
CUSTOMER
LETTER

April 1991

digital™

DECstation 5000 Model 200 Customer Letter

EK-368AA-CL-003

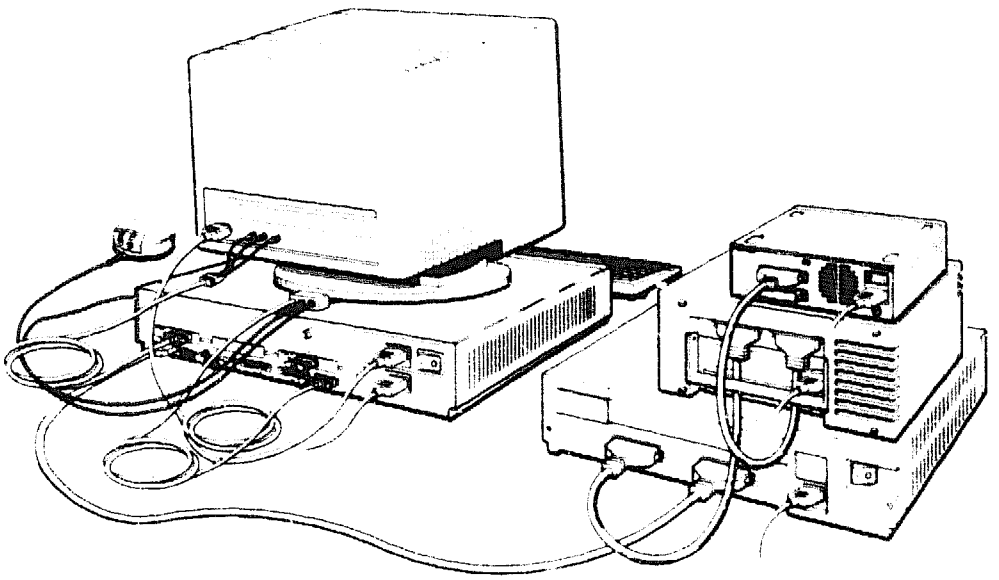
Dear Customer:

Congratulations on receiving your DECstation 5000 Model 200 workstation. Your high-performance ULTRIX workstation is based on Reduced Instruction Set Computer (RISC) technology and graphics hardware that brings new levels of performance to desktop computing.


REFERENCE
CARD

digital™

DECstation 5000 Model 200 Workstation Reference Card



WSE2R001

Table 1. Boot Commands

Command	Description
boot	Boots using the boot environment variable.
boot 5/tz5/vmunix -a	Boots the system software from the tape drive on the base system SCSI connector set at SCSI unit 5.
boot 5/rz0/vmunix -a	Boots the system software from the optical compact disc drive on the base system SCSI connector set at SCSI unit 0.
boot 6/mop -a	Boots the system software from the network.

Table 2. Configuration Display Commands

Command	Description
cnfg	Displays the general configuration for the base system.
cnfg 0	Displays a detailed configuration for option slot 0.
cnfg 1	Displays a detailed configuration for option slot 1.
cnfg 2	Displays a detailed configuration for option slot 2.
cnfg 5	Displays a detailed configuration for the SCSI connector in option slot 5.
cnfg 6	Displays a detailed configuration for the ThinWire Ethernet connector in option slot 6.
cnfg 7	Displays a detailed configuration for the system and memory modules in option slot 7.

Table 3. SCSI Commands

Command	Description
cnfg 5	Displays all SCSI devices attached to the base system SCSI controller.
init 5	Resets the SCSI devices attached to the base system SCSI controller.
t 5/target 5	Tests the unit on the base system's SCSI controller set to SCSI unit 5.
t 5/target 5 w	Tests the unit on the base system's SCSI controller set to SCSI unit 5. Allows write access during the test.

Table 4. System Commands

Command	Description
init	Resets the system.
passwd	Enters the current password to gain access to privileged console commands.
passwd -s	Sets a new password. The password is in effect after the system is reset.
passwd -c	Clears the existing password.
test	Tests the entire system.
7/pst-t	Tests the base system.
0/pst-t	Tests the hardware connected to option slot 0.
1/pst-t	Tests the hardware connected to option slot 1.
2/pst-t	Tests the hardware connected to option slot 2.
5/pst-t	Tests the hardware connected to the SCSI connector (base slot 5).
6/pst-t	Tests the cable connected to the ThinWire Ethernet connector (base slot 6).

Table 5. Environment Variables

Command	Description
printenv	Displays the value of environment variables.
setenv *variable value*	Sets the value of an environment variable.
unsetenv *variable value*	Deletes an environment variable.

Variable	Description
boot	The default bootpath specification. Possible values include 5/rz0/vmunix, 5/tz5, 6/mop, and 6/tftp.
testaction	Selects the level of self-test to be executed automatically. Possible values are **q** for brief tests and **t** for more thorough tests.
haltaction	Specifies what action the console will perform upon powerup or following a reset. Possible values are h = halt, r = restart and b = bootstrap.
console	Specifies which device is to be used as the console terminal. Value s = use printer port; value 0 = auto configure the console. Use the communications adapter (H8571A) that comes with the workstation to attach the console terminal to the workstation.

Table 6. SCSI ID Switch Settings

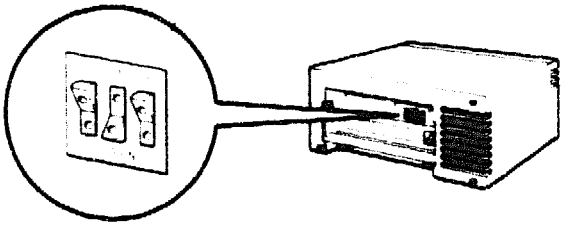
ID Number	Hard Disk Drive RRD40 Compact Disc Drive[1] TZ30 Tape Drive[2]	TK50Z Tape Drive TLZ04 Tape Drive[3] RX23, RX33 Floppy Disk Drive
7	Reserved	Reserved
6	Up Up Down	Down Down Up
5	Up Down Up	Down Up Down
4	Up Down Down	Down Up Up
3	Down Up Up	Up Down Down
2	Down Up Down	Up Down Up
1	Down Down Up	Up Up Down
0	Down Down Down	Up Up Up

[1]Switch 4 on the RRD40 optical compact disc drive has no effect on the ID number.

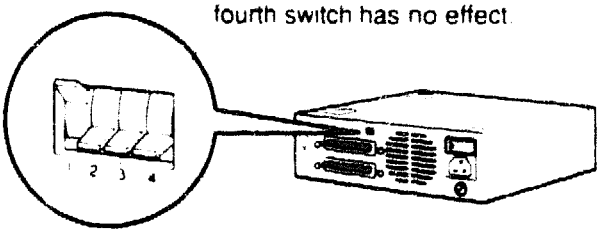
[2]Switch 1 (the left switch) on the TZ30 tape drive should always be in the up position. ID switch settings listed for this drive start with switch 2.

[3]Switch 1 (the left switch) on the TLZ04 tape drive should always be in the up position. ID switch settings listed for this drive start with switch 2.

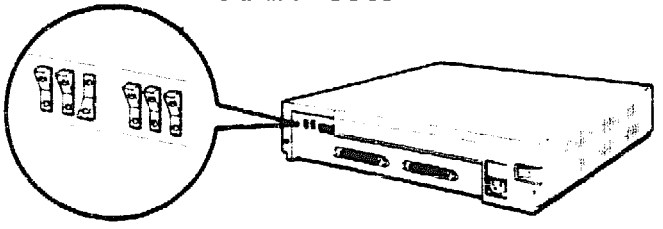
TKZ50Z tape drive expansion box SCSI switches set for ID numbers 5 (down up down).



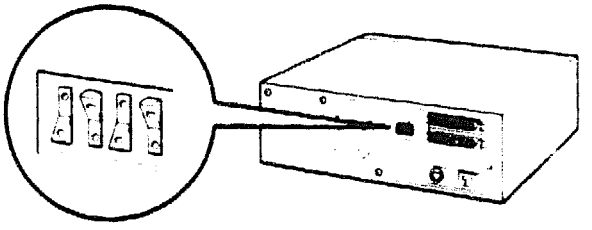
RRD40 optical compact disc drive expansion box SCSI switches set for ID number 4 (up down down). Note that the position of the fourth switch has no effect.



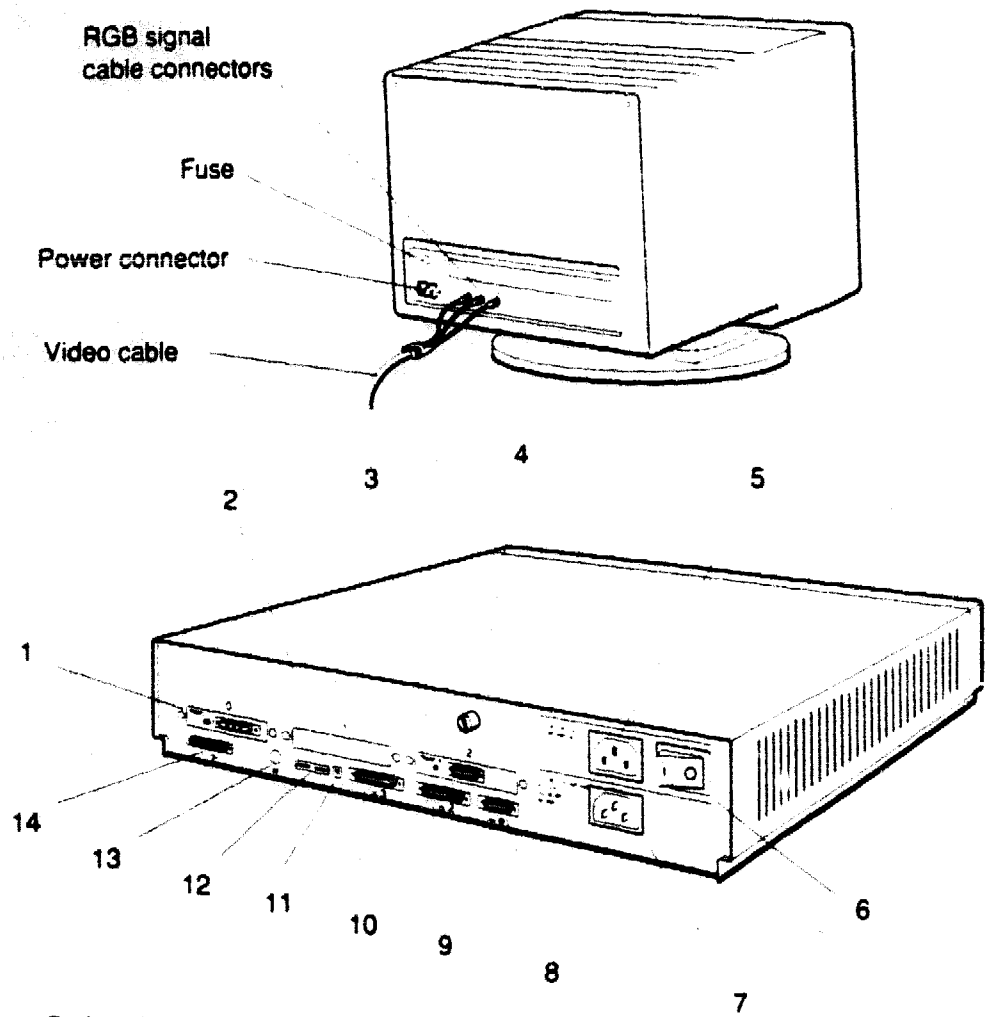
BA42 storage expansion box hard disk SCSI switches set for ID numbers 1 (down down up) on the left, and 0 (down down down) on the right. For SCSI switch settings for floppy disk and tape drives, see the BA42 Installation Guide.



TLZ04 tape drive expansion box SCSI switches set for ID number 5 (down up down beginning with the second switch). The first switch should always be in the up position.

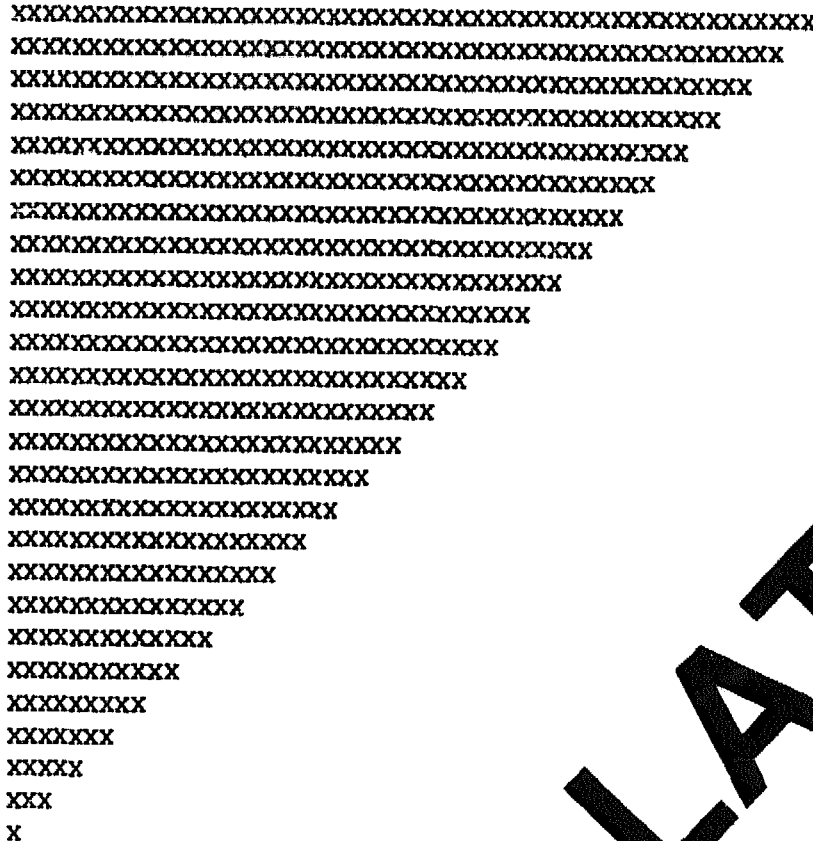


WSE21133

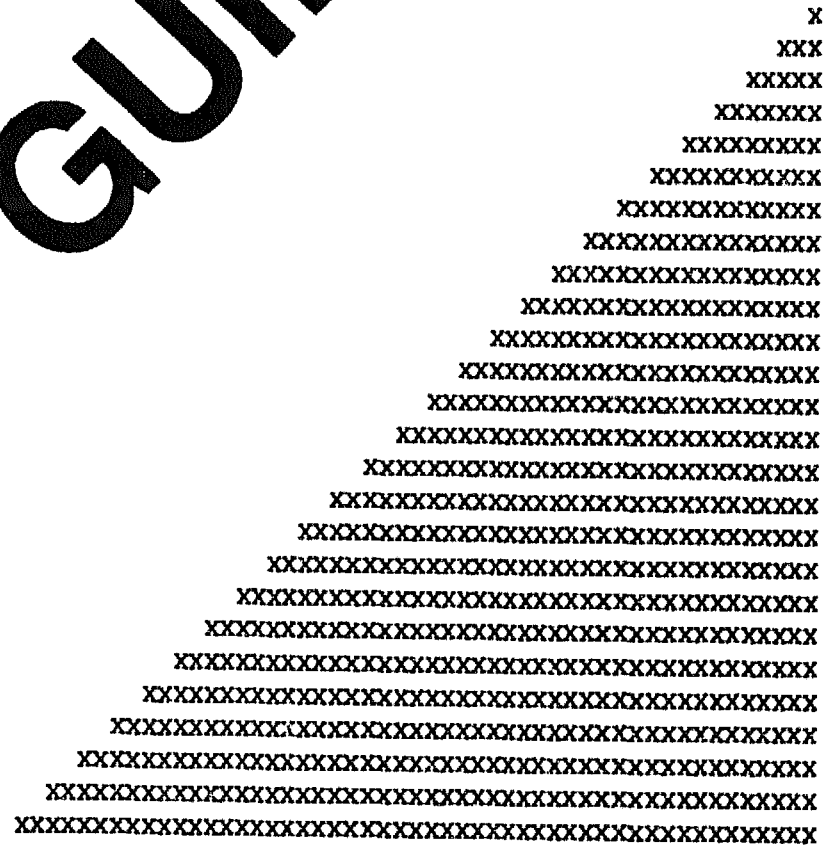


1. Option slot 0 with a color frame buffer connector in place
2. Option slot 1
3. ThickWire Ethernet connector
4. Cover-release screw
5. Monitor-to-system-unit power connector
6. On/off switch
7. System unit power connector
8. Keyboard-mouse connector
9. Communications connector
10. Communications connector
11. Reset button
12. Diagnostic indicator lights
13. ThinWire Ethernet connector
14. Small computer system interface (SCSI) connector

WSE2R002



INSTALLATION GUIDE



digital™

DECstation 5000 Model 200 Hardware Installation Guide

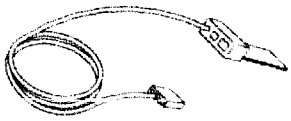
EK-365AA-IN-003

Cords, cables, terminators, adapters, and connectors on the system unit and expansion boxes

Power cord

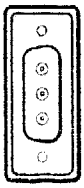
ThinWire T-connector
with two ThinWire terminators

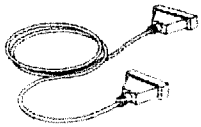
Monitor-to-system-unit
power cable



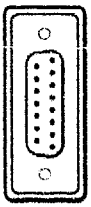
Keyboard-mouse cable

Color video cable assembly





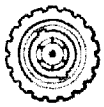
ThickWire Ethernet cable



Gray scale
video cable assembly

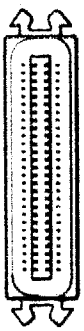
ThickWire Ethernet loopback connector

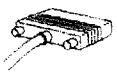
System-unit-to-
expansion-box cable



Monochrome video cable assembly

18-inch box-to-box
expansion cable

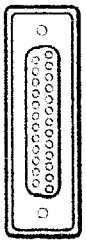




Communication device
cable connector

Expansion-box terminator

Communications
connector adapter



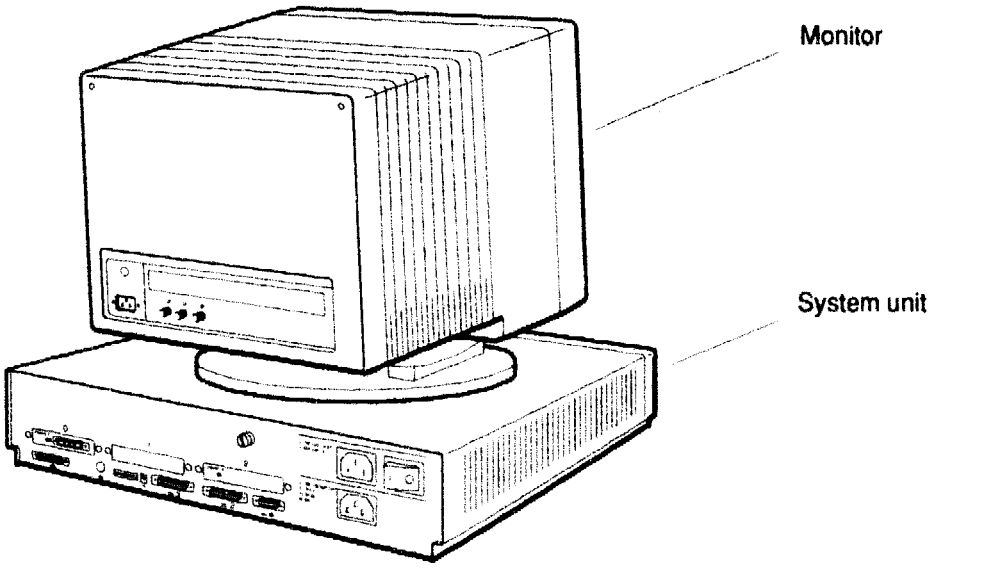
Serial cable for console terminal

Set up the system unit and monitor.

Warning: *It takes two people to unpack the monitor, system unit, and BA42 storage expansion box safely.*

Cautions: *Placing the system unit on its side blocks air vents and causes the unit to overheat.*

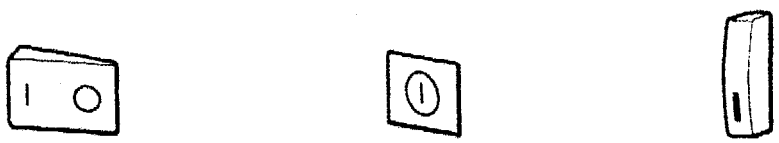
Placing the monitor near electromagnetic devices, such as printers or electric pencil sharpeners, or near magnetized objects, such as filing cabinets or steel beams in walls, can interfere with its performance.



WSE2I090

Be sure the on/off switches on the system unit and monitor are in the off position.

Press the 0 on the on/off switch on the system unit, the VRT16-D color monitor, the VRT19-D color monitor, the VR262 gray-scale monitor, and the VR297 color monitor. Press and release the on/off switch on the VR299 color monitor. Press the switch in and release it to turn off the VR319 monochrome monitor.



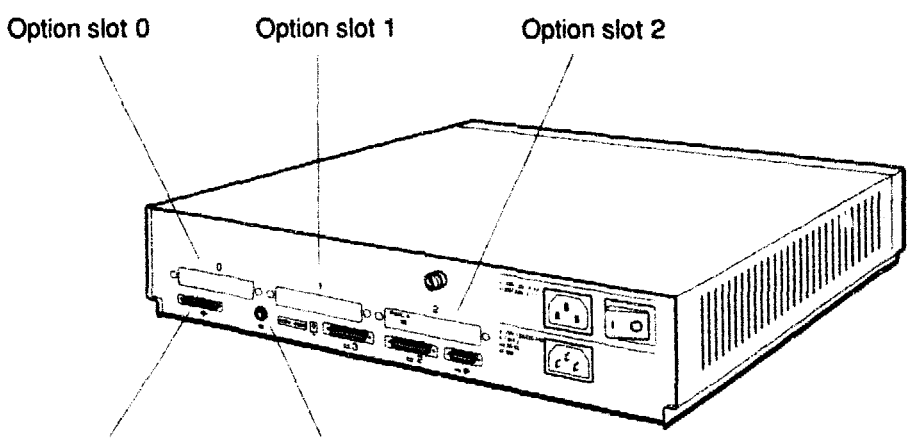
Press the 0 on this type of switch.

Press and release this type of switch.

Press this type of switch in.

WSE2I101

Familiarize yourself with base system slots 5 and 6 and with the three option slots on the back of the system unit.



Base system slot 5 contains the SCSI connector for the base workstation configuration.

Base system slot 6 contains the ThinWire Ethernet connector for the base workstation configuration.

WSE2I074

The basic workstation comes with a SCSI connector in base slot 5 and a ThinWire Ethernet connector in base slot 6 on the system unit.

You can have option modules in option slots 0, 1, and 2.

Direct memory access priority for the option slots is as follows:

- Slot 2—Highest priority. Use this slot to connect hardware you want to access memory first.
- Slot 1—Next highest priority.
- Slot 0—Lowest priority.

Set up any expansion boxes.

You can connect up to seven SCSI devices to a SCSI connector on the system unit so long as the amount of internal and external cabling does not exceed 6 meters (236 inches) in length.

Caution: *Using more than 6 meters of cable, including cable inside expansion boxes, to connect devices to a given SCSI connector on the system unit can make those devices unreliable.*

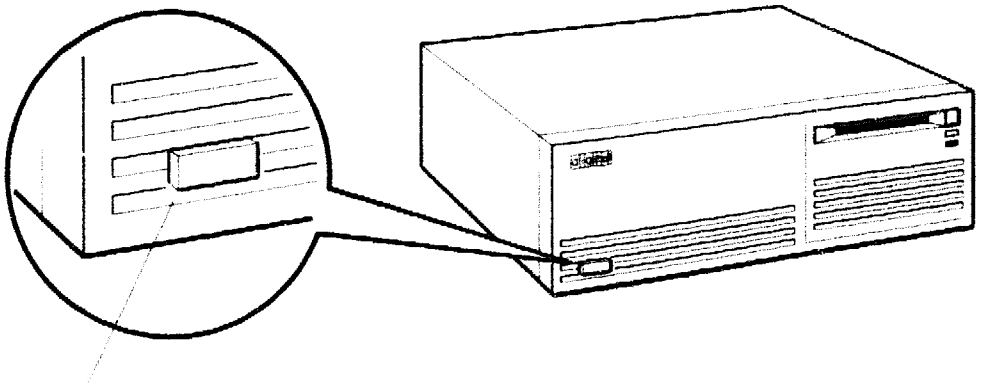
When you stack your storage device expansion boxes, use the following table to determine how much cable you will be using.

Cable	Length
BA42 storage expansion box internal cable	78.7 cm (31 in)
TK50Z tape drive internal cable	35.6 cm (14 in)
RRD40 optical compact disc drive internal cable	16.5 cm (6.5 inches)
TLZ04 tape drive internal cable	96.5 cm (38 in)
50-pin to 50-pin box-to-box external cable	66.0 cm (26 in)
68-pin to 50-pin system-unit-to-expansion-box external cable	188.0 cm (74 in)

Be sure expansion box on/off switches are in the off position.

Press the 0 on the on/off switch on the BA42 storage expansion box, the TK50Z tape drive expansion box, and the RRD40 optical compact disc drive expansion box.

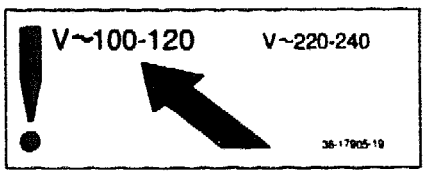
Press and release the on/off switch on the TLZ04 tape drive to turn it on and off.

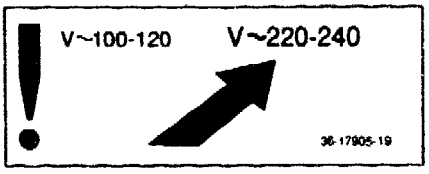


Check voltage requirements.

The voltage for many devices, including most monitors, must match that of your power source. Where necessary, a yellow voltage label that covers the power connector on your device tells you 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.*

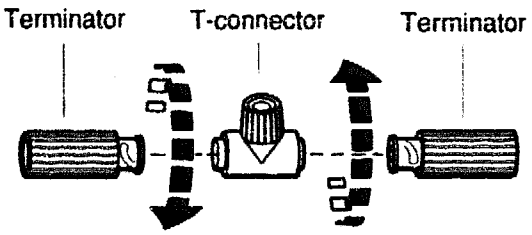




WSE2I021

Terminate ThinWire Ethernet.

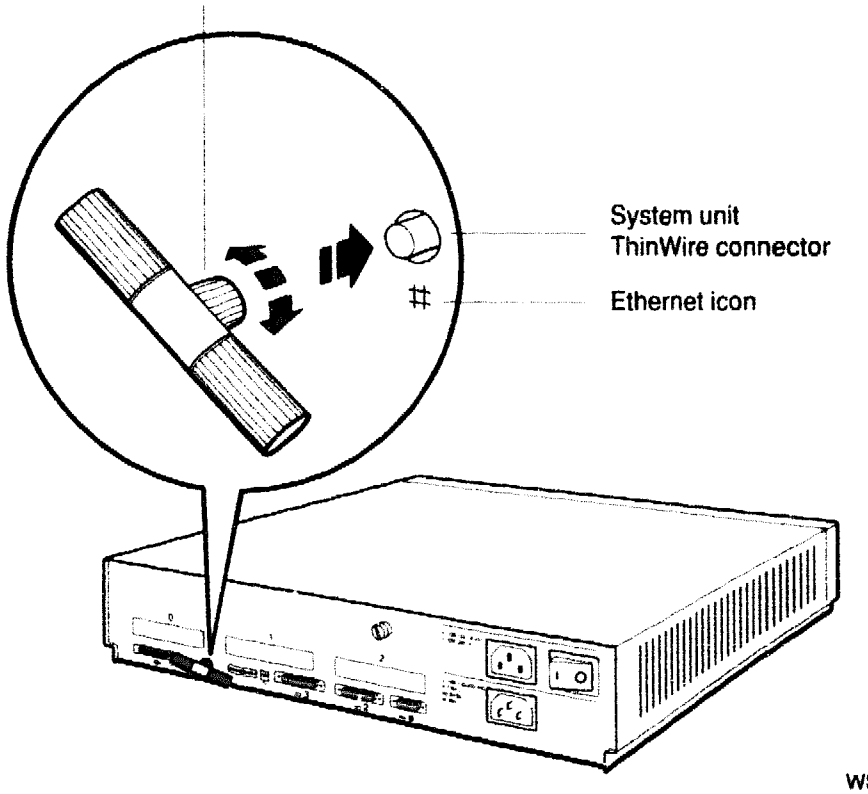
First terminate the ThinWire T-connector.



WSE2I089

Then connect the T-connector to the ThinWire connector in base slot 6 on the system unit.

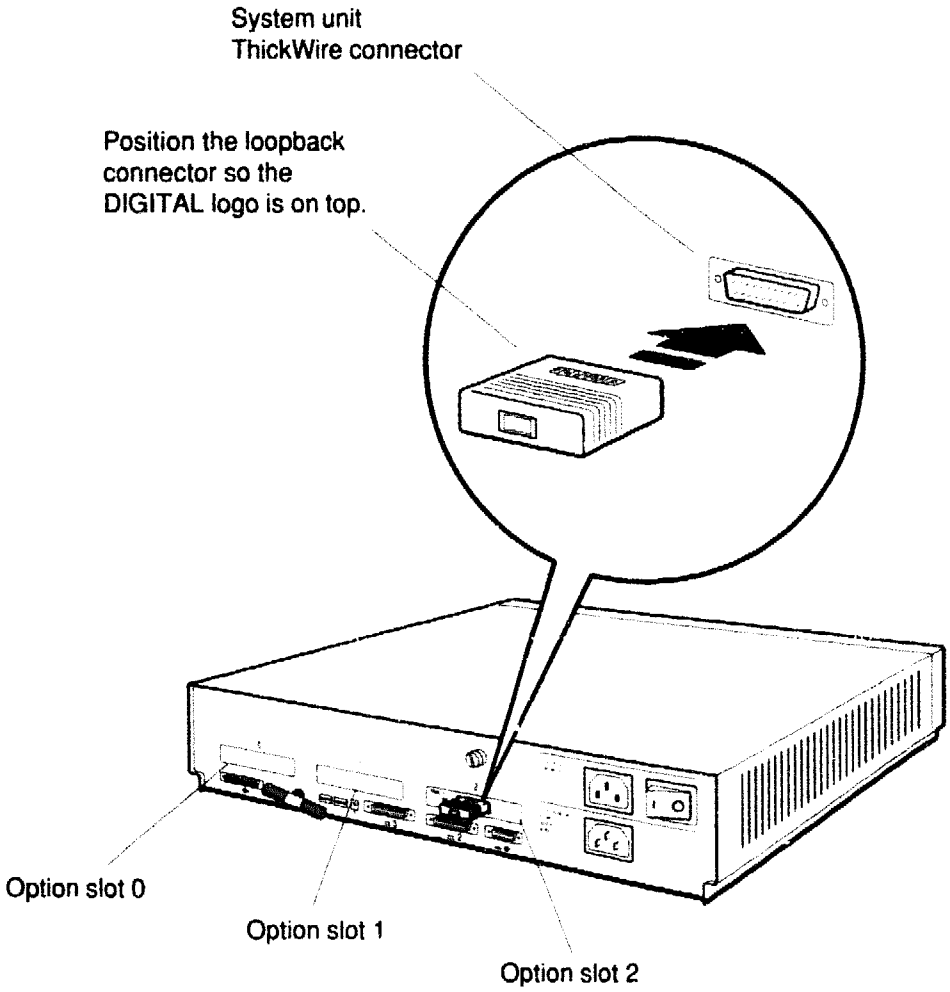
Twist the ribbed portion of the T-connector from side to side until you can push it into the system unit connector. Then turn it to the right until it locks into place.



WSE2I071

Attach any ThickWire loopback connectors.

Optional ThickWire Ethernet connectors can be present in any of the option slots on the back of the system unit. Each must have a loopback connector in place until the Ethernet cable is connected to the system unit and the network.



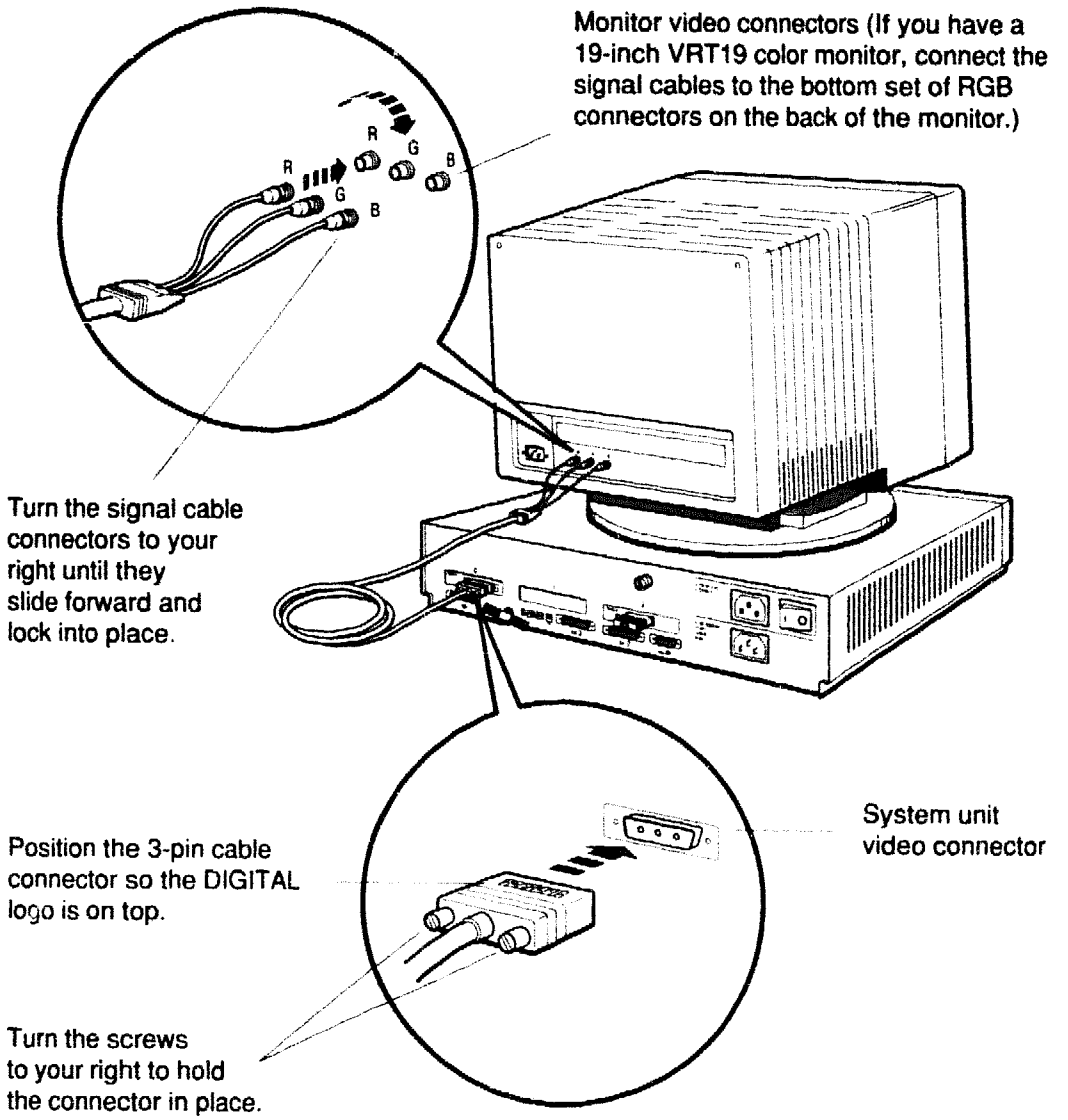
WSE2I073

Connect the monitor to the system unit.

To connect a gray-scale monitor, turn to page 10. To connect a monochrome monitor, turn to page 11.

To connect a color monitor

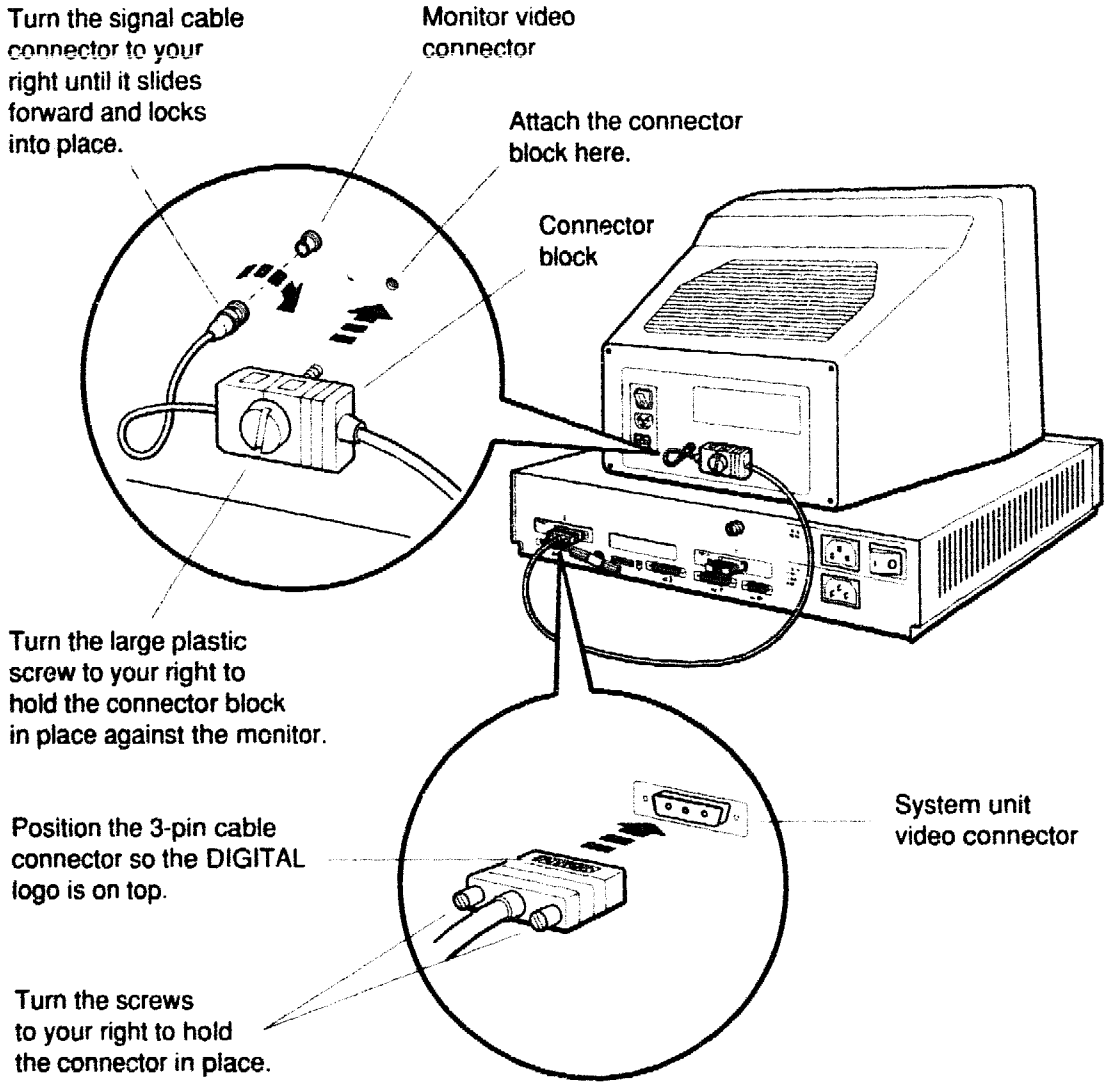
Connect the RGB signal cables on the video cable assembly to the monitor. Then connect the 3-pin connector to the video connector on the system unit.



WSE2I069

To connect a gray-scale monitor

First attach the round signal cable connector on the video cable assembly to the monitor and the 3-pin connector to the video connector on the system unit. Then attach the connector block to the back of the monitor.



WSE2I086

To connect a monochrome monitor

Connect the slotted signal cable connector on the video cable assembly to the round connector on the back of the monitor, and the threaded signal cable connector to the video option connector on the back of the system unit.

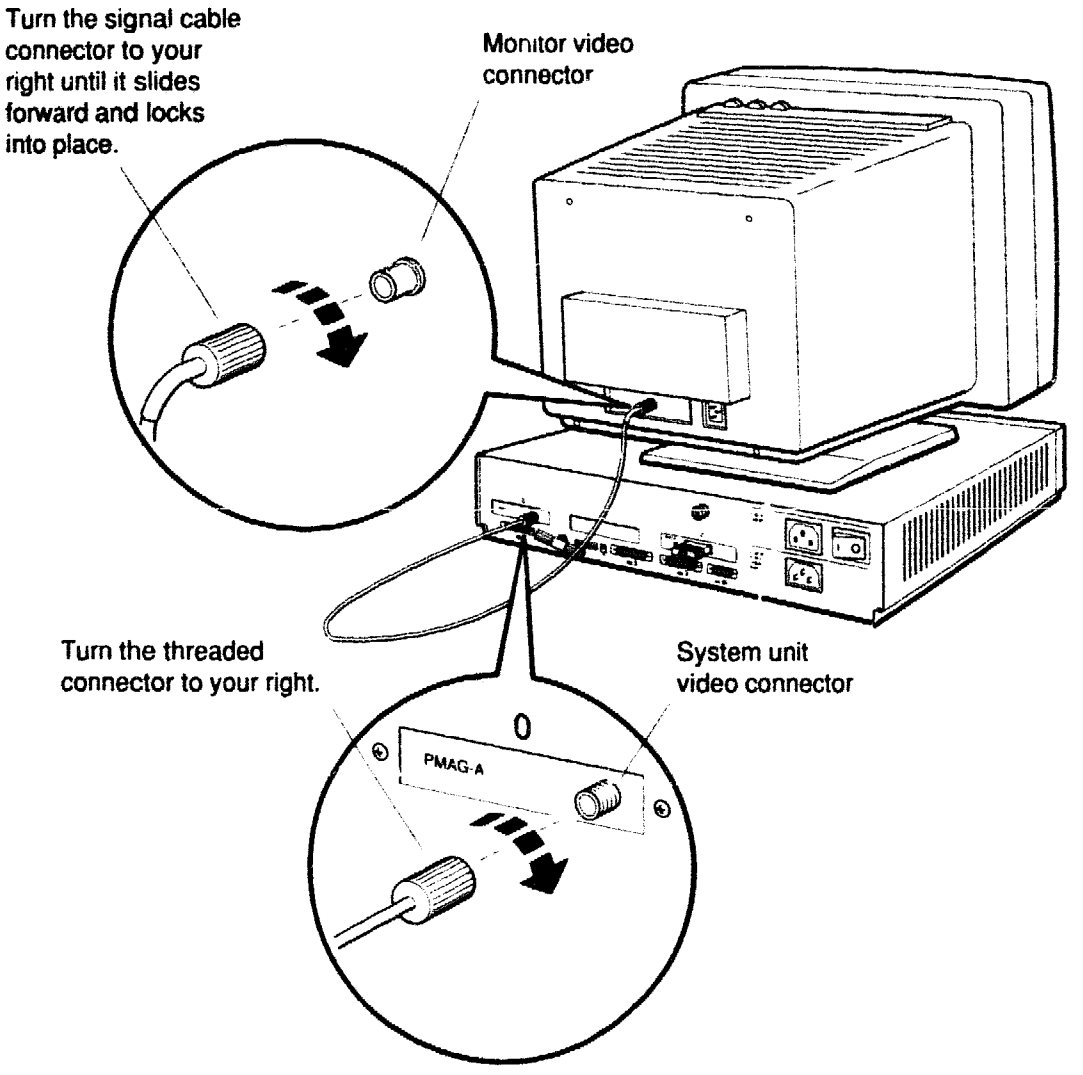
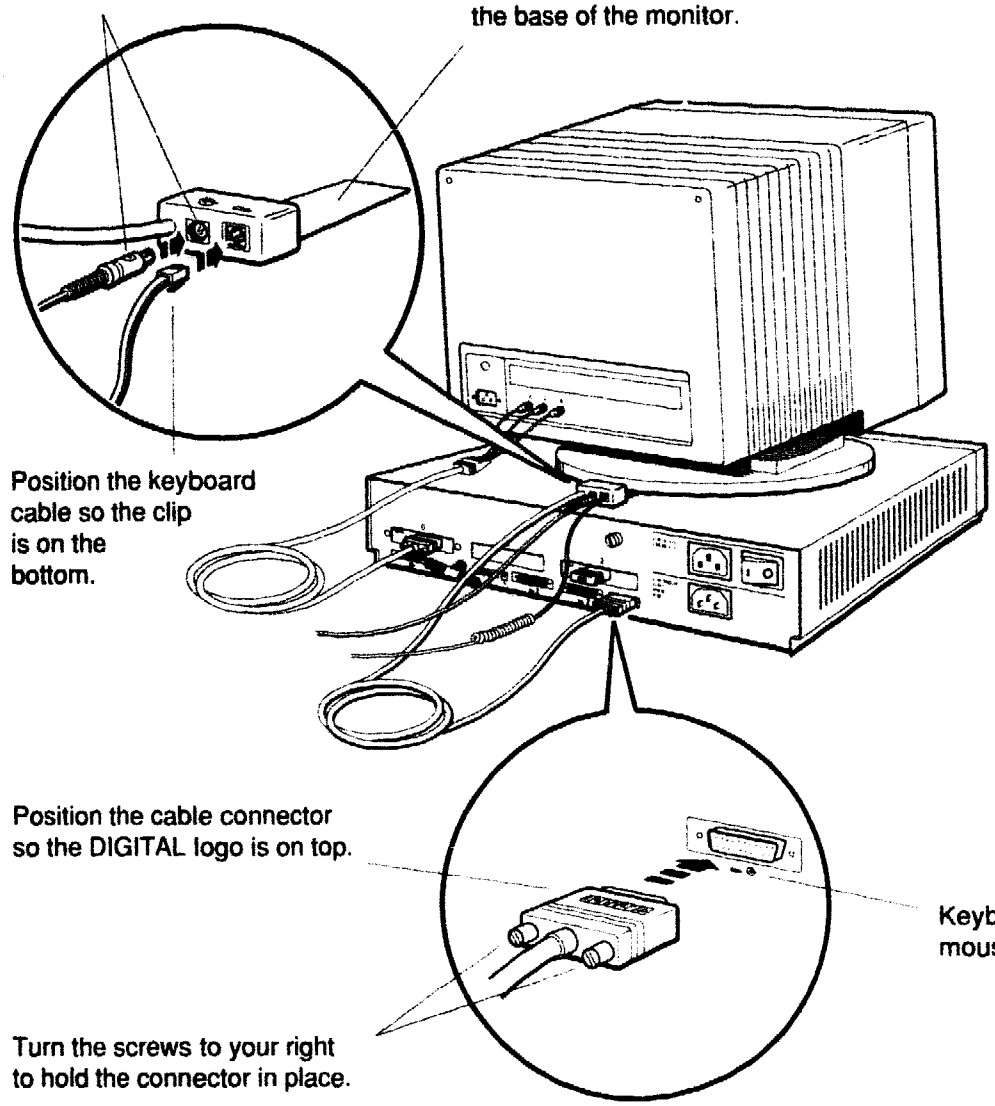


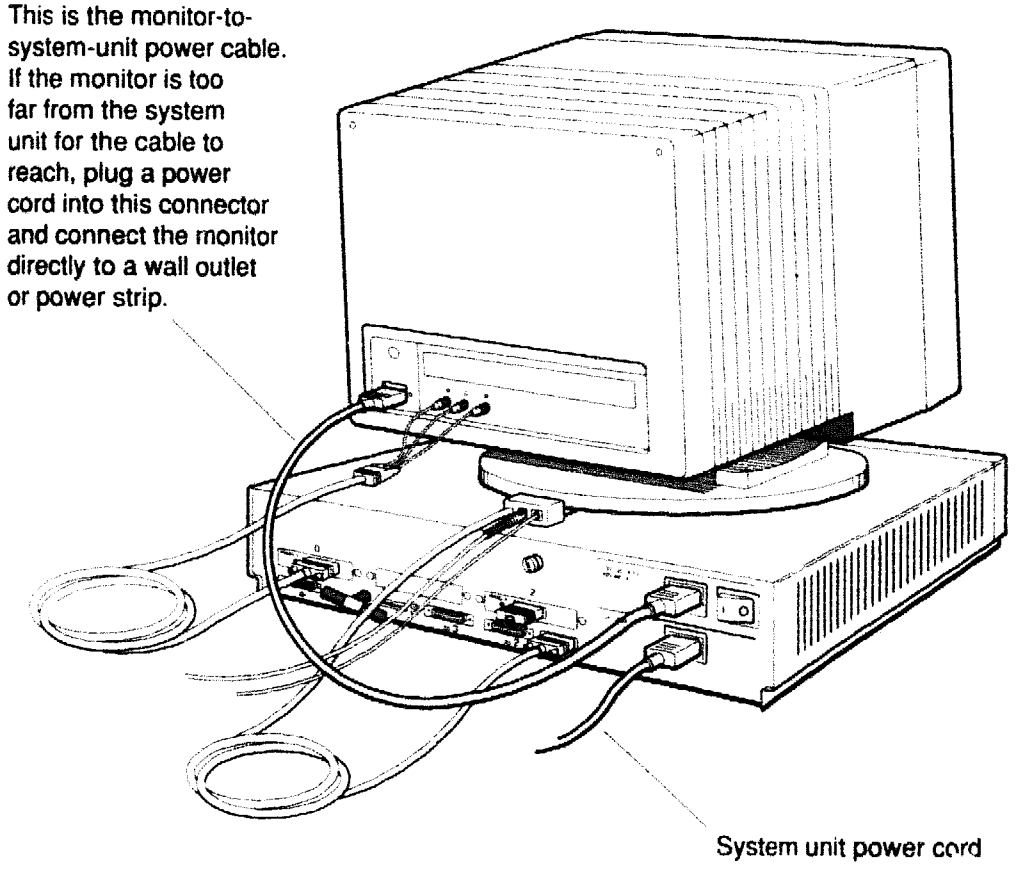
Figure 1. Connecting a monochrome video cable to the system unit

Connect the keyboard and the mouse or tablet to the connector block.



WSE2I070

Connect the system unit power cord and the monitor-to-system-unit power cable or monitor power cord.



WSE2I072

Turn on the monitor and system unit and set the keyboard language.

Turn on the monitor and then the system unit.

If you have multiple monitors connected to your workstation, the monitor in the option slot with the lowest number is the system console. This monitor displays all system test information.

