disk Drive Equipment Specifications

**Table A-7. RZ24 SCSI Hard Disk Drive Description**

---

<b>Internal drive</b>	
– Weight	0.77 kg (1.70 lb)
– Height	4.14 cm (1.63 in)
– Width	10.16 cm (4.00 in)
– Depth	14.61 cm (5.75 in)
<b>Capacity</b>	
– Bytes per drive	209.7 MB
– Blocks per drive	409,802
– Block size	512 bytes
<b>Data transfer rate</b>	
– Bus asynchronous mode	3.0 MB per second
– Bus synchronous mode	4.0 MB per second
– To and from media	1.5 MB per second
<b>Seek time</b>	5 ms track-to-track
	16 ms average
	35 ms maximum
<b>Average latency</b>	8.3 ms
<b>Interface</b>	SCSI

---

**Table A-8. RZ24 SCSI Hard Disk Drive Operating Conditions**

---

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

---

<sup>1</sup>Reduce maximum temperature by 1.8°C for each 1,000 meter (1.0°F for each 1,000 ft) increase in altitude.

---



**Table A-9. RZ24 SCSI Hard Disk Drive Nonoperating Conditions**

---

Temperature range	–40°C to 66°C ( –40°F to 151°F)
Temperature change rate per hour, maximum)	20°C (36°F)
Relative humidity	8% to 95% packaged, noncondensing
Maximum wet-bulb temperature	46°C (115°F) packaged
Altitude	–300 m to 12,200 m ( –1,000 ft to 40,000 ft)

---

**Table A-12. RZ25 SCSI 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 ( –1,000 ft to 40,000 ft)

# TZK10 QIC Tape Drive Equipment Specifications

**Table A-13. TZK10 QIC Tape Drive Description**

<b>Internal drive</b>	
- Weight	1.09 kg (2.40 lb)
- Height	4.39 cm (1.73 in)
- Width	14.61 cm (5.75 in)
- Depth	20.83 cm (8.20 in)
Cartridge capacity	320 MB (approximate) with DC6320 525 MB (approximate) with DC6525
Data density	16,000 bits per in
Drive interface	SCSI-2
Media	DC6320, DC6525, or Digital-approved equivalent
Mode of operation	Streaming
Number of tracks	26
Power consumption, normal	20 watts
Power consumption, peak	33 watts
Transfer rate	200 KB per second at average streaming mode 1.5 MB per second at SCSI maximum
Tape speed	305 cm (120 in) per second
Track format	Multiple track serpentine recording

**Table A-14. TZK10 QIC Tape Drive Operating Conditions**

Temperature range	5°C to 40°C (50°F to 104°F)
Temperature change rate	11°C (20°F) per hour, maximum
Relative humidity	2% to 80% noncondensing
Maximum wet-bulb temperature	28°C (82°F)
Minimum dew-point temperature	2°C (36°F)
Altitude	3900 m (13,000 ft) maximum

<sup>1</sup>Reduce maximum temperature by 1.8°C for each 1,000 meter (1.0°F for each 1,000 ft) increase in altitude.

**Table A-15. TZK10 QIC Tape Drive Nonoperating Conditions**

Temperature range	-30°C to 60°( -22°F to 151°F)
Temperature change rate	20°C (36°F) per hour, maximum
Relative humidity	10% to 95%
Maximum wet-bulb temperature	46°C (115°F)
Altitude	12,200 m (40,000 ft) maximum

# RRD42 Compact Disc Drive Equipment Specifications

**Table A-16. RRD42 Compact Disc Drive Description**

<b>RRD42-AA</b>	
– Weight	1.3 kg (2.8 lb)
– Height	4.15 cm (1.63 in)
– Width	14.60 cm (5.75 in)
– Depth	20.81 cm (8.2 in)
Capacity	600 MB
Seek time	450 ms average (typical) 700 ms maximum (typical)
Burst transfer rate	1.5 MB per second
Sustained transfer rate	150 KB per second
Heat dissipation	14 watts (typical)
Initialization startup time	2.0 seconds maximum
Interface	SCSI

**Table A-17. RRD42 Compact Disc Drive Operating Conditions**

Temperature range <sup>1</sup>	5°C to 50°C (41°F to 122°F)
Relative humidity	10% to 90% noncondensing
Maximum wet-bulb temperature	28°C (82°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 1,000 meter (1.0°F for each 1,000 ft) increase in altitude.

