DECsystem 5100

Operator's Guide

August 1990

This guide describes how to use and troubleshoot your DECsystem 5100 hardware.

Revision/Update Information: This is a new guide.

This document was prepared using VAX DOCUMENT, Version 1.2.

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Purpose of This Guide

This guide describes how to use and troubleshoot your DECsystem 5100. It also includes information about the optional equipment that you can connect to your system.

Who Should Use This Guide

This guide is for people who have little or no previous experience with computers. The new owner of a DECsystem 5100 should use this guide to operate the system.

Structure of This Guide

This guide contains four chapters, two appendixes, and a glossary of technical terms.

- Chapter 1 describes the basic DECsystem 5100 hardware.

- Chapter 2 describes how to use your DECsystem 5100, how to use console commands, and how to use the optional removable-media storage devices located in your system unit.

- Chapter 3 describes the hardware options available for your DECsystem 5100 and indicates where to find information on installing them.

- Chapter 4 describes the tests and procedures that you can use to diagnose and solve hardware problems.

The appendixes provide additional information on the following topics:

- Console commands

- Removable storage media

The glossary explains technical terms used in this guide.

For More Information

See Appendix B in the *DECsystem 5100 Installation Guide* for a list of associated documents to help you to learn about your new system.

Conventions

Table 1 lists the conventions used in this guide.

Table 1   Conventions

Convention	Description
MONOSPACE	Text displayed on the screen is shown in monospace type.
[ ]	In command syntax descriptions, brackets [ ] indicate optional elements.
|	In command syntax descriptions, a vertical line separates similar options, one of which you can choose.
bold	User input is shown in bold type.
italic type	Italic type emphasizes important information, indicates variables, and references titles of other manuals.
Note	A note contains information of special importance to the reader.
Caution	A caution contains information to prevent damage to the equipment.
Warning	A warning contains information to prevent personal injury.

1

DECsystem 5100 Hardware

This chapter describes the parts of the DECsystem 5100.

1.1 The System Unit

The system unit is designed to sit flat on a desk or table. You can place the console terminal on top of the system unit or next to it. Figure 1–1 shows the DECsystem 5100.

Figure 1–1   The DECsystem 5100
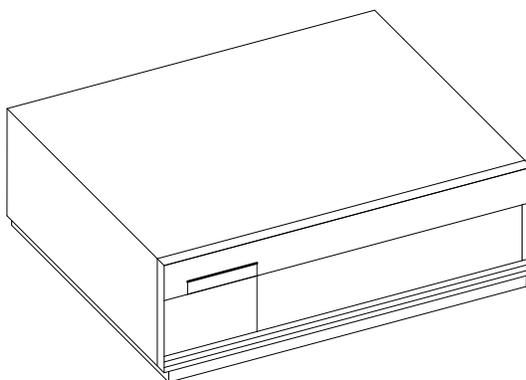
MLO-002941

Caution *Do not block the air vents on either side of the system unit. Blocking these air vents can cause the system to overheat.*

1.1.1 System Connectors, Controls, and Indicator Lights

Figure 1–2 shows the connectors, controls, and indicator lights on the back of the system unit. Table 1–1 describes the function of each.

Figure 1–2   Ports and Connectors

On/Off Switch
System AC Power
◇ SCSI Port
Second Modem Port (Optional)
MMJ Ports 8 to 10 (Optional)
MMJ Ports 4 to 7 (Optional)
Standard Ethernet Connector
Standard Ethernet Light
Network Select Button
ThinWire Ethernet Light
⁑ ThinWire Ethernet Connector
▽ Halt/Reset Button
1 ⇄ MMJ Port
2 ⇄ MMJ Port
3 ⇄ MMJ Port
◻ Modem Port
Diagnostic LEDs
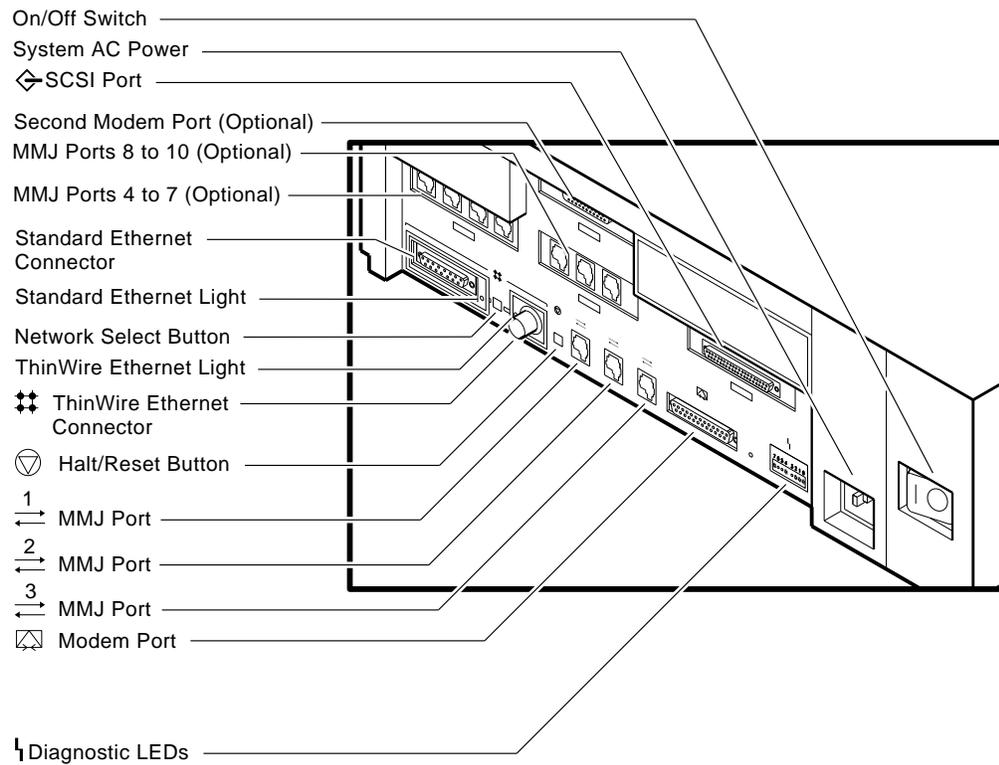
RE_EN05154A_90

