EK-VSM40-OM-002

VAXstation 3100 Model 48

Owner's Manual

digital equipment corporation
maynard, massachusetts

July 1990

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.

Any 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. No responsibility is assumed for the use or reliability of software or equipment that is not supplied by Digital Equipment Corporation or its affiliated companies.

Restricted Rights: Use, duplication, or disclosure by the U.S. Government is subject to restrictions as set forth in subparagraph (c)(1)(ii) of the Rights in Technical Data and Computer Software clause at DFARS 252.227-7013.

© Digital Equipment Corporation 1990.

All rights reserved.
Printed in U.S.A.

The postpaid Reader's Comments forms at the end of this document request your critical evaluation to assist in preparing future documentation.

The following are trademarks of Digital Equipment Corporation: CompacTape, DDIF, DEC, DECconnect, DECnet, DECUS, DECwindows, DELNI, DEMPR, Desktop-VMS, DEMPR, DESNC, DSS, INTERNET, LA75 Companion Printer, LN03, LN03R ScriptPrinter, MASSBUS, PrintServer, Q-bus, ReGIS, Remote System Manager, RRD40, ThinWire, ULTRIX, UNIBUS, VAX, VAX DOCUMENT, VAXcluster, VAXpc, VAXserver, VAXstation, VMS, VT, XUI, and the DIGITAL Logo

MS®, Microsoft®, and MS-DOS® are registered trademarks of Microsoft Corporation. NFS™ is a trademark of Sun Microsystems, Inc. IBM® and IBM Personal Computer AT® are registered trademarks of International Business Machines Corporation. PostScript® is a registered trademark of Adobe Systems, Inc. Teflon™ is a trademark of E.I. Du Pont de Nemours & Company, Inc. UNIX® is a registered trademark of American Telephone & Telegraph Company. X Window System® is a trademark of the Massachusetts Institute of Technology.

FCC NOTICE: The equipment described in this manual 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 when operated in a commercial environment. Operation of this equipment in a residential area may cause interference, in which case the user at his own expense may be required to take measures to correct the interference.

S1396

This document was prepared with VAX DOCUMENT, Version 1.2.

Contents

About This Guide xi

1 Your VAXstation 3100 System

1.1 System Highlights 1–2
1.2 The VAXstation 3100 Family 1–3

2 Installing System Hardware

2.1 Choosing the Right Location 2–2
2.2 Unpacking 2–3
2.3 Setting Up Your System 2–4
2.3.1 Identifying System Unit Ports and Connectors 2–4
2.3.2 Connecting the Keyboard 2–6
2.3.3 Connecting the Mouse 2–7
2.3.4 Attaching Ethernet Terminators 2–8
2.3.5 Connecting the Monitor 2–11
2.3.6 Connecting the Power Cords 2–14
2.4 Connecting Optional or Expansion Hardware 2–16
2.5 Inserting Media 2–16
2.6 Starting Your System 2–17
2.6.1 Checking the Power-Up Display 2–17
2.6.2 If You Have Problems 2–18
2.7 If You Need to Set the Keyboard Language 2–19
2.8 Connecting to a Network 2–20
2.9 Getting Ready to Install Your Operating System Software 2–20
2.10 Turning Your System Off 2–21

3 Learning About Your System

3.1 Hard Disk Drives 3–1
3.2 Using the RRD40 Compact Disc Drive 3–2
3.2.1 Loading a Compact Disc 3–2
3.2.2 Removing a Compact Disc 3–4
3.2.3 Inserting the Compact Disc into the Caddy 3–5
3.2.4 Removing the Compact Disc from the Caddy 3–7
3.2.5 Caring for Compact Discs 3–8
3.3 Using Tape Cartridges 3–8
3.3.1 Labeling a Tape Cartridge 3–8
3.3.2 Writing to and Protecting Tape Cartridges 3–9
3.3.2.1 Write Protecting a Tape 3–10
3.3.2.2 Writing to a Tape 3–11
3.3.3 Handling and Storing Tape Cartridges 3–11
3.4 Using the TZ30 Tape Drive 3–12
3.4.1 Inserting a Tape Cartridge 3–12
3.4.2 Removing a Tape Cartridge 3–14
3.4.3 Understanding TZ30 Lights 3–15
3.4.4 If You Have Problems 3–15
3.5 Mouse 3–15

4 Adding and Using Expansion Boxes

4.1 Guidelines for Connecting Expansion Boxes 4–2
4.2 Unpacking an Expansion Box 4–4
4.3 Installing a Bottom Dress Cover 4–6
4.4 Preparing Your System for an Expansion Box 4–7
4.5 Connecting One Expansion Box 4–9
4.6 Daisy-Chaining Multiple Expansion Boxes 4–12
4.7 Adding the RRD40 Compact Disc Expansion Box 4–14
4.7.1 Verifying the Voltage Selector Position on the RRD40 4–15
4.7.2 Verifying the SCSI ID on the RRD40 4–15
4.7.3 Resetting the SCSI ID on the RRD40 4–16
4.8 Adding an RZ55 Hard Disk Expansion Box 4–16
4.8.1 Verifying the SCSI ID on the First RZ55 4–17
4.8.2 Resetting the SCSI ID on the Second RZ55 4–17
4.9 Adding and Using a TK50Z–GA Tape Expansion Box 4–19
4.9.1 Verifying the SCSI ID on the TK50Z–GA 4–19
4.9.2 Inserting a Tape Cartridge 4–20
4.9.3 Removing a Tape Cartridge 4–23
4.9.4 Using TK50Z–GA Controls and Indicator Lights 4–24

5 Connecting to a Network

5.1 Connecting to a ThinWire Ethernet Network 5–1
5.1.1 Verifying the Network Select Button Position 5–2
5.1.2 Verifying ThinWire Ethernet Network Installation 5–3
5.1.3 Connecting ThinWire Ethernet Cable 5–5
5.1.4 Creating a Daisy-Chain Work Group 5–6
5.1.5 Connecting to a DECconnect Faceplate 5–7
5.1.6 Troubleshooting the ThinWire Ethernet Segment 5–8
5.2 Connecting to a Standard Ethernet Network 5–11
5.2.1 Setting the Network Select Button for Standard Ethernet . . . 5–11
5.2.2 Verifying Your Standard Ethernet Network Installation 5–11
5.2.3 Troubleshooting Standard Ethernet 5–12
5.2.4 Connecting a Transceiver Cable 5–14
5.2.5 Creating a Daisy-Chain Work Group 5–15

6 Troubleshooting

6.1 Identifying the Source of a Problem 6–1
6.2 Using the Troubleshooting Table 6–3

7 Running Diagnostics

7.1 Power-Up Messages 7–2
7.1.1 Power-Up Error Messages 7–3
7.1.2 Power-Up Status Messages 7–4
7.2 Running Self-Tests 7–5
7.3 Configuration Display 7–7
7.3.1 DZ Status Codes 7–9
7.4 Testing Internal Storage Devices 7–10
7.5 Testing Memory Modules 7–12
7.6 Device Display 7–15
7.7 Using the System Exerciser 7–17
7.8 Test Utilities 7–19
7.8.1 RRD40 Test Disc Utility 7–19
7.8.2 Erase Disk Utility for SCSI Hard Disks 7–20
7.9 Changing the Keyboard Language 7–22
7.10 Console Commands 7–23
7.11 Password Security Feature 7–24
7.11.1 Enabling the Password Security Feature 7–26
7.12 Rebooting the System After Running Tests 7–28
7.13 Service Information 7–29

8 Adding Options

8.1 Printers 8–1
8.2 Modems 8–4
8.3 Tablet 8–6
8.4 Monitors 8–6
8.4.1 Long Monitor Cable Option 8–7
8.5 Graphics Coprocessor Module/Color Option 8–7
8.6 SPX Color Graphics Accelerator 8–7

A System Parameters

A.1 Automatic Booting A–2
A.1.1 Setting the Default Boot Device A–2
A.1.2 Changing the Default Recovery Action A–3
A.1.3 Setting the Default Boot Flags A–5
A.2 Enabling the Server to Boot Satellite Systems Remotely A–5
A.3 Using an Alternate Console with Your System A–6

B SCSI IDs

B.1 SCSI ID Default Settings B–1
B.2 Setting the SCSI ID B–3
B.3 Setting SCSI Switches B–6

C Power-Up, Self-Test, and TEST 50 Status and Error Codes

C.1 Monochrome Video Circuits (MONO) C–2
C.2 Time-of-Year Clock (CLK) C–2
C.3 Nonvolatile RAM (NVR) C–3
C.4 Serial Line Controller (DZ) C–3
C.5 System Memory (MEM) C–6
C.6 Memory Management (MM) C–7
C.7 Floating Point (FP) C–7
C.8 Interval Timer (IT) C–7
C.9 SCSI Bus Controllers (SCSI-A and SCSI-B) C–8
C.10 Interrupt Controller and Ethernet ID ROM (SYS) C–15
C.11 Graphics Coprocessor Module/Color Option C–16
C.12 Ethernet Circuits (NI) C–17

D Hardware Specifications

E Associated Documents

Glossary

Index

Figures

1–1 VAXstation 3100 Model 48 System 1–1
2–1 Unpacking System Components 2–3
2–2 Lifting Equipment 2–4
2–3 Ports, Connectors, and Icons 2–5
2–4 Connecting the Keyboard to the System Unit 2–6
2–5 Connecting the Mouse to the System Unit 2–7
2–6 Connecting Terminators to the T-Connector 2–8
2–7 Connecting the T-Connector to the System Unit 2–9
2–8 Connecting the Loopback Connector to the System Unit 2–10
2–9 Connecting the Monitor Cable to the Monitor Using the Universal Strain Relief Strap 2–12
2–10 Connecting the Monitor Cable to the System Unit 2–13
2–11 Connecting the Monitor Power Cord 2–14
2–12 Connecting the System Power Cord 2–15
2–13 Opening the Front of the Model 48 System Unit 2–16
3–1 Opening the Front of the Model 48 System Unit 3–2
3–2 Loading a Compact Disc 3–3
3–3 Compact Disc Caddy 3–5
3–4 Inserting Disc in Housing 3–6
3–5 Pressing Locking Tabs 3–7
3–6 Labeling a Tape Cartridge 3–9
3–7 Write Protecting a Tape 3–10
3–8 TZ30 Lights and Controls 3–12
3–9 Inserting a Tape Cartridge in the TZ30 3–13
3–10 Removing a Tape Cartridge from the TZ30 3–14
4–1 50-Pin Terminator 4–4

4–2 Unpacking an RZ55 or TK50Z–GA Expansion Box 4–5
4–3 Installing Bottom Dress Cover 4–6
4–4 Removing the SCSI Cover 4–7
4–5 Removing the SCSI Terminator 4–8
4–6 Connecting One TK50Z–GA or One RZ55 Expansion Box 4–11
4–7 Connecting One RRD40 Expansion Box 4–11
4–8 Connecting Two Expansion Boxes 4–13
4–9 RRD40 Compact Disc Expansion Box 4–14
4–10 RRD40 Expansion Box Voltage Selector and Factory SCSI ID Switch Positions 4–15
4–11 Verifying the SCSI ID on the First RZ55 4–17
4–12 Resetting the SCSI ID on the Second RZ55 4–19
4–13 Verifying the SCSI ID on the TK50Z–GA 4–20
4–14 Inserting and Loading a Tape in the TK50Z–GA 4–22
4–15 Removing a Tape Cartridge from the TK50Z–GA 4–23
5–1 Network Select Button Set for ThinWire Ethernet 5–3
5–2 Halt Button 5–4
5–3 Adding ThinWire Cable to a T-Connector 5–5
5–4 Checking ThinWire Cable Connections 5–6
5–5 VAXstation 3100 Systems in a Daisy-Chain Work Group 5–7
5–6 Connecting to a DECconnect Faceplate 5–8
5–7 Removing a System from an Active ThinWire Segment 5–9
5–8 Connecting a Transceiver Cable to the System Unit 5–14
5–9 Daisy-Chain Work Group in Standard Ethernet Environment 5–15
7–1 Halt Button 7–6
7–2 Diagnostic Lights 7–29
8–1 Connecting a Printer Cable to the System Unit 8–2
8–2 Connecting a Modem to the System Unit 8–5

Tables

3–1 Understanding TZ30 Lights 3–15
4–1 Expansion Box SCSI ID Factory Default Switch Positions 4–9
4–2 Using the TK50Z–GA Controls 4–24
4–3 Understanding TK50Z–GA Lights 4–24
6–1 Troubleshooting 6–4
7–1 Device Identifiers in Power-Up and Self-Tests 7–3
7–2 SCSI Status Codes Indicating Good Devices 7–11
7–3 SCSI Status Codes Indicating Possible Problems 7–11

7–4 8-Digit Memory Error Code 7–14
7–5 SHOW DEVICE Display Column Heads 7–16
7–6 Error Messages for Erase Disk Utility 7–22
7–7 SHOW Commands 7–23
7–8 SET Commands 7–23
7–9 Test Commands 7–24
8–1 Device Names for Your Operating System 8–2
8–2 Printers 8–3
8–3 Modems 8–4
8–4 Device Names for Your Operating System 8–6
A–1 SCSI Boot Device Names A–2
A–2 Values for Default Recovery A–4
B–1 SCSI IDs for VAXstation 3100 Model 38 (with Diskette Drive) B–4
B–2 SCSI IDs for VAXstation 3100 Model 38 (with Hard Disk) B–4
B–3 SCSI IDs for VAXstation 3100 Model 48 . . . . . B–5
B–4 RRD40 Expansion Box SCSI IDs and Switch Positions B–6
B–5 RZ55/56 Expansion Box SCSI IDs and Switch Positions B–6
B–6 TK50Z–GA Expansion Box SCSI IDs and Switch Positions B–7
C–1 Monochrome Video Error Codes (0000.XXXX) C–2
C–2 Time-of-Year Clock Error Codes (0000.XXXX) C–2
C–3 Nonvolatile RAM Error Codes (0000.XXXX) C–3
C–4 Serial Line Controller Error Codes (0000.XXXX) C–3
C–5 Serial Line Status Codes (0000WWWW) C–4
C–6 Keyboard Self-Test Codes (YYYYYYYY) C–5
C–7 Mouse or Tablet Self-Test Codes (ZZZZZZZZ) C–5
C–8 System Memory Error Codes (0000.XXXX) C–6
C–9 Memory Management Error Codes (0000.000X) C–7
C–10 Floating Point Error Codes (0000.000X) C–7
C–11 Binary Mask of Selected Devices (WWXX.0000) C–8
C–12 Binary Mask of Error Flags (0000.YY00) C–9
C–13 SCSI Controller Error Codes (0000.00ZZ) C–9
C–14 Device Status Codes (DDMMSSTT) C–12
C–15 Interrupt Controller and Ethernet ID ROM Error Codes (0000.XXXX) C–15
C–16 8-Plane Graphics Module Error Codes (0000.YYY0) C–16
C–17 Ethernet Circuits Error Codes (0000.YYYY) C–17
D–1 System Specifications D–2
D–2 System Dimensions D–2
D–3 System Storage Conditions (Long-Term Storage) D–3

D–4 System Operating and Nonoperating Conditions D–3
D–5 RZ23 Hard Disk Drive Specifications D–4
D–6 RZ24 Hard Disk Drive Specifications D–5
D–7 RZ55/RZ56 Hard Disk Drive Dimensions D–6
D–8 RZ55/RZ56 Hard Disk Drive Specifications D–6
D–9 RZ55/RZ56 Hard Disk Environmental Specifications D–7
D–10 TZ30 Tape Drive Specifications D–7
D–11 TK50Z–GA Tape Drive Specifications D–7
D–12 RRD40 Compact Disc Drive Specifications D–8
E–1 Associated Documents E–1

About This Guide

Purpose of This Manual

This manual describes how to install, test, and maintain the hardware components of a VAXstation 3100 Model 48 computer system.

Who Should Use This Manual

This manual is for anyone setting up and using the Model 48 for the first time. It includes information on hardware installation, operation, and maintenance.

Structure of This Manual

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

- Chapter 1 includes an overview of the VAXstation 3100 Model 38 and VAXstation 3100 Model 48 systems, and introduces you to the product features.
- Chapter 2 provides instructions for installing your new Model 48.
- Chapter 3 discusses the software loading devices (TZ30 tape drive and RRD40 compact disc drive) that are an integral part of your system.
- Chapter 4 discusses the add-on storage and software loading devices that can be used with your system.
- Chapter 5 discusses connecting your system to a simple ThinWire daisy-chain work group.

- Chapter 6 provides basic system troubleshooting information.
- Chapter 7 describes how to run self-tests and system diagnostics.
- Chapter 8 lists the options available for your system. It also shows how to connect a printer or modem to your system.

Appendixes provide complementary information on the following topics:

- Appendix A: Customizing your startup procedures
- Appendix B: SCSI ID numbers
- Appendix C: Status and error codes
- Appendix D: Hardware specifications
- Appendix E: Associated documents

The glossary defines technical terms used in this guide.

The index helps you to find the information you need.

Guide to VAXstation 3100 Documentation



The manuals you will use to install, operate, manage, and maintain your VAXstation 3100 Model 48 system are listed below. The left column lists the manuals; the right column contains some of the topics described in each manual. See also Appendix E.

Manuals	Topics
Planning and Preparation	Planning workstation placement
	Checking power requirements
	Checking environmental requirements
Monitor Installation/Owner's Guide	Connecting a monitor
	Adjusting brightness and contrast
VAXstation 3100 Model 48 Owner's Manual	Setting up the system unit
	Connecting the keyboard and mouse
	Turning the system on
	Connecting to a network
	Troubleshooting and diagnostic testing
	Adding storage devices

Workstations Network Guide	Defining a network
	Describing network hardware and software
	Setting up a ThinWire or standard Ethernet network
	Expanding networks
VMS Installation Guide	Installing VMS operating system software
	Backing up files
ULTRIX Installation Guide	Installing ULTRIX system software
	Backing up files
VMS DECwindows User's Guide	Using DECwindows software, an optional software interface layered on VMS or ULTRIX
	Using the mouse
	Manipulating windows
	Creating and using files
VWS Installation Guide	Using VWS software, an optional software interface
	Installing VWS software
	Backing up files
Desktop-VMS Installation Guide	Using Desktop-VMS software, an optional software interface
	Installing Desktop-VMS software
Application Installation Guides	Installing and using applications

Conventions

The following conventions are used in this manual:

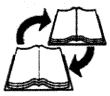
Ctrl/x	A sequence such as Ctrl/x indicates that you must hold down the key labeled Ctrl while you press another key or a pointing device button.
Return	A key name is shown enclosed to indicate that you press a named key on the keyboard.
red ink	Red ink indicates information that you must enter from the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

Margin Icon Definitions

Throughout this manual, symbols or icons in the margin identify important switches, buttons, connectors, or procedures. These icons are briefly described here. Figure 2–3 shows the locations for many of the ports and switches.

Icons That Signal Procedures

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



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



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



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

Icons for Ports, Connectors, and Buttons

This section describes the icons that appear on the bezel for the back of the system unit. The icon for a port or connector appears in the margin to signal that you connect a cable to that port or connector. The icon for a button appears to signal that you press that button. See Figure 2–3 for icon locations on the bezel.



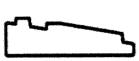
The SCSI icon in the margin signals that you attach a cable or terminator to the SCSI port.



The icon for Ethernet signals a procedure with one of the Ethernet connectors or the network select button.



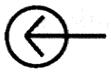
The halt icon signals that you press the halt button to put the system into console mode.



The keyboard icon identifies the connector where you put the keyboard cable.



The mouse icon identifies the connector where you put the mouse cable (or the tablet cable).



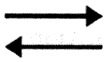
This icon appears on the cable for the mouse (or tablet). You put this cable into the port with the mouse icon.



The monitor icon identifies the connector where you put the monitor cable.



The printer icon identifies the port for the printer cable. This port also supports a hardcopy terminal or an additional video terminal for alternate console mode. See Appendix A.



The communications port is identified by this icon. You put the modem cable here, if you have this option.

S3

The alternate console switch is identified by this icon. Appendix A gives instructions for installing and using an alternate console.



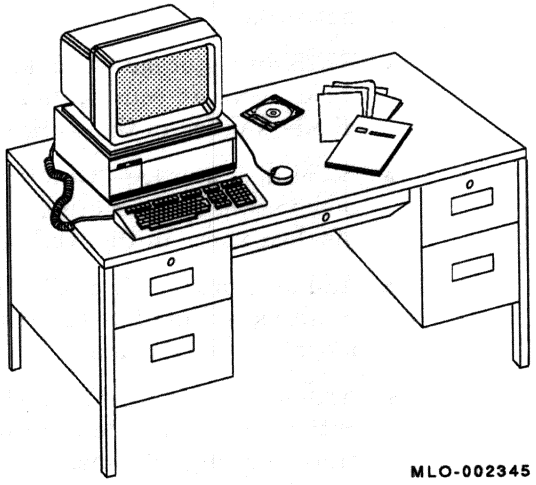
The row of diagnostic lights on the back of the system unit is identified by this icon. Chapter 7 describes how to use these lights.

1

Your VAXstation 3100 System

The VAXstation 3100 Model 48 is a desktop server/workstation that provides the full VMS or ULTRIX operating systems and applications to diskless members of a work group. The VAXstation 3100 Model 48 also functions as a workstation for the owner/local system manager. Figure 1–1 shows the VAXstation 3100 Model 48 system.

Figure 1–1 VAXstation 3100 Model 48 System



MLO-002345

1.1 System Highlights

The VAXstation 3100 Model 48 and the Model 38 system units are contained in similar enclosures. The Model 48 enclosure is 14.99 centimeters (5.9 inches) high; the Model 38 enclosure is smaller—10.3 centimeters (4 inches) high.

The Model 48 system unit has many special features, as described in the following list:

- RRD40 compact disc drive—The RRD40 compact disc drive built into your system unit is a read-only optical disc device that stores 600 megabytes (or about 200,000 pages) of data. Information is read from a compact disc (CD) using laser technology, which means that your operating system software can be installed rapidly. The compact disc may include operating system software, windowing software, applications, and documentation.
- Memory—You can order your system with up to 32 megabytes of memory.
- TZ30 tape drive—The built-in TZ30 tape drive stores up to 95 megabytes of data per tape cartridge.
- ThinWire and standard Ethernet connectivity—You can connect to either standard Ethernet or ThinWire Ethernet networks.
- RZ23 disk storage—One to three RZ23 104-megabyte hard disks serve as your system disk drive and as storage for the diskless users in the work group.
- RZ24 disk storage—One to three RZ24 209-megabyte hard disks serve as your system disk drive and as storage for the diskless users in the work group.
- Add-on storage—The RZ55 hard disk drive can be purchased in an expansion box to provide you with an extra 332 megabytes of storage.
- Add-on storage—Different RZxx-xx hard disk expansion box options are available to provide you with a variety of extra storage configurations.
- Two operating systems to choose from—VMS or ULTRIX, which is Digital Equipment Corporation's version of the UNIX operating system. Operating system software is purchased separately from the VAXstation 3100 hardware.

- Windowing software—DECwindows software and, optionally, VAX Windowing Software (VWS/UIS), give you a visual way to organize your work in windows. You can run several different applications simultaneously and switch between them. You can use graphic symbols instead of command lines to do your work.
- SCSI connectivity—Small Computer System Interface (SCSI) is an industry standard for connecting mass storage devices.
- For customers requiring additional security in their VAX console, you can secure your system in the **console mode** using the password security feature. See Section 7.11 for more information on this feature.

1.2 The VAXstation 3100 Family

The VAXstation 3100 systems can be used in several configurations, from a VAXstation 3100 Model 38 diskless workstation used as a satellite in a work group, to a Model 38 standalone workstation with hard disks, to a VAXstation 3100 Model 48 used as the server for one or more Model 38 workstations.

Your Model 48 system can be used as a standalone workstation, or it can be the server to members of a work group. It can be a networked server if that work group is connected to a larger network.

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

2

Installing System Hardware

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

- Connecting the keyboard
- Connecting the mouse
- Attaching Ethernet terminators to prepare for either networking or diagnostic tests
- Connecting the monitor
- Connecting the power cords
- Starting your system

The chapter then guides you to getting your system up and running, including:

- What to do if you are planning to connect to a network
- What to do if you are planning to add an expansion box, modem, or printer
- Where to learn about installing your operating system software

2.1 Choosing the Right Location

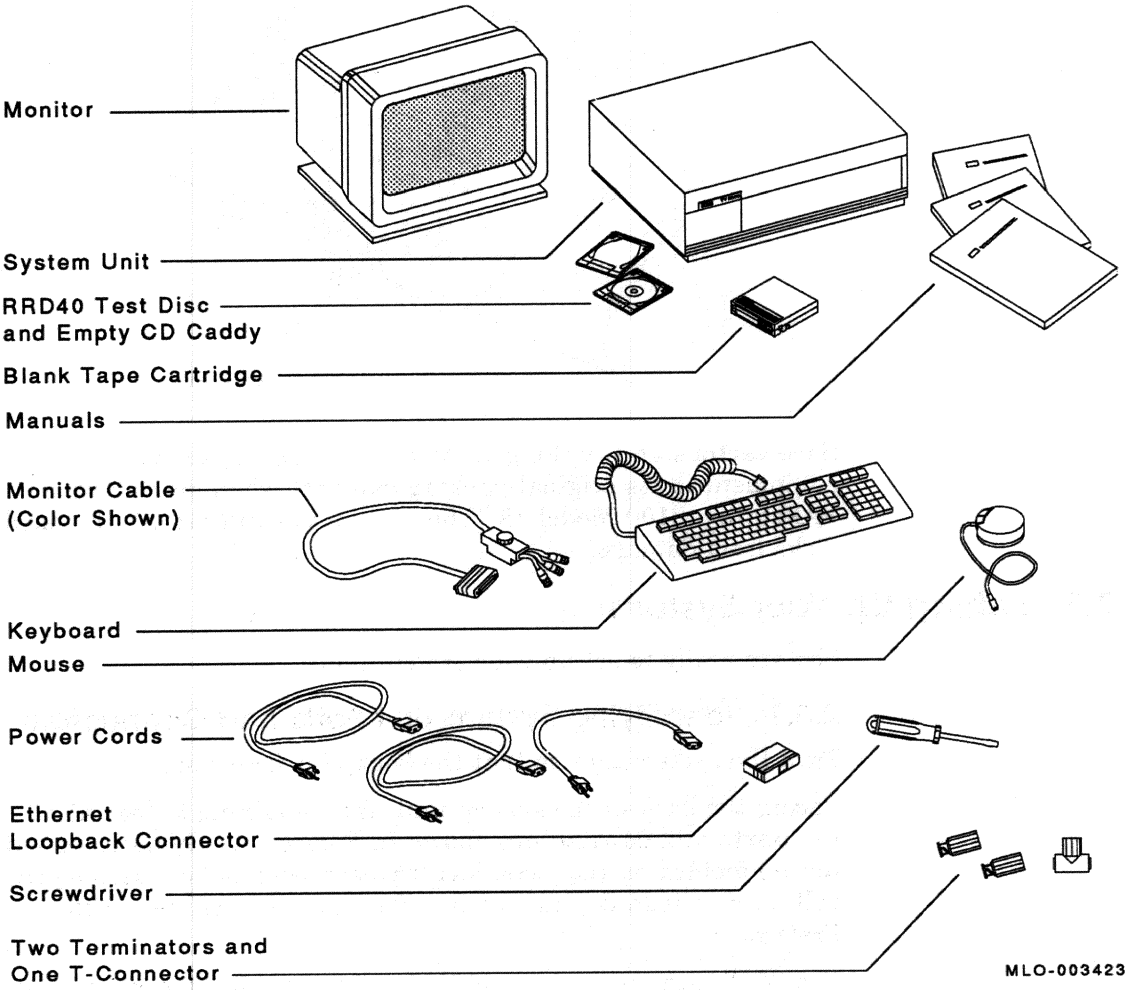
Use the following checklist to ensure that your VAXstation 3100 Model 48 operates at its best:

- Keep the temperature between 15.5° and 32°C (60° and 90°F).
- Keep the relative humidity between 40% and 80%. Store tape cartridges at this humidity.
- Keep the air well circulated to prevent excess heat and dust from accumulating.
- Keep your equipment away from heaters, photocopiers, direct sunlight, and abrasive particles.
- Select a surface that is large enough to hold a monitor, a system unit, and a keyboard and mouse. Your desk or work table is a good choice. It is important that your system unit be positioned at least three feet away from other operating equipment.
- Place the monitor so that the top line of the monitor display is at eye level.
- Choose a place where bright light will not reflect off the monitor, to eliminate screen glare.
- Keep the area clean. Do not place food or liquid on or near your equipment, and do not place your system unit directly on the floor. Dust and dirt damage system components.
- Keep air vents clear on each side of the system unit for proper ventilation.
- Do not place the system unit on its side. Blocking the air vents can cause the system unit to overheat.
- Connect your system to an isolated grounded circuit. Do not exceed the voltage requirement of the circuit.
- Let equipment warm to room temperature before you turn it on. This avoids the possibility of damaging equipment that has been moved in from the cold. Let tape cartridges stabilize for 24 hours.
- Finally, carefully read and follow all installation instructions before you turn on the power.

2.2 Unpacking

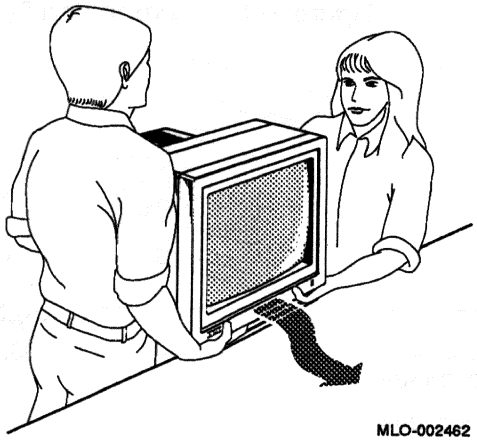
Figure 2–1 shows the basic components of your system. The contents of your shipment may differ from the components shown in Figure 2–1, depending on what you order.

Figure 2–1 Unpacking System Components



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

Figure 2–2 Lifting Equipment



Save cartons and packing material. Always repack your equipment in its original packing material when moving your VAXstation 3100 Model 48. This precaution will protect the hard disks from damage.

2.3 Setting Up Your System

You are ready to set up your system unit.

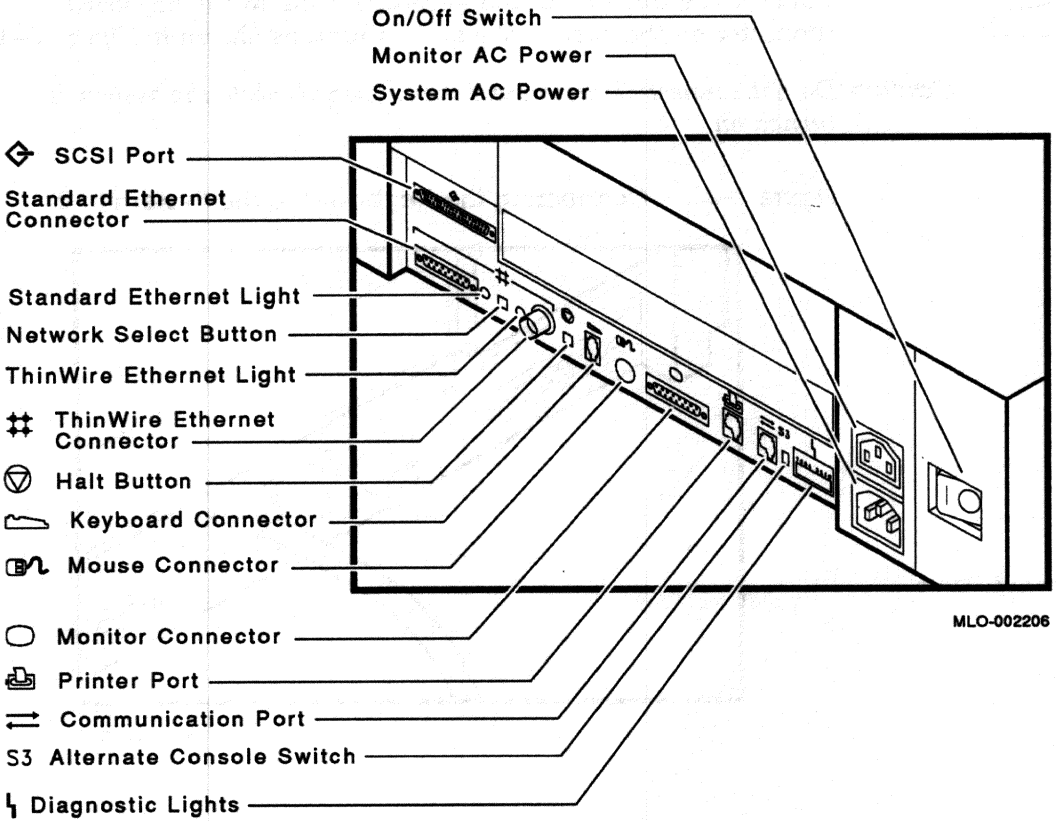
2.3.1 Identifying System Unit Ports and Connectors

Turn the system unit so that the back of it faces you.