**Table A-18. RRD42 Compact Disc Drive Nonoperating Conditions**

Temperature range	–30 °C to 55°C (–22°F to 131°F)
Relative humidity	10 to 90% packaged, noncondensing
Maximum wet-bulb temperature	46°C (115°F) packaged, noncondensing
Altitude	–300 to 12,200 m (–1000 to 40,000 ft)

# RX23 Diskette Drive Equipment Specifications

**Table A-19. RX23 Diskette Drive Description**

---

<b>Internal drive</b>	
- 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 tracks	80
Number of heads	2
Step rate	3 ms per track
Diskette size	8.9 cm (3.5 in)
Recording surfaces per diskette	2
Sectors per track	9 double density 18 high density
<b>Capacity</b>	
- Bytes per drive	737 KB double density 1,474 KB high density
- Blocks per drive	1,440 double density 2,880 high density
- Block size	512 bytes
<b>Data transfer rate</b>	
- To and from media	250 Kbits per second double density 500 Kbits per second high density
Operating power	3.0 watts
Standby power	0.3 watts

---

**Table A-20. RX23 Diskette Drive Operating Conditions**

Temperature range <sup>1</sup>	5°C 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	29°C (80°F)
Minimum dew-point temperature	2°C (36°F)
Altitude	–300 to 3060 m (–1,000 ft to 10,000 ft)

<sup>1</sup>Reduce maximum temperature by 1.8°C for each 1,000 meter (1.0°F for each 1,000 ft) increase in altitude.

**Table A-21. RX23 Diskette Drive Nonoperating Conditions**

Temperature	–40°C to 66°C (–40°F to 151°F)
Temperature change rate	20°C (36°F) per hour, maximum
Relative humidity	5% to 95%, packaged
Maximum wet-bulb temperature	46°C (115°F), packaged
Altitude	–300 to 12,300 m (–1,000 ft to 40,000 ft)

# B

---

## Part Numbers

This appendix lists the order numbers and part numbers for the components of the TURBOchannel Extender.



**Table B-1. Basic Components**

<b>Item</b>	<b>Order Number</b>
TCE option module	54-20623-01
TCE interface module	54-20625-01
TCE power supply	H7826-AA

**Table B-2. Cords, Cables, and Connectors**

<b>Item</b>	<b>Part Number</b>	<b>Order Number</b>
TURBOchannel accessory cord (U.S.)	17-00442-25	
TURBOchannel power cord (U.S.)	17-00606-10	BN19P-K
TURBOchannel interface cable	17-03335-01	
TURBOchannel-to-system SCSI cable	17-03352-01	
TURBOchannel-to-expansion box SCSI cable	17-02641-01	BC09D-03
TCE internal SCSI data cable	17-03055-01	
TCE internal SCSI power cable	17-03064-01	

**Table B-3. Hardware Documentation**

<b>Item</b>	<b>Order Number</b>
<i>TURBOchannel Extender Maintenance Guide</i>	EK-PM32X-MG
<i>TURBOchannel Extender Operator's Guide</i>	EK-PM32X-EX
<i>The TURBOchannel Extender Option Module Components and Add-Ons</i>	EK-TCEIM-TC
<i>RZ2X Hard Disk Drive Upgrade Installation</i>	EK-RZ2XH-UG
<i>Installing an RZ25 Disk Drive in Your Workstation</i>	EK-ORZ25-IN
<i>RRD42 Optical Compact Disc Drive Upgrade</i>	EK-RRDCD-UG
<i>RX23 Diskette Drive and RZXX Disk Drive</i>	EK-RSCSI-IS
<i>Upgrade Instructions for the RX23</i>	EK-RX23I-UI
<i>RX23 Diskette Drive Upgrade Installation</i>	EK-RX23D-UG
<i>TZK10 Quarter-Inch Cassette Tape Drive</i>	EK-TZK10-UG

---

## Connector Pin Assignments

This appendix lists pin assignments for the following connectors:

- SCSI cable
- TCE interface

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

<b>Pin</b>	<b>Signal</b>	<b>Pin</b>	<b>Signal</b>
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