When the system unit completes the power-up self-test successfully, the following language menu appears on the screen:

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

(1..16): _
```

At the language prompt [`(1..16): _`], type the number displayed to the left of the language of your choice. Then press Return. When the language has been set, the console prompt (>>) appears on the screen.

If anything other than a language menu appears, if no display at all appears on your screen when you turn on the system unit and monitor, or if anything other than the console prompt (>>) appears after you set the language, see Chapter 9 of the *DECstation 5000 Model 200 Hardware Operator's Guide* for troubleshooting instructions.

Run the system self-test.

When the system power-up self-test has completed successfully, the console prompt (>>) appears on the screen. To run the system self-test, type **test** at the console prompt and press Return.

As the system performs the subtests that make up the system self-test, the subtest being performed is briefly identified in a display in the lower-left corner of the screen. When the system self-test has completed successfully, the console prompt (>>) appears on the screen.

If the console prompt is not displayed, or if anything in addition to the console prompt appears on the screen at this point, see Chapter 9 of the *DECstation 5000 Model 200 Hardware Operator's Guide* for troubleshooting instructions.

Check your workstation configuration.

To be sure your option and memory modules have been installed correctly and are working properly, type **cnfg** at the console prompt (>>) and press Return. A display similar to the following appears on the screen:

```
>>cnfg
7: KN02-AA   DEC    V5.3a     TCF0    ( 24 MB)
6: PMAD-AA   DEC    V5.3a     TCF0    (enet: 08-00-2b-0f-45-72)
5: PMAZ-AA   DEC    V5.3a     TCF0    (SCSI = 7)
2: PMAD-AA   DEC    V5.3a     TCF0    (enet: 08-00-2b-0f-45-31)
1: PMAZ-AA   DEC    V5.3a     TCF0    (SCSI = 7)
0: PMAG-BA   DEC    V5.3a     TCF0    (CX -- d=8)
>>
```

The number that begins each line in the configuration display represents the number of a base slot or an option slot that contains a module.

Look at the lines that begin with `0:`, `1:`, and `2:`. These lines represent the option slots on the system unit. In the sample display, all three option slots contain option modules. Note that if an option slot is empty, it does not appear on the configuration display.

The letters in parentheses at the end of each slot display line show what kind of option module is present in that slot.

- `MX` shows that the module in that slot is a monochrome frame buffer.

  A monochrome frame buffer can be installed in any of the three option slots. If you have more than one monochrome frame buffer module installed in your system, the configuration display appears on the monitor connected to the module in the lowest-numbered option slot.

- `CX` shows that the module in that slot is a color frame buffer.

  A color frame buffer can be installed in any of the three option slots. If you have more than one color frame buffer module installed in your system, the configuration display appears on the monitor connected to the module in the lowest-numbered option slot.

- `PX` shows that you have a 2D graphics module.

  A 2D graphics module can be installed in option slot 0 or 1.

- `DA: PXG` shows that you have a low 3D graphics module.

  The following is a sample configuration display for a low 3D graphics module:

```
1: PMAG-DA  DEC     T5.1A  TCF0 (DA: PXG -- D=8, Z=24)
```

  A low 3D graphics module is installed in option slots 0 and 1 and is displayed in option slot 1.

- `EA: PXG` shows that you have a mid 3D graphics module.

  The following is a sample configuration display for a mid 3D graphics module:

```
1: PMAG-DA  DEC     T5.1A  TCF0  (EA: PXG -- D=8, Z=24)
```

  A mid 3D graphics module is installed in option slots 0 and 1 and is displayed in option slot 1.

- `FA: PXG_T` shows that you have a high 3D graphics module.

  A high 3D graphics module is installed in all three option slots and is displayed in option slot 1.

- `SCSI` shows that you have a SCSI option module.

  A SCSI module can be installed in any of the three option slots.

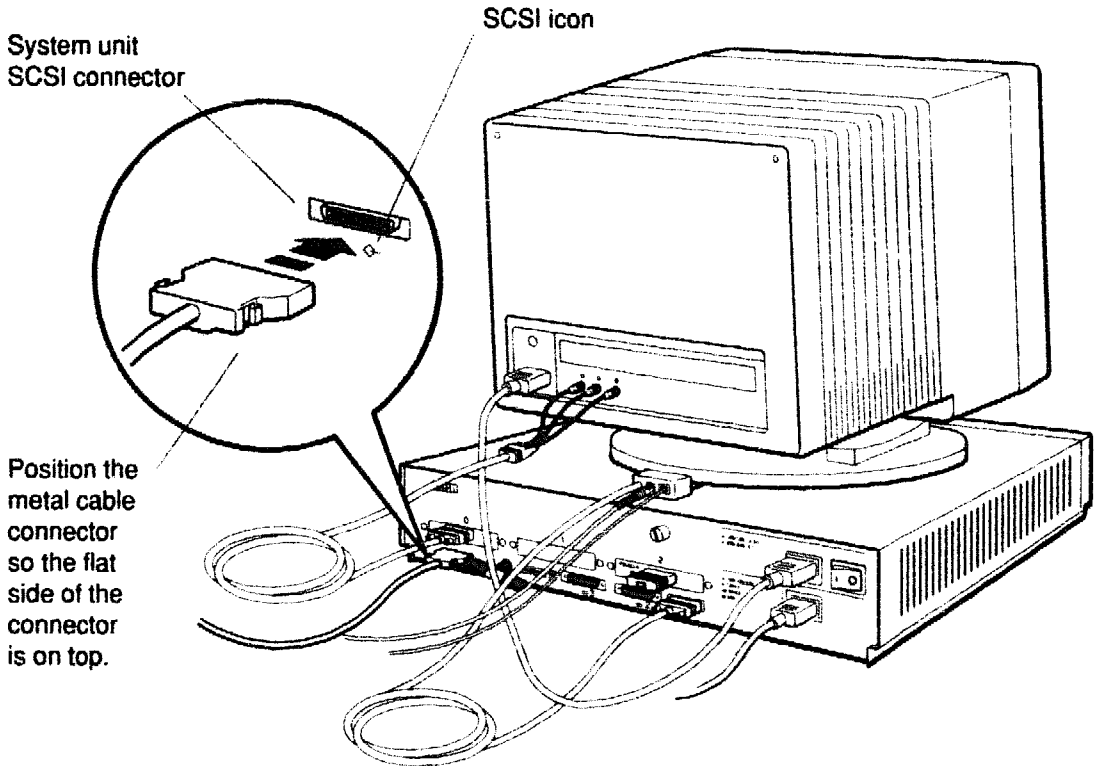
- `enet:` shows that you have a ThickWire Ethernet option module.

  A ThickWire module can be installed in any of the three option slots.

If the modules you ordered for your workstation do not appear on the configuration display, turn to Chapter 9 of the *DECstation 5000 Model 200 Hardware Operator's Guide* for troubleshooting instructions.

Connect a system-unit-to-expansion-box cable to each SCSI connector on the system unit.

Turn off the system unit and any expansion boxes.



WSE2I131

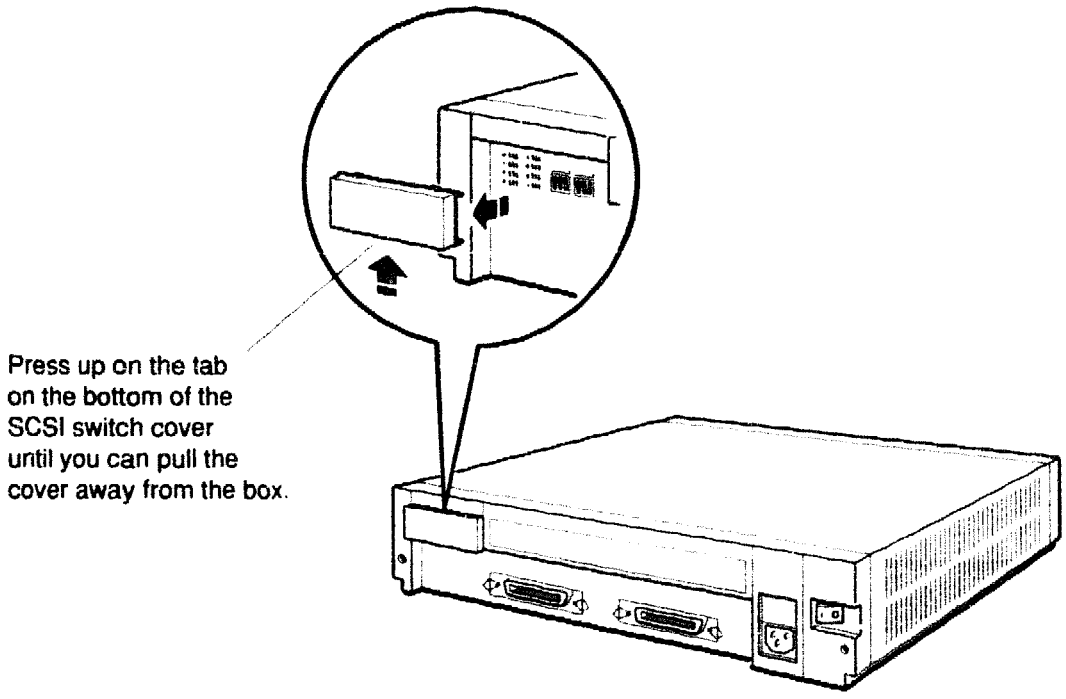
Set SCSI ID switches on storage device expansion boxes.

Each expansion device connected to a SCSI connector must be assigned a SCSI ID number for that connector.

The back of each expansion box has switches that you use to set the SCSI ID number for the drive or drives inside that box, except for floppy disks and tape drives inside a BA42 expansion box.

SCSI ID switches for these drives are located directly on the drives. Set the switches on the drives themselves instead of the switches on the expansion box.

SCSI switches on the BA42 storage expansion box are protected by a plastic cover that must be removed before you can set the switches. Use these switches to set ID numbers for hard disk drives inside the box.



WSE2I063

ID numbers available for expansion devices are 0 through 6. When assigning numbers, assign ID 0 to the device that connects directly to the system unit, assign ID 1 to the next device, and so on.

Note: *Be sure to assign a different ID number to each drive connected to a given SCSI option module. If two drives have the same number, the workstation does not recognize the drives correctly.*

If you have a BA42 storage expansion box, consider the drive on the right side of the box as you face the back of the box to be closer to the system unit than the one on the left.

Use the switch settings listed in the following table to set the SCSI switches on the backs of your expansion boxes. Remember that SCSI ID switches for floppy disk and tape drives inside a BA42 are located directly on the drives. Set the switches on the drive itself instead of the switches on the expansion box.

ID Number	Hard Disk Drive RRD40 Compact Disc Drive[1] TZ30 Tape Drive[2]	TK50Z Tape Drive TLZ04 Tape Drive[3] RX23 Floppy Disk Drive RX33 Floppy Disk Drive
7	Reserved	Reserved
6	Up Up Down	Down Down Up
5	Up Down Up	Down Up Down
4	Up Down Down	Down Up Up
3	Down Up Up	Up Down Down
2	Down Up Down	Up Down Up
1	Down Down Up	Up Up Down
0	Down Down Down	Up Up Up

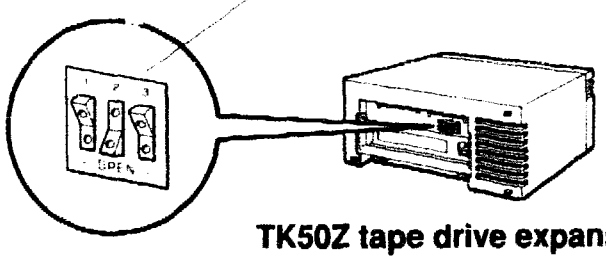
[1]Switch 4 on the RRD40 optical compact disc drive has no effect on the ID number.

[2]Switch 1 (the left switch) on the TZ30 tape drive should always be in the up position. ID switch settings listed for this drive start with switch 2.

[3]Switch 1 (the left switch) on the TLZ04 tape drive should always be in the down position. ID switch settings listed for this drive start with switch 2.

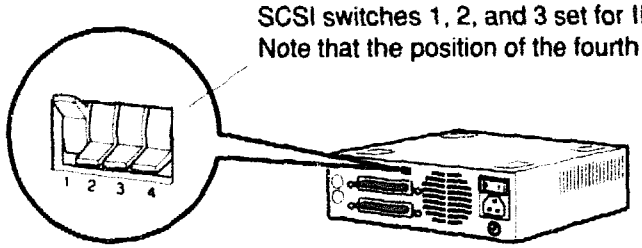
The following are sample switch settings for the four types of expansion boxes.

SCSI switches set for ID number 5 (Down Up Down).



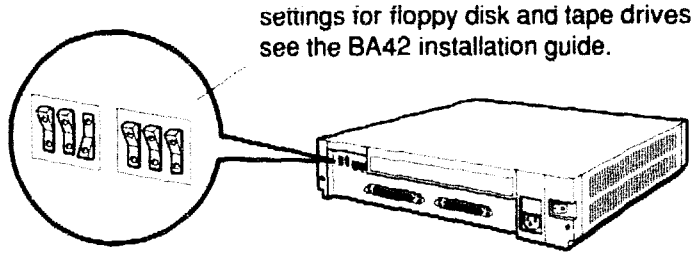
TK50Z tape drive expansion box

SCSI switches 1, 2, and 3 set for ID number 4 (Up Down Down). Note that the position of the fourth switch has no effect.



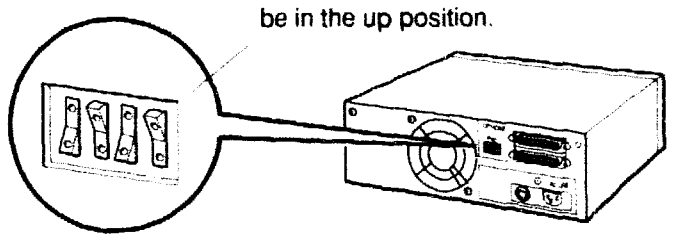
RRD40 optical compact disc drive expansion box

Hard disk drive SCSI switches set for ID numbers 1 (Down Down Up) on the left and 0 (Down Down Down) on the right. For SCSI switch settings for floppy disk and tape drives inside this box, see the BA42 installation guide.



BA42 storage expansion box

SCSI switches set for ID number 5 (Down Up Down beginning with the second switch). The first switch should always be in the up position.

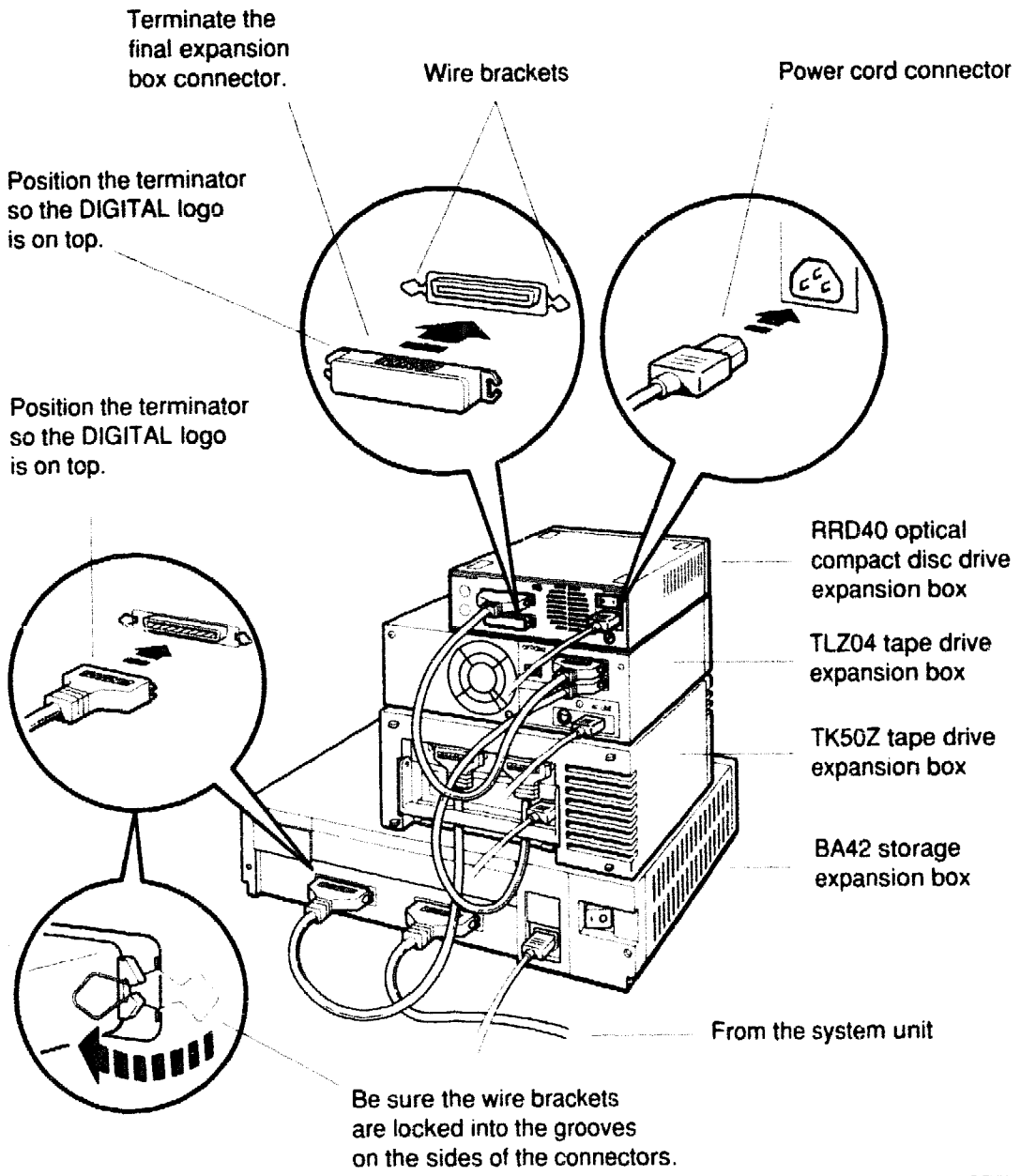


TLZ04 tape drive expansion box

WSE2I075

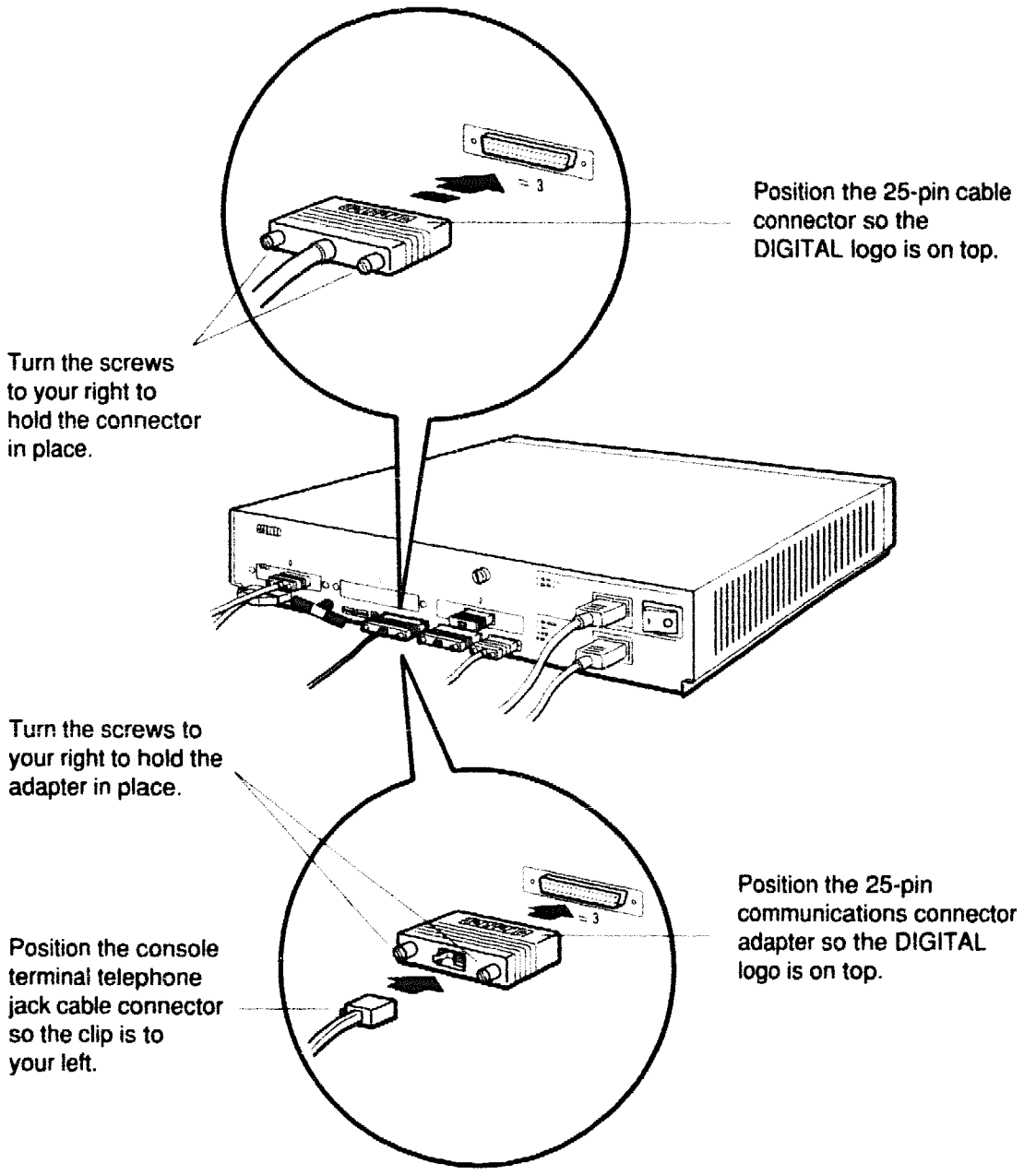
Connect expansion boxes.

Connect the system-unit-to-expansion-box cable and any box-to-box cables. Then connect a power cord to each expansion box.



Connect optional communication devices.

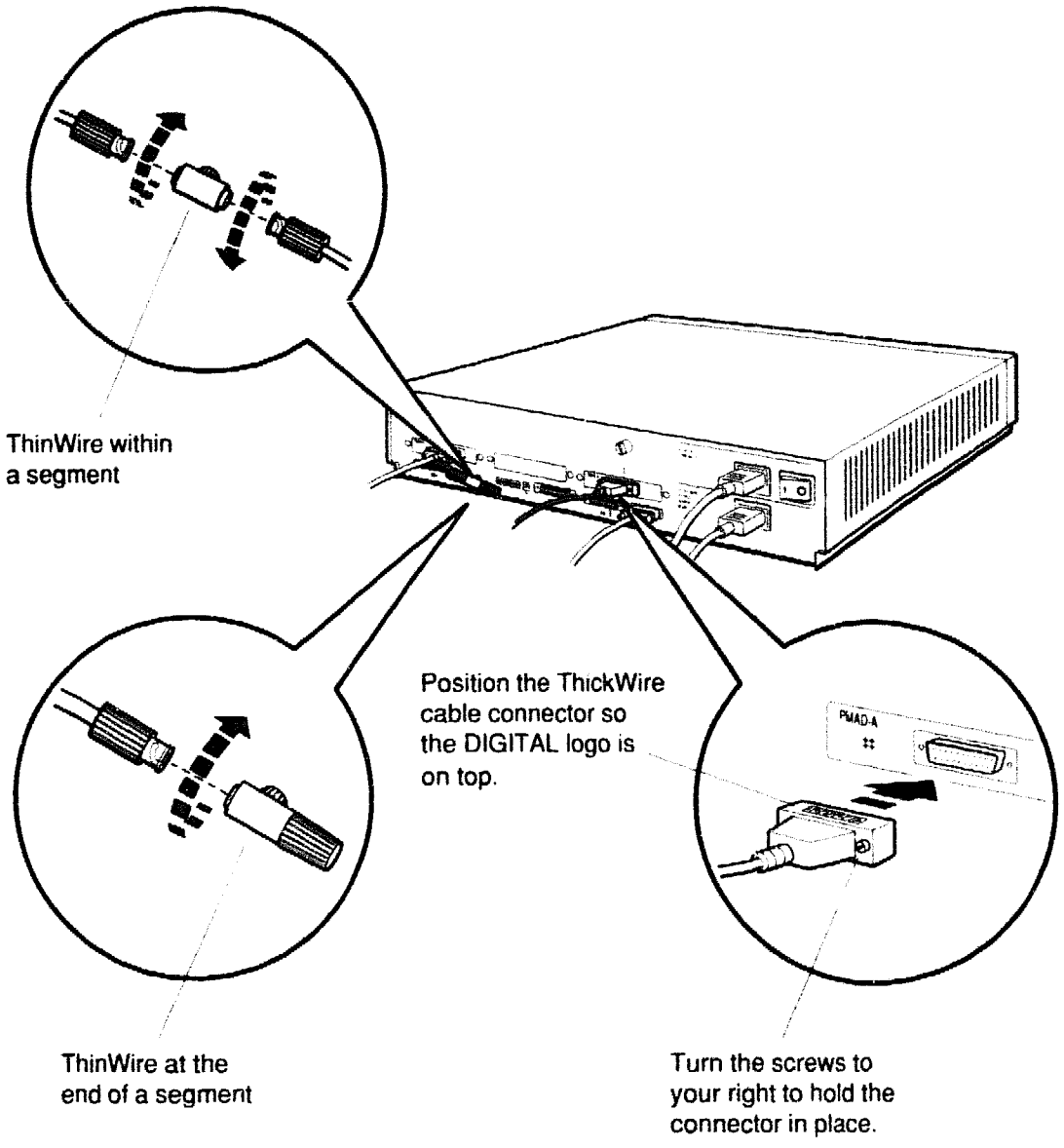
If a communication device cable has a 25-pin cable connector on one end, connect the cable directly to the system unit. If it has a modular connector on one end, use a communications connector adapter to connect the cable to the system unit.



Connect any Ethernet cables to the system unit.

Remove any ThinWire terminators and ThickWire loopback connectors if necessary. To remove ThinWire terminators, twist the left-hand terminator away from you and the right-hand terminator toward you until you can pull them away from the T-connector.

Then attach the cable connector.



Turn on the workstation and run the system self-test.

Turn on the monitor and any expansion boxes, and then turn on the system unit.

When the system has completed the power-up self-test successfully and the console prompt (>>) appears on the screen, run the system self-test. Type **test** at the console prompt and press Return.

If you have multiple monitors connected to your workstation, the monitor in the lowest-numbered option slot displays all system test information.

If anything but the console prompt appears on the screen at the end of the system self-test, refer to Chapter 9 of the *DECstation 5000 Model 200 Hardware Operator's Guide* for troubleshooting instructions.

If the workstation will not be on a network, prepare to install the worksystem software as described on page 27.

If the workstation will be on a network, turn to page 26 and find your Ethernet station address.

To find your Ethernet station address

Type **cnfg** at the console prompt (>>) and press Return.

A display similar to the following appears on the screen:

```
>>cnfg
7: KN02-AA  DEC   V5.3a    TCF0   ( 24 MB)
6: PMAD-AA  DEC   V5.3a    TCF0   (enet: 08-00-2b-0f-45-72)
5: PMAZ-AA  DEC   V5.3a    TCF0   (SCSI = 7)
2: PMAD-AA  DEC   V5.3a    TCF0   (enet: 08-00-2b-0f-45-31)
1: PMAZ-AA  DEC   V5.3a    TCF0   (SCSI = 7)
0: PMAG-BA  DEC   V5.3a    TCF0   (CX -- d=8)
>>
```

In this display, lines that contain `enet:` show Ethernet station addresses. The number of the option slot containing that Ethernet connector appears at the beginning of the line.

The sample display shows two Ethernet station addresses:

- The line that starts with `6:` contains the first Ethernet address. The first section of the display shows that the Ethernet connector with this address is in base slot 6.
- The second Ethernet address appears on the line that starts with `2:`. The Ethernet connector with this address is in option slot 2.

Once you know your Ethernet station address, have your system manager connect your workstation to the network and arrange to install the worksystem and other software.

Install worksystem software.

Before you install the worksystem software, make sure you have the following:

- The *ULTRIX Basic Installation Guide*
- The ULTRIX release notes and the *ULTRIX Advanced Installation Guide*
- An ULTRIX TK50 Tape Cartridge Kit or an ULTRIX CDROM Optical Compact Disc Kit containing media and installation documents
- A tape or optical compact disc drive for loading the tape or compact disc
- The owner's guide for the drive you will use
- Either a hard disk drive on which to install the worksystem software or, if you are loading from a network, an Ethernet hardware connection

To load the worksystem software from a network, contact your system manager, who will perform the installation for you.

To use a TK50 tape drive to perform a basic worksystem software installation, follow the instructions on page 28.

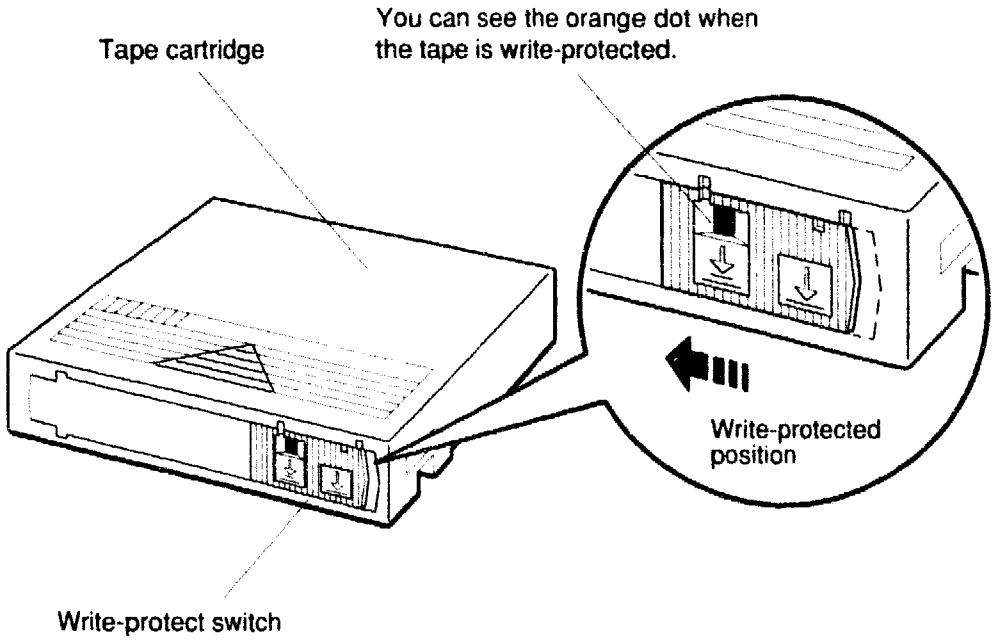
To use an RRD40 optical compact disc drive to perform a basic worksystem software installation, turn to page 32.

To use a disk inside a BA42 to install software, see the *BA42 Storage Expansion Box Installation Guide* that came with that expansion box.

To use a tape drive

1. Remove the tape cartridge labeled "ULTRIX/UWS SUPPORTED (RISC)" from your ULTRIX TK50 Tape Cartridge Kit and make sure it is write-protected.

   Set aside any other tape cartridges that came with the tape cartridge kit and the tape drive.



WSE2I132

2. Determine the SCSI ID number assigned to your tape drive.

   a. Type **cnfg** and the slot number of the SCSI module at the console prompt (>>) and press Return. A configuration display similar to the following appears on the screen.

```
>>cnfg 5
5: PMAZ-AA  DEC        T5.2a    TCF0  (SCSI = 7)
---------------------------------------------------------
   DEV   PID                     VID         REV    SCSI DEV
   ===== =================       ==========  ====== ========
   rz1   RZ55        (C) DEC     DEC         0700   DIR
   rz4   RRD40       (C) DEC     DEC         0700   CD-ROM
   tz6                                              SEQ
>>
```

   b. Look at the lines under the DEV column in the display and find the line that begins with tz followed by a number. This is the line that describes the tape drive.

   The number following tz shows the SCSI ID number assigned to the tape drive. In the sample display, the ID number assigned to the tape drive is 6.

3. Open the tape drive door, raise the flap of the tape drive until it locks into the up position, and load the ULTRIX/UWS-SUPPORTED (RISC) tape cartridge into the drive as shown in the picture on page 29.

4. Press the flap of the tape drive down and push the red indicator light in. The *TK50 Tape Drive Owner's Guide* contains detailed instructions on use of the drive.

5. When the red and green lights on the drive both glow steadily, type **boot** followed by the slot number, **/tz** and the SCSI ID number. Then press Return.

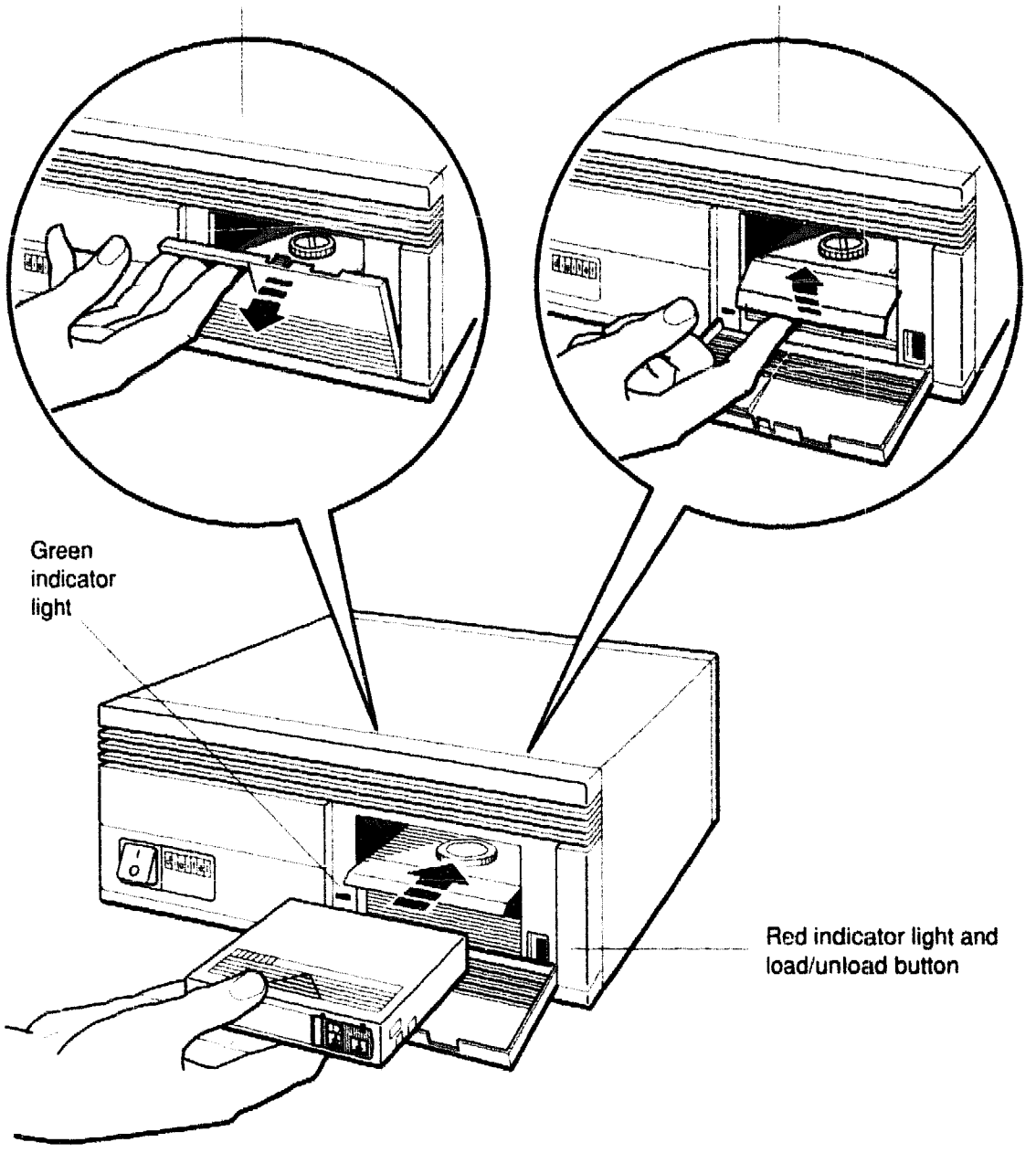
   Thus, for the tape drive in the sample display, you would type **boot 5/tz6**.

   If ?IO: 5/tz6 (bb rd) appears, make sure you have the tape cartridge labeled "ULTRIX/UWS SUPPORTED (RISC)" in the drive.

From this point on, you can complete the basic installation by following the instructions that appear on your screen.

As you follow the instructions on your screen, be sure you understand them fully before you respond. The entire installation should take approximately 50 minutes. When the installation is complete, the login screen with the DIGITAL logo appears on your monitor.

When you are finished, follow the instructions in the *TK50 Owner's Guide* to remove the tape from the drive.


Insert 3 fingers behind the lip on the left side of the top of the drive door and pull the door away from the drive to open it.
Raise the flap behind the bottom of the door until the flap locks into position.
Green indicator light
Red indicator light and load/unload button

WSE2I095

To use an optical compact disc drive

1. Remove the disc labeled "ULTRIX/UWS (RISC)" from your ULTRIX RRD40 Optical Compact Disc Kit.
2. Determine the SCSI ID number assigned to your disc drive.
   a. Type **cnfg** and the slot number of the SCSI module at the console prompt (>>) and press Return. A configuration display similar to the following appears on the screen.