Facing the back of the system unit, take a minute to look at all the **ports** and **connectors** shown in Figure 2–3. Symbols (called **icons**) molded on the bezel identify each port and connector you will need to install your system. The icons are defined in the Preface.

The SCSI port on the back of the system unit has a cover that is not shown in Figure 2–3. Leave the SCSI cover on until you are ready to add an expansion box.

Figure 2–3 Ports, Connectors, and Icons

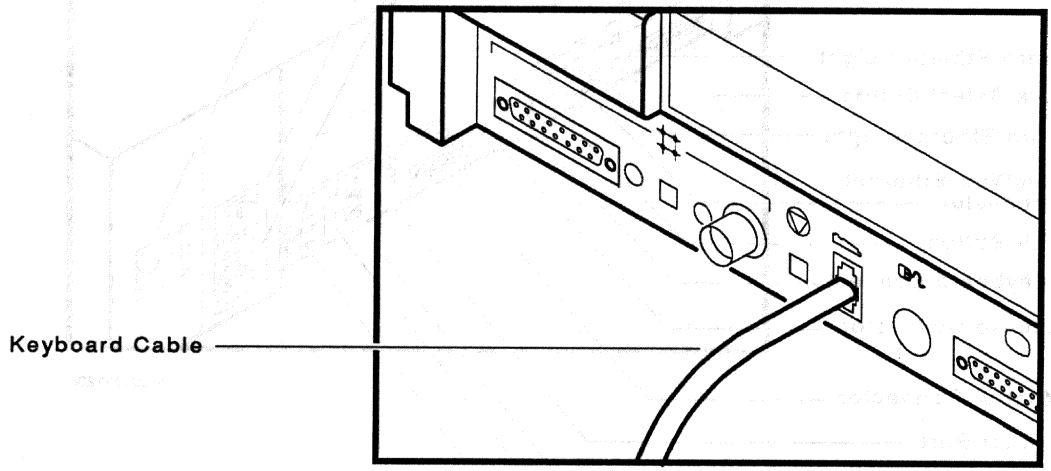


2.3.2 Connecting the Keyboard

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

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

Figure 2–4 Connecting the Keyboard to the System Unit



MLO-002204

2.3.3 Connecting the Mouse

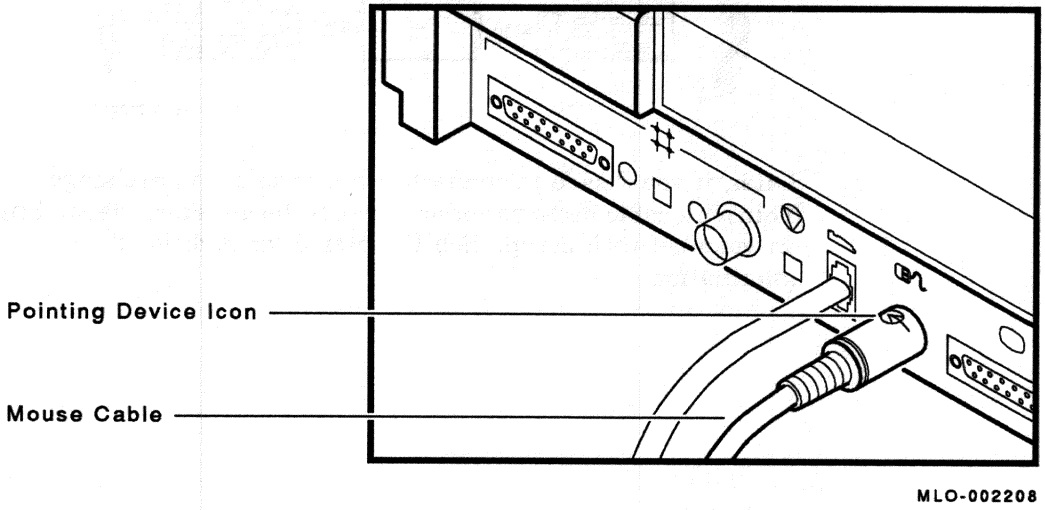
Find the mouse cable with its pointing device icon.

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



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

Figure 2–5 Connecting the Mouse to the System Unit

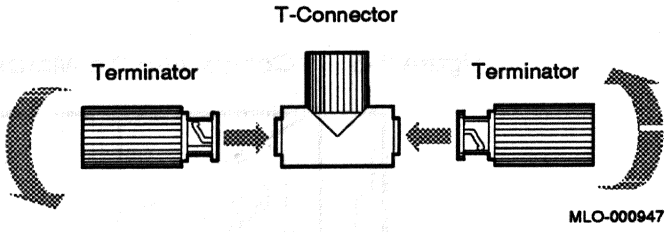


2.3.4 Attaching Ethernet Terminators

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

1 Push a **terminator** into each side of the T-connector and turn both to the right until they lock into place. See Figure 2–6.

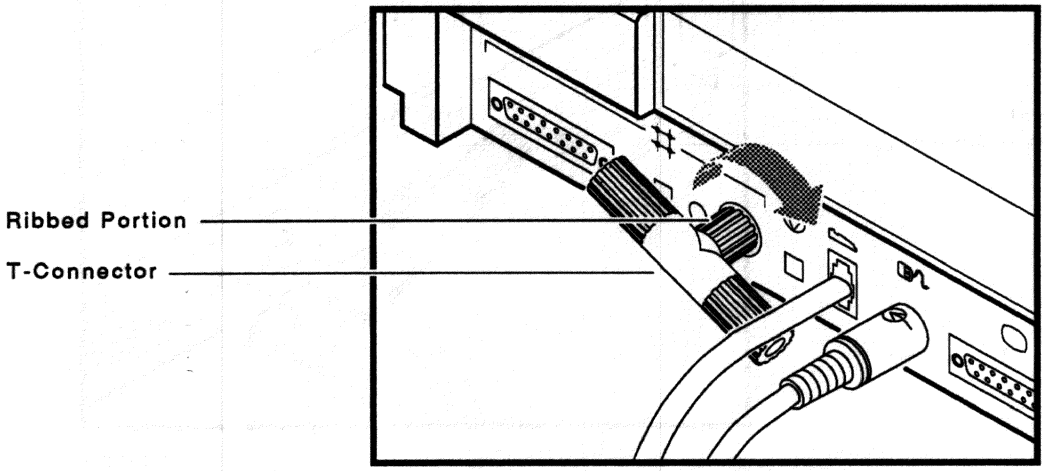
Figure 2–6 Connecting Terminators to the T-Connector



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

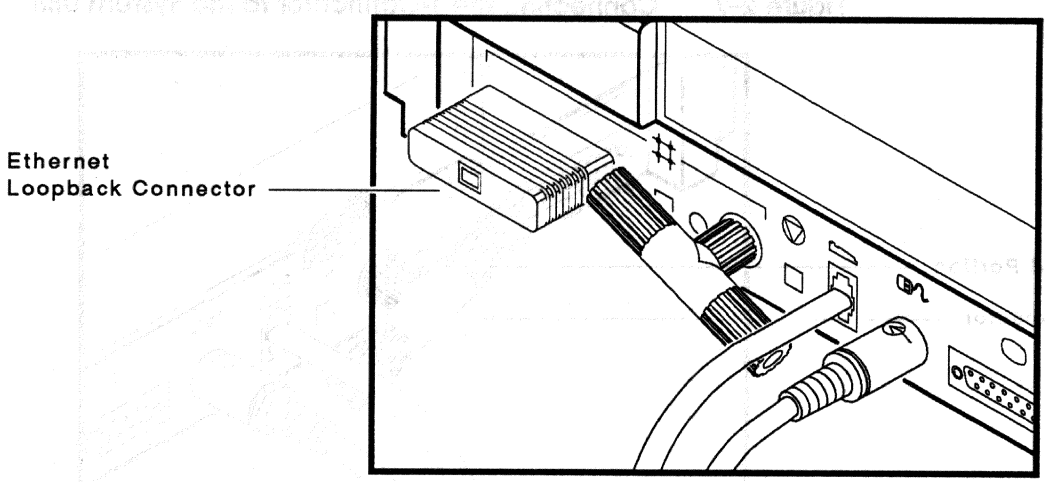
2 Next, connect the T-connector to the ThinWire Ethernet connector on the back of the system unit. Turn the ribbed portion of the connector to the right until it locks into place. See Figure 2–7. Make sure the T-connector is set at an angle, as shown in the illustration. This angle allows room for the loopback connector in the next step.

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



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

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



2.3.5 Connecting the Monitor

You can put the monitor to the side of the system unit or on top of it. In order to place your monitor away from the system unit, you need to order an optional long monitor cable. See Chapter 8.

Installation is basically the same for any of the monitors available for your system. With one exception (see step 5), install your monitor according to the instructions in your monitor guide. See your monitor guide for information on these procedures:



- Connecting the monitor cable to the monitor
- Changing the voltage setting to match the voltage source
- Replacing a fuse
- Adjusting brightness and contrast

To set up your monitor:

1 Check your monitor guide for instructions. (There is one exception; see step 7).

Caution *Do not connect or disconnect the monitor cable to the system unit while the power is on.*

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

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

4 Push the thumbscrew into the junction block of the monitor cable, and then screw it into the attachment point in the back of the monitor, being careful not to overtighten.

5 Attach the universal strain relief strap to the color monitor cable by following these steps:

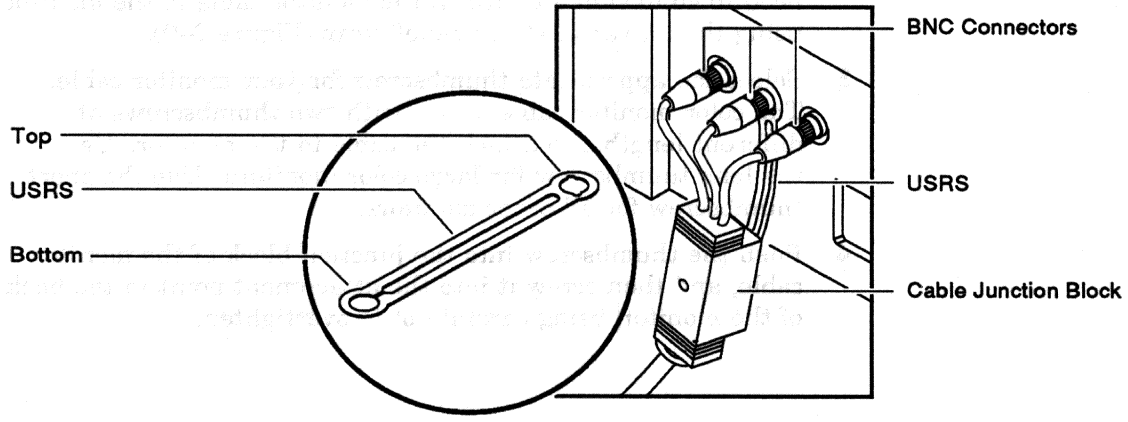
- Insert the three BNC connectors and cable junction block of the monitor cable through the center slot of the universal strain relief strap, making sure the strap is **under** the cable junction block.

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

- Pull the monitor cable into the slotted hole at the bottom end of the universal strain relief strap and bring the strap flush with the cable junction box.
- Align the center BNC connector (green) with the two key slots of the closed hole at the top end of the universal strain relief strap, and snap the BNC connector into the hole.
- Follow the instructions in your monitor guide to attach the BNC connectors to the back of the monitor.

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

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



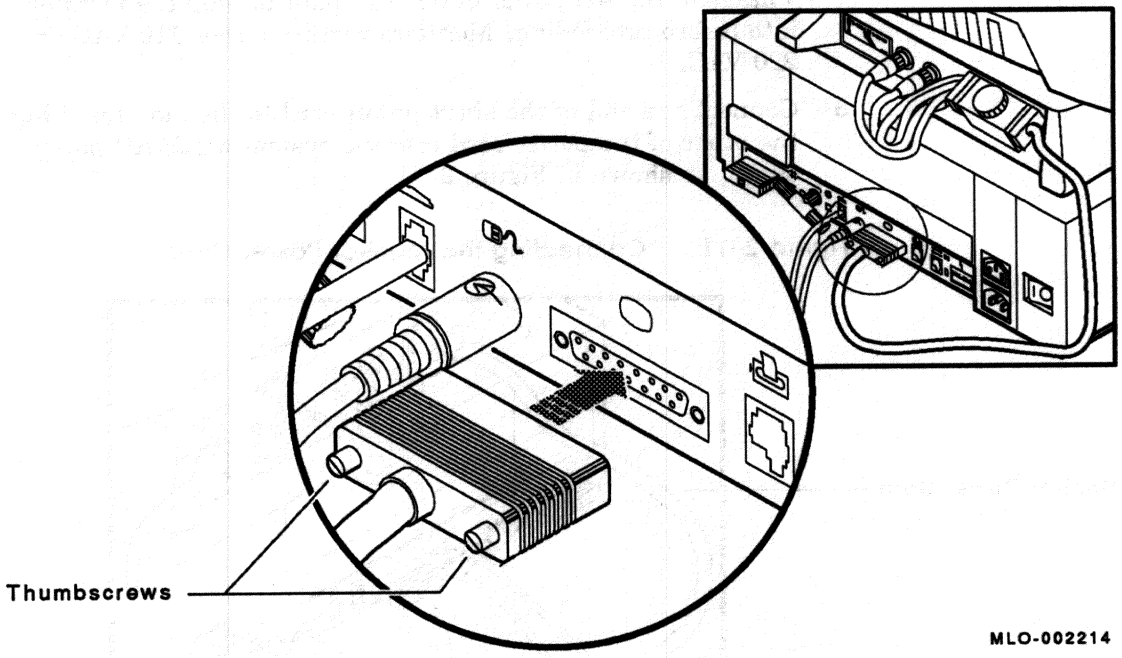
6 Follow the directions in the monitor guide to connect the monitor cable to the monitor.

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

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

Note *To order the optional longer monitor cable, see Chapter 8.*

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



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

2.3.6 Connecting the Power Cords

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

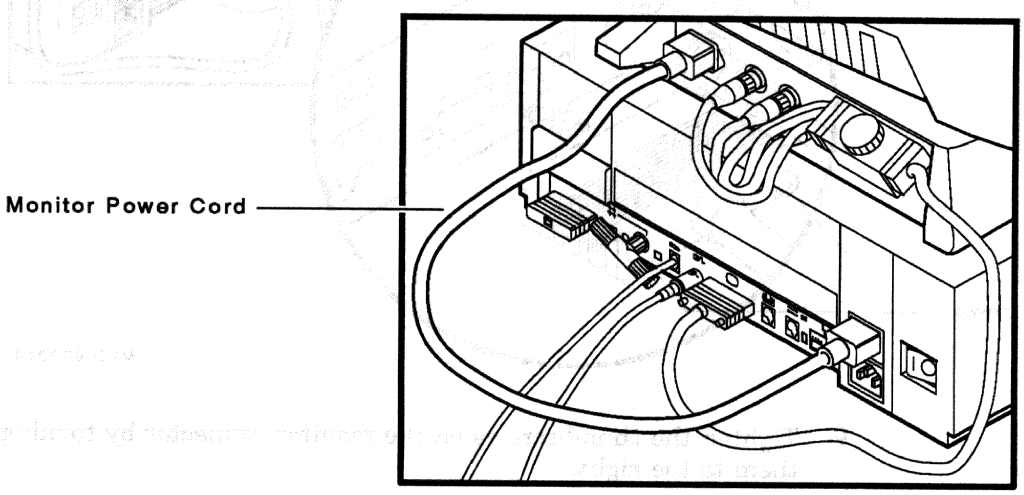
1 Make sure that the monitor and the system unit on/off switches are off (0).

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

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

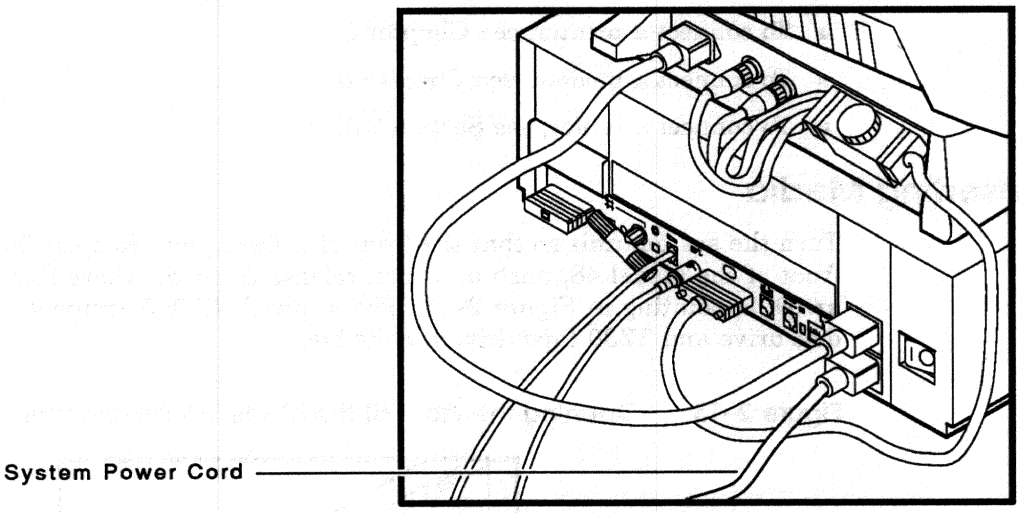
3 Connect one end of the short power cord to the monitor. Plug the other of the power cord into the system unit's AC power outlet, as shown in Figure 2–11.

Figure 2–11 Connecting the Monitor Power Cord



4 Plug one end of the long power cord into the AC power connector on the back of the system unit. Plug the other end into a grounded electrical wall outlet. See Figure 2–12.

Figure 2–12 Connecting the System Power Cord



MLO-002220

2.4 Connecting Optional or Expansion Hardware

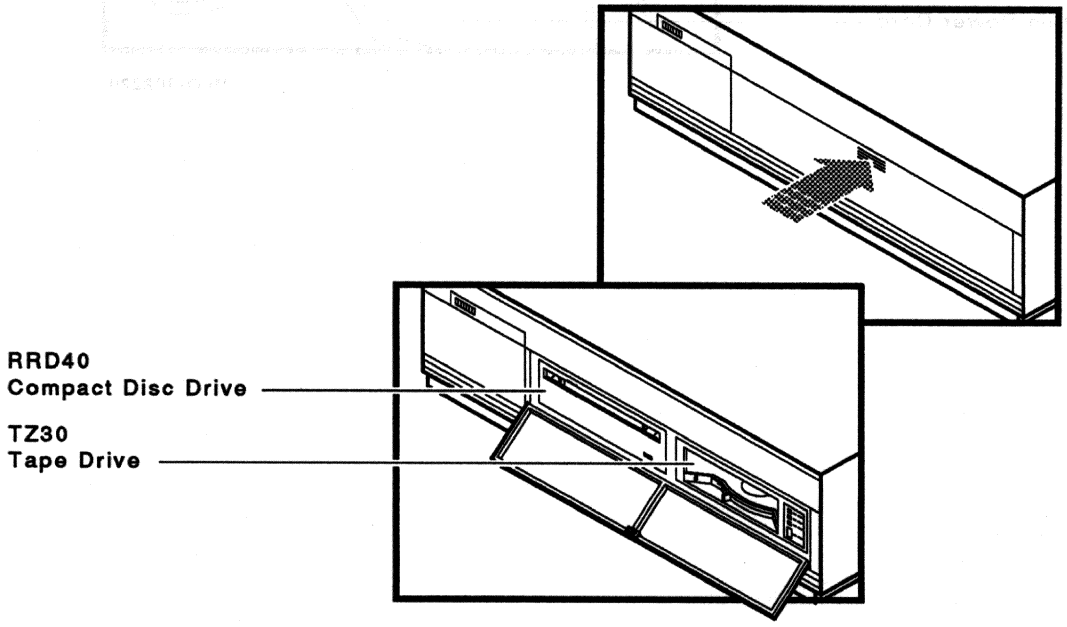
If optional equipment is included in your order, turn to the following chapters for instructions on connecting the equipment to your system:

- To connect expansion boxes, see Chapter 4.
- To connect a printer, see Chapter 8.
- To connect a modem, see Chapter 8.
- To connect a tablet, see Section 2.3.3.

2.5 Inserting Media

Turn the system unit so that the front of it faces you. To open the front of the Model 48, push and then release the door where the arrow is pointing in Figure 2–13. The internal RRD40 compact disc drive and TZ30 tape drive are visible.

Figure 2–13 Opening the Front of the Model 48 System Unit



Insert the RRD40 test disc, included in your initial shipment, in the disk drive. See Section 3.2 for instructions on how to correctly insert a compact disc.

Insert the blank tape cartridge, included in your initial shipment, in the TZ30 tape drive. See Chapter 3 for instructions on how to correctly insert and remove a tape in the TZ30 tape cartridge.

2.6 Starting Your System

Turn your system components on (|), in the order given in the following list.



1 Turn expansion boxes on (|) in the following order:
   - RZ55 hard disk expansion box
   - Other hard disk expansion boxes
   - TK50Z–GA tape expansion box
   - RRD40 compact disc expansion box
2 Turn printers and modems on (|), if you have this equipment.
3 Turn your monitor on (|).
   Leave the monitor on so that it turns on and off with the system unit.
4 Turn the system unit on (|).
   It takes approximately 90 seconds for the first line of the power-up display to appear on the screen. The green light on the front of the monitor should come on.



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

2.6.1 Checking the Power-Up Display

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

If you see a display similar to the following example, your system has passed all power-up tests and the keyboard language has been set:

```
KA42-B  V1.2

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

?  E  0040  0000.0005
?  D  0050  0000.0005

OK
>>>
```

You may possibly see a display similar to the following:

```
KA42-B  V1.2

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

?  E  0040  0000.0005
?  D  0050  0000.0005

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

DKA300     RZ3      A/3/0/00      DISK     104 MB      FX           RZ23
MKA500     TZ5      A/5/0/00      TAPE     .......     RM      WP
...HostID  ....     A/6           INITR

DKB200     RZ10     B/2/0/00      DISK     104 MB      FX           RZ23
DKB300     RZ11     B/3/0/00      DISK     104 MB      FX           RZ23
DKB400     RZ12     B/4/0/00      RODISK   205 MB      RM      WP   RRD40
...HostID  ....     B/6           INITR

[ESA0] ? >>>
>>>
```

If you see this display, press Ctrl/c to continue; that is, hold down the Ctrl key while you press the C. If you see a display similar to the first display in this section, your keyboard language has been set. If not, follow the instructions in Section 2.7.

2.6.2 If You Have Problems



If, after following the instructions in the prior section, you do not see the power-up display, turn your system unit off (0) and review each installation step. Repeat the power-up procedure. If you still do not see the power-up display, consult Chapter 6.

2.7 If You Need to Set the Keyboard Language

When you receive your system, the keyboard language should be set for the keyboard you ordered.

However, if the following display (the keyboard language menu) appears after you press Ctrl/C in Section 2.6.1, you need to set the keyboard language.

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

3? >>>
```

To set the keyboard language, perform the following steps:

1. Select a language from the keyboard language menu to match the type of keyboard you have.
2. If you want to select the default language (English, which is option 3), press the Return key. Otherwise, enter the number of the language that matches the language of your keyboard, and press the Return key.

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

The language you chose is now saved in memory. If you need to change the keyboard language later, Chapter 6 shows you how.

2.8 Connecting to a Network

If you are connecting your system to a work group (whether or not you are connecting to a larger network), read Chapter 5. You will need to install your network hardware before you install your operating system software.

2.9 Getting Ready to Install Your Operating System Software

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

- TZ30 tape drive
- Connection to a network to load the software from another system
- RRD40 compact disc drive
- TK50Z–GA tape drive

Your Model 48 system is set at the factory to automatically start your operating system software from any device that you specify during the software installation procedure.

Verify that the default recovery (automatic boot) on your system is set to 2. Enter the following command at the console prompt (>>>):