**Table C-2. TCE Interface Pin Assignments**

Pin	Signal	Pin	Signal	Pin	Signal	Pin	Signal
1	gnd	2	clk0	3	gnd	4	d[1][0]
5	gnd	6	[1][1]	7	gnd	8	d[1][2]
9	gnd	10	[1][3]	11	gnd	12	d[1][4]
13	gnd	14	[1][5]	15	gnd	16	d[1][6]
17	gnd	18	[1][7]	19	gnd	20	d[2][0]
21	gnd	22	[2][1]	23	gnd	24	d[2][2]
25	gnd	26	[2][3]	27	gnd	28	d[2][4]
29	gnd	30	[2][5]	31	gnd	32	d[2][6]
33	gnd	34	[2][7]	35	gnd	36	d[3][0]
37	gnd	38	[3][1]	39	gnd	40	d[3][2]
41	gnd	42	[3][3]	43	gnd	44	d[3][4]
45	gnd	46	[3][7]	47	gnd	48	d[3][6]
49	gnd	50	[3][9]	51	gnd	52	d[0][0]
53	gnd	54	[0][1]	55	gnd	56	d[0][2]
57	gnd	58	[0][3]	59	gnd	60	d[0][4]
61	gnd	62	[0][5]	63	gnd	64	d[0][6]
65	gnd	66	[0][7]	67	gnd	68	gnd
69	gnd	70	gnd	71	gnd	72	-err
73	gnd	74	~dmaDone	75	gnd	76	-reset
77	gnd	78	~int	79	gnd	80	~ackSlots
81	gnd	82	~rdy	83	gnd	84	~conflict
85	gnd	86	~wReq	87	gnd	88	clk1
89	gnd	90	clk	91	gnd	92	~sel
93	gnd	94	~write	95	gnd	96	~rReq
97	gnd	98	~ack	99	gnd	100	clk2

**Table C-3. Drive Power Supply Pin Assignments**

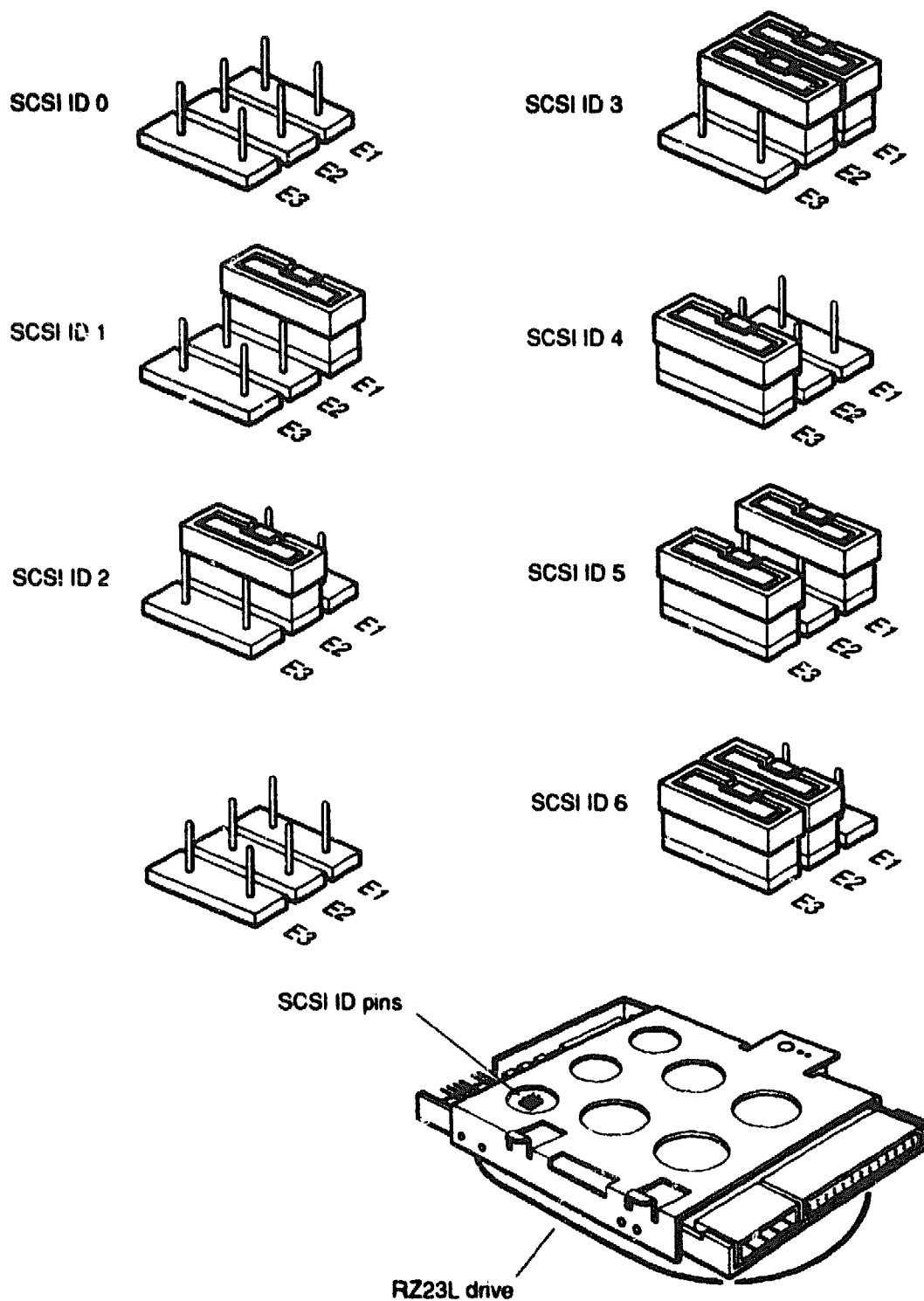
Pin	Signal	Color
1	+12 volt	Orange
2	Ground	Black
3	Ground	Black
4	+5 volt	Red