```
>>cnfg 5
5: PMAZ-AA  DEC        T5.2a    TCF0  (SCSI = 7)
-------------------------------------------------------------
   DEV   PID                     VID         REV     SCSI DEV
   ===== ==================      ==========  ======  ========
   rz1   RZ55        (C) DEC     DEC         0700    DIR
   rz4   RRD40       (C) DEC     DEC         0700    CD-ROM
   tz6                                               SEQ
>>
```

   b. Look at the lines in the PID column in the display and find the line that reads `RRD40`. This is the line that describes the optical compact disc drive.

      Look at the number that follows `rz` in the DEV column for the RRD40 drive. This is the SCSI ID number assigned to the compact disc drive. In the sample display, the ID number assigned to the compact disc drive is 4.
3. Load the ULTRIX/UWS (RISC) compact disc into the drive and remove the caddy from the drive.

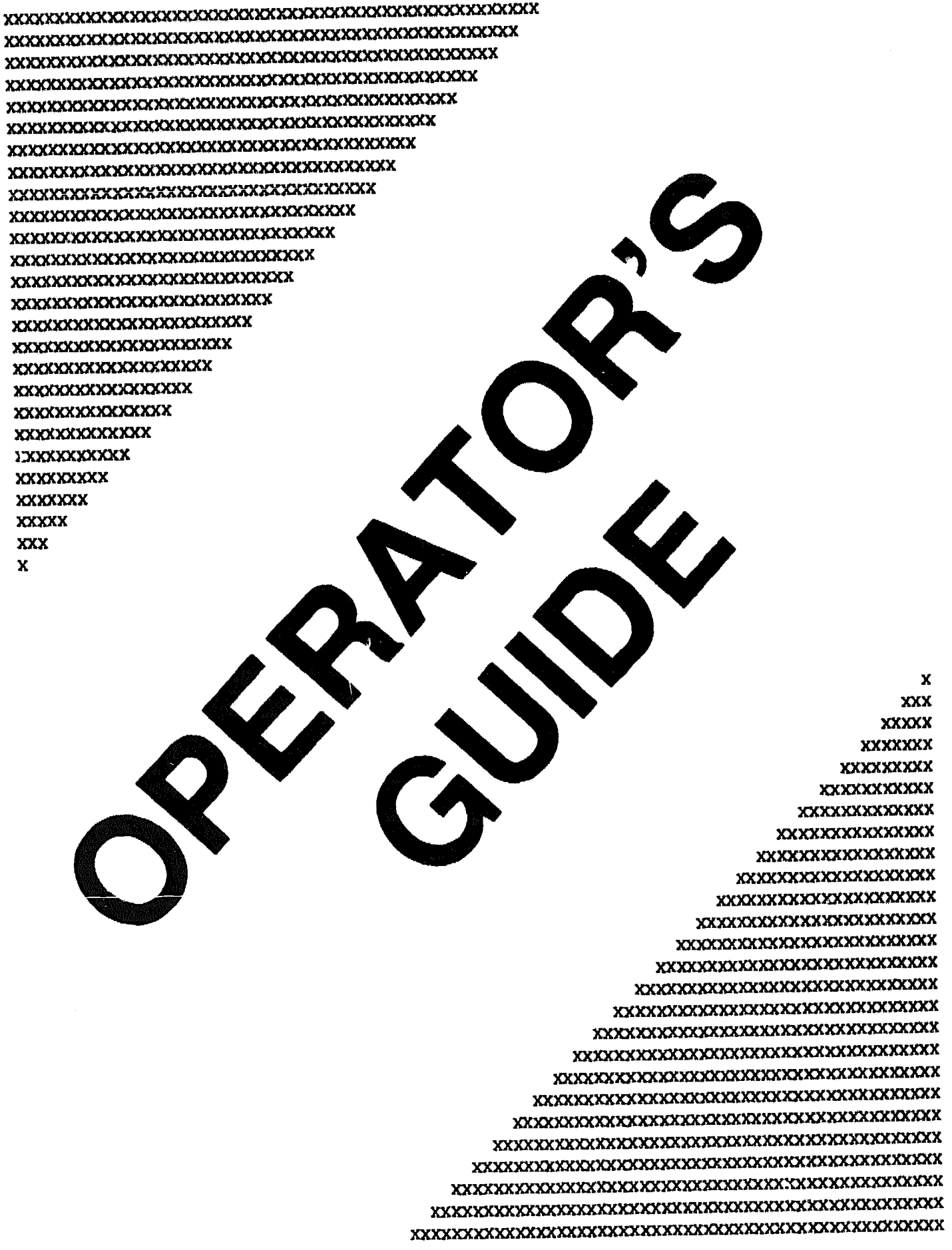
   If necessary, see the *RRD40 Optical Compact Disc Drive Owner's Guide* for instructions on using the drive.
4. When both green lights on the compact disc drive glow steadily, type **boot**, then the slot number, **/rz** followed by the SCSI ID number, and **/vmunix -a**, and press Return.

   For the compact disc drive in the sample display, you would type **boot 5/rz4/vmunix -a**.

From this point on, you can complete the basic installation by following the instructions that appear on your screen.

As you follow these instructions, be sure you understand them fully before you respond. The entire installation should take approximately 50 minutes. When the installation is complete, the login screen with the DIGITAL logo appears on your monitor.

When you are finished, follow the instructions in the *RRD40 Optical Compact Disc Drive Owner's Guide* to remove the compact disc from the drive.


OPERATOR'S
GUIDE

EK-366AA-OG-003

DECstation 5000 Model 200

Hardware Operator's Guide

digital equipment corporation
maynard, massachusetts

First printing, April 1990
Revised, October 1990
Revised, April 1991

The information in this document is subject to change without notice and should not be construed as a commitment by Digital Equipment Corporation. Digital Equipment Corporation assumes no responsibility for any errors that may appear in this document.

The software described in this document is furnished under a license and may be used or copied only in accordance with the terms of such license.

Digital Equipment Corporation assumes no responsibility for the use or reliability of its software on equipment that is not supplied by Digital or its affiliated companies.

U.S.A.

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

The following are trademarks of Digital Equipment Corporation:

DEC	PDP	VAXBI
DECnet	ThinWire	VAXcluster
DECstation	TURBOchannel	VAXstation
DECsystem	ULTRIX	VMS
DECUS	ULTRIX-32	VT
MicroVAX	UNIBUS	
MicroVMS	VAX	digital™

Contents

6 Optional Network Connections: ThinWire and ThickWire Ethernet

7 External Communication Options: Printers, Plotters, Modems, and Console Terminals

Part III Testing Hardware

8 Starting and Testing Workstation Hardware

9 Troubleshooting

10 Using the Console Program

11 Moving the DECstation 5000 Model 200 Workstation

Part IV Appendixes

A Equipment Specifications

B Part Numbers

Figures

Tables

Using This Guide

Use this guide to learn to operate and troubleshoot your DECstation 5000 Model 200 hardware.

This guide explains

- How to use the connectors and controls and interpret the indicator lights on your workstation hardware
- How to adjust your workstation hardware for your comfort
- What options you can add to improve workstation performance
- How to use console commands
- How to interpret the results of the power-up self-test and the system self-test
- How to read the configuration displays
- How to diagnose and solve basic hardware problems
- How to dismantle your workstation in preparation for moving
- What the specifications are for your workstation components
- What the part numbers are for the components of your workstation
- What the pin assignments are for your workstation cables and connectors

Table 1. Conventions Used in This Guide

Convention	Use
Monospace type	Anything that appears on your monitor is set in monospace in the text and looks like this.
Boldface type	**Anything you are asked to type is set in boldface in the text and looks like this.** ***Note:*** *Type console commands exactly as they appear in the text. The workstation does not recognize uppercase and lowercase letters as the same input.*
Note	Provides general information.
Caution	Provides information to prevent damage to the equipment.
Warning	Provides information that relates to personal safety.

1

Getting Started

This chapter explains

- What site requirements must be met so your hardware can operate efficiently and safely
- How to check the voltage requirements of the devices that make up your workstation
- What parts make up the basic DECstation 5000 Model 200 workstation

Workstation Site Requirements

For your DECstation 5000 Model 200 workstation to function efficiently, your work environment must meet the requirements listed here.

Caution: *Failure to meet these requirements can damage equipment.*

Temperature

- Keep the temperature around the workstation between 50 to 104°F (10 to 40°C).
  - Set up your workstation away from heaters, photocopiers, and other sources of heat.
  - Protect your workstation from sunlight.
- Allow air to flow freely around your workstation to keep heat from building up and damaging your equipment.
  - Leave 4 inches (10 cm) of space between system unit vents and other objects.
  - Leave 3 inches (8 cm) of space between monitor vents and other objects.

Humidity

- Keep relative humidity within the range of 10 to 80 percent.

Cleanliness

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

Interference

- Set up your workstation at least 30 inches (90 cm) away from other terminals or monitors and from other sources of electrical interference, such as printers or electric pencil sharpeners.
- Limit exposure to static electricity and magnetized objects by setting up your workstation away from busy corridors and other high-traffic areas and away from filing cabinets and steel beams in walls.

Power

- Provide a 15-ampere branch circuit for the exclusive use of your workstation.
- Be sure your electrical circuit is properly grounded and free from electrical noise.
- Be sure the voltage for workstation devices matches that of your power source.

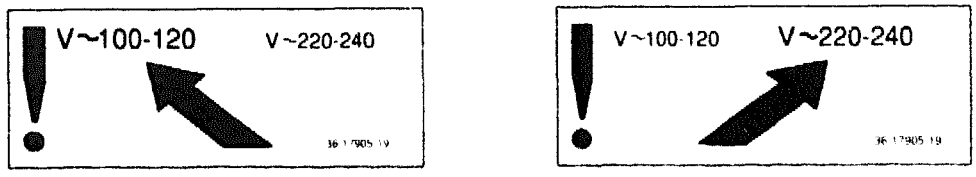
Supplies

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

Workstation Voltage Requirements

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



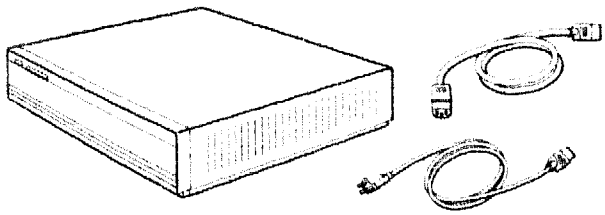
WSE21021

Figure 1-1. Voltage labels

The Parts of a Basic DECstation 5000 Model 200 Workstation

In addition to the documentation you are reading, you should have all the items that appear in Figure 1-2, plus your software and any options you have ordered. Options are discussed in Part II of this guide.

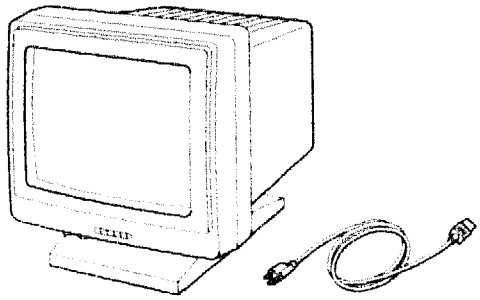
For a detailed list of items available for your workstation, see Appendix B of this guide.



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

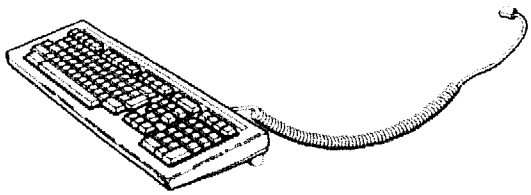
Color video cable assembly

Gray-scale video cable assembly

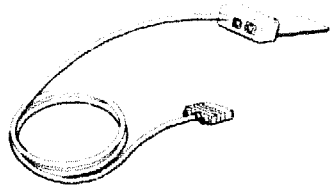


Monitor and monitor power cord

Monochrome video cable assembly

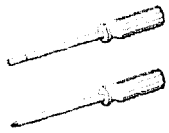


Keyboard with cable



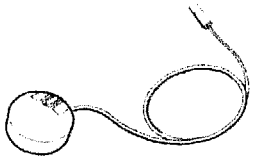
Keyboard-mouse cable assembly

Communictions connector adapter



Screwdrivers

Serial cable for console terminal or other communication device



Mouse with cable

One ThinWire T-connector and two ThinWire terminators

Antistatic wrist strap

WSE2I001

Figure 1-2. The parts of the basic DECstation 5000 Model 200 workstation

2

System Unit, Monitor, Keyboard, and Mouse or Tablet

This chapter explains

- What connectors, controls, and indicator lights are present on the system unit and monitor and what their functions are
- How to connect the monitor, keyboard, and mouse or tablet to the system unit
- When to use the monitor power cord instead of the monitor-to-system-unit power cable
- How to connect the system unit power cord and the monitor-to-system-unit power cable or the monitor power cord

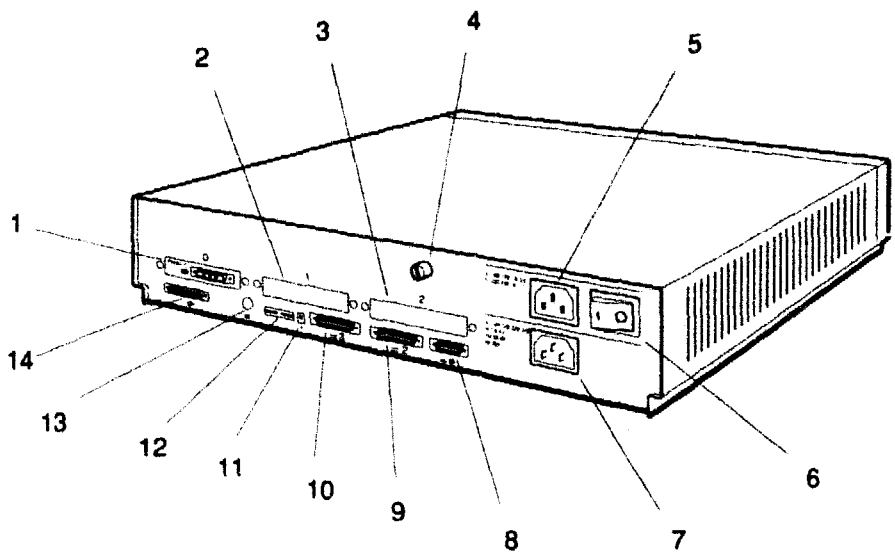
The System Unit

The system unit is designed to sit flat on a level surface with the monitor placed on top of or next to it.

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

Connectors, Controls, and Indicator Lights on the System Unit

The back of the system unit contains the connectors, controls, and indicator lights pictured in Figure 2-1 and described in Table 2-1. Icons that appear on the system unit are pictured in Figure 2-2.



1. Option slot 0 with a video connector in place
2. Option slot 1
3. Option slot 2
4. Cover-release screw
5. Monitor-to-system-unit power connector
6. On/off switch
7. System unit power connector
8. Keyboard-mouse connector
9. Communications connector (baud 2)
10. Communications connector (baud 3)
11. Reset button
12. Diagnostic indicator lights
13. ThinWire Ethernet connector
14. Small computer system interface (SCSI) connector

WSE2O002

Figure 2-1. The back of the system unit

Table 2-1. Connectors, Controls, and Indicator Lights on the System Unit

Item	Function
Option slots 0, 1, and 2	Points at which video, SCSI, and network options can connect to option modules in the system unit. In Figure 2-1, option slot 0 contains a video connector, the point at which a video cable connects the monitor to the system unit.
Cover-release screw	A captive screw that allows the cover to be removed from the system unit.
Monitor-to-system-unit power connector	The point at which power can pass from the system unit to the monitor.
On/off switch	Turns the system unit on and off. Pressing the 1 turns the system unit on. Pressing the 0 turns it off.
System unit power connector	The point at which power from the power source reaches the system unit.
Keyboard-mouse connector	The point at which the keyboard-mouse cable connects the keyboard and mouse or tablet to the system unit.
Communications connectors	The points at which communication devices, such as modems and printers, can connect to the system unit.
Reset button	Resets the system hardware.
Diagnostic indicator lights	When there is no display on the monitor, these lights indicate where system failures have occurred.
ThinWire Ethernet connector	The point at which ThinWire Ethernet connects to the system unit.
SCSI connector	The point at which up to seven external SCSI storage devices can connect to the system unit.

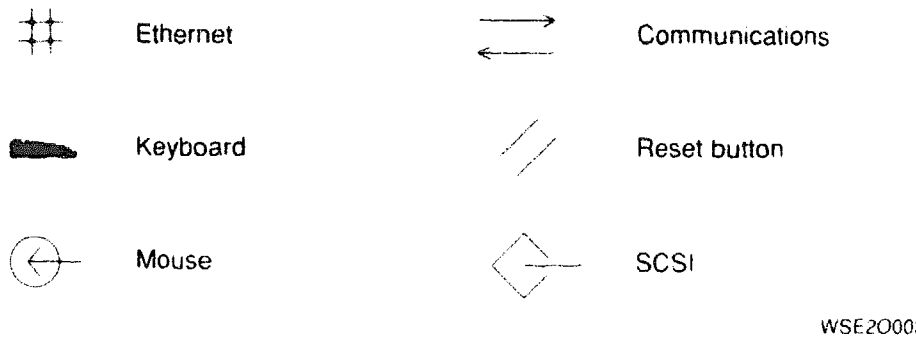


Figure 2-2. Icons on the system unit

The Monitor

Your DECstation 5000 Model 200 workstation came with one of the following monitors:

- 19-inch VR262 gray-scale monitor
- 16-inch VR297 color monitor
- 19-inch VR299 color monitor
- 19-inch VR319-D monochrome monitor
- 16-inch VRT16-D color monitor
- 19-inch VRT19-D color monitor

You can tell which monitor you have by looking at the identification plate on the back of the monitor.

Connectors, Controls, and Indicator Lights on the Monitors

Connectors, controls, and indicator lights are located in different places on different monitors. Look at the illustration of your monitor in Figures 2-4 through 2-9 to see where to find them.

Figure 2-3 shows the icons that appear on the monitors. Table 2-2 describes the connectors, controls, and indicator lights on the monitors.

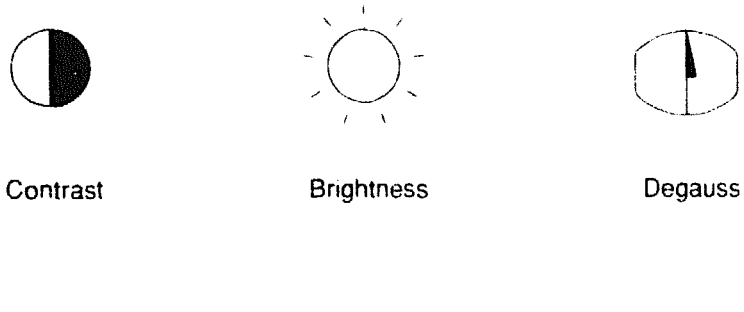


Figure 2-3. Icons on the monitors

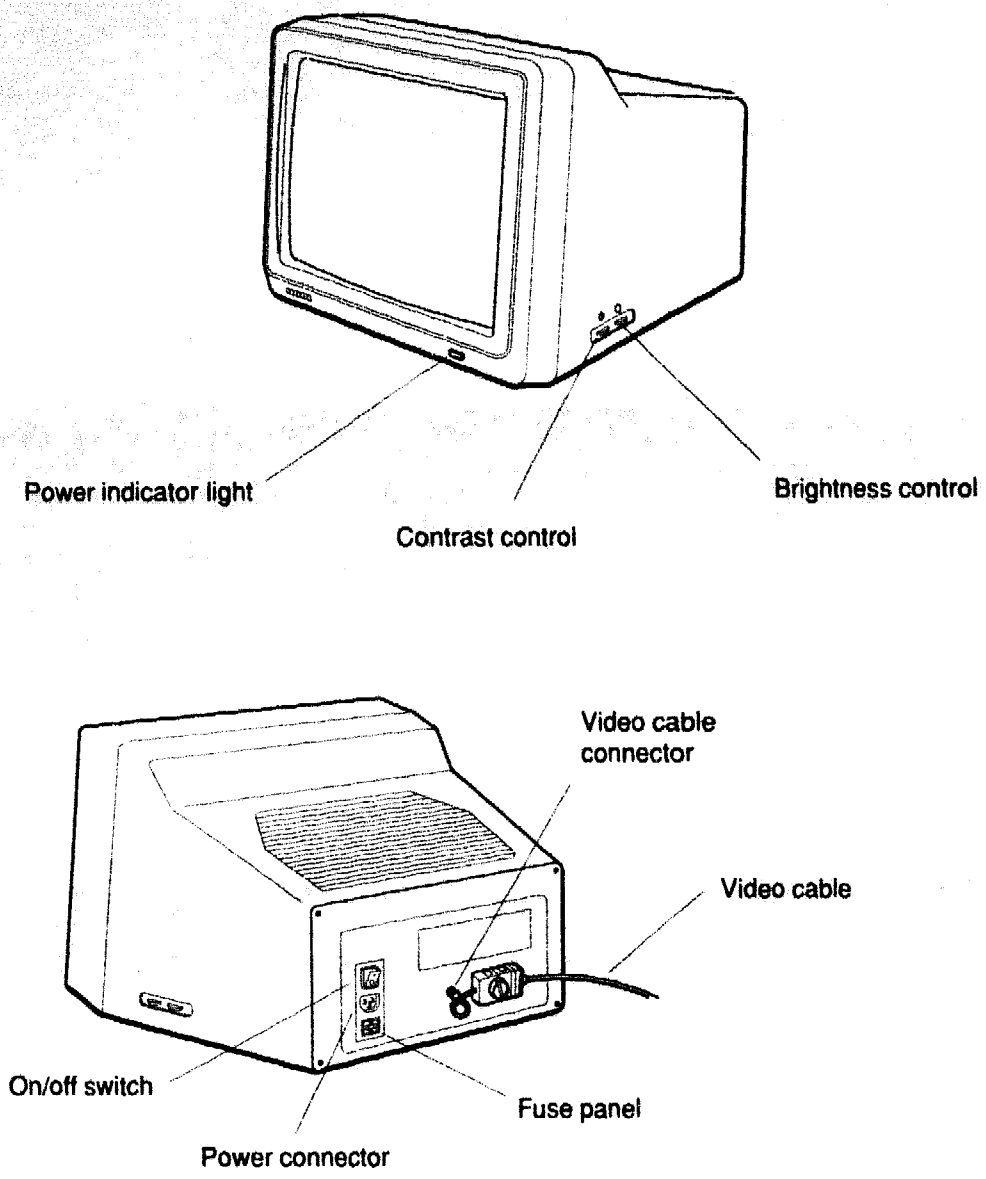
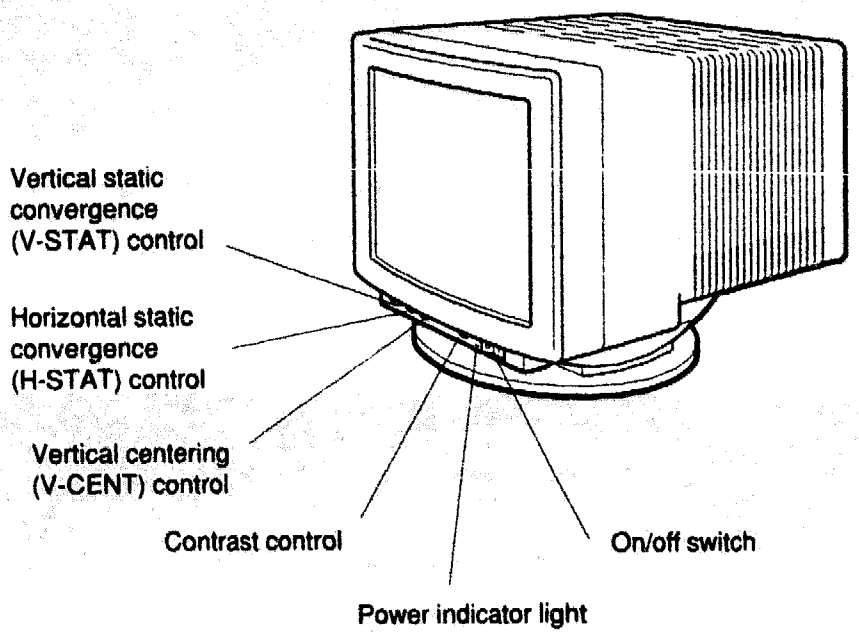
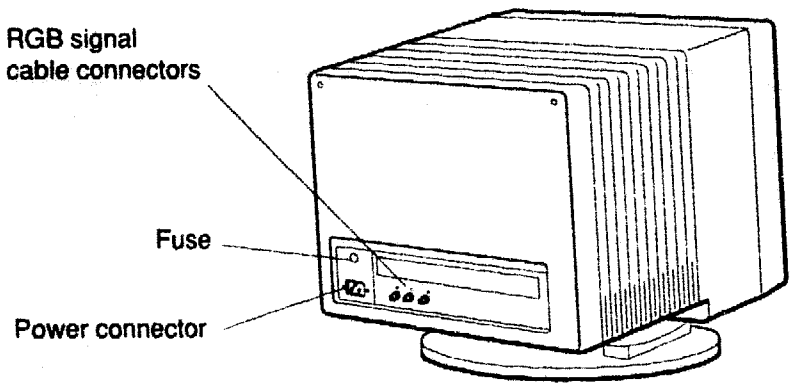


Figure 2-4. The 19-inch VR262 gray-scale monitor





WSE2O006

Figure 2-5. The 16-inch VR297 color monitor

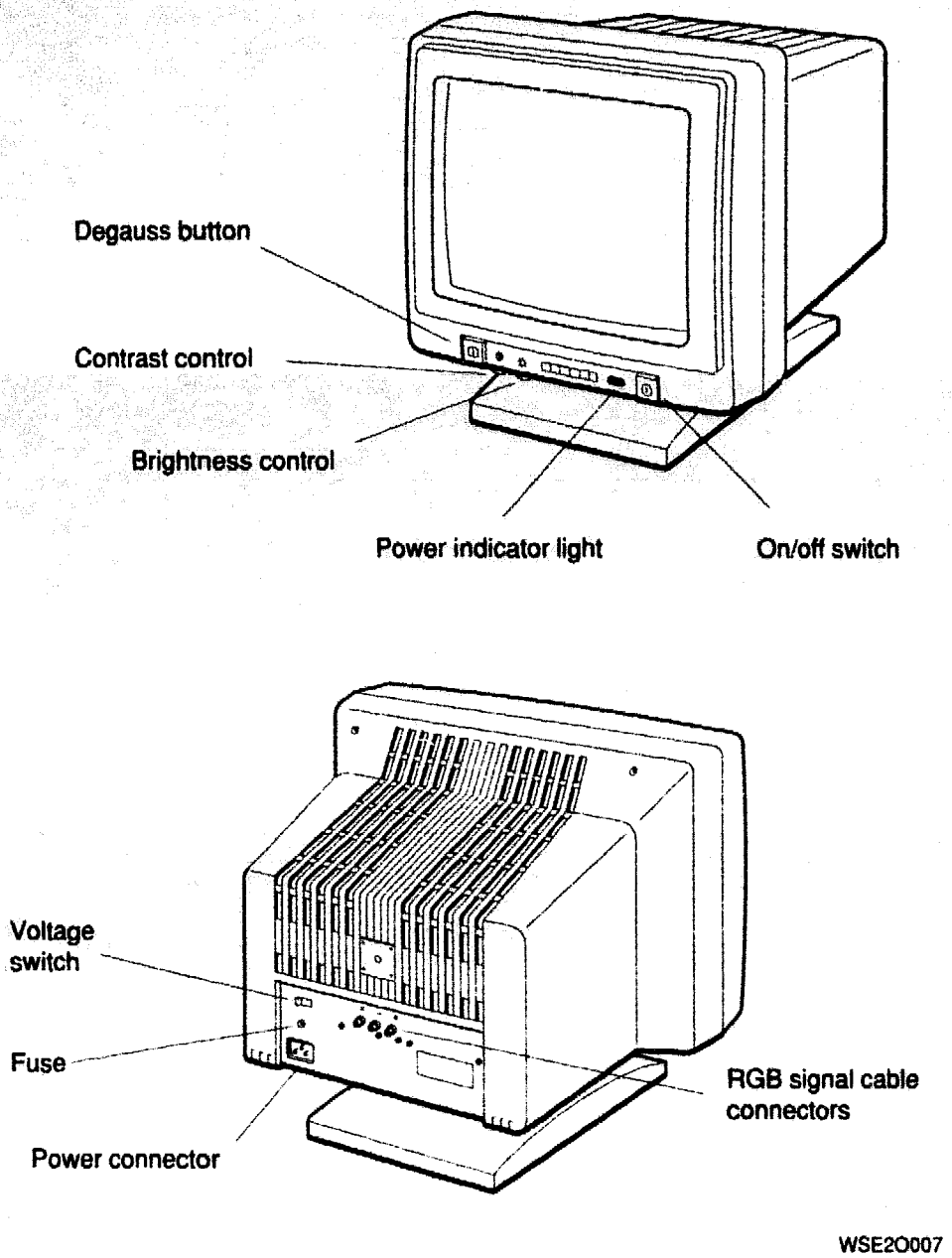


Figure 2-6. The 19-inch VR299 color monitor

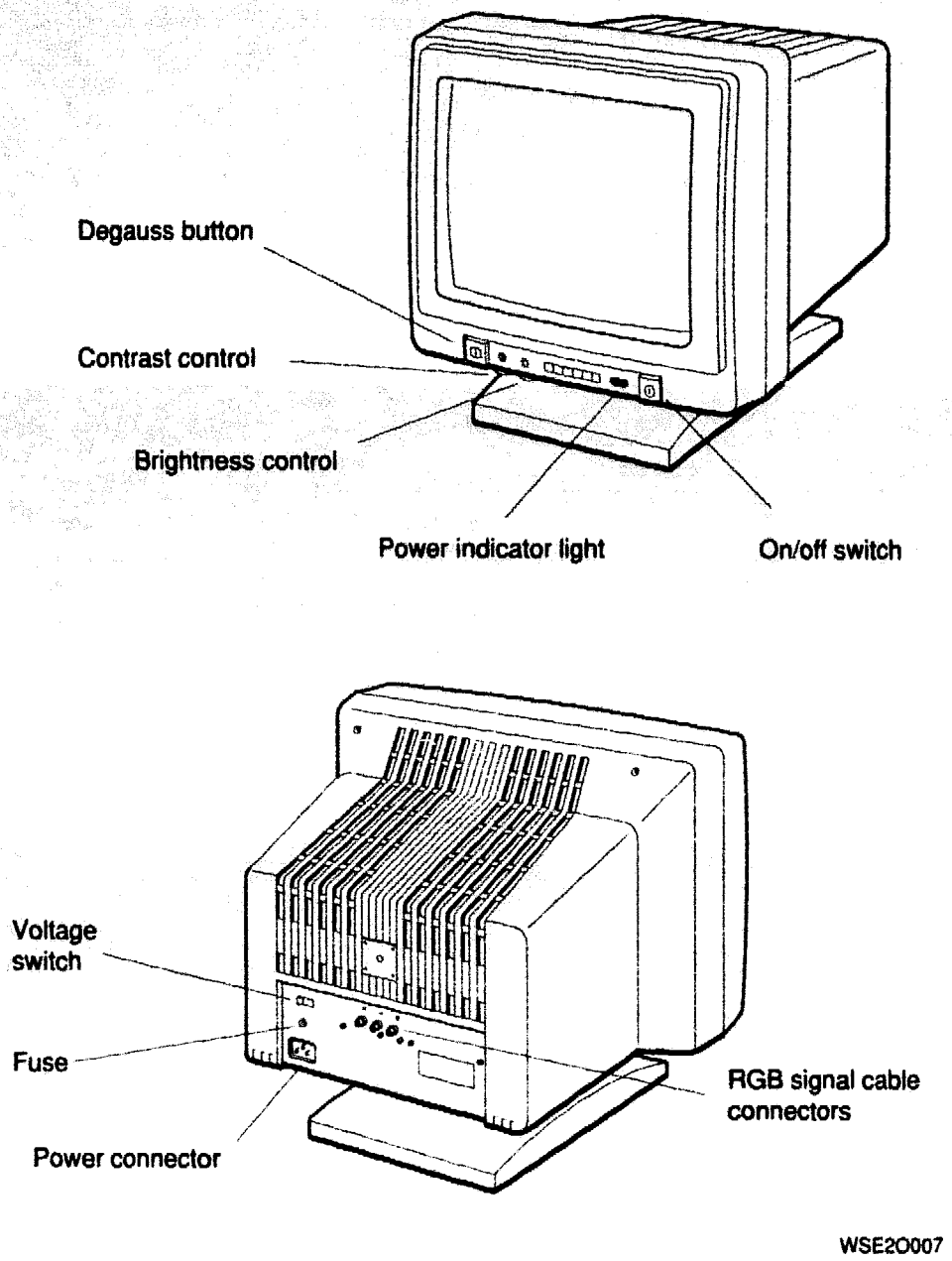


Figure 2-6. The 19-inch VR299 color monitor

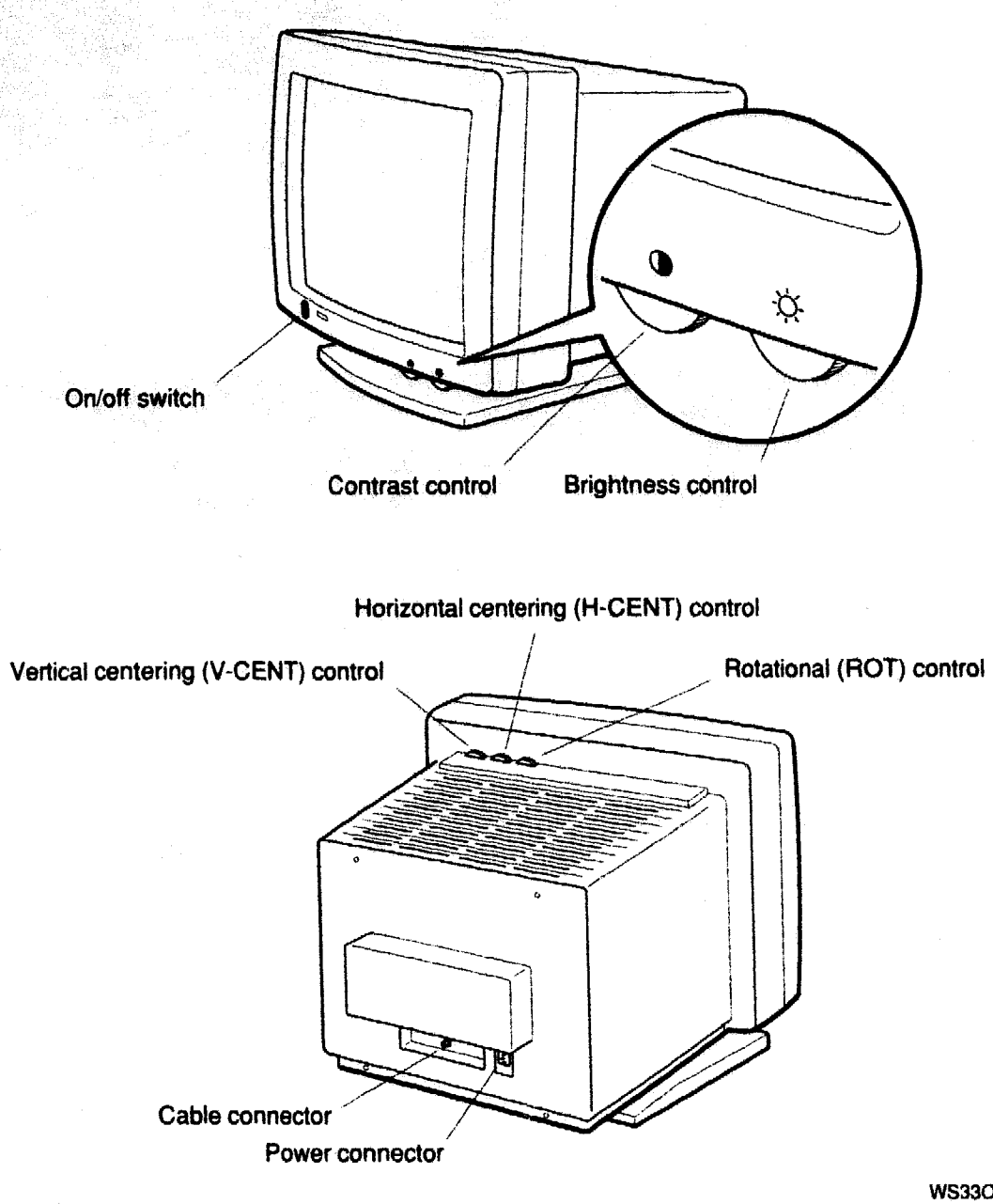


Figure 2-7. The 19-inch VR319 monochrome monitor

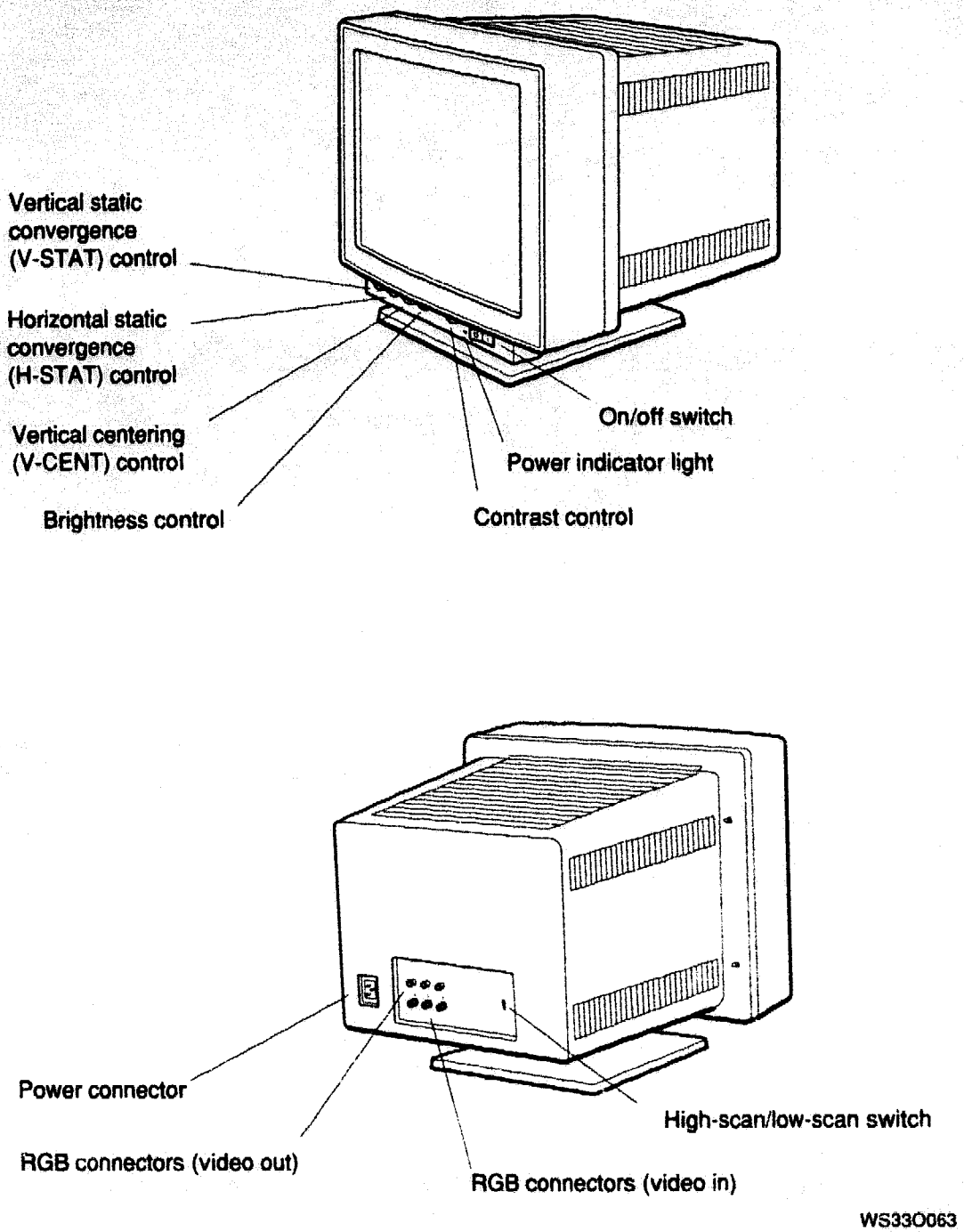


Figure 2-8. The 16-inch VRT16-D color monitor

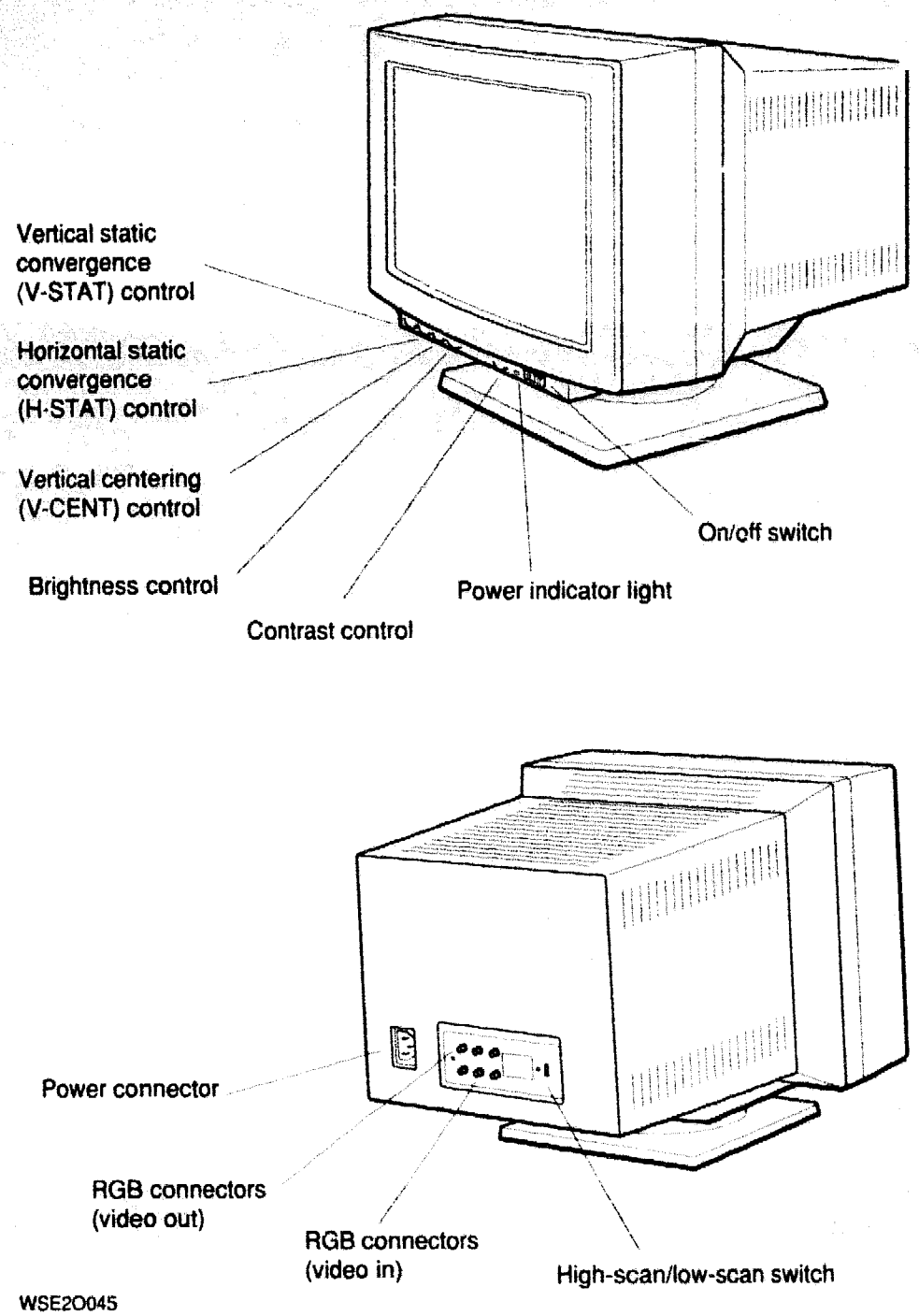


Figure 2-9. The 19-inch VRT19-D color monitor

Table 2-2. Controls, Connectors, and Indicator Lights on the Monitors

Item[1]	Function
Power indicator light	Glows green when the monitor receives power from a wall outlet or the system unit.
Contrast control	Adjusts the intensity of the display on the screen.
Brightness control	Adjusts the brightness of the background on the screen.
Vertical static convergence control (V-STAT)	Adjusts the red and blue horizontal lines in a color display so they converge with the green horizontal line in the display.
Horizontal static convergence control (H-STAT)	Adjusts the red and blue vertical lines in a color display so they converge with the green vertical line in the display.
Vertical centering control (V-CENT)	Adjusts the picture position upward or downward on the screen.
Horizontal centering control (H-CENT)	Adjusts the picture position sideways on the screen.
Rotational control (ROT)	Rotates the picture position around the center of the screen.
RGB signal cable connectors	Allow video signals to flow between the monitor and the system unit.
Fuse	Protects the monitor from electrical damage.
Voltage switch	Lets you match the monitor's voltage to the voltage at your power source.
Power connector	Allows power to flow from the system unit or from a wall outlet or a power strip to the monitor.
On/off switch	Turns the monitor on and off.
Degauss button	Lets you clear color distortion caused by outside magnetic interference.
High-scan/low-scan	Not used with the DECstation 5000 Model 200 workstation.

[1]Not every item appears on every monitor.

Connecting the Monitor to the System Unit

Caution: *Connecting or disconnecting your monitor while power is turned on can damage the monitor.*

1. Locate the video cable assembly for your workstation.
   - If you have a color monitor, the video cable assembly that came with your shipment has a set of red, green, and blue (RGB) signal cables at one end and a 3-pin connector at the other.
   - If you have a gray-scale monitor, a gray-scale video cable assembly came with your monitor. It has a round signal cable connector at one end and a 3-pin connector at the other end.

     Use this assembly instead of the one that came with the basic workstation shipment.
   - If you have a monochrome monitor, the video cable assembly has a round signal cable connector at each end. One signal cable connector is slotted, the other is threaded.

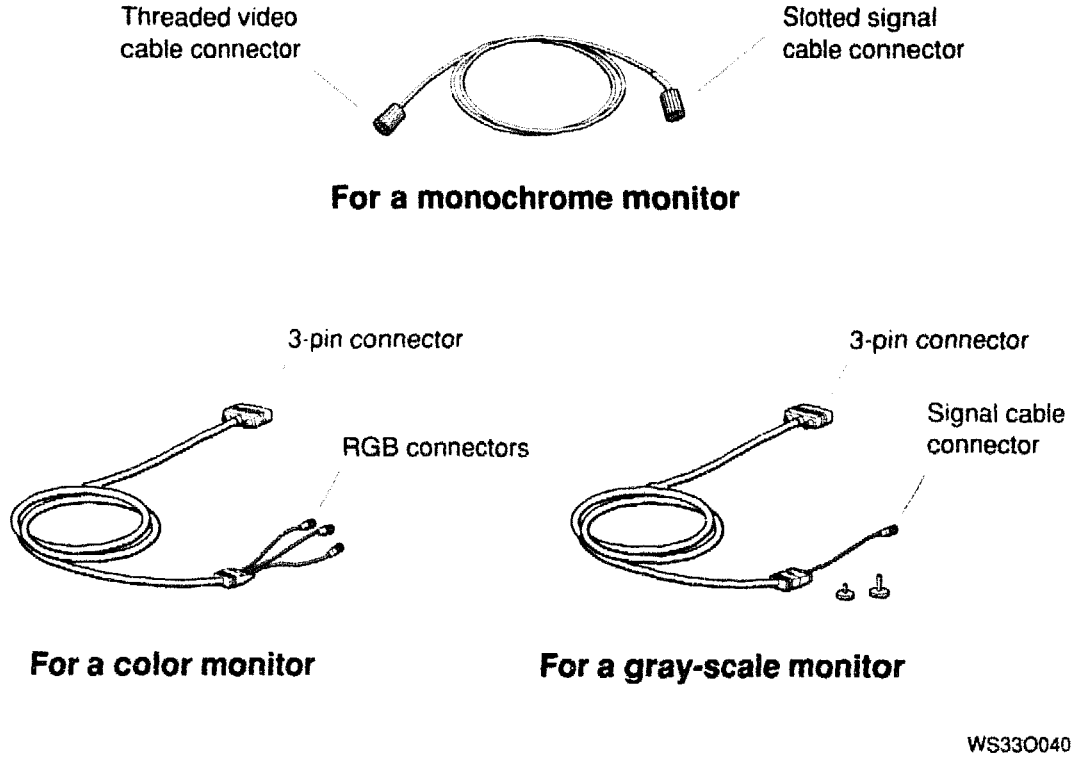


Figure 2-10. Video cable assemblies

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

   Caution: *Placing the monitor near an electromagnetic device, such as a printer or an electric pencil sharpener, or near magnetized objects, such as filing cabinets or steel beams in walls, can interfere with monitor performance.*

3. Be sure the on/off switch on the monitor is set to the off position.

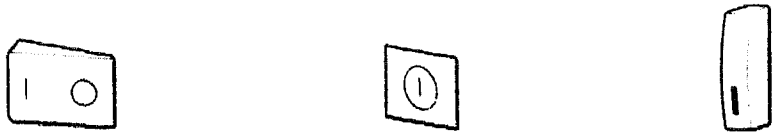


Figure 2-11. On/off switches on the monitors

4. Connect the video cable assembly to the system unit and monitor.

   - If you have a color monitor

     To connect the video cable assembly to the system unit (see Figure 2-12):

     a. Hold the 3-pin connector so the DIGITAL logo faces up.

     b. Firmly push the cable connector into the video option connector on the system unit.

     c. Turn the screws on the connector to your right to lock the connector securely in place.

     Note: *If the 3-pin connector is inserted upside-down, the colors red and blue are displayed in reverse.*

To connect the video cable assembly to the monitor (see Figure 2-13):

a. Connect the red, green, and blue signal cables to the round connectors on the back of the monitor labeled R, G, and B. The small collars on the cable connectors have two slots that fit over corresponding pins on the monitor connectors.

   The VRT16-D and VRT19-D color monitors have two sets of video connectors on the back of the monitor. Connect the signal cables to the lower set of connectors.

   Note: *If the upper connectors on the VRT16-D and VRT19-D are used no display will appear on the monitor.*

b. Align the slots on the collar of the red signal cable connector with the pins on the monitor connector labeled R.

c. Push the signal cable connector onto the monitor connector. Then twist the cable connector to the right to lock it.

d. Repeat this procedure with the green and blue signal cables.

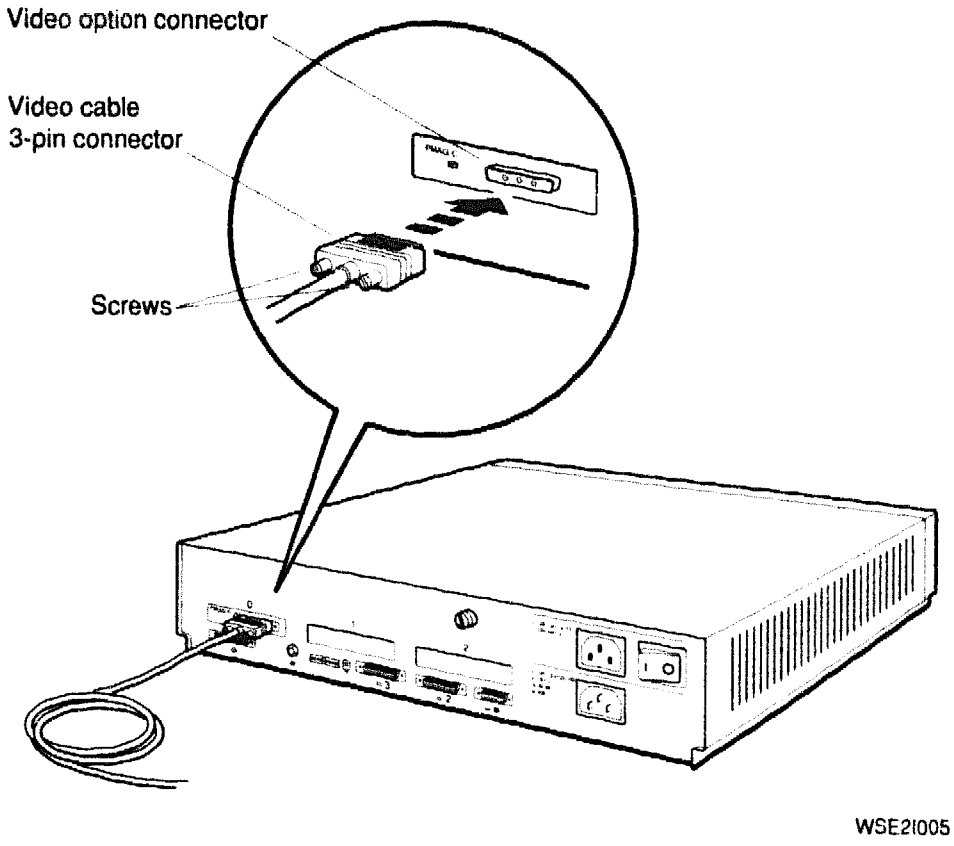


Figure 2-12. Connecting a video cable to the system unit

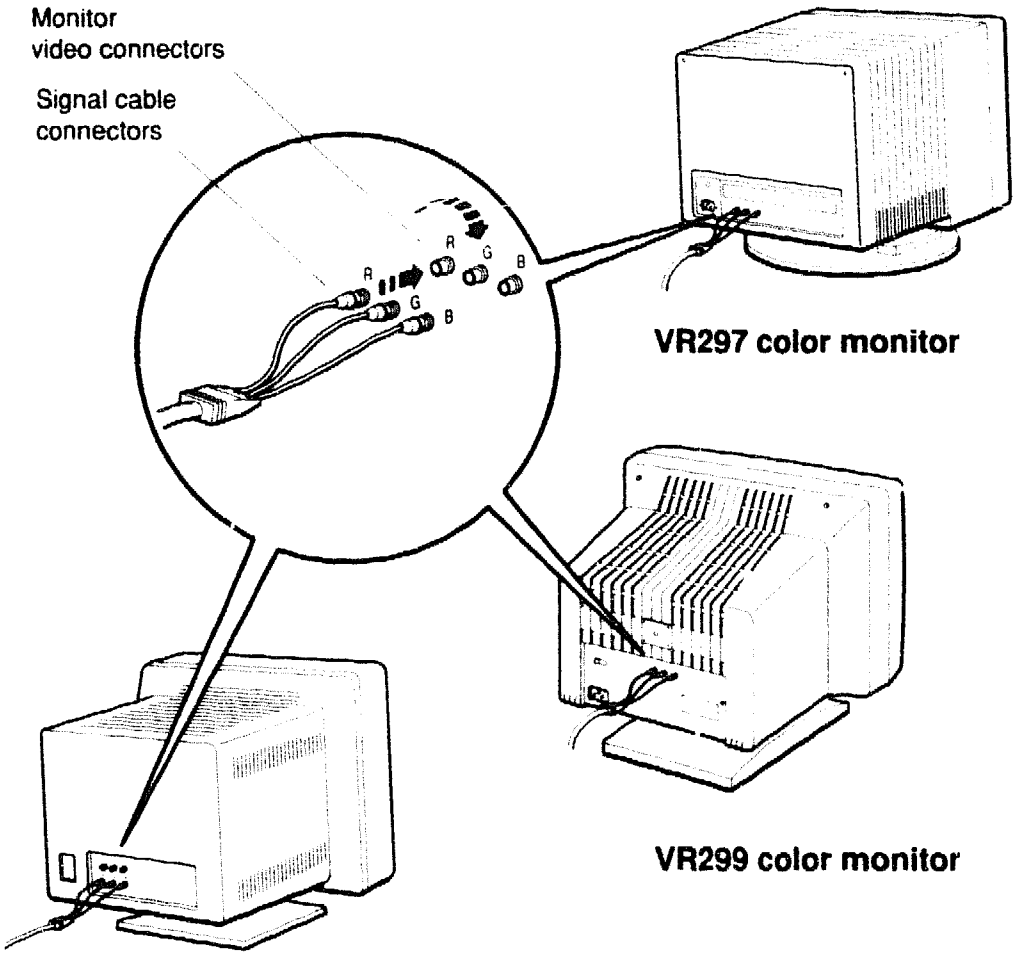


Figure 2-13. Connecting a video cable assembly to a color monitor

- If you have a gray-scale monitor

  To connect the video cable assembly to the system unit (see Figure 2-12):

  a. Hold the 3-pin connector so the DIGITAL logo faces up.

  b. Firmly push the cable connector into the video option connector on the system unit.

  c. Turn the screws on the connector to your right to lock the connector securely in place.

  To connect the video cable assembly to the monitor (see Figure 2-14):

  a. Connect the round signal cable on the video cable assembly to the round connector on the back of the monitor.

     The collar on the cable connector has two slots that fit over corresponding pins on the monitor connector. Align the slots on the collar of the signal cable connector with the pins on the monitor connector.

  b. Push the signal cable connector onto the monitor connector. Then twist the cable connector to the right to lock it.

  c. Attach the connector block to the back of the monitor.

     Turn the large plastic screw that came with the gray-scale video cable assembly to your right to hold the connector block in place on the monitor.

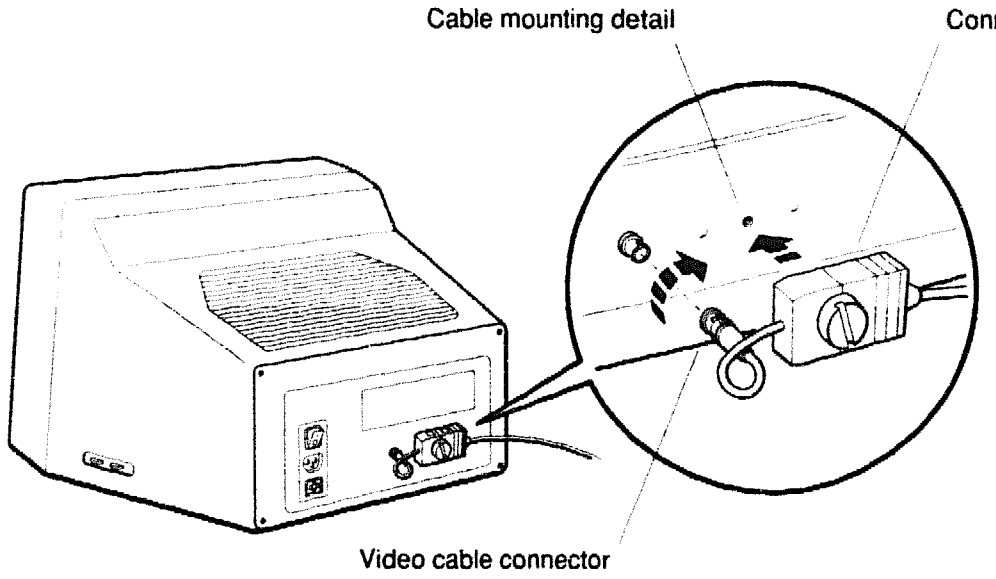


Figure 2-14. Connecting a video cable assembly to a gray-scale monitor

- If you have a monochrome monitor

  To connect the video cable assembly to the system unit (see Figure 2-12):

  a. Firmly push the threaded video cable connector onto the video option connector on the back of the system unit.

  b. Turn the connector to your right until it is securely in place.

  To connect the video cable assembly to the monitor (see Figure 2-14):

  a. Connect the round signal cable on the video cable assembly to the round connector on the back of the monitor.

     The collar on the cable connector has two slots that fit over corresponding pins on the monitor connector. Align the slots on the collar of the signal cable connector with the pins on the monitor connector.

  b. Push the signal cable connector onto the monitor connector. Then twist the cable connector to the right to lock it.

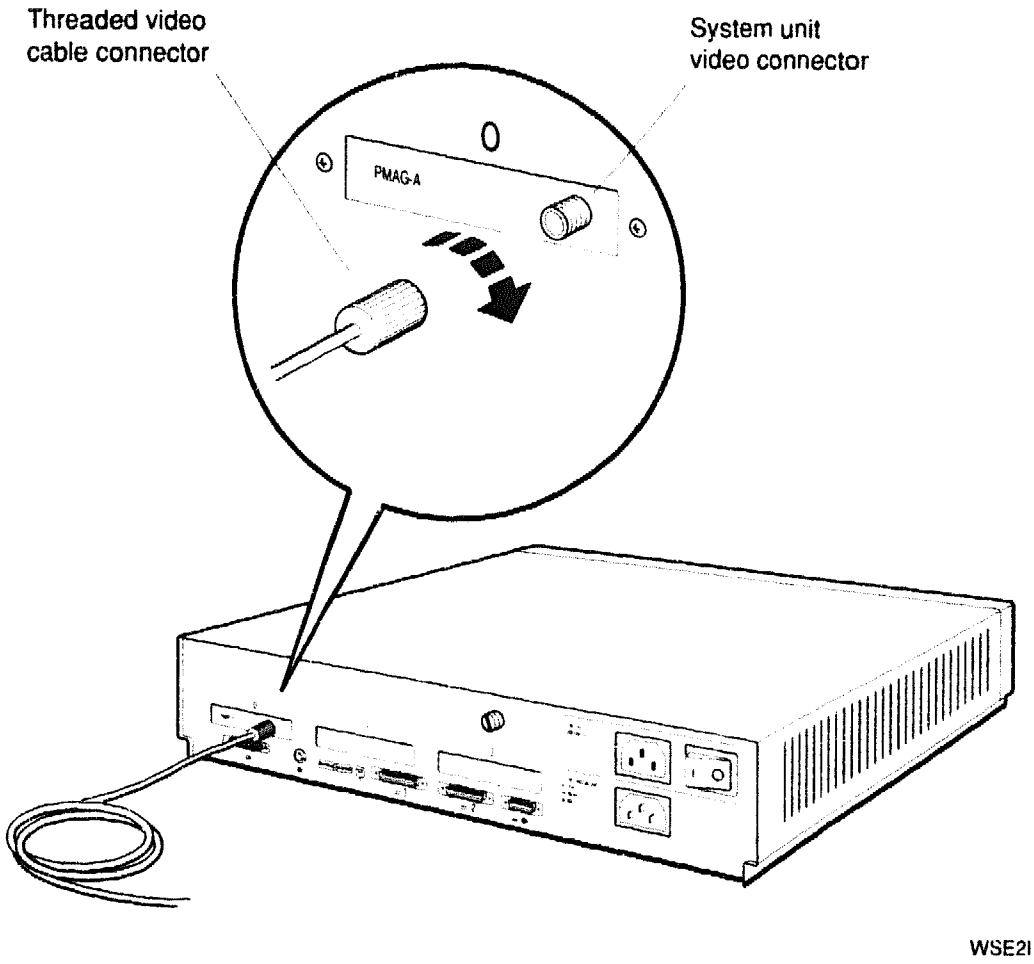


Figure 2-15. Connecting a monochrome video cable to the system unit

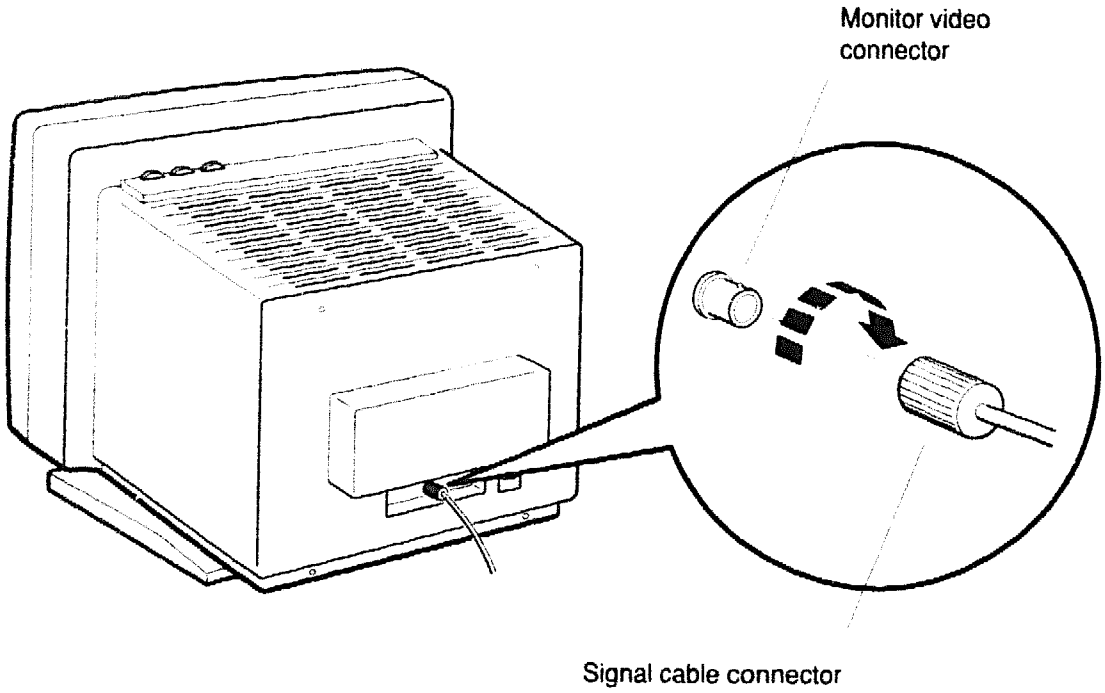


Figure 2-16. Connecting a video cable assembly to a monochrome monitor

Connecting More Than One Monitor to a Workstation

You can connect more than one graphics monitor to your workstation if you have two or three monochrome or color frame buffer graphics modules installed in your system unit.

You cannot install monochrome and color frame buffer graphics modules together in the same system unit, nor can you use other kinds of graphics modules with them.

Attach an appropriate monitor to each graphics module installed in your system unit. When you start the workstation, the monitor attached to the module in the lowest-numbered option slot is the system console. This monitor displays all system test information. For example, if you have monitors connected to option slots 0 and 1, the display for both option slots will appear on the monitor connected to option slot 0.

If you are installing more than one monochrome or color frame buffer graphics module in your system unit, you need to install ULTRIX version 4.2 or higher on your system. Be sure to back up all files you want to save before installing the software.

The Keyboard

The main part of the keyboard resembles a typewriter keyboard. In addition to the main keys, the keyboard has some special function keys, a special editing keypad, and a numeric/application keypad. The documentation that came with your software explains how to use keys other than the main keys.

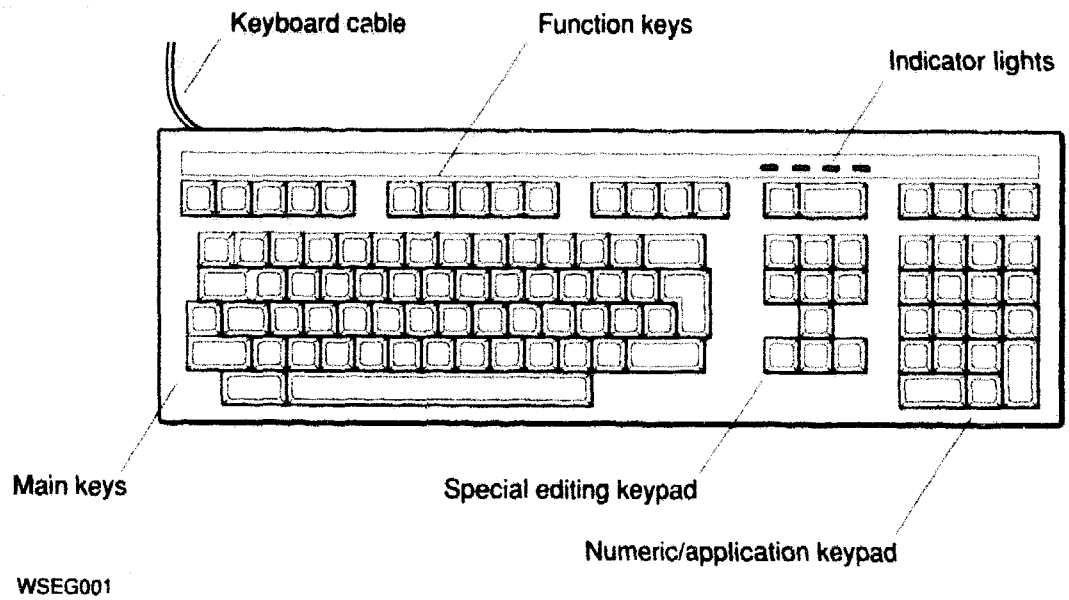


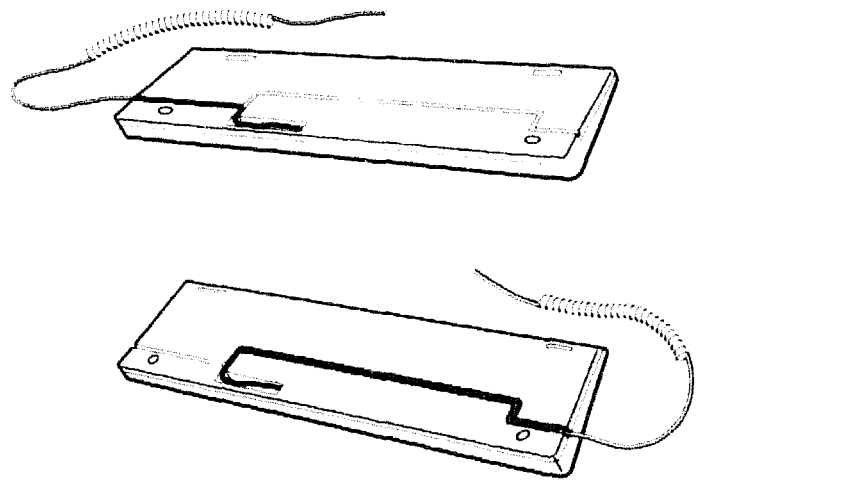
Figure 2-17. The keyboard

Adjusting the Keyboard

You can adjust the keyboard so the cable comes out of the left or right side and so the keyboard tilts or lies flat on its work surface.

To reroute the keyboard cable

1. Turn the keyboard upside down.
2. Remove the cable from the groove in which it rests.
3. Press the cable into the groove that runs out of the other side of the keyboard.



WSE2O014

Figure 2-18. Routing the keyboard cable

To adjust the tilt of the keyboard

1. Turn the keyboard upside down.
2. Find the two plastic feet that came in your keyboard carton.
3. Press the plastic feet firmly into the holes in the corners of the back of the keyboard.

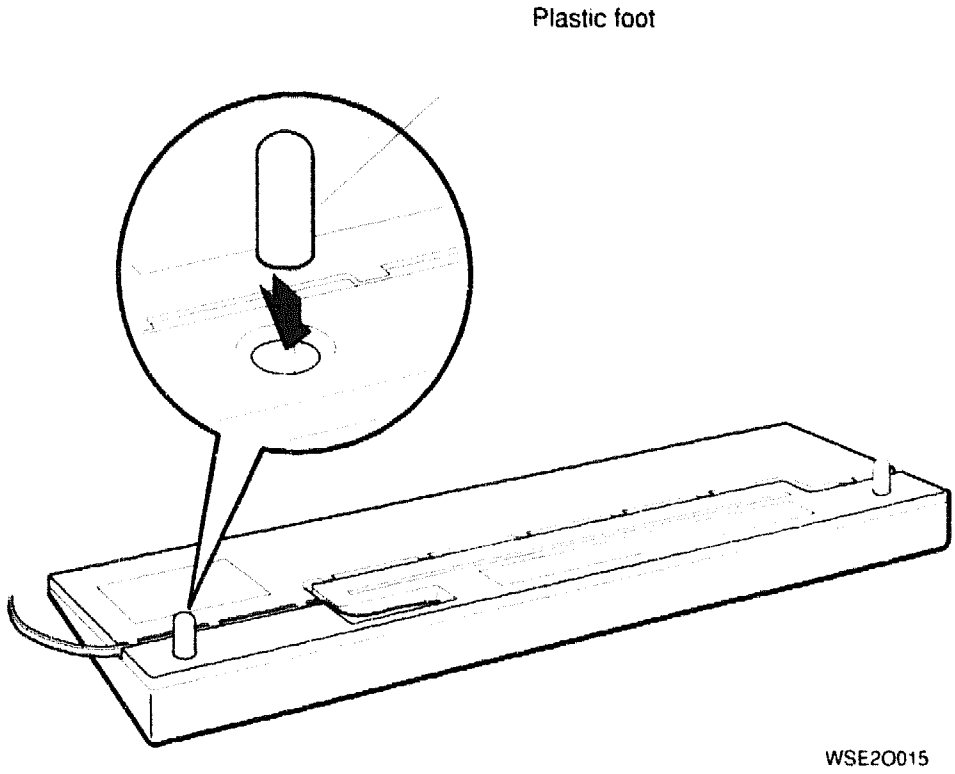
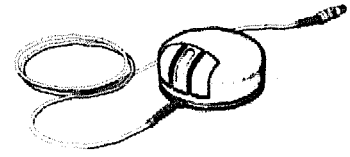


Figure 2-19. Adjusting keyboard tilt

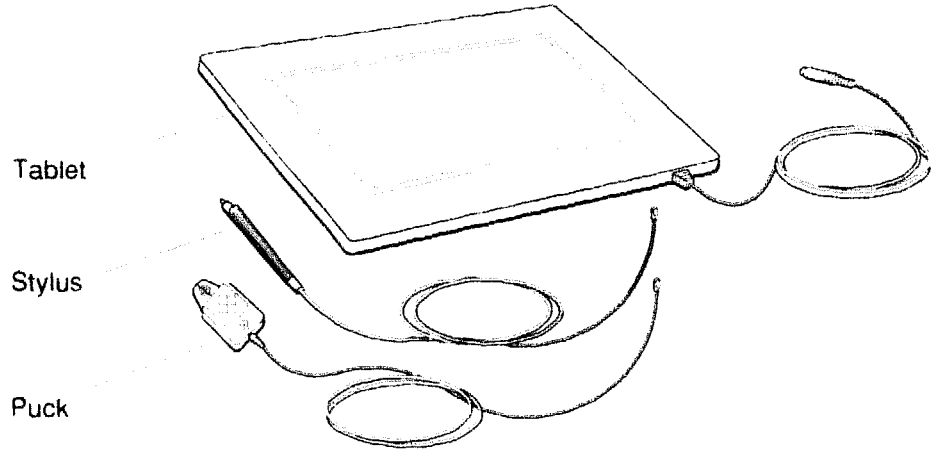
The Mouse and Tablet

The mouse and the puck or stylus that accompanies the tablet are hand-held pointing devices that let you easily position the cursor on your screen.

The way you use the mouse or tablet depends on your software. The documentation that came with your software explains how to use your pointing device.



Mouse



Tablet with puck and stylus

WSE2I083

Figure 2-20. A mouse and a tablet with its puck and stylus

Cleaning the Mouse

Clean the mouse when it fails to move the cursor smoothly on the screen.

1. Turn the mouse upside down.
2. Release the round plate from the bottom of the mouse by placing your fingers in the grooves on the plate and turning the plate to your left.
3. Lift off the plate and remove the tracking ball from inside the mouse.

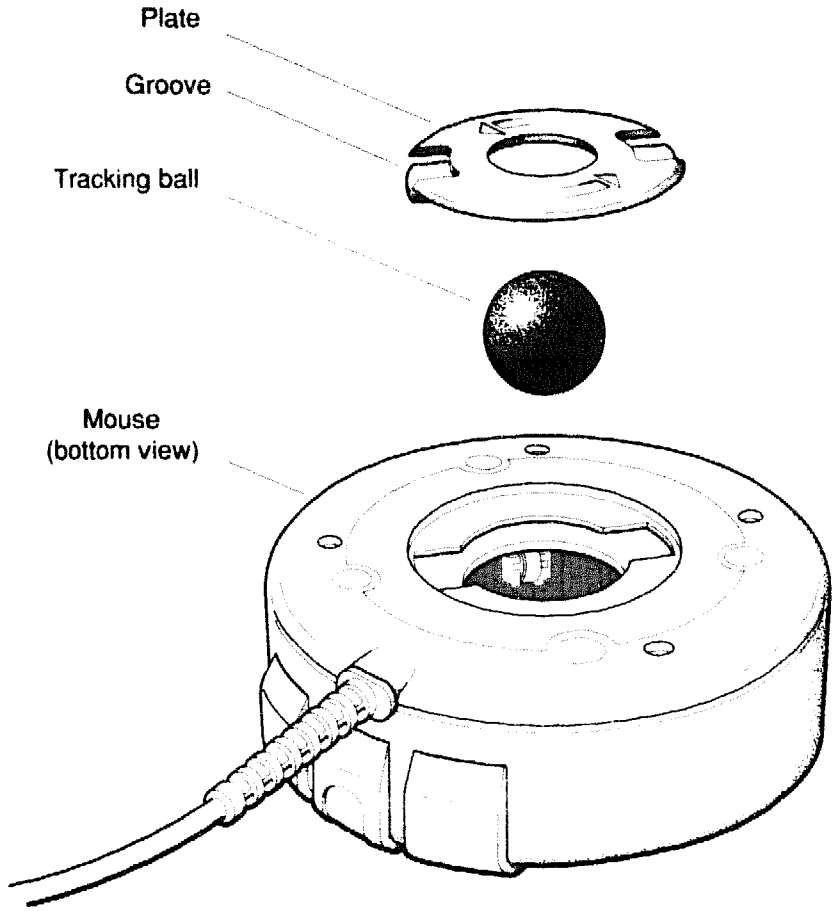


Figure 2-21. Removing the tracking ball from the mouse

4. Wash the ball with lukewarm water and, if necessary, mild soap.

   Caution: *Organic solvents, such as toluene or trichlorethane, damage the rubber coating.*

5. Dry the ball with a soft, lint-free cloth.
6. Replace the ball and then the plate.
7. Turn the plate to your right to lock it into place.

Connecting the Keyboard and Mouse or Tablet to the System Unit

The keyboard and mouse or tablet are connected to a keyboard-mouse cable assembly that connects to the system unit.

The keyboard-mouse cable assembly that came with your workstation has a 15-pin connector at one end and a connector block that contains connectors for the keyboard and mouse or tablet at the other end.

