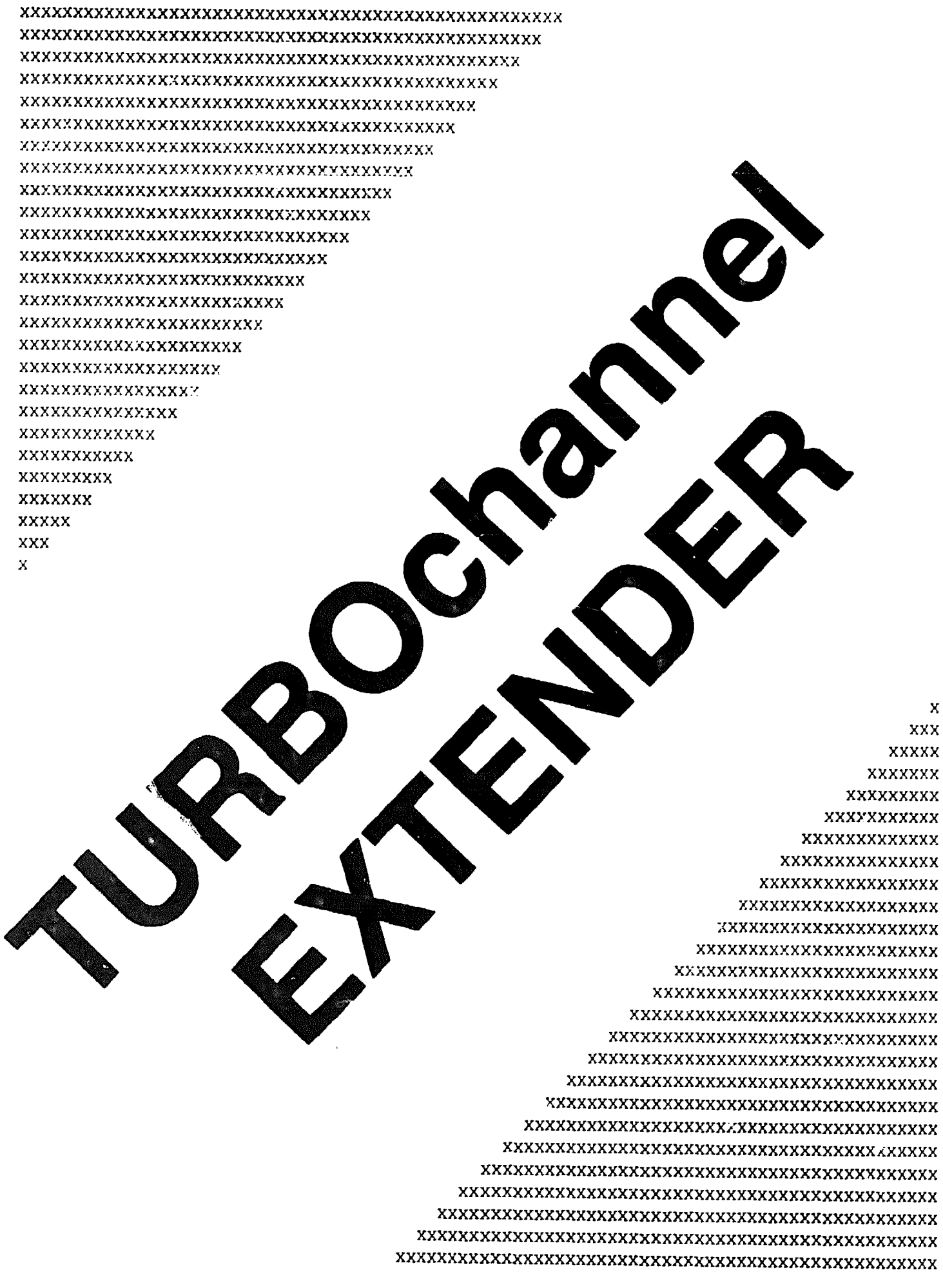
TURBOchannel
EXTENDER

EK-PM32X-MG-001

TURBOchannel Extender

Maintenance Guide

digital equipment corporation
maynard, massachusetts

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Using This Guide

Intended Audience

This guide is for Digital customer service representatives who have completed training in DECstation 5000 maintenance. This guide assumes that you are familiar with basic maintenance and troubleshooting operations and that you have experience with desktop computer systems.

How To Use This Guide

This guide explains how to identify and replace failed field-replaceable units (FRUs). FRUs for the TURBOchannel extender (TCE) include TCE hardware, TURBOchannel option modules, and drives.


CHAP 1

1

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 "Shut Down the Workstation" on page 3-xx.)
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-xx.")
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-xx..

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-xx.)

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-xx.)
3. Install the TCE option module in the system unit. See Figure 1-1.
   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 module 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.

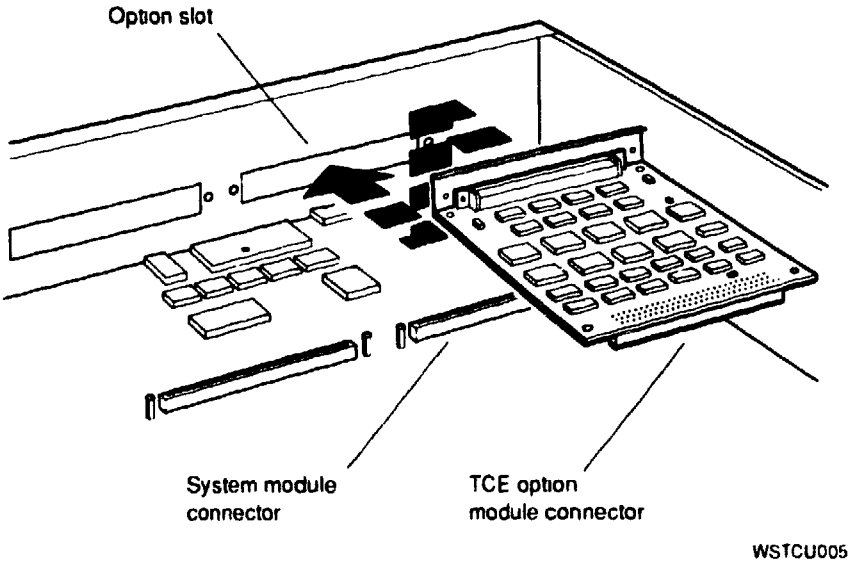


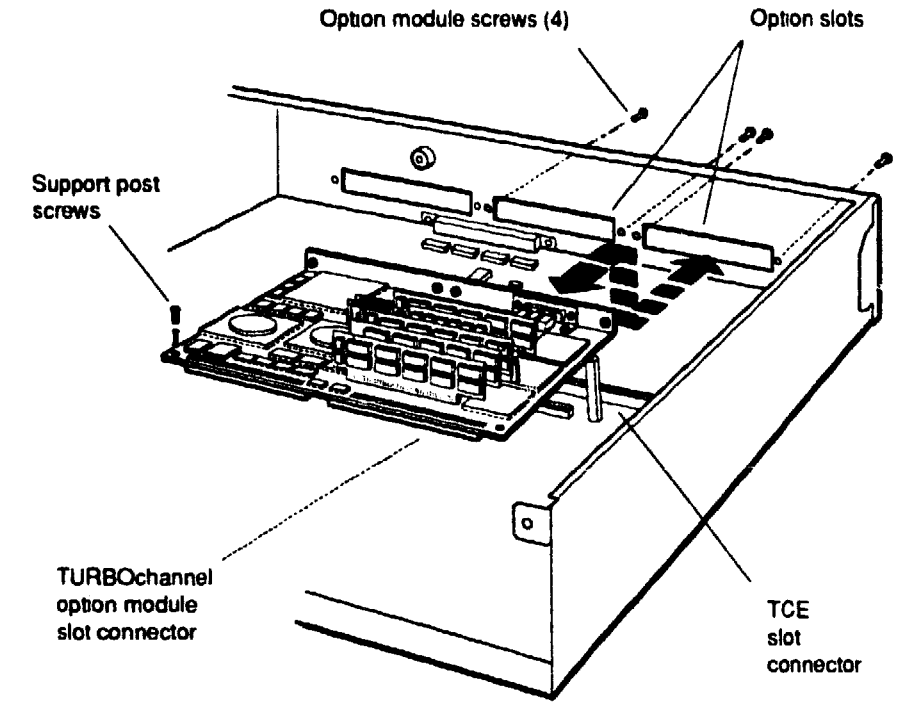
Figure 1-1. Installing a TCE option module

4. Replace the system unit cover.
5. Continue to the next section.

Install a TURBOchannel Option Module in the TCE Unit

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

1. Remove the TCE cover. (See "To Remove the TCE Cover" on page 3-xx.)
2. Attach the antistatic wrist strap. (See "Using an Antistatic Wrist Strap" on page 3-xx.)
3. Install the TURBOchanel option module in the TCE unit. See Figure 1-2.
   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.



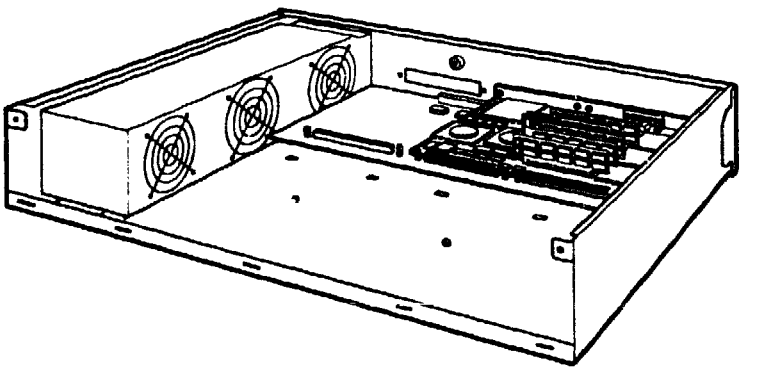


Figure 1-2. Installing an option module

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-xx.

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 5-xx.)
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 1-3.

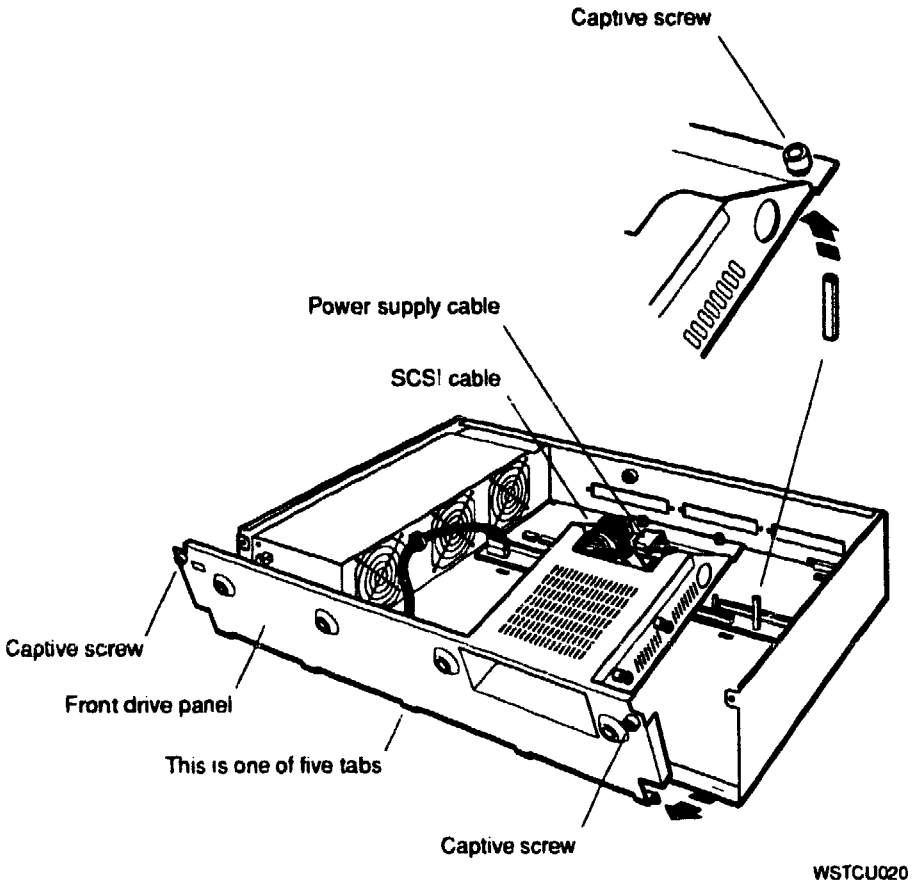


Figure 1-3. Removing the front drive panel

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-xx.

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 5-xx.)

1. Plug the power supply cable connector into the power supply connector on the hard disk drive.

   (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.
3. Insert the hard disk drive.
   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 5-5 on page 5-xx.)

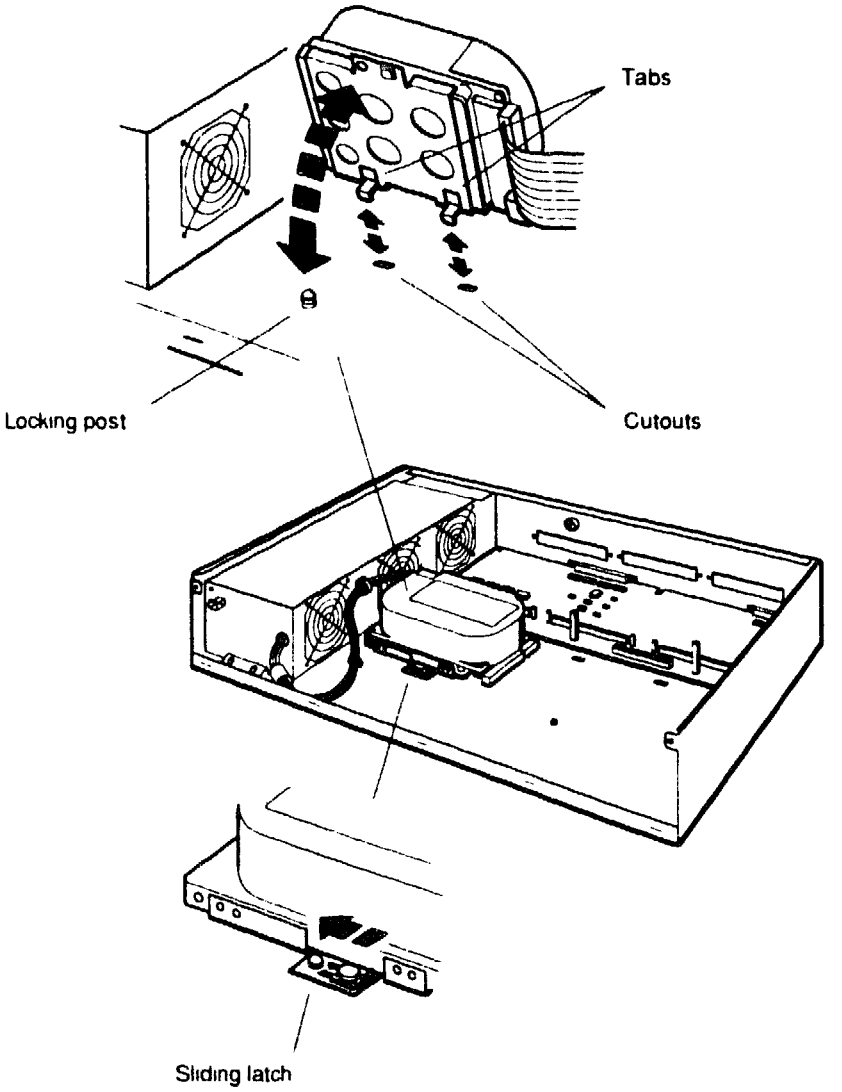


Figure 1-4. Installing and removing the hard disk drive

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-xx.

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 5-xx.)

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 1-5 shows a typical removable media drive.