---

## SCSI settings

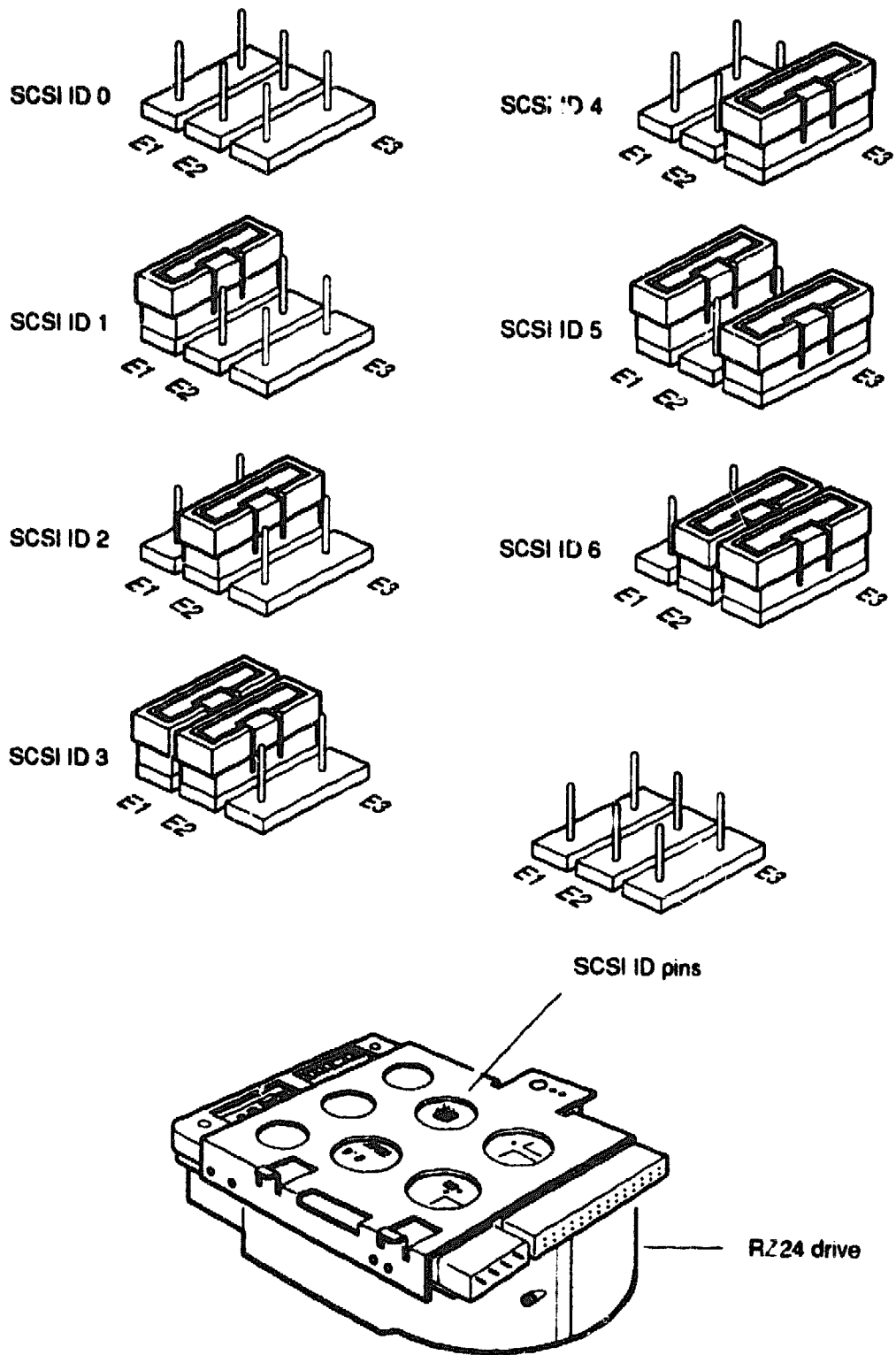
This appendix lists SCSI settings for the following drives:

- The RZ23L hard disk drive
- The RZ24 hard disk drive
- The RZ25 hard disk drive
- The RX23 diskette drive
- The RRD42 optical compact disc drive
- The TZK10 QIC tape drive



WSTCU040

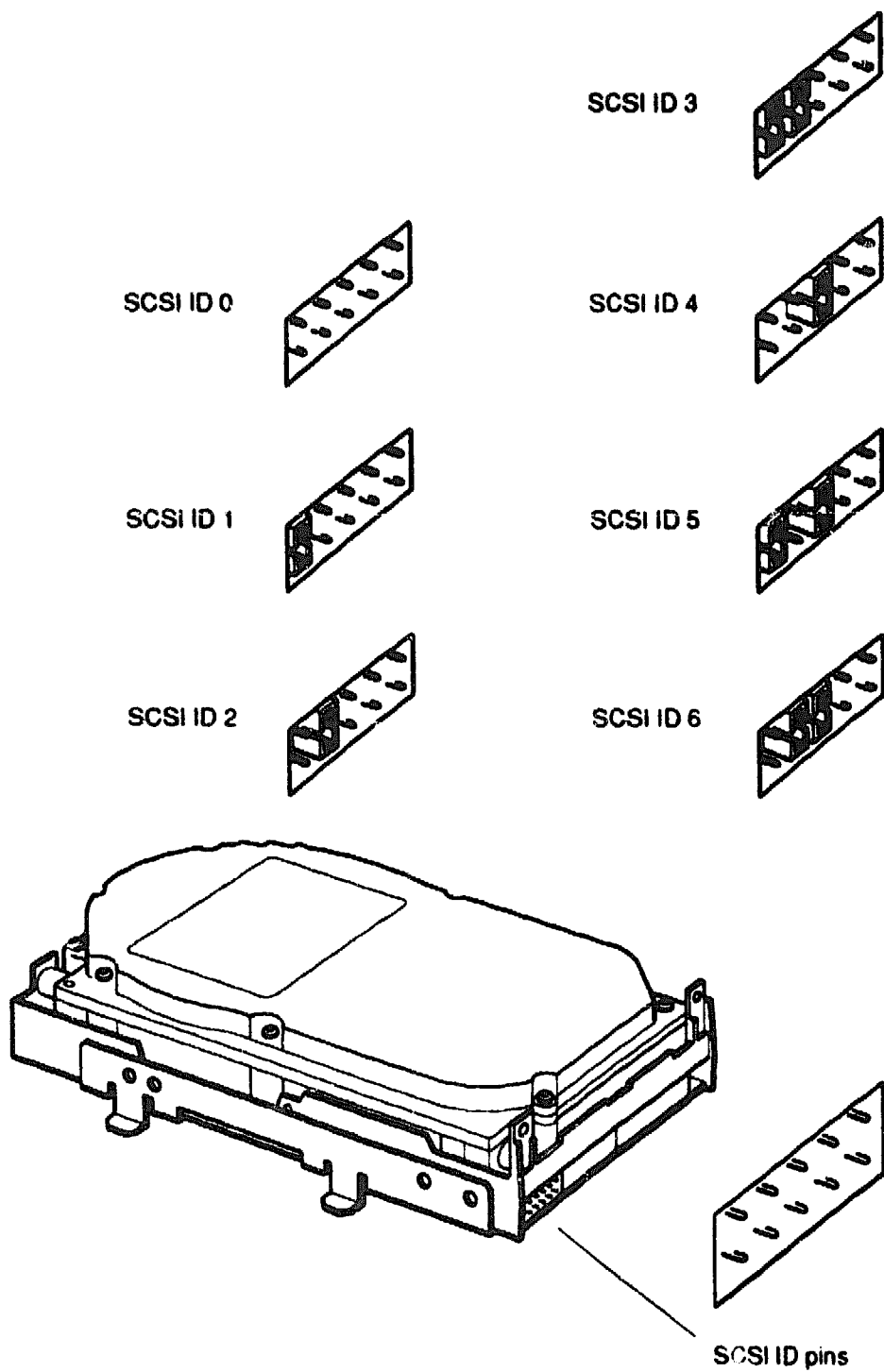
**Figure D-1. Jumper settings for an RZ23L hard disk drive**