The 15-pin connector attaches to the back of the system unit. The plastic flap on the connector block slides under one of the feet on the back of the base of the monitor, where it holds the block in place next to the monitor.

Connect the Cable Assembly to the System Unit

1. Position the cable connector so the DIGITAL logo is on top.
2. Push the cable connector all the way onto the connector on the system unit.
3. Turn the screws on the cable connector to your right to tighten them.

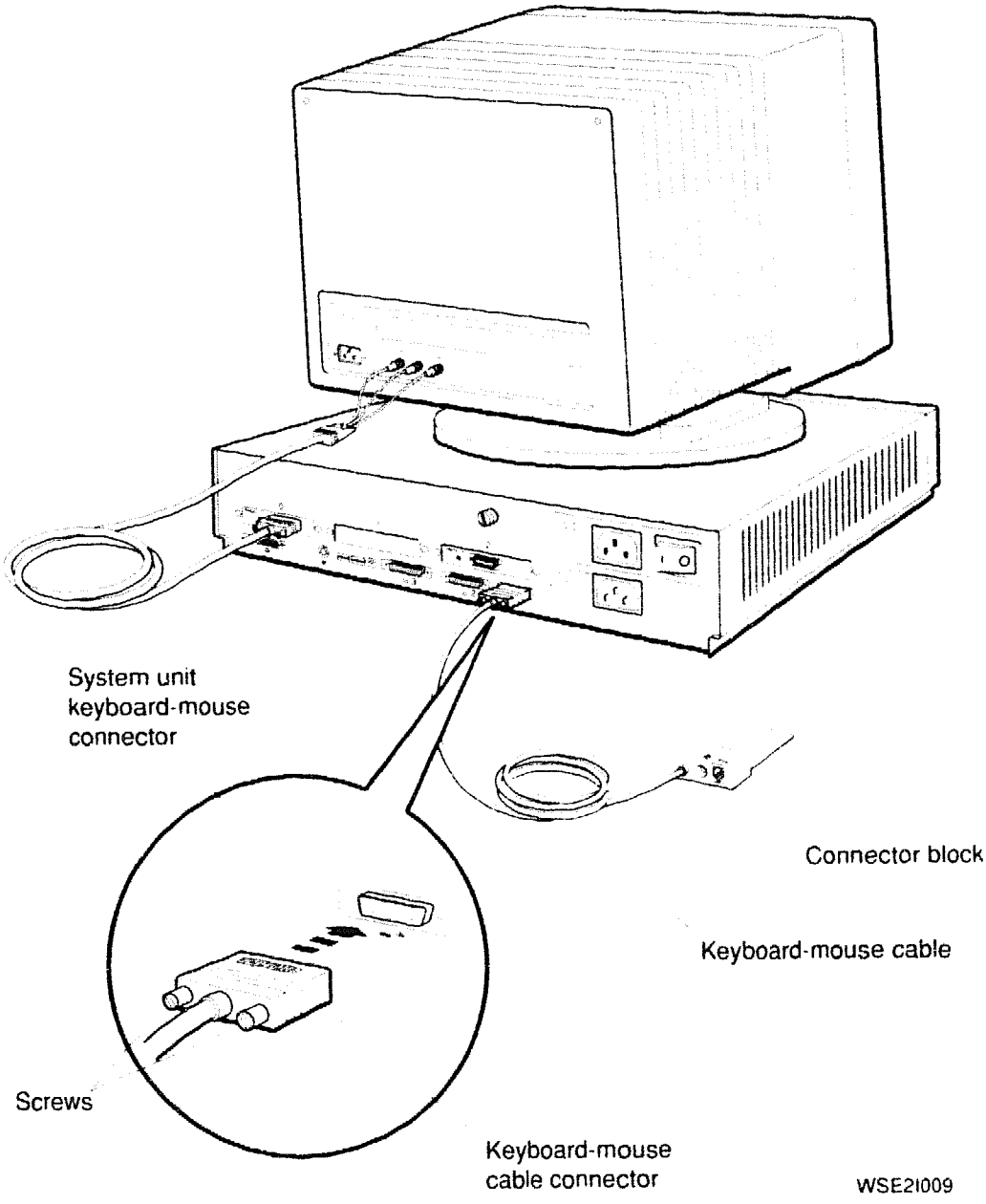


Figure 2-22. Connecting the keyboard-mouse cable

Position the Connector Block Next to the Monitor

1. Position the connector block so the keyboard and mouse icons are on top.
2. Slide the flap on the connector block on the free end of the cable under the back of your monitor until the block rests against the monitor and the flap is lodged securely under one of the feet on the monitor.

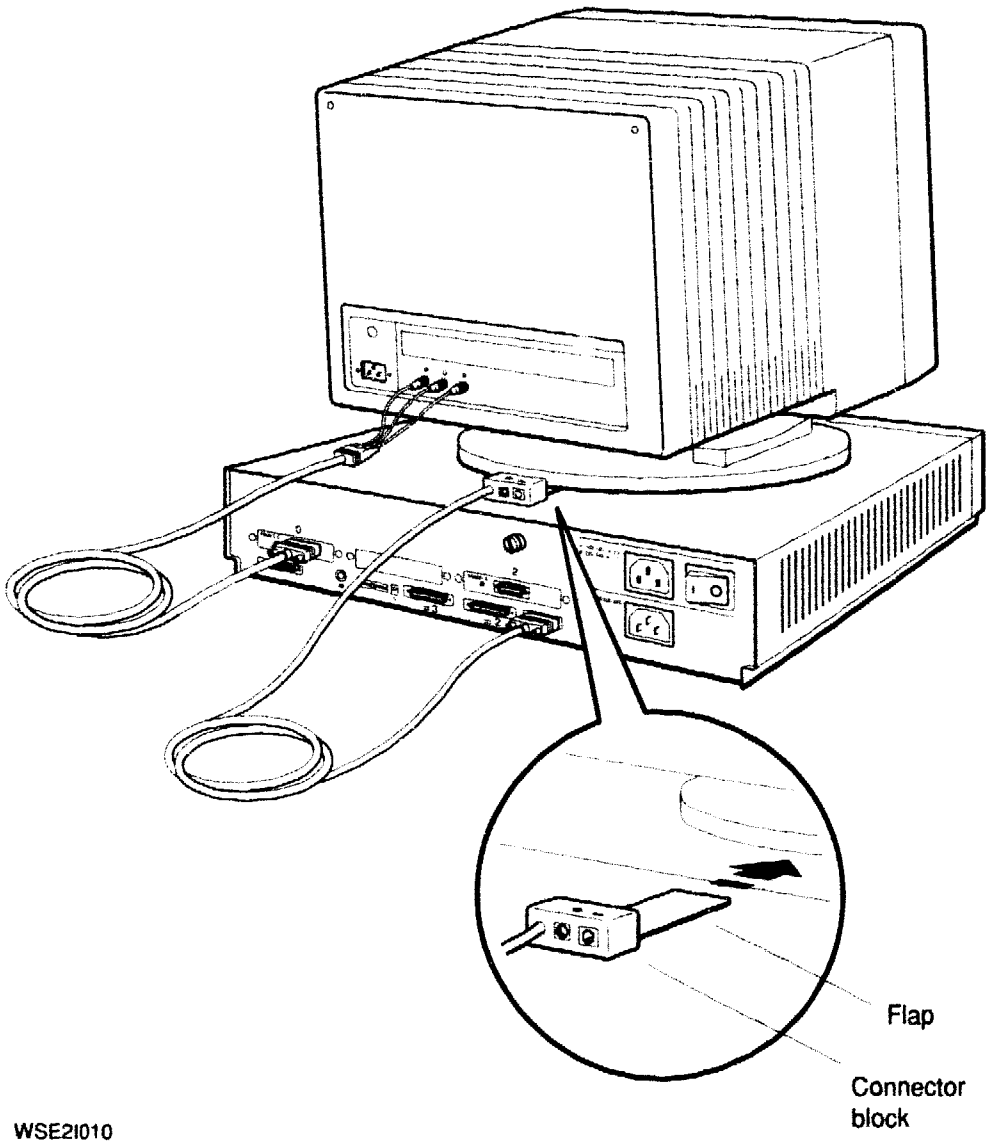


Figure 2-23. Positioning the connector block

Connect the Keyboard to the Connector Block

1. Position the keyboard cable connector so the clip is on the bottom.
2. Push the cable connector into the connector below the keyboard icon on the connector block. The cable connector snaps into place.

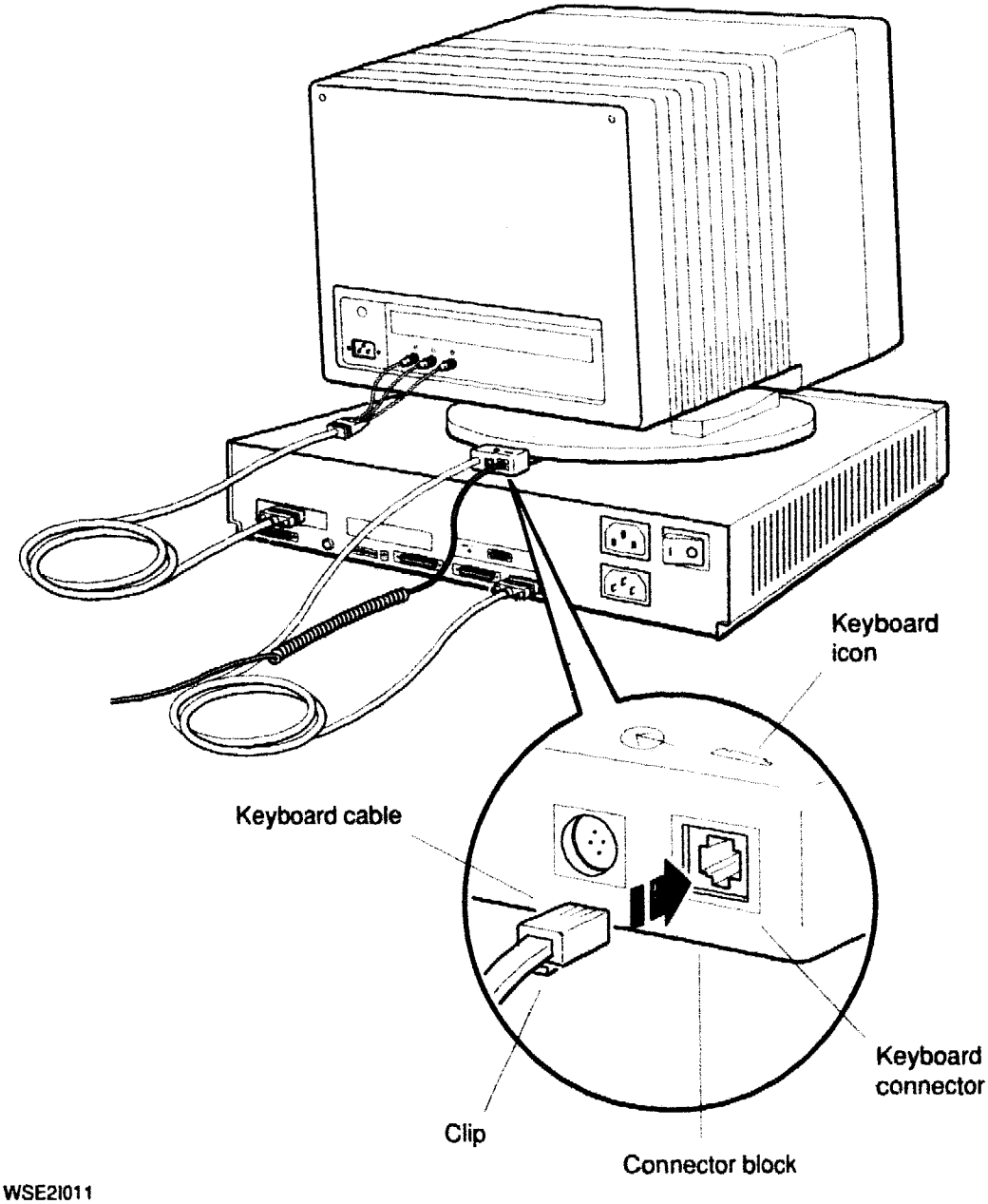


Figure 2-24. Connecting the keyboard to the connector block

Connect the Mouse or Tablet to the Connector Block

1. Carefully align the icon on the top of the mouse or tablet cable connector with the mouse icon on the connector block.
2. Push the cable connector all the way into the connector on the connector block.

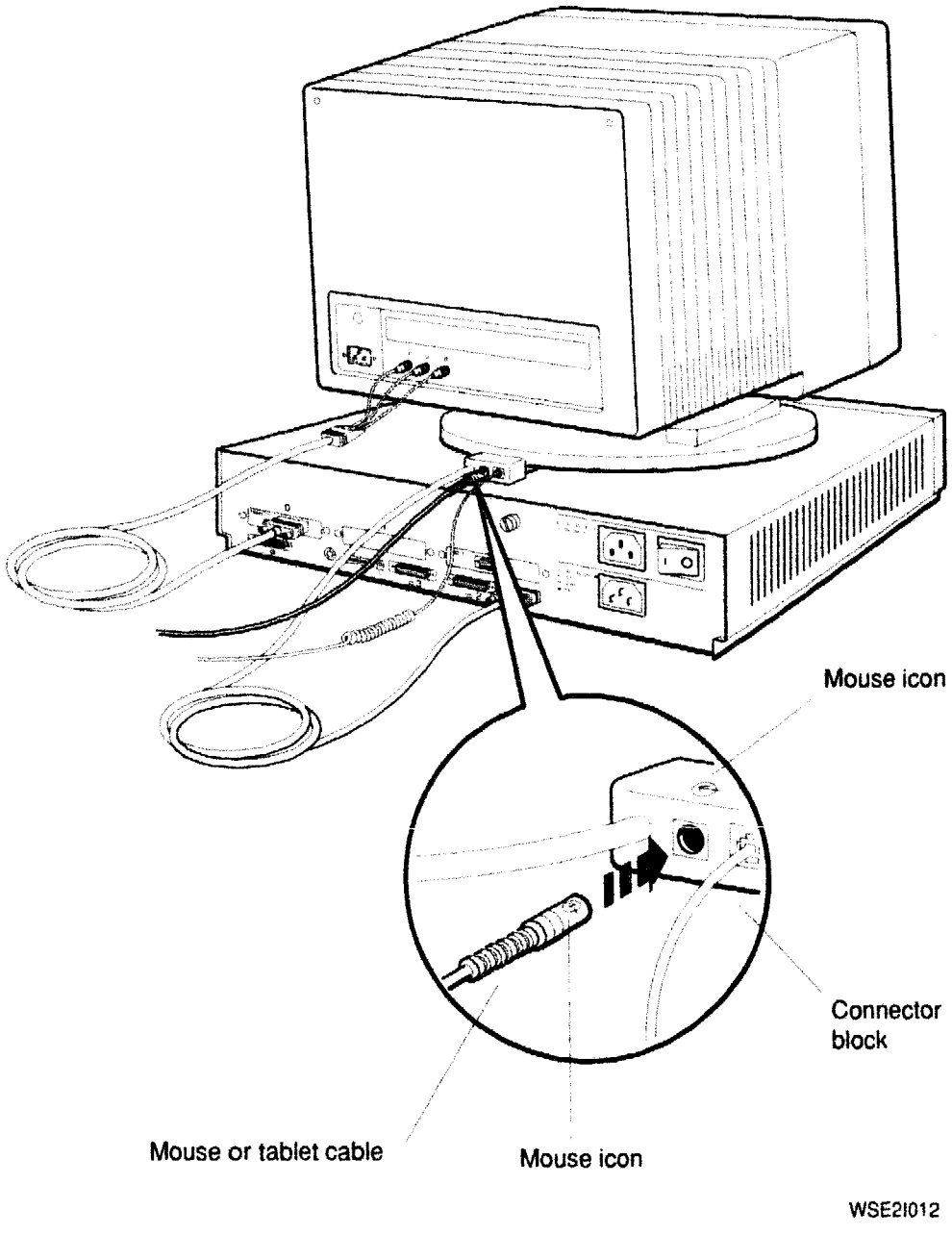


Figure 2-25. Connecting the mouse or tablet to the connector block

Supplying Power to the System Unit and Monitor

The DECstation 5000 Model 200 workstation comes with two identical power cords (one for the system unit and one for the monitor) and a monitor-to-system-unit power cable.

The monitor-to-system-unit power cable allows your monitor to receive its power through the system unit. Use it when your monitor is on top of or next to the system unit.

Use the monitor power cord when your monitor is too far from the system unit for the monitor-to-system-unit cable to reach between them.

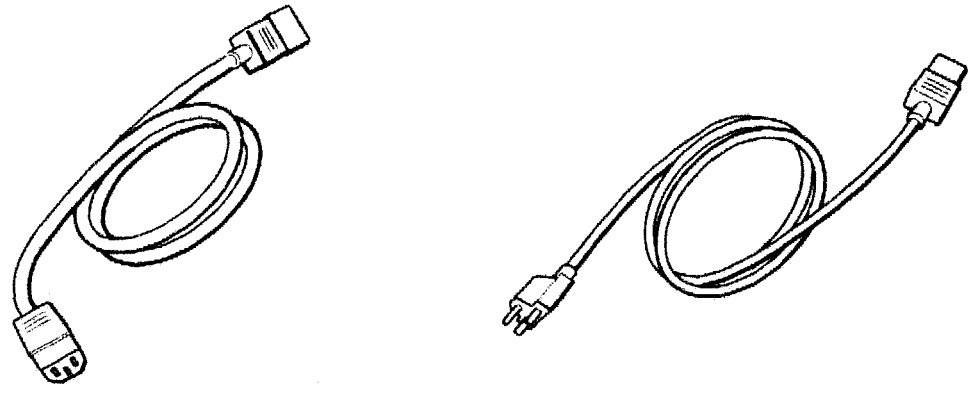


Figure 2-26. A monitor-to-system-unit power cable and a monitor or system unit power cord

Connect the Monitor-to-System-Unit Power Cable or the Monitor Power Cord

To use the monitor-to-system-unit power cable

Plug the pronged end of the cable into the power connector on the back of the system unit as shown in Figure 2-27.

Then plug the prongless end of the cable into the power connector on the back of the monitor as shown in Figure 2-28.

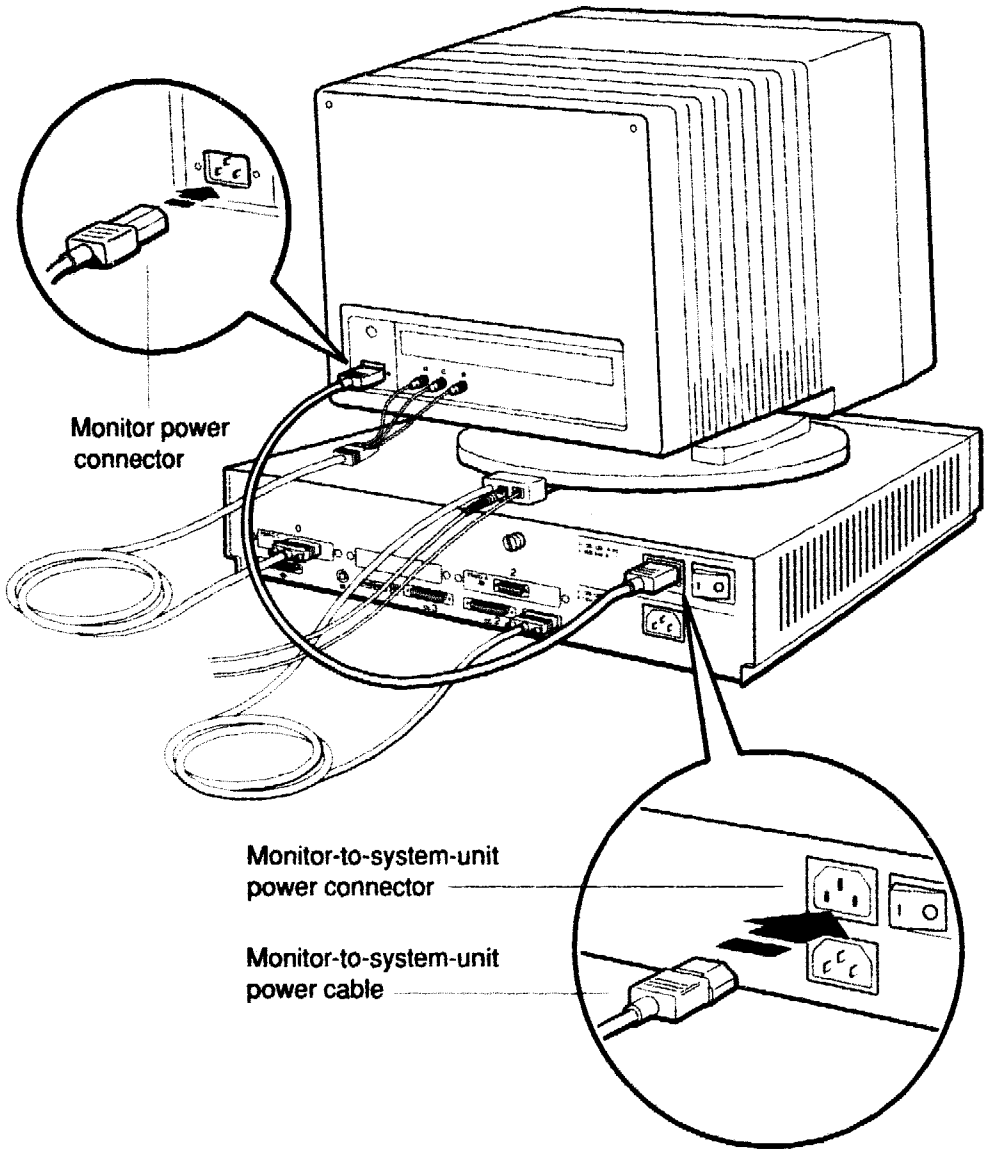


Figure 2-27. Connecting the monitor-to-system-unit power cable to the system unit and monitor

To use the monitor power cord

Plug the prongless end of the power cord into the power connector on the monitor.

Then plug the pronged end of the cord into the power source.

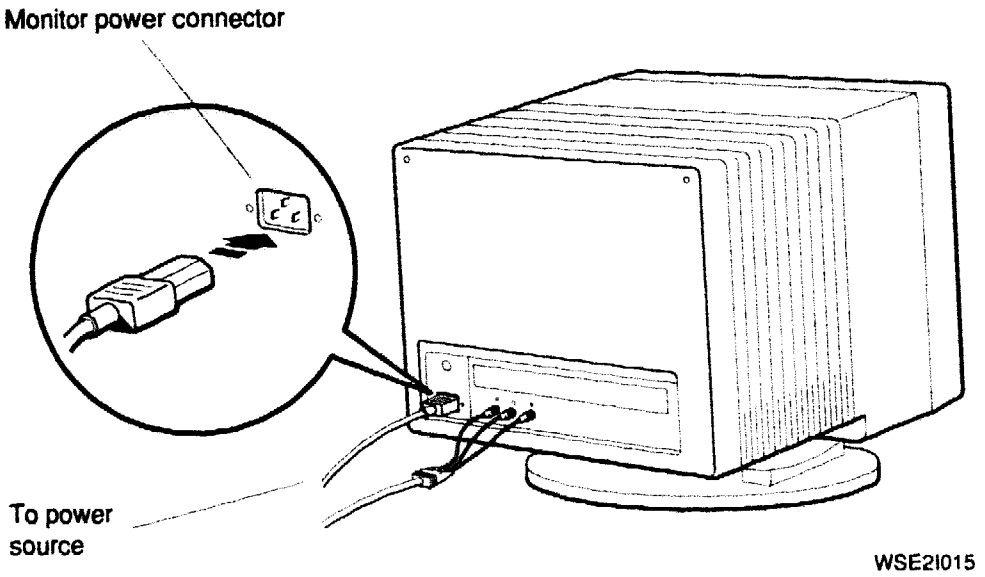


Figure 2-28. Connecting a power cord to a monitor

Connect the System Unit Power Cord

Plug the prongless end of the power cord into the power connector on the back of the system unit.

Then plug the pronged end of the cord into the power source.

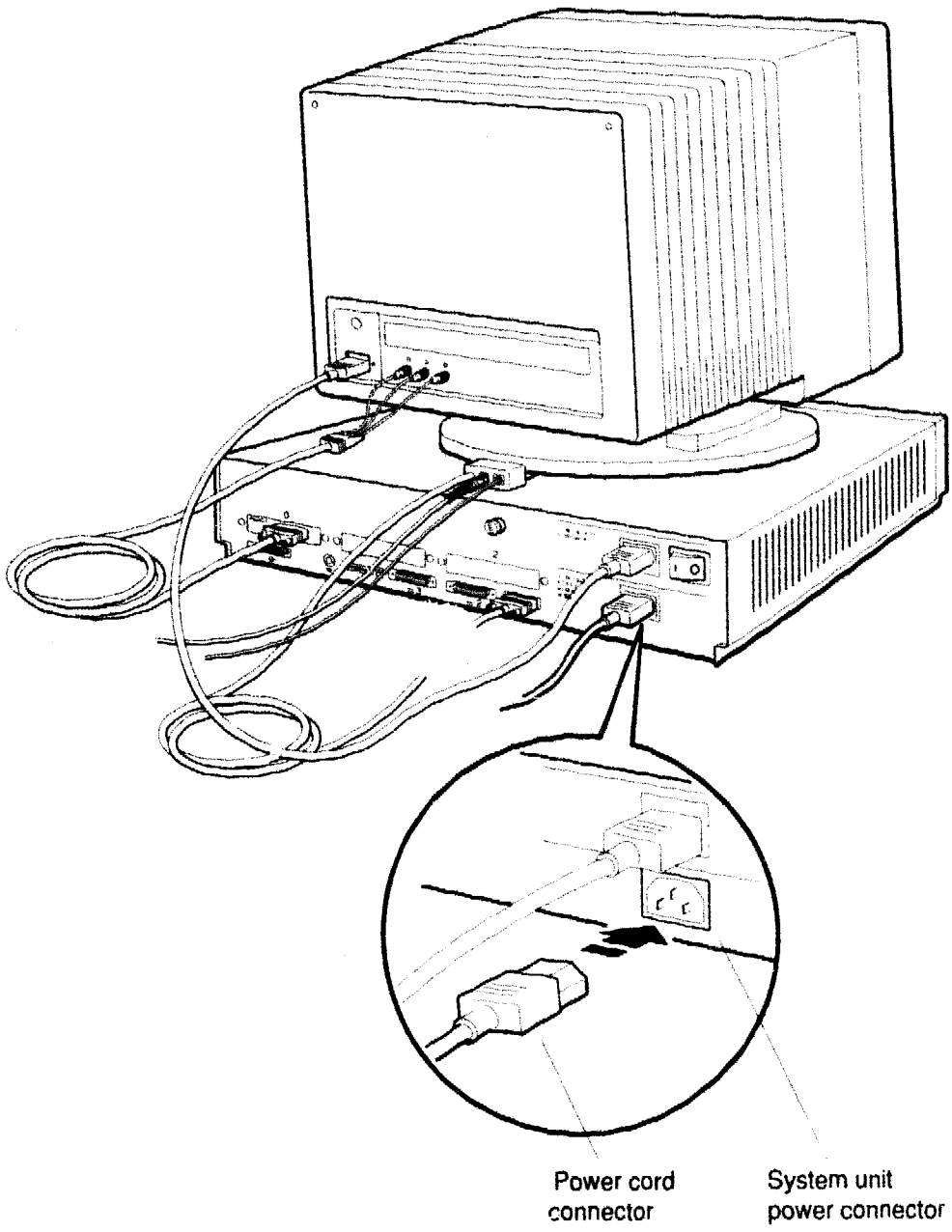


Figure 2-29. Connecting the power cord to the system unit

3

Ethernet Hardware for the Basic Workstation

This chapter explains

- How to terminate ThinWire Ethernet on the system unit
- How to connect a ThickWire loopback connector to a ThickWire option module in the system unit
- Where to find out how to connect to ThinWire and ThickWire Ethernet networks

Terminating ThinWire Ethernet

The basic DECstation 5000 Model 200 workstation comes with a ThinWire Ethernet connector already in place in base slot 6 in the system unit. A ThinWire T-connector and two T-connector terminators came with your shipment.

Ethernet connections are optional. If you want to use your workstation without connecting it to a ThinWire Ethernet network, simply terminate the ThinWire connector on the system unit.

If you want to connect your workstation to a ThinWire network, see the discussion of ThinWire network connections in Chapter 6 of this guide.

To terminate ThinWire Ethernet

1. Find the T-connector and the two T-connector terminators that came with your shipment.
2. Attach the terminators to the T-connector.
   a. Firmly push each terminator onto the T-connector.
   b. Twist the terminator on your left toward you and the terminator on your right away from you until they slide toward the T-connector and lock into place.

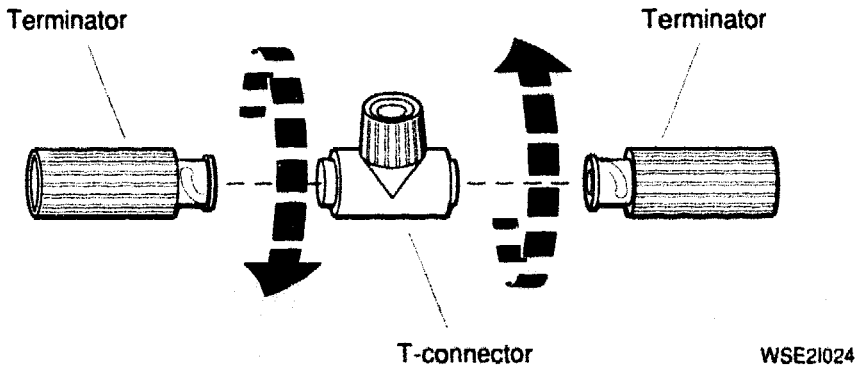


Figure 3-1. Attaching terminators to a T-connector

3. Push the ribbed portion of the terminated T-connector onto the ThinWire Ethernet connector, which is located above the Ethernet icon on the back of the system unit.
4. Twist the ribbed portion of the T-connector from side to side until you can push it onto the system unit connector.
5. Twist the ribbed portion of the T-connector to your right until it locks into place on the system unit connector.

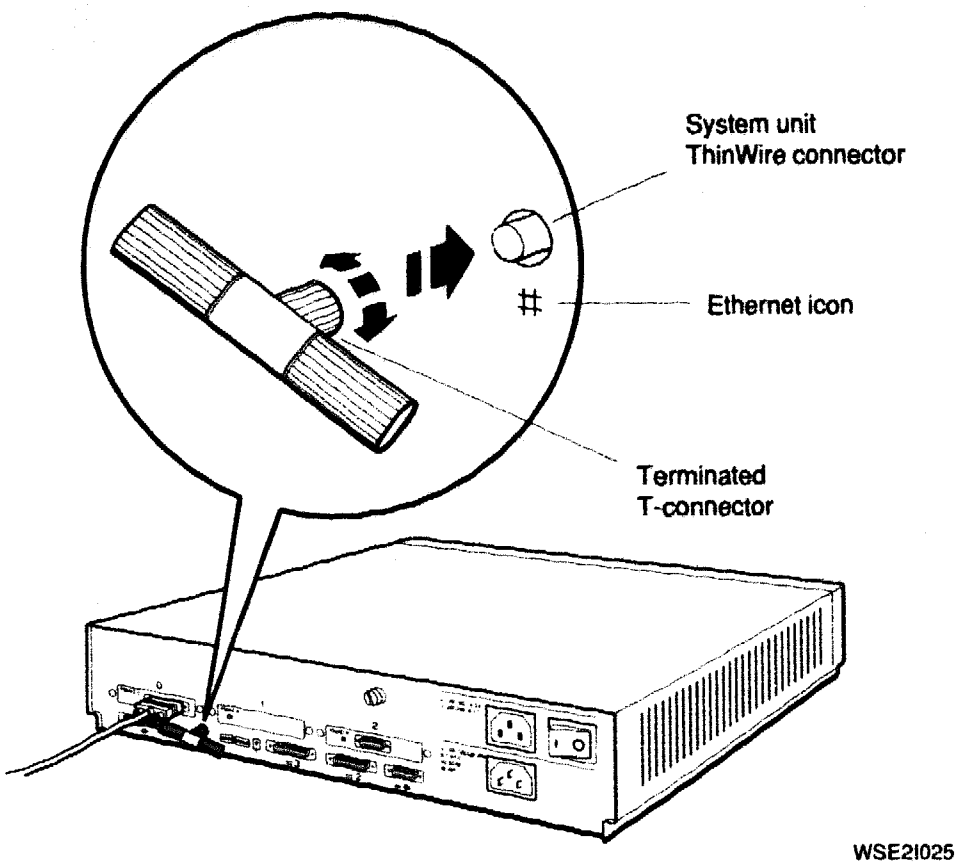


Figure 3-2. Terminating ThinWire Ethernet

Connecting ThickWire Ethernet Loopback Connectors

ThickWire Ethernet connectors can be in one or more of the option slots on the back of the system unit. Figure 3-3 shows a ThickWire Ethernet connector in option slot 2.

If you have a ThickWire option module installed in your system unit and you want to use your workstation without connecting it to a ThickWire Ethernet network, connect a ThickWire loopback connector to the ThickWire connector on the system unit.

If you want to connect your workstation to a ThickWire network, see the discussion of ThickWire network connections in Chapter 6 of this guide.

To install ThickWire Ethernet loopback connectors

1. For each ThickWire connector on the system unit, find the square ThickWire Ethernet loopback connector that came with your shipment.
2. Position the loopback connector so the DIGITAL logo is on top.
3. Firmly press the loopback connector onto the ThickWire connector.

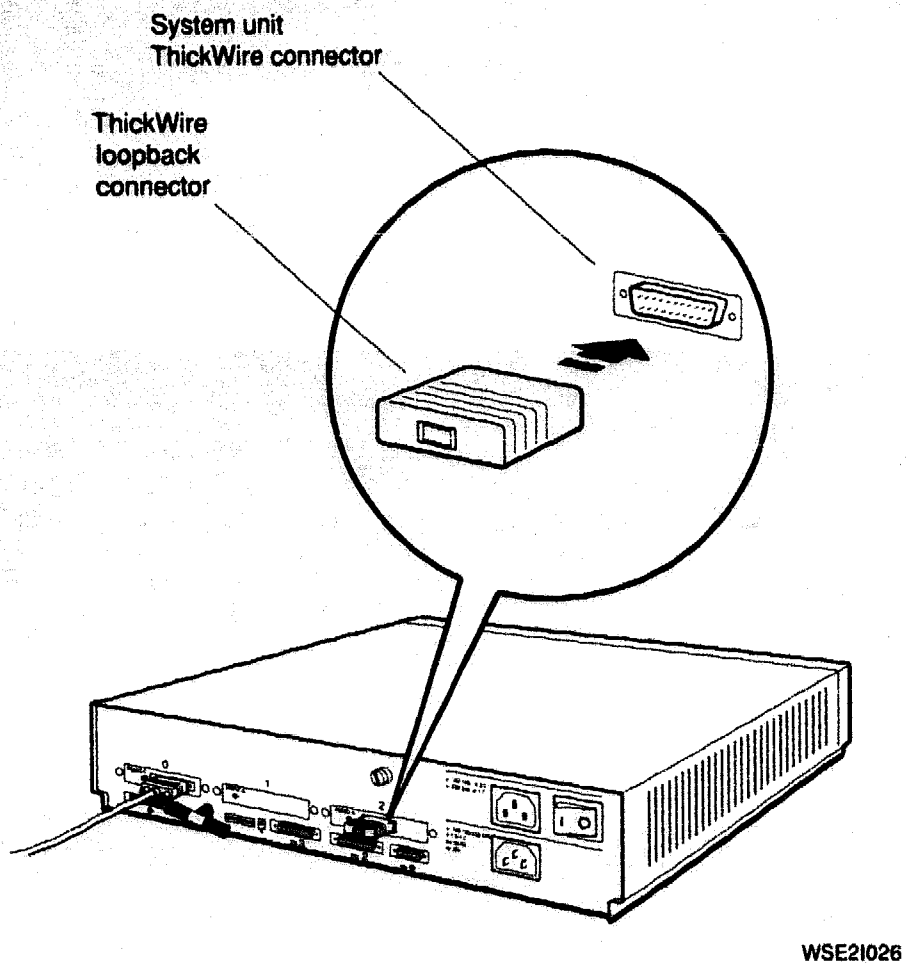


Figure 3-3. Attaching a ThickWire loopback connector

4

Internal Hardware Options

This chapter explains

- How to remove and replace the cover of the system unit
- How to use the antistatic wrist strap
- How to install and remove memory modules in the system unit
- How to install and remove option modules in the system unit

Removing and Replacing the System Unit Cover

Memory modules and graphics, SCSI, and ThickWire Ethernet option modules are installed inside the system unit.

You need the following items, which came in the accessories kit shipped with the basic workstation, when installing or removing an option module:

- A Phillips screwdriver
- A flat-blade screwdriver
- An antistatic wrist strap

Caution: *Use an antistatic wrist strap when handling any of the modules inside the system unit and when removing any static-sensitive materials from an antistatic bag. Failure to do so can result in damage to equipment.*

To remove the cover from the system unit

1. If you are removing the cover from a workstation already running software, first shut down the workstation software according to the instructions that came with that software.
2. Turn off the system unit by pressing the 0 on the on/off switch on the back of the unit.
3. Turn off the monitor. If you are installing a graphics module, disconnect the video cable assembly from the system unit.
4. Unplug the system unit power cord from the power source.
5. Loosen the cover-release screw on the back of the system unit. (Note that this is a captive screw; you can only loosen it, not remove it from the back of the system unit.)
6. Facing the front of the system unit, grasp each side of the cover and pull it straight toward you until it is free from the unit, as shown in Figure 4-1.

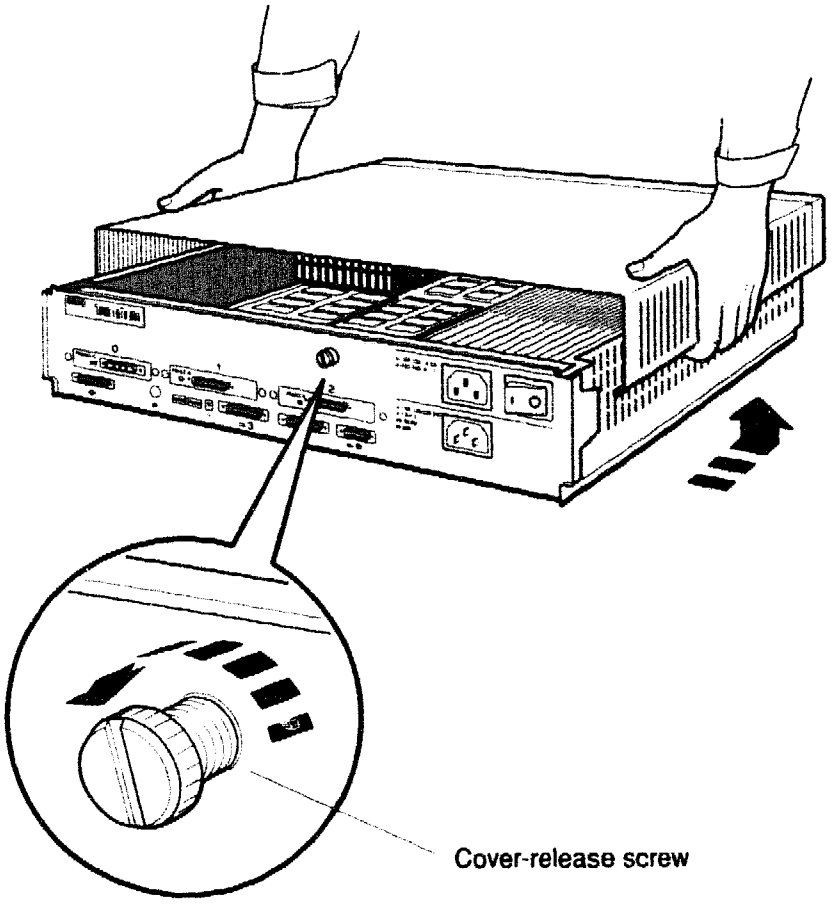


Figure 4-1. Removing the cover from the system unit

Before you touch anything inside the system unit or remove any static-sensitive item, such as an option or a memory module, from an antistatic bag, place the antistatic wrist strap around your wrist and clip the free end of the strap to the metal frame that encloses the system unit. Figure 4-2 illustrates how to use an antistatic wrist strap.

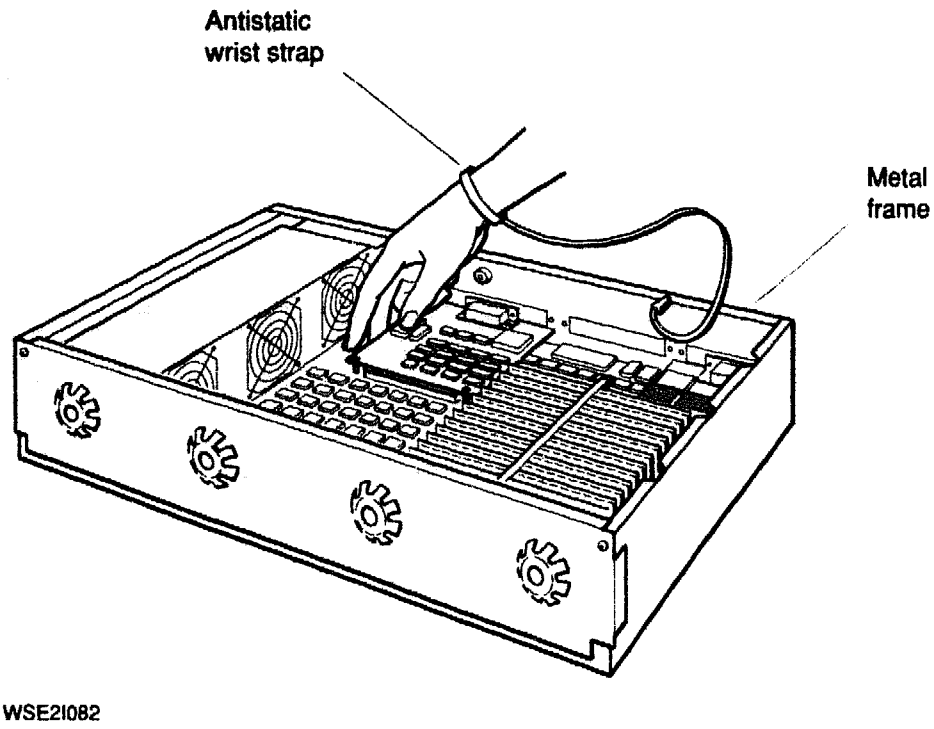


Figure 4-2. Using an antistatic wrist strap

To replace the cover on the system unit

1. Facing the front of the system unit, place your hands on each side of the cover and position the cover so it rests on top of the unit about 3 inches short of the back panel of the unit.
2. Move the cover straight toward the back of the unit until it slips into place on the unit.
3. Press the cover-release screw on the back of the unit toward you and turn it to your left until it locks into place.

Installing and Removing Memory Modules

Each workstation comes with at least one 8-megabyte or one 32-megabyte memory module.

If you are installing 8-megabyte memory modules, your workstation will support up to 15 modules, or 120 megabytes of memory. If you are installing 32-megabyte memory modules, workstations using versions of ULTRIX prior to ULTRIX version 4.0 will support up to 256 megabytes of memory, or 8 modules. Workstations using ULTRIX version 4.0 and later will support up to the maximum 480 megabytes of memory, or 15 modules.

Install either all 8-megabyte or all 32-megabyte memory modules in your system unit. Do not mix 8-megabyte modules and 32-megabyte modules in the same system.

To distinguish between 8-megabyte and 32-megabyte memory modules, look at the part number label on the back of the module (see Figure 4-3). The part number for an 8-megabyte memory module is 5419813-AA. The part number for a 32-megabyte memory module is 5419813-CA. (Note that the last letter in each part number may vary.)

You can add one memory module to each vacant memory slot in the system unit (see Figure 4-4).

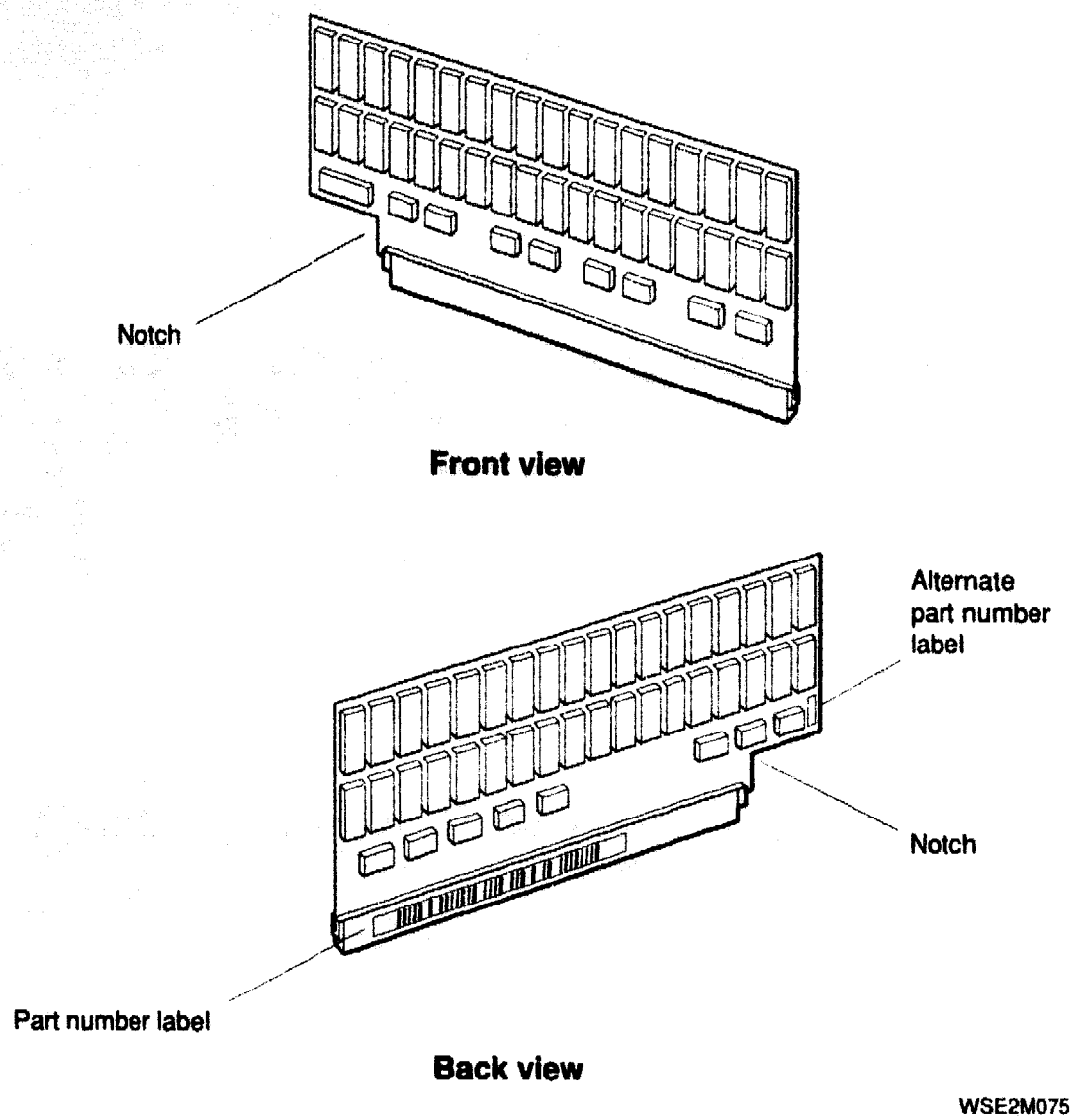


Figure 4-3. A memory module

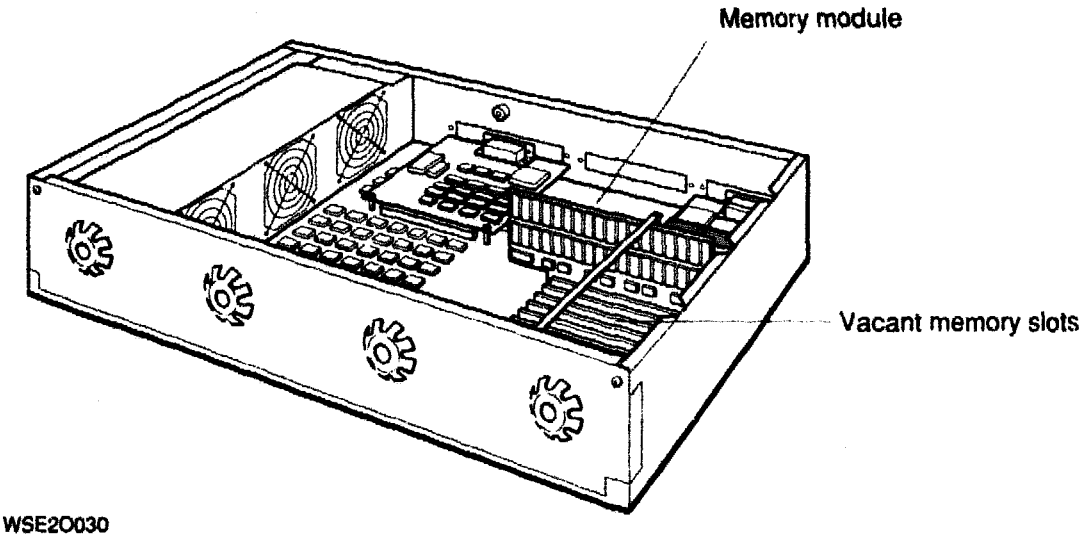


Figure 4-4. Memory inside the system unit

To install memory modules

1. If necessary, follow the instructions that came with your worksystem software to shut down the software.
2. Turn off the system unit and the monitor.
3. Unplug the system unit power cord from the power source.
4. Remove the cover from the system unit.
5. Place the loop on the antistatic wrist strap around your wrist and clip the other end to the metal frame that encloses the system unit.

6. Locate the metal bracket that locks the memory modules in place (see Figure 4-5).
7. Loosen the two screws on the bracket until the bracket can be pulled away from the system unit.

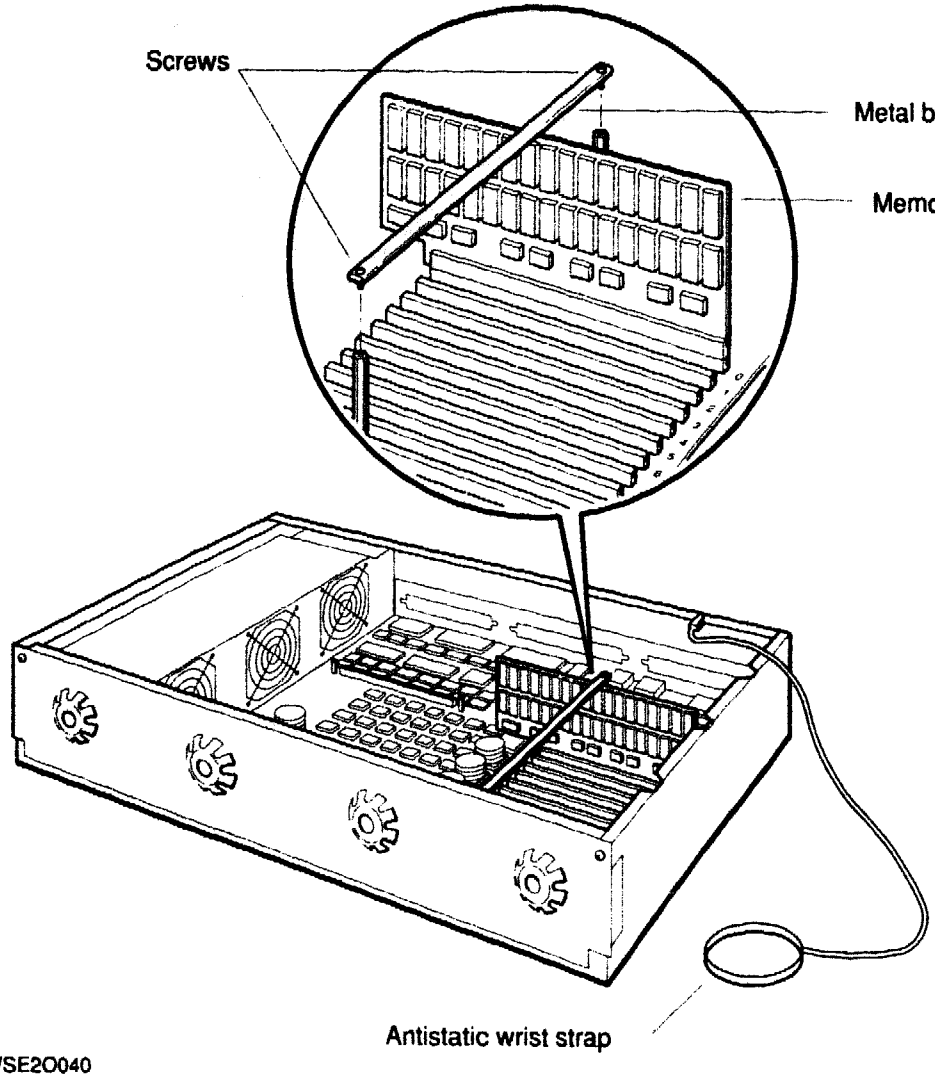


Figure 4-5. Releasing the memory module bracket

8. Look at the slot numbers printed beside the memory module slots inside the system unit. Find the empty slot with the lowest number.
9. Align the connector on the module with the lowest-numbered vacant connector in the system unit.
10. Push the memory module connector all the way into the memory connector on the system unit.

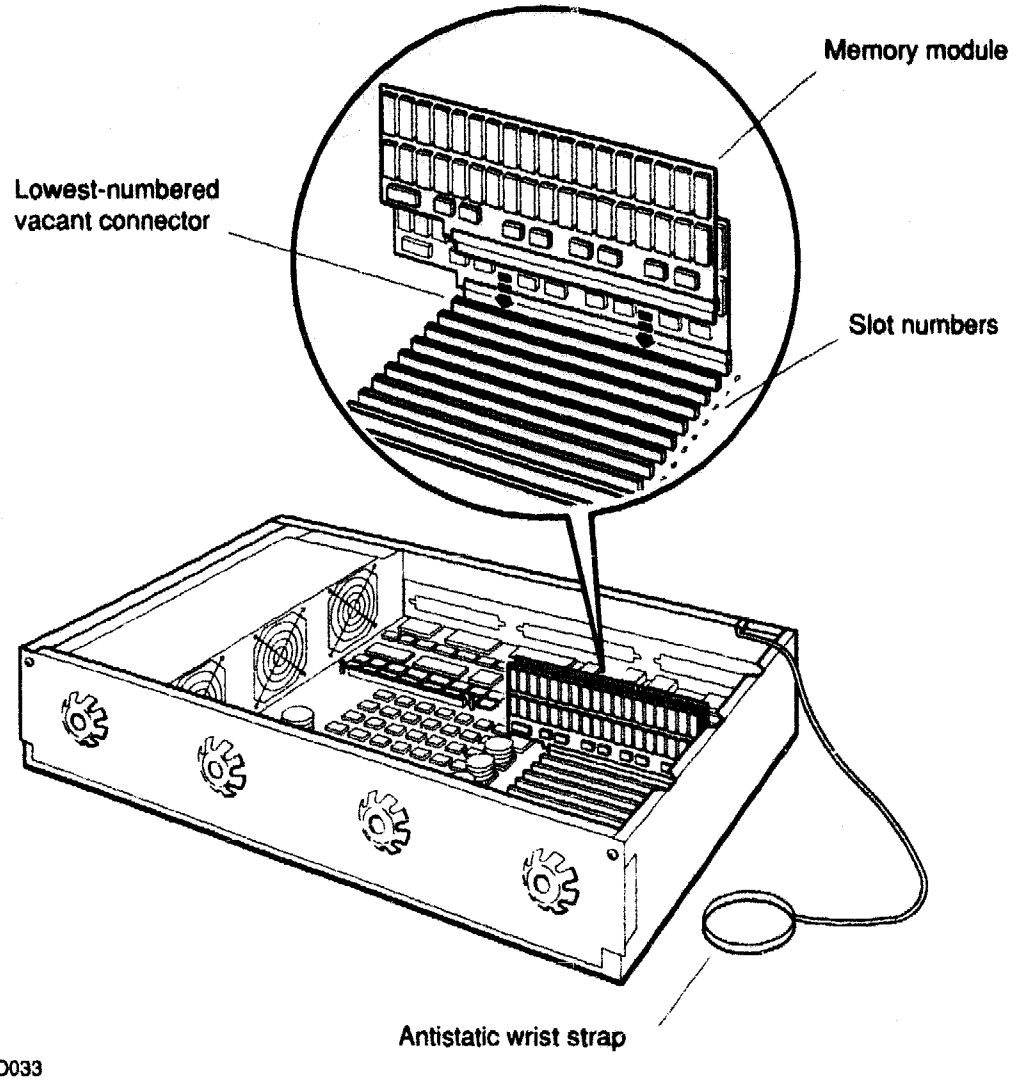


Figure 4-6. Installing a memory module

11. Replace the metal bracket and the two screws that hold it in place.
12. Remove the antistatic wrist strap from your wrist and from the system unit.
13. Replace the cover on the system unit.
14. Plug the system unit power cord into the power source.
15. First turn on the monitor, then the system unit.

    When the system unit completes the power-up self-test successfully, the console prompt appears on the screen.
16. Type **t 7/mem** followed by a space and the number of the memory slot into which you have just installed the memory module.

    For a memory module in slot 2, type **t 7/mem 2**, and so on.

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

    ```
    **\
    ```

    When the test has completed successfully, the console prompt (>>) appears at the end of this display.

    If something other than the console prompt appears, turn to Chapter 9 of this guide for troubleshooting instructions.

To remove memory modules

1. If necessary, follow the instructions that came with your worksystem software to shut down the software.
2. Turn off the system unit and the monitor.
3. Unplug the system unit power cord from the power source.
4. Remove the cover from the system unit.
5. Place the loop on the antistatic wrist strap around your wrist and clip the other end to the metal frame that encloses the system unit.

6. Locate the metal bracket that locks the memory modules in place (see Figure 4-7).
7. Loosen the two screws on the bracket until the bracket can be pulled away from the system unit.

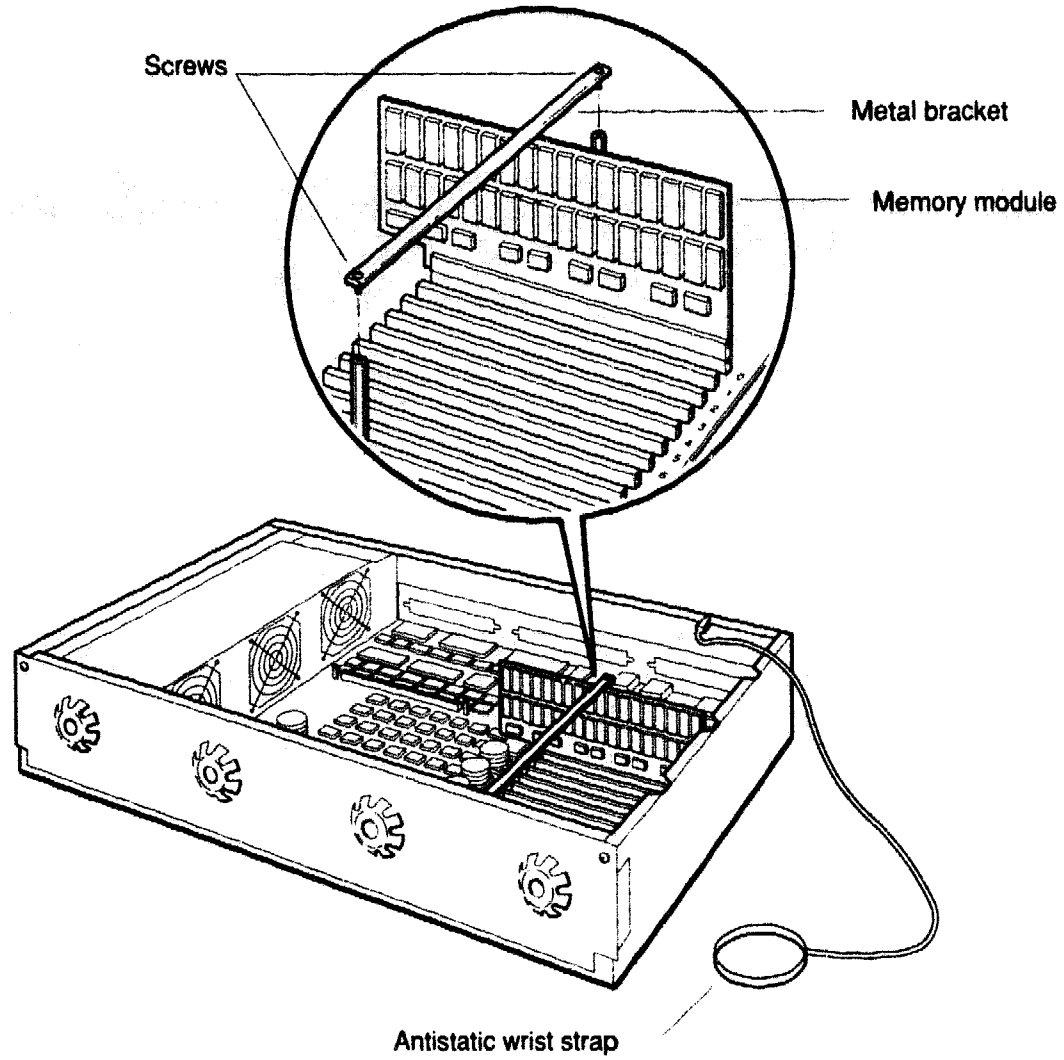


Figure 4-7. Releasing the memory module bracket

8. Locate the memory module in the highest-numbered slot and pull that module straight up until it is free of its connector.

   To remove more than one memory module, remove the second module from the next highest-numbered slot, the third from the third highest, and so on.

9. Replace the metal bracket and tighten the screws.
10. Remove the antistatic wrist strap and replace the cover on the system unit.
11. Plug the system unit power cord into the power source.
12. First turn on the monitor, then the system unit.

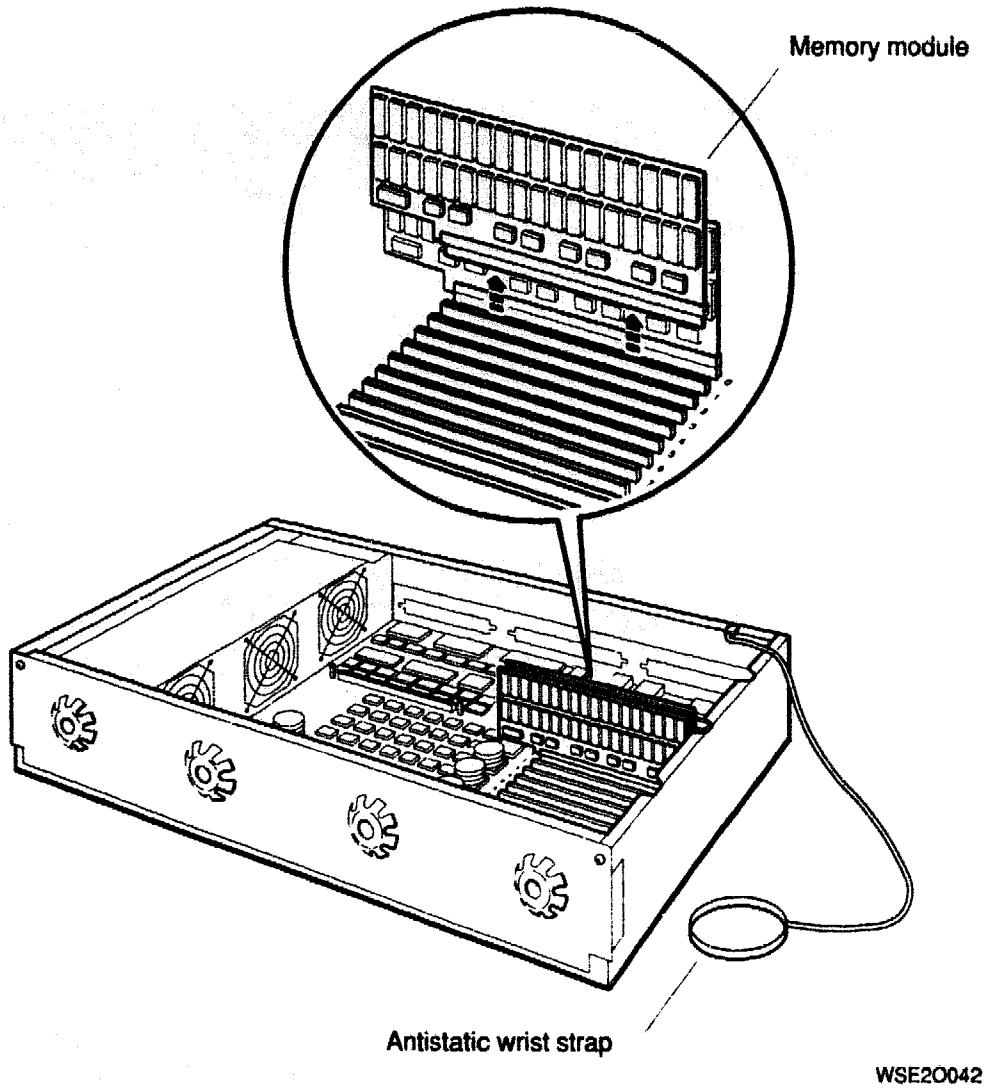


Figure 4-8. Removing a memory module

Installing and Removing Option Modules

Option modules available for the DECstation 5000 Model 200 workstation include the following:

- Graphics option modules

  Graphics option modules provide two- and three-dimensional gray-scale and color graphics on a monitor.

  Connecting the monitor to the video connector on the system unit is discussed in Chapter 2.

- SCSI modules

  SCSI modules link the system unit to the workstation's hard disk, tape, and optical compact disc drives.

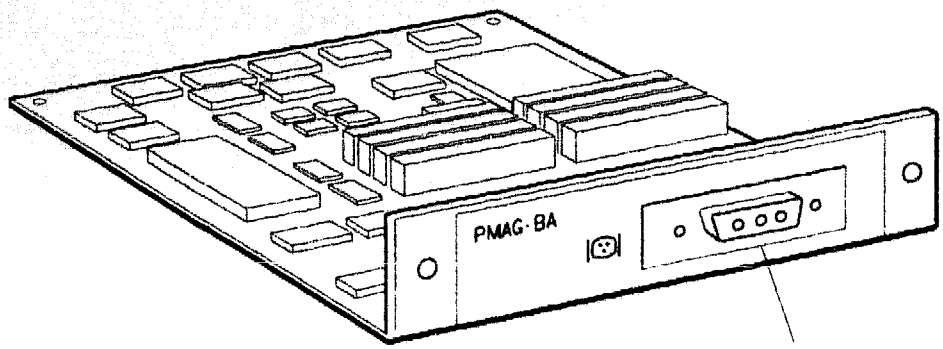
  Connecting SCSI devices to SCSI connectors on the system unit is discussed in Chapter 5.

- ThickWire Ethernet modules

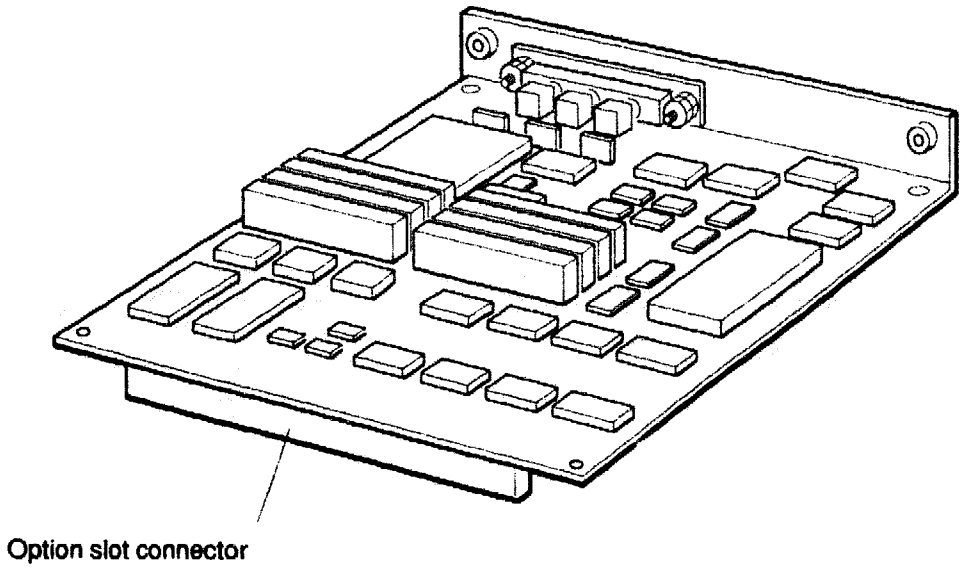
  Each ThickWire Ethernet module provides a ThickWire Ethernet connection. Up to three ThickWire modules can be installed in the system unit.

  Connecting Ethernet networks to Ethernet connectors on the system unit is discussed in Chapter 6.

Figure 4-9 shows an option module and its connectors. Figure 4-10 shows the option slots inside the system unit.



Front view



Back view

WSE2M027

Figure 4-9. An option module

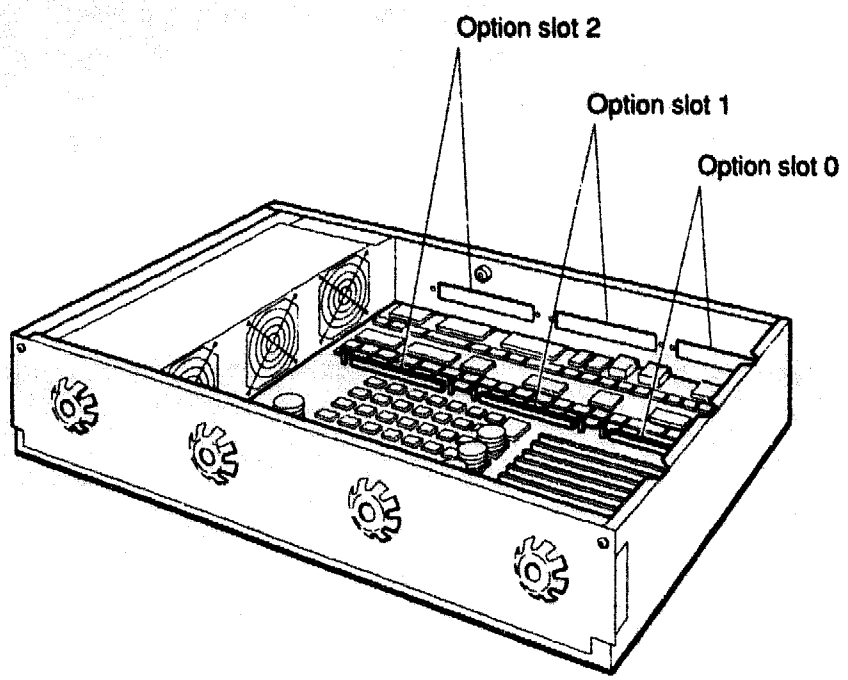


Figure 4-10. Option slots inside the system unit

All option modules are installed and removed in the same manner.

- A monochrome frame buffer graphics module provides two-dimensional monochrome graphics on a monitor.

  The workstation can support up to three monochrome frame buffer graphics modules, allowing you to connect up to three separate monitors to your workstation. The monitor screens act like windows. You can move your mouse pointer into the monitor screen in which you want to work.

  Install a monochrome frame buffer module in any of the three option slots.

  To display graphics generated by the monochrome frame buffer module, your workstation must have a VR319-D monochrome monitor.

  If you are installing multiple monochrome frame buffer modules, your workstation must have ULTRIX worksystem software version 4.2 or higher.

  Do not install another type of graphics module in a system that already has a monochrome frame buffer module without first removing the monochrome frame buffer.

- A color frame buffer graphics module provides two-dimensional color or gray-scale graphics on a monitor.

  The workstation can support up to three color frame buffer graphics modules, allowing you to connect up to three separate monitors to your workstation. The monitor screens act like windows. You can move your mouse pointer into the monitor screen in which you want to work.

  Install a color frame buffer module in any of the three option slots.

The following monitors will display graphics generated by the color frame buffer module:

- The VR297 color monitor
- The VR299 color monitor
- The VR262 gray-scale monitor

If you are installing multiple color frame buffer modules, your workstation must have ULTRIX worksystem software version 4.2 or higher.

Do not install another type of graphics module in a system that already has a color frame buffer module without first removing the color frame buffer.

- A 2D graphics accelerator module rapidly generates 8-plane two-dimensional graphics on a monitor.

  Install a 2D graphics accelerator module in option slot 0 or 1.

  Caution: *Replacing the system unit cover when a 2D graphics accelerator module is in option slot 2 will damage the module.*

  The following monitors will display graphics generated by the 2D graphics accelerator module:

  - The VRT16-D color monitor
  - The VRT19-D color monitor

  For the 2D graphics accelerator module to work correctly, your workstation must have ULTRIX worksystem software version 4.1 or higher.

  The workstation will support one 2D graphics accelerator module. Do not install another graphics module in a system that has a 2D graphics accelerator module without first removing the 2D graphics accelerator module.

- A low 3D graphics accelerator module provides 8-plane three-dimensional color graphics on a monitor.

  A mid 3D graphics accelerator module provides 24-plane three-dimensional color graphics on a monitor.

  Install a low or mid 3D graphics accelerator module in option slots 0 and 1, with the option cable connector in option slot 0.

  Caution: *Installing a low or mid 3D graphics accelerator module in option slots 1 and 2 can result in damage to the module.*

  To display graphics generated by a low or mid 3D graphics accelerator module, you must have a VRT16-D or VRT19-D color monitor.

  For a low or mid 3D graphics accelerator module to work correctly, your workstation must have ULTRIX worksystem software version 4.1 or higher.

  The workstation will support one low or mid 3D graphics accelerator module. Do not install another graphics module in a system that has a 3D graphics accelerator module without first removing the 3D graphics accelerator module.

- A high 3D graphics accelerator module rapidly generates 24-plane three-dimensional color graphics on a monitor.

  Install a high 3D graphics accelerator module in all three option slots, with the cable connector in option slot 0.

  To display graphics generated by a high 3D graphics accelerator, you must have a VRT16-D or VRT19-D color monitor.

  For a high 3D graphics accelerator module to work correctly, your workstation must have ULTRIX worksystem software version 4.1 or higher.

  The workstation will support one high 3D graphics accelerator module.

To install an option module

1. If necessary, follow the instructions that came with your worksystem software to shut down the software.
2. Turn off the system unit by pressing the 0 on the on/off switch on the back of the unit.
3. Turn off the monitor. If you are installing a graphics module, disconnect the video cable assembly from the system unit.
4. Unplug the system unit power cord from the power source.
5. Remove the cover from the system unit.
6. Place the loop on the antistatic wrist strap around your wrist and clip the free end to the metal frame that encloses the system unit.
7. If the back of the system unit has a metal cover over the opening for the option slot you want to use, remove the two screws that hold the cover in place and then remove the cover.

   Save the cover. You will need to replace it if you ever remove the option module from the system unit.
8. Position the option module so it is parallel to the bottom of the system unit, with its system unit slot connector facing down and its option cable connector facing the option-slot opening in the back of the system unit, as shown in Figures 4-11 through 4-13.
9. Move the option module cable connector through the option slot opening in the back of the system unit.

   If you are installing the module in option slot 0, you may need to tip the module slightly when inserting it into the option slot opening to avoid hitting the memory module braces.
10. Firmly push the option module down onto the support posts and into the option slot connectors on the floor of the system unit.

11. Use the screws that came with your option module to secure the module to the support posts.

    Insert one screw into each support post hole on the option module. Turn each screw to your right until the module is firmly in place.

12. Use the screws that held the metal cover over the option slot to hold the option module in place against the back of the system unit.

13. Remove the antistatic wrist strap from your wrist and from the system unit.

14. Replace the cover on the system unit. If you are installing a graphics module, connect the video cable assembly to the system unit.

15. Plug the system unit power cord into the power source.

16. Turn on the monitor and then the system unit.

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

    If no display appears on your screen, if the console prompt is not displayed, or if anything in addition to the console prompt appears on the screen, see Chapter 9 for troubleshooting instructions.

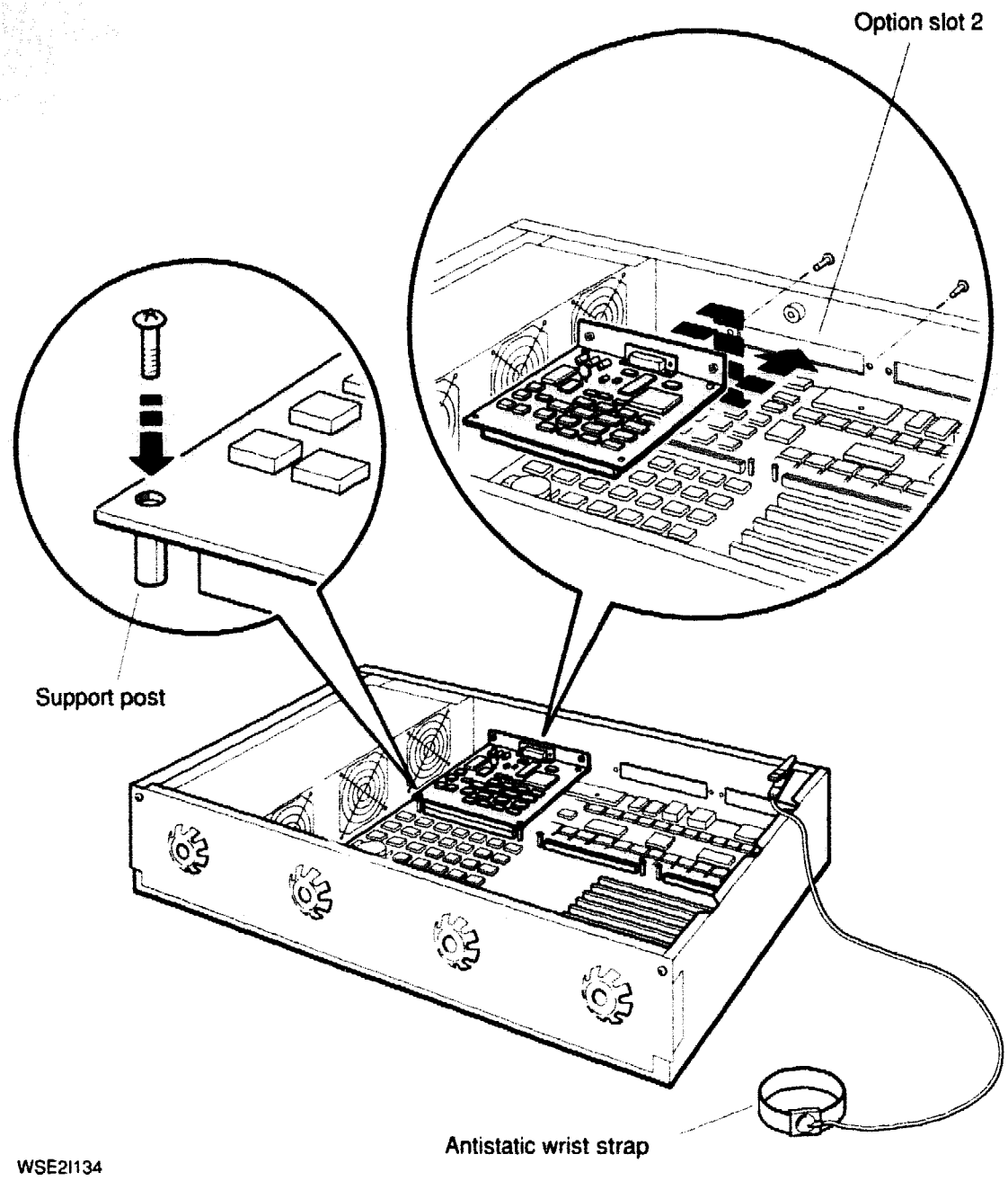


Figure 4-11. Installing an option module in option slot 2

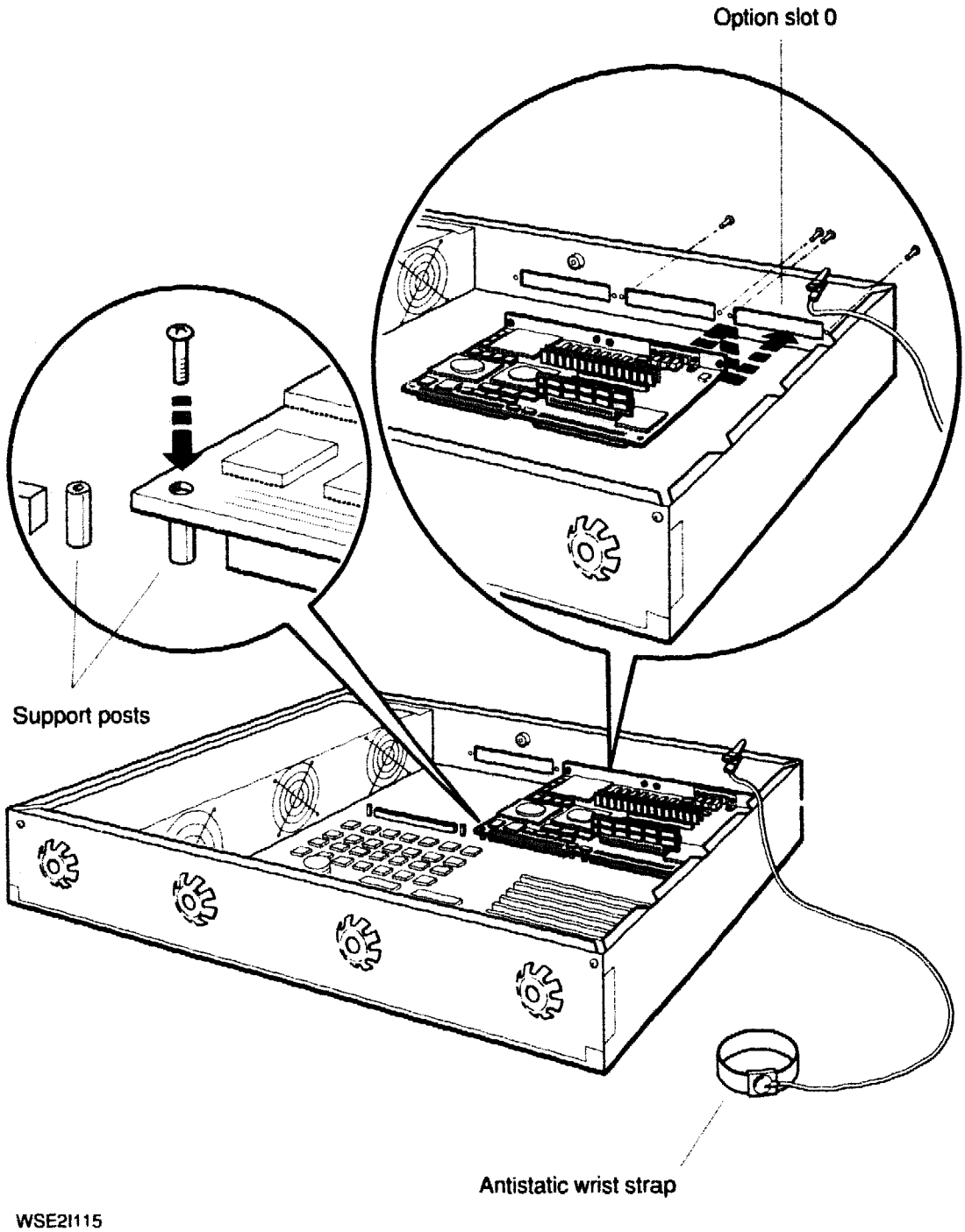


Figure 4-12. Installing a low 3D graphics accelerator option module

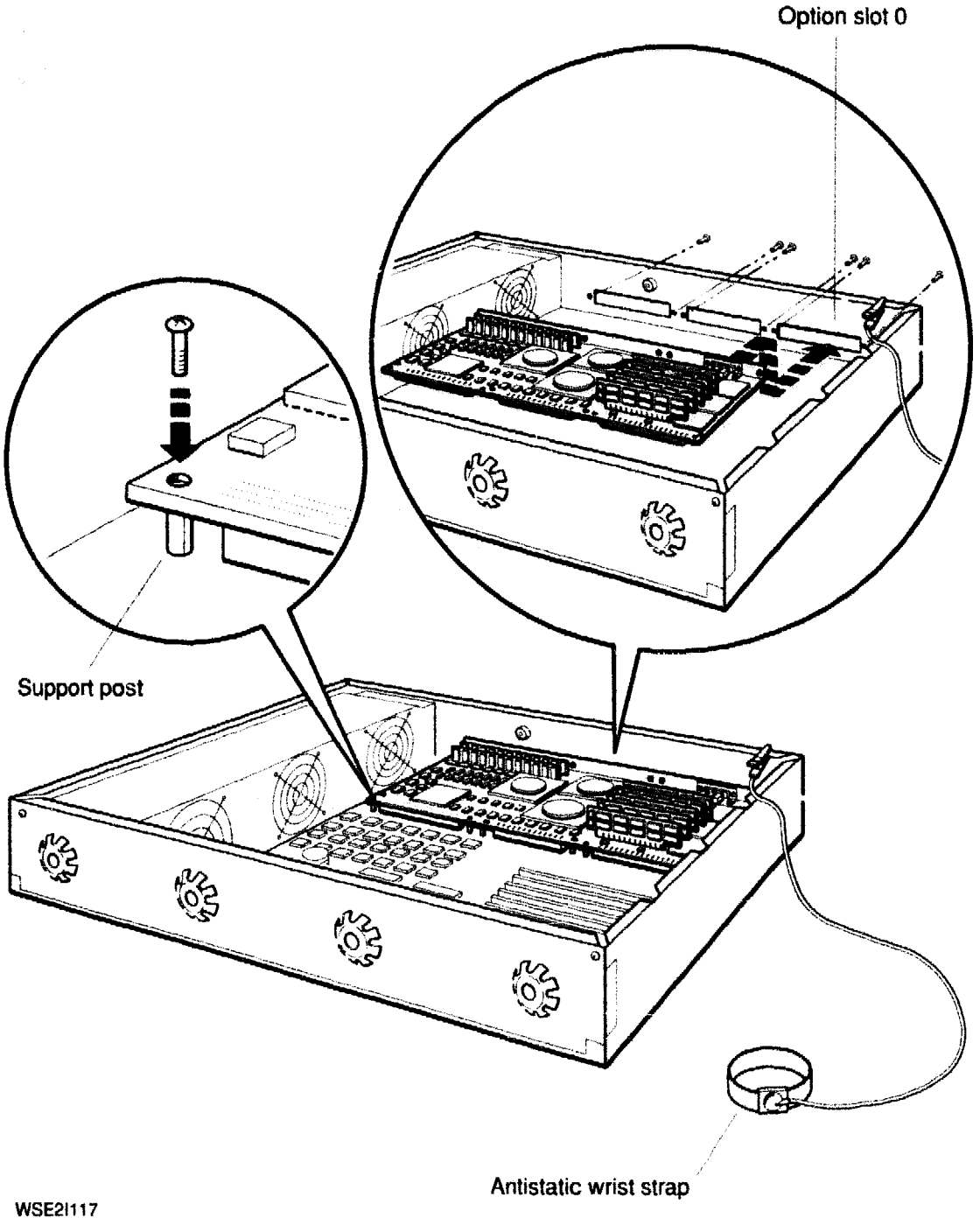


Figure 4-13. Installing a high 3D graphics accelerator option module

Testing a New Option Module

To be sure your new option module has been installed correctly and is working properly, type **cnfg** at the console prompt (>>) and press Return. A display similar to the following appears on the screen:

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

The number that begins each line in the configuration display represents the number of a base slot or an option slot that contains a module.

Look for lines that begin with `0:`, `1:`, and `2:`. These lines represent the option slots on the system unit. In the sample display, all three option slots contain option modules. If an option slot is empty, it does not appear on the configuration display.

The information inside the parentheses at the end of each slot display line shows what kind of module is present in that slot.

- `MX` shows that the module is a monochrome frame buffer.

  A monochrome frame buffer module can be installed in any of the three option slots.

  If you have more than one monochrome frame buffer module installed in your system, the configuration display appears on the monitor connected to the module in the lowest-numbered option slot. For example, if you have monitors connected to monochrome frame buffer modules in option slots 0 and 1, the display for both option slots will appear on the monitor connected to option slot 0, as shown in the following display:

```
1: PMAG-AA   DEC    V5.3a     TCF0    (MX -- d=1)
0: PMAG-AA   DEC    V5.3a     TCF0    (MX -- d=1)
```

- CX shows that the module is a color frame buffer.

  A color frame buffer module can be installed in any of the three option slots.

  If you have more than one color frame buffer module installed in your system, the configuration display appears on the monitor connected to the module in the lowest-numbered option slot. For example, if you have monitors connected to color frame buffer modules in option slots 0 and 1, the display for both option slots will appear on the monitor connected to option slot 0, as shown in the following display:

```
1: PMAG-BA  DEC    V5.3a     TCF0    (CX -- d=8)
0: PMAG-BA  DEC    V5.3a     TCF0    (CX -- d=8)
```

- PX shows that the module is a 2D graphics accelerator module.

  A 2D graphics accelerator module can be installed in option slot 0 or 1.

- DA: PXG shows that the module is a low 3D graphics accelerator. In the sample display, a low 3D graphics accelerator is in option slots 0 and 1. When a low 3D graphics accelerator module is in the system unit, option slot 0 does not appear in the display.

- EA: PXG shows that the module is a mid 3D graphics accelerator. When a mid 3D graphics accelerator module is in the system, option slot 0 does not appear in the display.

- PXG_T shows that the module is a high 3D graphics accelerator. When a high 3D graphics accelerator module is in the system, neither option slot 0 nor option slot 2 appears in the display.

- SCSI shows that you have a SCSI option module.

  A SCSI module is always present in base slot 5.

  In addition, a SCSI option module can be installed in any of the three option slots.

- `enet:` shows that you have an Ethernet module.

  ThinWire Ethernet is always present in base slot 6.

  In addition, a ThickWire Ethernet module can be installed in any of the three option slots on the system unit.

  In the sample display, a ThickWire Ethernet option module is present in option slot 0.

If the module you have just installed does not appear on the configuration display, turn to Chapter 9 for troubleshooting procedures.

To remove an option module

1. If necessary, follow the instructions that came with your worksystem software to shut down the software.
2. Turn off the system unit by pressing the 0 on the on/off switch on the back of the unit.
3. Turn off the monitor.
4. Disconnect the cable from the option module.
5. Unplug the system unit power cord from the power source.
6. Remove the cover from the system unit.
7. Place the loop on the antistatic wrist strap around your wrist and clip the free end to the metal frame that encloses the system unit.
8. Remove the screws that hold the option module in place against the back of the system unit and on its support posts.
9. Gently pull the option module up off the support posts and out of the system module connector on the bottom of the system unit.

   If you are removing the module from option slot 0, you may need to tip the module slightly to avoid hitting the memory module braces.
10. Pull the module out of the slot in the back of the system unit.

11. If the module will not be replaced inside the system unit, replace the metal cover over the empty slot on the back of the system unit. Use the screws that held the option module in place against the back of the system unit.
12. Remove the antistatic wrist strap from your wrist and from the system unit.
13. Replace the cover on the system unit.

5

External Storage Options: Hard Disk, Floppy Disk, Tape, and Optical Compact Disc Drives

This chapter tells you what SCSI storage devices are available for your workstation and how to install them.

External storage devices currently available for your workstation include the following:

- 332-megabyte RZ55 hard disk drive
- 665-megabyte RZ56 hard disk drive
- 1-gigabyte RZ57 hard disk drive
- 95-megabyte TK50Z tape drive
- 1-gigabyte TLZ04 digital audio tape drive
- 635-megabyte RRD40 optical compact disc drive
- 95-megabyte half-height TZ30 tape drive
- 1.44-megabyte RX23 floppy disk drive
- 1.2 half-height RX33 floppy disk drive

Tape drives and floppy disk drives come preinstalled in single-device expansion boxes or BA42 storage expansion boxes, or they can be installed in empty slots in BA42 storage expansion boxes you already have.

Hard disk drives come preinstalled in BA42 storage expansion boxes or can be installed in empty slots in BA42 storage expansion boxes you already have.

Optical compact disc drives come preinstalled in single-device expansion boxes.

The DECstation 5000 Model 200 workstation can have up to 28 external storage devices.

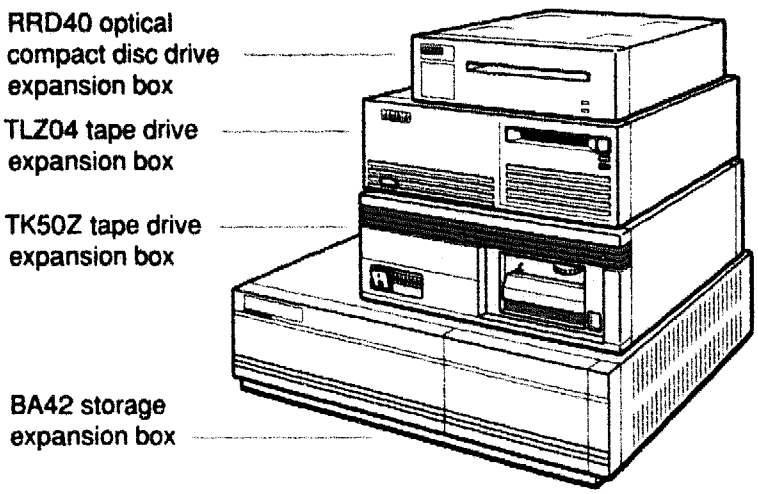


Figure 5-1. Some expansion boxes

The basic workstation comes with one SCSI connector located in base slot 5 on the lower-left corner of the back of the system unit as you face the back of the unit.

Other SCSI connectors can be installed in option slots 0, 1, and 2.

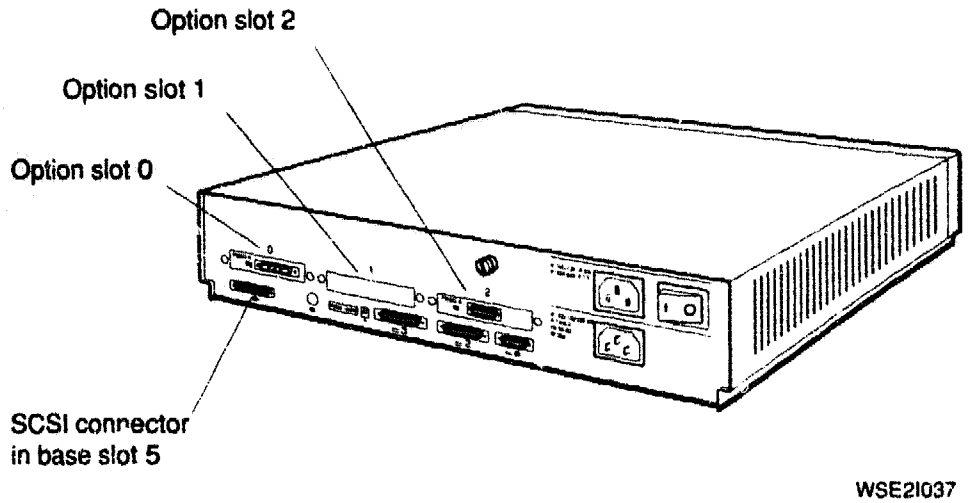


Figure 5-2. A SCSI connector and option slots

The first expansion box connects directly to the SCSI connector on the system unit. Each additional box for that connector connects to the box connected before it.

You can connect up to seven drives to a given SCSI connector. When you count the number of drives you are connecting, remember that the BA42 storage expansion box can contain two drives.

Unless you have only one SCSI connector and seven drives, don't fully load a connector. For example, if you have eight drives and two connectors, attach four drives to each connector.

Set Up Your Expansion Boxes

1. Place the expansion boxes for each SCSI connector as near as possible to where you will use them.
2. For each expansion box, locate the cables and terminators listed here.
   - One system-unit-to-expansion-box cable that has a different connector at each end.
   - One expansion box terminator.
   - One power cord for each expansion box you are using.
   - One 18-inch box-to-box expansion cable with identical connectors at each end for every expansion box except the last box at the SCSI connector.

   Be sure to use the cables that came with the system unit rather than the cables that came with your expansion boxes. The cables you should use are pictured in Figure 5-3.

Caution: *The amount of internal and external cabling cannot exceed 6 meters (236 inches) in length. Using more than 6 meters of cable, including cable inside expansion boxes, to connect devices to a given SCSI connector on the system unit can make those devices unreliable.*

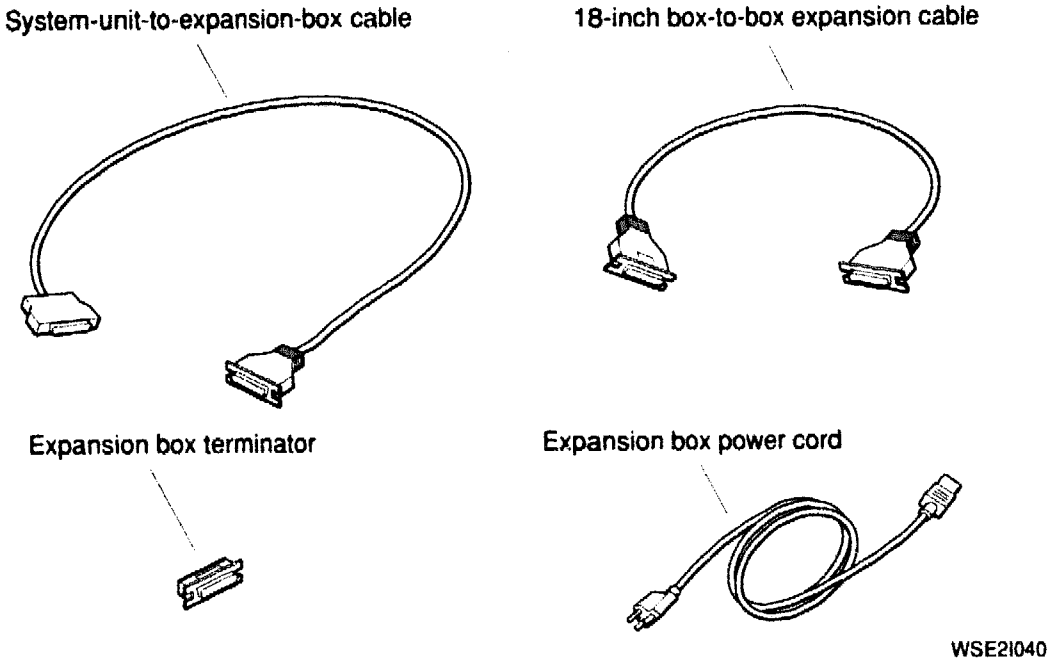


Figure 5-3. Expansion box cables and an expansion box power cord and terminator

When you stack your storage device expansion boxes, use the following table to determine how much cable you will be using.

Table 5-1. SCSI Cable Lengths

Cable	Length
BA42 storage expansion box internal cable	78.7 cm (31 in)
TK50Z tape drive internal cable	35.6 cm (14 in)
RRD40 optical compact disc drive internal cable	16.5 cm (6.5 inches)
TLZ04 tape drive internal cable	96.5 cm (38 in)
50-pin to 50-pin box-to-box external cable	66.0 cm (26 in)
68-pin to 50-pin system-unit-to-expansion-box external cable	188.0 cm (74 in)

Set the SCSI Switches for Each Device

Each expansion device connected to a SCSI connector must be assigned a SCSI ID number for that connector. ID numbers available for expansion devices are 0 through 6. These numbers are assigned by setting switches provided on the expansion boxes or, in the case of floppy disk and tape drives inside a BA42 expansion box, on the drives themselves.

To set the switches on the BA42 storage expansion box, you must first remove the plastic cover that protects the switches. To do so, press up on the tab on the bottom of the cover until you can pull the cover away from the box.

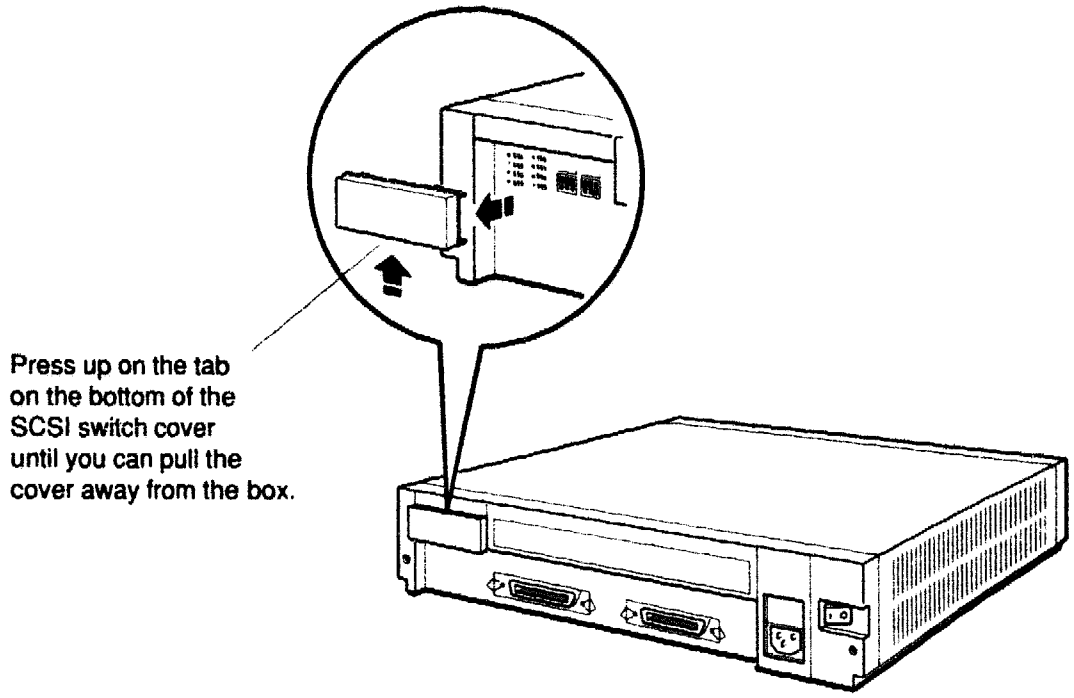


Figure 5-4. Removing the SCSI-switch cover from the BA42 storage expansion box

Use the switch settings listed in Table 5-2 to set the SCSI switches on the backs of your expansion boxes.

When assigning numbers, assign ID 0 to the device closest to the system unit, ID 1 to the device next to it, and so on. If you have a BA42 storage expansion box that contains two hard disk drives, consider the drive on the right side of the box as you face the back of the box to be closer to the system unit than the one on the left. If you have a BA42 expansion box that contains a tape or an optical compact disc drive, see the *BA42 Storage Expansion Box Installation Guide* for instructions on setting ID switches on those drives.

If a BA42 storage expansion box contains only one hard disk drive, use the set of switches on your right as you face the back of the box.

Expansion box SCSI switches are illustrated in Figure 5-5.

Table 5-2. SCSI ID Switch Settings

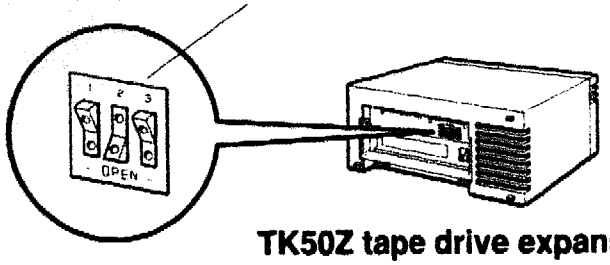
ID Number	Hard Disk Drive RRD40 Compact Disc Drive[1] TZ30 Tape Drive[2]	TK50Z Tape Drive TLZ04 Tape Drive[3] RX23 Floppy Disk Drive RX33 Floppy Disk Drive
7	Reserved	Reserved
6	Up Up Down	Down Down Up
5	Up Down Up	Down Up Down
4	Up Down Down	Down Up Up
3	Down Up Up	Up Down Down
2	Down Up Down	Up Down Up
1	Down Down Up	Up Up Down
0	Down Down Down	Up Up Up

[1]Switch 4 on the RRD40 optical compact disc drive has no effect on the ID number.

[2]Switch 1 (the left switch) on the TZ30 tape drive should always be in the up position. ID switch settings listed here for this drive start with switch 2.

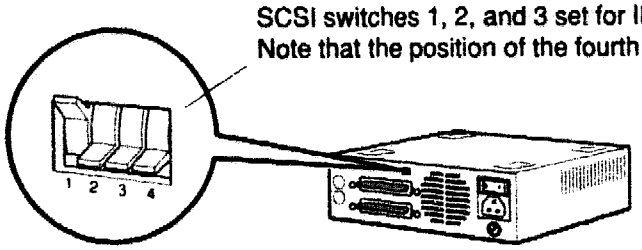
[3]Switch 1 (the left switch) on the TLZ04 tape drive should always be in the up position. ID switch settings listed here for this drive start with switch 2.

SCSI switches set for ID number 5 (Down Up Down).



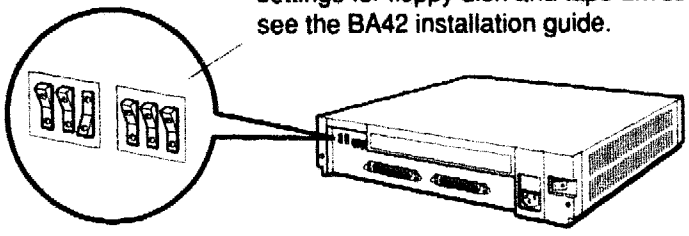
TK50Z tape drive expansion box

SCSI switches 1, 2, and 3 set for ID number 4 (Up Down Down).
Note that the position of the fourth switch has no effect.



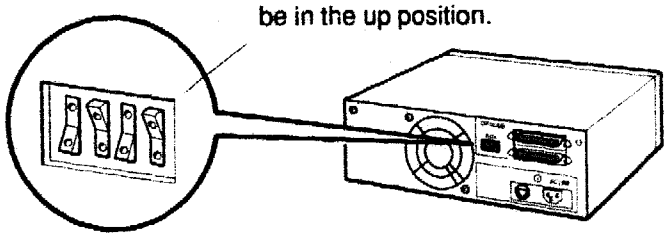
RRD40 optical compact disc drive expansion box

Hard disk drive SCSI switches set for ID numbers 1 (Down Down Up) on the left and 0 (Down Down Down) on the right. For SCSI switch settings for floppy disk and tape drives inside this box, see the BA42 installation guide.



BA42 storage expansion box

SCSI switches set for ID number 5 (Down Up Down beginning with the second switch). The first switch should always be in the up position.



TLZ04 tape drive expansion box

WSE2I075

Figure 5-5. Expansion box SCSI switches

Connect Expansion Boxes to the System Unit

For each SCSI connector on the system unit, perform the following steps:

1. If necessary, follow the instructions that came with your worksystem software to shut down the software.
2. Turn off the system unit and any expansion boxes.
   - Press the 0 on the on/off switch on the BA42 storage expansion box, TK50Z tape drive expansion box, and RRD40 optical compact disc drive expansion box.
   - Press and release the on/off switch on the TLZ04 tape drive to turn it on and off.
3. Position the small metal connector on the system-unit-to-expansion-box cable so the flat side of the connector is on top.
4. Push the cable connector into the SCSI connector until it clicks into place.

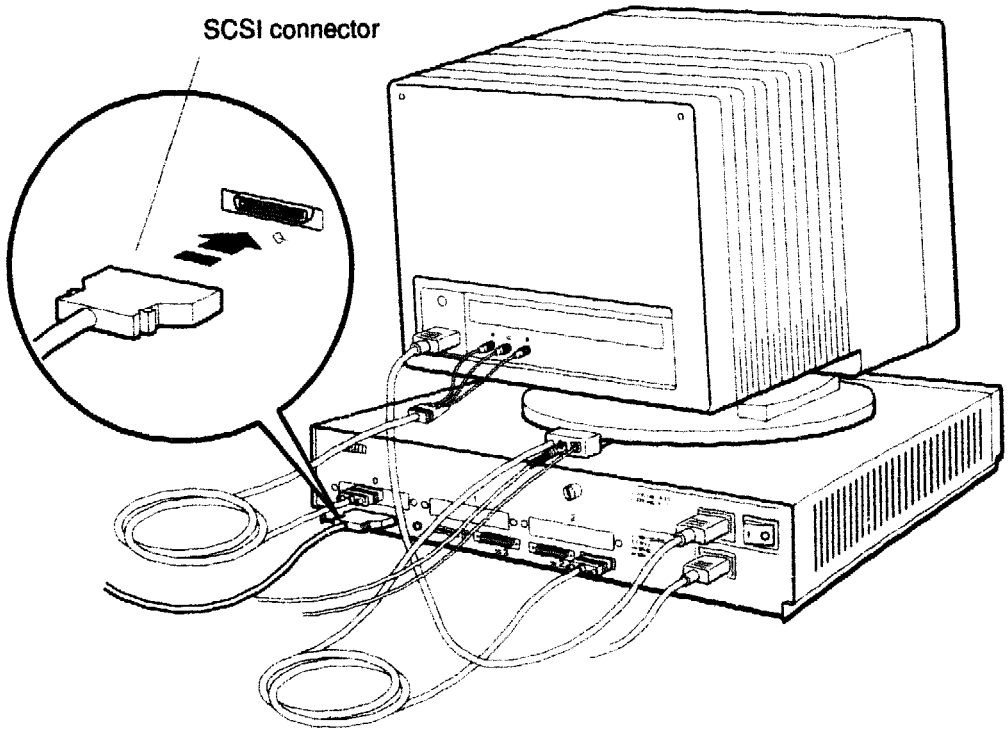


Figure 5-6. Attaching a system-unit-to-expansion-box cable to a SCSI connector on the system unit

5. Attach the free end of the system-unit-to-expansion-box cable to one of the connectors on the back of the first expansion box.

   a. Press the two wire brackets on the expansion box connector away from the connector.

   b. Position the cable connector so the DIGITAL logo is on top.

      If the box you are connecting is a TK50Z tape drive, slide the cable connector up between the handle and the back of the box.

   c. Push the cable connector into the expansion box connector as far as it will go.

   d. Press the two wire brackets firmly against the sides of the cable connector until they click into the grooves on the connector, as shown in Figure 5-7.

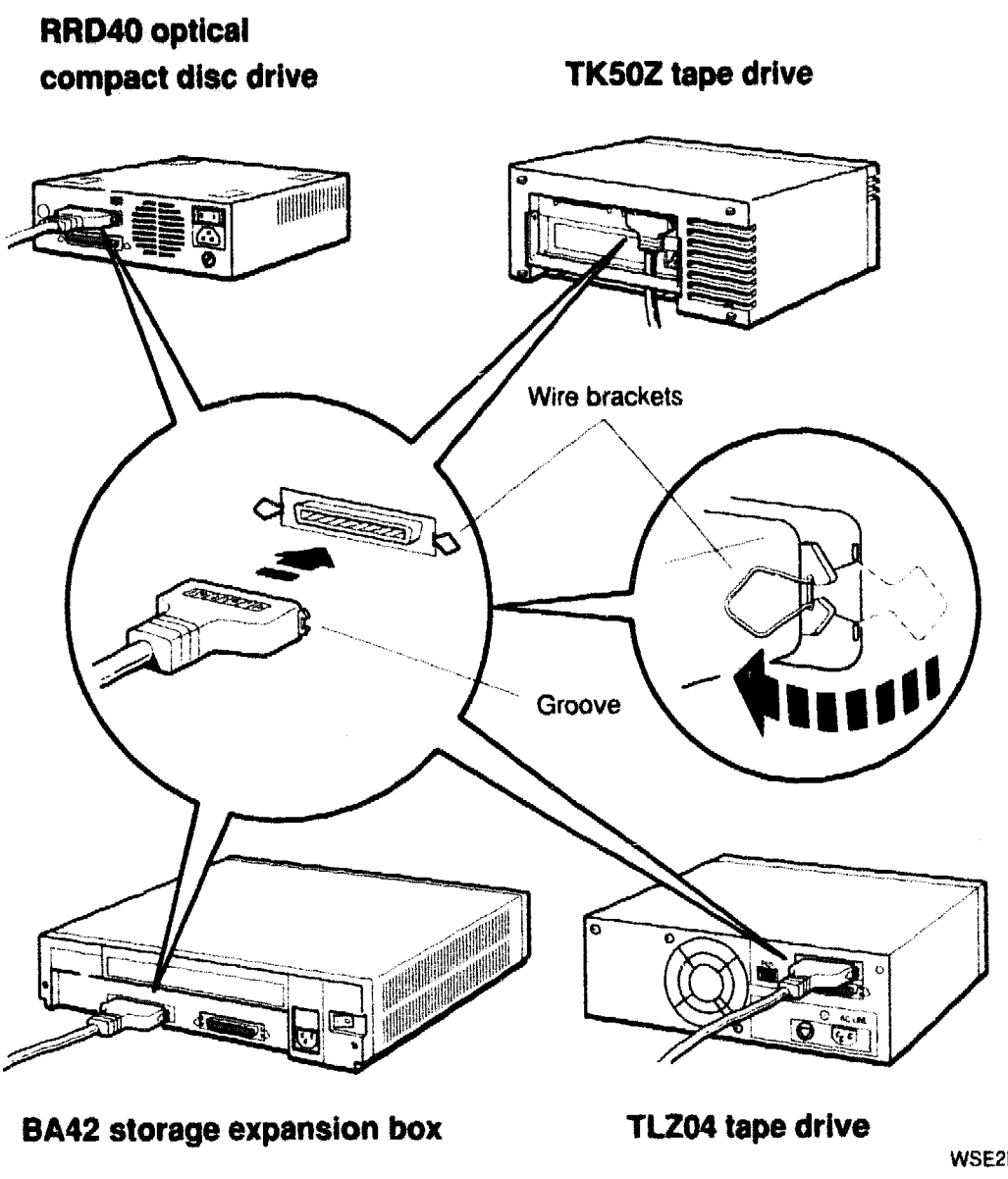


Figure 5-7. Attaching a system-unit-to-expansion-box cable to a SCSI connector on an expansion box

If you are attaching only one box, turn to step 9 on page 5-13.

To attach boxes after the first, follow the steps given here.

6. Plug one end of the 18-inch box-to-box expansion cable into the free connector on the back of the first expansion box.
7. Plug the free end of the cable into one of the connectors on the new box.

   If the box you are connecting is a TK50Z tape drive, slide the free end of the cable up between the box and its handle.
8. Repeat steps 6 and 7 for each additional box.

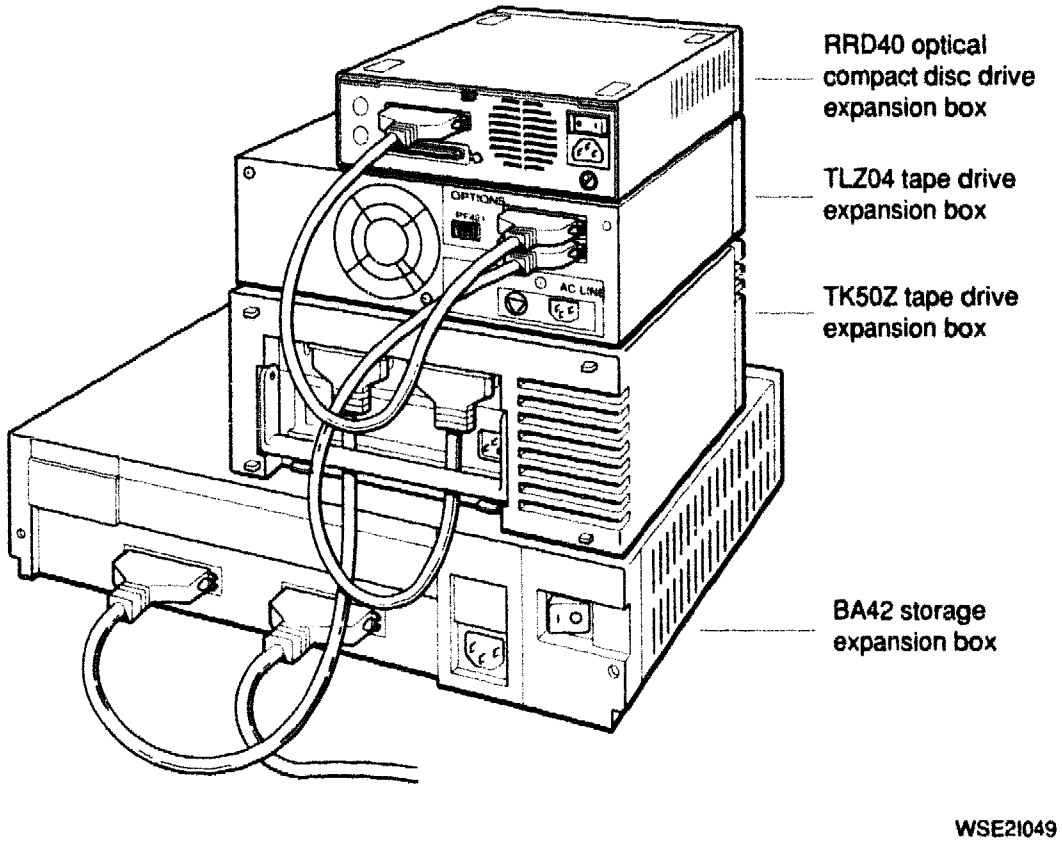


Figure 5-8. Connecting expansion boxes to other expansion boxes

9. When you reach the final box, or if you have only one box, attach the expansion box terminator to the empty connector on the box.

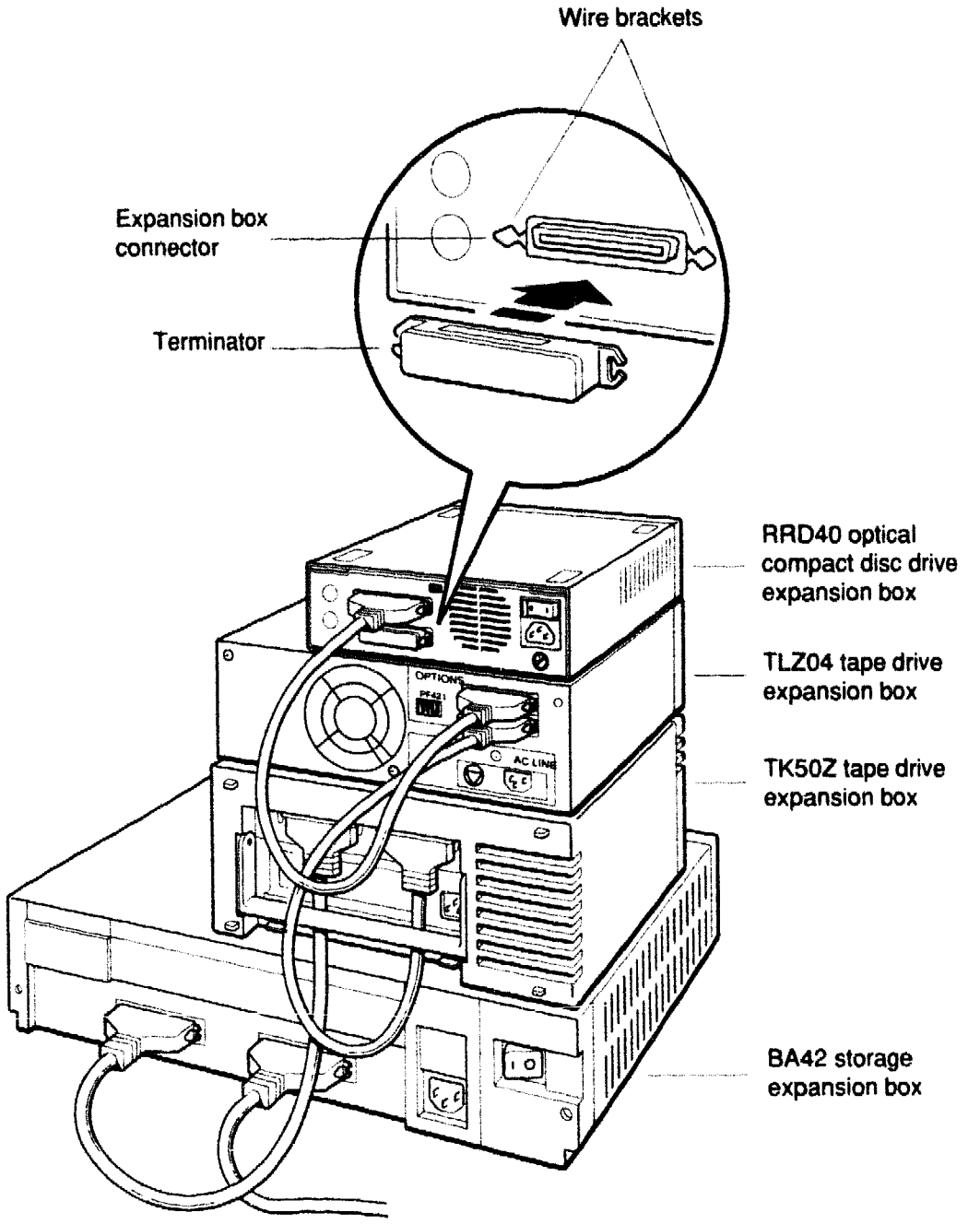


Figure 5-9. Terminating the final expansion box

10. Plug the prongless end of a power cord into the power connector on each expansion box.
11. Plug the pronged end of each cord into a power strip or a wall outlet.

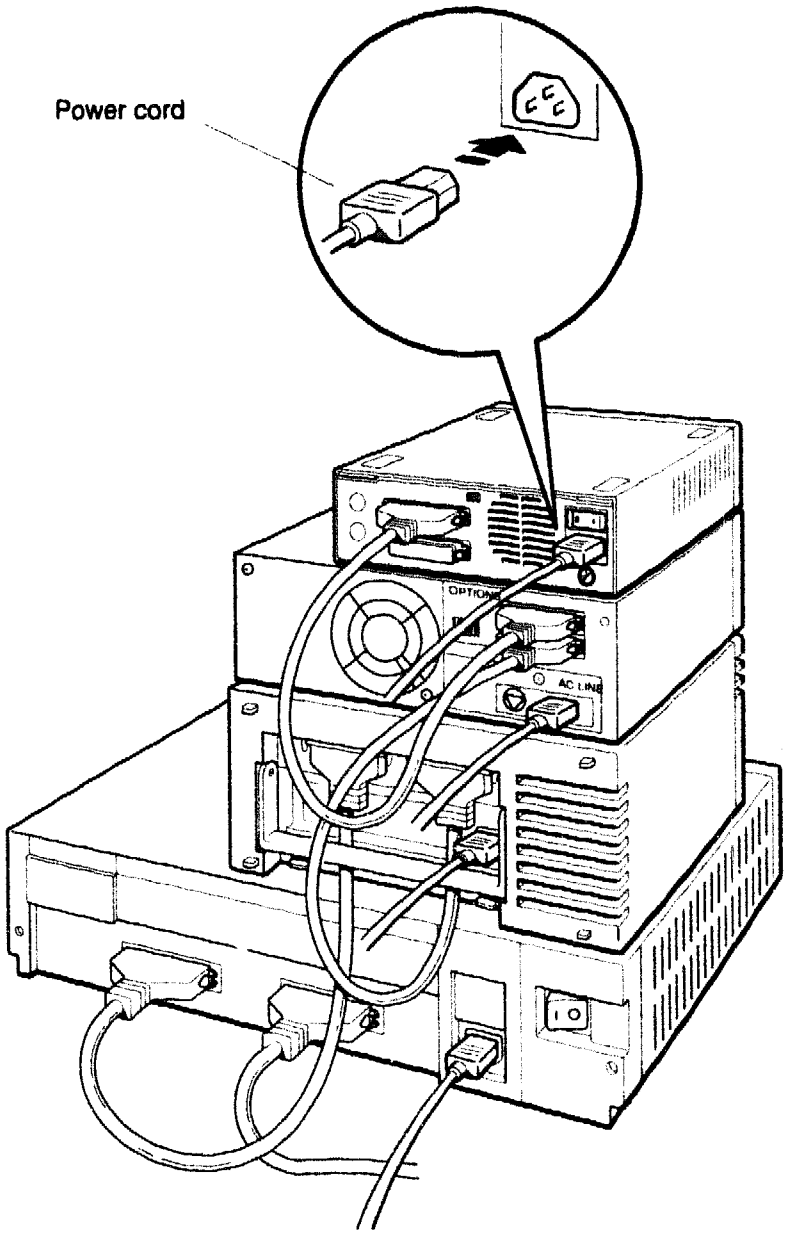


Figure 5-10. Connecting power cords

Turn On Expansion Boxes and Check Configuration Displays

1. Turn on each expansion box and then the system unit by pressing the 1 on the on/off switches on the system unit, the BA42 storage expansion box, the TK50Z tape drive expansion box, and the RRD40 optical compact disc drive expansion box. Press and release the on/off switch on the TLZ04 tape drive.

   Type **test** at the console prompt and press Return.

   As the system performs the power-up self-test, the subtest IDs flicker in the lower-left corner of your screen.

   When the system unit has completed the power-up self-test successfully, a display similar to the following appears on the screen.

   ```
   KN02-AA  V5.3d
   >>
   ```

2. Check your configuration displays to be sure your system recognizes each device you have connected.

   At the console prompt (>>), type **cnfg**, press the space bar, and then type one of the numbers listed here. Then press Return.

   - For the SCSI connector that comes with the basic workstation configuration, type **5**.
   - For a SCSI connector in option slot 0, type **0**.
   - For a SCSI connector in option slot 1, type **1**.
   - For a SCSI connector in option slot 2, type **2**.

In the following sample display, the SCSI connector in base slot 5 has an RZ55 hard disk drive assigned to unit 1, an RRD40 compact disc drive assigned to unit 4, and a TK50Z tape drive assigned to unit 6.