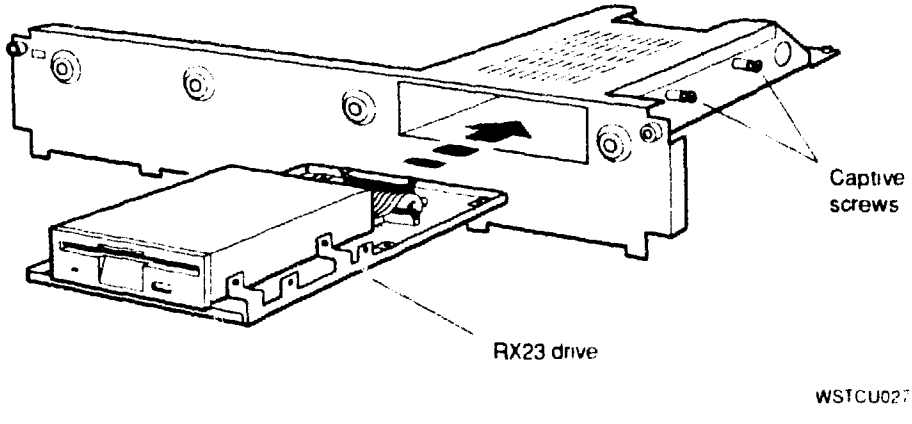


Figure 1-5. Inserting a drive into the drive bracket

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.
2. Move the power supply and SCSI cables aside and lower the end of the bracket onto the two support posts. (See "Installing the Removable Media Drive Panel" on page 5-xx.)
3. Tighten the screws on the drive panel.
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 "Installing a Bezel in the TCE Unit Cover" on page 5-xx.)
   c. Press the bezel for the drive that you installed into the opening in the TCE cover.
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 Power Outlet" on page 3-xx.)
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-xx.

Connect the TCE to the TCE Option Module in the Workstation

(See "To Connect the TCE to the TCE Option Module in the Workstation" on page 3-xx.)

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

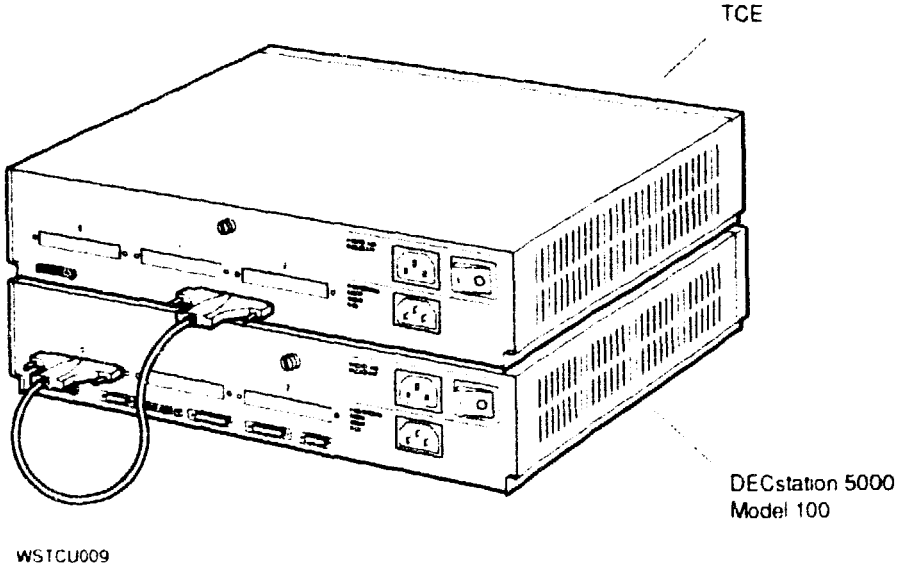


Figure 1-6. Connecting the TCE to the TCE option module in the workstation

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-xx.

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-xx.

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 1-7 shows the TCE connected to the SCSI connector on a typical DECstation 5000. (See "To Connect the TCE to the Workstation SCSI Connector" on page 5-xx.)

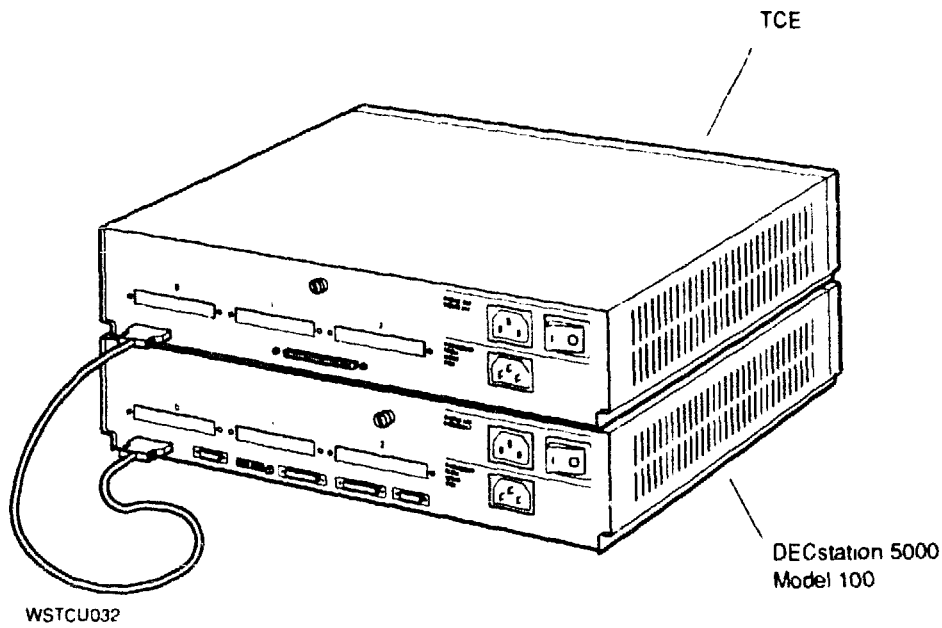


Figure 1-7. Connecting the TCE to the workstation SCSI connector

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 1-8 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 5-xx.)

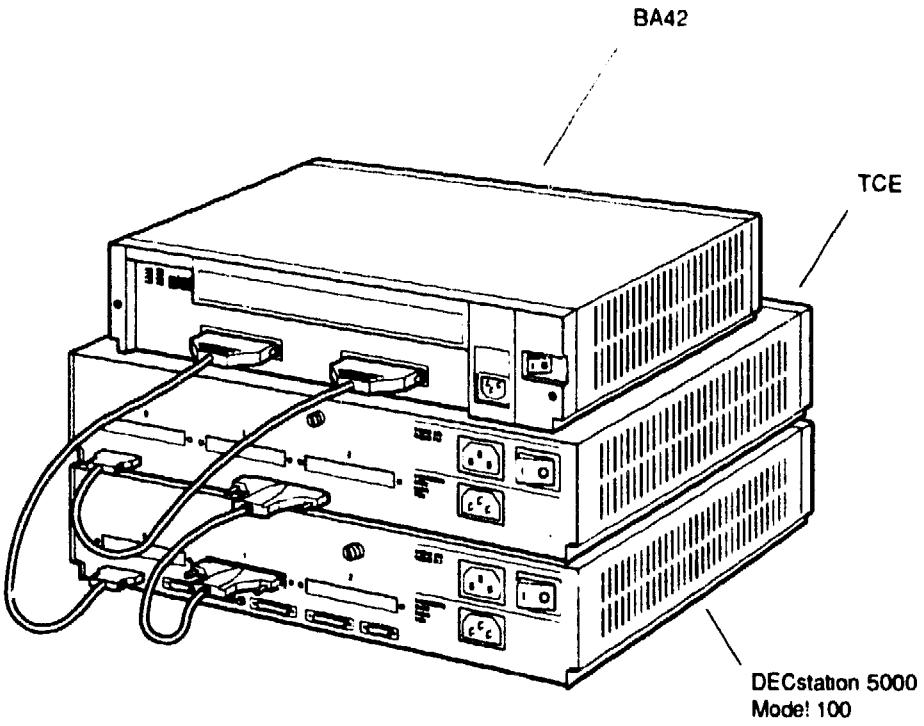


Figure 1-8. Connecting the TCE to an expansion box SCSI connector

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 refer to "Troubleshooting" on page 5-xx.

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 refer to "Troubleshooting" on page 5-xx.

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-xx.

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-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: 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

1. The TCE option module in the system unit is inserted tightly in the slot.
2. The TURBOchannel option module in the TCE is inserted tightly in the slot.
3. 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 refer to "Troubleshooting" on page 5-xx.

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)
                                         (enet: 08-00-2b-0f-45-72)
                                         (SCSI = 7)
              ------------------------------------------------------
              DEV   PID                  VID        REV     SCSI DEV
              ===== ================== ========== ======= ========
              tz1                                           SEQ
              rz2   RZ24       (C) DEC  DEC        0700    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 a drive is not shown in the configuration display, turn off the workstation and the TCE and check that

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

Test the drive again. If the drive is still not shown in the display refer to "Troubleshooting" on page 5-xx.


CHAP 2

2

TURBOchannel Extender Hardware

This chapter describes

- Basic TURBOchannel extender (TCE) hardware
- Possible TCE hardware configurations

TURBOchannel Extender Overview

The TURBOchannel extender (TCE) unit contains a TCE interface module and a power supply. The TCE can also contain any of the hardware listed below. Each of these items is a field-replaceable unit (FRU).

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

The TCE can be used as an extender and as a storage expansion box.

When the TCE is used as an extender, the TCE contains a single-, double-, or triple-width TURBOchannel option module. The TCE is linked to the TCE option module in the workstation.

The TCE option module in the workstation occupies one logical slot (and one physical slot). This allows the other two logical option slots on the workstation to be used for additional TURBOchannel 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 SCSI or to an expansion box.

The TCE can connect to any DECstation 5000 workstation.

Basic TCE Hardware

The basic TCE unit, shown in Figure 2-1, includes the following:

- One TCE interface module, which contains three TURBOchannel option module connectors. One single-, double-, or triple-width TURBOchannel option module can be installed in the TCE interface module. (The TCE contains three physical expansion slots but only one logical slot.)

  (The TCE option module in the workstation occupies one physical slot and one logical slot.)
- One power supply, which has three cooling fans

- Space for up to three internal drives
- A removable TCE unit cover and removable media drive panel
- One metal chassis that holds the TCE interface module, internal drives, and power supply

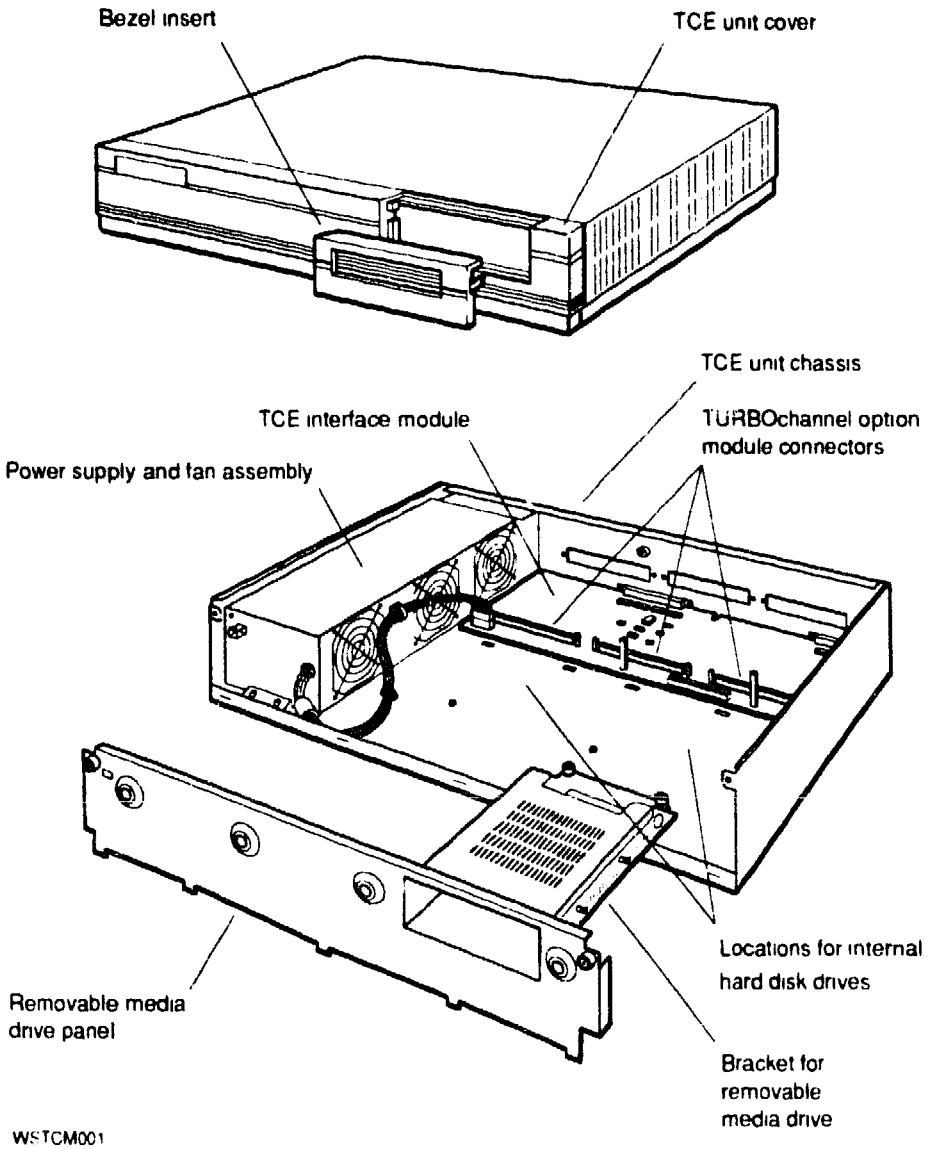


Figure 2-1. TCE unit

TCE Unit Controls and Indicators

The TCE unit controls and indicators are shown in Figure 2-2.

- The on/off switch is a toggle switch. Press down the 0 on the switch to turn off the power. Press down the 1 on the switch to turn on the power.
- The green power indicator LED (light-emitting diode) glows when the power supply is operating.

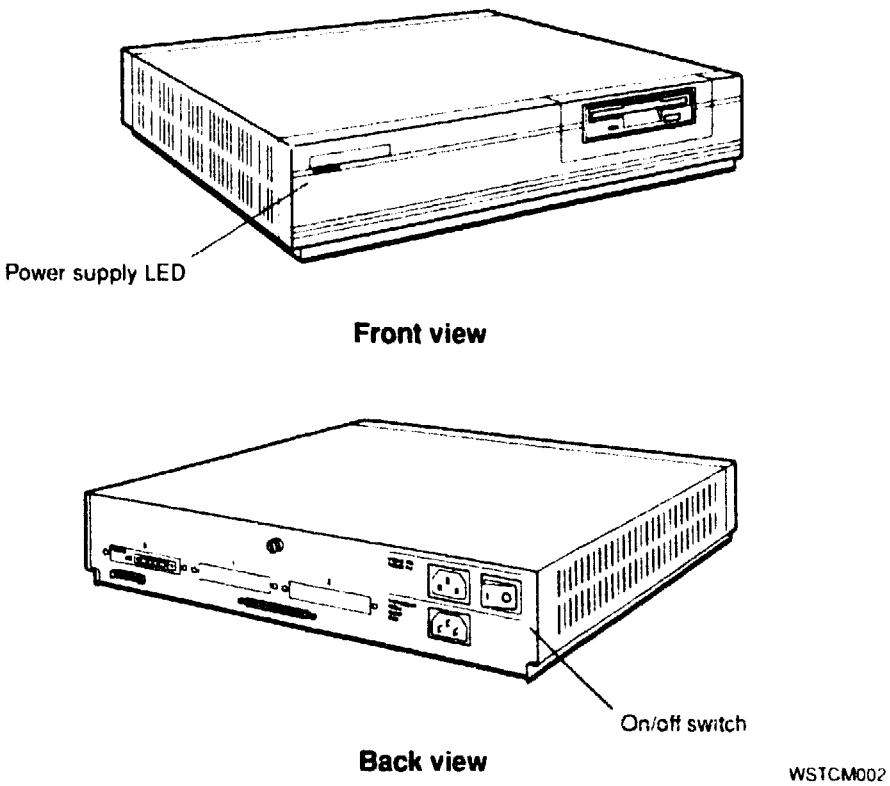


Figure 2-2. TCE unit controls and indicators

TCE Unit Connectors

The TCE unit connectors are shown in Figure 2-3.

- The power connector connects the TCE unit power cord to the power supply.
- The accessory power connector connects a monitor accessory cable to the TCE.
- The TCE interface connector connects the TCE unit to a TCE option module in a workstation.
- The TCE SCSI connector connects the TCE to the external small computer system interface (SCSI) port on a workstation or to a SCSI storage device.