```
>>>  SHOW HALT  Return
2
>>>
```

See Appendix A if you need to change the default recovery to 2.

To install VMS or ULTRIX software on the VAXstation 3100 Model 48, follow the installation instructions that were shipped with the software. During software installation, the software is transferred from the installation medium (tape cartridge or compact disc) to the hard disk in your VAXstation 3100 Model 48 or to an expansion box.

If your software does not load properly, see Chapter 6. The RRD40 test disc that comes with the RRD40 compact disc drive can help you determine the source of the problem.

If your local area VAXcluster is part of a larger network, you may be able to use **Remote System Manager (RSM)** software on a host system to **down-line load** and install application software.

2.10 Turning Your System Off



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

Note *When you use a VAXstation 3100 Model 48 in a cluster, you should not turn off, halt, or restart the system without notifying work group members. These activities affect the operation of the entire work group.*

After completing the system shutdown, turn your equipment off (0) in the following order:

1. Expansion boxes
2. Printer, modem, or other equipment
3. Monitor and system unit

3

Learning About Your System

This chapter provides information about:

- RZ23 and RZ24 hard disks
- RRD40 compact disc drive
- Tape cartridges
- TZ30 tape drive
- Mouse

3.1 Hard Disk Drives

A **hard disk** stores information on a nonremovable disk. You can have up to three hard disks in your Model 48 system unit. The RZ23 has 104 megabytes of storage, while the RZ24 has 209 megabytes of storage.

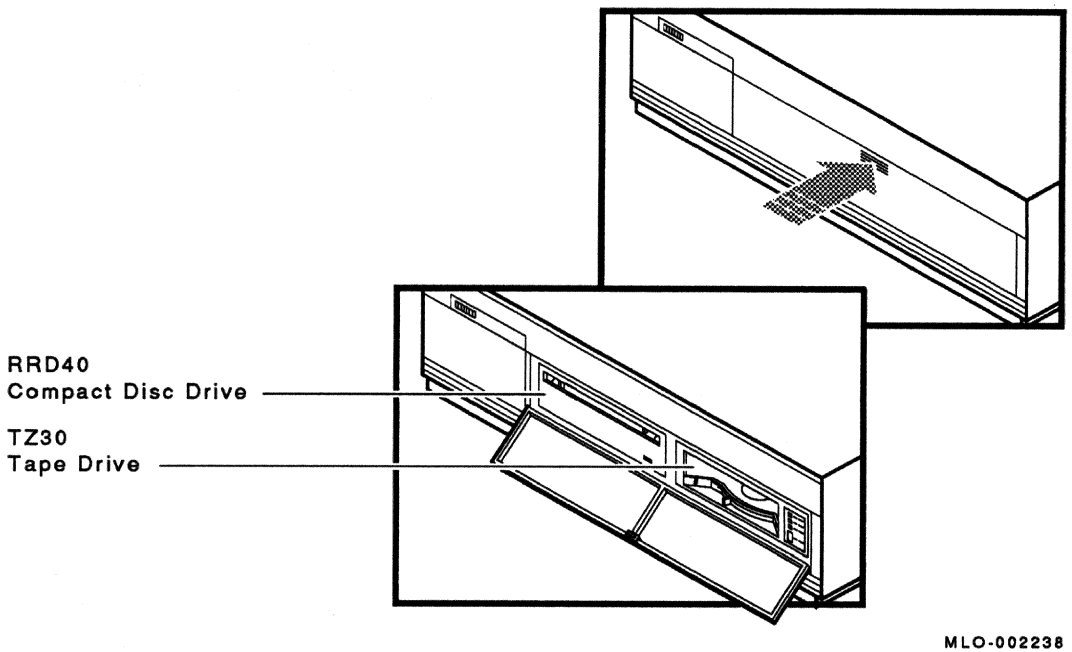
RZ23 and RZ24 hard disks are mounted internally in the system unit. Additional disks can only be added if there is available space. To determine the number of disks in your system, enter TEST 50 at the console prompt, then press the Return key. Your system configuration is displayed on the screen. It lists the storage devices mounted in your system. An example configuration display can be found in Section 7.3.

You can increase your system's storage capacity with the RZ55 hard disk expansion box and the RZ5x-xx series of hard disk expansion boxes. See Chapter 4 to learn about expansion boxes.

3.2 Using the RRD40 Compact Disc Drive

Turn the system unit so that the front of it faces you. To open the front of the Model 48, push and then release the door where the arrow is pointing in Figure 3–1.

Figure 3–1 Opening the Front of the Model 48 System Unit



The integral RRD40 compact disc drive and TZ30 tape drive are visible. The front of the RRD40 has an opening for the **optical disc** and one activity light. The green activity light goes on when you load a compact disc in the drive and flashes when the disc is transferring information.

3.2.1 Loading a Compact Disc

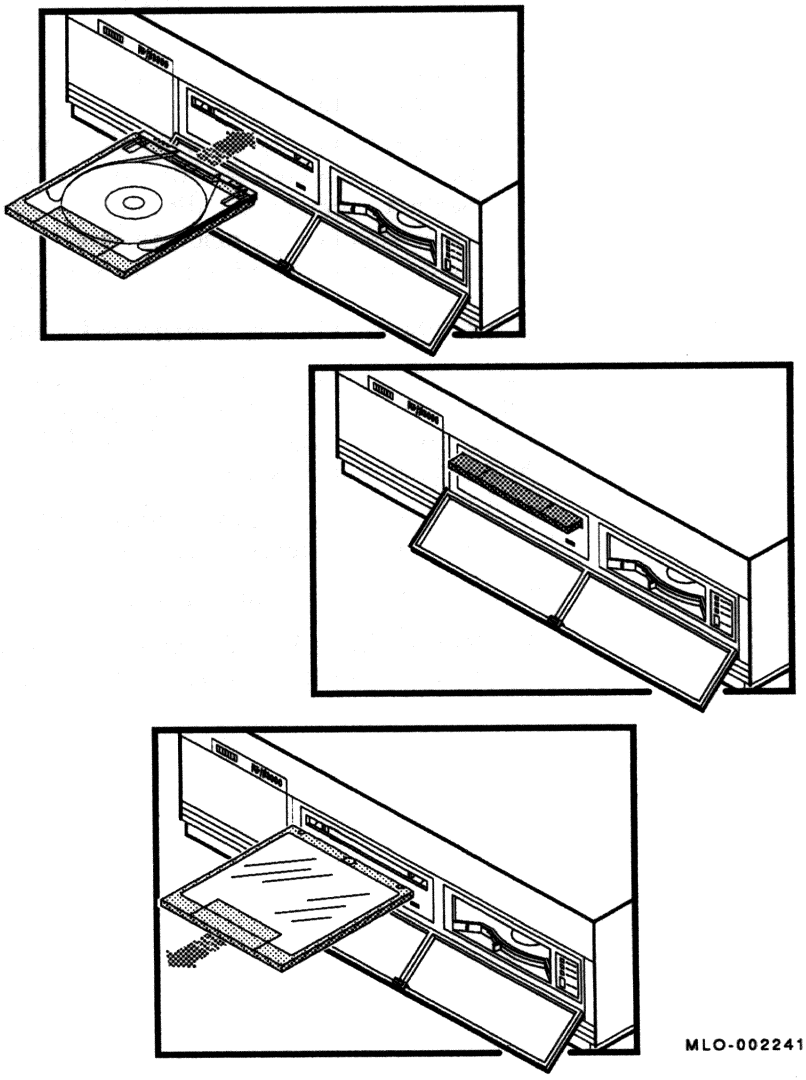
To load a compact disc into the disc drive, insert the entire disc **caddy** into the disc opening on the drive. Do not remove the compact disc from the caddy.

To load a disc:

1 Examine the disc caddy. Make sure that it is not cracked or damaged in any way. Never load a damaged caddy into a disc drive.

2 Insert the disc caddy as shown in Figure 3–2. The label on the disc should always be facing up when you insert the disc into the drive. Make sure the notches on the left side of the disc caddy line up with the notches on the opening of the drive.

Figure 3–2 Loading a Compact Disc



MLO-002241

Note *If you have the disc positioned label side up but the notches are on the right, then the disc is oriented improperly in the caddy. Proceed no further with the disc loading. See Section 3.2.4 and Section 3.2.3.*

3 Slide the caddy in as far as it will go and then remove the transparent sleeve. The disc and its **housing** remain in the drive. Only the **transparent sleeve** comes out. See Figure 3–2.

4 Also note that the green light on the front of the disk drive comes on and stays on.

The green activity light should come on within 5 seconds. If the drive accepted the disc and caddy but the activity light does not come on, the disc may be sitting incorrectly in the caddy. Remove the disc and check to make sure that the label is facing up as you insert the disc into the drive again.

3.2.2 Removing a Compact Disc

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

1 Position the transparent sleeve as for loading. Make sure the arrow on the sleeve is pointing into the drive opening.

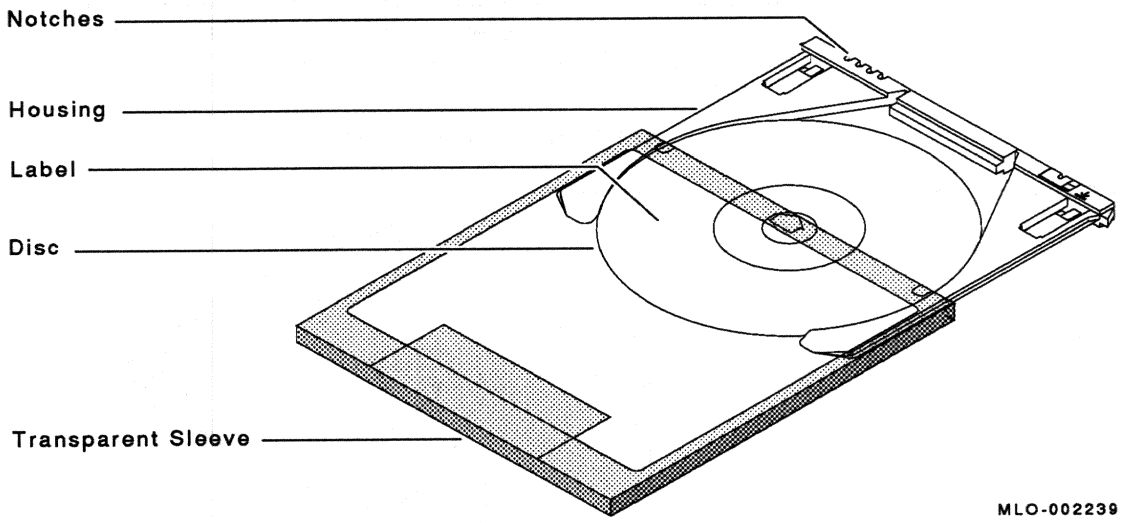
2 Insert the sleeve into the drive opening as far as it will go.

3 Remove the caddy. The disc and housing should be in the sleeve. The green activity light should go out.

3.2.3 Inserting the Compact Disc into the Caddy

A compact disc is contained inside a protective caddy for insertion into the compact disc drive. The caddy consists of three parts: the disc, the housing, and the transparent sleeve, as shown in Figure 3–3.

Figure 3–3 Compact Disc Caddy



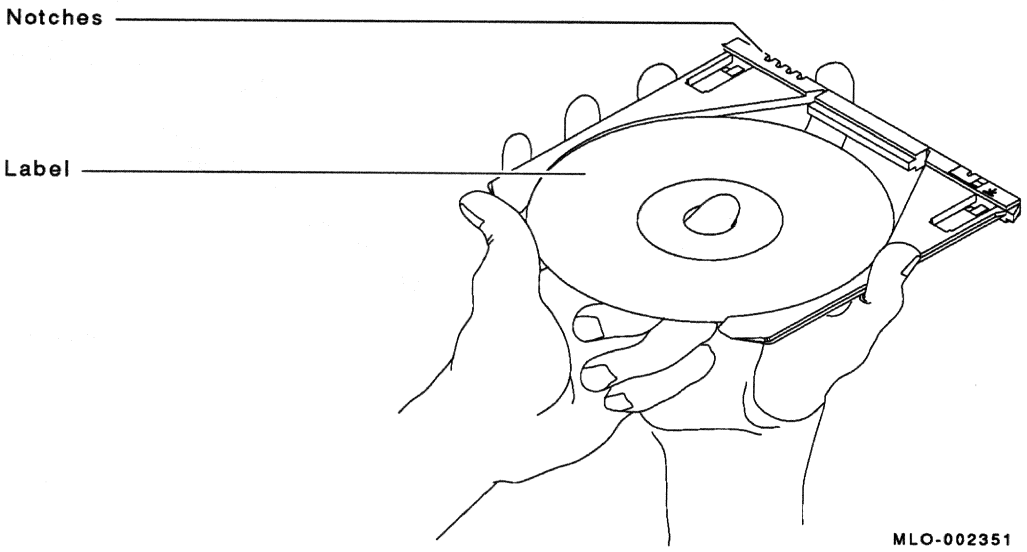
To place a compact disc into a caddy, perform the following steps:

1 Hold the disc with your free hand. Position the housing and disc as shown in Figure 3–4 (always work with the disc so the label is facing up, and the four notches on the housing are to the left).

2 Position your thumb on the outer edge of the disc and your index finger in the center hole of the disc.

3 Slip the disc into the housing. The inside of the housing is grooved to accept the disc. Exert inward pressure on the housing to hold the disc in the housing.

Figure 3–4 Inserting Disc in Housing



4 Slide the housing into the transparent sleeve until it clicks into place.

5 Turn the assembled caddy so that the label on the disc is facing up. Make sure that the notches on the housing are on the left. If the notches are not on the left when the disc is label side up, then the disc is mounted inside the caddy incorrectly. Remove the disc from the caddy, turn the disc over, and place it in the caddy in the correct position.

It is important that the disc be correctly mounted in the caddy. The compact disc drive cannot access data from a disc that is incorrectly mounted. If the disc is incorrectly mounted, remove it and remount it in the caddy.

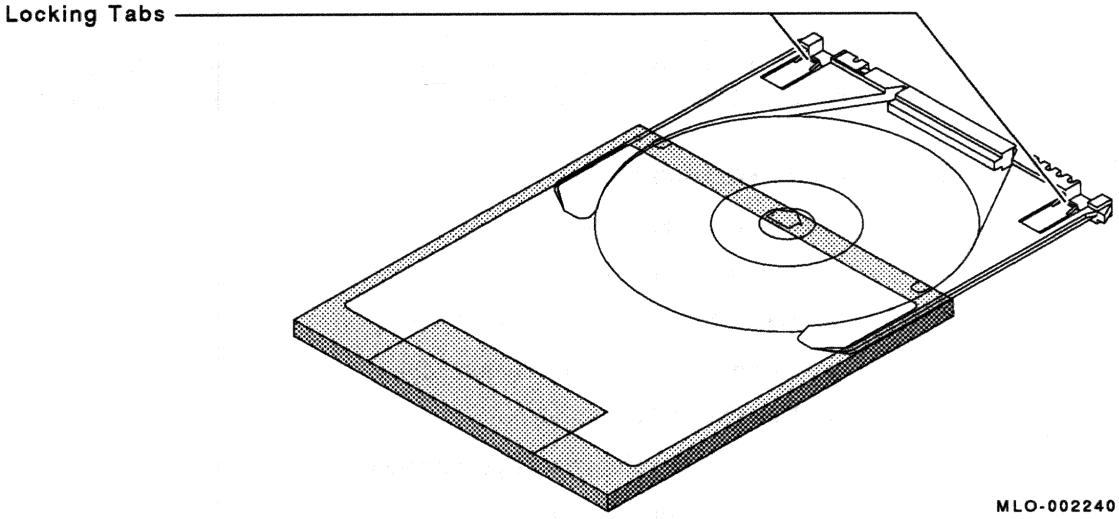
3.2.4 Removing the Compact Disc from the Caddy

To remove the disc from the caddy for cleaning or caddy repair, perform the following steps:

1 Hold the caddy so that it is facing label side down. Locate the locking tabs on either side of the disc housing.

2 Press down on both of the locking tabs while slightly separating the housing from the sleeve. Use your fingernails or a sharp, pointed instrument. See Figure 3–5.

Figure 3–5 Pressing Locking Tabs



3 When both tabs have been disengaged, pull the disc housing out to about the midpoint of the disc.

4 Hold the disc housing on each side. Exert inward pressure on the housing so the disc will not fall out. Remove the sleeve from the housing. Place the sleeve aside.

5 Hold the disc with your free hand as shown in Figure 3–4. Position your thumb on the outer edge of the disc and your index finger in the center hole of the disc. Release pressure from the housing and remove the disc.

3.2.5 Caring for Compact Discs

Protect a disc from dust, ink, fingerprints, or other contaminants whenever it is not in the caddy.

- Always handle a disc by the outer and inner edges.
- Never touch the data area of the disc (the area covered by the silk-screened label).

When loading a disc, gently insert the disc caddy into the compact disc drive.

To unload a disc, simply insert the transparent sleeve into the compact disc drive.

Compact discs can be cleaned with a dry, lint-free cloth. To clean a disc, wipe from the center of the disc to the edges. Use small circular strokes. Do not use a continuous circular stroke around the disc.

3.3 Using Tape Cartridges

This section shows you how to

- Label a tape cartridge
- Write to and protect tape cartridges
- Handle and store tape cartridges
- Use the TZ30 tape drive
- Insert and remove a tape cartridge
- Understand TZ30 lights

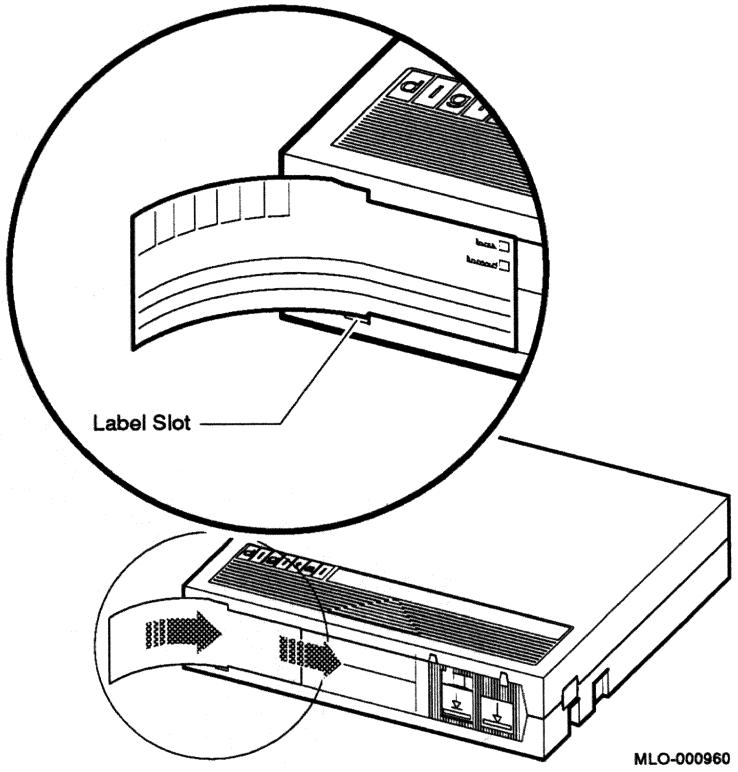
3.3.1 Labeling a Tape Cartridge

The TK50Z–GA and TZ30 tape drives both use TK50–K 95-megabyte (CompacTape) or TK52–K 296-megabyte (CompacTape II) tape cartridges.

Always label tape cartridges. A slot for the label is provided on the front of the cartridge, as shown in Figure 3–6. In this slot, the label is visible when the cartridge is in the drive. Labels or markings on any other part of the cartridge can interfere

with proper operation of the drive. Do not write directly on the cartridge with pen, pencil, or other marking medium.

Figure 3–6 Labeling a Tape Cartridge



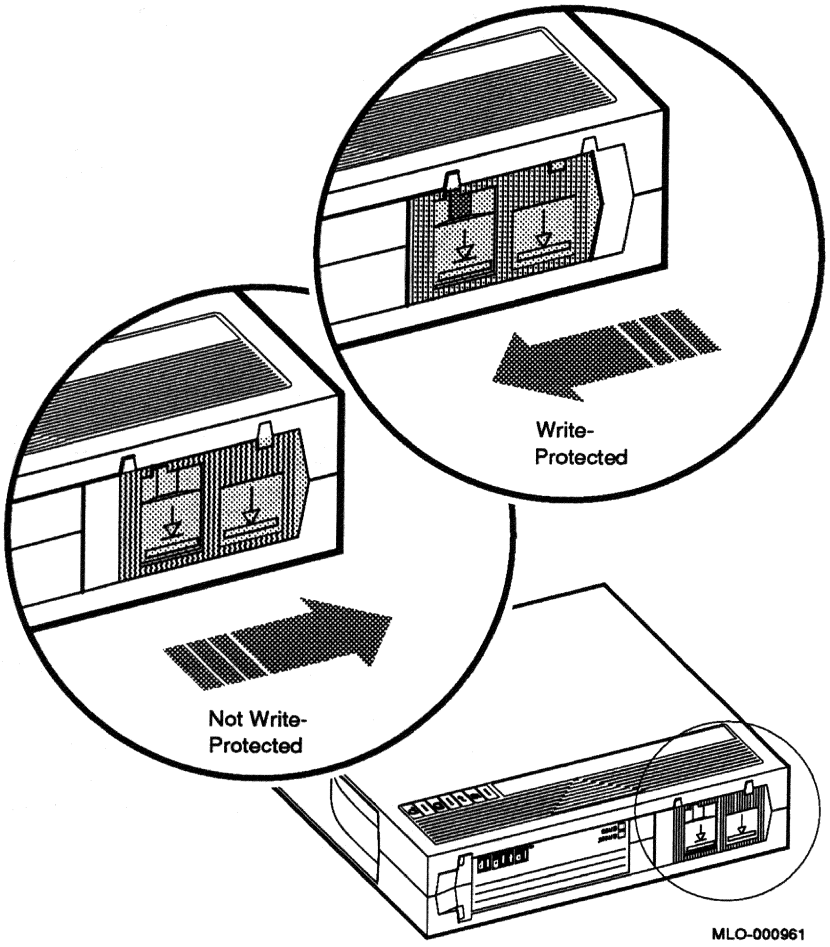
3.3.2 Writing to and Protecting Tape Cartridges

Write protecting a tape prevents accidental erasure of information. The VAXstation 3100 Model 48 can read information on the tape regardless of the position of the **write-protect switch**. However, the VAXstation 3100 Model 48 cannot write data to a write-protected tape.

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

To write protect a tape, slide the write-protect switch left toward the label until it locks in place (Figure 3–7). An orange rectangle appears when the write-protect switch locks in the write-protect position.

Figure 3–7 Write Protecting a Tape



If you move the write-protect switch to the right during operation, the software does not recognize that the tape is no longer write-protected. To write-enable the tape, unload the tape Section 3.4.2,

slide the write-protect switch to the right, and begin tape loading procedures again. The software will now recognize the cartridge as write enabled.

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

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

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

3.3.3 Handling and Storing Tape Cartridges

Take the following precautions when handling and storing tape cartridges:

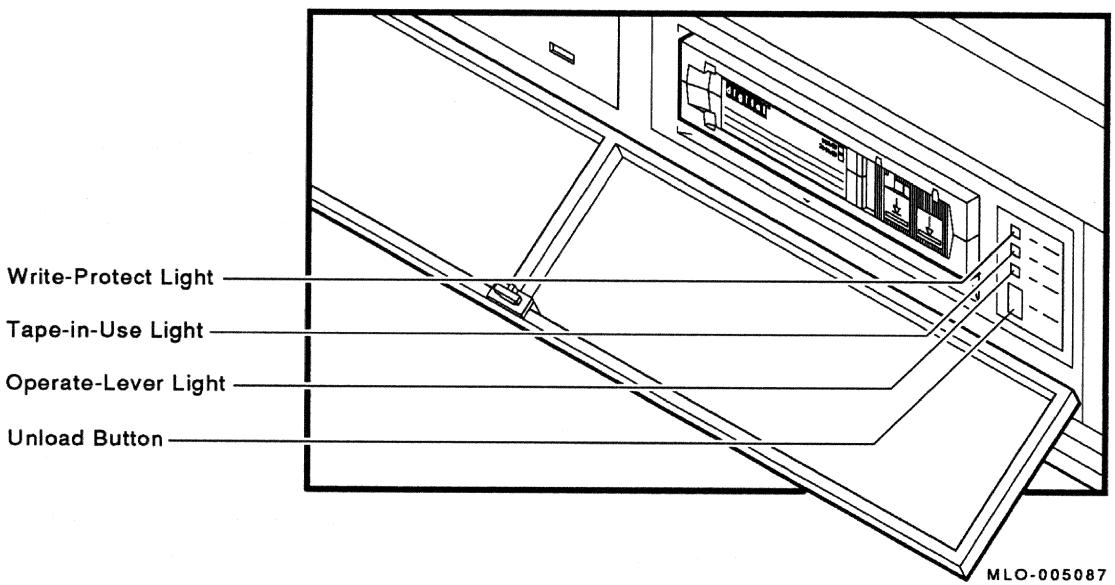
- Never touch the exposed surface of the tape.
- Avoid dropping the tape cartridge. The impact can cause damage.
- Allow new tape cartridges to come to room temperature before using them.
- Write on the identification label before sliding it into the slot on the tape cartridge. Do not put the label anywhere else on the cartridge.
- Store tape cartridges away from dust in their plastic covers.
- Keep tape cartridges out of direct sunlight, and away from heaters and other heat sources. Store tape cartridges at an even temperature between 10°C and 40°C (50°F and 104°F). Store cartridges where the relative humidity is between 40% and 80%.
- Keep tape cartridges away from magnets and equipment that generates magnetic fields, such as motors, transformers, and video monitors and terminals.
- Keep tape cartridges away from X-ray equipment.

3.4 Using the TZ30 Tape Drive

The TZ30 tape drive holds one removable magnetic tape cartridge. The tape cartridge stores up to 95 megabytes of data. Use the tape cartridge to load software or data or to make copies (or backups) of software or data. Figure 3–8 shows the indicator lights and the unload button.

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

Figure 3–8 TZ30 Lights and Controls



3.4.1 Inserting a Tape Cartridge

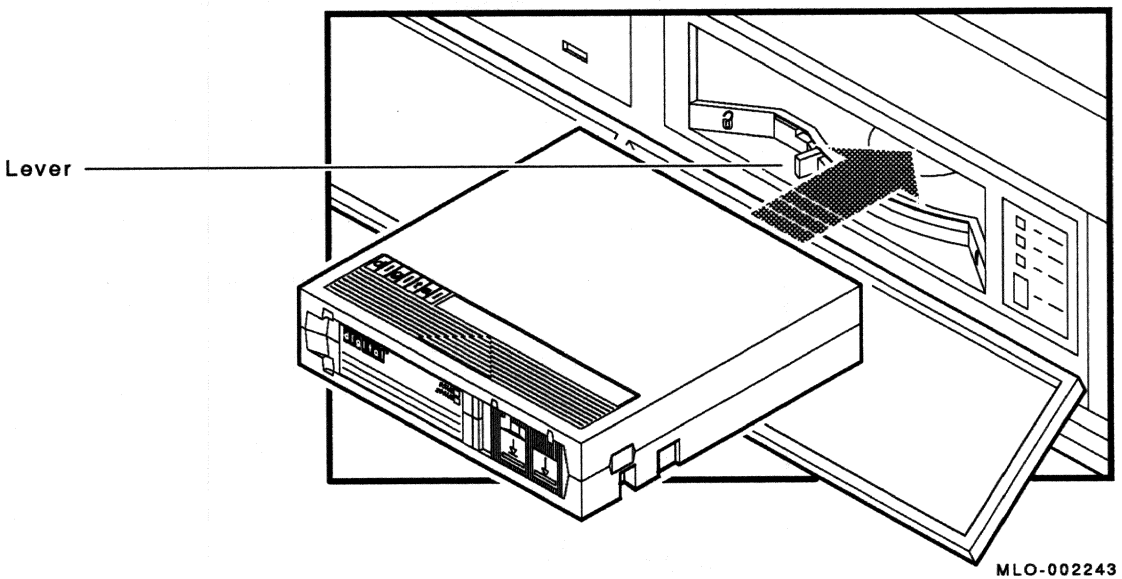
To learn about tape cartridges, see Section 3.3. To insert a tape cartridge, follow these steps:

1 Make sure the system unit is on (|).

2 Make sure the tape drive lever is to the left in the unlock position. See Figure 3–9.

3 Insert the tape cartridge, as shown in Figure 3–9.
The operate-lever light (green) comes on.

Figure 3–9 Inserting a Tape Cartridge in the TZ30



4 With the cartridge all the way in, move the lever to the lock position, all the way to the right. The green light goes off and the yellow (tape-in-use) light blinks, indicating that the tape is loading.
When the tape is loaded (ready for use), the yellow light stays on continuously. Whenever the yellow light is on continuously and it is the only light on, the tape is ready to use.
When the tape is being read, written to, or rewound, the yellow light blinks.

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

3.4.2 Removing a Tape Cartridge

To remove a tape cartridge:

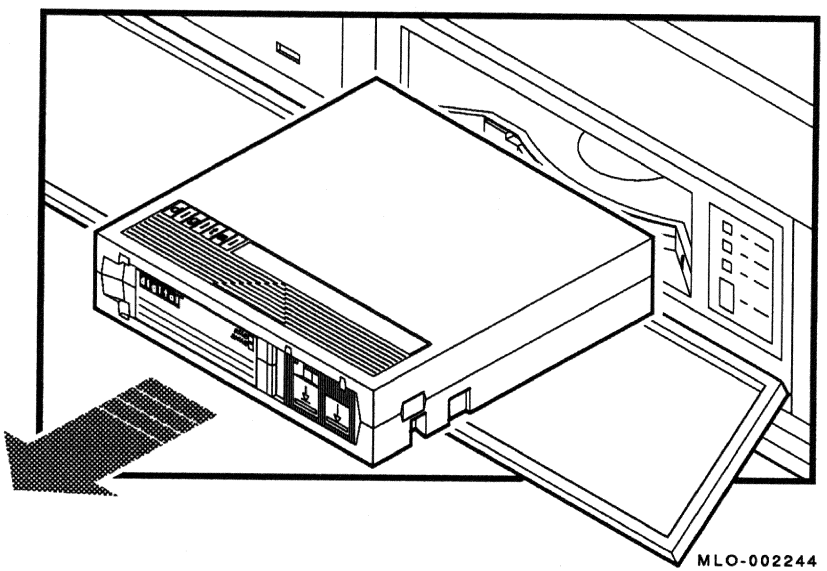
1. Press the unload button.

   Wait approximately two minutes for the tape to rewind. The yellow light will flash as the tape rewinds.

2. When the green light comes on, the yellow light goes off, and the beep sounds twice, move the lever to the unlock position (to the left). The cartridge ejects. Remove the cartridge as shown in Figure 3–10.

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

Figure 3–10 Removing a Tape Cartridge from the TZ30



3.4.3 Understanding TZ30 Lights

Table 3–1 is a summary of the possible light combinations.

Table 3–1 Understanding TZ30 Lights

Light	State	Meaning
Green (operate-lever)	On	OK to operate the cartridge lever.
	Off	Do not operate cartridge lever.
	Blinking	Cartridge or calibration error detected. See Chapter 6.
Yellow (tape-in-use)	Blinking	Tape is in use.[1]
	On	Tape is loaded and ready for use.
Orange (write-protect)	On	Tape is write protected.
	Off	Tape is write enabled.
All three lights	On	Power-up diagnostic test in progress.[2]
	Blinking	Drive fault. See Chapter 6.

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

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

3.4.4 If You Have Problems

If an error occurs when you are reading or writing to a tape, all three lights blink. If an error occurs when you are inserting the tape cartridge, the green light blinks and the tape does not move. In either event, see Table 6–1 for troubleshooting instructions.

3.5 Mouse

You can use the mouse to point to and select objects on the screen after installing windowing software on your system. To learn how to use your mouse, see your windowing documentation.

4

Adding and Using Expansion Boxes

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

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

- 332-megabyte RZ55 hard disk expansion box
- 95-megabyte TK50Z–GA tape expansion box
- 600-megabyte RRD40 compact disc expansion box
- Various RZ5x-xx storage options

Instructions for the following tasks are included in this chapter:

- Connecting one or more expansion boxes to your system unit
- Verifying the SCSI ID default (factory) switch setting on the first expansion box
- Setting the SCSI switches on a second expansion box
- Adding and using the TK50Z–GA tape expansion box
- Testing your expansion boxes

The RZ55 hard disk and the **TK50Z–GA tape drive** provide disk and tape storage for your system. Optionally, the TK50Z–GA can be used to load software.

- The RZ55 and the TK50Z–GA are enclosed in similar expansion boxes.
- If you have more than one RZ55 expansion box, you must reset the external SCSI ID switches on the second RZ55.
- Information on the RZ5x-xx expansion box series is covered in the manual that ships with each individual option. Please refer to that manual for information on adding any one of the RZ5x-xx series of expansion boxes.

The RRD40 compact disc drive is a read-only storage device that reads data from removable compact discs. The RRD40 disc drive is an integral device. It is also available in an external expansion box. Chapter 3 describes the integral RRD40 compact disc drive. This chapter discusses the expansion box model.

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

- The RRD40 compact disc expansion box is contained in a smaller expansion box than the RZ55 and the TK50Z–GA.
- Cable connections and installation instructions for the RRD40 compact disc expansion box are similar to those for the RZ55 and TK50Z–GA expansion boxes.
- The RRD40 compact disc expansion box has external SCSI ID switches that you must set for your configuration if you have more than one.
- You can set the voltage selector on the RRD40 expansion box to either 110 volts or 220 volts, depending on your power requirements.

4.1 Guidelines for Connecting Expansion Boxes

Use the following guidelines when connecting expansion boxes:

- Connect no more than three expansion boxes to the VAXstation 3100 SCSI port. Remember the following SCSI rules:
  - Seven SCSI IDs are available for customer configuration.



  - Multiple SCSI devices may be housed in one expansion box, but the number of SCSI devices cannot exceed seven. For more information on SCSI, please refer to the following documentation kit, *Small Computer System Interface: An Overview and a Developer's Guide.*
  - Each device must have its own unique SCSI ID.
- Some SCSI devices may not be housed in an expansion box. Always limit the number of SCSI devices per SCSI bus to seven when you configure your VAXstation 3100 Model 48 system.
- Use only the expansion boxes purchased for the VAXstation 3100. Expansion boxes purchased for use with other Digital equipment may need to be upgraded by Digital field service.
- A system must have an integral hard disk and a SCSI controller in order to support an expansion box.
- Always attach the 50-pin SCSI terminator that comes with your expansion box to the unused SCSI connector on the last expansion box.
- All expansion boxes should be plugged into the same grounded power strip or electrical source.
- Turn on all expansion boxes before you turn on a VAXstation 3100 system unit. Turn them on in the following order:
  - RZ55 hard disk expansion box or boxes
  - Other hard disk expansion boxes
  - TK50Z–GA tape expansion box
  - RRD40 compact disc expansion box or boxes

  This procedure ensures that the device in each expansion box is ready to be used, and that the system **firmware** includes the device in its configuration.
- After installing an expansion box, see Chapter 7 for instructions on how to display your new system configuration (TEST 50), and how to run the system exerciser (TEST 0).

4.2 Unpacking an Expansion Box

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

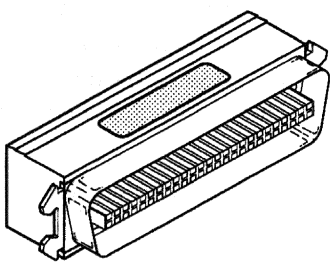
Each expansion box is shipped from the factory with the following accessories, as shown in Figure 4–2:

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

Note *The 68-pin connector is shaped differently from the 50-pin connector. See Figure 4–2.*

- One 50-pin to 50-pin cable. Use this cable to connect two expansion boxes in a chain.
- One power cord.
- One bottom dress cover (for RZ55 or TK50Z–GA). See Section 4.3.
- One 50-pin terminator, as shown in Figure 4–1. Use this to terminate the last expansion box.

Figure 4–1 50-Pin Terminator

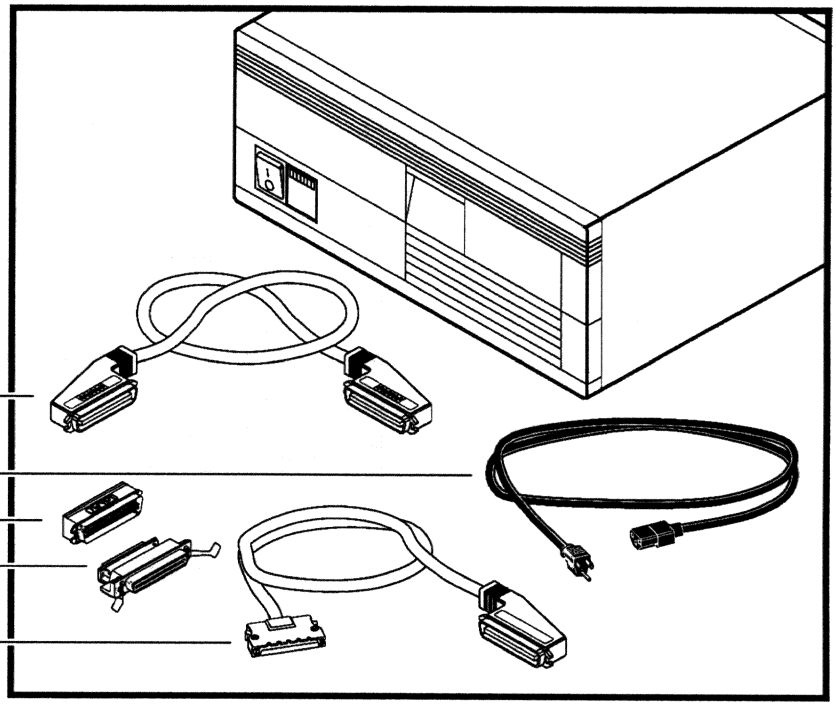


MLO-002346

Make sure you have all the parts shown in Figure 4–2 before you set up your expansion box. Note that the RRD40 compact disc expansion box differs somewhat from the RZ55 or TK50Z–GA expansion box shown in the figure, but the cables and terminator are identical. The bottom dress cover that comes with the RZ55 and TK50Z–GA expansion boxes is not shown in Figure 4–2. See Section 4.3.

In addition, the TK50Z–GA expansion box comes with a blank tape cartridge, and the RRD40 compact disc expansion box comes with an empty compact disc caddy and test disc.

Figure 4–2 Unpacking an RZ55 or TK50Z–GA Expansion Box



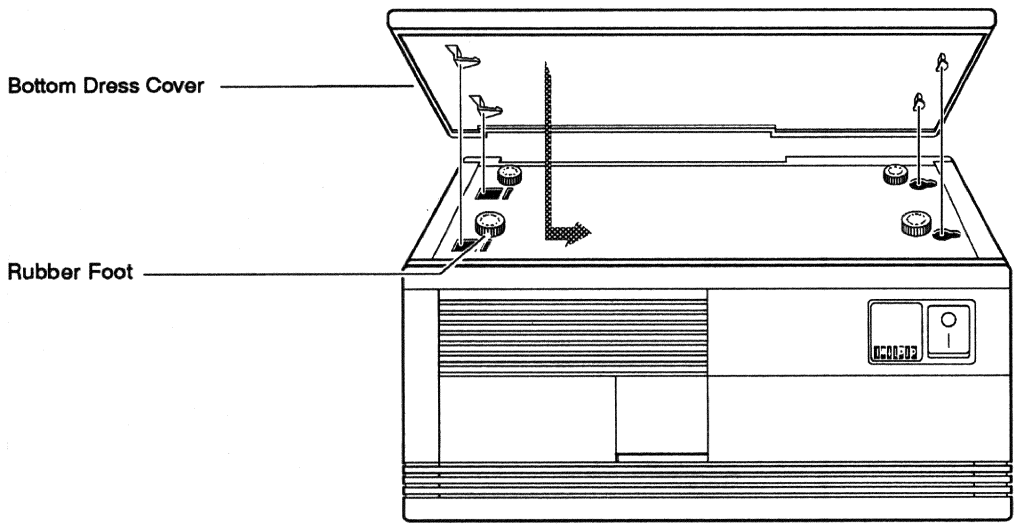
MLO-004582

4.3 Installing a Bottom Dress Cover

The RZ55 or TK50Z–GA expansion box comes with a bottom dress cover. To install the bottom dress cover, follow these steps:

1. Place the expansion box upside down on a level surface.
2. Remove the four rubber feet (optional).
3. Locate the bottom dress cover. Line up the molded inserts on the inside of the bottom dress cover over the holes on the bottom of the expansion box. Note that you must match the size of the inserts with the size of the holes. See Figure 4–3.
4. Slide the bottom dress cover until it locks into place.

Figure 4–3 Installing Bottom Dress Cover



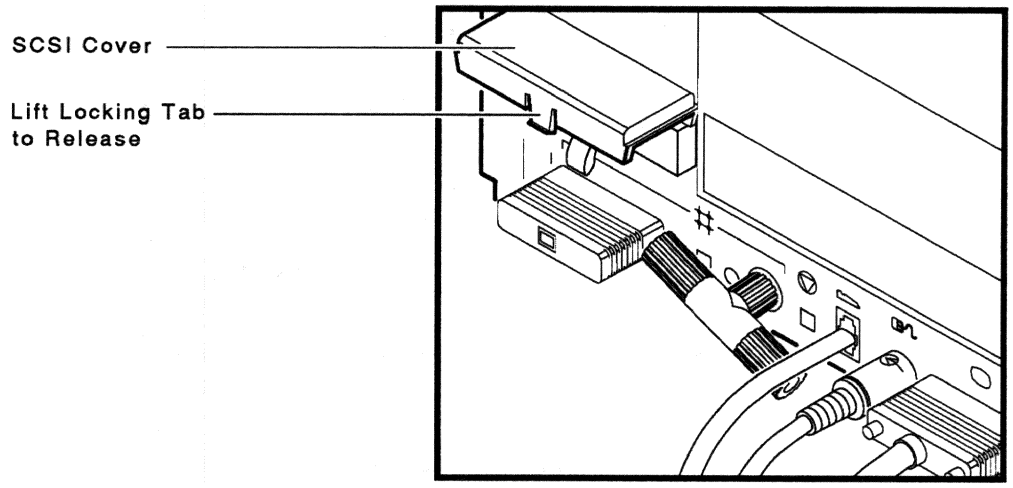
4.4 Preparing Your System for an Expansion Box

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

1 Turn your system off (0).

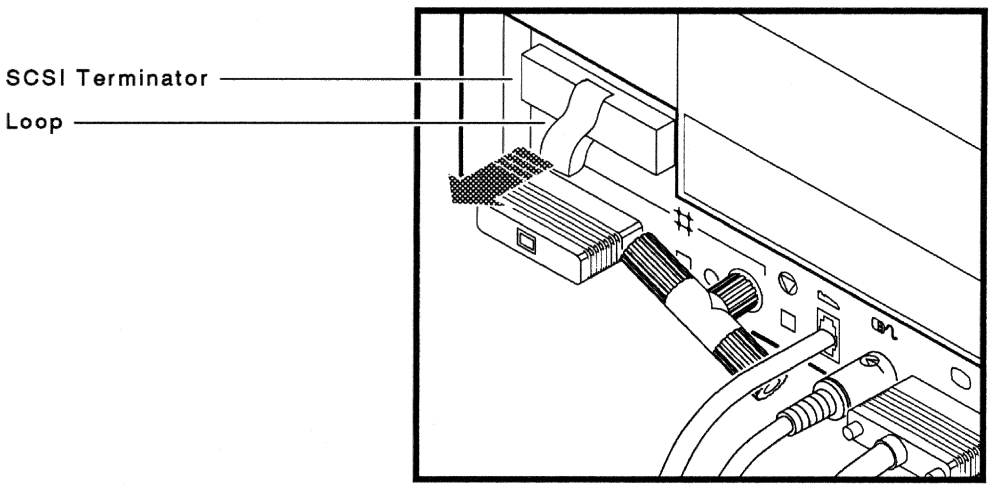
2 To remove the SCSI cover, press your fingers on the locking tab and lift the cover to release it, as shown in Figure 4–4.

Figure 4–4 Removing the SCSI Cover



3 To remove the SCSI terminator, place your fingers under the loop and pull out. Figure 4–5 shows you how to remove the terminator.

Figure 4–5 Removing the SCSI Terminator



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

4.5 Connecting One Expansion Box

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



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

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

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

3 Verify the default SCSI ID switch positions. Each device is shipped from the factory with the default switch positions shown in Table 4–1. Read the switch positions from left to right.

For detailed verification instructions, see

- Section 4.7.2 and Figure 4–9
- Section 4.8.1 and Figure 4–11
- Section 4.9.1 and Figure 4–13

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

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

4 Connect the 68-pin to 50-pin connector cable. See Figure 4–6 for the TK50Z–GA or the RZ55, and Figure 4–7 for the RRD40.



- Note the orientation of the pins in the system unit SCSI connector. There are more pins in the top row.

  Turn the 68-pin connector (small end of the cable) so its holes match the pins.

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

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

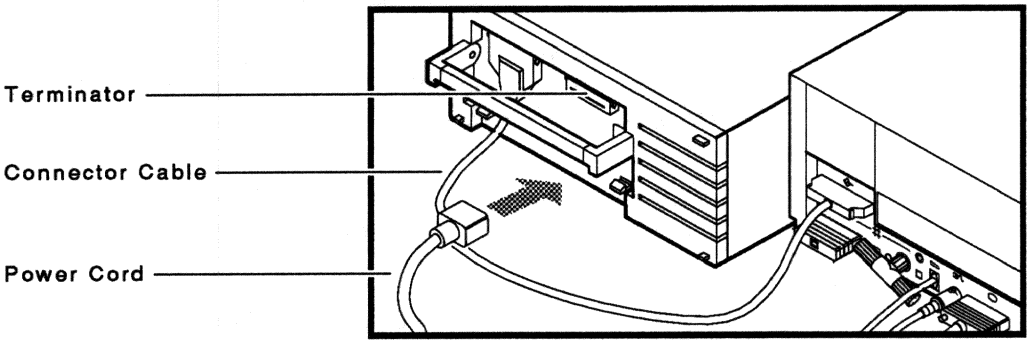
Connect the 50-pin connector (large end) to either port on the back of the expansion box and snap the bail lock loops in place.

5 Connect the 50-pin terminator that comes with the expansion box to the unused port on the expansion box. Figure 4–1 shows the 50-pin terminator.

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

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

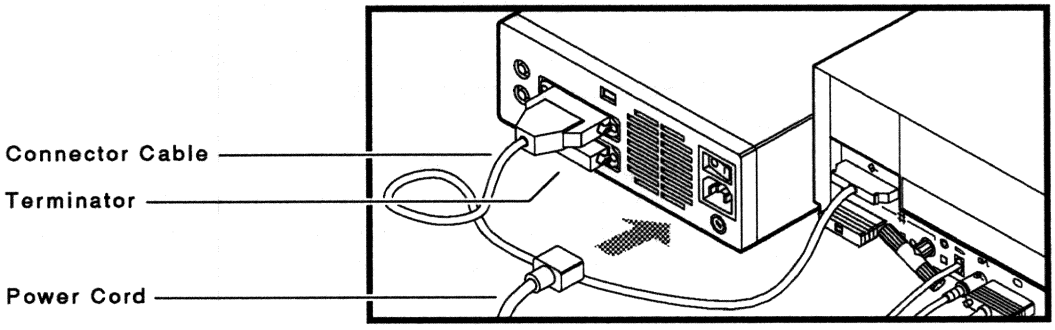
Figure 4–6 Connecting One TK50Z–GA or One RZ55 Expansion Box



MLO-002348

Figure 4–7 shows how to connect one RRD40 compact disc drive expansion box.

Figure 4–7 Connecting One RRD40 Expansion Box



MLO-002349

4.6 Daisy-Chaining Multiple Expansion Boxes

You can add additional expansion boxes and **daisy-chain** the second box to the first. To daisy-chain (link expansion boxes together in series), follow these steps:



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

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

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

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

You can daisy-chain devices to your system in any physical order.

3 Connect one end of the 50-pin to 50-pin connector cable to the new expansion box.

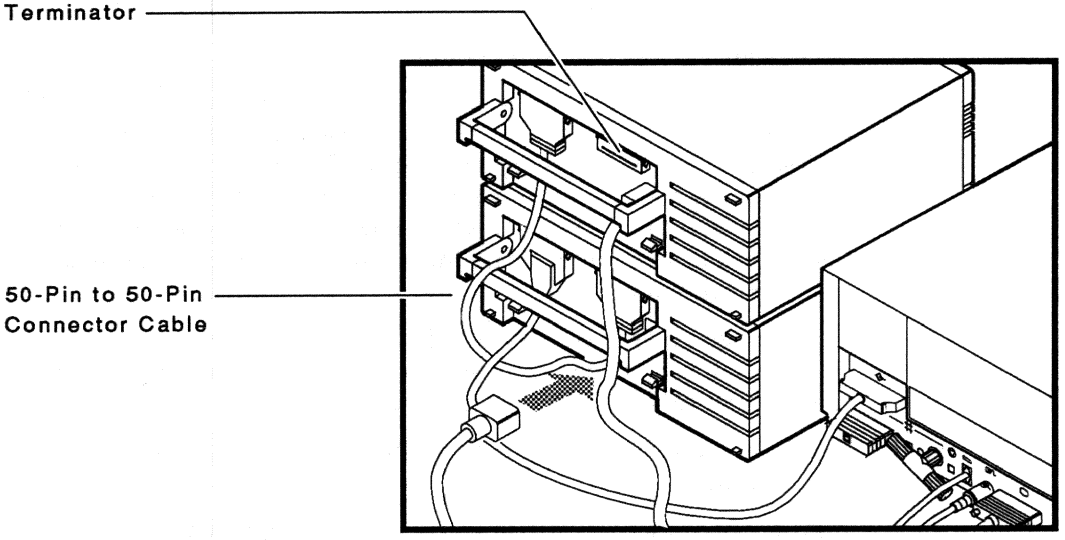
4 Connect the other end of the connector cable to an available port on the most recently installed expansion box.

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

6 Connect the power cord for the new expansion box to the expansion box power receptacle. Plug the other end into the same power source as the first expansion box. Each expansion box needs its own power connection.

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

Figure 4–8 Connecting Two Expansion Boxes



MLO-002350

4.7 Adding the RRD40 Compact Disc Expansion Box

To provide additional read-only disk storage, you can add an external RRD40 compact disc drive, which is available in an expansion box. You already have an internal RRD40 compact disc drive that is built into your system unit.

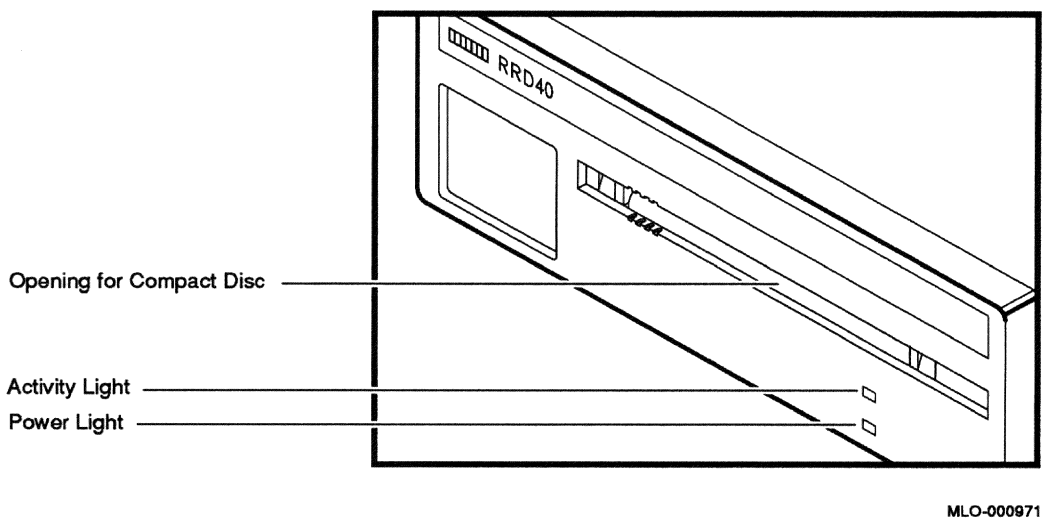
The front of the RRD40 disc drive is similar in both versions. The RRD40 has an opening for a compact disc and one light (internal RRD40) or two lights (expansion box). When you turn on the RRD40 compact disc expansion box, the power light comes on. In both versions of the product, the activity light goes on when you load a compact disc in the drive; it flashes while the disc is transferring information.

If you have ordered an RRD40 compact disc expansion box, see Section 4.1 and subsequent sections earlier in this chapter for installation and unpacking instructions.

See Chapter 3 for instructions on inserting and removing a compact disc.

Figure 4–9 shows the RRD40 compact disc expansion box.

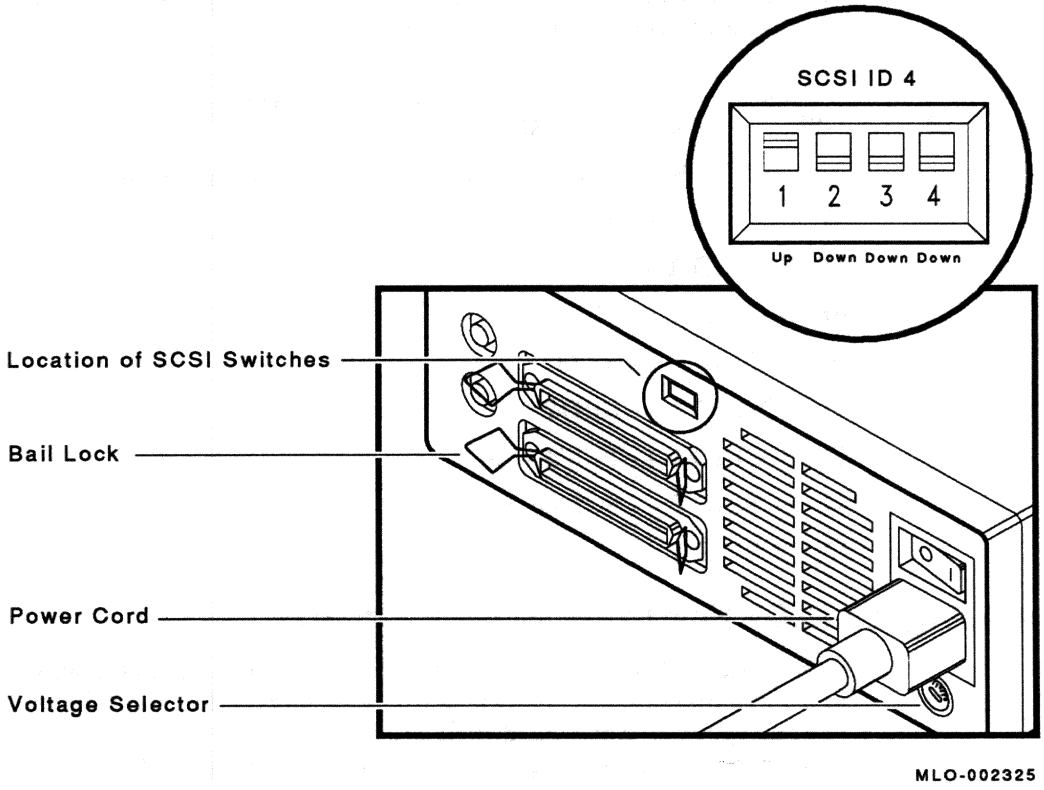
Figure 4–9 RRD40 Compact Disc Expansion Box



4.7.1 Verifying the Voltage Selector Position on the RRD40

Turn the RRD40 compact disc expansion box so that the back is facing you. Note that the expansion box has a voltage selector that can be set to one of two voltages (110V or 220V). Check that the voltage selector is set to the correct voltage for your power requirements. Figure 4–10 shows you the location of the voltage selector.

Figure 4–10 RRD40 Expansion Box Voltage Selector and Factory SCSI ID Switch Positions



4.7.2 Verifying the SCSI ID on the RRD40

The RRD40 compact disc expansion box and the internal RRD40 compact disc drive in the Model 48 are shipped from the factory with the SCSI switches set to ID 4 (up, down, down, down). See Figure 4–10.

4.7.3 Resetting the SCSI ID on the RRD40

If you are adding an RRD40 compact disc expansion box to your Model 48 configuration, you must reset the switches. The expansion box should be set to an open ID (one that is not currently being used); for example, ID 1 with the switches in the following positions: down, down, up, down. See Appendix B for more information.

To determine available IDs on the SCSI-B bus, enter TEST 50 at the console prompt (>>>), then press the Return key. Your system configuration appears on the screen. The following example is for a fully configured Model 48 system. FFFFFF05 indicates an open SCSI ID. In the following example, the SCSI IDs 0 to 7 are identified by the callouts 1 to 8.