WSTCU041

**Figure D-2. Jumper settings for an RZ24 hard disk drive**

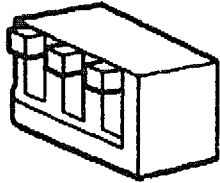




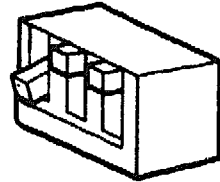
WSTCU044

**Figure D-3. Jumper settings for an RZ25 hard disk drive**

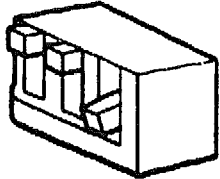
SCSI ID 0



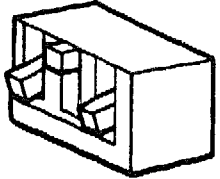
SCSI ID 4



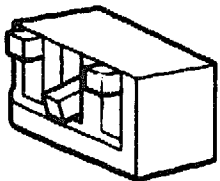
SCSI ID 1



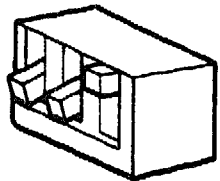
SCSI ID 5



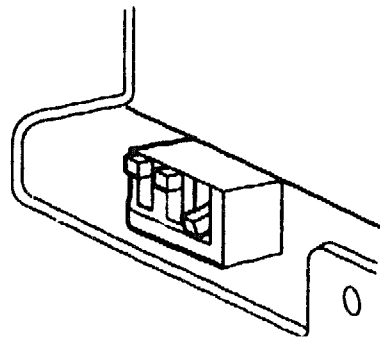
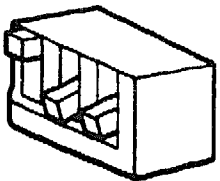
SCSI ID 2