```
>>cnfg 5
5: PMAZ-AA  DEC       T5.2e    TCF0  (SCSI = 7)
------------------------------------------------------------
   DEV   PID                  VID         REV    SCSI DEV
   ===== ==================== ========== ====== ========
   rz1   RZ55     (C) DEC     DEC         0700   DIR
   rz4   RRD40    (C) DEC     DEC         0700   CD-ROM
   tz6                                           SEQ
>>
```

If a device you installed fails to appear in the configuration display,

- Be sure that device has not been assigned an ID number that is the same as that assigned to some other device on the SCSI connector.
- Be sure the device in question is connected to an active power source.
- Be sure all cables are securely connected and a terminator has been installed in the empty connector on the last box.

If the device still fails to appear in the display, contact your system manager or your Digital service representative.

Installing a Device in a BA42 Storage Expansion Box

To install a hard disk drive, a tape drive, or a floppy disk drive in a BA42 storage expansion box, see the *BA42 Storage Expansion Box Installation Guide* that came with that box.

Using External Storage Devices

To use external storage devices, see the documentation that came with those devices.

6

Optional Network Connections: ThinWire and ThickWire Ethernet

This chapter explains

- How to find Ethernet station addresses for your workstation
- How to prepare your workstation for connection to ThinWire Ethernet
  - At the end of the ThinWire cable segment
  - Within a ThinWire cable segment
- How to prepare your workstation for connection to ThickWire Ethernet

The DECstation 5000 Model 200 workstation comes with ThinWire Ethernet installed in base slot 6 of the system unit. In addition, you can have ThickWire Ethernet option modules in option slots 0, 1, and 2 of the system unit.

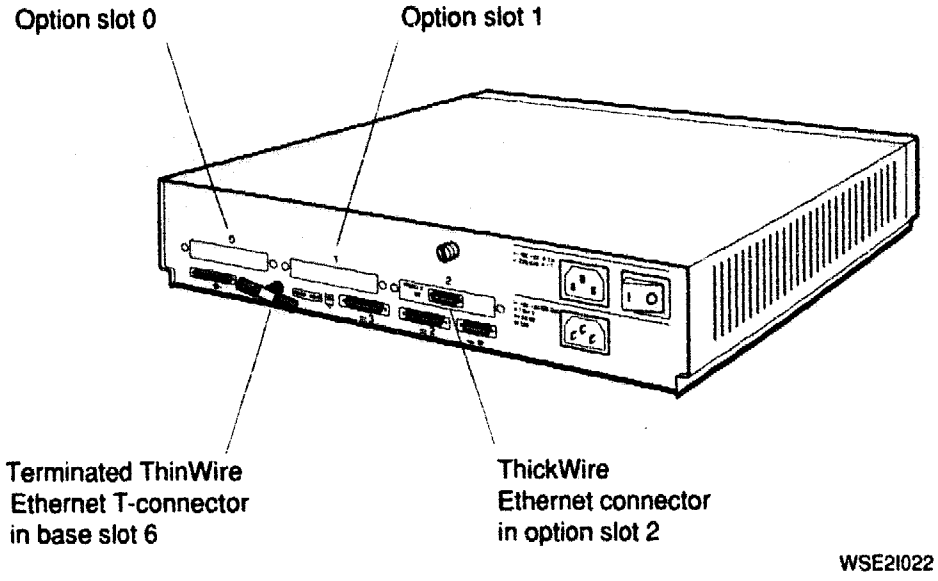


Figure 6-1. ThinWire and ThickWire connectors on the system unit

Finding Your Ethernet Station Address

If you plan to use your workstation on a network or networks, you need to learn the Ethernet station address for each Ethernet connector on the system unit.

To learn the Ethernet station address for base slot 6 and any option slots that contain Ethernet connectors, type **cnfg** at the console prompt (>>) and press Return.

A display similar to the following appears on your screen.