```
SCSI-B      1C1C.0001    V1.3
FFFFFF05 FFFFFF05 00000001 00000001 05020001 01000000 FFFFFF03 FFFFFF05
   ❶        ❷        ❸        ❹        ❺        ❻        ❼        ❽
```

The SCSI IDs shown in the examples are identified below:

❶ SCSI ID 0 — open

❷ SCSI ID 1 — open

❸ SCSI ID 2 — RZ23

❹ SCSI ID 3 — RZ23

❺ SCSI ID 4 — RRD40

❻ SCSI ID 5 — TK50Z–GA

❼ SCSI ID 6 — SCSI-B controller

❽ SCSI ID 7 — open

4.8 Adding an RZ55 Hard Disk Expansion Box

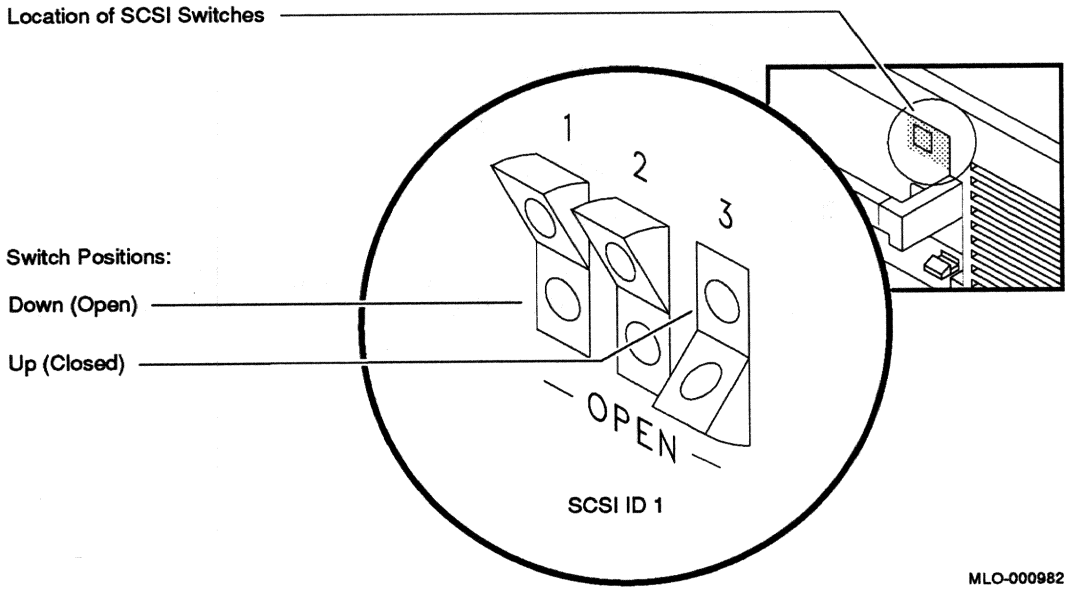
To provide additional disk storage, the RZ55 hard disk is available in an expansion box. You can add one or more RZ55 hard disks to your system. Each hard disk provides an additional 332 megabytes of disk storage. See Section 4.1, Section 4.2, and Section 4.6 for connection instructions.

4.8.1 Verifying the SCSI ID on the First RZ55

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

Figure 4–11 shows the back of the expansion box, the location of the switches, and default SCSI ID positions.

Figure 4–11 Verifying the SCSI ID on the First RZ55



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

4.8.2 Resetting the SCSI ID on the Second RZ55

If you are adding a second RZ55, you must change its SCSI ID setting to 0 or any other open ID on the SCSI-B bus. For more information, see Appendix B.

To determine available IDs on the SCSI-B bus, enter TEST 50 at the console prompt (>>>), then press the Return key. Your system configuration is displayed on the screen, as shown in the example

below. In the example, the SCSI IDs 0 to 7 are identified by the callouts 1 to 8. The code FFFFFF05 indicates an open SCSI ID.

```
SCSI-B      1C1C.0001    V1.3
FFFFFF05 FFFFFF05 00000001 00000001 05020001 01000000 FFFFFF03 FFFFFF05
   ❶        ❷        ❸        ❹        ❺        ❻        ❼        ❽
```

The SCSI IDs shown in the example are identified below:

❶ SCSI ID 0 — open

❷ SCSI ID 1 — open

❸ SCSI ID 2 — RZ23

❹ SCSI ID 3 — RZ23

❺ SCSI ID 4 — RRD40

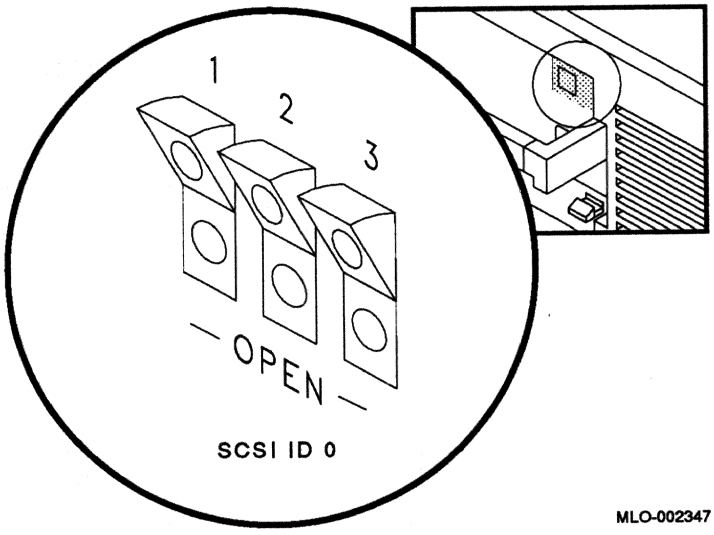
❻ SCSI ID 5 — TK50Z–GA

❼ SCSI ID 6 — SCSI-B controller

❽ SCSI ID 7 — open

Each device on the bus must have a unique SCSI ID. For SCSI ID 0, set the switches to the following positions (left to right): down, down, down as shown in Figure 4–12.

Figure 4–12 Resetting the SCSI ID on the Second RZ55



4.9 Adding and Using a TK50Z–GA Tape Expansion Box

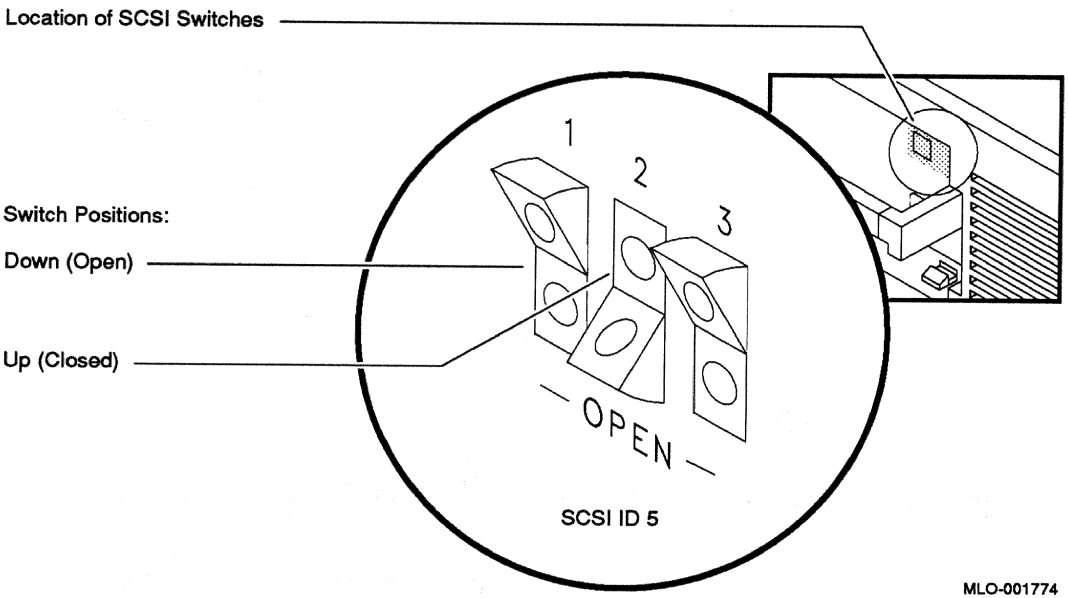
The TK50Z–GA tape drive is available in an expansion box. The tape drive is located behind the protective door on the front of the box. The TK50Z–GA holds one removable TK50–K or TK52–K magnetic tape cartridge. Use the tape cartridges to load application software or data files, or to make copies (or backups) of your files. See Section 4.2 for additional information.

4.9.1 Verifying the SCSI ID on the TK50Z–GA

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

Figure 4–13 shows the back of the expansion box, the location of the switches, and the default SCSI ID switch settings.

Figure 4–13 Verifying the SCSI ID on the TK50Z–GA



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

4.9.2 Inserting a Tape Cartridge

The TK50Z–GA tape drive has two primary controls: the cartridge release handle and the load/unload button.

- The cartridge release handle allows cartridges to be inserted, locked into position, and removed.
- The load/unload button controls winding and rewinding of the tape. The in (on) position of the load/unload button is for loading tape cartridges. The out (off) position is for unloading tape cartridges.

The TK50Z–GA uses TK50–K or TK52–K CompacTape tape cartridges. For additional information on tape cartridges, see Chapter 3.

TK50Z–GA controls and lights are described in Table 4–2 and Table 4–3.

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

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

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

If a cartridge is new, the tape drive performs a calibration sequence that takes approximately 40 seconds. The green light flashes rapidly and irregularly during calibration.

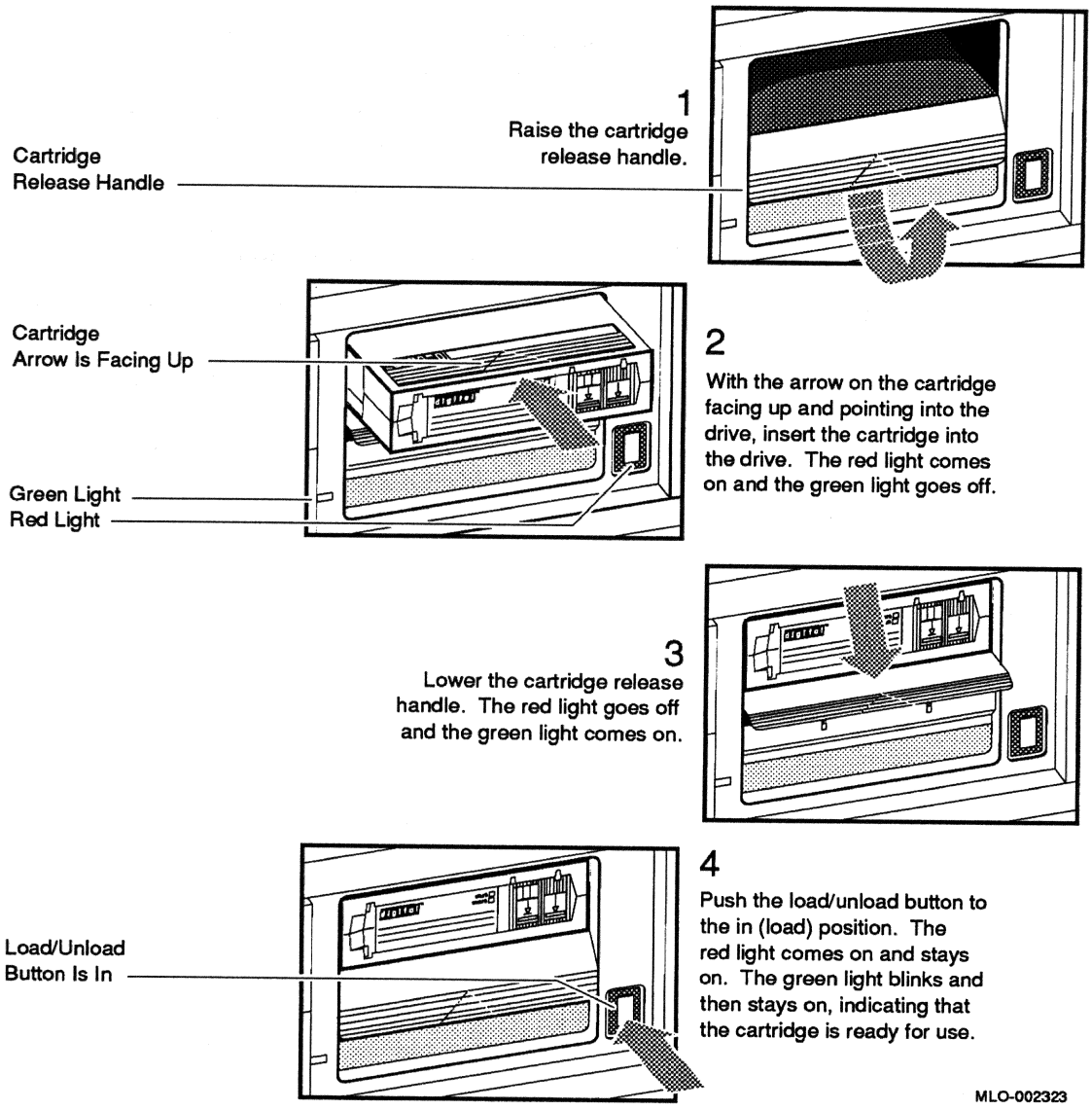
Caution *Do not move the cartridge release handle unless the red light is off and the green light is on.*

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

If the red light flashes rapidly at any time, press the load/unload button four times. If the problem persists, do not attempt to use the tape drive or remove the cartridge. See Chapter 6.

Figure 4–14 shows how to insert and load a tape cartridge.

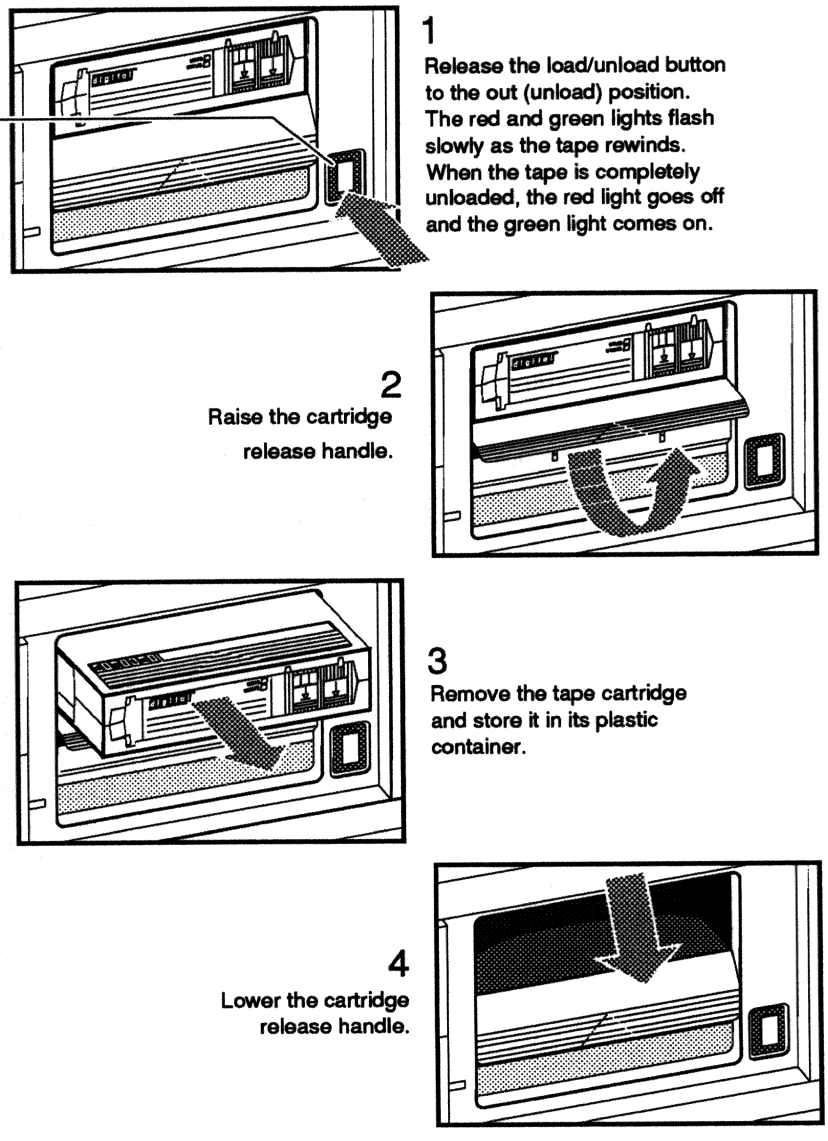
Figure 4–14 Inserting and Loading a Tape in the TK50Z–GA



4.9.3 Removing a Tape Cartridge

Figure 4–15 shows how to unload and remove a tape cartridge.

Figure 4–15 Removing a Tape Cartridge from the TK50Z–GA



4.9.4 Using TK50Z–GA Controls and Indicator Lights

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

Table 4–2 Using the TK50Z–GA Controls

Control	Position	Functions
Load/unload button	In	Loads tape (10 to 15 seconds).
	Out	Rewinds and unloads tape.
Cartridge release handle	Up	Lets you insert or remove a tape after rewind and unload operations are completed.
	Down	Locks tape in operating position.

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

Table 4–3 Understanding TK50Z–GA Lights

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

(continued on next page)

Table 4–3 (Cont.) Understanding TK50Z–GA Lights

Green Light	Red Light	Functions
Off	Flashing rapidly	Tape or drive fault exists. See Section 6.2.

5

Connecting to a Network

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

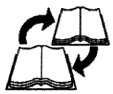
- With ThinWire Ethernet cable
  See Section 5.1 for more information.
- With standard Ethernet cable
  See Section 5.2 for more information.

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

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

5.1 Connecting to a ThinWire Ethernet Network

- If you are setting up a new work group, you may wish to designate someone as the **network coordinator** to help create and manage the work group, assign unique node names and addresses for each system, and provide administrative assistance.
- If you are connecting a work group to an existing network, ask the network coordinator for the best way to connect to the larger network. Check that each **DECnet node name** and **DECnet node number** in your work group is unique and does not already exist in the larger network. See your software documentation.



- If you are new to networking and need additional networking information, consult your *VAXstation 3100 Network Guide.* The guide introduces networking concepts and identifies the hardware and software needed to connect many systems together to form a work group, and connect that work group to the network.

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

- Verify the network select button position
- Verify ThinWire Ethernet network installation
- Connect ThinWire Ethernet cable to your system unit

5.1.1 Verifying the Network Select Button Position

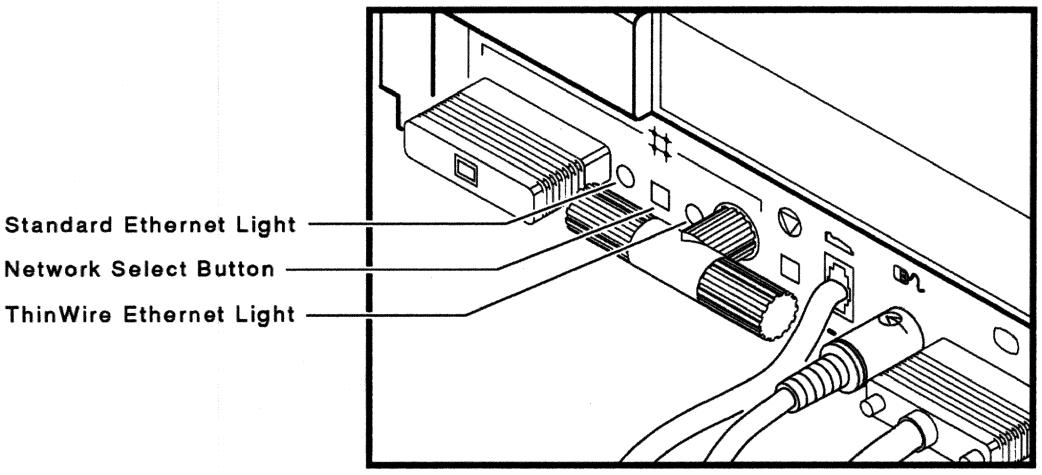


The ThinWire/standard Ethernet network select button is usually set in the out position when you receive your VAXstation 3100. There are two positions for the network select button:

- Out—standard Ethernet
- In—ThinWire Ethernet

Figure 5–1 shows the network select button in the in position, that is, set for ThinWire Ethernet. The light on the right of the button should be on when the system is on.

Figure 5–1 Network Select Button Set for ThinWire Ethernet



If your system is set incorrectly, follow these steps:

1 Locate the recessed network select button.

2 Press the network select button so that the light to the right of the network select button (ThinWire Ethernet Light) comes on.

5.1.2 Verifying ThinWire Ethernet Network Installation

To verify your ThinWire Ethernet installation:

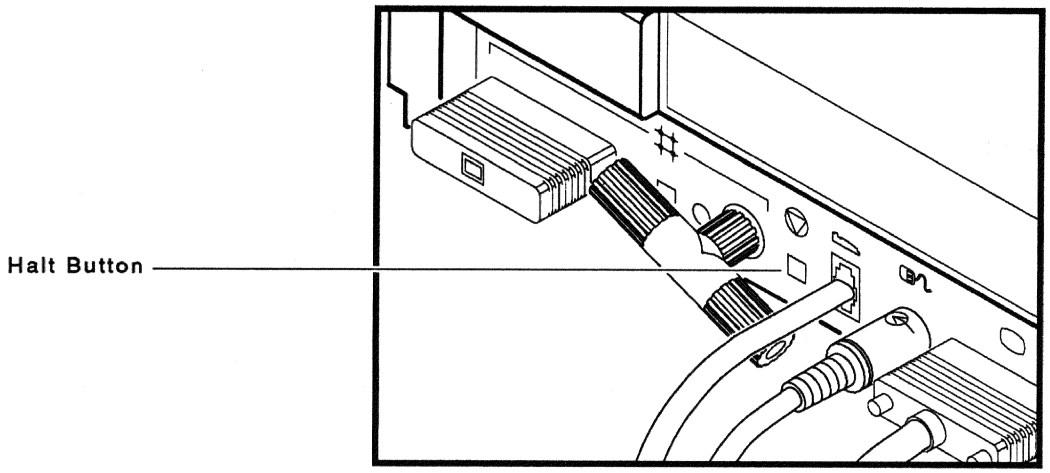
1 Turn your VAXstation 3100 on (|). The green light to the right of the network select button should come on. The following display appears:

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

If the console prompt (>>>) does not appear, press the halt button on the back of the system unit.

Figure 5–2 shows the location of the halt button.

Figure 5–2 Halt Button



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

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

For example:

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

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

3 Write your Ethernet hardware address here:

```
Ethernet hardware address _____________________________
```

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

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

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

If a number between 0000.0002 and 0000.7000 appears, there may be a failure in the Ethernet subsystem. Check that there are terminators attached to the T-connector. Enter TEST 1 at the console prompt and press the Return key. Now repeat

the TEST 50 command. If you continue to receive a failure indicator, call your Digital service representative.

If NI 0000.7000, or any number above 0000.7000, appears on that line, check all Ethernet connections.

5.1.3 Connecting ThinWire Ethernet Cable

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

1 Turn your system off (0).

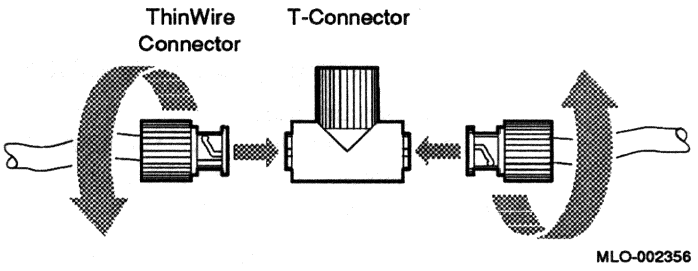
2 Remove a terminator from one side of the T-connector.

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

- If your system is the first or last system in a single ThinWire segment, leave the terminator attached to the other side of the T-connector. A segment is a length of cable made up of one or more cable sections connected with barrel connectors or T-connectors.
- If your system is not the first or last system and you want to connect your system between two other systems, replace both terminators with sections of ThinWire cable.

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

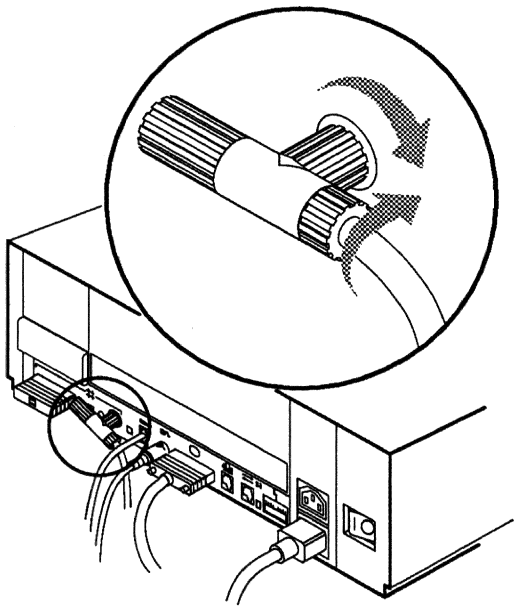
Figure 5–3 Adding ThinWire Cable to a T-Connector



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

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

Figure 5–4 Checking ThinWire Cable Connections



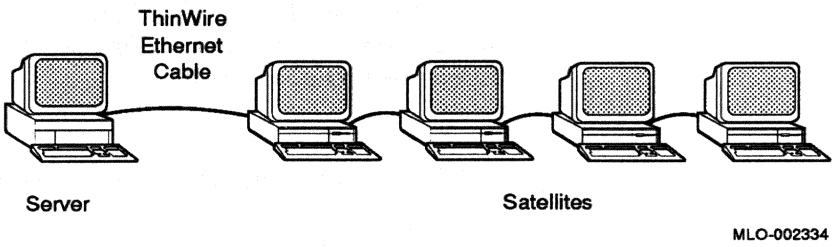
5.1.4 Creating a Daisy-Chain Work Group

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

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

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

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



When you finish connecting your system to the ThinWire segment, visit each of the VAXstation 3100 Model 38 installations.

- Physically connect each Model 38 system to the ThinWire Ethernet cable in the same way you connected your Model 48.
- Collect the Ethernet hardware address for each of the Model 48 systems.

5.1.5 Connecting to a DECconnect Faceplate

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

DECconnect cabling components support network configurations ranging from simple work groups to multimedia local area networks (LANs). No matter how large or small your network, the most visible DECconnect component in your office is the faceplate. A faceplate is a wall receptacle that provides a single network connection for your VAXstation 3100 system.

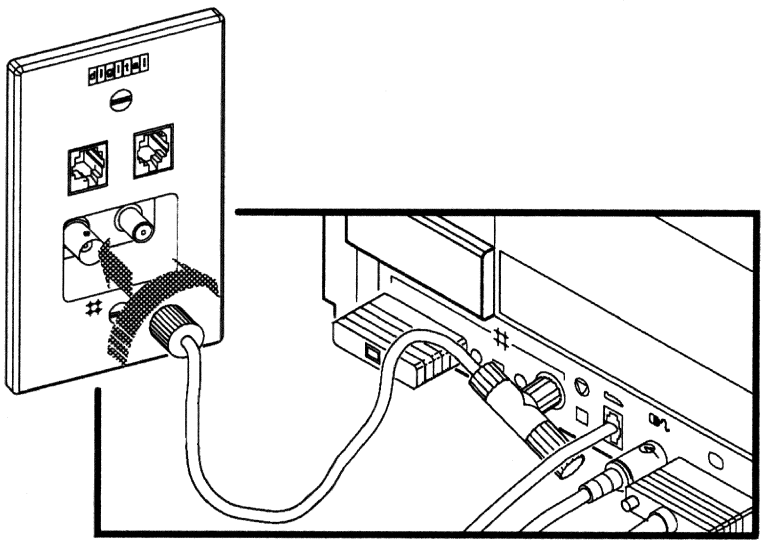
- A faceplate contains a single ThinWire **BNC connector**. Connect one VAXstation 3100 system to the BNC connector. Other systems can then be daisy-chained to the first system to form a daisy-chained work group. See Figure 5–5.
- Optionally, a faceplate may contain a special ThinWire Ethernet daisy-chain connector that permits behind-the-wall daisy-chaining of multiple faceplates to a single segment of ThinWire cable.

To connect your VAXstation 3100 system to a DECconnect faceplate:

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

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

Figure 5–6 Connecting to a DECconnect Faceplate



MLO-002235

5.1.6 Troubleshooting the ThinWire Ethernet Segment

If you have verified your ThinWire Ethernet installation and have found problems, use the following checklist to make sure all connections are correct:

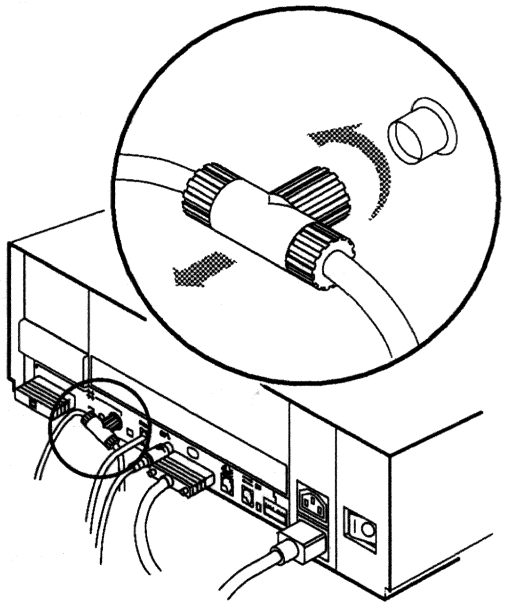
1 Check that the green light to the right of the network select button is on.

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

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

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

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

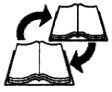


MLO-002236

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

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

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



6 Check that there are no branches off a ThinWire segment except through a **DEMPR** (Digital Ethernet Multiport Repeater). A DEMPR provides eight ThinWire Ethernet drops from a single standard Ethernet connection. See the *Workstations Network Guide* for additional information.

7 Check that a ThinWire segment is not looped from one port on the DEMPR to another port on the DEMPR.

8 After you have checked all ThinWire Ethernet connections, retest the Ethernet. Enter the following command at the console prompt (>>>):

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

If a connection is established, the following display appears:

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

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

```
? 84 FAIL
>>>
```

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

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

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

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

- Take the T-connector and two terminators that shipped with your system and plug the two terminators in place on the T-connector. Plug this T-connector with the terminators attached into the ThinWire port on the back of the system unit.
- Enter the following command at the console prompt:

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

If TEST 1 passes, the following display appears:

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

If TEST 1 fails, you have an internal hardware problem with your VAXstation 3100 Model 48 and need to call your Digital service representative.

5.2 Connecting to a Standard Ethernet Network

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

- Put the network select button in the out position for standard Ethernet.
- Verify standard Ethernet network installation.
- Troubleshoot standard Ethernet.
- Connect a transceiver cable to your VAXstation 3100 system.

5.2.1 Setting the Network Select Button for Standard Ethernet



To use standard Ethernet on your VAXstation 3100:

1. Press the recessed network select button on the back of the system unit (see Figure 5–1) to the standard Ethernet (out) position.
2. When you turn on your system, the green light to the left of the network select button comes on, indicating you are ready to connect to standard Ethernet.

5.2.2 Verifying Your Standard Ethernet Network Installation

To verify standard Ethernet installation, follow these steps:

1. Check that the Ethernet loopback connector is attached to your system unit. If you have not attached the loopback connector, see Section 2.3.4.
2. Turn your system on (|). The light at the end of the loopback connector should come on. The following display appears:

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

3. At the console prompt, enter the following command:

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

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

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

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

For example:

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

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

```
Ethernet hardware address _____________________
```

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

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

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

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

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

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

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

5.2.3 Troubleshooting Standard Ethernet

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

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

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

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

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

If a connection is established, the following display appears:

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

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

```
? 84 FAIL
>>>
```

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

If TEST 1 fails, and your Ethernet select switch is in the correct position, you have an internal hardware problem with your VAXstation 3100 Model 48 and need to call your Digital service representative.

5.2.4 Connecting a Transceiver Cable

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

To connect a transceiver cable:

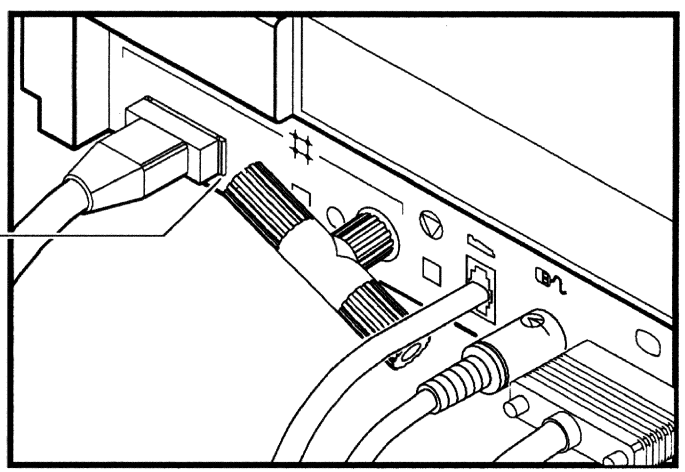
1 Turn the system unit off (0).

2 Remove the loopback connector.

3 Attach the 15-pin connector on the standard Ethernet transceiver cable to the back of the system unit. Make the connection in this way if your system is a standalone networked system.

4 Use the screwdriver included in your shipment to move the sliding lock (part of the standard Ethernet connector) to make the standard Ethernet connection secure. Figure 5–8 shows the correct connection.

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



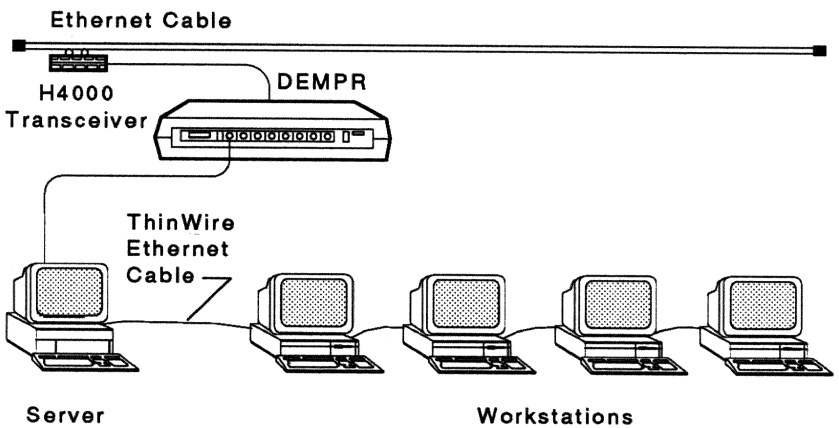
If your system is to be part of a work group, you will need a DEMPR to convert between the standard Ethernet and the ThinWire daisy chain. The use of a DEMPR keeps the cost per connector to work group members down. Otherwise, it is necessary to have an H4000 and a transceiver drop cable for each new member of your work group. See Section 5.2.5 for information on using a DEMPR to create a daisy-chain work group.

5.2.5 Creating a Daisy-Chain Work Group

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

Figure 5–9 shows a Model 48 connected through a ThinWire Ethernet cable to several Model 38 systems forming a work group. The standard Ethernet connection is made to a DEMPR through an H4000 transceiver.

Figure 5–9 Daisy-Chain Work Group in Standard Ethernet Environment



When you finish connecting your system to the DEMPR, visit each of the VAXstation 3100 Model 38 installations.

1 Physically connect each of the VAXstation 3100 Model 38 systems to the ThinWire cable.

   See Section 5.1.3, earlier in this chapter, for the correct way to install ThinWire Ethernet cable to VAXstation 3100 systems.

2 Collect the Ethernet hardware address from each of the VAXstation 3100 Model 38 users.

6

Troubleshooting

This chapter provides procedures for

- Identifying the source of a problem with your system
- Using the troubleshooting table

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

6.1 Identifying the Source of a Problem

To determine where your problem is, follow these steps:

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



1. Turn all expansion boxes off (0).
2. Turn the monitor and all peripheral devices off (0).
3. Turn the system unit off (0).
4. Check that the following cables are correctly connected at both ends:
   - Monitor cable
   - Monitor power cord
   - System unit power cord
   - Expansion box connector cable
   - Expansion box power cord
   - Keyboard cable

- Mouse or tablet cable
- Network cables

At this point, all components should be off.

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



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

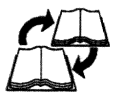
- RZ55 hard disk expansion box
- Other hard disk expansion boxes
- TK50Z–GA tape expansion box
- RRD40 compact disc expansion box
- Printer
- System unit and monitor.

2 Adjust the brightness and contrast on your monitor.

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

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

6.2 Using the Troubleshooting Table



After you have determined the source of your problem, follow these steps:

- For monitor problems, see your monitor guide.
- For network problems, see Chapter 5.
- For problems with the RRD40 compact disc drive, see the diagnostic information in Section 7.8.1 and in the *RRD40 Disc Drive Owner's Manual*.
- For other problems:

  1 Note the symptoms of the problem.

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

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

  4 Follow the advice in the Suggested Solution column.

  5 Run system diagnostics, as described in Chapter 7.

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

Table 6–1 Troubleshooting

Symptom	Possible Cause	Suggested Solution
System Unit Problems		
System unit fan is off.	Power cable not connected.	Check the power cable connections at both ends.
	Power supply or system unit fan failure.	Contact your Digital service representative.
Power light is off.	Power cable not connected.	Check the power cable connections at both ends.
	Wall socket may not be working.	Try a different wall socket, or try an electrical device that you know works in the wall socket.
	Power supply problem or failure.	Contact your Digital service representative.
		Turn the system off for 10 seconds and then turn it back on. Turn the system off. Unplug the video cable, communications cable, and printer. Then plug all cables back in and turn the system on.
Power-up display does not show after 2 minutes.	Monitor cable or video cable not connected.	Check that the monitor cable and video cable are plugged in at both ends.
	Alternate console switch in wrong position (up).	Change alternate console switch to correct position (down). See Section A.3.
	Monitor brightness and contrast controls are too dark to see the screen display.	Adjust monitor brightness and contrast controls.
		Verify that monitor power switch is on (|).

(continued on next page)

Table 6–1 (Cont.) Troubleshooting

Symptom	Possible Cause	Suggested Solution
System Unit Problems		
	Keyboard cable is not connected.	Check keyboard cable connection.
	Monitor fuse is blown.	See your monitor guide for fuse replacement instructions.
	Wall socket may not be working.	Try a different wall socket, or try an electrical device that you know works in the wall socket.
		If problem persists, contact your Digital service representative.
	8-plane board is installed but new color cable is not.	Install color cable.
Power-up display contains question marks or asterisks.	Possible system error. Can be a soft error or a hard error.	If question marks or asterisks appear with any numbers in the power-up display, see Section 7.2, Section 7.1.1, and Section 7.7 in Chapter 7 for further test instructions.
		If problem persists, contact your Digital service representative.
Window display does not appear on the screen. (System does not boot.)	Your software is not installed.	See your software documentation for installation instructions.
		See Section 7.2, Section 7.7, and Section 7.3 in Chapter 7 for further test instructions.
	Video option failure	See Section 7.2 and Section 7.7 in Chapter 7 for more information.
	Software problem	Call your Digital service representative.
	Default recovery action is set to halt.	Change the default recovery action to boot system from system disk. See Appendix A.
	Incorrect boot device specified.	Change default to boot system from correct device. See Appendix A.

(continued on next page)

Table 6–1 (Cont.) Troubleshooting

Symptom	Possible Cause	Suggested Solution
Monitor Problems		
No display on monitor screen.	Monitor not turned on.	Check monitor on/off switch.
		Check monitor power cable at both ends.
	Contrast and brightness controls are too dark to see screen display.	Adjust contrast and brightness controls.
Refer to your monitor guide for more information.		
Mouse/Tablet Problems		
Pointing device (mouse or optional tablet) pointer does not appear on screen, or monitor does not respond to pointing device commands.	Pointing device cable is installed incorrectly or is loose.	Turn off system. Unplug and then replug the cable to reset the device.
	The system is in console mode; no pointer appears on the screen.	Install your windowing software.
	Pointing device is faulty.	Replace with another pointing device, or call your Digital service representative.
Keyboard Problems		
Keys do not work.	Hold Screen key is active.	Press Hold Screen key to release hold on screen.
	Keyboard cable loose or not connected.	Check keyboard cable at both ends.
	Keyboard failure.	Replace with another keyboard. If problem persists, contact your Digital service representative.
RRD40 Compact Disc Drive Problems		
Refer to the *RRD40 Disc Drive Owner's Manual* that comes with your RRD40 compact disc expansion box. See Section 7.8.1 in Chapter 7 of this manual for additional information.		

(continued on next page)

Table 6–1 (Cont.) Troubleshooting

Symptom	Possible Cause	Suggested Solution
RZ55 Hard Disk Expansion Box Problems		
Power light does not come on.	Power cable not connected or loose.	Check power cable connections at both ends.
RZ55 fails system exerciser test and power-up self test.	Faulty disk drive assembly. No AC power. Faulty cabling.	Check that all cables are secure at both ends. Check to see if the fan is blowing (AC power is present).
		Remove defective RZ55 expansion boxes from the system. Call your Digital service representative.
	SCSI ID not set, or set to same ID as another device.	Set SCSI ID, as described in Appendix B.
RZ56 Hard Disk Expansion Box Problems		
Power light does not come on.	Power cable not connected or loose.	Check power cable connections at both ends.
RZ56 fails system exerciser test and power-up self-test.	Faulty disk drive assembly. No AC power. Faulty cabling.	Check that all cables are secure at both ends. Check to see if the activity light comes on or if the fan is blowing (AC power is present).
		Remove defective RZ56 expansion box from the system. Call your Digital service representative.
	SCSI ID not set, or set to same ID as another device on the system.	Set SCSI ID. Check SCSI IDs to ensure no other device set to ID. See Appendix B.
Disk Problems		
Software does not boot from hard disk drive.	A problem exists with the hard disk.	See Section 7.2, Section 7.3, and Section 7.7 in Chapter 7.
	Default boot device is set incorrectly.	See Chapter 2 to set or change the default boot device.
	Recovery action may be set to halt.	See Section A.1.2 in Appendix A.
	A problem exists with the software (if installed) on the hard disk.	Refer to your software documentation for help.

(continued on next page)

Table 6–1 (Cont.) Troubleshooting

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

(continued on next page)

Table 6–1 (Cont.) Troubleshooting

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

7

Running Diagnostics

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

This section includes information on the following:

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

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

7.1 Power-Up Messages

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

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

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

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

```
KA42-B V1.0    ❶
F...E...D...C...B...A...9...8...7...6...5...4_..3_..2_..1...  ❷
```

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

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

The Model 48 displays important information during its power-up test sequence. If the sequence displayed during power-up contains question marks or asterisks, failures may exist in the system. Use Table 7–1 to identify the faulty device.

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

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

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

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

7.1.1 Power-Up Error Messages

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

For example:

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

A single question mark (?) next to a device indicates a minor problem, and the system will usually boot okay. See Section 7.1.2 for examples of problems flagged with a single question mark.

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

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

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

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

7.1.2 Power-Up Status Messages

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

- System clock not set

  ```
  ?  E   0040   0000.0005
  ```

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

- Low battery

  ```
  ?  D   0050   0000.0005
  ```

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

- No devices connected to internal SCSI-A bus

  ```
  ? 7   00A0   0000.4001
  ```

- No devices connected to external SCSI-B bus

  ```
  ? 6   00B0   0000.4001
  ```

- No Ethernet cable (ThinWire)

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

  This message indicates one or more of the following:

  - No cable is installed on the ThinWire Ethernet connectors.
  - No terminator on the ThinWire Ethernet port, or no terminator present at one or both ends of the segment.

- Network select button is set to wrong position. The correct positions are in for ThinWire Ethernet or out for standard Ethernet.
- Faulty cable or loose connection.

- No Ethernet cable (standard)

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

  This message indicates one or more of the following:

  - No cable is installed on the standard Ethernet connectors.
  - No loopback connector is installed on the standard Ethernet port.
  - Network select button set to wrong position. The correct positions are in for ThinWire Ethernet or out for standard Ethernet.
  - Faulty cable or loose connection.

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

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

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

7.2 Running Self-Tests

This section describes how to run self-tests on your system. Self-tests are used to display the status of the devices installed on your system. Self-test diagnostic programs reside permanently in the Model 48 read-only memory (ROM).

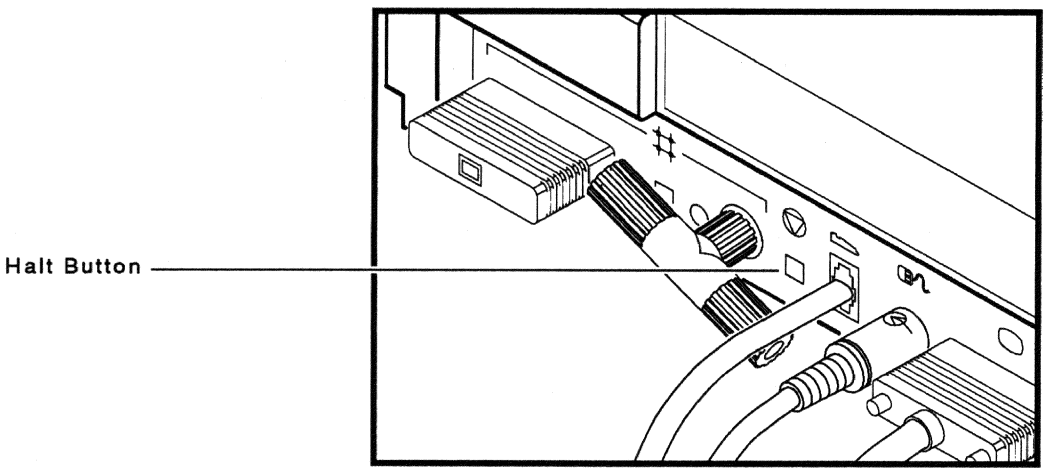
To test a device in your Model 48 system, follow these steps:

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

2 Put the Model 48 in console mode by pressing the halt button on the back of the system. Use a pen or a small pointed object to press the button. Figure 7–1 shows the location of the halt button.

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

Figure 7–1 Halt Button



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

```
>>> TEST 7 Return
```

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

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

```
>>> TEST F 7 Return
```

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

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

```
7...
>>>
```

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

```
7_..
>>>
```

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

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

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

Call your Digital service representative.

7.3 Configuration Display

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

To display your system configuration, perform the following steps:



1 Put the Model 48 in console mode by pressing the halt button on the rear of the system.

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

2 Enter the following:

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

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

Error information in the configuration display is valuable to your service representative. See Chapter 4 and Appendix B for additional information.

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

```
>>> TEST 50 [Return]

KA42-B  V1.3      ❶
ID 08-00-2B-07-E3-83  ❷

   MONO         0000.0001 ❸
   CLK          0000.0001
   NVR          0000.0001
   DZ           0000.0001

       00000001 00000001 00000001 00000001 00000001 000012A0 ❹

   MEM          0010.0001
        01000000          ❺
   MM           0000.0001
   FP           0000.0001
   IT           0000.0001

   SCSI-A       2828.0001  V1.3  ❻
   FFFFFF05 FFFFFF05 FFFFFF05 00000001 FFFFFF05 01000001 FFFFFF03 FFFFFF05

   SCSI-B       1C1C.0001  V1.3
   FFFFFF05 FFFFFF05 00000001 00000001 05000001 FFFFFF05 FFFFFF03 FFFFFF05

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

❶ CPU (KA42–B) and ROM (V1.0) version

❷ Ethernet hardware address

❸ Status codes for devices

❹ DZ status codes. See Section 7.3.1.

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

❻ SCSI status codes. See Section 7.4.

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

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

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

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

Note *To update the information in the configuration display after making a change to the system configuration, you can either turn the system off and then back on, or enter the following command:*

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

Reenter TEST 50 to view the current configuration.

7.3.1 DZ Status Codes

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

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

❶ Keyboard port status

❷ Video port status

❸ Communication port status

❹ Printer port status

❺ Keyboard self-test

❻ Mouse or tablet self-test

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

7.4 Testing Internal Storage Devices

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

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

- Ascertain the device's SCSI ID setting.
- Find the SCSI-A line in the TEST 50 display.

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

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

❶ SCSI ID 0 — open

❷ SCSI ID 1 — open

❸ SCSI ID 2 — open

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

❺ SCSI ID 4 — open

❻ SCSI ID 5 — TZ30 tape drive

❼ SCSI ID 6 — SCSI-A controller

❽ SCSI ID 7 — open

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

Table 7–2 SCSI Status Codes Indicating Good Devices

Status Code	Device
FFFFFF03	SCSI bus controller
00000001	RZ22, RZ23, RZ24, RZ55, or RZ56 disk drive
01000001	TZ30 tape drive

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

Table 7–3 SCSI Status Codes Indicating Possible Problems

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

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

If you see any code different from those listed in Tables 7–2 or 7–3, call your Digital service representative.

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

7.5 Testing Memory Modules

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

```
MEM             0008.0001 ❶
    00800000 ❷
```

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

- 0004.0001 means the system has 4 megabytes of memory
- 0008.0001 means the system has 8 megabytes of memory
- 000C.0001 means the system has 12 megabytes of memory
- 0010.0001 means the system has 16 megabytes of memory
- 0014.0001 means the system has 20 megabytes of memory
- 0018.0001 means the system has 24 megabytes of memory
- 0020.0001 means the system has 32 megabytes of memory

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

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

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

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

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

1 Find the nonzero digits in the error code.

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

3 Locate each nonzero digit's position in the line for your module configuration. The positions are numbered 1 through 8 from left to right and correspond to the digits in the error code.

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

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

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

Table 7–4 8-Digit Memory Error Code

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

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

7.6 Device Display

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

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

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

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

DKA300     RZ3      A/3/0/00   DISK     104 MB      FX           RZ23
MKA500     TZ5      A/5/0/00   TAPE     .......     RM      WP
...HostID....       A/6        INITR

DKB100     RZ9      B/1/00     DISK     332 MB      FX           RZ55
DKB200     RZ10     B/2/0/00   DISK     104 MB      FX           RZ23
DKB300     RZ11     B/3/0/00   DISK     104 MB      FX           RZ23
DKB400     RZ12     B/4/0/00   RODISK   205 MB      RM      WP   RRD40
DKB500     RZ13     B/5/0/00   DISK     568MB       FX           RZ56
...HostID....       B/6        INITR

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

❶ Ethernet device and Ethernet hardware address

❷ Device numbers for VMS operating system

❸ Device numbers for ULTRIX operating system

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

❺ Device type—disk, tape, RODISK (read-only disk)

❻ Number of megabytes

❼ Removable (RM) or fixed (FX) disk

❽ Write-protected

❾ Device name

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

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

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

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

Table 7–5 SHOW DEVICE Display Column Heads

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

7.7 Using the System Exerciser

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

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

To test your system, run the system exerciser:

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

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



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

3 Enter

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

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

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

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

❶ RZ23 disk drive (user disk)

❷ RZ23 disk drive (system disk)

❸ RZ23 disk drive (user disk)

❹ RRD40 compact disc drive

❺ TK50Z–GA expansion box

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

❼ Column of device identifiers

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

❾ Status and error information for each device

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

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

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

7.8 Test Utilities

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

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

7.8.1 RRD40 Test Disc Utility

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

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



1. Press the halt button on the back of your system unit. The console prompt (>>>) is displayed on your screen.
2. Insert the test disc in the RRD40 compact disc drive, following the instructions in Section 3.2.
3. Enter TEST 0 and press the Return key. The system exerciser display appears on your screen.
4. The number 4100.0001 as part of the system exerciser display indicates a normal response code.
5. A 4101.0471 error code on the screen display indicates a problem with the RRD40 compact disc drive. A 4104.0A71 error code on the screen display indicates that the RRD40 compact disc drive has failed the test. Do not use the drive. Call your Digital service representative for assistance.