Table 1–1   System Connectors, Controls, and Indicator Lights

Item	Function
On/off switch	Turns the system unit on and off. To turn the system on, set the on/off switch to the on (	) position. To turn the system off, set the on/off switch to the off (O) position.
System AC power	The connector at which power from the power source reaches the system unit.
SCSI port	The connector at which external small computer system interface (SCSI) storage devices connect to the system unit.
Modem port (optional)	The connector at which a modem, terminal, printer, or other devices using RS232 connectors are connected to the system unit.
MMJ ports 4 to 10 (optional)	The connectors at which terminals, printers, and other devices using DEC423 connectors are connected to the system unit.
Standard Ethernet connector	The connector at which standard Ethernet connects to the system unit.
Standard Ethernet light	The standard Ethernet light glows green on a DECsystem 5100 selected for standard Ethernet.
Network select button	The network select button selects between ThinWire or standard Ethernet connection.
	The DECsystem 5100 uses standard Ethernet when the the network select button is in the out position. It uses ThinWire Ethernet when the network select button is in the in position.
ThinWire Ethernet connector	The connector at which ThinWire Ethernet connects to the system unit.
ThinWire Ethernet light	The ThinWire Ethernet light glows green on a DECsystem 5100 selected for ThinWire Ethernet.

Table 1–1 (Cont.)   System Connectors, Controls, and Indicator Lights

Item	Function
Halt/reset button	The halt/reset button has two functions. When you are in console mode, pressing this button resets the system and causes the power-up self-tests to run. If you enter the following command before booting the system, pressing this button in program mode causes the operating system to halt, and you are returned to console mode:
	`>>` **`setenv bootmode h`**
	You can return to the operating system by entering the following command at the console prompt:
	`>>` **`continue`**
	On an unprivileged system with the security password set, you must enter privileged mode before you use the continue command. Section 2.2 contains more information on secure DECsystem 5100s.
	If you do not enter the setenv bootmode h command, and if you are in the ULTRIX operating system, you reset the system when you press the halt/reset button. You cannot return to the operating system by entering the continue command when you reset the system.
MMJ ports 1 to 3	The connectors at which the console terminal, terminal, and printer are connected to the system unit.
Modem port	The connector at which a modem is connected to the system unit.
Diagnostic Light Emitting Diodes(LEDs)	The diagnostic LEDs (status LED display) indicate diagnostic failures.

2

Using the DECsystem 5100

This chapter describes how to use your DECsystem 5100 and includes information on the following topics:

- Turning your system on and off
- Using your system's security feature
- Using and interpreting the configuration display
- Booting and shutting down your operating system
- Using internal devices

2.1 Turning on Your DECsystem 5100

The DECsystem 5100 on/off switch is at the back of the system unit. Figure 2–1 shows the location of the on/off switch.