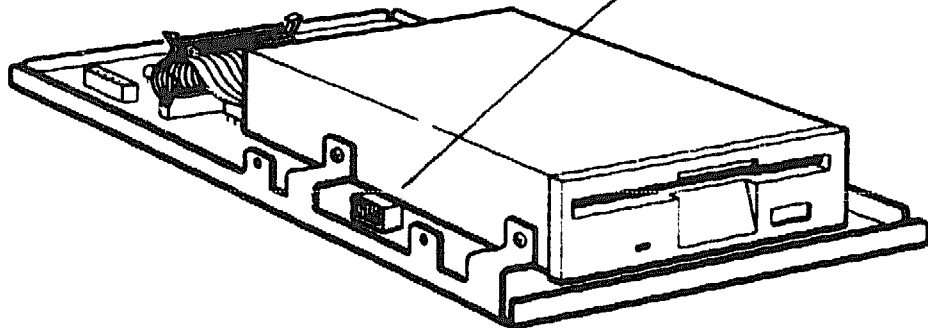
SCSI ID 6



SCSI ID 3



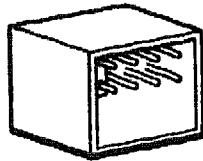
SCSI ID switches



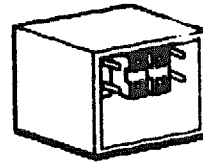
WSTCU042

**Figure D-4. Jumper settings for an RX23 diskette drive**

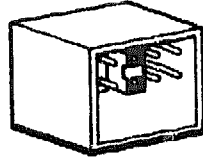
SCSI ID 0



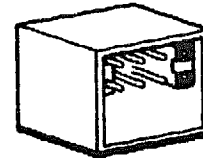
SCSI ID 3



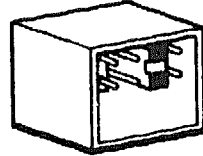
SCSI ID 1



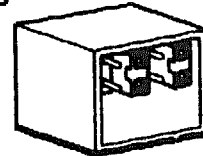
SCSI ID 4



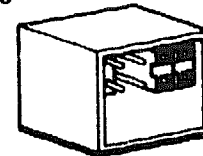
SCSI ID 2



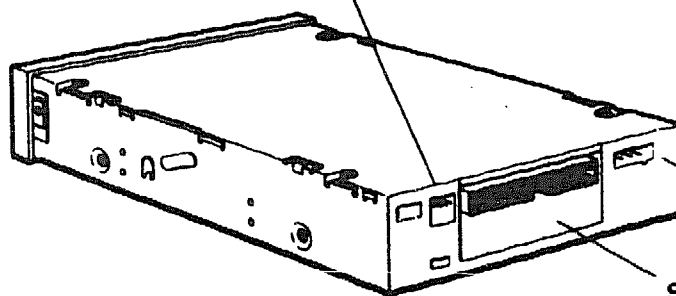
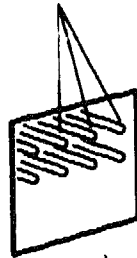
SCSI ID 5



SCSI ID 6



SCSI ID pins



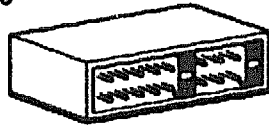
Power supply connector

SCSI connector

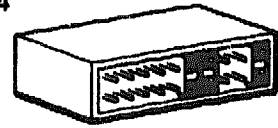
WSTCU043

**Figure D-5. Jumper settings for an RRD42 optical compact disc drive**

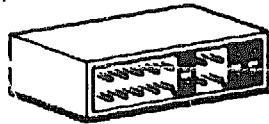
SCSI ID 0



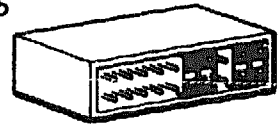
SCSI ID 4



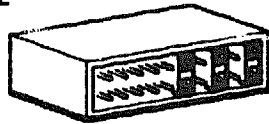
SCSI ID 1



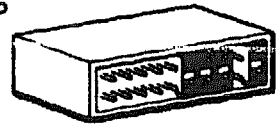
SCSI ID 5



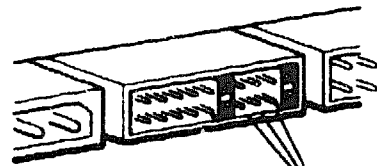
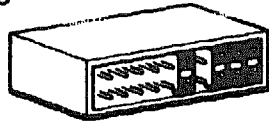
SCSI ID 2



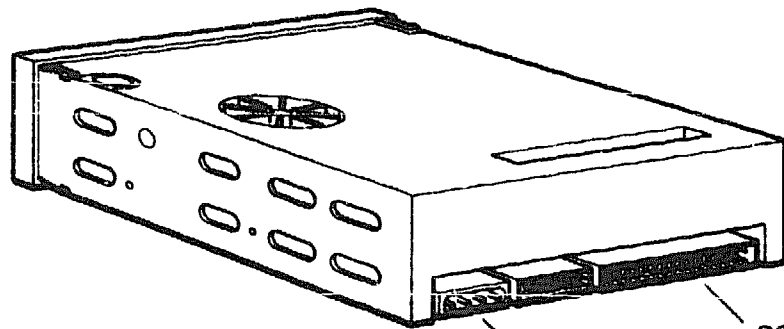
SCSI ID 6



SCSI ID 3



SCSI ID pins



SCSI connector

Power supply connector

WSTCU031

**Figure D-6. Jumper settings for a TZK10 QIC tape drive**

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