7.8.2 Erase Disk Utility for SCSI Hard Disks

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

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

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



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

2 At the console prompt (>>>), enter SHOW DEVICE and press the Return key.

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

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

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

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

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

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

```
>>> TEST 75 [Return]

                    ScsHDerase

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

PV_SCS_FMTING.....                                       ❹
PV_SCS_FMT_BBrepl=0                                      ❺

PV_SCS_FMT_SUCC                                          ❻

>>>
```

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

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

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

❹ Your hard disk is being erased.

❺ The number of bad blocks is listed.

❻ Your hard disk has been successfully erased.

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

```
>>> TEST 75 [Return]

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

PV_SCS_FMTing.....?

PV_SCS_FMT_ERR#3

>>>
```

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

Table 7–6 Error Messages for Erase Disk Utility

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

7.9 Changing the Keyboard Language



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

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

1 At the console prompt (>>>), enter TEST 54 and press The keyboard language menu appears.

2 Select a language from the keyboard language menu.

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

```
>>> TEST 54 Return

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

3? >>> 9 Return
```

7.10 Console Commands

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

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

Table 7–7 SHOW Commands

Command	Information Displayed
HELP	All commands
SHOW BFLG	Default boot flag
SHOW BOOT	Default boot device (see Section A.1.3)
SHOW DEVICE	Boot devices available (see Section A.1.1)
SHOW ETHER	Hardware Ethernet address
SHOW HALT	Default action after your system halts (see Section A.1.2)
SHOW KBD	Keyboard type selected (see Section 7.9)
SHOW MEMORY	Memory for your system unit
SHOW PSE	Password enable bit
SHOW SCSIA	SCSI-A bus host ID number
SHOW SCSIB	SCSI-B bus host ID number
SHOW VER	Version of ROM

Table 7–8 SET Commands

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

Table 7–9 Test Commands

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

7.11 Password Security Feature

In normal operation, your VAXstation 3100 Model 48 allows all console operator privileges, such as HALT, SET, DEPOSIT, EXAMINE, etc. Some customers require that direct access to memory and kernel system operation be restricted to authorized personnel only. To implement this restricted access, a password security feature is available in console access and operation.

A password security feature can be initiated by using the console command LOGIN, which is not the same as the VMS LOGIN command. The system will ask for a password, after which access to privileged console commands will be allowed only to users possessing the password code.

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

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

The privileged console commands are:

BOOT (with parameters)
DEPOSIT
EXAMINE
FIND
HALT
INITIALIZE
LOAD
MICROSTEP
NEXT
REPEAT
SET
SHOW
START
UNJAM
X
@
Any commands which modify memory and registers, or commands which transfer control of the CPU from the console monitor to another program such as BOOT or START.

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

Console commands accepted in nonprivileged mode (secure) include:

LOGIN (to allow password entry to the privileged state)
BOOT (with no parameters)
CONTINUE (if the user inadvertently pushes the HALT button, this command allows them to continue operations in a nonprivileged mode)
! (to allow the user to enter optional text that is not acted upon by the computer)

7.11.1 Enabling the Password Security Feature

Your VAXstation 3100 Model 48 arrives from the factory with the password security feature disabled, and the password set to 0. Follow these steps to initialize the password security feature on your system.

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

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

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

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

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

```
?31 ILL PSWD
```

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

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

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

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

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

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

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

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

```
?31 ILL PSWD
```

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

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

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

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

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

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

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

6 The console will respond with the following code:

```
?23 ILL CMD
```

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

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

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

```
?23 ILL CMD
```

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

7.12 Rebooting the System After Running Tests

While you are running any of the tests or procedures in this chapter, you are in console mode. To resume normal operation of the Model 48, you must reenter **program mode**. There are two ways to enter program mode:

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

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

```
>>> BOOT DKA300 Return
```

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

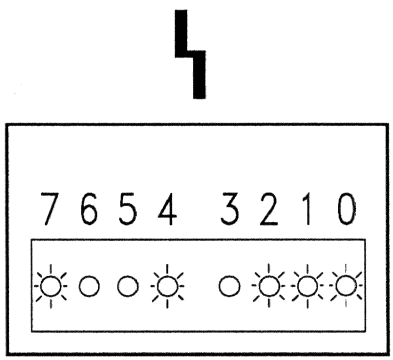
See Appendix A for information on setting your system parameters.

7.13 Service Information

If you followed the corrective actions listed in Chapter 6 and Chapter 7 but you continue to have problems with your Model 48, call your Digital service representative. Before you call:

1. Write down the serial and model numbers of your system. Your service representative may need this number when you call. Your system is identified on the back of the system unit with a label: Model: VS42S-xx is a VAXstation 3100 Model 48 system. The numbers in place of xx identify the contents of the system unit.
2. Make notes based on Table 6–1. This information helps your service representative know the state of your system when the problem occurred.
3. Be prepared to read information from the screen and to enter commands at the keyboard while you talk to your service representative on the telephone.
4. Eight recessed diagnostic lights on the back of the system unit come on when you turn on the system. Write down the status of these lights. Your service representative may ask you to describe which lights are on. Figure 7–2 shows that lights 7, 4, 2, 1, and 0 are on.

Figure 7–2 Diagnostic Lights



MLO-002326

8

Adding Options

This chapter describes hardware options available with your VAXstation 3100 Model 48 system.

8.1 Printers

When you order a printer, you need to order a DEC 423 serial line cable and the appropriate adapter to connect the printer to your VAXstation 3100 Model 48. As the correct adapter depends on which printer you use, consult your Digital representative to determine which adapter you need to order.

To connect a printer:

1 Use the documentation that came with the printer:

- Unpack and set up the printer.
- Set the **baud rate** on the printer to 4800 baud before connecting it to your Model 48.



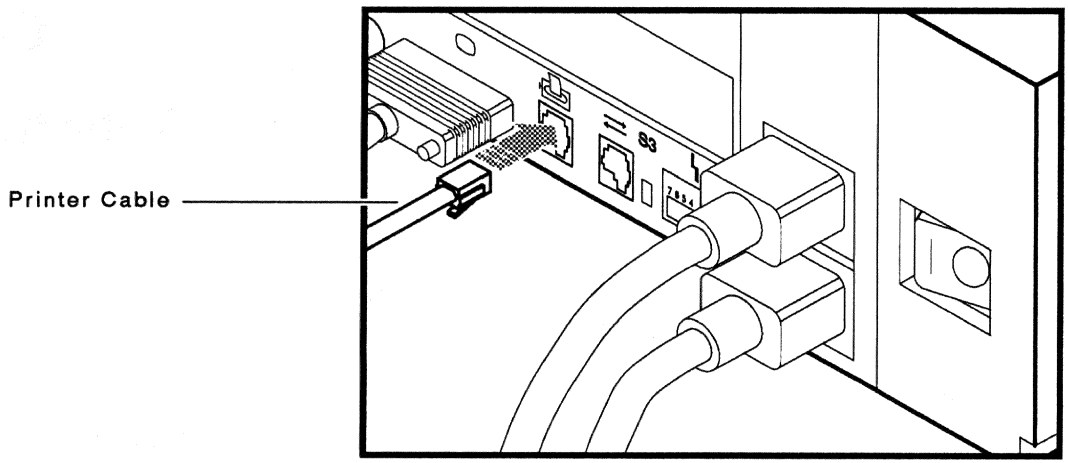
2 Make sure that the printer and all equipment, including expansion boxes and the system unit, are off (0). See your software documentation for shutdown procedures.

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

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

5 Attach the free end of the serial line cable to the printer port on the back of the system unit, as shown in Figure 8–1.

Figure 8–1 Connecting a Printer Cable to the System Unit



When building your software, you will need the following information to set up a printer port for your VAXstation 3100 Model 48. Table 8–1 lists the device names that are specific for your operating system.

Table 8–1 Device Names for Your Operating System

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

It is important that along with the device-specific information found in Table 8–1 you consult the following documentation for important information on connecting a printer to your operating system:

- For VMS:

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

- For ULTRIX:

  System Manager Binder 3A, System Environment Setup

The printers available for the Model 48 system are shown in Table 8–2.

Table 8–2 Printers

Printer	Description
LN03	Desktop nonimpact laser printer that produces letter-quality text at 8 pages per minute.
LN03 PLUS	Enhanced LN03. Prints documents with both text and graphics.
LN03R ScriptPrinter	Nonimpact page printer that uses laser recording technology to produce high-quality POSTSCRIPT output, text, graphics, and images.
LA100	Desktop dot-matrix printing terminal.
LA75 Companion Printer	Desktop dot-matrix printer, sixel graphics.
LA50	Desktop dot-matrix printer, bitmap or character cell graphics.
LJ250/252 Companion/ Color Printer	Desktop dot-matrix color printer, serial (LJ250) or parallel (LJ252).
LPS20 PrintServer	Networked POSTSCRIPT printer.
LPS40 PrintServer	Networked POSTSCRIPT printer. The LPS20 and LPS40 printers are network devices and function as independent systems (nodes) in a network.

8.2 Modems

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

The communications port on the back of the VAXstation 3100 system unit is set at the factory at 1200 baud. Refer to your modem documentation for instructions on setting your modem baud rate. Table 8–3 lists the modems available for the Model 48 system.

Table 8–3 Modems

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

When you order a modem, you need to order a DEC 423 serial line cable and a 25-pin D-sub adapter/DECconnect passive adapter, to connect the modem to your VAXstation 3100 system. Autoanswer is not available; data leads only are connected.

To connect your modem:



1 Turn off (0) modem and other equipment, including expansion boxes and the system unit.

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

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

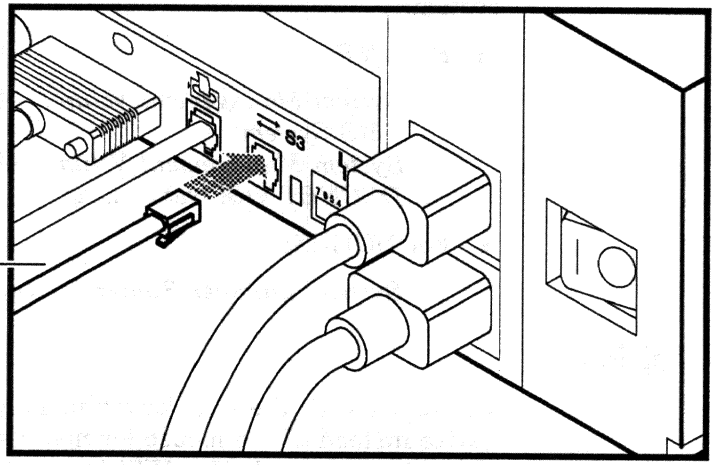
3 Use your modem documentation to clear the Force DSR attribute on your modem. (By your clearing the Force DSR attribute, your system will recognize the loss of modem connection, should it occur.)

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

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

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

Figure 8–2 Connecting a Modem to the System Unit

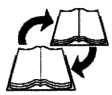


MLO-002327

When building your software, you will need the following information to set up a modem port for your VAXstation 3100 Model 48. Table 8–4 lists the device names that are specific for your operating system.

Table 8–4 Device Names for Your Operating System

Operating System	Device Name
VMS	TTA2:
ULTRIX	/dev/tty02



It is important that along with the device-specific information found in Table 8–4 you consult the following documentation for important information on connecting a modem to your operating system:

- For VMS:

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

- For ULTRIX:

  System Manager Binder 3A, System Environment Setup

8.3 Tablet

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

To connect a tablet, see Section 2.3.3 in Chapter 2.

8.4 Monitors

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

8.4.1 Long Monitor Cable Option

Order a long monitor cable if you wish to locate your system unit away from your monitor. Before ordering cables, verify that a long cable is available for your configuration, especially for the SPX Color Graphics Accelerator.

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

8.5 Graphics Coprocessor Module/Color Option

To add color to your system, you can order an 8-plane graphics coprocessor module/color option and color monitor.

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

8.6 SPX Color Graphics Accelerator

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

A

System Parameters

This appendix describes how to customize your system's startup procedures, including how to

- Set the hardware to boot the software from a specified device.
- Set your system to have a particular mode of action should the system lose power.
- Set the default boot flags for your software.
- Use an alternate console.
- Set a remote trigger to permit a remote system to request a local boot of the system.

A.1 Automatic Booting

Booting your system means an internal program attempts to load the software from a mass storage device.

A.1.1 Setting the Default Boot Device

Set the default boot device to the disk drive on which you installed your operating system software. The Model 48 will boot from the designated device at startup. The operating system software can reside in one of the following places:

- On a hard disk in the system unit
- On a hard disk in an expansion box
- On a compact disc
- On a remote system that you access through the Ethernet

Table A–1 shows the names assigned to each of the possible devices. The default boot device should be set to one of the listed device names. Note that x refers to any number 0 through 7. The system disk for the Model 48 is usually DKA300.

Table A–1 SCSI Boot Device Names

Device and Location	VMS and Boot Device Name	ULTRIX Device Name
Hard disk in system unit (SCSI-A bus at IDx[1])	DKAx00[1]	RZx[1]
Hard disk or RRD40 compact disc drive in system unit (SCSI-B bus at IDx)	DKBx00	RZxx
Hard disk or compact disc in expansion box (SCSI-B bus at IDx)	DKBx00	RZxx
Mass storage on remote system	ESA0	SE0
Tape (SCSI-A bus at IDx)	MKAx00	TZxx
Tape (SCSI-B bus at IDx)	MKBx00	TZxx

[1] x = any number 0 through 7.

To change the default boot device:

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



2 Check to be sure your system is in console mode. If the console prompt (>>>) does not appear on the screen, press the halt button on the rear of the system unit.

Note *If the system is running, the system displays the following information:*

```
?02 EXT HLT
PC = 000158E
>>>
```

3 At the console prompt, enter SET BOOT and the name of the default boot device on which the software will reside. Then press the Return key.

```
>>> SET BOOT DKA300 Return
>>>
```

If you enter SHOW BOOT at the console prompt, the name of the default boot device appears.

```
>>> SHOW BOOT Return
DKA300
>>>
```

A.1.2 Changing the Default Recovery Action

When you receive your system, it is set to start up the operating system software automatically whenever you turn the system on, or in the event of an operating system software failure. You can change the default to suit your needs.

The options for setting the default recovery action are listed and explained in Table A–2. Default values or settings are the normal or expected values that are automatically included in a command.

Table A–2 Values for Default Recovery

Value	Recovery Action	Result	Action
1	Automatic restart	System restarts automatically. Ideal for VAXstation Model 38 system.	None
2	Automatic reboot	Operating system software automatically reboots after every power-up. Ideal for VAXstation 3100 Model 48 system.	None
3	Automatic halt	Console prompt (>>>) appears after every power-up.	Enter BOOT[1]

[1]You must enter BOOT or BOOT and the device name (for example, BOOT DKA300) on which the operating system software resides.

If you want to change the recovery action setting, follow these steps:



1 Put the Model 48 in console mode by pressing the halt button on the back of the system unit.

Note *Check your software documentation for shutdown procedures before halting your system.*

2 At the console prompt (>>>), enter the following:

```
>>> SHOW HALT Return
```

The value for the default recovery action appears:

```
2
>>>
```

3 To set the recovery action to automatic restart should the system go down, at the console prompt (>>>), enter:

```
>>> SET HALT 1 Return
```

4 To change to automatic reboot, at the console prompt (>>>), enter:

```
>>> SET HALT 2 Return
```

5 If you want your system to halt after each time you turn it on, at the console prompt (>>>), enter:

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

A.1.3 Setting the Default Boot Flags

Default boot flags (used in specialized startup procedures) should be set for the operating system installed on your Model 48.

To set the default boot flags:

1 Check to be sure the system is in console mode. If the console prompt (>>>) does not appear on the screen, press the halt button on the back of the system unit.

Note *Check your software documentation for shutdown procedures before halting your system.*

2 Determine the default boot flag number (a hexadecimal number of up to eight characters) from your operating system software documentation.

3 Set the default boot flags. At the console prompt (>>>), enter:

```
>>> SET BFLG default_bootflag_number Return
```

A.2 Enabling the Server to Boot Satellite Systems Remotely

If the Model 48 is used as the boot server and operating system resource for members of a work group, the system manager can tell the server to boot the satellite systems from the server console without having to go to each satellite and boot it manually.

After initial setup, issue the following commands from the keyboard of each Model 38 satellite system:

1 The SET MOP command enables or disables the network listener. SET MOP 1 enables the listener bit.

At each workstation, enable the listener bit using the SET MOP command as follows:

```
>>> SET MOP 1 Return
```

SET MOP 0 disables the listener bit.

2 The SET TRIG command allows a remote system to request a local boot of the system. SET TRIG 1 enables the remote system's request.

At each workstation, enable the state of the remote trigger using the SET TRIG command as follows:

```
>>> SET TRIG 1 Return
```

SET TRIG 0 disables the remote system's request.

3 Set the password with the SET PASSWORD command. The value for the password can be any 16 hexadecimal characters, 0 through 9 and A through F. For security reasons, the password is one-way encrypted and cannot be displayed. This example shows the command for setting a password for a new account:

```
>>> SET PASSWORD new_password Return
```

To change a password, enter the SET PASSWORD command specifying first the new password, followed by the old password:

```
>>> SET PASSWORD new_password old_password Return
```

With the server booted, and the operating system installed and running, enter the following commands at the server keyboard:

```
$ MCR NCP  Return
NCP>  TRIG NODE remote_system_name SERVICE PASSWORD your_password Return
NCP>  EXIT Return
>>>
```

The remote system should boot.

Remotely booting satellite systems is an option. You can also boot each of the systems in a work group by entering the following command at each system keyboard:

```
>>> B ESA0 Return
>>>
```

A.3 Using an Alternate Console with Your System

The VAXstation 3100 Model 48 has a serial port to which you usually attach a printer. A picture of a small printer appears above this port. You can also attach a video terminal (or VAXstation 3100 Model 38 system) to this port and use it as an alternate (operator) console. You may want to add a terminal or a Model 38 to this port in the following cases:

- If you want a printout of a software installation: In this instance, add a supported hardcopy terminal or video terminal to the printer port. You can then connect a printer to the video terminal.
- If your server no longer has a monitor: You want to use your system only as a server, and still have access to console mode for software installation, maintenance, and troubleshooting.

S3

To attach a video terminal or VAXstation 3100 Model 38 system to the serial port in order to use it as an alternate console terminal, you must set the alternate console switch on the back of the system unit. Perform the following steps:

1 Shut down your system. See your software documentation for proper shutdown procedures before turning your system off. Also, you should not turn off, halt, or restart the system without notifying work group members.

2 Turn the expansion boxes, monitor, and system unit to the off (0) position.

3 On the back of the system unit, find the S3 icon over the alternate console slide-switch. Down is the normal position.

4 Set the alternate console switch to the up (on) position. Use a small pointed object (do **NOT** use a pencil, as the graphite will damage the switch) to set the switch. When the switch is in the up position, you enable a video terminal or a Model 38 as an alternate console. The serial port is now a terminal port.



5 Attach one end of a DEC 423 serial cable to the serial port (printer port) on the Model 48 system unit and the other end of the serial cable to the serial port on the alternate console terminal.

6 Turn the alternate console terminal on (|).

7 If you are adding a terminal, check the baud rate. The baud rate should be set to 9600 baud. See your terminal documentation for additional information.



8 Turn all expansion boxes, the VAXstation 3100 Model 48 system unit, and the alternate console on (|).

9 If the console prompt (>>>) does not appear on the alternate console screen, press the Break key on the alternate console terminal keyboard.

- At the Model 48 or alternate console keyboard, enter DTE at the console prompt (>>>) and press the Return key.

This command converts the system from console mode to terminal emulation mode. An asterisk is added to the console prompt after you enter the DTE command. The new prompt (*>>>) indicates that you are working in alternate console mode. All information displayed on the screen comes from the Model 48 system.

To exit terminal emulation mode, press Ctrl/p and press the Return key. The Model 30 system returns to local console mode (>>>).

The Model 48 system (with the S3 switch in the up position) will always attempt to use the serial line. The Model 38 system only uses the information after you enter the DTE command. The state of the S3 switch is only read at power-up.

B

SCSI IDs

This appendix contains information common to both the VAXstation 3100 Model 38 and VAXstation 3100 Model 48 systems. The information is for technical users who wish to create custom configurations.

SCSI is the acronym for Small Computer System Interface. SCSI is an interface designed for connecting hard disks and other peripheral devices to computer systems. SCSI is defined by an American National Standards Institute (ANSI) standard and is used by many computer and peripheral vendors throughout the industry.

Up to eight SCSI devices can share a SCSI bus (a cable). All data is sent back and forth on the cable. Each SCSI device attached to the cable looks at all the data, but only takes the data that has the proper device identification. Each of the eight devices is identified by a number from 0 to 7, called a SCSI ID.

B.1 SCSI ID Default Settings

You are responsible for the SCSI ID settings on your equipment. Digital Equipment Corporation sets each SCSI device to a default SCSI ID before the equipment leaves the factory. You may never need to change a default setting. Default settings should only be changed when a system is configured with more than one of a particular device.

The number 7 is used by devices requiring the highest priority on the SCSI bus. The number 6 is reserved for the controller. The remaining six ID numbers (0 through 5) are available for custom configuration.

SCSI default settings for each VAXstation 3100 system are listed in Tables B–1, B–2, and B–3. The identification numbers listed give optimal performance on most systems. However, if you have special performance needs, you can set the identification number on each SCSI device manually. For most applications, SCSI IDs can be set arbitrarily as long as no two devices share the same ID.

Each device has a set of switches or jumpers that can be set to a specific SCSI ID. The TK50Z tape drive, the RZ55/56 hard disk drive, and the RRD40 compact disc drive are mounted in expansion boxes. Each of these devices has external switches that you can set.

The integral RRD40 compact disc drive (Model 48 system only), the RZ22 (Model 38 system only), RZ23 and RZ24 hard disks, the TZ30 tape drive, and the diskette drive (Model 38 system only) have internal switches or jumpers. These switches must be reset by your Digital service representative if you need to change their default settings.

B.2 Setting the SCSI ID

Enter TEST 50 at the console prompt (>>>), then press the Return key. Your system configuration is displayed on the screen. The example below shows the display for a fully configured Model 48 system.

```
SCSI-B      1C1C.0001    V1.0
FFFFFF05 FFFFFF05 00000001 00000001 05020001 01000000 FFFFFF03 FFFFFF05
   ❶        ❷        ❸        ❹        ❺        ❻        ❼        ❽
```

❶ SCSI ID 0 — open

❷ SCSI ID 1 — open

❸ SCSI ID 2 — RZ23, RZ24

❹ SCSI ID 3 — RZ23, RZ24

❺ SCSI ID 4 — RRD40

❻ SCSI ID 5 — TK50Z–GA

❼ SCSI ID 6 — SCSI-B controller

❽ SCSI ID 7 — open

Note that FFFFFF05 identifies an open ID. Remember that the external SCSI-B bus on a fully configured Model 48 system may contain a controller, two RZ23 or RZ24 hard disks, one TK50Z tape drive, and one RRD40 compact disc drive. This leaves three open IDs.

Follow these rules when you set SCSI IDs:

- You can have up to seven devices on one bus.
- Each device must have its own unique identifier.
- You cannot have two devices with the same SCSI ID on the same SCSI bus.
- Each SCSI bus must be terminated. Add a terminator to an unused SCSI port.

Table B–1 SCSI IDs for VAXstation 3100 Model 38 (with Diskette Drive)

SCSI-ST506 Option
7 Reserved for expansion
6 SCSI adapter
5 TZ30, TK50Z
4 RRD40 compact disc expansion box
3 RZ22 (paging and swapping disk), RZ23, RZ24[1]
2 RZ22, RZ23, RZ24
1 Reserved for expansion
0 Reserved for expansion

[1]Normally used for system disk

Table B–2 SCSI IDs for VAXstation 3100 Model 38 (with Hard Disk)

SCSI-A Internal Bus	SCSI-B External Bus
7 Unused	7 Reserved for expansion
6 SCSI-A adapter	6 SCSI-B adapter
5 TZ30	5 TK50Z expansion box
4 Unused	4 RRD40 expansion box
3 RZ22, RZ23, RZ24[1]	3 RZ22, RZ23, RZ24
2 Unused	2 Reserved for expansion
1 Unused	1 Reserved for expansion
0 Unused	0 Reserved for expansion

[1]Normally used for system disk

Table B–3 SCSI IDs for VAXstation 3100 Model 48

SCSI-A Internal Bus	SCSI-B External Bus
7 Unused	7 Reserved for expansion
6 SCSI-A adapter	6 SCSI-B adapter
5 TZ30	5 TK50Z expansion box
4 Unused	4 RRD40 internal or expansion box
3 RZ22, RZ23, RZ24[1]	3 RZ22, RZ23, RZ24
2 Unused	2 RZ22, RZ23, RZ24
1 Unused	1 Reserved for expansion
0 Unused	0 Reserved for expansion

[1]Normally used for system disk

Note *Proper operation of the SCSI bus requires high-quality, properly configured cables and connectors to connect all devices. Only Digital-supplied cable assemblies intended for interconnecting SCSI devices should be used. This ensures that the impedance characteristics, signal propagation velocity, inductance, capacitance, cross-talk, grounding, conductor pairing, and shielding meet the requirements for proper bus operation. In addition, all units on the SCSI bus should be powered from a common AC power source. Proper operation of any SCSI bus that uses cable assemblies not supplied by Digital, or not configured in accordance with Digital's recommendations, is not guaranteed.*

B.3 Setting SCSI Switches

SCSI IDs (addresses on SCSI bus) and the corresponding switch positions shown in Tables B–4, B–5, and B–6 are the recommended IDs and switch positions for each expansion box.

Table B–4 RRD40 Expansion Box SCSI IDs and Switch Positions

SCSI ID on SCSI-B Bus	Switch Positions — Switches 1, 2, 3, and 4			
	1	2	3	4[1]
0	Down	Down	Down	Down
1	Down	Down	Up	Down
2	Down	Up	Down	Down
3	Down	Up	Up	Down
4	Up	Down	Down	Down
5	Up	Down	Up	Down
6	Up	Up	Down	Down
7	Up	Up	Up	Down

[1]Switch 4 is unused; leave in down position.

Table B–5 RZ55/56 Expansion Box SCSI IDs and Switch Positions

SCSI ID on SCSI-B Bus	Switch Positions — Switches 1, 2, and 3		
	1	2	3
0	Down	Down	Down
1	Down	Down	Up
2	Down	Up	Down
3	Down	Up	Up
4	Up	Down	Down
5	Up	Down	Up
6	Up	Up	Down
7	Up	Up	Up

Table B–6 TK50Z–GA Expansion Box SCSI IDs and Switch Positions

SCSI ID on SCSI-B Bus	Switch Positions — Switches 1, 2, and 3		
	1	2	3
0	Up	Up	Up
1	Up	Up	Down
2	Up	Down	Up
3	Up	Down	Down
4	Down	Up	Up
5	Down	Up	Down
6	Down	Up	Down
7	Down	Down	Down

C

Power-Up, Self-Test, and TEST 50 Status and Error Codes

This appendix lists some of the error codes and status codes for the power-up test, self-test, and TEST 50. The error and status codes are the same for each of these tests. For quick reference, use this table to find the codes for each device.

Failing Test/Device	Tables
Test F - Monochrome video circuits (MONO)	C–1
Test E - Time-of-year clock (CLK)	C–2
Test D - Nonvolatile RAM (NVR)	C–3
Test C - Serial line controller (DZ)	C–4, C–5, C–6, C–7
Test B - System memory (MEM)	C–8
Test A - Memory management (MM)	C–9
Test 9 - Floating point (FP)	C–10
Test 8 - Interval timer (IT)	
Tests 6 and 7 - SCSI bus controller (SCSI-A and SCSI-B)	C–12, C–13, C–14
Test 5 - Interrupt controller and Ethernet ID ROM (SYS)	C–15
Test 4 - Graphics coprocessor module/color option (8PLN)	C–16
Test 3 - Not supported	
Test 2 - Not supported	
Test 1 - Ethernet network circuits (NI)	C–17

C.1 Monochrome Video Circuits (MONO)

Error code format: 0000.XXXX

where XXXX is one of the codes listed in Table C–1.

Table C–1 Monochrome Video Error Codes (0000.XXXX)

Error Codes	Definition
0001	No error.
0010	End of frame bit not set in interrupt pending register.
0020	End of frame failed to set for second time.
0040	End of frame failed to set for third time.
0080	No end of frame interrupt seen.
0100	Wrong IPL level for EOF interrupt.
0200	Interrupt request failed to clear interrupt pending register bit.
0400	End of frame interrupt did not occur.
0800	Error during cursor test.

C.2 Time-of-Year Clock (CLK)

Error code format: 0000.XXXX

where XXXX is one of the error codes listed in Table C–2.

Table C–2 Time-of-Year Clock Error Codes (0000.XXXX)

Error Codes	Definition
0001	No error.
0003	Tell dispatcher to check time at the end of testing.
0004	Invalid time set.
0005	Clock has not been reset since the last time battery voltage level was low.
0010	Failure in time-of-year test.
0020	Vrt bit failed to set after it was read the first time.
0040	Battery voltage level was down during the clock test.

C.3 Nonvolatile RAM (NVR)

Error code format: 0000.XXXX

where XXXX is one of the codes listed in Table C–3. An error code of 5 indicates that the battery voltage is below an acceptable level for data in the NVR to be valid.

Table C–3 Nonvolatile RAM Error Codes (0000.XXXX)

Error Codes	Definition
0001	No error.
0004	Battery was down at last entry.
0008	NVR failed.
0080	The battery check code in the NVR did not agree with the expected check code.

C.4 Serial Line Controller (DZ)

This error code has two lines.

First line of error code format: 0000.XXXX

where XXXX is one of the error codes listed in Table C–4.

Table C–4 Serial Line Controller Error Codes (0000.XXXX)

Error Codes	Definition
0001	No error.
0002	Master reset failed.
0004	Failure in basic CSR test.
0008	Failure in CSR read-write test.
0010	Basic test of TCR failed.
0020	Read-write test of TCR failed.
0040	Transmitter ready test failed.
0080	Receiver ready test failed.
0100	Transmitter interrupt timeout.
0200	Receiver interrupt timeout.

(continued on next page)

Table C–4 (Cont.) Serial Line Controller Error Codes (0000.XXXX)

Error Codes	Definition
0400	Either transmitter or receiver interrupted at the wrong priority.
0800	Receiver interrupt occurred when the receiver was not enabled.
1000	Data comparison error.
2000	Overrun error did not happen.
4000	This line is untested.
8000	Error in the modem control logic test.

The second line of six codes contains the status of each serial line as well as the status of the keyboard and mouse. This second line of status codes is provided so you can isolate a failing serial line. The status codes in the second line appear as follows:

```
0000WWWW 0000WWWW 0000WWWW 0000WWWW YYYYYYYY ZZZZZZZZ
 line 0   line 1   line 2   line 3  keyboard  mouse
```

where WWWW is one or more of the status codes listed in Table C–5, YYYYYYYY is the keyboard internal self-test code listed in Table C–6, and ZZZZZZZZ is the mouse or tablet internal self-test code listed in Table C–7.

Table C–5 Serial Line Status Codes (0000WWWW)

Status Code	Definition
0001	Serial line tested successfully.
4000	Serial line is untested.

Table C–6 Keyboard Self-Test Codes (YYYYYYYY)

Status Code	Definition
00000000	No keyboard is connected.
00000001	Keyboard connected and tested successfully.
000000FD	Loopback connected and tested successfully.

Table C–7 Mouse or Tablet Self-Test Codes (ZZZZZZZZ)

Status Code	Definition
00000000	No mouse or tablet is connected.
000012A0	Mouse or tablet is connected and tested successfully.
00000054	Loopback is connected and tested successfully.

C.5 System Memory (MEM)

First line of error code format: 0000.XXXX

where XXXX is one of the codes listed in Table C–8. These codes show the error/status information for the memory on the system module and also the option memory module.

Table C–8 System Memory Error Codes (0000.XXXX)

Error Codes	Definitions
0001	No error
0002	Failure in test address routine
0004	Byte mask failure
0008	Data/address test failure
0010	No memory found during sizing
0020	Unexpected parity error

The second line under the MEM code contains additional information on the memory in the system.

Second line status code format: YYYYYYYY ZZZZZZZZ

where YYYYYYYY is the total number of bytes of good memory found in the system. If this field is not an even megabyte value (for instance, 00020000), then the second field, ZZZZZZZZ, will be displayed to indicate the failing megabyte bank. Each bit in the ZZZZZZZZ status code indicates the status for one bank of memory. In some cases, where a parity error is detected, the error may be on both the system module and the option memory module.

C.6 Memory Management (MM)

Error code format: 0000.000X

where X is one of the codes listed in Table C–9.

Table C–9 Memory Management Error Codes (0000.000X)

Error Codes	Definition
1	No error
4	Memory management error
8	Illegal vector during MM test

C.7 Floating Point (FP)

Error code format: 0000.000X

where X is one of the error codes listed in Table C–10.

Table C–10 Floating Point Error Codes (0000.000X)

Error Codes	Definition
0002	Floating point error
0004	Invalid floating point exception

C.8 Interval Timer (IT)

Error code format: 0000.000X

where X is either 2 for a fatal error or 1 for success.