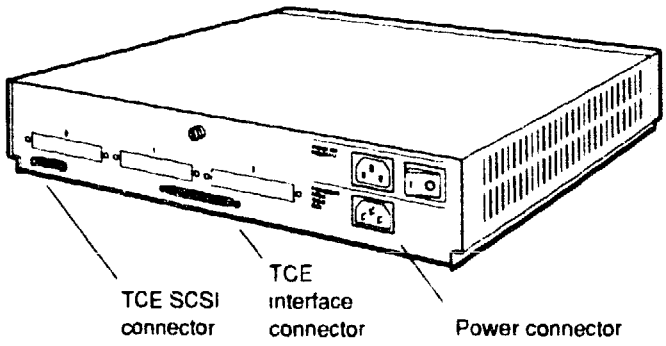


Figure 2-3. TCE unit connectors

TCE Interface Module

The TCE contains a replaceable TCE interface module. Figure 2-4 shows the TCE interface module module with its TURBOchannel option module slots and internal SCSI connectors.

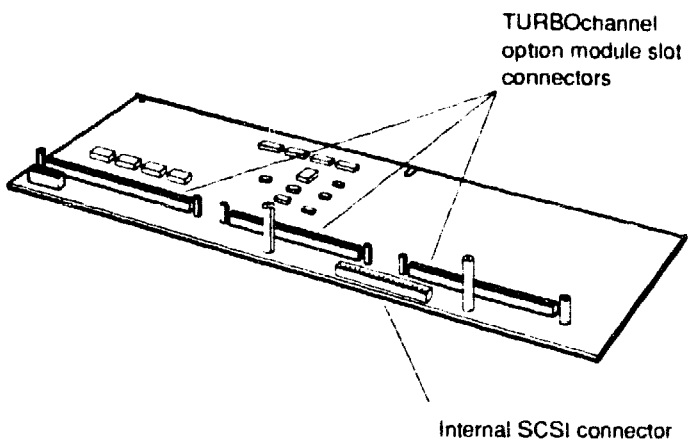


Figure 2-4. TCE interface module

TURBOchannel Option Modules

The TURBOchannel slots on the TCE unit support one TURBOchannel option module that can be up to three slots wide.

The TCE Option Module

The TCE option module is installed in the workstation and connects to the TCE unit interface connector. The TCE option module contains a green power indicator LED that glows when the module is connected to a TURBOchannel option module in the TCE, and the workstation and TCE are operating. Figure 2-5 shows the TCE option module.

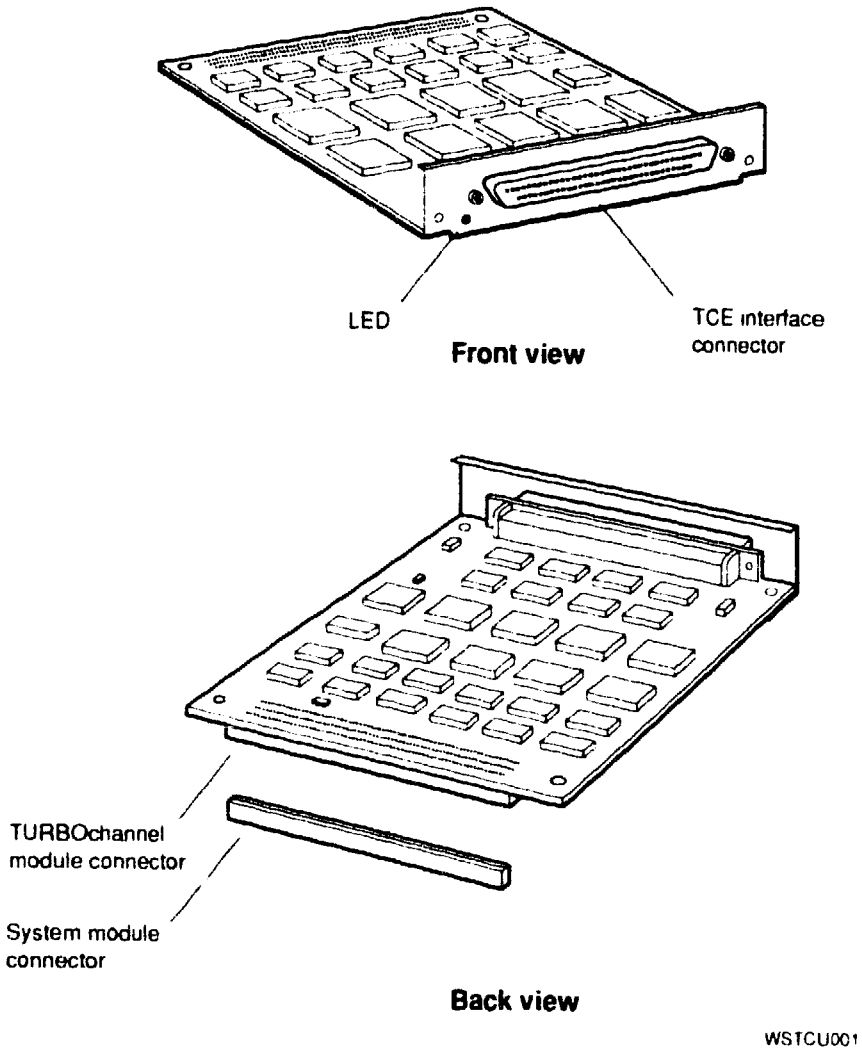


Figure 2-5. TCE option module

Drives

The TCE unit can contain up to three of the internal drives listed below.

- Two of the following hard disk drives:
  - RZ23L hard disk drive
  - RZ24 hard disk drive
  - RZ25 hard disk drive
- One of the following removable media drives:
  - RX23 diskette drive
  - RRD42 optical compact disk drive
  - TZK10 QIC tape drive


СНАР 3

3

Base TCE FRUs

This chapter explains how to remove, install, and troubleshoot TCE base FRUs. It describes how to

- Avoid electrostatic damage when handling components
- Remove and replace the TCE unit cover
- Remove and install the TCE interface module
- Remove and install the power supply

Using an Antistatic Kit

The Digital antistatic kit contains the equipment you need to handle static-sensitive materials safely. When handling static-sensitive materials, always

- Connect the antistatic mat to the TCE chassis.
- Place the antistatic wrist strap around your wrist.
- Snap the other end of the strap to the antistatic mat.
- Place the static-sensitive component on the antistatic mat when you set it down.

Figure 3-1 shows the antistatic kit parts and their proper use.

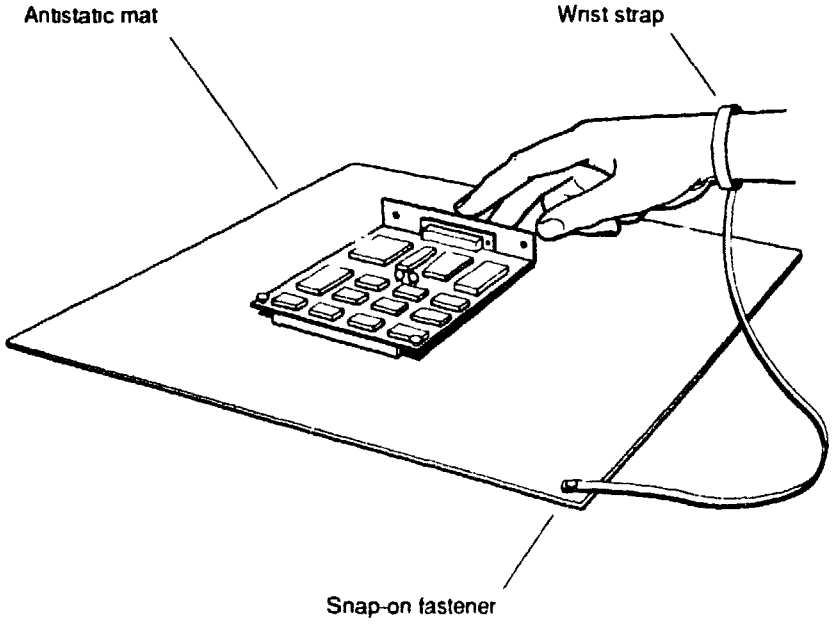


Figure 3-1. How to use an antistatic kit

Removing and Installing the TCE Unit Cover

Figure 3-2 shows how to remove and install the TCE unit cover.

To Remove the TCE Unit Cover

1. Loosen the captive screw that holds the cover.
2. Face the front of the TCE unit and grip each side of the TCE unit cover.
3. Pull the cover toward you until it comes loose from the chassis. Then lift the cover up and away from the TCE unit.

To Replace the TCE Unit Cover

1. Place the TCE unit cover on the chassis. Leave at least 2 inches between the cover and the back of the TCE unit.
2. Make sure that all cables, especially drive cables, are safely within the enclosure before closing the cover. If you catch a cable with the cover, you can disconnect a drive or damage a cable or other component.
3. Move the TCE unit cover toward the back of the unit until it slides into place.
4. Tighten the captive screw.

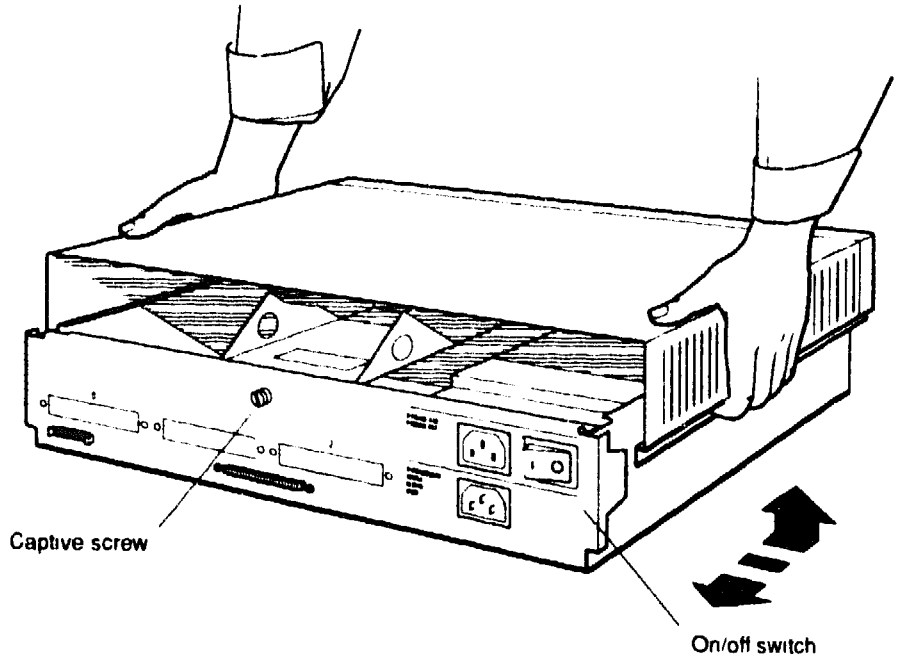


Figure 3-2. Removing and installing the TCE unit cover

TCE Interface Module

The TCE interface module, shown in Figure 3-3, provides basic TCE functions. The TCE interface module contains

- An interface for a single TURBOchannel option module
- SCSI connectors for internal SCSI drives

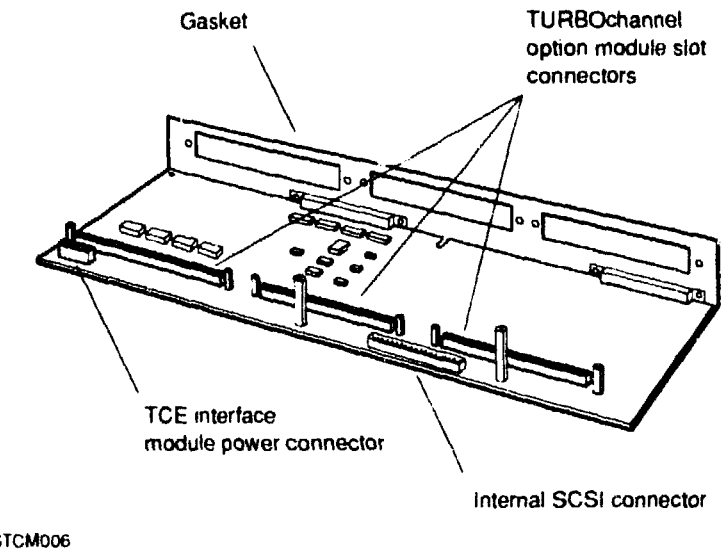


Figure 3-3. TCE interface module

To Remove the TCE Interface Module

Figure 3-4 shows how to remove a TCE interface module.

1. Turn off the workstation, the TCE, and any peripheral devices.
2. Disconnect the TCE interface module power cord from the module.
3. Disconnect any cables attached to the back of the TURBOchannel extender unit.
4. Remove the TCE unit cover.
5. Remove any TURBOchannel option module attached to the TCE interface module. Refer to "To Remove a TURBOchannel Option Module" on page 4-xx for directions.
6. If the removable media drive panel contains a drive, disconnect the internal SCSI and power cables from the drive. Then remove the drive panel. Refer to "To Remove the Removable Media Drive Panel" on page 5-xx for directions.
7. Remove any hard disk drives. Refer to "To Remove a Hard Disk Drive" on page 5-xx for directions.
8. Unscrew the option module standoffs and the removable media bracket standoffs.
9. Pull the TCE interface module toward the front of the unit until the retaining post pulls out of the keyhole slots.
10. Lift the TCE interface module up from the retaining posts and away from the chassis.

Caution: *Be careful not to damage the gasket on the TCE interface module.*

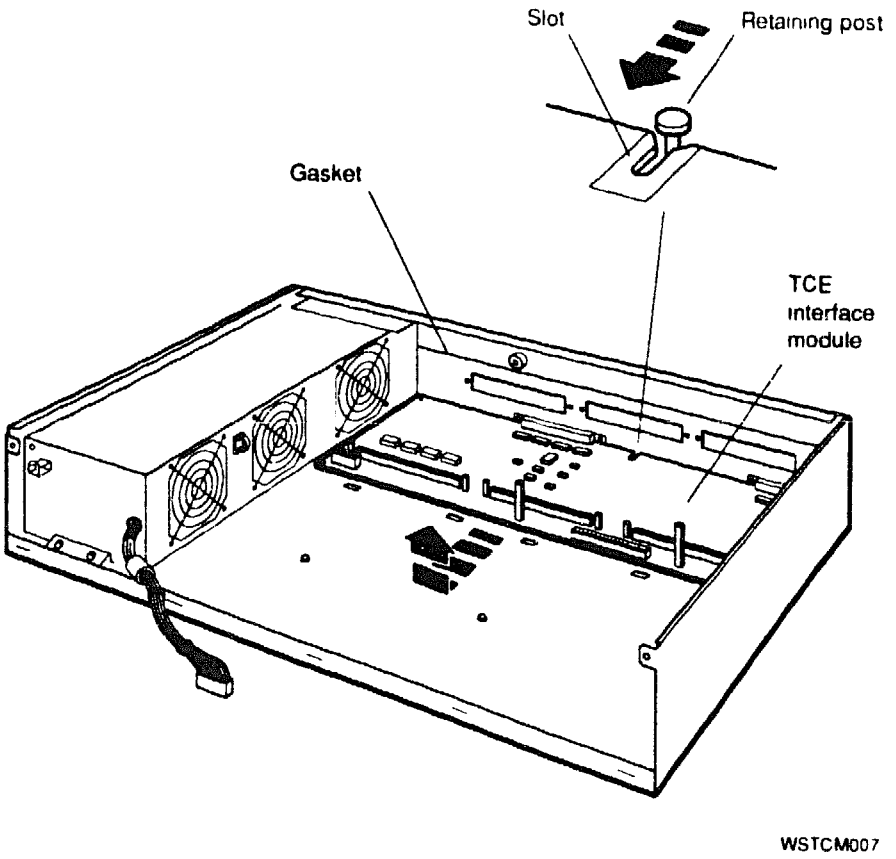


Figure 3-4. Removing a TCE interface module

To Install the TCE Interface Module

Figure 3-5 shows how to install a TCE interface module.