```
>>cnfg
7: KN02-AA  DEC      T5.2a    TCF0  ( 24 MB)
6: PMAD-AA  DEC      T5.2a    TCF0  (enet: 08-00-2b-0f-45-72)
5: PMAZ-AA  DEC      T5.2a    TCF0  (SCSI = 7)
2: PMAD-AA  DEC      X5.1f    TCF0  (enet: 08-00-2b-0f-45-31)
1: PMAZ-AA  DEC      X5.1e    TCF0  (SCSI = 7)
0: PMAG-BA  DEC      T5.2a    TCF0  (CX -- d=8)
>>
```

Figure 6-2. Sample configuration display with Ethernet station addresses

In the sample display, lines that contain `enet:` inside the parentheses at the end of the line show Ethernet station addresses. The number of the base or option slot containing that Ethernet connector appears at the beginning of the line.

The display in Figure 6-2 shows two Ethernet station addresses:

- The line that starts with `6:` contains the first Ethernet address: `08-00-2b-0f-45-72`. The number 6 at the beginning of this line shows that the Ethernet connector with this address is in base slot 6, the location of the ThinWire Ethernet connector.
- The second Ethernet address appears on the line that starts with `2:`. The Ethernet connector with this address — `08-00-2b-0f-45-31` — is in option slot 2. Ethernet modules in option slots are always ThickWire modules.

Connecting the Workstation to an Ethernet Network

ThinWire Ethernet cable connections are discussed here. If you want to terminate a ThinWire connector, turn to page 3-2 earlier in this guide.

If you want to connect to ThickWire Ethernet, turn to page 6-9.

If you have a ThickWire Ethernet option module inside your system unit and don't want to be connected to the network yet, turn to page 3-4 earlier in this guide for instructions on using a ThickWire loopback connector.

Connecting to a ThinWire Network

Find the ThinWire cabling in the networking kit that came with your shipment.

For a workstation to be connected to the end of a ThinWire cable segment, follow the instructions given on page 6-5.

For a workstation to be connected within a ThinWire cable segment, follow the instructions given on page 6-7.

For a workstation at the end of a ThinWire cable segment

1. If necessary, follow the instructions that came with your worksystem software to shut down the software.
2. Turn off the system unit by pressing the 0 on the on/off switch on the back of the unit.
3. Remove one terminator from the ThinWire T-connector in base slot 6 of the system unit.

   Turn the terminator on your left away from you or the terminator on your right toward you until you can pull the terminator away from the T-connector.

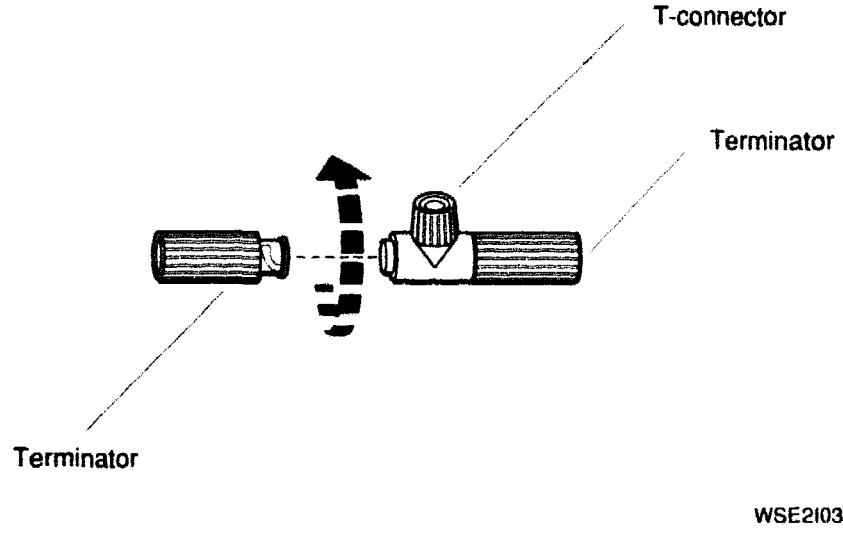


Figure 6-3. Removing a terminator from the T-connector

4. Attach the connector on the ThinWire cable segment to the free end of the T-connector.

   Firmly push the cable connector onto the T-connector. Twist the cable connector on your left away from you or the cable connector on your right toward you until the connector slides forward and locks into place.

5. Contact your system manager, who will complete network installation for you. To complete the installation yourself, follow the instructions in the networking guide for your worksystem software.

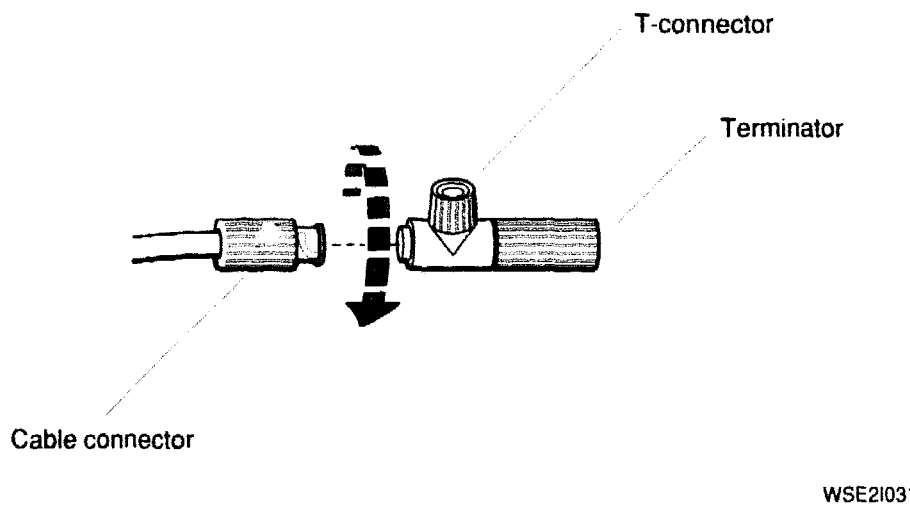


Figure 6-4. Connecting a ThinWire cable to the T-connector

For a workstation within a ThinWire cable segment

1. If necessary, follow the instructions that came with your worksystem software to shut down the software.
2. Turn off the system unit by pressing the 0 on the on/off switch on the back of the unit.
3. Remove both terminators from the ThinWire T-connector located in base slot 6 of the system unit.

   Turn the terminator on your right toward you and the terminator on your left away from you until you can pull them away from the T-connector.

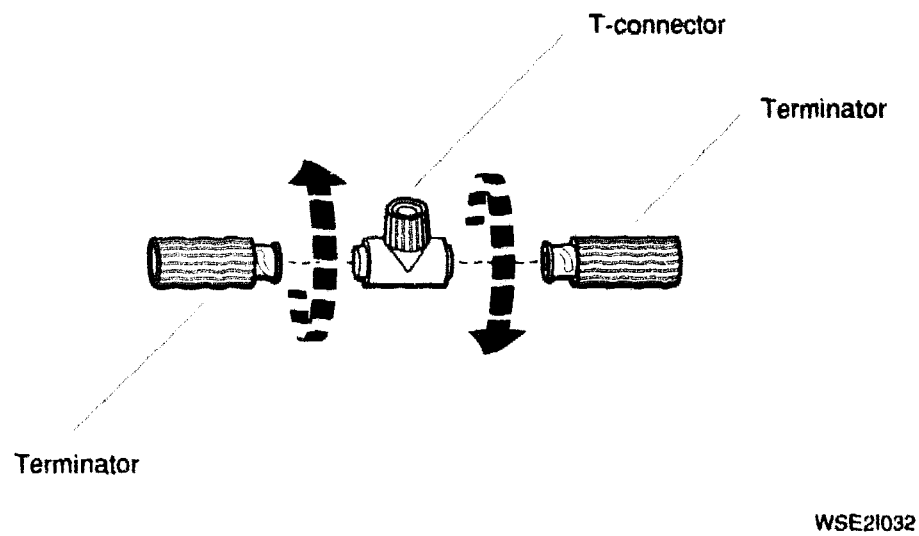


Figure 6-5. Removing the terminators from the T-connector

4. Attach the cable connectors to the T-connector.

   Firmly push each cable connector into the T-connector. Twist the cable connector on your right away from you and the connector on your left toward you until each slides forward and locks into place.

5. Contact your system manager, who will complete network installation for you. To complete the installation yourself, follow the instructions in the networking guide for your worksystem software.

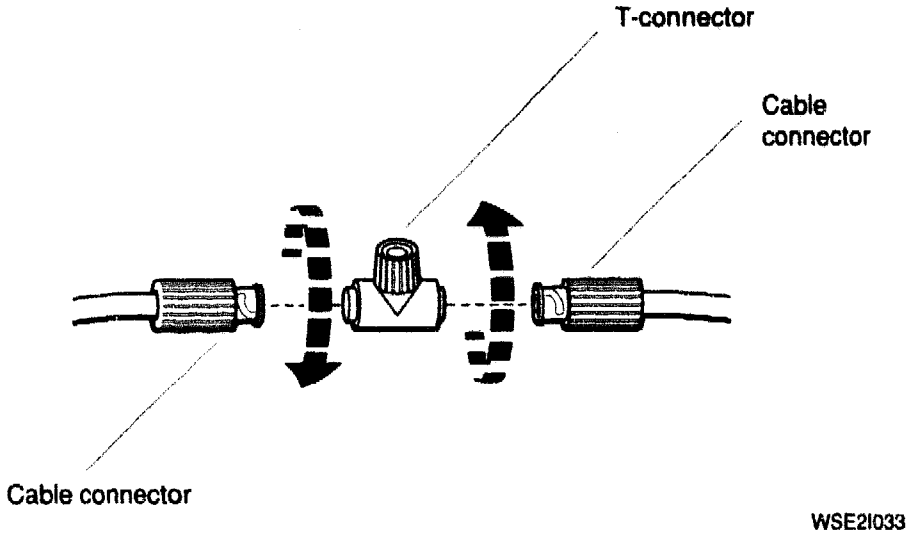
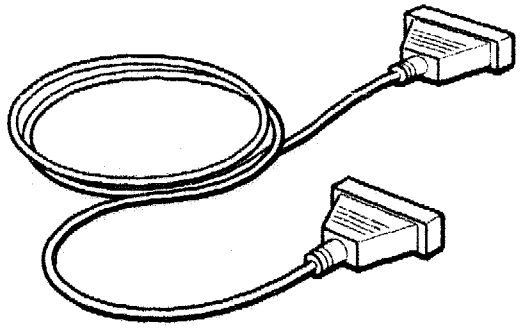


Figure 6-6. Connecting ThinWire cables to a T-connector

Connecting to ThickWire Networks

For each ThickWire connector on your system unit, find the ThickWire Ethernet cable in the networking kit that came with your shipment.



WSE2I034

Figure 6-7. A ThickWire Ethernet cable

1. If necessary, follow the instructions that came with your worksystem software to shut down the software.
2. Turn off the system unit by pressing the 0 on the on/off switch on the back of the unit.

3. Pull each ThickWire loopback connector out of its connector on the back of the system unit.

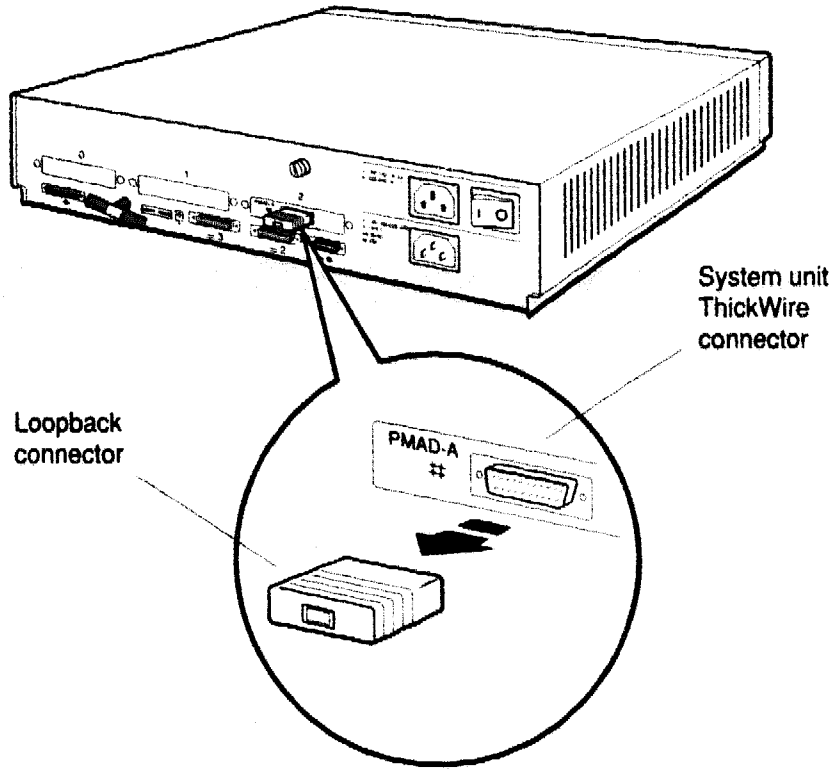


Figure 6-8. Removing a loopback connector from a ThickWire connector

4. Position the cable connector so the DIGITAL logo is on top.
5. Push the cable connector all the way into the ThickWire connector on the system unit.
6. Contact your system manager, who will complete network installation for you. To complete the installation yourself, follow the instructions provided in the networking guide for your worksystem software.

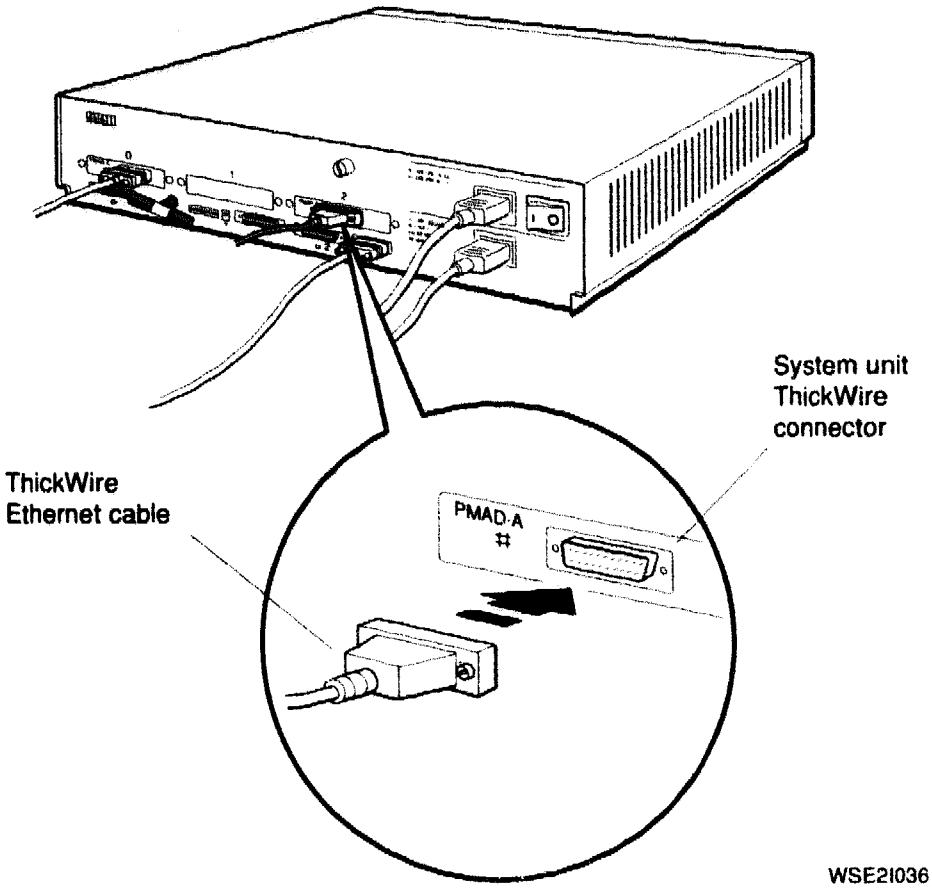


Figure 6-9. Connecting a ThickWire Ethernet cable to the system unit

7

External Communication Options: Printers, Plotters, Modems, and Console Terminals

This chapter explains

- How to connect a communication device directly to the system unit
- How to use a communications connector adapter
- Where to find out how to use communication devices

Communication devices that can be used with your DECstation 5000 Model 200 workstation include printers, plotters, modems, and console terminals.

Communication devices connect to the communications connectors on the system unit by means of one of two types of connectors:

- A 25-pin connector that can be connected directly to either of the communications connectors on the system unit
- A modular connector that requires a communications connector adapter before it can be connected to the system unit

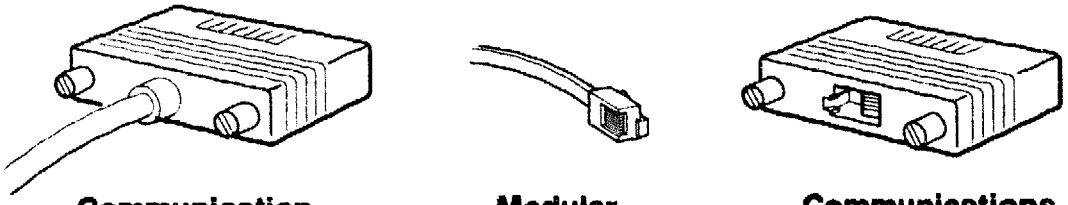


Figure 7-1. Communication device connectors and an adapter

To install a device that has a 25-pin connector, turn to page 7-3.

To install a device that has a modular connector and requires a communications connector adapter, turn to page 7-6.

Installing a Device That Has a 25-Pin Connector

1. Follow the instructions that came with your device to perform these tasks:
   - Be sure the device is turned off.
   - Set up the device and attach the cable and power cord that came with it.
   - Set the proper baud rate and control settings.
2. If necessary, follow the instructions that came with your worksystem software to shut down the software.
3. Turn off the system unit by pressing the 0 on the on/off switch on the back of the unit or by turning off your power strip if you are using one.
4. Connect the free end of the device cable to the system unit as shown in Figure 7-2.
   a. Align the widest part of the cable connector with the widest part of one of the communications connectors on the system unit.
   b. Press the cable connector all the way into the connector on the system unit and turn the screws to your right to tighten them.

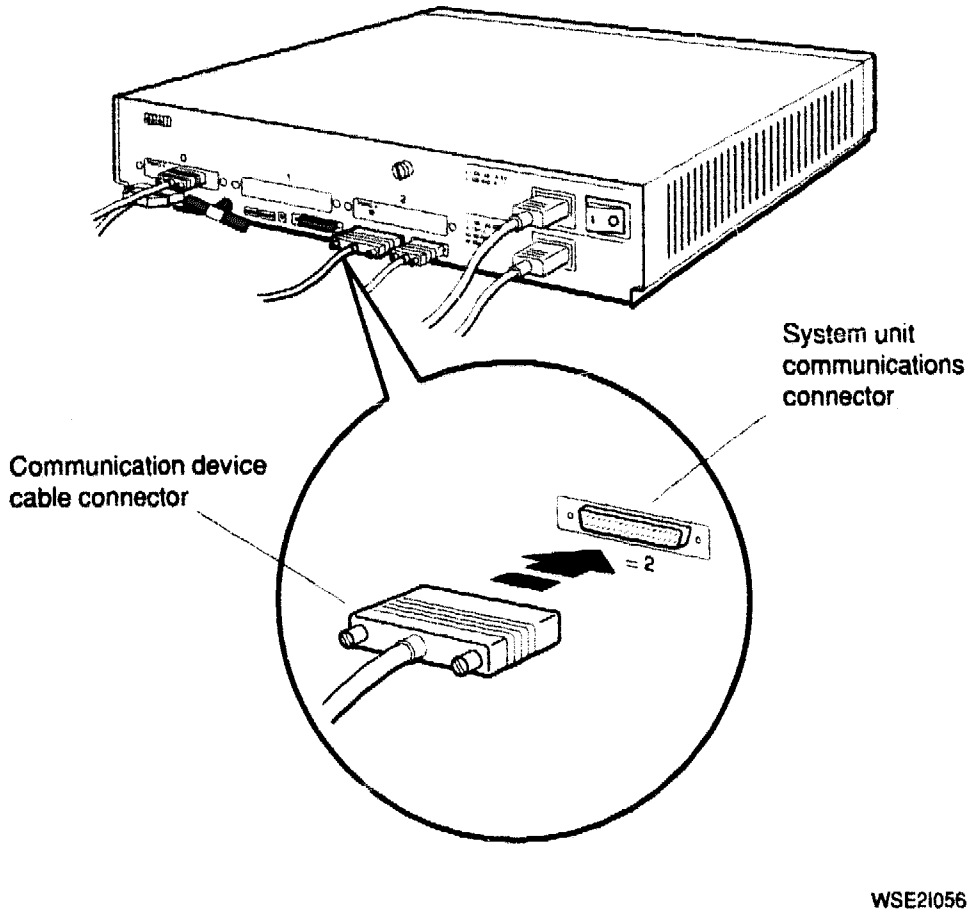


Figure 7-2. Connecting a communication device directly to the system unit

5. Plug the power cord into the power source.
6. Turn on the device according to the instructions that came with it.
7. Turn on the system unit by pressing the 1 on the on/off switch on the back of the unit or by turning on the power strip.

   Your system unit performs its power-up self-test and displays the console prompt (>>) when all the subtests have completed successfully.

8. At the console prompt (>>), type **test** and press Return.

   This causes the workstation to run the system self-test. As the system performs the subtests that make up this test, the subtest IDs flicker in the lower-left corner of your screen.

   When all tests have been completed successfully, the console prompt (>>) appears in the lower-left corner of your screen.

   If a subtest fails, turn to Chapter 9 of this guide for troubleshooting instructions.

Installing a Device That Has a Modular Connector

1. Follow the instructions that came with your device to perform these tasks:
   - Be sure the device is turned off.
   - Set up the device and attach the cable and power cord that came with it.
   - Set the proper baud rate and control settings.
2. If necessary, follow the instructions that came with your worksystem software to shut down the software.
3. Turn off the system unit by pressing the 0 on the on/off switch on the back of the unit or by turning off your power strip if you are using one.
4. Find the communications connector adapter that came with your shipment.

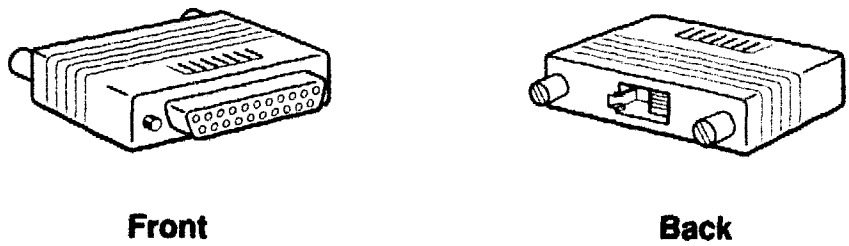


Figure 7-3. A communications connector adapter

5. Position the 25-pin connector on the adapter so the DIGITAL logo is on top.
6. Press the adapter connector all the way into one of the communications connectors on the system unit and turn the screws to your right to tighten them.
7. Position the connector on the end of your device cable so the clip is on your left.
8. Push the cable connector into the connector on the adapter until the cable connector clicks into place.

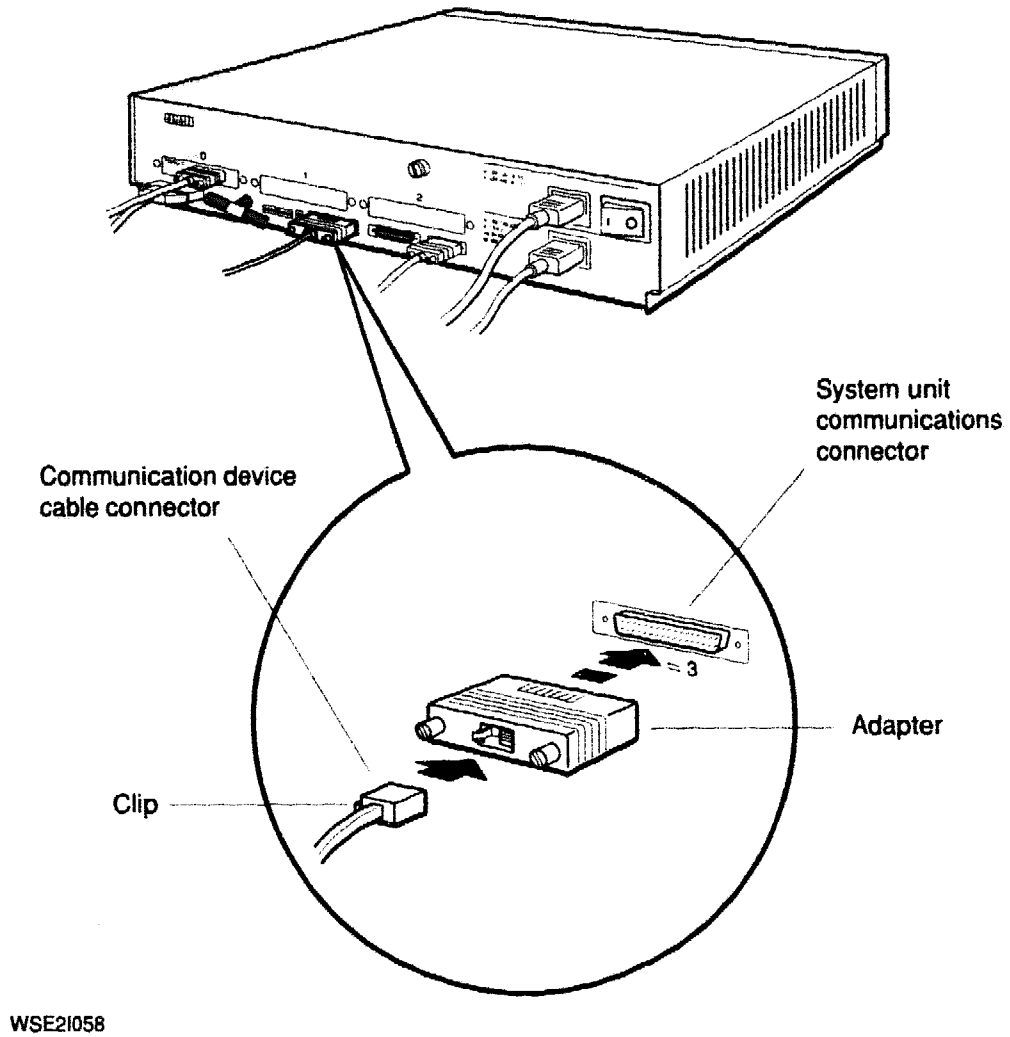


Figure 7-4. Using an adapter to connect a communication device to the system unit

9. Plug the power cord into the power source.
10. Turn on the device according to the instructions that came with it.
11. Turn on the system unit by pressing the 1 on the on/off switch on the back of the unit or by turning on the power strip.

    The system unit performs its power-up self-test and displays the console prompt (>>) when all the subtests are completed successfully.
12. At the console prompt (>>), type **test** and press Return.

    This causes the workstation to run the system self-test. As the system performs the subtests that make up the system self-test, the subtest being performed is briefly identified in a display in the lower-left corner of your screen.

    When all tests have been completed successfully, the console prompt (>>) appears in the lower-left corner of your screen.

    If a subtest fails, turn to Chapter 9 of this guide for troubleshooting instructions. The console prompt (>>) reappears in the lower-left corner of your screen.

8

Starting and Testing Workstation Hardware

This chapter explains

- How to turn your workstation on and off
- How the power-up and system self-tests operate
- How to set your keyboard language
- How to check the configuration of your workstation

Turning On Your Workstation

If your workstation is on a power strip, be sure the power strip is plugged into a power source and turned on.

Then turn on the parts of your workstation in the order described here. As you turn on each piece of equipment, its power indicator light begins to glow.

Turn On Optional External Devices

Turn on each expansion box by pressing the 1 on the on/off switch on the box.

Turn on any communication device by following the instructions that came with it.

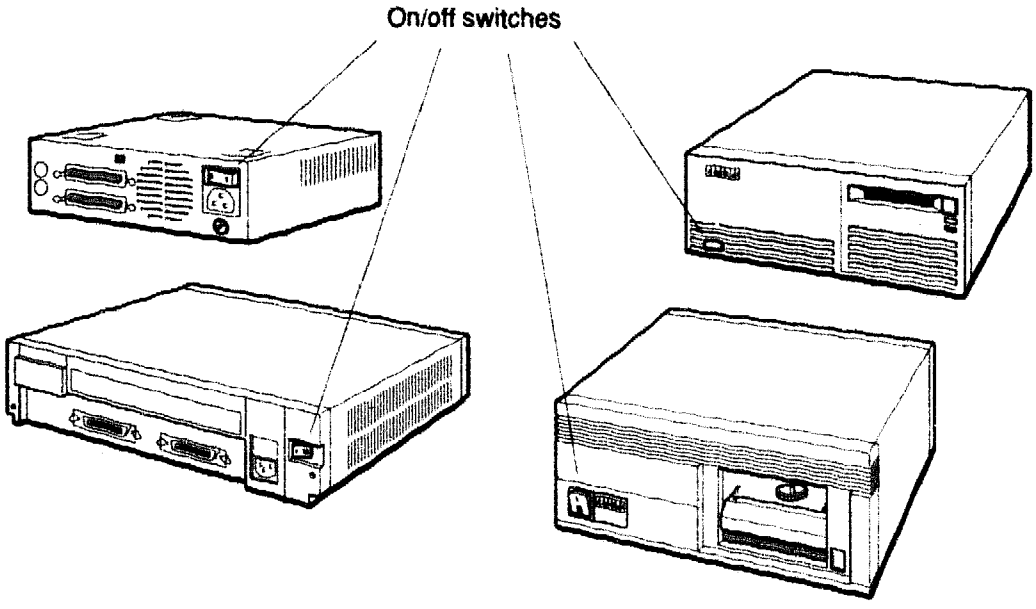


Figure 8-1. Expansion box on/off switches

Turn On the Monitor

The procedure for turning on the monitor varies according to the monitor you use and the way your monitor receives its power.

- If your monitor receives its power from a wall outlet or a power strip, the indicator light glows green when you turn on the monitor, but the display appears only after you turn on the system unit.
- If your monitor power cord is connected to the system unit, the indicator light will not come on when the monitor is turned on. When you turn on the system unit, the indicator light glows green and the display appears.

In both cases, a green indicator light glows on the front of the monitor when it is receiving power.

If you have multiple monitors connected to your workstation, the monitor in the option slot with the lowest number is the system console. This monitor displays all system test information.

The power switch is located in different places on different monitors. Look at the illustration of your monitor in Figures 2-4 through 2-9 to find the power switch location.

- For a VRT16-D color monitor, VRT19-D color monitor, VR262 gray-scale monitor, or VR297 color monitor, press the 0 on the on/off switch.
- For a VR299 color monitor, press and release the on/off switch on the front of the monitor.
- For the VR319-D monochrome monitor, the on/off switch also contains the power indicator light. Press this switch in to turn on the monitor.

Figure 8-2 illustrates power switches.

Figure 8-2. On/off switches on the monitors

The brightness and contrast controls are located in different places on different monitors. Look at the illustration of your monitor in Figures 2-4 through 2-9 to find the location of these controls. The VR297 does not have an external brightness control. Figure 8-3 illustrates the brightness and contrast control icons.

Figure 8-3. Brightness and contrast icons

Turn the brightness and contrast controls all the way to the right.

If your monitor fails to turn on

If you are using a monitor power cord instead of a monitor-to-system-unit power cord, the indicator light turns on but the screen remains dark until the system unit is also turned on.

If nothing happens when you turn on the monitor, be sure that:

- The monitor power cord or the monitor-to-system-unit power cord is connected properly.
- There is power at the power outlet.
- If you are using a power strip, the power strip is plugged in and turned on.
- The monitor power switch and, if you are using a monitor-to-system-unit power cord, the system unit power switch are set to the on position.
- The brightness and contrast controls are turned up.

If the screen remains dark, turn to Chapter 9 of this guide for troubleshooting instructions.

Turn On the System Unit

Set the on/off switch on the back of the system unit to the on position by pressing the 1 on the switch.

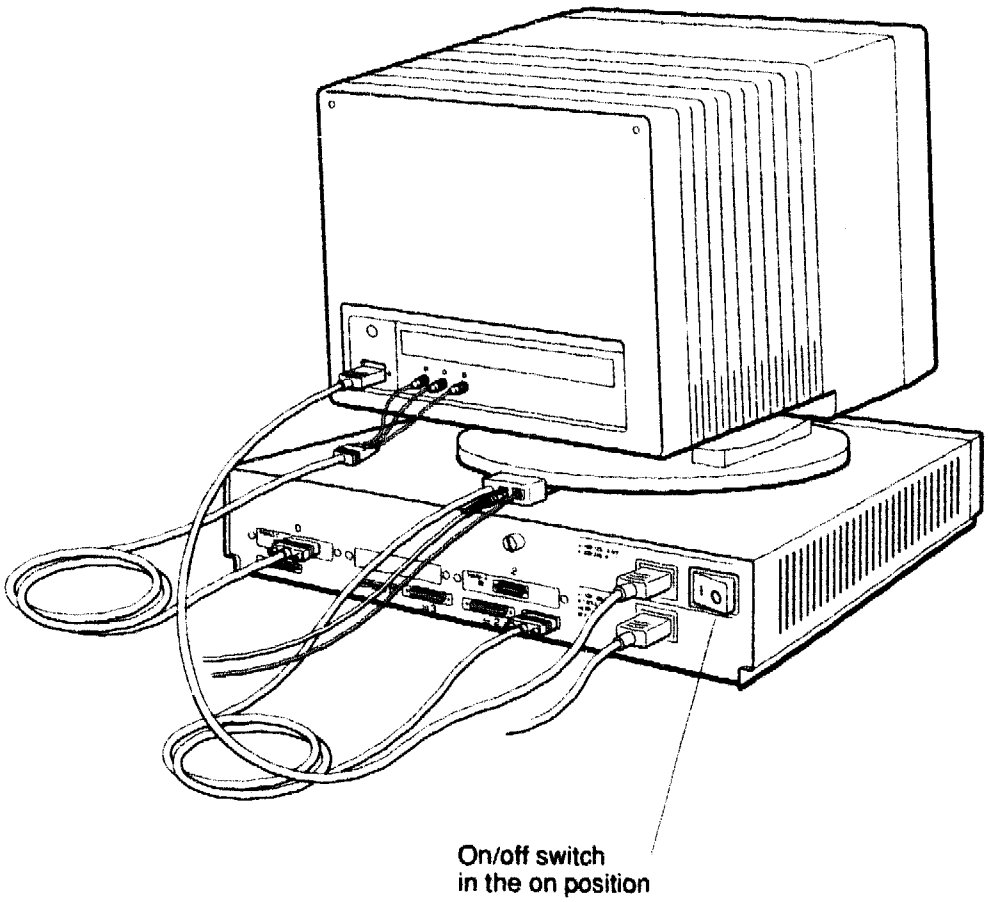


Figure 8-4. Turning on the system unit

When the system unit turns on, the following things happen:

- A green indicator light glows on the front of the system unit.
- The system unit runs the power-up self-test. If you have multiple monitors connected to your workstation, the monitor in the lowest-numbered option slot is the system console. This monitor displays all system test information.
- If necessary, the workstation prompts you to set your keyboard language.

As the system performs the subtests that make up the power-up self-test, the subtest IDs flicker in the lower-left corner of the screen.

If your workstation language has already been set, a display similar to the following appears on your screen when the system unit has completed the power-up self-test successfully:

```
KN02-AA  V5.3d
>>
```

If the workstation language needs to be set, the following language menu appears on the screen:

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

At the language prompt [`(1..16): _`], type the number displayed to the left of the language you want to use. Then press Return.

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

If the display that appears on your screen after the power-up self-test has been completed is neither a language menu nor similar to the preceding successful self-test display, turn to Chapter 9 of this guide for an explanation of error messages and troubleshooting instructions.

If Your System Unit Fails to Turn On

If nothing happens when you turn on the system unit, turn it off and check to be sure that

- Both power cords are connected properly and the power strip, if there is one, is plugged in and turned on.
- There is power at power outlets.
- Monitor and system unit power switches are set to the on position.

If the system unit still fails to work, turn to Chapter 9 of this guide for troubleshooting instructions.

Run the System Self-Test

When the system unit completes the power-up self-test and the console prompt (>>) appears on the screen, type **test** and press Return.

This causes the workstation to run its system self-test. As the system performs the subtests that make up the system self-test, the subtest being performed is briefly identified in a display in the lower-left corner of your system console monitor screen.

When all tests have been completed successfully, the console prompt (>>) appears on the lower-left corner of your screen.

If a self-test fails or if there is no display on the monitor

When the system self-test is completed, any error messages that have been generated appear in the lower-left corner of the screen above the console prompt (>>).

If any messages appear along with the console prompt (>>), or if no display appears on the monitor, turn to Chapter 9 for a discussion of error messages both on the screen and on the diagnostic indicator lights on the system unit.

Checking Your Configuration Displays

The configuration test shows which option modules are present in your system unit and where they are.

The display that appears when you run the configuration test identifies each module in your system unit in the following ways:

- By a special ID (or part) number
- By the number of the system unit slot that contains the module

When you run the configuration test, check to be sure all the modules ordered for your workstation are listed in the display that appears on your screen. The modules you ordered are listed on the packing list for your shipment.

Type **cnfg** at the console prompt (>>) and press Return. A display similar to the following appears on the screen:

```
>>cnfg
7: KN02-AA  DEC   V5.3a    TCF0   ( 24 MB)
6: PMAD-AA  DEC   V5.3a    TCF0   (enet: 08-00-2b-0f-45-72)
5: PMAZ-AA  DEC   V5.3a    TCF0   (SCSI = 7)
2: PMAD-AA  DEC   V5.3a    TCF0   (enet: 08-00-2b-0f-45-31)
1: PMAZ-AA  DEC   V5.3a    TCF0   (SCSI = 7)
0: PMAG-BA  DEC   V5.3a    TCF0   (CX -- d=8)
>>
```

The number that begins each line in the configuration display represents the number of a base slot or an option slot that contains a module.

Look for lines that begin with `0:`, `1:`, and `2:`. These lines represent the option slots on the system unit. In the sample display, all three option slots contain option modules. If an option slot is empty, it does not appear on the configuration display.

The information inside the parentheses at the end of each display line shows what kind of option module is present in that slot.

- MX shows that the module is a monochrome frame buffer.

  A monochrome frame buffer module can be installed in any of the three option slots.

  You can have up to three monochrome frame buffer modules installed in your system.

- CX shows that the module is a color frame buffer.

  A color frame buffer module can be installed in any of the three option slots.

  You can have up to three color frame buffer modules installed in your system.

  In the sample display, a color frame buffer module is present in option slot 0.

- PX shows that the module is a 2D graphics accelerator module.

  A 2D graphics accelerator module can be installed in option slot 0 or 1.

- DA: PXG shows that the module is a low 3D graphics accelerator.

  A low 3D graphics accelerator module can be installed in option slots 0 and 1 and is displayed in option slot 1. In this case, option slot 0 would not be shown in the display.

- EA: PXG shows that the module is a mid 3D graphics accelerator.

  A mid 3D graphics accelerator module can be installed in option slots 0 and 1 and is displayed in option slot 1. In this case, option slot 0 would not be shown in the display.

- FA: PXG_T shows that the module is a high 3D graphics accelerator.

  A high 3D graphics accelerator module is installed in all three option slots and is displayed as option slot 1. In this case, neither option slot 0 nor option slot 2 would appear in the display.

- SCSI shows that you have a SCSI module.

  A SCSI module is always present in base slot 5. In addition, a SCSI option module can be installed in any of the three option slots.

  In the display a SCSI option module is present in option slot 1.

- enet: shows that you have an Ethernet option module.

  A ThinWire Ethernet module is always present in base slot 6. In addition, a ThickWire Ethernet module can be installed in any of the three option slots on the system unit.

  In the display a ThickWire Ethernet option module is present in option slot 2.

To display the configuration for a particular slot, type **cnfg** and the slot number at the console prompt (>>). Then press Return. A configuration display similar to the following appears on the screen.

```
>>cnfg 5
5: PMAZ-AA  DEC       T5.2a     TCF0   (SCSI = 7)
---------------------------------------------------------
   DEV   PID                  VID         REV     SCSI DEV
   ===== ==================   ==========  ======  ========
   rz1   RZ55       (C) DEC   DEC         0700    DIR
   rz4   RRD40      (C) DEC   DEC         0700    CD-ROM
   tz6                                            SEQ
>>
```

In the configuration display the line that begins with a number followed by a colon tells you the number of the slot for which the configuration is being displayed. In the example, the display is the configuration for the SCSI module in base slot 5.

The entries in the first column of the display tell you what drives are present and what their ID numbers are. Entries that begin with `rz` are for hard disk and optical compact disc drives. Entries that begin with `tz` are for tape drives.

The entries in the last column tell you what type the drive is. `DIR` indicates that the drive is a hard disk drive. `CD-ROM` indicates that the drive is an optical compact disc drive. `SEQ` indicates that the drive is a tape drive.

The in the sample display that contain `5:` and `tz6` show that a TK50 drive with SCSI ID number 5 is connected to a SCSI module located in base slot 5 on the system unit.

Turning Off Your Workstation

If your worksystem software has been installed, follow the instructions that came with that software to shut it down.

If your workstation is on a power strip

Turn off the power strip by pressing the raised portion of its on/off switch.

If your workstation is not on a power strip

1. Turn off any communication device by following the instructions that came with it.
2. Turn off each expansion box you have by pressing the 0 on the on/off switch on the box.
3. Turn off the monitor.
   - If your monitor receives its power through the system unit, the monitor turns off when you turn off the system unit.
   - If your monitor receives its power from a wall outlet, press the 0 on the on/off switch for the VRT16-D color monitor, VRT19-D color monitor, VR262 gray-scale monitor, or VR297 color monitor. Press and release the on/off switch on the VR299 color monitor. Press the power switch out on the VR319-D monochrome monitor.
   - Turn off the system unit by pressing the 0 on the on/off switch on the back of the unit.

9

Troubleshooting

This chapter explains

- How to use the system self-tests
- How to interpret error messages on the screen
- How to interpret diagnostic indicator lights on the system unit
- How to solve basic hardware problems
- When to contact your Digital service representative

Using Self-Tests

Self-tests consist of a number of subtests that check the parts of your workstation and tell you whether they are working correctly.

You can run a self-test in one of the following ways:

- By turning on your workstation
- By typing **test** at the console prompt (>>) and pressing Return
- By pressing the reset button on the back of the system unit

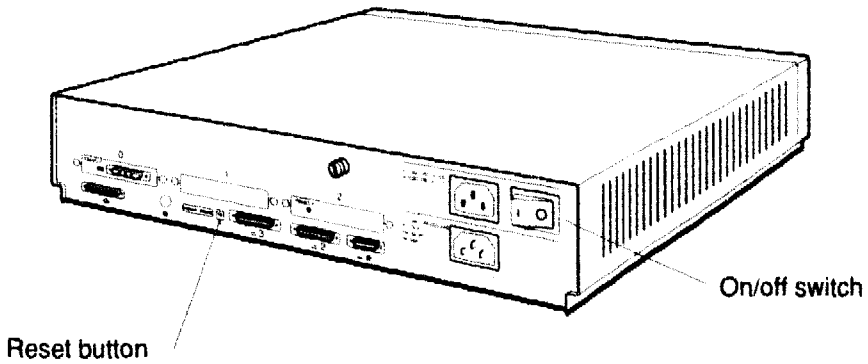


Figure 9-1. The reset button on the system unit

The Power-Up Self-Test

When you turn on your workstation, the system unit runs the power-up self-test.

As the system performs the subtests that make up this test, the subtest IDs flicker in the lower-left corner of the screen.

If you have multiple monitors connected to your workstation, the monitor in the option slot with the lowest number is the system console. This monitor displays all system test information.

When the system unit has completed the power-up self-test successfully, and if your workstation language has been set, a display similar to the following appears on the screen:

```
KN02-AA  V5.3d
>>
```

If your workstation language needs to be set, a list of available languages appears on the screen. Turn to page 8-7 for information about setting the language.

If an error message appears on your screen, or if the self-test does not complete and no display appears on the screen, turn to "Reading Self-Test Results" on page 9-4.

The System Self-Test

When the system unit has completed the power-up self-test, the workstation language has been set if necessary, and the console prompt (>>) has appeared on the screen, type **test** and press Return.

This causes the workstation to run the system self-test. As the system performs the subtests that make up the system self-test, the subtest being performed is briefly identified in a display in the lower-left corner of your screen.

When all subtests have been completed successfully, the console prompt (>>) appears in the lower-left corner of the screen.

Reading Self-Test Results

You can read system self-test results in the following ways:

- By interpreting the display on the monitor.
- By interpreting the diagnostic indicator lights on the back of the system unit. Use these lights when there is no display on the monitor.

Interpreting Error Messages Displayed on the Screen

For every error the system detects when the monitor is working, an error message appears on the screen.

The first line of the message tells you where the error occurred. This line looks something like the following:

```
?TFL 7/dz/alrm (bad interrupt) [KN02-AA]
```

- The question mark and the three letters that follow the question mark show that this is an error message.

  If any letters other than TFL appear in this location, call your system manager or your Digital service representative.
- The first number that follows `?TFL` is the slot number of the module that reported the error. In the sample message, the failure is in slot 7, the system module.
- The characters that follow the first slash are the error code for the individual test that failed.
- The characters after the second slash are the error code that indicates which part of the test failed.
- The characters in parentheses give additional information about the error.
- The last section of the error message shows the module identification number.

Tables 9-1 through 9-9 list error messages you might see and tell you what they mean and how to use them to find out where the problem is. Follow the troubleshooting instructions in Table 9-1 before you turn to any of the others.

Chapter 4 of this guide contains instructions for removing and replacing the cover of the system unit, using the antistatic wrist strap, and handling memory and other option modules.

Warnings: *Always shut down the worksystem software and turn the workstation off before connecting or disconnecting a piece of hardware and before removing or replacing the cover from the system unit.*

Always use the antistatic wrist strap when handling memory or other option modules.

Table 9-1. Error Messages on the Monitor

Message	Action
?TFL 0	Check the option module in option slot 0 on the system unit. Be sure the module is inserted tightly in its slot and that anything that is connected to it is connected correctly. If you have another option module that you know is good, try it in that option slot. If the test no longer fails, the problem is in the option module. If the test continues to fail, the problem is probably in the system module. If you don't have another option module that you know is good, move that module to another option slot and run the test again. Remember that 2D graphics accelerator modules can go only in slots 0 or 1 and that a 3D module cannot be moved to another slot. If the test no longer fails, the problem is in the system module. If the test continues to fail, the problem is in either the option module or the system module.

(continued on next page)

Table 9-1 (Cont.). Error Messages on the Monitor

Message	Action
	See the following tables for descriptions of test error messages that relate to specific types of modules. ■ Monochrome frame buffer video modules–Table 9-2 ■ Color frame buffer video modules–Table 9-3 ■ 2D graphics accelerator modules–Table 9-4 ■ 3D graphics accelerator modules–Table 9-5 ■ SCSI modules–Table 9-6 ■ Ethernet modules–Table 9-7 ■ The system module and memory modules–Table 9-8
?TFL 1	Check the option module in option slot 1 in the system unit. Be sure the module is inserted tightly in its slot and that anything that is connected to it is connected correctly. If you have another option module that you know is good, try it in that option slot. If the test no longer fails, the problem is in the option module. If the test continues to fail, the problem is probably in the system module. If you don't have another option module that you know is good, move the module to another option slot and run the test again. Remember that 2D graphics accelerator modules can go in only slots 0 and 1 and that a 3D module cannot be moved to another slot.

(continued on next page)

Table 9-1 (Cont.). Error Messages on the Monitor

Message	Action
	If the test no longer fails, the problem is in the system module. If the test continues to fail, the problem is in either the option module or the system module. See the following tables for descriptions of test error messages that relate to specific types of modules. ■ Monochrome frame buffer video modules–Table 9-2 ■ Color frame buffer video modules–Table 9-3 ■ 2D graphics accelerator modules–Table 9-4 ■ 3D graphics accelerator modules–Table 9-5 ■ SCSI modules–Table 9-6 ■ Ethernet modules–Table 9-7 ■ The system module and memory modules–Table 9-8

(continued on next page)

Table 9-1 (Cont.). Error Messages on the Monitor

Message	Action
?TFL 2	Check the option module in option slot 2 in the system unit. Be sure the module is inserted tightly in its slot and that anything that is connected to it is connected correctly. If you have another option module that you know is good, try it in that option slot. If the test no longer fails, the problem is in the option module. If the test continues to fail, the problem is probably in the system module. If you don't have another option module that you know is good, move the module to another option slot and run the test again. Remember that 2D graphics accelerator modules can go in only slots 0 and 1 and that a 3D module cannot be moved to another slot. If the test no longer fails, the problem is in the system module. If the test continues to fail, the problem is in either the option module or the system module. See the following tables for descriptions of test error messages that relate to specific types of modules. ■ Monochrome frame buffer video modules–Table 9-2 ■ Color frame buffer video modules–Table 9-3 ■ 2D graphics accelerator modules–Table 9-4 ■ 3D graphics accelerator modules–Table 9-5 ■ SCSI modules–Table 9-6 ■ Ethernet modules–Table 9-7 ■ The system module–Table 9-8
?TFL 5	Check the SCSI module in base slot 5 in the system unit. Be sure the system module is inserted tightly in its slot and that anything that is connected to it is connected correctly. See Table 9-5 for more information about troubleshooting SCSI modules.

(continued on next page)

Table 9-1 (Cont.). Error Messages on the Monitor

Message	Action
?TFL 6	Check the ThinWire Ethernet module in base slot 6 in the system unit. If your Ethernet module is connected to a ThinWire network, be sure the ThinWire cables are connected correctly. Then disconnect the ThinWire cables and terminate the T-connector. If the test still fails, the problem is in the system module. If the test no longer fails, the problem is in the network. If your Ethernet module is not connected to a ThinWire network, be sure a terminated T-connector is connected to the ThinWire connector on the system unit. See Table 9-7 for more information about troubleshooting Ethernet modules.
?TFL 7	Check the system module in base slot 7 in the system unit. Be sure that anything connected to the system module is inserted tightly into its slot. See Table 9-8 for more information about troubleshooting the system module, memory modules, the keyboard and mouse, and the power supply.

Table 9-2. Test Error Codes for Monochrome Frame Buffer Modules

Error Code	Action
curs int vdac vram	Replace the monochrome frame buffer module.

Table 9-3. Test Error Codes for Color Frame Buffer Modules

Error Code	Action
curs int vdac vram	Replace the color frame buffer module.
ptrn	The problem is in the monitor or video cable. Try a new monitor. Try a new video cable.

Table 9-4. Test Error Codes for the 2D Graphics Accelerator Module

Error Code	Action
stic	The problem is in the 2D graphics accelerator module or the system module. Move the 2D graphics accelerator module to another option slot, remembering that a 2D module cannot go in option slot 2. If the test no longer fails, replace the system module and chassis. If the test returns error code stic in the new slot, replace the 2D graphics module.
damaddrs intr-dma shade stamp vdac vdacsig	Replace the 2D graphics accelerator module.
ff fbfill	Contact your Digital service representative.

Table 9-5. Test Error Codes for 3D Graphics Accelerator Modules

Error Code	Action
fb fbfill vdacsig	The problem may be in the 3D graphics module. If the error message ends with the phrase vsimm=*number*, contact your Digital service representative. If the error message does not end with the phrase vsimm=*number*, replace the 3D graphics module.
intrdma i860 patrns sdmaddrs shade stamp stic-reg vdacreg	The problem is in the 3D graphics module or the system module. If you have another 3D module that you know is good, try it in the option slots. If the test no longer fails, replace the option module. If the test continues to fail, replace the system module and chassis. If you have no other 3D module, contact your Digital service representative.

Table 9-6. Test Error Codes for SCSI Modules

Error Code	Action
cntl sram	Replace the SCSI controller. The slot number in the error message is the number of the slot in which the problem SCSI controller is located. If the faulty SCSI controller is on the system module, replace the system module and chassis. If the faulty SCSI controller is an option module, replace the option module.
sdiag	The problem is in the SCSI controller or a drive connected to the SCSI controller. Contact your Digital service representative.

Table 9-7. Test Error Codes for Ethernet Controller Modules

Error Code	Action
cllsn crc esar init int-lb m-cst promisc ram regs	Replace the Ethernet controller. The slot number in the error message is the number of the slot in which the problem Ethernet controller. If the faulty Ethernet controller is in base slot 6, replace the system module and chassis. If the faulty Ethernet controller is in one of the option slots, replace the Ethernet option module.
ext	Check the Ethernet connection. If the test no longer fails, the problem is in the Ethernet controller. If the faulty Ethernet controller is in base slot 6, replace the system module and chassis. If the faulty Ethernet controller is in one of the option slots, replace the Ethernet option module.

Table 9-8. Test Error Codes for Base System Modules

Error Code	Action
dz/cache	Replace the system module and chassis.
ecc	The problem is in the memory module or the system module. Make sure the memory modules are firmly seated on the system module. If the test still fails, run the system memory test for all memory modules. Type **t 7/mem *** and press Return. This test, which checks the operation of each memory module, takes several minutes for each module tested. The number in the parentheses in the error message that appears on the screen is the number of the slot that contains a bad memory module. Replace any modules the memory test indicates are bad. If the system reports that all memory modules are bad, remove them all and insert a memory module that you know is good. Run the memory test again. If the memory test still fails, replace the system module and chassis.
fpu	Replace the system module and chassis.

(continued on next page)

Table 9-8 (Cont.). Test Error Codes for Base System Modules

Error Code	Action
mem	The problem is in the memory module or the system module. Make sure the memory modules are firmly seated on the system module. If the test still fails, run the system memory test for all memory modules. Type **t 7/mem *** and press Return. This test, which checks the operation of each memory module, takes several minutes for each module tested. The number in the parentheses in the error message that appears on the screen is the number of the slot that contains a bad memory module. Replace any modules the memory test indicates are bad. If the system reports that all memory modules are bad, remove them all and insert a memory module that you know is good. Run the memory test again. If the memory test still fails replace the system module and chassis.
misc/kbd misc/mouse	The problem is in the keyboard, mouse, keyboard-mouse cable, or the system module. Be sure that the keyboard and mouse are attached correctly to the keyboard-mouse cable and the keyboard-mouse cable is attached correctly to the system unit. If the test still fails and the error message is misc/kbd, replace the keyboard. If the test still fails and the error message is misc/mouse, replace the mouse. If the test still fails after the problem item is replaced, try a new keyboard-mouse cable. If the test still fails, replace the system module and chassis.

(continued on next page)

Table 9-8 (Cont.). Test Error Codes for Base System Modules

Error Code	Action
misc/pstemp	The problem is in the power supply. Contact your Digital service representative.
misc/wbpart	Replace the system module and chassis.
tlb	Replace the system module and chassis.

Interpreting Diagnostic Indicator Lights on the System Unit

When no display appears on your monitor, you can read self-test results by looking at the diagnostic indicator lights on the back of the system unit. They are located between the ThinWire Ethernet connector and the reset button.

Table 9-9 lists the error messages you might see on the diagnostic indicator lights and explains what they mean and how to use them to find out what the problem is. The four lights on the left display a pattern that tells you where the problem is. The four lights on the right provide additional information about the problem.

Warnings: *Always shut down the worksystem software and turn the workstation off before connecting or disconnecting a piece of hardware and before removing or replacing the cover from the system unit.*

Always use the antistatic wrist strap when handling memory or other option modules, whether they are in or out of the system unit.

Chapter 4 of this guide contains instructions for removing and replacing the cover of the system unit, using the antistatic wrist strap, and handling memory and other option modules.

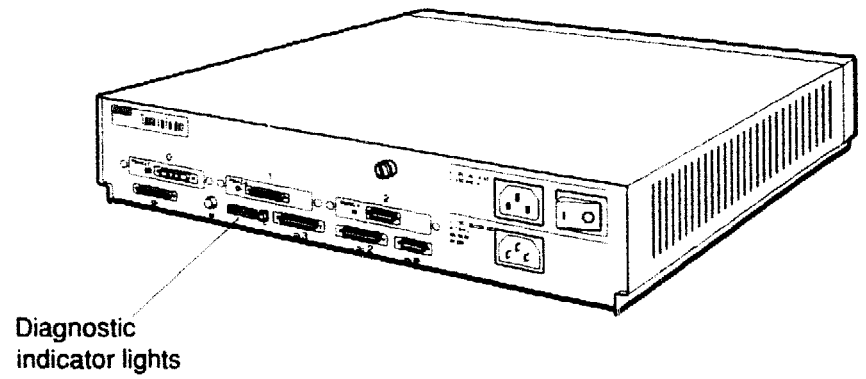


Figure 9-2. Diagnostic indicator lights

Table 9-9. Interpreting Diagnostic Indicator Lights on the System Unit

Four Left Lights	Action
No display; test does not start	Check for loose or damaged connectors. Reseat any loose modules. If the system still does not start, there is a basic problem in the system. Contact your Digital service representative.
On On On On	A hardware problem is preventing the test from running. Contact your Digital service representative.
Off On On On	If, in addition, the right indicator lights display On On On On, replace the memory module in memory slot 1. If the right indicator lights do not display On On On On, the problem is in the system module. Replace the system module and chassis.
Off On On Off	The problem is in the system module. Replace the system module and chassis.
Off On Off On	The problem is in the system module. Replace the system module and chassis.
Off Off On Off	Replace the module in option slot 2.
Off Off Off On	Replace the module in option slot 1.
Off Off Off Off	If any of the indicator lights on the right are on, replace the option module in option slot 0. If the indicator lights blinked as the system ran its tests and the four right indicator lights are off, the self-test completed successfully. Check your monitor.

Solving Basic Hardware Problems

Table 9-10 offers solutions to a number of hardware problems. If you follow the suggestions given here and your problem remains unresolved, contact your system manager or your Digital service representative.

Warnings: *Always turn the workstation off before connecting or disconnecting a piece of hardware and before removing or replacing the cover from the system unit.*

Always use the antistatic wrist strap when handling memory or other option modules, whether they are in or out of the system unit.

Table 9-10. Solutions to Basic Hardware Problems

Problem	Solution
The screen is blank.	Follow these steps: 1. Press any key on your keyboard. If your screen saver was active, the display will reappear. 2. Be sure the system unit and monitor are turned on. 3. Adjust your brightness and contrast controls to increase the brightness and contrast. 4. Turn off the system unit and monitor. 5. Be sure the system unit power cord and the monitor-to-system-unit power cable or the monitor power cord are connected correctly. 6. Be sure the video cable is securely connected to the monitor and system unit. 7. Turn on the system unit and monitor. 8. If you have multiple monitors connected to your workstation, the monitor in the lowest-numbered option slot displays all system test information. After running the preconsole tests at powerup, the additional monitor screens remain blank until you move your mouse pointer into the monitor screen.

(continued on next page)

Table 9-10 (Cont.). Solutions to Basic Hardware Problems

Problem	Solution
The screen display is distorted or unstable.	Follow these steps: 1. Shut down your worksystem software, if necessary, and turn off the system unit and monitor. 2. Make sure the video cable connectors are correctly attached to the monitor and system unit. 3. Turn on the system unit and monitor.
Color is distorted or unclear.	Follow these steps: 1. Move such items as magnetic paper clip holders and electric pencil sharpeners or other electromechanical devices away from the monitor. 2. If your monitor has a degauss button, press it for 5 seconds. If the monitor has no degauss button, turn the monitor off and then on again. 3. See the documentation that came with your monitor for further troubleshooting instructions.
Red or blue color is missing from the display on your screen.	Follow these steps: 1. Shut down your worksystem software, if necessary, and turn off the system unit and monitor. 2. Be sure the video cable connectors are attached to the monitor in the following order, from left to right: red, green, blue. 3. Turn on the system unit and monitor.

(continued on next page)

Table 9-10 (Cont.). Solutions to Basic Hardware Problems

Problem	Solution
The DIGITAL logo appears in red instead of blue on the login screen on a color monitor.	Follow these steps: 1. Shut down you worksystem software, if necessary, and turn off the system unit and monitor. 2. Remove the video cable connector from the video connector on the system unit. 3. Position the cable connector so the DIGITAL logo is on top and reattach the cable connector to the connector on the system unit. 4. Turn on the system unit and monitor.
When you type, nothing happens on the screen.	Follow these steps: 1. Check the indicator light under the Hold Screen label on the function key strip on the keyboard. If the indicator light glows green, press the Hold Screen key. 2. Shut down your worksystem software, if necessary, and turn off the system unit. 3. Disconnect the keyboard cable from its connector on the keyboard-mouse connector block and then reconnect it. 4. Make sure the keyboard-mouse cable is firmly attached to the system unit and turn on the system unit. 5. Turn off the system unit and monitor, connect another keyboard, and turn on the system unit and monitor again.

(continued on next page)

Table 9-10 (Cont.). Solutions to Basic Hardware Problems

Problem	Solution
You cannot log on to the network, and you have already ruled out software problems.	*If you are using ThickWire Ethernet, follow these steps*: 1. Shut down your worksystem software, if necessary, and turn off the system unit. 2. Be sure your ThickWire connector is firmly attached to the ThickWire connector on the system unit. 3. Turn on the system unit. *If you are using ThinWire Ethernet, follow these steps*: 1. Shut down your worksystem software, if necessary, and turn off the system unit. 2. Be sure your ThinWire cable connector(s) and/or terminator are firmly attached to the ThinWire T-connector. 3. Be sure the ThinWire T-connector is correctly attached to the ThinWire connector on the system unit. 4. Turn on the system unit. (continued on next page)

Table 9-10 (Cont.). Solutions to Basic Hardware Problems

Problem	Solution
No cursor appears on the screen.	Follow these steps: 1. Check the indicator light under the Hold Screen label on the function key strip on the keyboard. If the indicator light glows green, press the Hold Screen key. 2. Move the mouse around on your desktop or the puck or stylus around on your tablet to be sure you haven't accidentally moved the cursor off your screen. 3. Shut down your worksystem software, if necessary, and turn off the system unit. 4. Make sure the mouse cable is correctly connected to the keyboard-mouse connector block and the keyboard-mouse cable is correctly connected to the system unit. 5. Turn on the system unit. 6. Turn off the system unit, connect another mouse or tablet, and turn on the system unit again.
The cursor on the screen fails to follow the movement of the mouse on the desktop or the puck or stylus on the tablet.	Follow these steps: 1. Shut down your worksystem software, if necessary, and turn off the system unit. 2. Be sure the mouse cable is correctly connected to the keyboard-mouse connector block and the keyboard-mouse cable is correctly connected to the system unit. 3. Turn on the system unit. 4. Turn off the system unit, connect another mouse or tablet and turn on the system unit again. If a new mouse works, clean the old mouse by following the directions given in Chapter 2 of this guide.

(continued on next page)

Table 9-10 (Cont.). Solutions to Basic Hardware Problems

Problem	Solution
You cannot install worksystem software from a tape or optical compact disc drive.	*If you have only one external storage device, follow these steps:* 1. Be sure the device is turned on. 2. Turn off the device and the system unit. 3. Be sure the system unit expansion cable is correctly connected to the device and the system unit. 4. Be sure a terminator is correctly attached to the second connector on the device. Turn on the device and the system unit. For further troubleshooting instructions, see the documentation that came with the device and the installation guide that came with your worksystem software. *If you have more than one external storage device, follow these steps:* 1. Be sure all devices and the system unit are receiving power from an active power source. 2. Be sure all devices are turned on. 3. Type **cnfg** and the number of the base slot or option slot to which the device is connected. If the drive you are using does not appear in the configuration display on the screen, turn off all devices connected to the system unit and then turn off the system unit. For a discussion of configuration displays, see Chapter 8 of this guide. 4. Check the SCSI ID numbers assigned to the devices connected to that slot to be sure none is duplicated. For a discussion of SCSI ID numbers, and how to set them, see Chapter 5 of this guide.

(continued on next page)

Table 9-10 (Cont.). Solutions to Basic Hardware Problems

Problem	Solution
	5. Be sure the system unit expansion cable is correctly connected to the first device and the system unit. 6. Be sure a terminator is firmly attached to the second connector on the final device. 7. Be sure the connector cables between devices are the 18-inch cables supplied by Digital and that they are connected correctly. 8. Be sure that the cabling used to connect SCSI devices to a given connector on the system unit does not exceed 19 feet 8 inches in length. This includes cable within expansion boxes as well as external cable. 9. Turn on the system unit and each device. For further troubleshooting instructions, see the documentation that came with your devices, and the installation guide that came with your workstation software.
A red light blinks rapidly on the front of your TK50Z tape drive.	Follow these steps: 1. Push the load/unload button four times. 2. Turn the tape drive off and then on again. Do this only one time.

(continued on next page)

Table 9-10 (Cont.). Solutions to Basic Hardware Problems

Problem	Solution
Nothing happens when you try to use your printer.	Follow these steps: 1. Be sure the printer is turned on. 2. Shut down your worksystem software, if necessary, and turn off the printer and the system unit. 3. Be sure the printer power cord is connected to an active power source. 4. Be sure the printer cable connector is correctly attached to one of the communications connectors on the system unit. 5. Turn on the system unit and the printer. For further troubleshooting instructions, see the documentation that came with your printer.
Nothing happens when you try to use a communication device.	Follow these steps: 1. Be sure the device is turned on. 2. Shut down your worksystem software, if necessary, and turn off the device and the system unit. 3. Be sure the device power cord is connected to an active power source. 4. Be sure the connector on the communication device cable is correctly attached to the communications connector or the communications connector adapter on the system unit. 5. Turn on the system unit and the device. For further troubleshooting instructions, see the documentation that came with the communication device.

Contacting Your Digital Service Representative

If you have followed the suggestions offered in this chapter and your problem persists, your Digital service representative can help you. You can get your service representative's name and telephone number from your Digital sales representative.

Before you place your call

- Write down the nature of the problem. Include any error messages you have received and the number of any self-test subtest that failed.
- List the steps you have taken to correct the problem and the results of those steps.
- Write down the serial and model numbers of the equipment with which you are having a problem.
- Be prepared to type commands on the keyboard and read information from the screen or the system unit diagnostic indicator lights as you talk to your service representative.

10

Using the Console Program

This chapter explains how to

- Select console and operating modes
- Follow console command conventions
- Use the console commands
- Set environment variables
- Work within the system environment

Console and Operating Modes

The workstation operates in one of two modes: console mode and operating mode.

When you use console mode, the console program allows you to communicate directly with your workstation hardware by means of console commands.

When you use operating mode, the worksystem software allows you to use applications to perform daily workstation activities.

Using Console Mode

Use console commands for such tasks as

- Running workstation self-tests
- Displaying workstation hardware configurations
- Setting workstation environment variables
- Booting the operating system

Console prompts

When you use console mode, the system displays one of these two prompts on the screen:

>> or R>

- The >> prompt means that the workstation is in privileged mode and anyone can use all the console commands.
- The R> prompt means that the workstation is in restricted mode and users who don't know the password can use only the boot and password console commands. This does not mean, however, that they cannot use the worksystem software. See the description of the passwd command later in this chapter for more information.

If you have multiple monitors connected to your workstation, the monitor in the option slot with the lowest number is the system console. This monitor displays all system information.

Using Operating Mode

Use worksystem commands for such activities as

- Creating and revising files
- Backing up files
- Sending and receiving electronic mail

Operating system prompts

When you use operating mode, the operating system prompts you to supply your user name and password.

Entering Console and Operating Modes

Console mode

You enter console mode in any of the following ways:

- By turning on the workstation
- By pressing the workstation reset button

  Caution: *Turning off the workstation or pressing the reset button when the operating system is running may cause loss of data.*

- By using the shutdown command, if you are running ULTRIX worksystem software

Operating mode

You enter operating mode in either of the following ways:

- By booting the operating system at the console prompt
- By setting your workstation to boot the worksystem software automatically

Rules for Typing Console Commands

Use console commands when the system console displays the prompt >> or R>. Follow these rules:

- Type uppercase and lowercase letters exactly as they appear in command lines. The system recognizes uppercase and lowercase letters as different input.
- Press Return after typing a command message.
- Enter number values as follows:
  - Enter *decimal values* as a string of decimal digits with no leading zeros (for example, 123).
  - Enter *octal values* as a string of octal digits with a leading zero (for example, 0177).
  - Enter *hexadecimal values* as a string of hexadecimal digits preceded by 0x (for example, 0x3ff).
- When reading or writing to memory, you have a choice of data sizes: byte, halfword, or word. Because a word is 4 bytes, successive addresses referenced by a word are successive multiples of 4. For example, the address following 0x80000004 is 0x80000008. An error occurs if you specify an address that is not on a boundary for the data size you are using.
- The following key combinations have an immediate effect in console mode:
  - Ctrl-s freezes the screen display.
  - Ctrl-q releases a frozen screen display.
  - Ctrl-c aborts a command.
  - Ctrl-u erases a partially typed command line.
  - BACKSPACE deletes the last character typed.

Conventions Used in This Chapter

- **Letters in boldface type like this** are to be typed exactly as they appear.
- *Letters in italic type like this* are variables that you replace with actual values. (Note that the help and menu screens display these variables in all capital letters.)
- *LETTERS IN UPPERCASE ITALIC TYPE LIKE THIS* are used for variables you can select from a specific list of values. (The command descriptions presented later in this chapter explain these values.)
- Arguments enclosed in square brackets ([ ]) are optional.
- Ellipses (...) follow an argument that can be repeated.

Console Command Formats and Functions

The console commands are described in alphabetical order. To locate the page that discusses a specific command, see the table of contents.

Console commands and formats are listed here as they appear in the help menu. To display the help menu, type a question mark (?) and press Return.

CMD:

boot [[**-z #**] [**-n**] **#/path** [**ARG...**]]
cat SCRPT
cnfg [**#**]
d [**-bhw**] [**-S #**] **RNG val**
e [**-bhwcdoux**] [**-S #**] **RNG**
erl [**-c**]
go [**ADR**]
init [**#**] [**-m**] [**ARG...**]
ls [**#**]
passwd [**-c**] [**-s**]
printenv [**EVN**]
restart
script SCRPT
setenv EVN STR
sh [**-belvS**] [**SCRPT**] [**ARG..**]
t [**-l**] **#/STR**] [**ARG..**]
unsetenv EVN

Table 10-1 lists the function of valid console commands.

Table 10-1. Console Command Functions

Command	Function
?	Displays list of console commands and formats
boot	Boots the system
cat	Displays scripts
cnfg	Displays system configuration information
d	Writes data into memory
e	Examines memory contents
erl	Displays a log of error messages
go	Transfers control to a specific address
init	Resets the system
ls	Displays a list of objects present in a module
passwd	Sets and clears the console password
printenv	Prints environment variables
restart	Performs a software restart
script	Enters a short script at the console
setenv	Sets environment variables
sh	Invokes a script
t	Invokes module diagnostics
unsetenv	Deletes environment variables

Console Command Description

DECstation 5000 Model 200 console commands are described here. To use a console command, type the command as shown in its description, add the appropriate options and arguments, and press Return.

The console prompt >> is shown on the command line for clarity.

? Command

>>**?** [*command name*]

The ?, or help, command displays brief help messages for console commands. If you specify a command name, the screen displays the help message for that command. Otherwise, the screen displays the help messages for all console commands. The ? command is not listed in the help menu.

boot Command

>>**boot** [[*OPTIONS*] #/*path* [*argument...*]]

OPTIONS	**-a**	Perform a multiuser boot
	-n	Load but do not execute
	-z *number*	Sleep for *number* seconds

The boot command loads and optionally executes the program specified by #/*path*, where # is the slot number of the module acting as the boot device and *path* is a device-specific file specification. The -a option boots for a multiuser environment; to perform a single user boot, enter the boot command without the -a option. The -n option suppresses execution of the program after it is loaded. The -z option causes the system to wait for *number* seconds before starting the bootstrap.

If no arguments are specified, the contents of the boot environment variable are used as the argument list. Use the setenv command to specify the contents of the boot environment variable.

If you specify any arguments, you must include the entire argument string in the boot command. The system ignores the boot environment variable when any additional arguments are included.

For example, you can use the boot command to specify a file on a disk drive connected to the SCSI module that has SCSI ID 0 and is located in base slot 5 by typing **boot 5 rz0/vmunix**. To boot for a multiuser environment, type **"boot 5/rz0/vmunix -a"**.

Note that if you use the setenv command to set the boot environment variable for a multiuser environment, you must surround the command with double quotation marks because this command contains a blank. Thus enter **"5/rz0/vmunix -a"**. See "Environment Variables" later in this chapter for more information.

cat Command

>>**cat** # */scriptname*

The cat command displays the contents of the script specified by *scriptname*. Replace # with the slot number of the module that contains the script whose contents you want to display.

cnfg Command

>>cnfg [#]

The cnfg command displays system configuration information. If you specify a module number for #, the screen displays configuration information for that module. Otherwise, the screen displays configuration information for each module in the system. The following example shows a cnfg display that might appear when no slot number is specified. This display shows a system with optional Ethernet, SCSI, and color frame buffer modules.