C.9 SCSI Bus Controllers (SCSI-A and SCSI-B)

This section includes the codes for all SCSI bus controllers on all VAXstation 3100 systems.

Note *A **soft error** occurs if nothing is connected to the SCSI-B bus.*

First line of error code format: WWXX.YYZZ

where WW is the binary mask field of the devices selected successfully on the SCSI bus (see Table C–11), XX is the binary mask field of the devices tested successfully on the SCSI bus (Table C–11), YY is a set of binary error flags (see Table C–12), and ZZ is the status code and error code of the SCSI controller on the SCSI mass storage controller module (see Table C–13).

Second line of error code format: DDMMSSTT

where the DD is the status of the data in phase of the INQUIRY command, MM is the status of the message in phase of the INQUIRY command, SS is the status of the status phase of the INQUIRY command, and TT is the status of the devices on the SCSI bus. All of these status codes are identical and are listed in Table C–14.

The second line of the error code indicates the status of the eight possible devices on the SCSI bus, including the controller on the SCSI mass storage controller module. The first code in this second line is reserved for the SCSI controller on the SCSI mass storage controller module. Codes 2 through 8 are for the devices connected to the SCSI bus. See Table C–14.

Table C–11 Binary Mask of Selected Devices (WWXX.0000)

Binary Mask	Device ID	Screen Display
0000 0001	0	01
0000 0010	1	02
0000 0100	2	04
0000 1000	3	08
0001 0000	4	10
0010 0000	5	20
0100 0000	6	40

(continued on next page)

Table C–11 (Cont.) Binary Mask of Selected Devices (WWXX.0000)

Binary Mask	Device ID	Screen Display
1000 0000	7	80

Table C–12 Binary Mask of Error Flags (0000.YY00)

Binary Mask	Definition	Display
0000 0001	Problem is on the system module.	01
0000 0010	Problem is not on the system module.	02
0001 0000	Reset is required to free SCSI bus.	10
0010 0000	Not all selected devices are operating properly.	20
0100 0000	DMA and interrupts are untested.	40

Table C–13 SCSI Controller Error Codes (0000.00ZZ)

Error Codes	Definition
01	No error.
02	Data buffer RAM addressing failure.
04	Data buffer RAM byte mask failure.
06	Data buffer data path failure.
10	Error in SCSI controller registers during reset.
12	Error in SCSI controller registers after reset.
20	Unexpected interrupt after reset, IPL = 1F.
22	No interrupt request after reset.
24	No interrupt after reset when IPL has been lowered.
26	Interrupt request not cleared following ISR (after reset).
28	Multiple interrupts following reset.
2A	Unknown interrupt following reset.
2C	Wrong interrupt following reset.
30	Phase not bus free at start of test.
40	First attempt to read SCSI controller's registers failed.

(continued on next page)

Table C–13 (Cont.) SCSI Controller Error Codes (0000.00ZZ)

Error Codes	Definition
42	SCSI controller register address test failed at ini_cmd.
44	SCSI controller register address test failed at mode.
46	SCSI controller register address test failed at tar_cmd.
48	SCSI controller register address test failed at scd_cnt.
4A	Mode (DMA) found set after being cleared when ini_ cmd(bsy) clear.
4C	Mode (DMA) found set after being set when ini_ cmd(bsy) clear.
4E	Mode (DMA) found set after being cleared when ini_ cmd(bsy) set.
50	Mode (DMA) found clear after being set when ini_ cmd(bsy) set.
60	Data output to bus with ini_cmd(enout) clear.
62	No data to bus with ini_cmd(enout) set.
64	Parity bit cur_stat(dbp) did not match data on bus.
66	With bus free, data in did not match data out.
68	ini_cmd(sel) to cur_stat(sel) mismatch.
6A	ini_cmd(ack) to status(ack) or ini_cmd(atn) to status(atn) mismatch.
6C	Tar_cmd(req) to cur_stat(req) or tar_cmd(msg) to cur_ stat(msg) or tar_cmd(cd) to cur_stat(cd) or tar_cmd(io) to cur_stat(io) mismatch with mode(targ) set.
6E	Clearing mode(targ) does not prevent tar_cmd bits from appearing on the bus.
70	ISR hit with IPL = 1F and int_msk(sc) clear.
72	Interrupt request int_req(sc) set for no reason.
74	SCSI bus status(intreq) set for no reason.
80	SCSI bus busy at start if interrupt test—no test done.
82	ISR hit following bus free with IPL = 1F and int_ msk(sc) clear.
84	Interrupt request int_req(sc) not set following bus free.
86	SCSI bus status(intreq) not set following bus free.
88	Status(bsyerr) not set after it caused an interrupt.

(continued on next page)

Table C–13 (Cont.) SCSI Controller Error Codes (0000.00ZZ)

Error Codes	Definition
90	SCSI bus busy during interrupt test—no test done.
92	ISR hit following bus free with IPL = 1F and int_ msk(sc) set.
94	Interrupt request int_req(sc) not set following bus free.
96	SCSI bus status(intreq) not set following bus free.
98	Status(bsyerr) not set following bus free.
A0	SCSI bus busy during interrupt test—no test done.
A2	Timeout waiting for bus free interrupt.
A4	ISR not hit following bus free.
A6	Interrupt request int_req(sc) not cleared following ISR after bus free.
A8	SCSI bus status(intreq) not set following bus free.
AA	Multiple interrupts from bus free.
AC	Unknown interrupt from bus free.
AE	Wrong interrupt from bus free.
B0	SCSI bus busy during interrupt test—no test done.
B2	Timeout waiting for parity interrupt.
B4	ISR not hit following parity.
B6	Interrupt request int_req(SC) not cleared following ISR after parity.
B8	SCSI bus status(intreq) not set following parity.
BA	Multiple interrupts from parity.
BC	Unknown interrupt from parity.
BE	Wrong interrupt from parity.
C0	Phase not bus free before arbitration.
C2	Ini_cmd(aip) bit failed to set.
C4	Lost arbitration (first check of ini_cmd(la)).
C6	Higher priority device in bus.
C8	Lost arbitration (second check of ini_cmd(la)).
D0	Not all selected targets tested satisfactory.

Table C–14 Device Status Codes (DDMMSSTT)

Status Codes	Definition
FF	Device is untested.
01	No error.
03	This device is reserved by the host (SCSI controller).
05	Device did not respond to selection.
10	Device did not set cur_stat(req) soon enough when changing phase.
12	Jitter on the phase lines when changing phase.
20	Device set command phase twice.
22	Device changed phase before command complete.
24	Device failed to set cur_stat(req) when getting command.
26	Device failed to clear cur_stat(req) when getting command.
28	Command phase out of sequence.
2A	Stuck in command phase.
30	Device set data in phase twice.
32	Device failed to set cur_stat(req) when returning data.
34	Device failed to clear cur_stat(req) when returning data.
36	Device changed data in phase before transferring any data.
38	Data in phase out of sequence.
3A	Stuck in data in phase.
40	Target set status phase twice.
42	Target failed to set cur_stat(req) when returning data.
44	Target failed to clear cur_stat(req) when returning data.
46	Target changed status phase before transferring any data.
48	Status phase out of sequence.
4A	Stuck in status phase.
50	Target set message in phase twice.
52	Target failed to set cur_stat(req) when returning data.
54	Target failed to clear cur_stat(req) when returning data.

(continued on next page)

Table C–14 (Cont.) Device Status Codes (DDMMSSTT)

Status Codes	Definition
56	Target changed message_in phase before transferring any data.
58	Message in phase out of sequence.
5A	Stuck in message in phase.
60	Target set data out phase (unexpectedly).
62	Target set phase to 100b (reserved phase).
64	Target set phase to 101b (reserved phase).
66	Target set message out phase.
68	Selected target did not set any phase before releasing bus.
70	Target not following expected phase sequence.
72	Parity error detected during programmed I/O transfer.
80	Unexpected interrupt at start of DMA test.
90	Target failed to set command phase.
92	Unexpected interrupt at start of command phase in DMS test.
94	Timeout waiting for DMA complete in command phase in DMA test.
96	No DMA end following command phase in DMA test.
98	Wrong interrupt following command in DMA test.
9A	Scd_cnt not zero following command in DMA test.
9C	DMA not complete after EOP command phase (ACK not clear soon enough).
A0	status(demand) bit not cleared by clearing mode(DMA) at start of data in phase in DMA test.
A2	Target failed to set data in phase in DMA test.
A4	Timeout waiting for DMA complete in data in phase in DMA test.
A6	No status(demand) following data in phase in DMA test.
A8	Wrong interrupt following data in phase in DMA test.
AA	Scd_cnt not zero following data in phase in DMA test.

(continued on next page)

Table C–14 (Cont.) Device Status Codes (DDMMSSTT)

Status Codes	Definition
AC	DMA not complete after EOP in data in phase (ACK not clear soon enough).
B0	status(demand) not cleared by clearing mode(DMA) at start of status phase in DMA test.
B2	Target failed to set status phase in DMA test.
B4	Timeout waiting for DMA complete in status phase in DMA test.
B6	No status(demand) following status phase in DMA test.
B8	Wrong interrupt following status in DMA test.
BA	Scd_cnt not zero following status in DMA test.
BC	DMA not complete after EOP in status phase (ACK not clear soon enough).
C0	status(demand) not cleared by clearing mode(DMA) at start of message in phase in DMA test.
C2	Target failed to set message in phase in DMA test.
C4	Timeout waiting for DMA complete in message in phase in DMA test.
C6	No status(demand) following message in phase in DMA test.
C8	Wrong interrupt following message in phase in DMA test.
CA	Scd_cnt not zero following message in phase in DMA test.
CC	DMA not complete after EOP in message in phase (ACK not clear soon enough).
D0	Status(demand) not cleared by clearing mode(DMA) at end of DMA test.
D2	SCSI bus not free soon enough at end of DMA test.

C.10 Interrupt Controller and Ethernet ID ROM (SYS)

Error code format: 0000.XXXX

where XXXX is one of the codes listed in Table C–15.

Table C–15 Interrupt Controller and Ethernet ID ROM Error Codes (0000.XXXX)

Error Codes	Definition
0001	No error.
0002	System ROM failed checksum.
0004	Ethernet ROM failed checksum.
0008	No interrupts pending.
0010	All of the expected interrupts did not occur.
0020	Unexpected interrupt.
0040	Improper priority.
0080	Default interrupt service routine was called. An interrupt that was not enabled occurred.
0100	No keyboard found in the configuration.

C.11 Graphics Coprocessor Module/Color Option

Error code format: XXXX.YYYZ

where XXXX is the status of the failing test (ignore this field); YYY is one of the codes listed in Table C–16; and Z is 1 to indicate no error, 2 to indicate a **fatal error**, or 3 to indicate a status message.

Table C–16 8-Plane Graphics Module Error Codes (0000.YYY0)

Error Code	Failing Test	Error Code	Failing Test
0001	No error	012Z	Packing/ unpacking
001Z	Initialization	013Z	Compression/ decompression
002Z	Chip select	014Z	Adder interrupt
003Z	Long memory	015Z	FCC interrupt
004Z	Memory	016Z	VDAC
005Z	ID data bus	017Z	Cursor
006Z	Scrolling	018Z	Sync readback
007Z	FCC initialization	019Z	Left edge detect readback
008Z	FCC RAM counters	020Z	Right edge detect readback
009Z	FCC RAM	021Z	Video readback
010Z	Display list commands	022Z	Cursor readback
011Z	Short display list	03AZ	Memory data path

C.12 Ethernet Circuits (NI)

Error code format: 0WXX.YYYY

where W = 1 if no **heartbeat** present, 0 = heartbeat present; XX is the number of retries over the Ethernet cable before a success; and YYYY is one of the codes listed in Table C–17. If your transceiver is not designed to provide a heartbeat (an H4001, for example), this condition will not apply to your situation. If your transceiver is designed to provide a heartbeat (an H4000, for example) and this bit is set to 1, you have an external hardware problem with your transceiver.

Table C–17 Ethernet Circuits Error Codes (0000.YYYY)

Error Codes	Definition	Error Codes	Definition
0001	No error.	4008	Bad filter value.
1002	Failed initialization.	400A	Initialization failed.
1004	RX not enabled.	400C	Failed loopback.
1006	TX enabled.	400E	Initialization failed.
1008	Initialization failed.	4010	Failed loopback.
100A	RX enabled.	5002	Initialization failed.
100C	TX not enabled.	5004	OWN not toggled.
2002	Initialization failed.	5006	No RTRY error.
2004	Failed loop.	5008	TX turned off.
3002	Initialization failed.	500A	Initialization failed.
3004	Failed loop.	500C	TX failed.
3006	No CRC match.	500E	No RCV MISS.
3008	Initialization failed.	6002	Initialization failed.
300A	Failed TX.	6004	Loopback failed.
300C	Failed RX.	6006	Bad CSR0.
300E	Initialization failed.	6008	No NI interrupt.

(continued on next page)

Table C–17 (Cont.) Ethernet Circuits Error Codes (0000.YYYY)

Error Codes	Definition	Error Codes	Definition
3010	Failed TX.	600A	Initialization failed.
3012	OWN not toggled.	600C	Loopback failed.
3014	No RX error.	600E	Wrong number of interrupts.
3016	No STP.	6010	NI interrupts bits set.
3018	No ENP.	7002	Initialization failed.
301A	No CRC error.	7004	OWN not toggled.
301C	No FRAM error.	7006	No BUFF error.
301E	No RINT.	7008	TX still on.
4002	Initialization failed.	700A	Initialization failed.
4004	Failed TX.	700C	TX failed.
4006	Packet received.	700E	RX failed.

D

Hardware Specifications

This appendix lists the hardware specifications for the VAXstation 3100 Model 48 and its add-on devices.

- For VAXstation 3100 Model 48 system specifications, see Table D–1.
- For VAXstation 3100 Model 48 system dimensions, see Table D–2.
- For VAXstation 3100 Model 48 system storage conditions, see Table D–3.
- For VAXstation 3100 Model 48 operating and nonoperating conditions, see Table D–4.
- For RZ23 hard disk drive specifications, see Table D–5.
- For RZ24 hard disk drive specifications, see Table D–6.
- For RZ55/RZ56 hard disk drive dimensions, see Table D–7.
- For RZ55/RZ56 hard disk drive specifications, see Table D–8.
- For RZ55/RZ56 hard disk drive environmental specifications, see Table D–9.
- For TZ30 tape drive specifications, see Table D–10.
- For TK50Z–GA tape drive specifications, see Table D–11.
- For RRD40 compact disc drive specifications, see Table D–12.

Table D–1 System Specifications

Processor	KA42–AA 90ns CPU plus 32 KB cache
DRAM memory	16 MB, expandable to 32 MB
ROM memory	256 KB
Optional coprocessor	8-plane graphics coprocessor
Optional hard disks	One to three 104 MB or 209 MB internal hard disks
Optional expansion boxes	RZ55, TK50Z–GA, and RRD40
Optional monitors	38 cm (15 in) monochrome or color, 1024 x 864-pixel; 48 cm (19 in) monochrome or color, 1024 x 864-pixel See monitor guide for additional information.
Interfaces	1 SCSI port, 1 selectable ThinWire Ethernet/standard Ethernet port, 4 serial lines
Input voltage	Automatically adjusting AC input. Range: 100 to 120 VAC and 220 to 240 VAC
Input current	6.3 Amps @ 100 VAC includes auxiliary outlet
Power consumption	378 to 480 watts
Frequency range	47 to 63 Hz

Table D–2 System Dimensions

	Weight	Height	Width	Depth
Main unit	18.7 kg	14.99 cm	46.38 cm	40.00 cm
	41 lb	5.90 in	18.26 in	15.75 in

Table D–3 System Storage Conditions (Long-Term Storage)

Temperature range	5°C to 50°C (41°F to 122°F)
Relative humidity	10% to 95% at 66°C (noncondensing) (151°F)
Altitude	0 to 2400 m (0 to 8000 ft)
Maximum wet bulb temperature	32°C (90°F)
Minimum dew point	2°C (36°F)

Table D–4 System Operating and Nonoperating Conditions

Operating Conditions	
Temperature range	10°C (50°F) to 32°C (90°F) with TZ30 tape drive; otherwise, 10°C (50°F) to 40°C (104°F)
Temperature change rate	11°C/hr (20°F/hr maximum)
Relative humidity	10% to 80% noncondensing
Maximum wet bulb temperature	28°C (82°F)
Minimum dew point	2°C (36°F)
Altitude	2400 m (8000 ft)
Heat dissipation	155 watts maximum
BTU rating	529 BTU/hour

Nonoperating Conditions (Short-Term Storage, Less than 60 Days)	
Temperature range	–40°C (–40°F) to 66°C (151°F)
Relative humidity	10% to 95% at 66°C (151°F)
Altitude	4900 m (16,000 ft)
Maximum wet bulb temperature	28°C (82°F)
Minimum dew point	2°C (36°F)

Table D–5 RZ23 Hard Disk Drive Specifications

Formatted Storage Capacity	
Per drive	104 MB
Per surface	13 MB
Bytes per track	16,896
Bytes per block	512
Blocks per track	33
Blocks per drive	204,864
Spare blocks per track	1
Spare blocks per drive	6208

Performance	
Transfer rate to/from media	1.25 MB/sec
Transfer rate to/from buffer	1.25 MB/sec
Seek time track to track	≤8 msec
Seek time average	≤25 msec
Seek time maximum (full stroke)	≤45 msec
Average latency	8.4 msec
Rotational speed	3575 r/min ±#0.1%
Start time (maximum)	20 sec
Stop time (maximum)	20 sec
Interleave	1:1

Functional Specifications	
Recording density (bpi at ID)	23,441
Flux density (fci at ID)	15,627
Track density (tpi)	1150
Tracks/surface	776
R/W heads	8
Disks	8
Time to process ECC (512 bytes)	<100 msec

Table D–6 RZ24 Hard Disk Drive Specifications

Formatted Storage Capacity	
Per drive	209.7 MB
Per surface	26.2 MB
Bytes per track	19,456
Bytes per block	512
Blocks per track	38
Blocks per drive	409,792
Spare blocks per track	1
Spare blocks per drive	10,944

Performance	
Transfer rate to/from media	1.5 MB/sec
Transfer rate to/from buffer	1.25 MB/sec
Seek time track to track	≤5 msec
Seek time average	≤16 msec
Seek time maximum (full stroke)	≤35 msec
Average latency	8.3 msec
Rotational speed	3497 r/min ±#0.5%
Start time (maximum)	20 sec
Stop time (maximum)	20 sec
Interleave	1:1

Functional Specifications	
Recording density (bpi at ID)	23,441
Flux density (fci at ID)	15,627
Track density (tpi)	1150
Tracks/surface	776
R/W heads	8
Disks	8
Time to process ECC (512 bytes)	<100 msec

Table D–7 RZ55/RZ56 Hard Disk Drive Dimensions

Weight	Height	Width	Depth
13.2 kg	14 cm	33 cm	29 cm
29 lb	5.5 in	12.75 in	11.25 in

Table D–8 RZ55/RZ56 Hard Disk Drive Specifications

Subject	Description
Formatted capacity per drive	332.30 MB
Formatted capacity per surface	22.48 MB
Formatted capacity per track	18,432
Formatted capacity per block	512 bytes
Formatted blocks per track	36
Formatted blocks per drive	649,040
Formatted capacity spare blocks per cylinder	8
Formatted capacity spare blocks per drive	10,300 MB
Transfer rate to/from media	1.25 MB/sec
Performance bus asynchronous mode	1.50 MB/sec
Performance bus synchronous mode	4 MB/sec
Performance seek time track to track	$\leq$4 msec
Performance seek time average	$\leq$16 msec
Performance seek time maximum	$\leq$35 msec
Average rotational latency	8.3 msec
Rotational speed	3600 r/min
Start time (maximum)	20 sec
Stop time (maximum)	20 sec
Interleave	1:1
Bus latency	600 microseconds
Input current	2.4 Amps @ 100 to 120 VAC
Frequency	50 to 60 Hz
Power	160 watts

Table D–9 RZ55/RZ56 Hard Disk Environmental Specifications

	Operating	Nonoperating
Ambient temperature	10°C to 50°C (50°F to 122°F)	–40°C to 66°C (–40°F to 150°F)
Relative humidity	8% to 80% (noncondensing)	8% to 95% (packaged)
Altitude	–300 m to 4600 m (–1000 ft to 15,000 ft)	–300 m to 12,200 m (–1000 ft to 40,000 ft)
Maximum wet bulb	25.6°C (46°F)	46°C (82.8°F)

Table D–10 TZ30 Tape Drive Specifications

Subject	Description
Mode of operation	Streaming
Media	12.77 mm (½ in) unformatted magnetic tape
Bit density	2624 B/cm (6667 B/in.)
Number of tracks	22
Transfer rate	62.5 KB per second at average streaming mode
	1.5 MB per second at SCSI (maximum)
Tape speed	190 cm/sec (75 in/sec)
Track format	Multiple track serpentine recording
Cartridge capacity	95 MB, formatted (approximate)

Table D–11 TK50Z–GA Tape Drive Specifications

Subject	Description
Mode of operation	Streaming
Media	1.2 cm (0.5 in.) unformatted magnetic tape
Bit density	2624 B/cm (6667 B/in.)
Number of tracks	22
Tape speed	190 cm/sec (75 in/sec)
Capacity	94.5 MB (formatted)

Table D–12 RRD40 Compact Disc Drive Specifications

Subject	Description
Capacity per disc	635 MB
Average latency	155 msec outer track
	60 msec inner track
Average transfer rate	175.2 KB per second
Initialization startup time	Less than 6 seconds

E

Associated Documents

For option and system hardware part numbers, and for information on the VAX/VMS and ULTRIX base documentation sets, consult your Digital sales representative.

Not all of the documents in Table E–1 are available in every country. Check with your Digital sales representative for availability.

Table E–1 Associated Documents

Titles	Order Numbers
VAXstation 3100 Family	
VAXstation 3100 Planning and Preparation	EK–VS315–RC
Workstations Network Guide	EK–VS315–GD
VAXstation 3100 Model 38 Owner's Manual	EK–VSM30–OM
VAXstation 3100 Maintenance Guide	EK–285AA–MG
VAXstation 3100 Maintenance Guide Addendum	EK–344AA–AD

(continued on next page)

Table E–1 (Cont.) Associated Documents

Titles	Order Numbers
Microcomputer Handbook Series	
VAX Architecture Handbook	EB–19580–20
VAX Software Handbook	EB–21812–20
Microcomputer Interfaces Handbook	EB–20175–20
Microcomputers and Memories Handbook	EB–18451–20
A Technical Summary of Digital's VAXstation Family	EB–29389–51
RZ22/23 Disk Drive	
RZ22/23 Disk Drive Service Manual	
RZ24 Disk Drive	
RZ24 Installation Information Sheet	EK–RZ24I–IS
Printers	
Installing and Using the LN03	EK–0LN03–UG
LN03 PLUS User Guide	EK–LN03S–UG
LN03R ScriptPrinter Installation Guide	EK–LN03R–UG
LN03R ScriptPrinter Operator Guide	EK–LN03R–OG
LA100 Letterwriter User Documentation Kit	EK–LW100–UG
Installing and Using the LA75 Companion Printer	EK–OLA75–UG
Installing and Using the LJ250/252 Companion Color Printer	EK–LJ250–DK
PrintServer 20 Installation Guide	EK–LPS20–IN
LPS20 Operator's Guide	EK–LPS20–OP
System Management Volume 1A, Guide to Setting Up a VMS System	AA–LA25A–TE
General User Volume 4, DCL Dictionary	AA–LA12A–TE
System Manager Binder 3A, System Environment Setup	AA–KS85A–TE

(continued on next page)

Table E–1 (Cont.) Associated Documents

Titles	Order Numbers
Modems	
System Management Volume 1A, Guide to Setting Up a VMS System	AA–LA25A–TE
General User Volume 5A: Networking, Guide to DECNET VAX Networking	AA–LA47A–TE
System Manager Binder 3A, System Environment Setup	AA–KS85A–TE
RRD40 Disc Drive	
RRD40 Disc Drive Owner's Manual	EK–RRD40–OM
SCSI	
Small Computer System Interface: An Overview and a Developer's Guide	EK–SCSIS–DK
TZ30 Tape Drive	
TZ30 Cartridge Tape Drive Subsystem Owner's Manual	EK–OTZ30–OM
TZ30 Cartridge Tape Drive Subsystem Service Manual	EK–OTZ30–SM
TZ30 Cartridge Tape Drive Subsystem Reference Card	EK–OTZ30–RC
TK50Z Tape Drive	
TK50Z Tape Drive Subsystem Owner's Manual	EK–LEP05–OM
TK50Z User's Guide	EK–OTK50–UG
TK50Z Technical Manual	EK–OTK50–TM

(continued on next page)

Table E–1 (Cont.) Associated Documents

Titles	Order Numbers
DECconnect System	
DECconnect System General Description	EK–DECSY–GD
DECconnect System Requirements Evaluation Workbook	EK–DECSY–EG
DECconnect System Installation and Verification Guide	EK–DECSY–VG
DECconnect System Standalone ThinWire Networks: Planning and Installation Guide	EK–DECSY–TG
DECconnect System Planning and Configuration Guide	EK–DECSY–CG

Glossary

32-bit

The length of the internal data path of the CPU.

ANSI

American National Standards Institute.

application program

A program, such as a financial spreadsheet program, that performs an end-user task.

architecture

The internal configuration of a computer (processor) including its registers, instruction set, and input/output structure.

ASCII

American Standard Code for Information Interchange. A set of 7- or 8-bit binary numbers representing the alphabet, punctuation, numerals, and other special symbols used in text representation and communications protocol.

backup

A procedure that allows you to make copies of information to be retained in the event of a computer failure.

backup copy

A copy of files or software made for safekeeping in a backup operation.

backup process

The process of making copies of the data stored on your disk so that you can recover that data after an accidental loss.

bad block

A damaged block on a disk that the system cannot access. Blocks become damaged from wear or abuse.

barrel connector

A female connector for connecting two sections of ThinWire cable.

baud rate

The speed at which signals are serially transmitted along a communications line. One baud equals one bit per second.

binary

A number system that uses two digits: 0 and 1. They are represented in system circuitry by two voltage levels, and programs are executed in binary form.

bit

A binary digit; the smallest unit of information in a binary system of notation, designated as a 0 or a 1.

block

A standard unit of storage space on a disk or tape surface; 512 bytes. Although a drive writes data to the disk or tape 1 byte at a time, a block is the smallest amount of space on a disk or tape that the system can access.

BNC connector

See **connector**.

boot

To bring a device or system to a defined state where it can operate on its own. See **bootstrap**.

bootable medium

A hard disk, optical disc, or magnetic tape cartridge containing software (such as an operating system) that can be loaded into memory and executed.

boot device

The device on which the operating system software is loaded. The device that is booted at system startup. See **device**.

boot node

The management center for a work group and its major resource provider.

bootstrap (or boot)

To execute the bootstrap loader program, a program that runs automatically whenever system power is turned on. (The bootstrap loader loads the operating system software from a mass storage device and executes it.)

bootstrapping

The process by which the system software is transferred to your workstation. If you shut down your system and turn off the power, you need to start, or "boot," the system before you can use it again.

BOT

Beginning of tape. This is the first position on the tape where data can be written. BOT is set automatically. A tape is at the BOT position when it is first loaded into a TZ30 drive and when it is rewound.

bus

A channel (a set of wires) along which communication signals travel in a computer system.

byte

A group of 8 binary digits (bits). A byte is one-quarter of a VAX system longword.

cable

A sheathed group of electrical conductors.

caddy

The holder for the compact disc.

calibration

A calibration procedure that is used to position the heads and set up operating parameters every time a tape cartridge is loaded for the first time.

cartridge lever

This lever sets internal TZ30 mechanisms to accept or eject the tape cartridge. Move the lever to the unlock position to insert a tape, move to the lock position so the tape can be used, and move to the unlock position again to eject the cartridge after the tape has been completely rewound.

cartridge leader

A plastic leader at the beginning of the magnetic tape. The mating of the cartridge leader with the drive leader is like threading a needle. The leader inside the cartridge serves as the "eye" of the needle. Compare **drive leader.**

CD

See **compact disc.**

central processing unit (CPU)

The part of the system that controls the interpretation and execution of instructions.

cluster

A group of computers networked together that share disk storage, application programs, and other computer resources. See **VAXcluster.**

coaxial cable

A two-conductor, concentric, constant-impedance transmission cable.

command

A request you make to the operating system to perform a specific function. For example, a request to run a program.

communications line

A cable along which electrical signals are transmitted. Devices or systems that are connected by a communications line can share information and resources.

compact disc

A flat circular plate on which read-only optical data is stored. A laser optical reader, called a compact disc drive, retrieves this information.

computer system

A combination of system hardware, software, and external devices that performs operations and tasks.

configuration

The layout of the hardware in a particular computer system. See **system configuration.**

connection

The network path between a client and server.

connector

A BNC-style connector that connects a section of ThinWire cable to a T-connector, to a system, or to a barrel connector.

console

A device through which an operator communicates with the computer.

console mode

The state in which the computer is controlled from the console terminal. You can put your system in console mode by pressing the halt button on the rear panel of the system unit. Console mode is indicated by the console prompt (>>>) on the monitor screen. Compare **program mode.**

console prompt

A prompt used for communication between the user and the computer.

controller

A system component, usually a printed circuit board, that regulates the operation of one or more peripheral devices.

CPU

See **central processing unit.**

daisy-chain

To link computers or expansion boxes sequentially.

data

A formal representation of information suitable for communication, interpretation, and processing by humans or computers.

data transmission

The movement of data in the form of electrical signals along a communications line.

debug

To detect, locate, and correct errors (bugs) in hardware or software.

DECconnect

Digital's family of networking products that includes network electronics, cabling, and connections.

DECconnect faceplate

See **faceplate.**

DECnet software

Digital networking software that enables many Digital computer systems to form a network. It runs on systems in both local and wide area networks.

DECwindows

Digital Equipment Corporation's windowing software that allows applications to be run on multiple windows on a workstation.

default

A value or setting that in most cases is normal or expected.

DELNI (Digital Ethernet Local Network Interconnect)

A local network interconnect product that provides eight separate network interfaces from a single transceiver tap.

DEMPR (Digital Ethernet Multiport Repeater)

A multiport repeater that provides eight ThinWire Ethernet drops from a single standard Ethernet connection.

DESTA (Digital Ethernet Station Adapter)

An adapter that acts as a ThinWire Ethernet transceiver. A DESTA adapter lets you connect a system with a standard Ethernet transceiver cable to ThinWire Ethernet.

device

The general name for any unit connected to the system that is capable of receiving, storing, or transmitting data. See **input/output (I/O) device** and **controller.**

device name

The name by which a device or controller is identified in the system.

diagnostics

Programs, located in read-only memory, that detect and identify abnormal system hardware operation. See **read-only memory.**

disc

See **compact disc.**

disk

A flat circular plate with a coating on which data is magnetically stored in concentric circles (tracks). A hard disk resides permanently inside a disk drive.

disk drive

A device that holds a disk. The drive contains mechanical components that spin the disk and move the read/write heads that store and read information on the surface of the disk.

diskless system

A VAXstation 3100 Model 38 system that has no storage capacity of its own.

disk server

A hardware system designed to provide operating system and data storage for other users.

down-line load

To send a copy of a system image or other file over a communications line to the memory of a target node. Also called remote install.

drive leader

A plastic leader inside the tape drive. The cartridge leader on the magnetic tape mates with the drive leader on the tape drive. The drive leader draws the magnetic tape out of the tape cartridge and onto a take-up reel inside the drive. As the tape is wound onto the take-up reel, it passes the magnetic read and write heads.

error message

A message displayed by a system to indicate a mistake or malfunction.

Ethernet

A communications concept for local networks that use coaxial cable.

Ethernet network

A type of local area network based on Carrier Sense Multiple Access with Collision Detection (CSMA/CD). In 1980, Digital Equipment Corporation, Xerox Corporation, and Intel Corporation developed a specification for the Ethernet local area network. The specification includes information on how to connect devices to a coaxial cable, how to configure nodes, the maximum number of nodes, and the distance between nodes.

faceplate

A wall receptacle that provides a single network connection for your workstation.

fatal error

An error from which a process cannot recover. Fatal errors are those that cause the CPU to stop, or are disk write errors not caused by the disk drive being powered down or write-locked. Errors that a process can recover from are not fatal. Same as nontrappable errors.

file

A collection of related information treated by the system as a single unit.

firmware

Software that is stored in a fixed or wired-in way, usually in read-only memory.

ground

A voltage reference point in a system that has a zero voltage potential.

H4000 transceiver

An Ethernet transceiver used to connect standard Ethernet communications equipment to standard Ethernet. The H4000 supports a heartbeat signal used in network diagnostics.

H4000–BA transceiver

An H4000–BA is an Ethernet transceiver used to connect standard Ethernet communications equipment to standard Ethernet. The H4000–BA does not support a heartbeat signal, because the heartbeat disrupts DELNI/DEMPR performance. See **transceiver**.