1. Position the TCE interface module over the chassis with its connectors toward the back of the unit.
2. Place the keyhole slots in the TCE interface module over the retaining posts on the chassis.
3. Slide the TCE interface module toward the back of the unit until it is firmly in place.
4. Reinstall the option module standoffs and the removable media bracket standoffs removed earlier. Push the TCE interface module to the back of the box while inserting the standoffs. Note that the standoffs hold the board in place against the back of the chassis.
5. Reinstall any hard disk drives removed earlier. Refer to "To Install a Hard Disk Drive" on page 5-xx for directions.
6. Replace the removable media drive panel. Reconnect any removable media drive internal SCSI and power cables removed earlier Refer to "To Replace the Removable Media Drive Panel" on page 5-xx for directions.
7. Reinstall any TURBOchannel option module that you removed earlier. Refer to "To Install a TURBOchannel Option Module" on page 4-xx for directions.
8. Replace the TCE unit cover.
9. Reconnect any cables that were attached to the back of the TCE unit.
10. Reconnect the TCE power cord.
11. Turn on the TCE unit and any other peripheral devices. Then turn on the workstation.

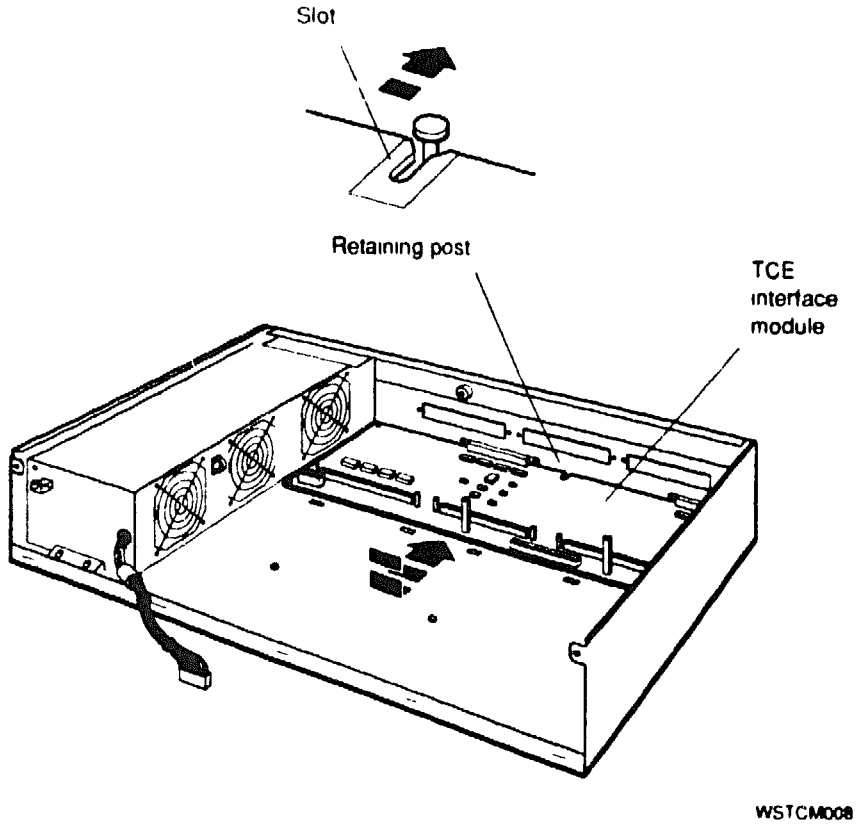
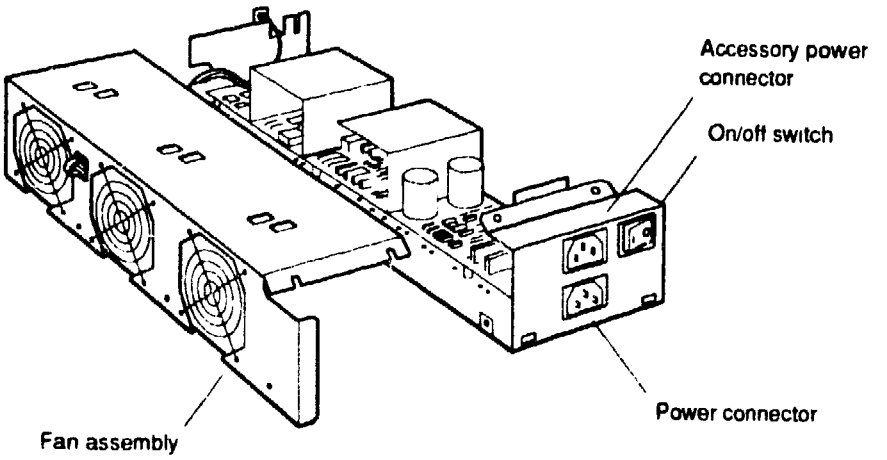


Figure 3-5. Installing a TCE interface module

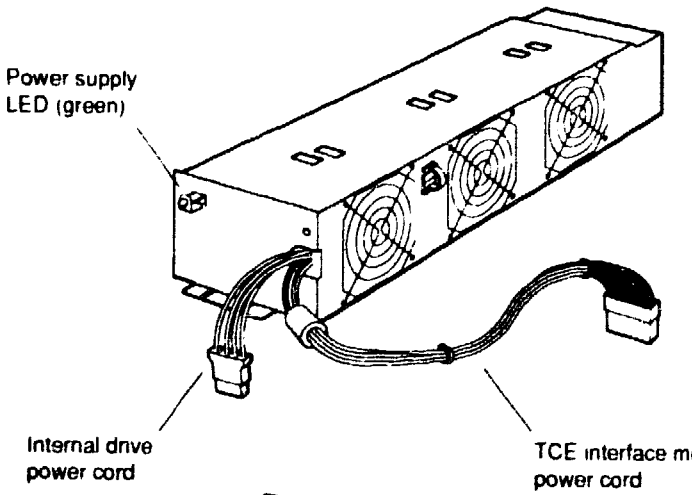
Power Supply Hardware

The power supply provides 196 watts of DC power to the TCE unit. The back of the power supply has a power connector. A green LED on the front panel lights up when the power supply is operating properly.

The power supply consists of a power supply base and a removable panel with three fans that cool the TCE unit. The power supply is shown in Figure 3-6.



Back view



Front view

WSTCM009

Figure 3-6. Power supply hardware

To Remove the Power Supply

Figure 3-7 shows how to remove the power supply.

1. Turn off the workstation, the TCE, and any peripheral devices.
2. Disconnect the TCE unit power cord from the back of the unit.
3. Disconnect the monitor power cord if a monitor is connected to the unit.
4. Remove the TCE unit cover.
5. Remove the removable media drive panel. Refer to "To Remove the Removable Media Drive Panel" on page 5-xx for directions.
6. Disconnect the TCE interface module and internal drive power cords.
7. Loosen the two screws that hold the power supply.
8. Pull the power supply away from the back of the TCE unit and out of the unit chassis.

To Install the Power Supply

Figure 3-7 shows how to install the power supply.

1. Turn off the power supply switch. (Press down the 0 on the switch.)
2. Place the power supply in the TCE unit chassis. The power supply on/off switch should face the back of the TCE unit.
3. Tighten the two screws.
4. Reconnect the TCE interface module power cord.
5. Reconnect the internal drive power cord.
6. Replace the removable media drive panel. Refer to "To Replace the Removable Media Drive Panel" on page 5-xx for directions.
7. Replace the TCE unit cover.
8. Reconnect the TCE unit power cord.
9. Reconnect the monitor power cord if one was removed earlier.

10. Turn on the TCE unit and any other peripheral devices. Then turn on the workstation.

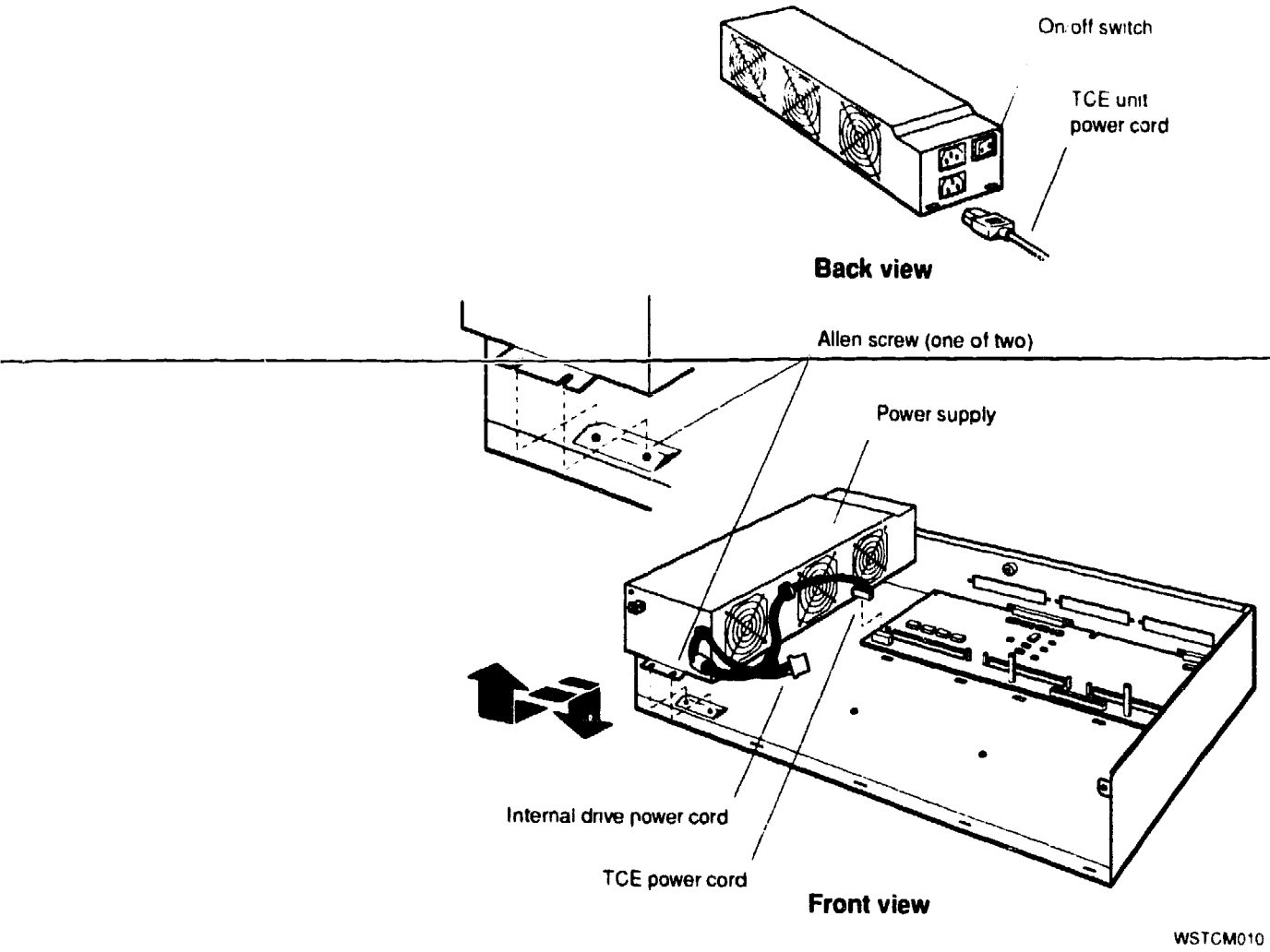


Figure 3-7. Removing and installing the power supply

To Remove the Power Supply Fan Assembly

Figure 3-8 shows how to remove the power supply fan assembly.

1. Turn off the workstation, the TCE, and any peripheral devices.
2. Disconnect the TCE unit power cord from the back of the unit.
3. Disconnect the monitor power cord if a monitor is connected to the unit.
4. Remove the TCE unit cover.
5. Remove the power supply from the TCE unit. Refer to "To Remove the Power Supply" on page 2-xxx for instructions.
6. Remove the eight screws that hold the fan assembly to the power supply base.
7. Hold the fan assembly away from the power supply base.
8. If you are installing a new fan assembly, disconnect the fan assembly power cord.
9. Set aside the old fans to be returned.

To Install the Power Supply Fan Assembly

Figure 3-8 shows how to install the power supply fan assembly.

1. Check that the fan assembly power cord is connected firmly to the fan assembly power connector.
2. Align the screw holes on the fan assembly housing and power supply base. Then replace the eight screws that hold the fan to the power supply base.
3. Replace the TCE unit cover.
4. Reconnect the monitor power cord if one was removed earlier.
5. Connect the TCE unit power cord.

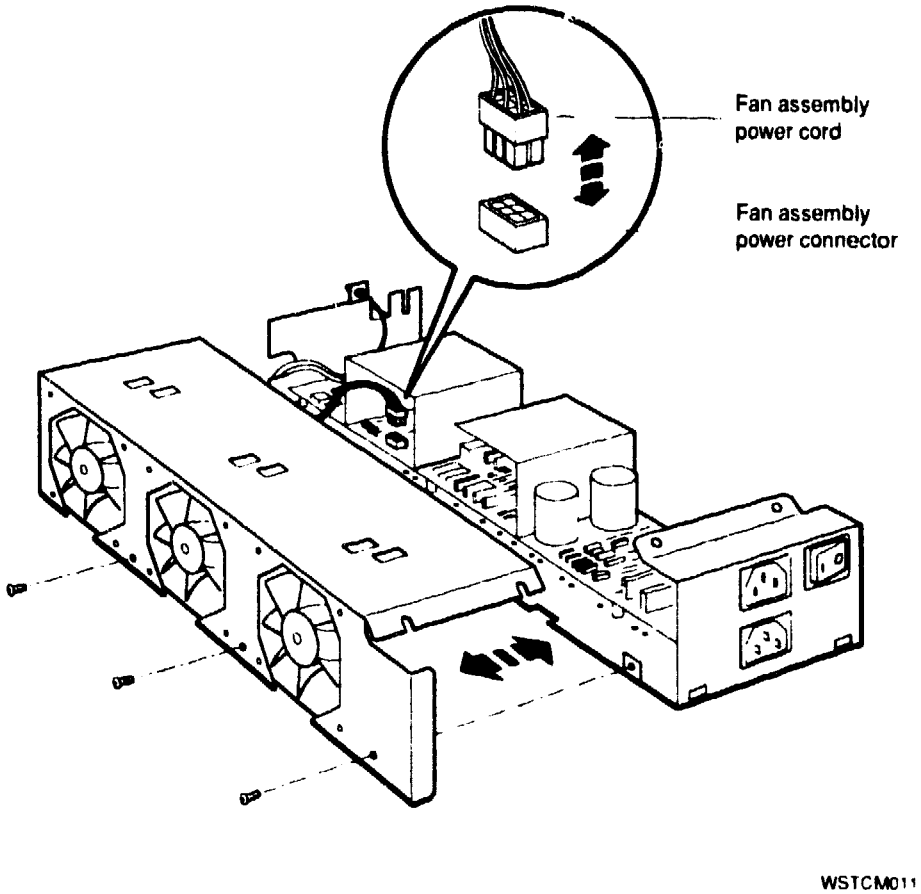


Figure 3-8. Removing and installing the power supply fan assembly


CHAP 4

4

Option Modules

This chapter explains how to remove and install the TCE option module and other TURBOchannel option modules. It describes how to

- Remove and install the TCE option module in the workstation
- Remove and install a TURBOchannel option module in the TCE
- Connect the TCE to the TCE option module in the workstation
- Troubleshoot

The TCE option module is installed in the DECstation 5000 system unit and connects to the interface connector on the TCE.

Figure 4-1 shows how to remove and install the TCE option module.

Caution: *Always follow antistatic procedures when handling option modules.*

To Remove the TCE Option Module

1. Turn off the workstation, the TCE, and any peripheral devices.
2. Disconnect the system unit power cord from the back of the unit.
3. Remove the system unit cover.
4. Disconnect the interface cable from the rear of the TCE option module.
5. Remove the screws that hold the option module to the standoffs.
6. Remove the screws that hold the option module to the back of the system unit.
7. Grip the option module near the slot opening and pull the module out of the slot. If necessary, gently rock the module to loosen it.

To Install the TCE Option Module

1. Remove the metal plate over the option slot opening in the back of the system unit.
2. Insert the TCE option module cable connector into the option slot opening.
3. Firmly press the TCE option module slot connector into the connector on the system module.
4. Tighten the screws that hold the option module to the back of the system unit.

standoffs.

6. Replace the system unit cover.
7. Connect the system unit power cord.
8. Connect the interface cable to the back of the TCE option module.
9. Turn on the TCE unit and any other peripheral devices. Then turn on the workstation.