```
>>cnfg
 7:  KN02-AA  DEC      T5.2a    TCF0  ( 24 MB)
 6:  PMAD-AA  DEC      T5.2a    TCF0  (enet: 08-00-2b-0c-e0-d1)
 5:  PMAZ-AA  DEC      T5.2a    TCF0  (SCSI = 7)
 2:  PMAD-AA  DEC      X5.1f    TCF0  (enet: 08-00-2b-0f-43-31)
 1:  PMAZ-AA  DEC      X5.1e    TCF0  (SCSI = 7)
 0:  PMAG-BA  DEC      T5.2a    TCF0  (CX -- d=8)
```

The following is a sample configuration display for the system and three memory modules located in base slot 7.

```
>>cnfg 7
 7: KN02-AA  DEC      T5.2f    TCF0   ( 24 MB)
        mem( 0): a0000000:a07fffff   (  8 MB)
        mem( 1): a0800000:a0ffffff   (  8 MB)
        mem( 2): a1000000:a17fffff   (  8 MB)
```

The following is a sample display for the SCSI devices connected to a SCSI module located in base slot 5.

```
>>cnfg 5
 5: PMAZ-AA  DEC      T5.2e    TCF0    (SCSI = 7)
    ------------------------------------------------------
    DEV   PID                 VID          REV      SCSI DEV
    ===== ================== ============ ======== =========
    rz0   RZ55      (C) DEC   DEC          0700     DIR
    rz1   RZ56      (C) DEC   DEC          0200     DIR
    tz3                                              SEQ
```

In the column heads for the table in this display,

- DEV stands for device name.
- PID stands for peripheral identifier.
- VID stands for vendor identifier.
- REV stands for device revision level.
- SCSI DEV stands for SCSI device type.

  DIR indicates a direct access device, or hard disk drive.
  SEQ indicates a sequential access device, or tape drive.
  CD-ROM indicates an optical compact disc drive.

d Command

>>**d** [*OPTIONS*] *RANGE value*

OPTIONS	**-w**	Word (default)
	-h	Halfword
	-b	Byte
	-S *count*	Repeat deposit *count* times
RANGE	*address*	Single address
	address:address	Start and end address
	address#count	Start address and count
	range,range	More than one range

The d, or deposit, command deposits values in memory. Values can be stored as words, halfwords, or bytes. The default size is word. The d command deposits the specified *value* through the range of specified addresses. No intervening blanks are allowed in an address range. You can specify the address range as follows:

- A single address (*address*)
- A starting and an ending address (*address:address*)
- A starting address and the number of addresses (*address#count*)
- Multiple address ranges separated by commas *(range,range)*. Note that no space follows the comma in an address range.

The -S option causes a value to be stored repeatedly in memory. The value is stored *count* times at each address in the address range.

e Command

>>**e** [*OPTIONS*] *RANGE*

OPTIONS	**-w**	Word (default)
	-h	Halfword
	-b	Byte
	-S *count*	Repeat examine *count* times
	-x	Display in hexadecimal format
	-o	Display in octal format
	-u	Display in unsigned decimal format
	-d	Display in decimal format
	-c	Display as ASCII characters
RANGE	*address*	Single address
	address:address	Start and end address
	address#count	Start address and count
	range,range	More than one range

The e, or examine, command examines the contents of memory. Memory can be examined as words, halfwords, or bytes. The default size is word. The e command examines values in the range of addresses specified. You can specify the address range by using the following:

- A single address (*address*)
- A starting and an ending address (*address:address*)
- A starting address and the number of addresses (*address#count*)
- Multiple address ranges separated by commas *(range,range)*

  Note that no intervening space follows the comma in an address range.

The format options -x, -o, -u, -d and -c specify how the data is to be displayed. If more than one option is specified, data is displayed in each format specified. If no format option is specified, -x is assumed.

The -S option causes the value to be fetched repeatedly. The contents of each address in the address range is fetched *count* times. Only the final value fetched is displayed.

erl Command

>>**erl** [**-c**]

The erl command displays a log of error messages. Error messages are displayed messages that start with a question mark (?). The system records error messages in a special error log buffer, and the erl command displays the contents of this buffer. If you specify -c, the buffer is cleared. The system stops recording error messages when the buffer is full and resumes when the buffer is cleared.

go Command

>>**go** [*address*]

The go command transfers control to the specified address. If no address is specified, the execution address returned by the last boot -n command is used. If no boot -n command has been executed and no *address* is specified, the command is ignored.

init Command

>>**init** [#] [**-m**] [*arguments...*]

The init command initializes module hardware. If you specify a module number (#), only that module is initialized. Otherwise, all modules are initialized.

If you specify init with -m for system module 7, all base system memory is cleared to zero.

The interpretation of remaining arguments is module specific.

ls Command

>>**ls** [#]

The ls command displays a list of files present in a module ROM. If no module is specified in the slot number option (#), a list of files for all modules is displayed.

passwd Command

>>**passwd** [*OPTIONS*]

OPTIONS	**-s**	Set new console password
	-c	Clear console password

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

If the console prompt is R>, the use of console commands is restricted, and you can use only the boot and passwd commands (with no argument). Use the passwd command with no arguments to gain unrestricted use of the console commands. The console prompts for the password. If you enter the proper password, the prompt changes to >>. The screen does not display the password as it is being entered.

If the system prompt is >>, the use of console commands is unrestricted. You can set the console password by using the -s option. The console prompts for the new password twice. The screen does not display the password as it is being entered. Both password values must be the same. You can clear the console password by using the -c option. When the console password is cleared, console access is unrestricted.

printenv Command

>>**printenv** [*evname*]

The printenv command displays the value of environment variables. If you specify the name of an environment variable, the screen displays the value of that variable. Otherwise, the screen displays the values of all environment variables. See "Environment Variables" later in this chapter for more information.

restart Command

>>**restart**

The restart command attempts to perform a software restart, if a restart block has been set up in software. Refer to the TURBOchannel firmware documentation for further information.

script Command

>>**script** *name*

The script command accepts a short script entered at the console. After a script has been entered, you can execute the script by using the sh command.

To terminate a script entry, press Ctrl-d, enter a blank line, or enter a line containing only a single period (.).

setenv Command

>>**setenv** *evname value*

The setenv command sets the value of an environment variable. Note that you must enclose the command in double quotation marks if *value* contains blanks. See "Environment Variables" later in this chapter for more information.

sh Command

>>**sh** [*OPTIONS*] [#/*scriptname*] [*argument...*]

OPTIONS	**-e**	Exit on error
	-b	Branch to script
	-v	Verbose; echo to console
	-S	Suppress script-not-found errors
	-l	Loop

The sh, or shell, command activates a script. Replace # with the slot number of the module that contains the script.

If you specify a script name for *scriptname*, the script is used as the input stream. Otherwise, entries at the console are used as the input stream, and a subshell is created. When a shell script is activated, environment variable 0 is set to the script name, 1 is set to the first argument, 2 is set to the second argument, and so on.

The -e option directs the shell to exit when an error occurs. Normally, the shell ignores errors.

The -b option executes the script specified by *scriptname* instead of creating a subshell.

The -v option causes the script to be echoed to the console when it is executed. The default is no echo.

The -S option suppresses any error message if the script is not found and causes the sh command to return a status that indicates success.

The -1 option causes a script to be executed continuously until a system reset occurs or Ctrl-c is pressed.

t Command

>>t [*OPTIONS*] #/*testname* [*argument...*]

OPTIONS **-l** Loop

The t, or test, command runs module tests. Specify a test with #/*testname*, where # is the slot number and *testname* is a module-specific test name.

The -l option causes a test to be executed continuously until a system reset occurs or Ctrl-c is pressed.

If executed from a script, the t command displays #/*testname* on the system console as each test is run.

Tests specific to the system module are performed by Digital service representatives.

To display the individual tests and test formats for a specific module, type **t#/ ?**, where # is the slot number of the module.

You can also type **test** to invoke a script that performs a thorough test of the entire system. Typing **test** is a shorthand way of typing **sh 7/test**. If you type **sh -l 7/test**, the test script will loop.

unsetenv Command

>>**unsetenv** *evname*

The unsetenv command deletes an environment variable. See "Environment Variables" later in this chapter for more information.

Environment Variables

Environment variables store system parameters, parameterize scripts, and pass information to the operating system. Some environment variables are retained in nonvolatile memory. Others are lost when power is interrupted.

Console commands used for environment variables are summarized in Table 10-2. Table 10-3 defines standard environment variables that can be set by the user. Environment variables are set by the system.

Table 10-2. Console Commands for Environment Variables

Command	Description
printenv	Displays the value of environment variables.
setenv *variable value*	Sets the value of an environment variable.
unsetenv *variable value*	Deletes an environment variable.

Table 10-3. Environment Variables Set by the User

boot[1]	Specifies the default arguments for the boot command.
console[1]	Controls the choice of the system console. If you specify any value other than s, the system *rom* the console. If you specify s, the system uses a terminal connected tc the system module. Setting console causes the system to immediately reconfigure and initialize the system console.
haltaction[1]	Specifies system halt actions: b causes the system to perform a boot command. h causes the system to halt (accept command from the console). r causes the system to perform a restart operation or, if that fails, to perform a boot operation.
more	Contains the screen size. If more is nonzero, the system paginates all command output using the value as the page size.
osconsole	Contains the slot numbers of the console driver(s). If a tty driver from slot *x* is used as the console, osconsole is set to *x*. If a crt driver from slot *y* and a kbd driver from slot *z* are used as the console, osconsole is set to *y,z*. This environment variable is not a standard system environment variable.
testaction[1]	Controls the power-up self-test behavior: t specifies a thorough (but slow) testing of the system. q specifies a quicker but less thorough testing. m specifies manufacturing-specific tests.
#	Contains the number of the module that contains the current script. If no script is active, the base system module is assumed.

[1]Environment variables preserved in nonvolatile memory

Additional environment variables can be set as implementation specific side effects of various bootstrap and test procedures.

Console Autoconfiguration

When the console environment variable contains any value other than s, the system autoconfigures the console terminal.

First the system searches all options for a crt driver. If a crt driver is found, the system searches all option modules and then the system module for a kbd driver. Because the system module has a kbd driver, this search is always successful. When the search for the kdb driver has completed successfully, the crt and kbd drivers are loaded and the osconsole environment variable is set to the slot numbers of the crt and kbd drivers, respectively.

If a crt driver is not found, the tty driver is loaded from the system module and the osconsole environment variable is set to 7, the slot number of the system module.

11

Moving the DECstation 5000 Model 200 Workstation

This chapter explains how to take your workstation apart and pack it in preparation for moving.

Dismantling Your Workstation

1. Follow the procedures for turning off your workstation given in Chapter 8 of this guide.
2. Unplug all power cords from their power sources.
3. Disconnect any optional peripheral devices from the system unit, and if you have more than one expansion box, disconnect them from each other.
4. Disconnect the monitor, the mouse or tablet, and the keyboard from the system unit.
5. Disconnect the keyboard and the mouse or tablet from the connector block on the keyboard-mouse cable.
6. If you are on a network, disconnect your Ethernet cable from the connector on the system unit.

   Caution: *Disconnecting the Ethernet cable at the network instead of at the system unit interrupts network performance.*

Packing Your Equipment

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

Be sure to include the following in each carton:

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

Reinstalling Your DECstation 5000 Model 200

To reinstall your workstation, follow the instructions in the *DECstation 5000 Model 200 Hardware Installation Guide*.

A

Equipment Specifications

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

- DECstation 5000 Model 200 system unit
- VR262 monitor
- VR297 monitor
- VR299 monitor
- VR319-D monitor
- VRT16-D monitor
- VRT19-D monitor
- LK201 keyboard
- VSXXX-AA mouse
- VSXXX-AB tablet
- BA42 expansion box
- RZ55 hard disk drive
- RZ56 hard disk drive
- RZ57 hard disk drive
- TK50Z tape drive
- TZ30 tape drive

- TLZ04 cassette tape drive
- RRD40 optical compact disc drive
- RX23 diskette drive
- RX33 diskette drive

DECstation 5000 Model 200 System Unit Equipment Specifications

Table A-1. System Unit Description

Weight	12.70 to 22.70 kg (28.00 to 50.00 lb)
Height	9.14 cm (3.60 in)
Width	51.03 cm (20.09 in)
Depth	43.48 cm (17.12 in)
Input voltage	Auto adjust 100–120 Vac or 220–240 Vac
Input current	5 A at 100–120 Vac 2.4 A at 220–240 Vac
Power	
– Frequency	50 to 60 Hz
– Heat dissipation	359 watts, maximum

Table A-2. System Unit Operating Conditions

Temperature range[1]	10°C to 40°C (50°F to 104°F)
Temperature change rate	11°C (52°F) per hour, maximum
Relative humidity	20% to 80%, 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. System Unit Nonoperating Conditions

Temperature range	−40°C to 66°C (−40°F to 151°F)
Relative humidity	10% to 95%, noncondensing
Maximum wet-bulb temperature	46°C (115°F), packaged
Altitude	4,900 m (16,000 ft) maximum

VR262 Monitor Equipment Specifications

Table A-4. VR262 Monitor Description

Weight	19.05 kg (42.00 lb)
Height	39.37 cm (15.50 in)
Width	45.47 cm (17.90 in)
Depth	39.12 cm (15.40 in)
External controls, switches, and indicators	Brightness Contrast Power switch Power indicator
Cathode-ray tube (CRT)	483 mm (19 in) diagonal Monochrome Paper-white phosphor High-efficiency antiglare treatment
Display characteristics	1,024 pixels horizontal by 864 pixels vertical Approximate picture size 334 by 282 mm Maximum brightness no less than 30 footlamberts (fl)
Video input	
– Termination	75 ohms BNC
– Amplitude	1.0 Vpp composite video
Horizontal rate timing	
– Active video time	14.8 μs
– Back porch	1,690 ns
– Blanking interval	3.70 μs maximum
– Frequency	54.054 kHz
– Front porch	160 ns
– Horizontal period	18.5 μs
– Pixels displayed	1,024
– Sync pulse	1,850 ns
Vertical rate timing	
– Active video time	16.0 ms
– Blanking interval	37 horizontal lines maximum

(continued on next page)

Table A-4 (Cont.). VR262 Monitor Description

– Frequency	60 Hz
– Front porch	0 horizontal lines
– Lines displayed	864
– Sync pulse	3 horizontal lines
– Vertical period	16.67 ms
Power	
– Power supply type	Transistor, switch mode ac to dc converter
– ac input	100–120 Vac or 220–240 Vac Switch selectable
– Frequency	47 to 63 Hz
– Power consumption	Approximately 65 watts
Fuse	100–120 Vac: 1 A 6.35 by 31.8 mm (0.25 by 1.25 in) slow blow (Digital part number 90-07212-00) 220 to 240 Vac: 1 A 5 by 20 mm time lag (Digital part number 12-19283-00)

Table A-5. VR262 Monitor Operating Conditions

Temperature range [1]	10°C to 40°C (50°F to 104°F)
Temperature change rate	11° (52°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-6. VR262 Monitor 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

VR297 Monitor Equipment Specifications

Table A-7. VR297 Monitor Description

Weight	29.03 kg (64.00 lb)
Height	40.64 cm (16.00 in)
Width	40.64 cm (16.00 in)
Depth	45.07 cm (17.75 in)
External controls, switches, and indicators	Contrast Power switch Power indicator V-STAT, H-STAT, V-CENT
Tilt range	−5° to 15°
Swivel range	±60°
Cathode-ray tube (CRT)	432 mm (17 in) diagonal Color 0.26 mm phosphor pitch aperture grill 90° deflection High-efficiency antiglare treatment
Display characteristics	1,024 pixels horizontal by 864 pixels vertical Maximum brightness no less than 30 footlamberts (fl)
Video input	
– Termination	75 ohms BNC
– Amplitude	Red: 0.7 Vpp Green (with sync): 1 Vpp Blue: 0.7 Vpp
Horizontal rate timing	
– Active video	14.8 μs
– Back porch	1,680 ns
– Blanking interval	3.70 μs
– Frequency	54.054 kHz
– Front porch	160 ns
– Sync pulse	1.850 μs
Vertical rate timing	
– Active video	16.0 ms

(continued on next page)

Table A-7 (Cont.). VR297 Monitor Description

– Blanking interval	37 lines
– Frequency	60 Hz
– Front porch	0 lines
– Sync pulse	3 lines
– Vertical period	16.67 ms
Video rate	
– Pixel frequency	69.189 MHz
– Pixel period	14.45 ns nominal
Power	
– ac input	110–120 or 220–240 Vac Switch selectable
– Frequency	47 to 63 Hz
Fuse	100–120 V for VR297-DA Domestic 220–240 V for VR297-D3 Northern Hemisphere

Table A-8. VR297 Monitor Operating Conditions

Temperature range [1]	10°C to 40°C (50°F to 104°F)
Relative humidity	10% to 90% noncondensing
Maximum wet-bulb temperature	28°C (82°F)
Minimum dew-point temperature	2°C (36°F)
Altitude	2600 m (10,000 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-9. VR297 Monitor 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	13,000 m (50,000 ft) maximum

VR299 Monitor Equipment Specifications

Table A-10. VR299 Monitor Description

Weight	31.75 kg (70.00 lbs)
Height	46.99 cm (18.50 in)
Width	50.55 cm (19.90 in)
Depth	52.58 cm (20.70 in)
External controls, switches, and indicators	Brightness Contrast Degauss Power switch Power indicator Voltage selector switch
Swivel range	±120°
Tilt range	−5° to +15°
Cathode-ray tube (CRT)	Color 508 mm (20 in) diagonal Medium persistence P22 RGB phosphor 0.32 mm pitch shadow mask High-efficiency antiglare treatment
Display characteristics	1,024 pixels horizontal by 864 pixels vertical Approximate picture size 326 by 275 mm Contrast 35 footlamberts (fl) maximum
Video input	
– Termination	75 ohms BNC
– Amplitude	Red: 0.7 Vpp Green (with sync): 1 Vpp Blue: 0.7 Vpp
Horizontal rate timing	
– Active video time	14.8 μs
– Back porch	1,680 ns
– Blanking interval	3.69 μs maximum
– Frequency timing	54.054 kHz
– Front porch	159 ns
– Horizontal period	18.5 μs

(continued on next page)

Table A-10 (Cont.). VR299 Monitor Description

– Sync pulse	1,850 ns
Vertical rate timing	
– Active video time	16.0 ms
– Blanking interval	37 horizontal lines
– Frequency	60 Hz
– Front porch	0 horizontal lines
– Sync pulse	3 horizontal lines
– Vertical period	16.67 ms
Power	
– ac input voltage	Switch selectable 88–132 Vac or 185–254 Vac
– Frequency	47 to 63 Hz
– Power consumption	150 watts maximum
Fuse	
	3.2 A for 120 V system 1.6 A for 240 V system

Table A-11. VR299 Monitor Operating Conditions

Temperature range [1]	10°C to 40°C (50° to 104°F)
Relative humidity	10% to 95% noncondensing
Maximum wet-bulb temperature	32°C (89°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-12. VR299 Monitor Nonoperating Conditions

Temperature range	–40°C to 66°C (–40°F to 150°F)
Relative humidity	10% to 95% noncondensing
Maximum wet-bulb temperature	46°C (115°F) packaged
Altitude	4,900 m (16,000 ft) maximum

VR319-D Monitor Equipment Specifications

Table A-13. VR319-D Monitor Description

Weight	22.68 kg (50.00 lb)
Height	45.72 cm (18.00 in)
Width	49.55 cm (19.50 in)
Depth	40.13 cm (15.80 in)
External controls, switches, and indicators	Brightness Contrast Degauss Power switch Power indicator Rotation H-center V-center
Tilt range	5° to 15°
Swivel range	±90°
Cathode-ray tube (CRT)	483 mm (19 in) diagonal Monochrome High resolution Paper-white phosphor High-efficiency antiglare treatment
Display characteristics	1280 pixels horizontal by 1024 lines vertical Approximate picture size 342 by 273 mm Maximum brightness no less than 30 footlamberts (fl)
Video input	
– Termination	75 ohms BNC
– Amplitude	1.0 Vpp composite video
Refresh rate	72 Hz Factory or field service configurable
Horizontal rate timing	
– Active video time	9.7853 μs
– Back porch	1.7124 ns
– Blanking interval	3.1802 μs
– Frequency	77.173 kHz

(continued on next page)

Table A-13 (Cont.). VR319-D Monitor Description

– Front porch	0.2446 ns
– Horizontal period	12.9579 μs
– Pixels displayed	9.7853
– Sync pulse	1.2232 ns
Vertical rate timing	
– Active video time	13.2767 μs
– Back porch	0.427864 ns
– Blanking interval	0.505658 μs
– Front porch	0.038897 ns
– Horizontal period	13.7842 μs
– Lines displayed	13.2767
– Sync pulse	0.038897 ns
Power	
– Power supply type	Switch mode ac to dc converter
– ac input	Automatic voltage select
– Frequency	47 to 63 Hz
– Power consumption	Approximately 123 watts
Fuse	250 V: 5 A 6.35 by 31.8 mm (0.25 by 1.25 in) slow blow

Table A-14. VR319-D Monitor Operating Conditions

Temperature range [1]	10°C to 40°C (50°F to 104°F)
Temperature change rate	11° (52°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-15. VR319-D Monitor 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

VRT16-D Monitor Equipment Specifications

Table A-16. VRT16-D Monitor Description

Weight	25.00 kg (56.00 lb)
Height	40.90 cm (16.10 in)
Width	40.60 cm (16.00 in)
Depth	45.30 cm (17.80 in)
External controls, switches, and indicators	Brightness Contrast Power switch Power indicator V-CENT, H-STAT, V-STAT
Swivel range	±45°
Tilt range	−5° to +15°
Cathode-ray tube (CRT)	432 mm (17 in) diagonal Trinitron aperture grill 0.25 mm triad pitch 90° deflection angle 3 color High-efficiency antiglare treatment
Display characteristics	1,280 by 1,024 pixels Maximum brightness no less than 30 footlamberts (fl)
Video input	
– Termination	75 ohms BNC
– Amplitude	Red: 0.7 Vpp Green (with sync): 1 Vpp Blue: 0.7 Vpp
Horizontal rate timing	
– Active video	10.6806 μs
– Back porch	1,869.1 ns
– Blanking interval	3.4712 μs
– Frequency	70.6621 kHz
– Front porch	267 ns
– Horizontal period	14.1518 μs

(continued on next page)

Table A-16 (Cont.). VRT16-D Monitor Description

– Sync pulse	1,335.1 ns
Vertical rate timing	
– Active video	14.4915 ms
– Blanking interval	39 horizontal lines
– Frequency	66.4743 Hz
– Front porch	3 horizontal lines
– Sync pulse	3 horizontal lines
– Vertical period	15.0434 ms
Video rate	
– Pixel frequency	119.843 MHz
– Pixel period	8.3443 ns nominal
Power	
– ac input voltage	90–132 or 198–264 Vac Switch selectable
– Frequency	47 to 63 Hz
– Power consumption	200 watts maximum

Table A-17. VRT16-D Monitor Operating Conditions

Temperature range [1]	10°C to 40°C (50° to 104°F)
Relative humidity	10% to 95%
Maximum wet-bulb temperature	32°C (89°F)
Minimum dew-point temperature	2°C (36°F)
Altitude	10,000 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-18. VRT16-D Monitor Nonoperating Conditions

Temperature range	–40°C to 60°C (–40°F to 145°F)
Relative humidity	10% to 95%
Maximum wet-bulb temperature	46°C (115°F) packaged
Altitude	12,780 m (50,000 ft) maximum

VRT19-D Monitor Equipment Specifications

Table A-19. VRT19-D Monitor Description

Weight	34.02 kg (75.00 lb)
Height	47.55 cm (18.72 in)
Width	49.94 cm (19.66 in)
Depth	46.96 cm (18.49 in)
External controls, switches, and indicators	Brightness Contrast Power switch Power indicator V-CENT, H-STAT, V-STAT
Swivel range	±45°
Tilt range	−5° to +15°
Cathode-ray tube (CRT)	508 mm (20 in) diagonal Trinitron aperture grill 0.31 mm triad pitch 90° deflection angle 3 color High-efficiency antiglare treatment
Display characteristics	1,280 by 1,024 pixels Maximum brightness no less than 30 footlamberts (fl)
Video input	
– Termination	75 ohms BNC
– Amplitude	Red: 0.7 Vpp Green (with sync): 1 Vpp Blue: 0.7 Vpp
Horizontal rate timing	
– Active video	10.6806 μs
– Back porch	1,869.1 ns
– Blanking interval	3.4712 μs
– Frequency	70.6621 kHz
– Front porch	267 ns
– Horizontal period	14.518 μs

(continued on next page)

Table A-19 (Cont.). VRT19-D Monitor Description

– Sync pulse	1,335.1 ns
Vertical rate timing	
– Active video	14.4915 ms
– Blanking interval	39 horizontal lines
– Frequency	66.4743 Hz
– Front porch	3 horizontal lines
– Sync pulse	3 horizontal lines
– Vertical period	15.0434 ms
Power	
– ac input voltage	90–132 to 198–264 Vac
– Frequency	47 to 63 Hz
– Power consumption	220 watts maximum

Table A-20. VRT19-D Monitor Operating Conditions

Temperature range [1]	10°C to 40°C (50° to 104°F)
Relative humidity	10% to 95%
Maximum wet-bulb temperature	32°C (89°F)
Minimum dew-point temperature	2°C (36°F)
Altitude	10,000 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-21. VRT19-D Monitor Nonoperating Conditions

Temperature range	–40°C to 60°C (–40°F to 145°F)
Relative humidity	10% to 95%
Maximum wet-bulb temperature	46°C (115°F) packaged
Minimum dew-point temperature	2°C (36°F)
Altitude	12,780 m (50,000 ft) maximum

LK201 Keyboard Equipment Specifications

Table A-22. LK201 Keyboard Description

Weight	2.04 kg (4.50 lb)
Height	5.08 cm (2.00 in)
Width	53.34 cm (21.00 in)
Depth	17.15 cm (6.75 in)
Number of keys	105
Number of indicators	4 status LEDs
Language variations	15 Software selectable (keycaps required)
Cable	1.8 m (6 ft) uncoiled length detachable 4-pin mmj connector at both ends
Baud rate	4800
Electrical interface	EIA RS 423
Power consumption	4.2 watts maximum
Power input	11.8 V ±6% at 350 ma
Volume control	8 levels, plus off Maximum 65 dba 1 ft above keyboard
Keystroke timing	20 ms minimum

Table A-23. LK201 Keyboard Operating Conditions

Temperature range [1]	10°C to 40°C (50°F to 104°F)
Relative humidity	10% to 90%
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-24. LK201 Keyboard 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

VSXXX-AA Mouse Equipment Specifications

Table A-25. VSXXX-AA Mouse Description

Weight	0.82 kg (0.37 lb)
Height	39.9 mm (1.57 in)
Diameter	88.9 mm (3.50 in)
Buttons	3
Cable length	1.5 m (5 ft) shielded, 6 conductors and terminals in a 7-pin micro-DIN-type connector (male)
Accuracy	±3% 0 to 24.5 cm (0 to 10 in) per second in any direction ±15% 24.5 to 49 cm (10 to 20 in) per second in any direction ±30% 49 to 73.5 cm (20 to 30 in) per second in any direction
Baud rate	4800
Data format	Delta binary
Electrical interfaces	EIA RS-232-C or TTL
Operating modes	Incremental or polling
Power requirements	+5 V ±5% at 130 ma -12 V ±10% at 20 ma
Resolution	79 counts per cm (200 counts per in)
Tracking speed	73.5 cm (30 in) per second
Tracking rate	In incremental mode: 55 reports per second In polling mode: up to 95 reports per second

Table A-26. VSXXX-AA Mouse Operating Conditions

Temperature range [1]	10°C to 40°C (50°F to 104°F)
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-27. VSXXX-AA Mouse Nonoperating Conditions

Temperature range	40°C to 66°C (40°F to 151°F)
Relative humidity	5% to 95% noncondensing
Maximum wet-bulb temperature	46°C (115°F) packaged
Altitude	4,900 m (16,000 ft) maximum

VSXXX-AB Tablet Equipment Specifications

Table A-28. VSXXX-AB Tablet Description

Weight	3.18 kg (7.00 lb)
Height	20.32 cm (8.00 in)
Width	40.64 cm (16.00 in)
Depth	41.15 cm (16.20 in)
Puck	4 buttons
Stylus	2 buttons
Cable length	1.5 m (5 ft), terminated in a 7-pin Micro-DIN-type connector
Output connector (power and data)	7-pin Micro-DIN (male)
Mating connector	7-pin Micro-DIN (female)
Active area	280 mm by 280 mm (11 in by 11 in)
Baud rate	4800 or 9600 baud (software selectable)
Electrical interfaces	Serial, asynchronous, full-duplex EIA RS-232-C signal levels
Incremental	Position reports generated when cursor is in motion and when pushbuttons are pressed or released
Operating modes	Incremental and polling
Power requirements	+12 V dc ±10% at 0.3 A
Proximity (nominal)	1.27 cm (5 in) cursor
Resolution	79 counts per cm (200 counts per in)
	0.63 cm (0.25 in) stylus
Remote request	X-Y coordinate update and proximity report when polled by host
Tracking rates	
– In incremental mode	55, 72, or 120 reports per second
– In polling mode	50 reports per second at 4800 baud 80 reports per second at 9600 baud

Table A-29. VSXXX-AB Tablet Operating Conditions

Temperature range [1]	10°C to 40°C (50°F to 104°F)
Relative humidity	20% to 80% noncondensing
Maximum wet bulb temperature	28°C (82°F)
Minimum dew point temperature	2°C (36°F)
Altitude	2400 m (8000 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-30. VSXXX-AB Tablet 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	4900 m (16,000 ft) maximum

BA42 Storage Expansion Box Equipment Specifications

Table A-31. BA42 Storage Expansion Box Description

Weight	17.24 kg (38.00 lb) maximum
Height	10.16 cm (4.00 in)
Width	46.02 cm (18.12 in)
Depth	40.64 cm (16.00 in)
Input voltage	Automatically adjusting ac input 120–240 Vac
Frequency range	47 to 63 Hz
Power	90 watts maximum

Table A-32. BA42 Storage Expansion Box 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	20% to 80% noncondensing
Maximum wet-bulb temperature	28°C (82°F)
Minimum dew-point temperature	2°C (36°F)
Altitude	2400 m (8000 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-33. BA42 Storage Expansion Box Nonoperating Conditions

Temperature range	5°C to 50°C (41°F to 122°F)
Relative humidity	10% to 95% noncondensing
Maximum wet-bulb temperature	46°C (115°F) packaged
Altitude	4900 m (16,000 ft) maximum

RZ55 SCSI Hard Disk Drive Equipment Specifications

Table A-34. RZ55 SCSI Hard Disk Drive Description

Expansion box	
– Weight	13.15 kg (29.00 lb)
– Height	13.97 cm (5.50 in)
– Width	32.39 cm (12.75 in)
– Depth	28.55 cm (11.25 in)
Internal drive	
– Weight	3.81 kg (8.40 lb)
– Height	8.26 cm (3.25 in)
– Width	14.61 cm (5.75 in)
– Depth	20.83 cm (8.20 in)
Capacity	
– Bytes per drive	332.3 MB
– Blocks per drive	649,040
– Block size	512 bytes
Data transfer rate	
– Bus asynchronous mode	1.5 MB per second
– Bus synchronous mode	4 MB per second
– To and from media	1.25 MB per second
Seek time	4 ms track-to-track 16 ms average 35 ms maximum
Average latency	8.3 ms
Interface	SCSI

Table A-35. RZ55 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	20% to 80% noncondensing
Maximum wet-bulb temperature	25.6°C (78°F)
Minimum dew-point temperature	2°C (36°F)
Altitude	-300 to 4600 m (-1000 ft 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-36. RZ55 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	20% to 95% packaged
Maximum wet-bulb temperature	46°C (115°F) packaged
Altitude	-300 to 12,200 m (-1000 ft to 40,000 ft)

RZ56 SCSI Hard Disk Drive Equipment Specifications

Table A-37. RZ56 SCSI Hard Disk Drive Description

Internal drive	
Weight	3.81 kg (8.40 lb)
Height	8.26 cm (3.25 in)
Width	14.61 cm (5.75 in)
Depth	20.32 cm (8.00 in)
Capacity	
– Bytes per drive	655.17 MB
– Blocks per drive	1,299,174
– Block size	512 bytes
Data transfer rate	
– Bus asynchronous mode	1.6 MB per second
– Bus synchronous mode	4.0 MB per second
– To and from media	1.875 MB per second
Seek time	4 ms track-to-track 16 ms average 35 ms maximum
Average latency	8.3 ms
Interface	SCSI

Table A-38. RZ56 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	25.6°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-39. RZ56 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
Maximum wet-bulb temperature	46°C (115°F) packaged
Altitude	−300 to 12,200 m (−1000 to 40,000 ft)

RZ57 SCSI Hard Disk Drive Equipment Specifications

Table A-40. RZ57 SCSI Hard Disk Drive Description

Internal drive	
– Weight	3.81 kg (8.40 lb)
– Height	8.26 cm (3.25 in)
– Width	14.61 cm (5.75 in)
– Depth	20.32 cm (8.00 in)
Capacity	
– Bytes per drive	1.0 gigabytes
– Blocks per drive	1,954,050
– Block size	512 bytes
Data transfer rate	
– Bus asynchronous mode	1.6 MB per second
– Bus synchronous mode	4.0 MB per second
– To and from media	2.5 MB per second
Seek time	4 ms track-to-track 14.5 ms average 33 ms maximum
Average latency	8.3 ms
Interface	SCSI

Table A-41. RZ57 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)
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-42. RZ57 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
Maximum wet-bulb temperature	46°C (115°F), packaged
Altitude	−300 to 12,200 m (−1000 to 40,000 ft)

TK50Z Tape Drive Equipment Specifications

Table A-43. TK50Z Tape Drive Description

Expansion box	
– Weight	12.70 kg (28.00 lb)
– Height	13.97 cm (5.50 in)
– Width	32.39 cm (12.75 in)
– Depth	28.58 cm (11.25 in)
Bit density	6,667 bits per in
Cartridge capacity	95 MB approximate
Frequency	50 to 60 Hz
Heat dissipation	32 watts maximum
Input current	2.4 A: 100 to 120 Vac
	1.3 A: 220 to 240 Vac
Media	12.77 mm (0.5 in), 183 m (600 ft) long magnetic tape
Mode of operation	Streaming
Number of tracks	22
Power	160 watts
Track format	Serpentine
Data transfer rate	360 Kbits per second (45 KB per second)
Tape speed	75 in per second

Table A-44. TK50Z Tape Drive 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 80% 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-45. TK50Z Tape Drive Nonoperating Conditions

Temperature range	−30°C to 66°C (−22°F to 151°F)
Temperature change rate	20°C (36°F) per hour, maximum
Relative humidity	10% to 95% noncondensing
Maximum wet-bulb temperature	46°C (115°F) packaged
Altitude	9,140 m (30,000 ft) maximum

TZ30 Tape Drive Equipment Specifications

Table A-46. TZ30 Tape Drive Description

Internal drive	
– Weight	1.50 kg (3.31 lb)
– Height	4.14 cm (1.63 in)
– Width	14.48 cm (5.70 in)
– Depth	21.59 cm (8.50 in)
Bit density	2624 bits per cm (6667 bits per in)
Cartridge capacity	95 Mbytes, formatted (approximate)
Media	12.77 mm (0.5 in) unformatted magnetic tape
Mode of operation	Streaming
Number of tracks	22
Tape speed	190 cm per second (75 in per second)
Track format	Multiple track serpentine recording
Data transfer rate	62.5 Kbytes per second

Table A-47. TZ30 Tape Drive 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	20% to 80% noncondensing
Maximum wet-bulb temperature	25°C (77°F)
Minimum dew-point temperature	2°C (36°F)
Altitude	2400 m (8000 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-48. TZ30 Tape 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	10% to 95%
Maximum wet-bulb temperature	2°C (36°F)
Altitude	9100 m (30,000 ft) maximum

TLZ04 Cassette Tape Drive Equipment Specifications

Table A-49. TLZ04 Cassette Tape Drive Description

Expansion box	
– Weight	7.7 kg (17.00 lb)
– Height	11.50 cm (4.50 in)
– Width	35.00 cm (14.00 in)
– Depth	30.00 cm (12.00 in)
Cassette capacity	1.2 gigabyte
Drive interface	SCSI
Media	TLZ04-CA cassette tape
Mode of operation	Streaming and start/stop
Power consumption	230 watts
Power requirements	1.6 A: 100 to 120 Vac 1.0 A: 200 to 240 Vac
Track format	Digital data storage (DDS)
Transfer rate	156 KB per second

Table A-50. TLZ04 Cassette Tape Drive Operating Conditions

Temperature range[1]	10°C to 40°C (50°F to 104°F)
Relative humidity	20% to 80% noncondensing
Altitude	0 m to 4600 m (0 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-51. TLZ04 Cassette Tape Drive Nonoperating Conditions

Temperature range	–40°C to 70°C (40°F to 158°F)
Relative humidity	5% to 95% noncondensing
Altitude	0 m to 15,200 m (0 to 50,000 ft)

RRD40 Compact Disc Drive Equipment Specifications

Table A-52. RRD40 Compact Disc Drive Description (Tabletop)

Weight	3.99 kg (8.80 lb)
Height	7.62 cm (3.00 in)
Width	23.19 cm (9.13 in)
Depth	27.94 cm (11.00 in)
Access time	Maximum 1,000 ms, including latency Average 500 ms
Average latency	155 ms at outer track 60 ms at inner track
Average transfer rate	175.2 KB per second
Capacity per disc	635 MB
Heat dissipation	14 watts (typical)
Initialization startup time	Less than 6 second
Interface	SCSI

Table A-53. RRD40 Compact Disc Drive Operating Conditions (Tabletop)

Temperature range[1]	10°C to 50°C (50°F to 122°F)
Relative humidity	10% to 80% noncondensing
Maximum wet-bulb temperature	28°C (82°F)
Minimum dew-point temperature	2°C (36°F)
Altitude	3400 m (11,150 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-54. RRD40 Compact Disc Drive Nonoperating Conditions (Tabletop)

Temperature range	4°C to 70°C (40°F to 158°F)
Relative humidity	5% to 95% noncondensing
Maximum wet-bulb temperature	46°C (115°F) packaged
Minimum dew-point temperature	2°C (36°F)
Altitude	13,600 m (44,600 ft) maximum

RX23 Diskette Drive Equipment Specifications

Table A-55. 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-56. 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-57. 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)

RX33 Diskette Drive Equipment Specifications

Table A-58. RX33 Diskette Drive Description

Internal drive	
– Weight	1.10 kg (2.43 lb)
– Height	4.32 cm (1.70 in)
– Width	14.61 cm (5.75 in)
– Depth	20.32 cm (8.00 in)
Number of tracks	80
Number of heads	2
Track density	96 tracks per inch
Step rate	3 ms per track
Diskette size	13.13 cm (5.25 in)
Recording surfaces per diskette	2
Sectors per track	10 normal density 15 high density
Capacity	
– Bytes per drive	409 KB normal density
	1200 KB high density
– Blocks per drive	800 normal density
	2400 high density
– Block size	512 bytes
Data transfer rate	
– To and from media	250 Kbits per second normal density
	500 Kbits per second high density
Operating power	4.1 watts
Standby power	1.5 watts

Table A-59. RX33 Diskette Drive Operating Conditions

Temperature range[1]	10°C to 46°C (50°F to 115°F)
Temperature change rate	11°C (20°F) per hour, maximum
Relative humidity	20% to 80% noncondensing
Maximum wet-bulb temperature	45°C (113°F)
Minimum dew-point temperature	2°C (36°F)
Altitude	2400 m (8000 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-60. RX33 Diskette Drive Nonoperating Conditions

Temperature	−34°C to 60°C (−30°F) to 140°F)
Temperature change rate	20°C (36°F) per hour, maximum
Relative humidity	5% to 90%
Maximum wet-bulb temperature	45°C (113°F) packaged
Altitude	9100 m (30,000 ft) maximum

B

Part Numbers

This appendix lists the part numbers for the components of the DECstation 5000 Model 200 Workstation.

Table B-1. Basic Components

Item	Order Number
VR262, 19-inch monochrome monitor, 120 volts	VR262-AA
VR262, 19-inch monochrome monitor, 240 volts	VR262-A3
VR297, 16-inch color monitor, 120 volts	VR297-DA
VR297, 16-inch color monitor, 240 volts, Northern Hemisphere	VR297-D3
VR297, 16-inch color monitor, 240 volts, Southern Hemisphere	VR297-D4
VR299, 19-inch color monitor, 120 volts	VR299-DA
VR299, 19-inch color monitor, 240 volts, Northern Hemisphere	VR299-D3
VR299, 19-inch color monitor, 240 volts, Southern Hemisphere	VR299-D4
VR319, 19-inch monochrome monitor, 120/240 volts	VR319-DA
VR319, 19-inch monochrome monitor, 120/240 volts, Southern Hemisphere	VR319-D4
VRT16, 16-inch color monitor, 120/240 volts	VRT16-DA
VRT16, 16-inch color monitor, 120/240 volts, Southern Hemisphere	VRT16-D4
VRT19, 19-inch color monitor, 120 volts	VRT19-DA
VRT19, 19-inch color monitor, 240 volts, Northern Hemisphere	VRT19-D3
VRT19, 19-inch color monitor, 240 volts, Southern Hemisphere	VRT19-D4
RZ55 hard disk drive, 332 Mbytes	RZ55-E
- RZ55 hard disk drive PCB	29-27347-01
RZ56 hard disk drive, 665 Mbytes	RZ56-E
- RZ56 hard disk drive HDA and frame assembly	29-27890-01
- RZ56 hard disk drive PCB	29-27889-01
RZ57 hard disk drive, 1.2 Gbytes	RZ57-E
- RZ57 hard disk drive HDA and frame assembly	29-28158-01
- RZ57 hard disk drive PCB	29-28159-01
RRD40 optical compact disc drive, 600 Mbytes	RRD40-FA
TK50Z tape drive, 95 Mbytes, 120 volts	TK50Z-GA

(continued on next page)

Table B-1 (Cont.). Basic Components

Item	Order Number
TK50Z tape drive, 95 Mbytes, 240 volts	TK50Z-G3
TLZ04 tape drive, 1.2 Gbytes, 120 volts	TLZ04-DA
Mouse	VSXXX-AA
Keyboard	LK201

Table B-2. Cords, Cables, and Connectors

Item	Part Number	Order Number
Monitor-to-system-unit power cord (U.S.)	17-00442-26	—
System unit or expansion box power cord	17-00606-10	BN19P-K
Expansion-box-to-expansion-box cable	17-01351-04	BC19J-1E
Keyboard-mouse cable	17-02640-01	—
Serial line cable	—	BC16E-10
System-unit to expansion-box cable	17-02641-02	BC09D-06
ThickWire cable	17-01321-01	BNE4C-02
ThinWire cable (12 ft)	17-01241-12	BC16M-12
ThinWire LAN assembly kit	22-00112-01	BC16T-12
Video cable, color	17-02906-01	—
Video cable, monochrome	17-03054-01	—
Video cable, gray-scale	17-02878-01	—

Table B-3. Software Documentation

Item	Order Number
ULTRIX Media and Doc-TK50	QA-VV1AA-H5
ULTRIX Guide to the Error Logger	AE-ME95B-TE
Technical Summary for RISC Processors	AA-MM35A-TE
Documentation Overview for RISC Processors	AA-MM05A-TE

Table B-4. Hardware Documentation

Item	Order Number
DECstation 5000 Model 200 User Documentation Kit	EK-364AA-DK
DECstation 5000 Model 200 Hardware Installation Guide	EK-365AA-IN
DECstation 5000 Model 200 Hardware Operator's Guide	EK-366AA-OG
DECstation 5000 Model 200 Workstation Reference Card	EK-367AA-IC
DECstation 5000 Model 200 Maintenance Guide	EK-370AA-MG
DECstation 5000 Model 200 Field Service Pocket Guide	EK-371AA-PG
Components and Add-Ons	
The RZ55 Disk Drive Service Manual	EK-RZ55D-SV
The RZ56 Disk Drive Subsystem Service Manual	EK-RZ56D-SV
The RZ57 Disk Drive Subsystem Service Manual	EK-RZ57D-SV
The RRD40 Owner's Manual	EK-RRD40-OM
The TLZ04 Cassette Tape Drive Owner's Manual	EK-TLZ04-OM
Installing and Using the LN03	EK-0LN03-UG
LN03 PLUS User Guide	EK-LN03S-UG
ScriptPrinter Installation Guide	EK-LN03R-UG
ScriptPrinter Operator Guide	EK-LN03R-OG
LA100 Letterwriter User Documentation Kit	EK-LW100-UG
Installing and Using the LA75 Companion Printer	EK-0LA75-UG
Installing and Using the LJ250/252 Companion Color Printer	EK-LJ250-DK
TK50Z Tape Drive Subsystem Owner's Manual	EK-LEP05-OM
TK50Z User's Guide	EK-OTK50-UG
TK50Z Technical Manual	EK-OTK50-TM

C

Connector Pin Assignments

This appendix lists pin assignments for the following connectors:

- SCSI cable connectors
- Keyboard and mouse or tablet
- Communications
- ThickWire Ethernet
- Loopback
- Power Supply
- Modem loopback
- Ethernet loopback

Table C-1. SCSI Cable Connector Pin Assignments

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

Table C-2. Keyboard and Mouse or Tablet Connector Pin Assignments

Pin	Source	Signal	Description
1		GND	Ground
2		KEY.TX	Keyboard transmitted data
3	Keyboard	KEY.RX	Keyboard received data
4		+12V	Keyboard/tablet power
5		GND	Ground
6	Mouse/Tablet	MSE.RX	Mouse received data
7		MSE.TX	Mouse transmitted data
8		GND	Ground
9		GND	Ground
10		NC	
11		NC	
12		NC	
13		+5V	Mouse power
14		–12V	Mouse power
15		GND	Ground

Table C-3. Communications Connectors Pin Assignments

Pin	Source	Signal	CCITT[1]	EIA[2]	Description
1		GND	102	AB	Signal ground
2	KNO2	TX	103	BA	Modem transmitted data
3	Modem/printer	RX	104	BB	Modem received data
4	KNO2	RTS	105	CA	Request to send
5	Modem/printer	CTS	106	CB	Clear to send
6	Modem/printer	DSR	107	CC	Data set ready
7		GND	102	AB	Signal Ground
8	Modem/printer	CD	109	CF	Carrier detector
9					Unconnected
10					Unconnected
11					Unconnected
12					Unconnected
13					Unconnected
14					Unconnected
15					Unconnected
16					Unconnected
17					Unconnected
18					Unconnected
19					Unconnected
20	KNO2	DTR	108.2	CD	Data terminal ready
21					Unconnected
22	Modem/printer	RI	125	CE	Ring indicator
23					Unconnected
24					Unconnected
25					Unconnected

[1]Comite Consultatif International Telegraphique et Telephonique, an international consultative committee that sets international communications standards

[2]Electronic Industries Association

Table C-4. ThickWire Ethernet Connector Pin Assignments

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

Table C-5. Summary of Loopback Connectors

Function	Standard/ Unique	Part Number	Option Number
Communications loopback connector	Standard	12-15336-13	H3200
ThickWire loopback connector	Standard	12-22196-02	N/A
ThinWire T-connector	Standard	12-25869-01	H8223
ThinWire terminator	Standard	12-26318-01	H8225

Table C-6. Power Supply Pin Assignments

Pin	Signal	Wire Gauge
1	+12 volt	18
2	Ground	18
3	–12 volt	22
4	Ground	22
5	POK	22
6	Warning	22

Table C-7. Modem Loopback Connector Pin Assignments

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

Table C-8. Ethernet Loopback Connector Pin Assignments

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

Index

F

G

H

I

K

L

M

O

P

R

S

T

V

W

Reader's Comments

DECstation 5000, Model 200 Operator's Guide

Order No: EK-366AA-OG-003

Your comments and suggestions will help us in our continuous effort to improve the quality and usefulness of our publications.

What is your general reaction to this manual?

	Excellent	Very Good	Good	Fair	Poor
Accuracy					
Completeness					
Organization					
Format					

Does the publication satisfy your needs? ☐ Yes ☐ No

How or How not?

What errors have you found? (Reference page number, table number, figure number.)

Please write additional comments on the back of this form.

Name _____ Title _____

Department _____ Company _____

Street _____ City _____

State-Country _____ Zip _____

Return with your comments and suggestions to:

Digital Equipment Corporation
Workstation Systems Engineering
Documentation Department
100 Hamilton Avenue (UCO-2)
Palo Alto, CA 94301