H4005 transceiver

A smaller and less expensive transceiver than the H4000 and H4000–BA. Its small dimensions permit installation in constricted spaces such as cable trays.

hard disk

A hard disk resides permanently inside a disk drive.

hard error

A nonrecoverable error.

hardware

The physical equipment, both mechanical and electrical, that makes up a system. Compare **software**.

hardware Ethernet address

The unique Ethernet physical address associated with a particular Ethernet communications controller. It is a combination of 12 characters, including letters (A to F) and numbers (0 to 9). The characters are grouped in six pairs; each pair is separated by a hyphen (-). For example, 08-00-2B-04-FD-C9 is a valid Ethernet address.

head

The part of a hard disk drive, or tape drive that reads, records, and erases data. Also called read/write head.

heartbeat

A signal generated by the H4000 Transceiver and transmitted on the collision pair of the transceiver cable. This signal indicates that a packet was sent and is used to verify that the collision detection circuitry is functional.

host

The system on which the client is operating.

host system

The primary or controlling computer in a multiple-computer network.

housing

The plastic case in which a compact disc sits.

icon

Graphic representation of an application or object. Icons appear on the back of the system unit to identify lights, switches, and the devices that can be plugged into the connectors.

IEEE

Institute of Electrical and Electronics Engineers.

initialize

To prepare a new tape for use. Initializing erases any files stored on the tape.

input

Power, energy, or data entered into a device or system in order to produce a result or output.

input/output (I/O) device

A piece of equipment that accepts data for transmission to (input) and from (output) the system. For example, a monitor.

input device

A keyboard, mouse, tablet, track-ball, button, key, or other source of input to the workstation.

insert

Placing a tape cartridge in the TZ30 tape drive. The cartridge leader mates with the drive leader during insertion of the tape.

interactive

A method of communicating with the computer. In an interactive session, you enter a command at the keyboard; the system executes the command and responds with a prompt character for another command.

interface

An electronic circuit board that links an external device to a computer; software that allows the components of the system to communicate with each other.

kilobyte (KB)

When referring to memory or secondary storage capacity, 1024 bytes.

LAVc

See **local area VAXcluster**.

LED

Light-emitting diode. The diagnostic lights on the Model 48 system enclosure are LEDs.

link

A communication path between two nodes. A physical link is the electrical connection between two nodes. A logical link implies that two nodes are able to communicate regardless of whether they have a direct physical link.

load

To copy software (usually from a peripheral device) to memory. Also, to place a compact disc in an RRD40 compact disc drive or a tape in a tape drive.

When the tape cartridge has been inserted correctly and the TZ30 cartridge lever is moved to the lock position, the TZ30 tape drive performs tests and automatically winds the tape to BOT when a tape is loaded.

load device

The drive that holds the distribution medium during software installation.

local area network (LAN)

A high-speed communications network that covers a limited geographical area, such as a section of a building, an entire building, or a cluster of buildings. It is a privately owned communication network whose speed is upward of 1 megabit per second.

local area VAXcluster

A group of two or more computers connected by an Ethernet cable or computer-interconnect. In a LAVc, one computer (the VAXstation 3100 Model 48) serves the other VAXstation 3100 Model 38 systems, starts them, and manages the resources that they share.

local device

A disk drive, tape drive, or other device that is only available to the computer to which it is directly connected.

logical link

Two nodes that are able to communicate by means of software regardless of whether they have a direct physical link.

magnetic tape

A tape made of plastic and coated with magnetic oxide, used to store data. Also called magtape.

megabyte (MB)

A unit of measure equal to 1,000 kilobytes or 1,048,576 bytes.

memory

The area of the system that electrically stores instructions and data, often temporarily.

memory module

A printed circuit board that contains additional memory for the system.

MIPs

Millions of instructions per second (a measure of processor performance).

modem

A device that converts computer signals to signals that can be sent over a telephone line.

module

A printed circuit board that contains electrical components and electrically conductive pathways between components. A module stores data or memory or controls the functions of a device.

monitor

A video device that displays data.

mouse

A pointing device that, when moved across any surface, causes a corresponding movement of the pointer on the screen. A mouse can have one or more buttons.

MS-DOS

An operating system produced by Microsoft Corporation.

network

Two or more computers linked by communication lines to exchange information and share resources. A network can vary in size; it can be contained within an office, a department, a building, a country, or distributed worldwide. See **local area network** and **wide area network.**

network coordinator (network manager)

The person who manages the network, assigns unique node names, node addresses, and cluster group IDs for each system on the network, configures and tunes network software, monitors network performance, diagnoses and troubleshoots network problems and provides administrative assistance to network users.

node

A computer, workstation, or peripheral device that is connected to a network. Also, a node is an end point to any branch of a network or a junction common to two or more branches.

offline

Indicates that a system is unavailable; it has either been turned off or shut down.

online

Indicates that the power has been turned on and equipment and devices can communicate with the system.

operating system

A collection of system programs that control the operation of the system and allow the user access to data files, input/output devices, and applications programs. The operating system software performs such tasks as assigning memory to programs and data, processing requests, and scheduling jobs.

optical disc

See **compact disc.**

output

Data that has been processed by the computer.

output device

A device that accepts data from the system. For example, a printer.

password

The "key" to an account. You use your password, in combination with your user name, to start a session. The system checks your password to be sure you are authorized to use the account.

peripheral device

A device that provides the CPU with additional memory storage or communication capability. Examples are disk drives and printers.

physical link

The electrical connection between two network nodes.

pixel

A picture element. A location on the monitor screen that can be selectively turned on or off. The basic unit of a graphic display.

plotter

A device to construct visual representations of data by an automatic pen or pencil. Plotters can also receive plotting coordinates from digital computers.

pointing device

An input device that allows you to control pointer position on the screen. See **mouse**, **puck**, and **tablet**.

port

The name of the logical socket at the back of the system unit to which a terminal, printer, or other communication device is connected. For example, there is one switch-selectable port on the back of the VAXstation 3100 system unit for Ethernet devices.

power-up sequence (power up)

A series of ordered events that occur when you supply power by turning on the system.

printer

A peripheral device that provides paper copies of information stored on the system.

private device

A disk drive, tape drive, or other device available only to computers that are directly connected to it.

program

The sequence of instructions the system uses to perform a task. See **software**.

program mode

The state in which the computer is controlled by the operating system. After the operating system is installed, the system will always operate in program mode unless you put it into console mode. Compare **console mode**.

prompt

Words or characters displayed by the system, asking you to provide input.

puck

A palm-sized device that slides on a tablet's surface. The puck and tablet together function as a pointing device. See **pointing device** and **tablet**.

random-access memory (RAM)

Memory that can be both read from and written to and can randomly access any one location during normal operations. The type of memory the system uses to store the instructions of programs currently being run.

read-only memory (ROM)

Memory that cannot be modified. The system can use (read) the data contained in ROM but cannot change it.

remote

Linked to a computer by communication lines.

resolution

A measure of the precision or sharpness of a graphic image. Often a function of the number of pixels on a screen.

ROM

See **read-only memory.**

run

A single continuous execution of a program (noun). To execute a program (verb).

satellite node

A node that is booted remotely from the system disk on the boot server. In general, a satellite node is a consumer of cluster resources. It relies on a boot server for system software and management services. Compare **server node.**

scratch disk

A disk where a save set is stored. By default, it is SYS$UPDATE.

SCSI

See **Small Computer System Interface.**

section

A single length of ThinWire Ethernet cable terminated at each end with a connector.

segment

A length of ThinWire Ethernet cable made up of one or more cable sections connected with barrel connectors or T-connectors.

server

Hardware or software that provides a specific set of services to a satellite or client.

server node

In a VAXcluster or a work group, a computer that is used to start the satellite nodes and to manage their use of common resources.

single-segment LAN

A LAN composed of only one coaxial cable segment. See also **section** and **segment**.

Small Computer System Interface (SCSI)

An interface designed for connecting disks and other peripheral devices to computer systems. SCSI is defined by an American National Standards Institute (ANSI) standard and is used by many computer and peripheral vendors.

soft error

A recoverable error.

software

Programs executed by the system to perform a chosen or required function. Compare **hardware**.

standalone workstation

A workstation that starts and operates alone without another computer.

standard Ethernet cable

Coaxial cable used to connect wiring centers and computer facilities, floors of buildings, and standalone ThinWire segments. It is rugged, reliable, and immune to external factors that limit high-speed 10 megabit-per-second data communication.

standard Ethernet network

An IEEE standard **802.3** compliant Ethernet network connected with standard Ethernet cable. Also known as ThickWire Ethernet.

station

A single addressable device on a LAN.

storage medium

A device, such as a tape, capable of recording information.

store

To enter data into a storage device, such as a disk, or into memory.

stylus

A pen-like device that draws on the tablet's surface and together with the tablet functions as a pointing device. See **pointing device** and **tablet.**

system

A combination of hardware, software, and peripheral devices that perform specific processing operations.

system configuration

The layout of the hardware in a particular computer system.

system management tasks

Tasks performed by an assigned person (usually the system manager) to operate and maintain the system.

tablet

An absolute-positioning input device composed of a flat-surfaced digitizing tablet and a puck or stylus. The tablet is a drawing surface. The puck and stylus are pointing devices that move the cursor on the monitor screen, draw graphics, and make selections from the menu.

tape drive

A device that contains mechanical components and holds, turns, reads, and writes on magnetic tape.

T-connector

Connector used to join ThinWire Ethernet cable sections.

TCP/IP

Transmission Control Protocol/Internet Protocol. Networking protocols standard with ULTRIX software.

terminal

An input/output device that lets you communicate with the system. Terminals are divided into two categories: video and hard-copy.

terminator

A connector used on one or both ends of an Ethernet segment that provides the 50-ohm termination resistance needed for the cable.

ThinWire

A Digital trademark used to describe its Ethernet products used for local distribution of data.

ThinWire cable

All Digital Ethernet products can connect to ThinWire cable. ThinWire cable can be used in any size of environment; it is flexible, fully compatible with standard Ethernet, inexpensive, and offers 10 megabit-per-second communication.

ThinWire connector

The connector on the rear of the system unit to which the ThinWire Ethernet cable is attached.

transceiver

A device that provides a single physical connection between standard Ethernet and Ethernet communication equipment. See **H4000 transceiver**.

ULTRIX operating software

Digital Equipment Corporation's implementation of the UNIX operating system. DECnet–ULTRIX networking software provides an Ethernet-based communication link between the VMS and ULTRIX operating systems.

unshielded twisted-pair cable

Multiple-conductor cable whose component cables are paired, twisted, and enclosed in a single jacket.

VAXcluster configuration

An integrated organization of VAX computer systems. VAXclusters simplify the task of setting up and maintaining many systems at the same time, because all the workstations in a VAXcluster are under a single management domain.

VMS operating software

Digital Equipment Corporation's proprietary operating system.

wide area network (WAN)

A network that covers a large geographical area, spanning buildings, cities, or countries. WANs typically use common carriers, such as the telephone network, to transport messages over most or part of the distance between computers.

Winchester disk

A hard disk permanently sealed in a drive unit to prevent contaminants from affecting the read/write head. The sealed head/disk assembly (HDA) helps to increase drive reliability and ensure data integrity.

window

An area on your monitor screen in which you can start, run, and view a separate process.

word

The largest number of bits (16) that the VAXstation 3100 system can handle in an operation. These systems can also handle longwords (that is, two words or 32 bits).

workstation

A single-user system that offers high-performance, high-resolution graphics and can function in a network environment.

write protect

To protect a disk or other storage medium from being added to, revised, or deleted.

write-protect switch

A switch on the CompacTape cartridge that prevents data from being written to the tape.

X Window System

A windowing system architecture that allows the execution and display of applications to be independent. Specific components of the architecture control the display of applications. Different components determine how applications run. Since its introduction by MIT, the X Window System has become an industry standard.

Index

A

Air vents, 2–2
Alternate console
  DTE command, A–7
  Model 38, A–5
  MOP command, A–5
  PASSWORD command, A–5
  setting the baud rate, A–7
  TRIG command, A–5
  using, A–6
Alternate console prompt (*>>>), A–7
ANSI standard
  SCSI, B–1
Applications
  installing, 2–20
Asterisks
  in power-up display, 7–4

B

Backups
  using the TK50Z–GA for, 4–19
  with tape cartridges, 3–11
Barrel connector, 5–5
Baud rate
  alternate console, A–7
  modems, 8–4
  printers, 8–1
BOOT command, 7–28
Boot device
  changing to no default, A–3
  hard disk, A–2
  remote system, A–2
  setting default, A–2
Boot device names, A–2
Boot flags
  setting default, A–5
Booting your system, A–1, A–3
  SET BOOT command, 7–23, A–3
  SHOW BOOT command, A–3
Bottom dress cover
  expansion box, 4–4
Brightness control, 2–17

C

Cables, 2–3
  expansion box, 4–4
  keyboard, 2–6
  long monitor, 8–7
  modem, 8–4
  monitor, 2–11
  mouse, 2–7
  printer, 8–1
  SCSI, 4–10
  tablet, 8–6
  transceiver, 5–14
  troubleshooting, 6–1
Caddy, 3–2

Caddy (Cont.)
insert compact disc into, 3–5
removing compact disc from, 3–7
Care and handling
compact discs, 3–8
hard disks, 2–4
tape cartridges, 3–11
Cartridge lever
TZ30, 3–13
Cartridge release handle
TK50Z–GA tape drive, 4–23
Color
add graphics coprocessor module/color option, 8–7
add SPX Color Graphics Accelerator /color option, 8–7
Communications port, 2–5
baud rate, 8–4
connecting modem to, 8–4
CompacTape cartridges, 3–8
Compact disc
care, 3–8
software on, 2–20
testing, 7–19
Compact disc expansion box
See RRD40
Configuration display, 4–16, 7–7
code example, 7–8
Configurations
for expansion boxes, 4–2
Connecting
Ethernet connectors, 2–8
expansion box, 4–9, 4–13
keyboard, 2–6
modems, 8–4
monitor, 2–11
mouse, 2–7
power cords, 2–14
tablet, 8–6
terminators, 2–8
to networks, 2–20
transceiver cable, 5–14
two expansion boxes, 4–12
Connecting to
Connecting to (Cont.)
standard Ethernet networks, 5–11 to 5–16
ThinWire Ethernet networks, 5–1 to 5–10
Connectors, 2–4
Console mode, 7–24, 7–28
setting, A–3, A–4
Console prompt (>>>), 4–16
Contrast control, 2–17
Controls
TK50Z–GA tape drive, 4–23, 4–24

D

Daisy-chaining
defined, 4–12
expansion boxes, 4–12
Daisy-chain work group
creating, 5–6, 5–15
Database storage, 4–2
DECconnect cabling components, 5–7
DECconnect faceplate
connecting to, 5–7
DECwindows, 1–3
Default boot device
changing, A–3
hard disk, A–2
remote system, A–2
setting default, A–2
startup, A–2
Default boot flags
operating system software, A–5
setting default, A–5
Default recovery
setting, A–3
DELNI, 5–14
DEMPR
converting between standard Ethernet and ThinWire, 5–15
troubleshooting, 5–9
Device
ESA000, A–2
listing, A–2
Device display, 7–15

Device display (Cont.)
mnemonics, 7–15
Device testing, 7–5
Diagnostic commands, 7–24
Diagnostic lights, 2–5, 7–29
Diagnostics
boot device, A–3
configuration display, 7–7
device, 7–5
Ethernet, 2–8
mnemonics for system exerciser, 7–17
power-up display, 7–5
self-tests, 7–5
standard Ethernet, 5–11
system exerciser, 7–17
ThinWire Ethernet, 5–3
TZ30 tape drive, 3–15
Disk
RZ23, 3–1
RZ24, 3–1
RZ55, 3–1

E

Environmental requirements, 2–2
nonoperating conditions, D–3
operating conditions, D–3
Erase Disk Utility, 7–20
code example, 7–21
Error codes, C–1
Error messages
configuration, 7–7
double question mark and, 7–18
power-up display, 7–3
RRD40 compact disc drive, 7–18
standard Ethernet cable, 7–5
system, 7–7
ThinWire Ethernet cable, 7–4
ESA000
remote system device, A–2
Ethernet
diagnostics, 2–8
Ethernet connectors
attaching to system unit, 2–8
Ethernet hardware address
standard, 5–12
ThinWire, 5–4
Ethernet networks
See Standard Ethernet networks; ThinWire Ethernet networks
Expansion boxes, 4–1, 4–20
See also RRD40 compact disc expansion box; RZ55 hard disk expansion box; TK50Z–GA tape drive expansion box
connecting one, 4–9
daisy-chaining (connecting two), 4–12
possible configurations, 4–2
testing, 4–3
testing RRD40, 7–19
turn expansion boxes off, 2–21
turning on, 2–16, 4–14
unpacking, 4–4

F

Faceplate, DECconnect
connecting to, 5–7
Fan, 6–4
Field service, 7–29

G

Grounding power strip, 2–2

H

H4000 transceiver, 5–14
H4005 transceiver, 5–14
Halt button, 2–5, 7–5
Handling problems, 2–18
See also Troubleshooting
Hard disk
boot device, A–2
installing software on, 2–20
protecting, 2–4
Hard disk drives, 3–1
turning on, 2–16
Hardware installation, 2–1

Hardware specifications, D–1

I

Icons
  defined, xv, 2–4
  port and connector, xv, 2–4
Installing software, 2–20
  with tape cartridges, 3–10

K

Keyboard
  connecting, 2–6
  troubleshooting, 6–6
Keyboard connector, 2–5
Keyboard language
  changing, 7–22
  setting, 2–19
Keyboard language menu, 2–19, 7–22
  display example, 7–22

L

Labeling tape cartridges, 3–8
Lifting equipment, 2–4
Lights
  diagnostic, 7–29
  RRD40, 4–14
  standard Ethernet, 2–5, 5–11
  system unit, 2–4
  ThinWire Ethernet, 2–5, 5–2
  TK50Z–GA tape drive, 4–20, 4–23
  troubleshooting, 7–29
  TZ30 tape drive, 3–15
Load/unload button
  TK50Z–GA tape drive, 4–23
Local area network
  installing software on, 2–20
Local area VAXcluster
  setting up, 5–1
  standard Ethernet hardware address, 5–12
  ThinWire Ethernet hardware address, 5–4
Locating the workstation, 2–2
Loopback connector
  connecting to system unit, 2–8, 2–10
  diagnostics, 2–8
  in network diagnostics, 5–11

M

Memory
  storage capacity of system, 1–2
  testing
    for failing, 7–12
Messages
  error, C–1
  power-up, 7–2
Model 48
  identifier, 7–29
  memory storage capacity, 1–2
  opening front of unit, 2–17
  special features, 1–2
Modems
  connecting, 8–4
  setting baud rate, 8–4
  summary of, 8–4
  turning off, 2–21
  turning on, 2–16
Monitor
  AC power, 2–5
  connecting long cable to, 8–7
  connecting power cord to, 2–14
  connecting to system unit, 2–11
  installing, 2–11
  optional long cable, 8–7
  positioning, 2–2, 2–11
  setting brightness and contrast, 2–17
  troubleshooting, 6–4
  turning on, 2–16
  turning system off, 2–21
  unpacking, 2–3
  voltage setting, 2–11
Monitor cable
  long (optional), 2–11
Monitor connector, 2–5
Mouse, 3–15

Mouse (Cont.)
connecting, 2–7
troubleshooting, 6–6
Mouse connector, 2–5

N

Network coordinator, 5–1
Network diagnostics
and power-up display, 7–3
Networks, 5–1 to 5–16
connecting to, 2–20
Network select button, 2–5
setting for standard Ethernet, 5–11
setting for ThinWire Ethernet, 5–2
Node address, 5–1
Node name, 5–1

O

Online documentation, 4–2
On/off switch, 2–5
Options, 8–1
graphics coprocessor module/color option, 8–7
long monitor cable, 8–7
modems, 8–4
8-plane color upgrade, 8–7
printers, 8–1
RRD40 compact disc drive, 4–1
RZ55 hard disk drive, 4–1
SPX Color Graphics Accelerator, 8–7
tablet, 8–6
Outlets, grounded, 2–2

P

Packing materials, 2–4
Password Security Feature, 7–24
implementing, 7–26
Peripheral devices, 4–1
See also specific device
Port cover, 2–4
Ports, 2–4
Power cords
Power cords (Cont.)
connecting, 2–14
expansion boxes, 4–4, 4–10, 4–12
Power receptacles, 2–2, 4–3
system unit, 2–5
Power strip, 2–2
Power-up
error messages, 7–3
Power-up display, 2–17, C–1
description of identifiers in, 7–5
examples of common status messages in, 7–4
setting the clock, 7–4
system exerciser, 7–18
troubleshooting, 2–18, 6–4
Power-up messages, 7–2
Power-up tests
TK50Z–GA tape drive, 4–20
TZ30 tape drive, 3–15
Printer
cables, 8–1
Printer port, 2–5
Printers
summary of, 8–1, 8–3
turning off, 2–21
turning on, 2–16
Program mode, 7–28
Puck, 8–6

Q

Question marks
in power-up display, 7–3, 7–4
in system exerciser, 7–19

R

Remote system
boot device, A–2
Remote system device
ESA000, A–2
Remote System Manager, 2–20
Restarting your system, 7–28
RRD40
See also Expansion boxes

RRD40 compact disc
care and handling, 3–8
damage to, 3–2
importance of mounting correctly, 3–7
inserting into caddy, 3–5
loading, 3–2
orientation in caddy, 3–4
remove disc from caddy, 3–7
unloading, 3–4
RRD40 compact disc drive
activity light, 3–4
error message, 7–18
hardware specifications, D–7
integral to Model 48 system, 2–16, 3–2, 4–14
opening front of, 2–16
storage capacity, 1–2
test disc, 2–20
test disc utility, 7–19
transparent sleeve, 3–4
troubleshooting, 6–6
using test disc during power-up, 2–16
RRD40 compact disc expansion box, 4–14
connecting one expansion box, 4–9
connecting two, 4–12
installing, 4–2
possible uses for, 4–2
resetting the SCSI ID switches, 4–16
SCSI ID default switch setting, 4–9
SCSI IDs, 4–16
storage capacity, 4–1
tabletop model, 4–14
turning on, 4–14
using, 4–14
verifying default SCSI ID setting, 4–15
verifying voltage, 4–15
RSM, 2–20
RZ22/23 hard disk drive
testing for failing, 7–9
RZ23 hard disk, 1–2
hardware specifications, D–4
RZ23 hard disk (Cont.)
storage capacity, 3–1
RZ24 hard disk, 1–2
hardware specifications, D–5
RZ55
See also Expansion boxes
hardware specifications, D–6
troubleshooting, 6–6
RZ55 hard disk, 1–2, 3–1, 4–1
adding, 4–16 to 4–19
connecting one expansion box, 4–9
connecting two, 4–12
installing, 4–2
SCSI ID default switch setting, 4–9
SCSI IDs, 4–16 to 4–19
storage capacity, 4–1
RZ56
troubleshooting, 6–6
RZ5x-xx series, 3–1

S

SCSI, B–1
bus, B–1
device, B–1
RRD40 switches, 4–16, B–2, B–6
RZ55/56 switches, B–2, B–6
RZ55 switches, 4–17
setting switches, B–6
switch locations, B–2
terminators, 4–7, B–3
TK50Z–GA switches, B–2, B–6
SCSI bus
in system exerciser, 7–19
SCSI devices
See SCSI, SCSI IDs
SCSI hard disks
erase disk utility, 7–20
SCSI IDs, B–4, B–5
default settings, B–1
default switch positions, 4–9
definition of, B–1
displaying, 4–16
RRD40 compact disc drive, 4–16
RZ55 hard disk, 4–16 to 4–19

SCSI IDs (Cont.)
setting, B–1 to B–7
TK50Z–GA tape drive, 4–19 to 4–20
SCSI port, 1–3, 2–4
connecting an expansion box to, 4–8
removing SCSI terminator, 4–8
SCSI terminator, B–3
removing, 4–7, 4–8
Self-tests, 7–5, C–1
description of identifiers in, 7–5
restarting after, 7–28
system exerciser, 7–18
Service, 7–29
SET commands, 7–23
Setting up system, 2–4
Shipping cartons
unpacking, 2–3, 2–4
SHOW commands, 7–23
SHOW DEVICE command, 7–15
SHOW ETHERNET, 5–4
Shut the system down, 2–21
Small Computer System Interface
See SCSI IDs; SCSI port
Software
troubleshooting, 6–6
Software installation, 2–20
devices used for, 4–2
with tape cartridges, 3–10
with TK50Z–GA, 4–19
Standard Ethernet
attaching loopback connector to, 2–8
connector, 2–4
light, 2–4
transceiver cable, 5–14
troubleshooting, 5–12
Standard Ethernet hardware address, 5–12
Standard Ethernet networks
connecting to, 5–11 to 5–16
setting network select button for, 5–11
verifying, 5–11
Starting up, 2–16
Storage devices, 3–1
Stylus, 8–6
Surge protector, 2–2
System
AC power, 2–4
configuration display, 4–16, 7–7
dimensions, D–2
hardware specifications, D–2
set-up, 2–4
storage conditions, D–2
weight, 2–4
System exerciser, 7–17
display example, 7–18
restarting after running, 7–28
testing media, 7–17
when to use, 7–17
System parameters, A–1
System unit
attaching Ethernet connectors to, 2–8
connecting expansion boxes, 4–1
connecting keyboard to, 2–6
connecting modem to, 8–4
connecting monitor to, 2–11
connecting mouse to, 2–7
connecting power cord to, 2–14
connecting to a work group, 2–20
connecting transceiver cable, 5–14
default recovery, 2–20
diagnostic lights, 7–29
hardware specifications, D–1
opening, 2–17
ports and connectors, 2–4
positioning, 2–2
troubleshooting, 6–4
turning off, 2–21
turning on, 2–16
unpacking, 2–3
System weight, D–3

T

Tablet, 8–6
troubleshooting, 6–6
Tape cartridges
caring for, 3–11

Tape cartridges (Cont.)
faulty, 7–19
inserting TZ30, 3–12
installing software with, 3–10
labeling, 3–8
loading, 4–20 to 4–21
making backups with, 3–11
removing TZ30, 3–14
TK50Z–GA tape drive, 4–20, 4–21
removing, 4–23
storage capacity, 4–19
used by TK50Z–GA tape drive, 3–8
used by TZ30 tape drive, 3–8
write protecting, 3–9 to 3–11
write-protect switch, 3–10
writing to, 3–9, 3–11
Tape drives
See TK50Z–GA tape drive; TZ30 tape drive
T-connector
attaching terminators to, 2–8
connecting ThinWire Ethernet cable to, 2–9, 5–5
connecting to system unit, 2–8, 5–6
diagnostics, 2–8
removing from system unit, 5–9
troubleshooting, 5–9
Temperature requirements, 2–2
Terminators
attaching to T-connector, 2–8
expansion box, 4–4
SCSI, 4–10, B–3
ThinWire Ethernet, 5–5
troubleshooting, 5–9
TEST 0 command, 7–18
TEST 1 command, 5–10, 5–13
TEST 50 command, 5–4, 5–12, 7–7
to display system configuration, 4–16
TEST 54 command, 7–22
TEST commands, 7–5, 7–24
Test Utilities, 7–19
ThinWire Ethernet
attaching T-connector to, 2–8
ThinWire Ethernet cable
ThinWire Ethernet cable (Cont.)
connecting to, 5–5
to create a daisy-chain work group, 5–6, 5–15
ThinWire Ethernet connector, 2–5
ThinWire Ethernet hardware address, 5–4
ThinWire Ethernet light, 2–5
ThinWire Ethernet network
connecting to, 5–1 to 5–10
removing systems from, 5–9
setting network select button for, 5–2
troubleshooting, 5–8
verifying, 5–3
ThinWire Ethernet segment
defined, 5–5
TK50Z–GA
See also Expansion boxes
cartridges used by, 3–8
TK50Z–GA tape drive
description, 4–19
hardware specifications, D–7
in expansion box, 4–2
installing, 4–2
lights, 4–20 to 4–23
loading tape cartridges, 4–20, 4–21
removing tape cartridges, 4–22
SCSI IDs, 4–19 to 4–20
storage capacity, 4–19
unloading, 4–23
unloading tape cartridges, 4–23
TK50Z–GA tape drive expansion box
connecting one expansion box, 4–9
connecting two, 4–12
SCSI ID default switch setting, 4–9
storage capacity, 4–1
troubleshooting, 6–8
using, 4–19 to 4–20
Transceiver cable, 5–14
Transparent sleeve
RRD40 compact disc, 3–4
Troubleshooting, 6–1 to 7–29
configuration display, 7–7
diagnostic lights (LEDs), 7–29

Troubleshooting (Cont.)
keyboard, 6–6
mnemonics for system exerciser, 7–17
monitor, 6–4
mouse, 6–6
power-up display, 2–18
power-up error messages, 7–3
RRD40, 2–20
RRD40 compact disc drive, 6–6
RZ55 hard disk drive, 6–6
RZ56 hard disk drive, 6–6
self-tests, 7–5
software, 6–6
standard Ethernet, 5–12
system exerciser, 7–17
system unit, 6–4
table, 6–3
tablet, 6–6
ThinWire Ethernet, 5–8
TK50Z–GA tape drive, 6–8
TZ30 tape drive, 6–7
Turning off
expansion boxes, 2–21
order of, 6–1
system, 2–21
Turning on
expansion boxes, 2–16, 4–14
order of, 2–16
system, 2–16
TZ30 tape drive, 3–8 to 3–15
cartridges used by, 3–8
controls and lights, 3–15
hardware specifications, D–7
inserting tape cartridge, 3–12
integral to Model 48 system unit, 2–16, 3–2
lights and controls, 3–15
loading tape cartridge, 3–12
power-up test, 3–15
removing tape cartridges, 3–14
storage capacity, 1–2, 3–12
testing
for failing, 7–9
TZ30 tape drive (Cont.)
troubleshooting, 6–7
unloading tape cartridge, 3–14
using blank tape during power-up, 2–17

U

ULTRIX operating system
installing, 2–20
universal strain relief strap, 2–11
Unpacking
expansion box, 4–4
system components, 2–3

V

VAXstation 3100
enclosure dimensions, 1–2
features, 1–2
hardware specifications, D–1
possible configurations, 1–3
VAX Windowing Software (UIS), 1–3
Ventilation, 2–2
VMS DECwindows software, 1–3
VMS operating system
installing, 2–20
Voltage select switch
RRD40 compact disc expansion box, 4–15
Voltage setting
monitor, 2–11
RRD40 compact disc expansion box, 4–15

W

Windowing software, 1–3, 3–15
Work group
creating daisy-chain, 5–6, 5–15
Write protecting tape cartridges, 3–9 to 3–11
Write protect light on TZ30, 3–15
Write-protect switch, 3–10
Writing to tape cartridges, 3–9, 3–11

HOW TO ORDER ADDITIONAL DOCUMENTATION

From	Call	Write
Alaska, Hawaii, or New Hampshire	603–884–6660	Digital Equipment Corporation P.O. Box CS2008 Nashua NH 03061
Rest of U.S.A. and Puerto Rico[1]	800–DIGITAL	
[1]Prepaid orders from Puerto Rico, call Digital's local subsidiary (809–754–7575)		
Canada	800–267–6219 (for software documentation) 613–592–5111 (for hardware documentation)	Digital Equipment of Canada Ltd. 100 Herzberg Road Kanata, Ontario, Canada K2K 2A6 Attn: Direct Order Desk
Internal orders (for software documentation)	DTN: 241–3023 508–874–3023	Software Supply Business (SSB) Digital Equipment Corporation Westminster MA 01473
Internal orders (for hardware documentation)	DTN: 234–4323 508–351–4323	Publishing & Circulation Services (P&CS) NRO3–1/W3 Digital Equipment Corporation Northboro MA 01532

Reader's Comments

VAXstation 3100 Model 48
Owner's Manual

EK–VSM40–OM–002

Your comments and suggestions help us improve the quality of our publications.

Please rate the manual in the following categories:	Excellent	Good	Fair	Poor
Accuracy (product works as described)	☐	☐	☐	☐
Completeness (enough information)	☐	☐	☐	☐
Clarity (easy to understand)	☐	☐	☐	☐
Organization (structure of subject matter)	☐	☐	☐	☐
Figures (useful)	☐	☐	☐	☐
Examples (useful)	☐	☐	☐	☐
Table of contents (ability to find topic)	☐	☐	☐	☐
Index (ability to find topic)	☐	☐	☐	☐
Page design (overall appearance)	☐	☐	☐	☐
Print quality	☐	☐	☐	☐

What I like best about this manual: _____

_____

What I like least about this manual: _____

_____

Additional comments or suggestions: _____

_____

_____

I found the following errors in this manual:

Page	Description
_____	_____
_____	_____
_____	_____

For which tasks did you use this manual?

☐ Installation
☐ Maintenance
☐ Marketing
☐ Operation/Use
☐ Programming
☐ System Management
☐ Training
☐ Other (please specify) _____

Name/Title _____

Company _____

Address _____

_____

Phone _____ Date _____

Do Not Tear - Fold Here and Tape

digital

NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY MAIL

FIRST CLASS PERMIT NO. 33 MAYNARD MASS.

POSTAGE WILL BE PAID BY ADDRESSEE

DIGITAL EQUIPMENT CORPORATION
CORPORATE USER PUBLICATIONS
PKO3–1/D30
129 PARKER STREET
MAYNARD, MA 01754–9975

Do Not Tear - Fold Here and Tape