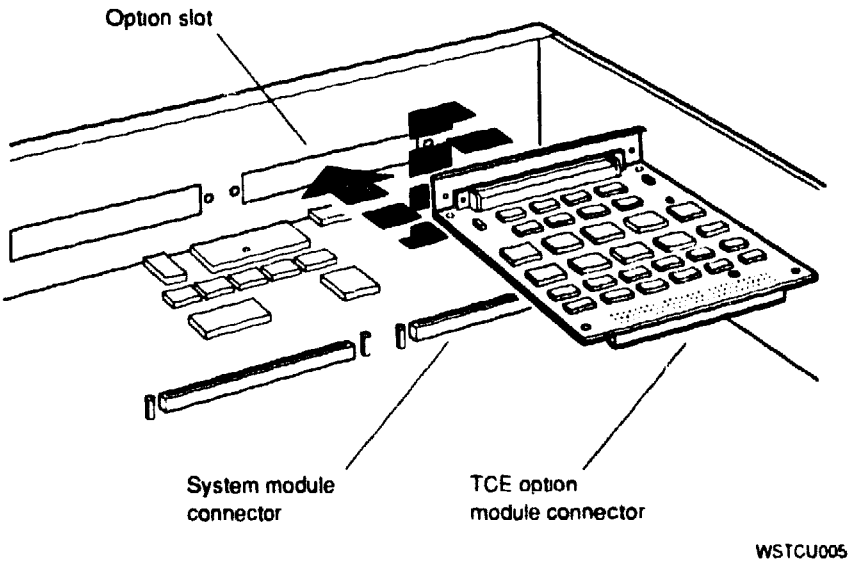


Figure 4-1. Removing and installing the TCE option module

The TURBOchannel option module is installed in the TCE.

Figure 4-2 shows how to remove and install a TURBOchannel option module.

Caution: *Always follow antistatic procedures when handling option modules.*

To Remove a TURBOchannel Option Module

1. Turn off the workstation, the TCE, and any peripheral devices.
2. Disconnect the TCE unit power cord from the back of the unit.
3. Remove the TCE unit cover.
4. Disconnect any cables that are connected to the rear of the TURBOchannel option module.
5. Remove the screws that hold the option module to the standoffs.
6. Remove the screws that hold the option module to the back of the TCE unit.
7. Grip the option module near the slot opening and pull the option module out of the slot. If necessary, gently rock the module to loosen it.

To Install a TURBOchannel Option Module

The TCE can support one TURBOchannel option module. An option module that is two slots wide is usually installed in slot 0, away from the power supply.

1. Remove the metal plate over the option slot opening in the back of the TCE unit.
2. Insert the option module cable connector into the option slot opening.
3. Firmly press the option module slot connector into the connector on the TCE interface module.

TCE unit.

5. Tighten the screws that hold the option module to the standoffs.
6. Replace the TCE unit cover.
7. Connect the TCE unit power cord.
8. Connect the option module cable.
9. Turn on the TCE unit and any other peripheral devices. Then turn on the workstation.

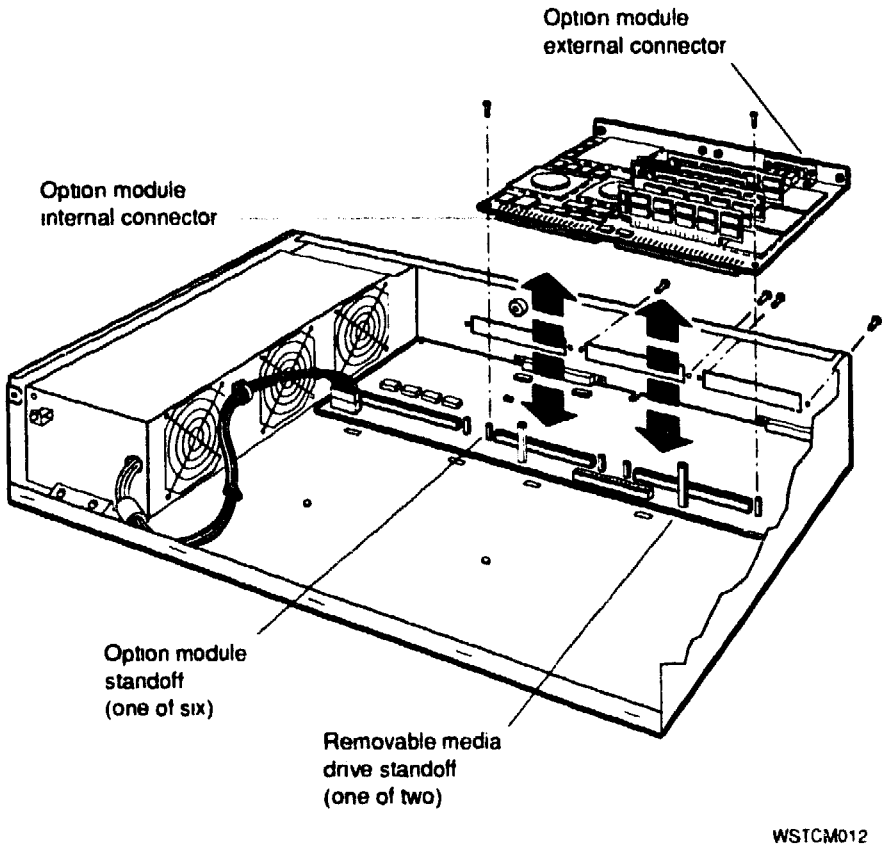


Figure 4-2. Removing and installing a TURBOchannel option module

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.

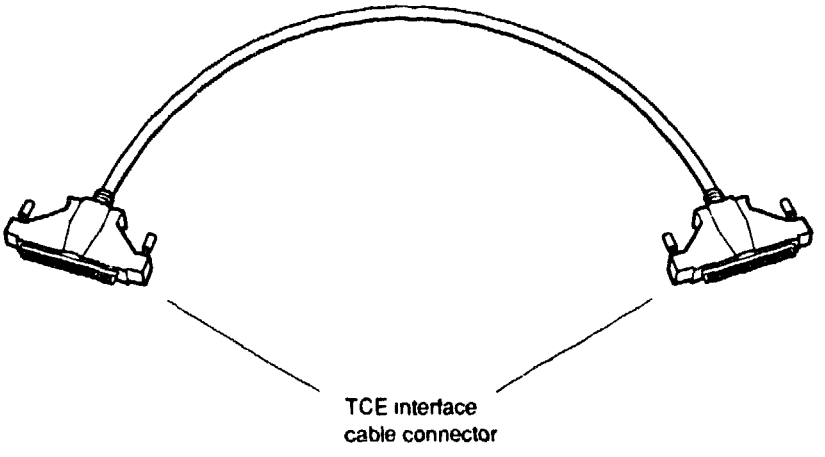


Figure 4-3. The TCE interface cable

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 4-4 on page 3-xxx 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.

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.

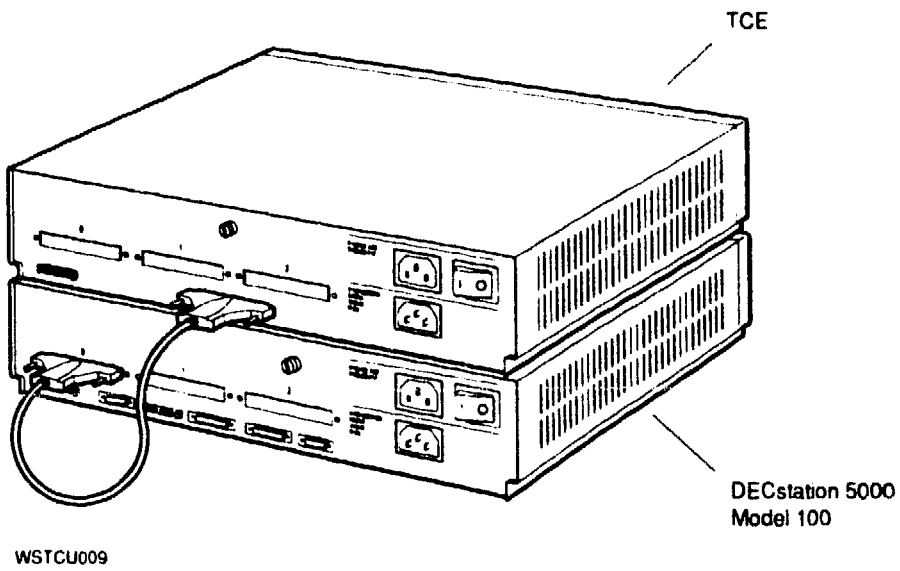


Figure 4-4. Connecting the TCE to the TCE option module in the workstation

For information about interpreting LED displays or using error logs to troubleshoot, refer to the Maintenance Guide for the workstation.

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

- Replace the TCE power cable.
- If this does not resolve the problem, replace the power supply.

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:

1. The TCE option module is connected to the TCE unit
2. A TURBOchannel option module is installed in the TCE unit
3. 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

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

1. Replace the TCE interface cable.
2. Move the TCE option module to another option slot in the workstation. If this resolves the problem, the fault is in the workstation. Refer to the Maintenance Guide for the workstation troubleshooting information.
3. Remove the TURBOchannel option module from the TCE and install it in the workstation. If the option module functions, the TCE interface module is defective.
4. Install another TURBOchannel option module in the TCE unit. If this resolves the problem, the TURBOchannel option module is defective.

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. For example, if the TCE option module is installed in slot 2 on the workstation and a mid 3D TURBOchannel option module is installed in the TCE, the configuration display will show the mid 3D module in slot 2 on the workstation.

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: PXG -- 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

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

If this does not resolve the problem,

1. Replace the TCE interface cable.
2. Move the TCE option module to another option slot in the workstation. If this resolves the problem, the fault is in the workstation. Refer to the Maintenance Guide for the workstation for troubleshooting information.

and install it in the workstation. If the option module functions, the TCE interface module is defective.

4. Install another TURBOchannel option module in the TCE unit. If this resolves the problem, the TURBOchannel option module is defective.

CHAP 5

5

Drives

This chapter discusses the drives that the TCE supports. It explains

- How to remove and install the removable media drive panel
- How to remove and install removable media drives
- How to remove and install hard disk drives
- How to set drive SCSI IDs
- How to connect the TCE to the workstation SCSI connector
- How to connect the TCE to an expansion box SCSI connector
- Troubleshooting

For more information about specific internal drives that the TCE supports, refer to the documentation that came with the drive.

Internal Drives in the TCE

The TCE supports up to three internal drives.

- One removable media drive can reside in the removable media drive panel.
- One or two hard disk drives can mount on the TCE unit chassis near the front of the TCE unit.

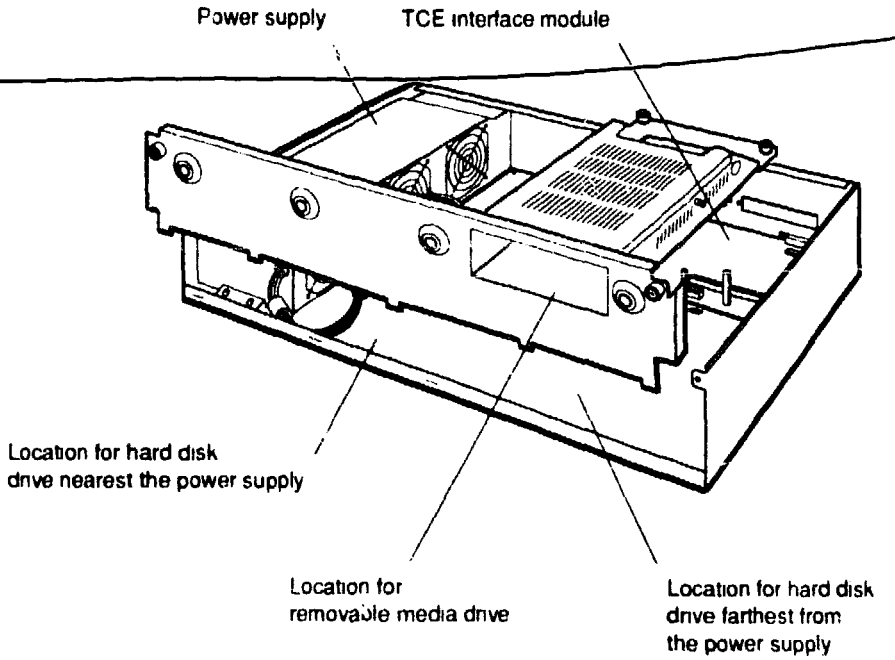


Figure 5-1. Internal drive locations

Internal Drive SCSI and Power Cable Connections

Each internal drive connects to the internal SCSI and power cables.

- The internal SCSI cable connects each drive to the base TCE SCSI connector.
- The internal drive power cable supplies electrical power to each internal drive. The last power cable connector is the longest and must be used for the removable media drive in the front panel.

Figure 5-2 shows which drive each internal SCSI connector supports. Figure 5-3 shows which drive each internal power cable connector supports.

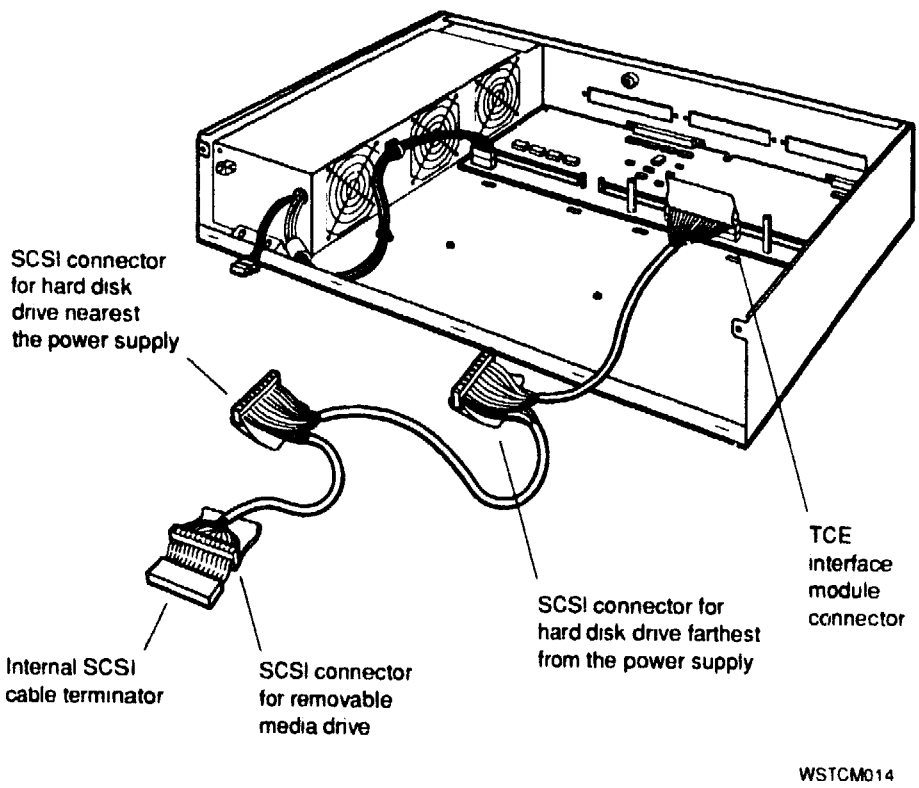


Figure 5-2. Internal SCSI cable connectors

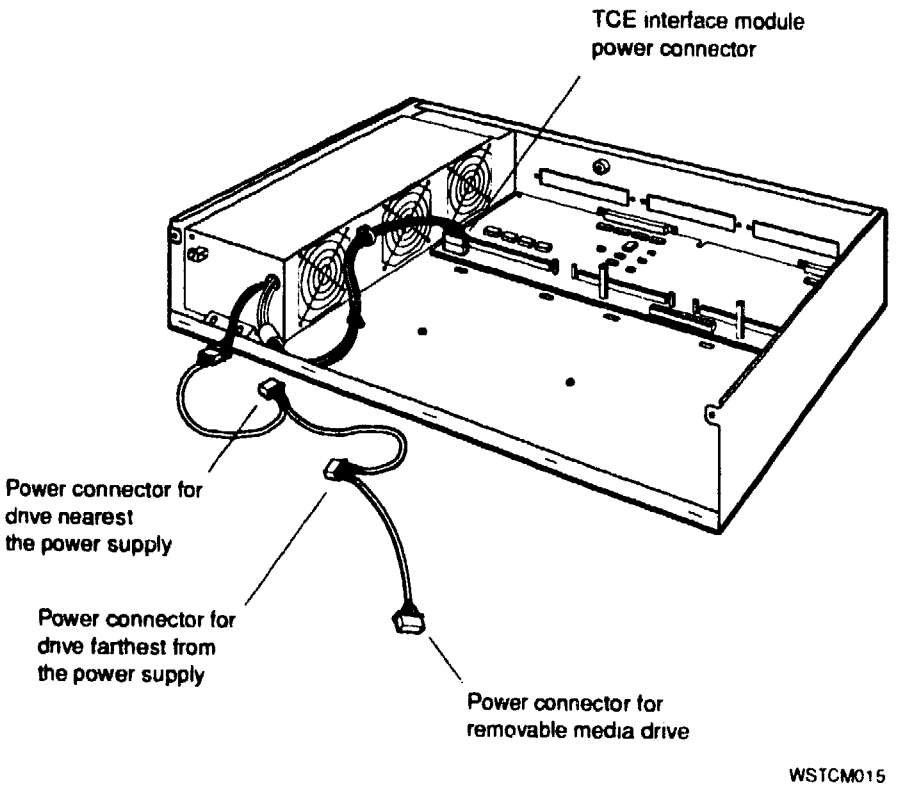


Figure 5-3. Internal power cable connectors

Removing and Installing a Removable Media Drive

Caution: *Always observe antistatic procedures when removing or installing a drive in the TCE unit.*

Figure 5-4 shows how to disconnect and attach cables to a removable media drive.

Figure 5-5 shows how to remove and install a media drive in the removable media drive panel.

To Remove a Removable Media Drive

1. Turn off the workstation, the TCE unit, and any peripheral devices.
2. Remove the TCE unit cover.
3. Disconnect the SCSI and power cables that are attached to the drive.
4. Loosen the four captive screws that hold the drive. If necessary, remove the panel and use a screwdriver to loosen the screws. Refer to "To Remove the Removable Media Drive Panel" on page xxx for directions.
5. Grip the front of the drive and slide the drive out of the panel.

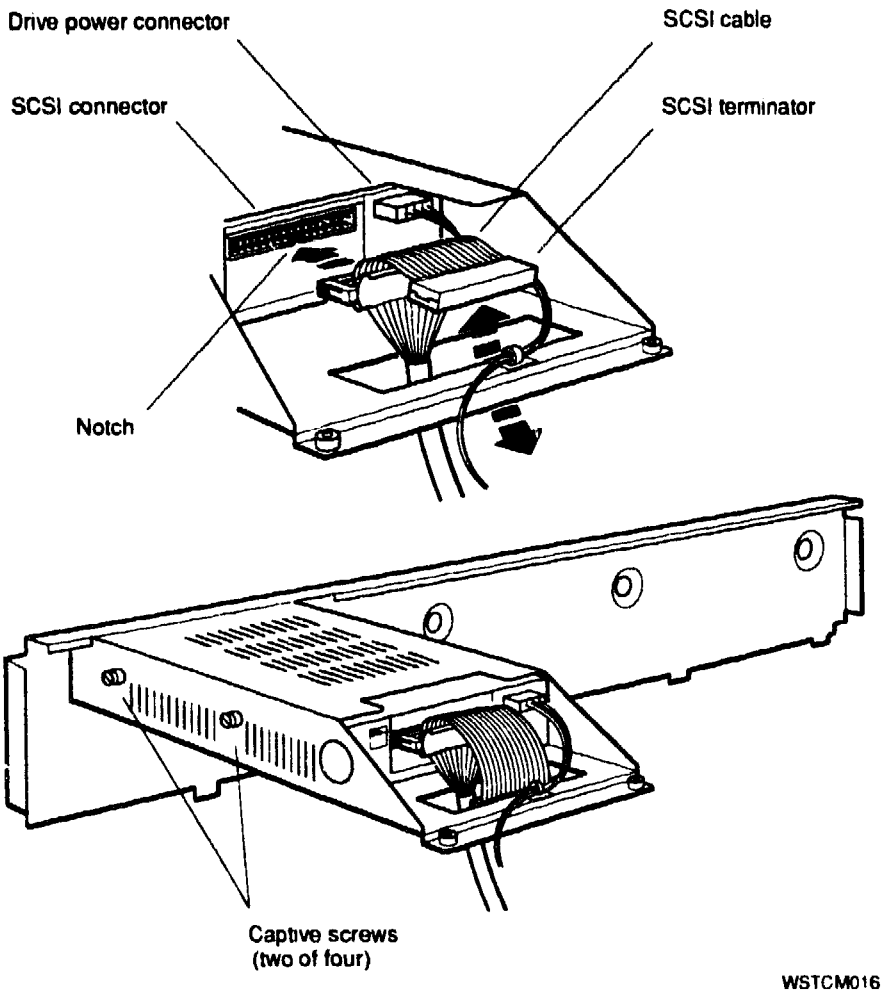


Figure 5-4. Disconnecting a removable media drive

To Install a Removable Media Drive

1. Check that the drive has the correct SCSI ID. To find the SCSI ID settings for a specific drive, refer to "SCSI ID Settings" on page 4-xxx.
2. Check that the TCE unit cover has the correct bezel for the type of drive that you are installing. For directions on removing and installing the bezel, refer to "To Remove a Bezel from the TCE Unit Cover" on page xxx.
3. Slide the drive into the removable media drive panel.
4. Tighten the four captive screws that hold the drive inside the panel.
5. Connect the SCSI ID cable and internal power cable to the drive.
6. Replace the TCE unit cover.
7. Turn on the TCE and any other peripheral devices. Then turn on the system unit.

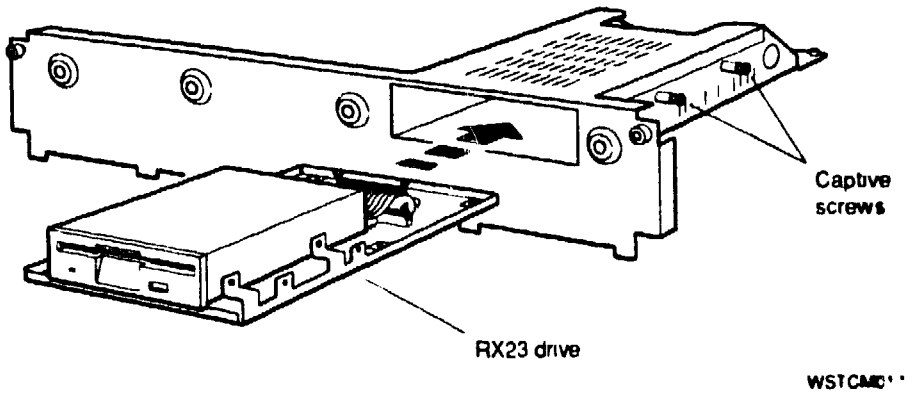


Figure 5-5. Removing and installing a removable media drive

Removing and Installing the Removable Media Drive Panel

Figure 5-6 shows how to remove and install the removable media drive panel.

To Remove the Removable Media Drive Panel

1. Loosen the two captive screws that hold the back of the panel to the standoffs.
2. Loosen the two captive screws that hold the panel to the front of the chassis.
3. Disconnect the internal SCSI and power cables from the drive, if a drive is in the panel.
4. Lift the back of the panel up from the standoffs.
5. Lift the panel away from the TCE unit.

To Install the Removable Media Drive Panel

1. Pass the ends of the internal SCSI and power cables through the hole near the back of the panel.
2. Position the panel on the TCE unit. Align the five tabs along the bottom of the removable media drive panel with the five slots along the front of the TCE unit chassis. Position the back of the removable media drive panel so that the two captive screws on the back of the panel are over the standoffs.
3. Tighten the captive screws in the standoffs.
4. Tighten the two captive screws that hold the panel to the front of the TCE unit chassis.

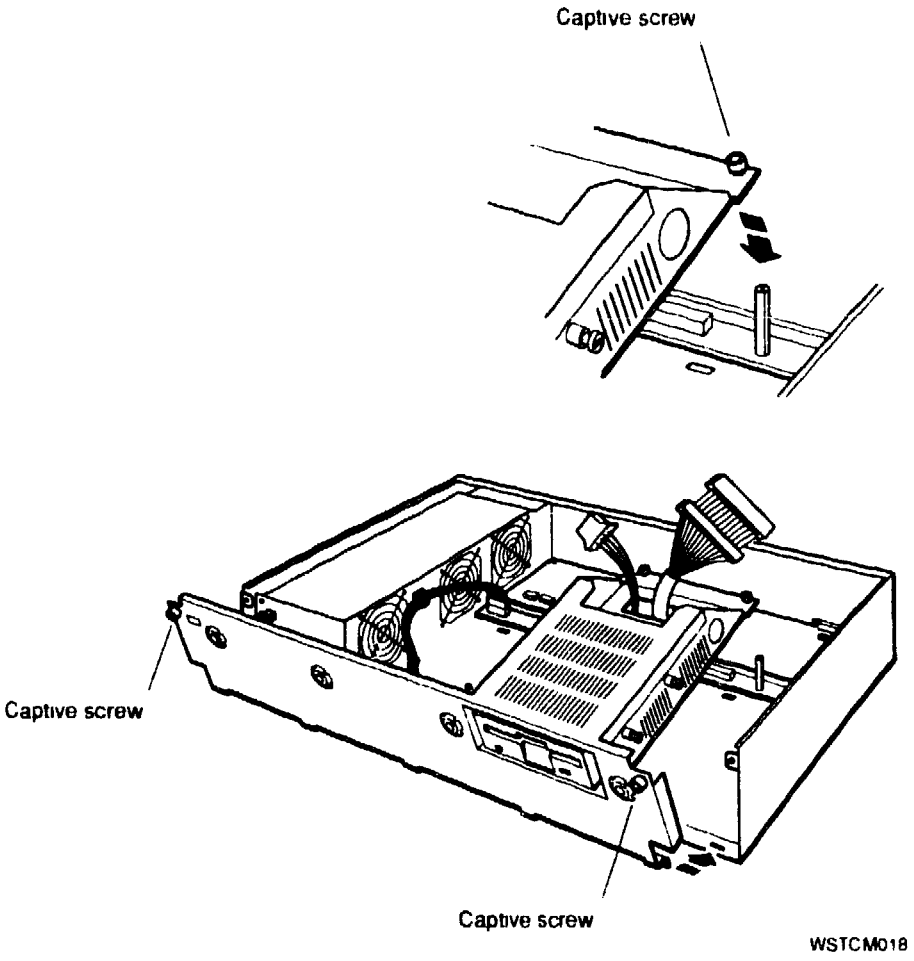


Figure 5-6. Removing and installing the removable media drive panel

Removing and Installing the TCE Unit Cover Bezel

Figure 5-7 shows how to remove and install a bezel in the TCE unit cover.

To Remove a Bezel from the TCE Unit Cover

1. Push the four tabs on the bezel toward the hole in the bezel.
2. Pull the bezel out of the cover.

To Install a Bezel in the TCE Unit Cover

1. Align the bezel over the hole in the TCE unit cover.
2. Press the bezel into the cover until the bezel snaps into place.

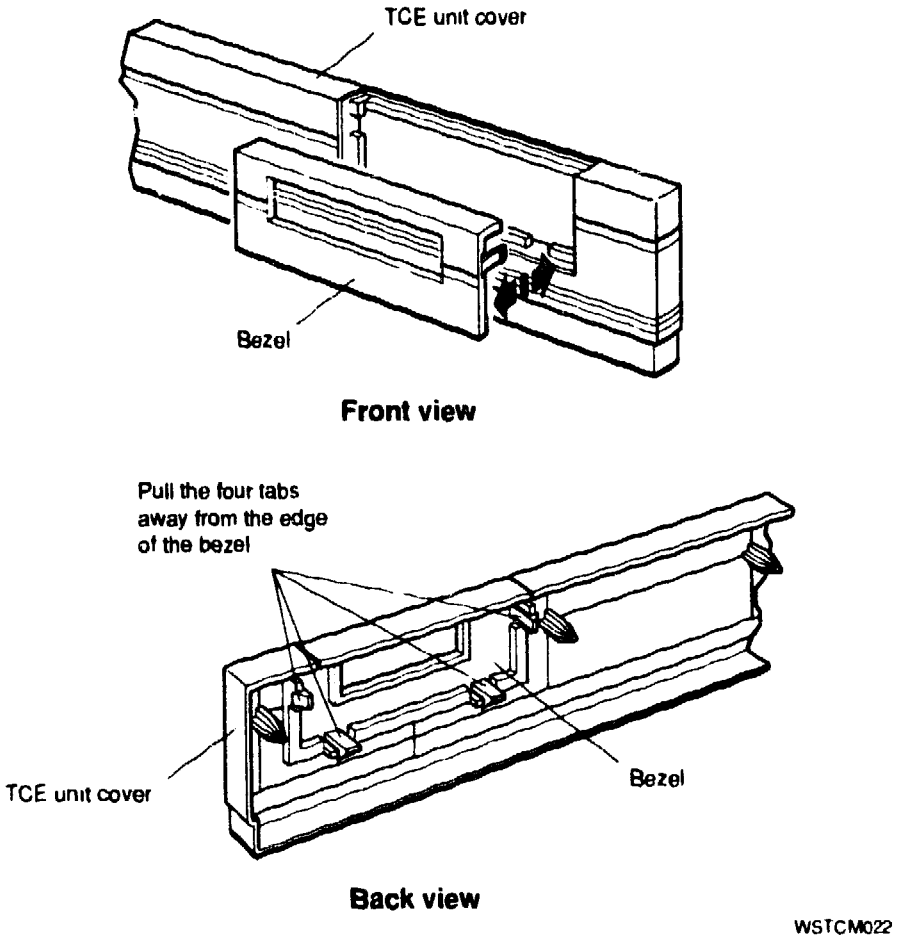


Figure 5-7. Removing and installing a bezel in the TCE unit cover

Removing and Installing a Hard Disk Drive

Figure 5-8 shows how to remove and install a hard disk drive.

Caution: Always observe antistatic procedures when removing or installing a drive in the TCE unit.

To Remove a Hard Disk Drive

1. Turn off the workstation, the TCE unit, and any peripheral devices.
2. Remove the TCE unit cover.
3. Loosen the latch that holds the drive onto the chassis.
4. Tilt up the side of the drive that has the latch and lift the drive away from the chassis.
5. Disconnect the SCSI and power cables that are attached to the drive.

To Install a Hard Disk Drive

1. Make sure the drive has the correct SCSI ID setting. To find the SCSI ID settings for a specific drive, refer to "SCSI ID Settings" on page xxx.
2. Connect the internal SCSI cable and internal power cable to the drive. Make sure the key on the SCSI data cable connector is up.
3. Slide the tabs on the drive mounting bracket into the holes in the TCE unit chassis.
4. Fasten the latch on the drive mounting bracket by sliding the latch toward the power supply.

   Caution: Be sure the latch is fully engaged.
5. Replace the TCE unit cover.
6. Turn on the TCE and any other peripheral devices. Then turn on the system unit.

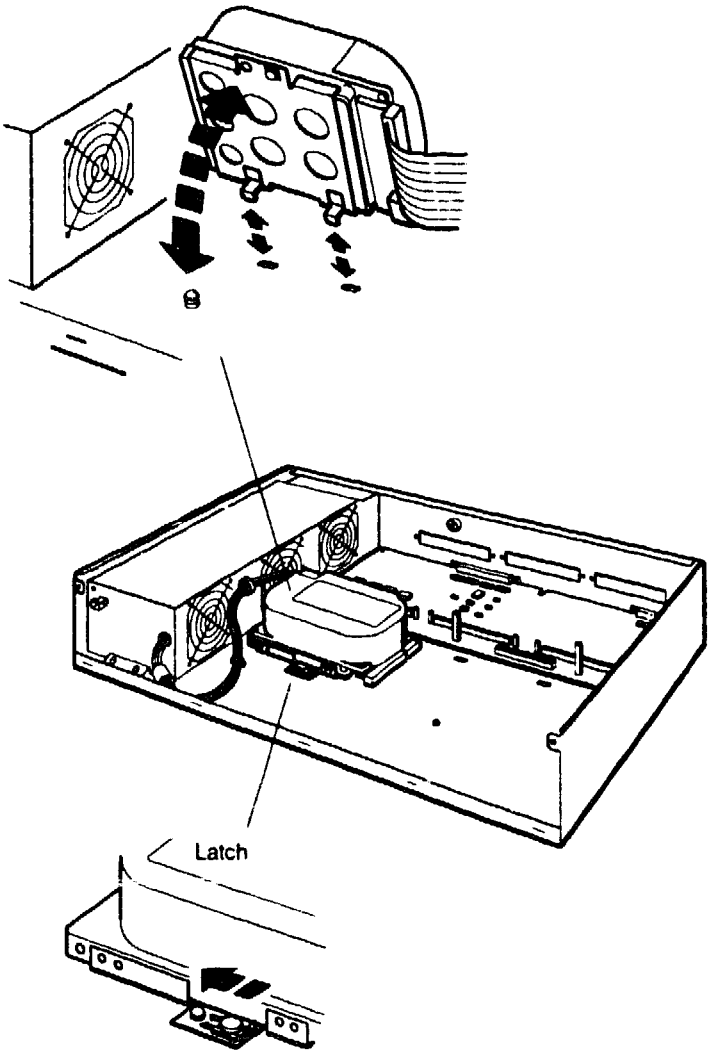


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Figure 5-8. Removing and installing a hard disk drive

SCSI ID Settings

The following sections explain the SCSI ID settings for the drives that the TCE supports. Each drive in the TCE must have a unique SCSI ID number from 0 to 6. This SCSI ID number must be unique for all the drives attached to the workstation SCSI controller.

The TCE supports the following internal drives:

- RZ23L half-height hard disk drive
- RZ24 hard disk drive
- RZ25 hard disk drive
- RX23 3-1/2 inch diskette drive
- RRD42 optical compact disc drive
- TZK10 QIC (Quarter-inch cassette) tape drive

Figure 5-9 through Figure 5-14 show SCSI ID jumper settings.

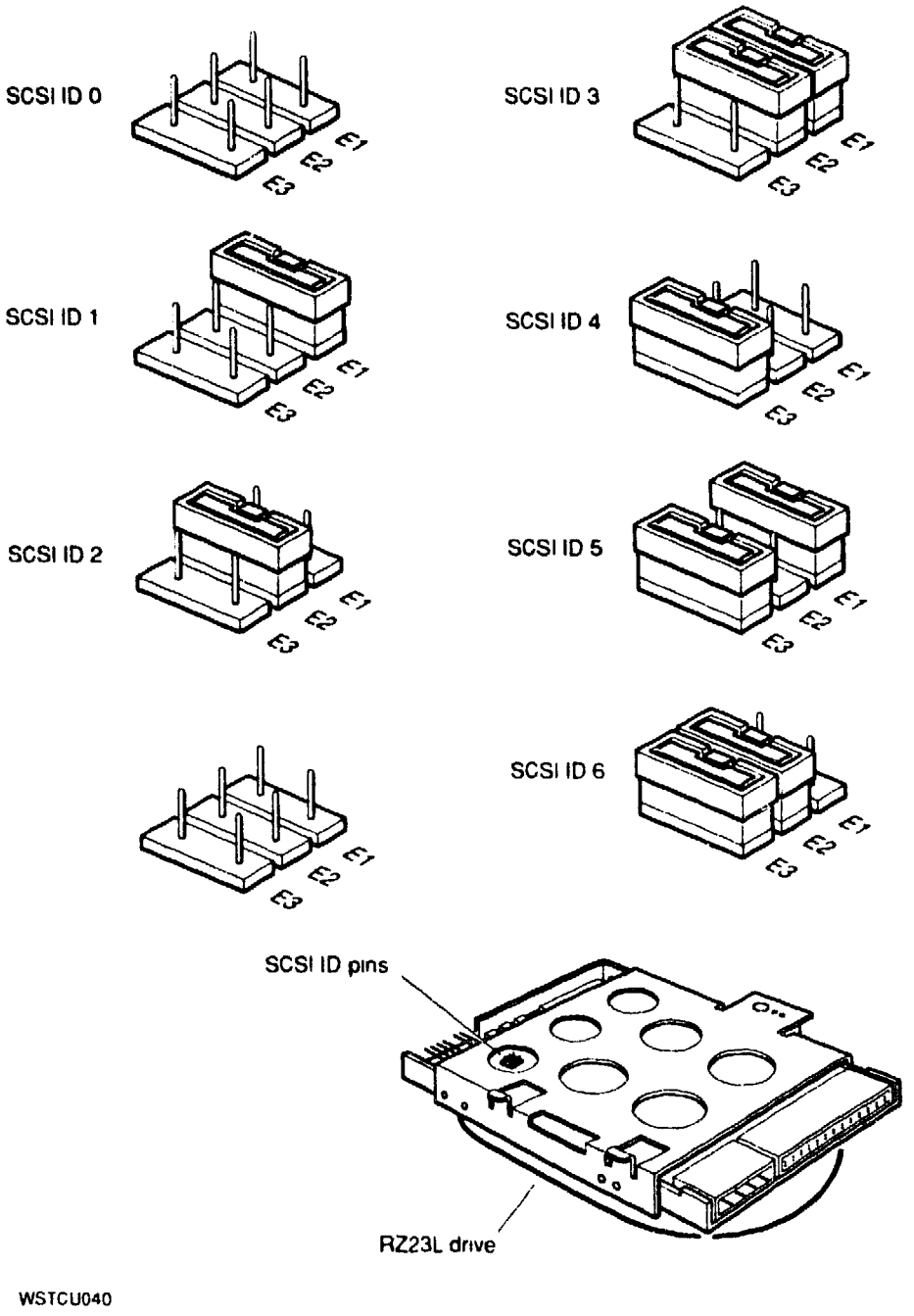


Figure 5-9. RZ23L drive SCSI ID jumper settings

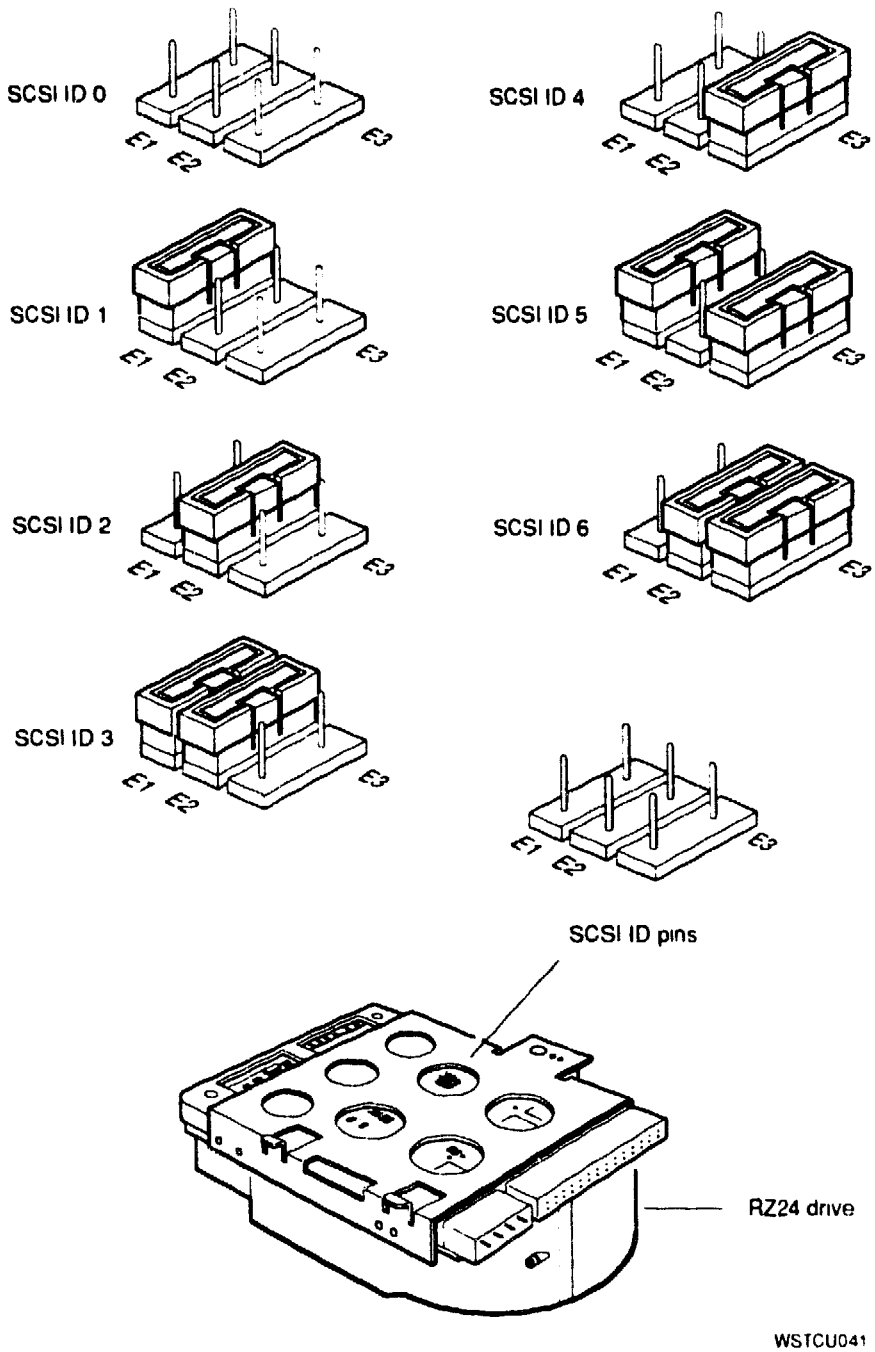


Figure 5-10. RZ24 drive SCSI ID jumper settings

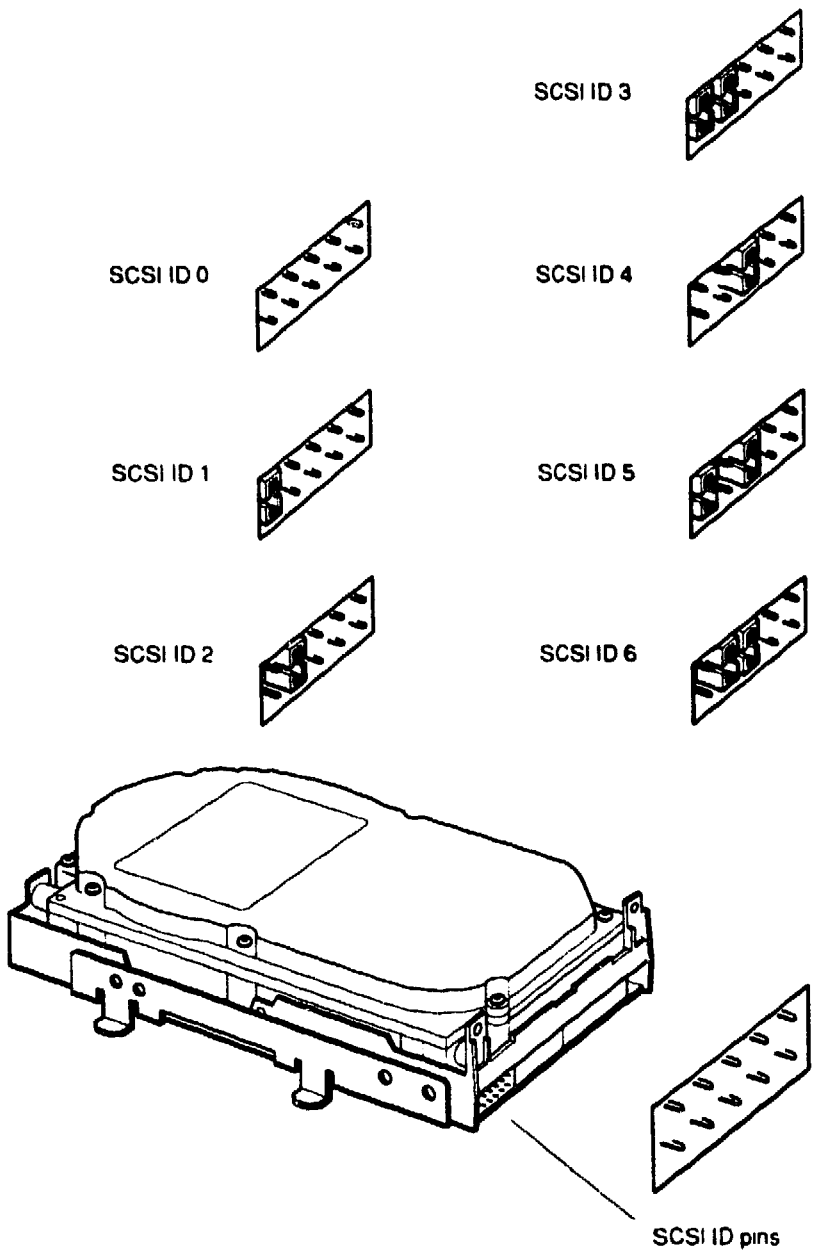


Figure 5-11. RZ25 drive SCSI ID jumper settings

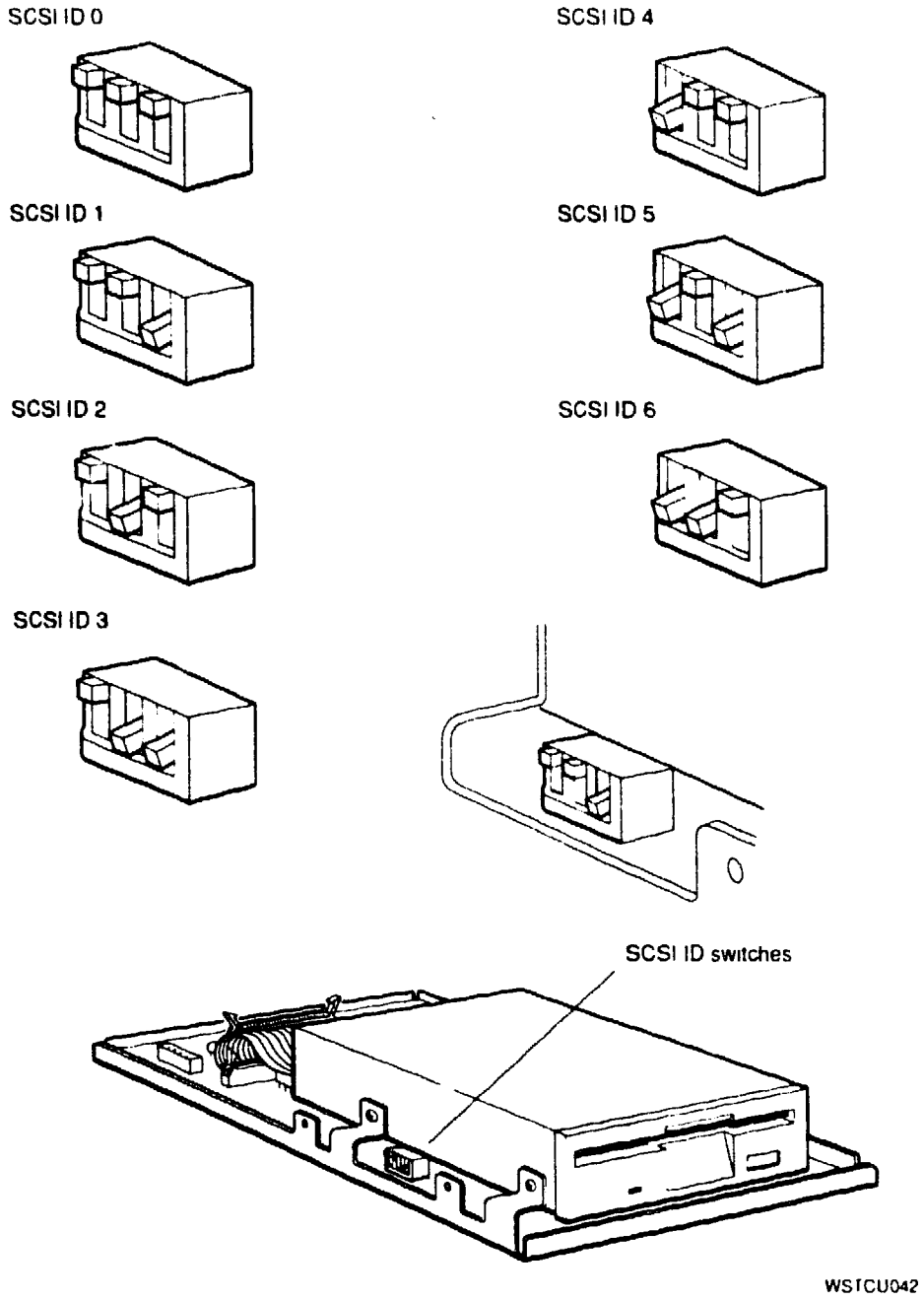


Figure 5-12. RX23 drive SCSI ID switch settings

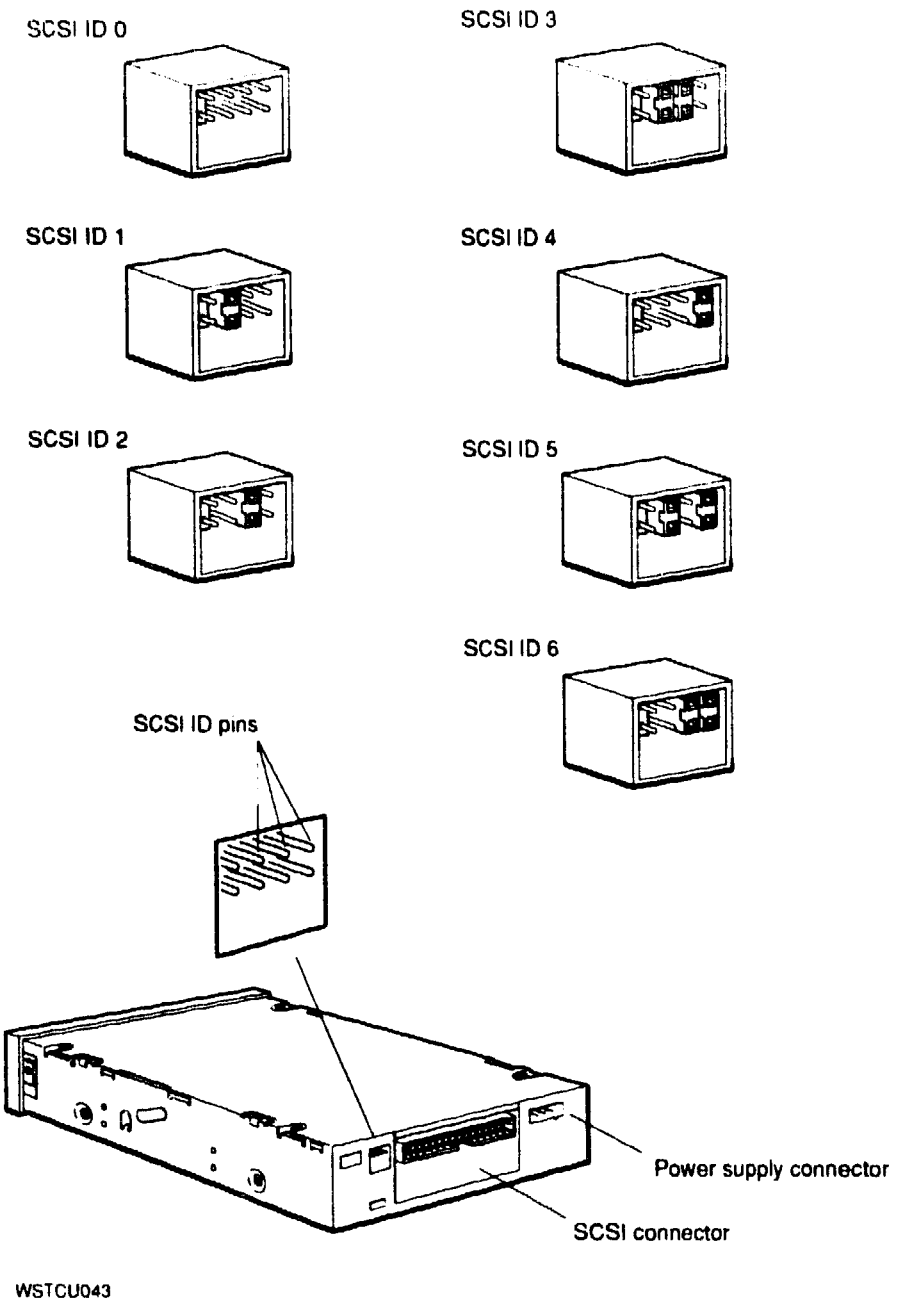


Figure 5-13. RRD42 drive SCSI ID jumper settings

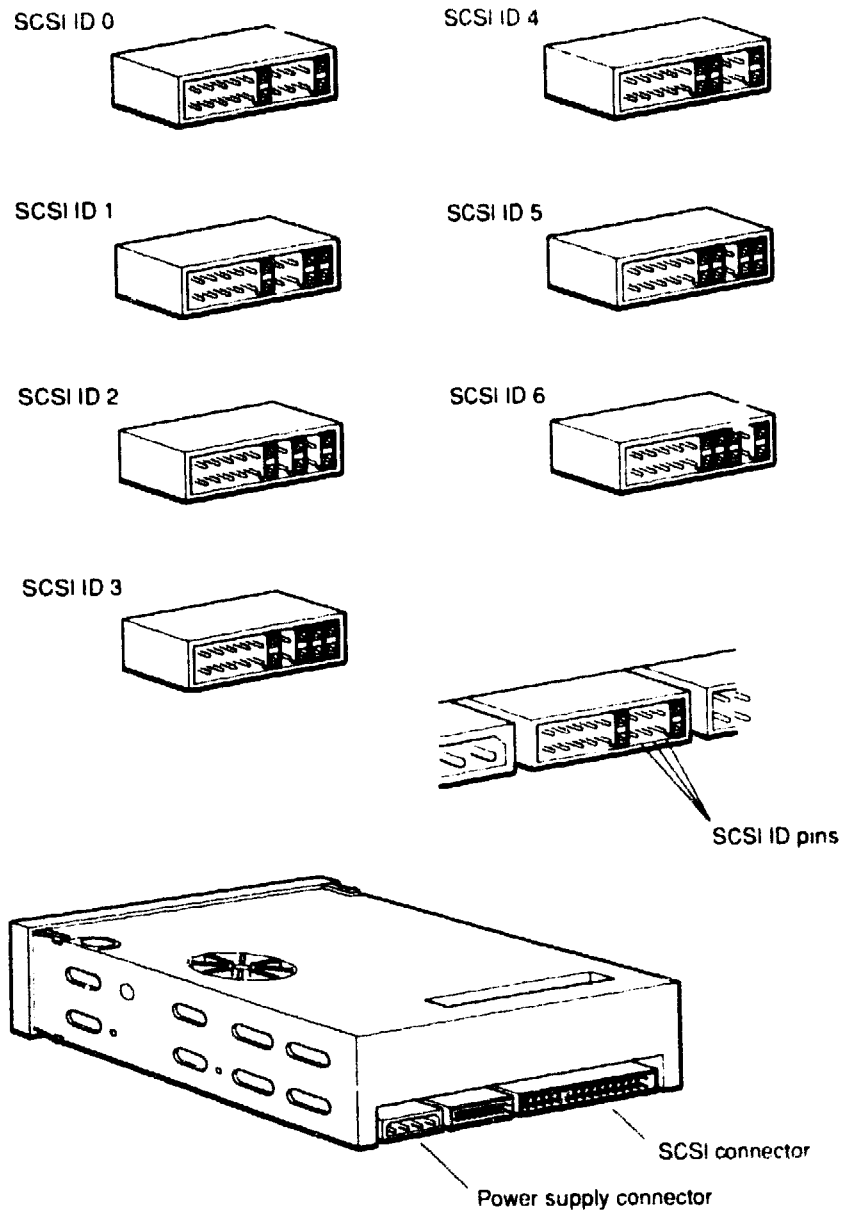
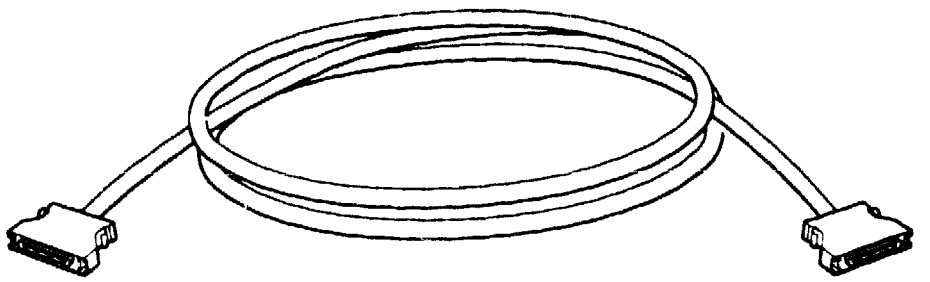


Figure 5-14. TZK10 drive SCSI ID jumper settings

Connecting 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 5-15. TCE-to-system unit SCSI cable

Follow these steps to connect the TCE-to-system unit SCSI cable. Figure 5-16 on page 4-xx 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.

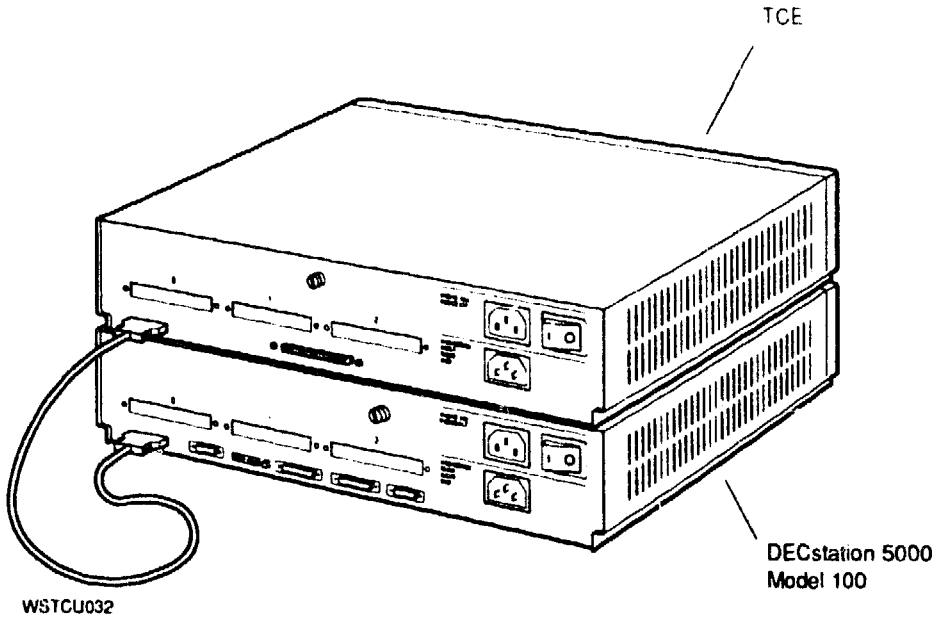
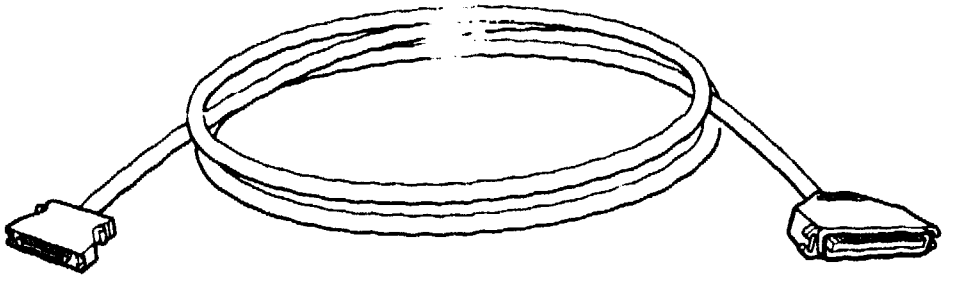


Figure 5-16. Connecting the TCE to the workstation SCSI connector

Connecting 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.



WSTCU035

Figure 5-17. TCE-to-expansion box SCSI cable

Follow these steps to connect the TCE-to-expansion box SCSI cable. Figure 5-18 on page 4-xx 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.

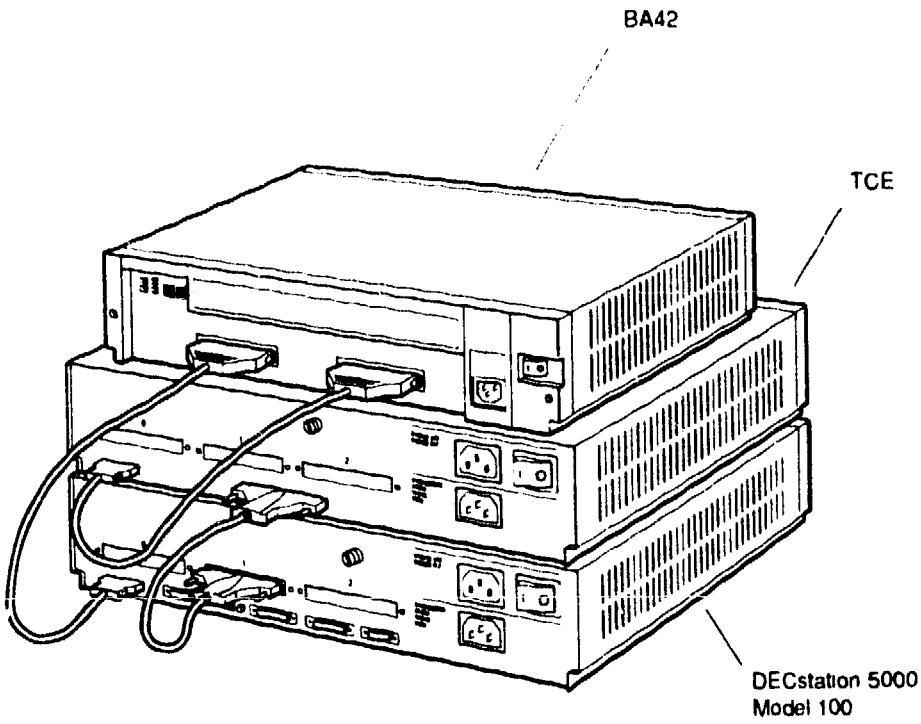


Figure 5-18. Connecting the TCE to an expansion box SCSI connector

Troubleshooting

For information about interpreting LED displays or using error logs to troubleshoot refer to the Maintenance Guide for the workstation.

Using the Configuration Display

Use the **cnfg** display to check that the drive is installed correctly. The display shows 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                                              SEQ
              rz2    RZ24       (C) DEC     DEC        0700    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 NAME 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 "SCSI ID Settings" on page xxx. 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 install another drive in the same location. If this resolves the problem, the drive is defective.

If the problem is still not resolved, refer to the Maintenance Guide for the Workstation for more troubleshooting information.


APPA

A

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[1]	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

[1]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

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 MB
– Blocks per drive	237,588
– Block size	512 bytes
Data transfer rate	
– 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
Seek time	8 ms track-to-track 19 ms average 35 ms maximum
Average latency	8.8 ms
Interface	SCSI

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

Temperature range[1]	10°C to 55°C (50°F to 128°F)
Temperature change rate per hour, maximum)	11°C (20°F
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)

[1]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

Internal drive	
– 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)
Capacity	
– Bytes per drive	209.7 MB
– Blocks per drive	409,802
– Block size	512 bytes
Data transfer rate	
– 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
Seek time	5 ms track-to-track 16 ms average 35 ms maximum
Average latency	8.3 ms
Interface	SCSI

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

Temperature range[1]	10°C to 55°C (50°F to 131°F)
Temperature change rate per hour, maximum)	11°C (20°F
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)

[1]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)

RZ25 SCSI Hard Disk Drive Equipment Specifications

Table A-10. RZ25 SCSI 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 MB
- Blocks per drive	832,527
- Block size	512 bytes
Data transfer rate	
- Bus asynchronous mode	3.0 MB per second
- Bus synchronous mode	4.0 MB per second
- To and from media	2.1–3.2 MB per second
Seek time	2.5 ms track-to-track 14 ms average 26 ms maximum
Average latency	6.8 ms
Interface	SCSI

Table A-11. RZ25 SCSI Hard Disk Drive Operating Conditions

Temperature range[1]	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)

[1] 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-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

Internal drive	
– 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[1]	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

[1]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°C (−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

RRD42-AA	
– 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[1]	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)

[1]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	10to 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

Internal drive	
– 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
Capacity	
– 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
Data transfer rate	
– 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[1]	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)

[1]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)


APP B

B

Part Numbers

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

Table B-1. Basic Components

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

Table B-2. Cords, Cables, and Connectors

Item	Part Number	Order Number
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

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

APPENDIX C

C

Connector Pin Assignments

This appendix lists pin assignments for the following connectors:

- SCSI cable
- TCE interface

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

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