Figure 2–1   The DECsystem 5100 On/Off Switch

On/Off Switch
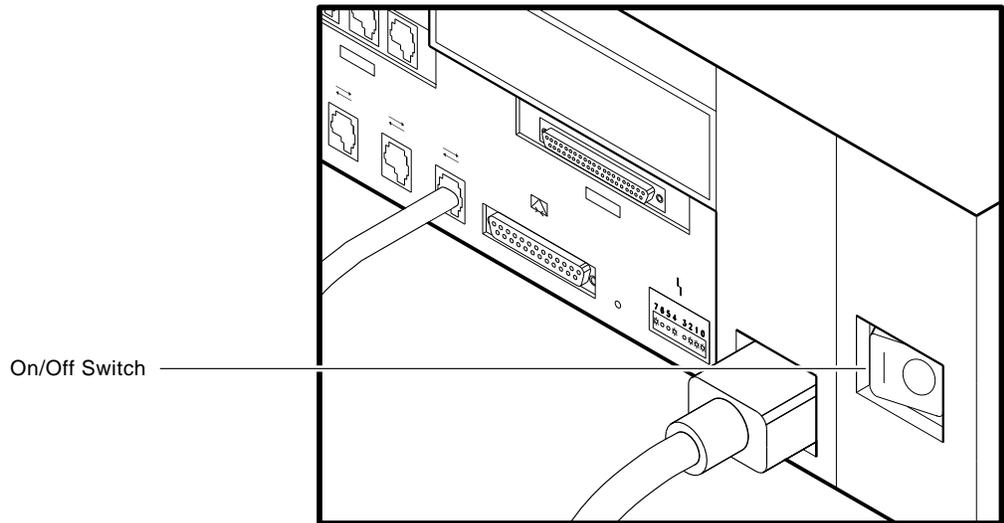
RE_EN05205A_90

Note *The power-up tests are not displayed on the console terminal if you enter the following command at the console prompt:*

```
>>  setenv bootmode d
```

When you turn on your system, it displays the console banner immediately.

Turn on your system by setting the on/off switch to the on (|) position. The system executes its power-up tests, causing a display on the console terminal similar to the following:

```
26..25..24..23..22..21..20..19..18..17..16..15..14..14..14..
13..12..11..10..9..8..7..6..5..4..3..

KN230 Vx.x
08-00-2b-55-55-55
0x1000000
>>
```

Console Banner

If the power-up self-test completes successfully, the system displays the console banner and prompt. The console banner is as follows:

```
KN230 Vx.x          ❶
08-00-2b-55-55-55   ❷
0x1000000           ❸
>>                  ❹
```

The significance of each line in the console banner is as follows:

❶ CPU name and the firmware version

❷ Ethernet address

❸ Internal memory size in hexadecimal format

Table 4–1 is a conversion table that translates hexadecimal memory sizes into decimal memory sizes.

Table 2–1   Memory Size Indication

Memory Size	Hexadecimal Value
8MB	0x800000
16MB	0x1000000
24MB	0x1800000
32MB	0x2000000
40MB	0x2800000
48MB	0x3000000
56MB	0x3800000
64MB	0x4000000
72MB	0x4800000
80MB	0x5000000
96MB	0x6000000
104MB	0x6800000
128MB	0x8000000

❹ Console prompt

Unusable Memory Console Banner

When the power-up diagnostics find unusable memory, the console banner message contains an information message showing the amount of unusable memory. The system console banner looks similar to the following:

```
KN230 Vx.x
08-00-2b-55-55-55
0x1000000
bad mem: 0x1400      ❶
>>
```

❶ The size of the unusable memory, in hexadecimal format, found by the power-up diagnostics

You may still be able to use your system when you see a console banner of this type, depending on how much of the memory is unusable.

Chapter 4 outlines the actions you must perform if the system does not display the power-up tests, or if it displays lines similar to the following during the power-up self-test sequence:

```
?1f 03 ff 0001

P1= 00000000 P2= 00000000 P3= 00000000 P4= 00000000 P5= 00000000
P6= 00000000 P7= 00000000 P8= 00000000 P9= 00000000 P10=00000000
gp= 17bcbcfc sp= a000f7b0 fp=bfc00480  sr= 00000000
epc=bfc20a70 badvaddr=00060000 cause=3000000
```

2.2 Using the DECsystem 5100 Security Feature

The DECsystem 5100 has a security feature that you can use to prevent unauthorized users from entering console commands that could damage the system. The security feature allows you to use the system in one of three different modes. These modes are as follows:

- Console mode

  When you use your system for the first time, the system is in console mode. The DECsystem 5100 accepts all console commands from all the users.

  The console prompt in console mode is displayed as follows:

  ```
  >>
  ```

- Unprivileged console mode

  After you set a security password, the system is in unprivileged console mode. The DECsystem 5100 accepts only commands that cannot damage the system. You can use only the following commands without arguments or options:

```
S>  passwd
```

or

```
S>  boot
```

The console prompt in unprivileged console mode is displayed as follows:

```
S>
```

- Privileged console mode

  Users who know the security password can use the system in privileged console mode after entering that password. In privileged console mode, the DECsystem 5100 accepts all the console commands.

  The console prompt in privileged console mode is displayed as follows:

  ```
  >>
  ```

2.2.1 Putting Your DECsystem 5100 in Unprivileged Console Mode

The following procedure describes how to set the security password, putting your system in unprivileged console mode:

1 Enter the following command to set the security password:

```
>>  passwd -s
New Password:
Retype new password:
```

2 Enter a password between 8 and 32 characters long and press Return. The system does not display the password as you enter it.

   The system then prompts you to verify the password that you entered.

3 Enter the password again and press Return. As before, the system does not display the password as you enter it.

   Your password is now set and the console prompt changes to the unprivileged mode console prompt, as follows:

   ```
   S>
   ```

   This prompt indicates that your system is in unprivileged console mode.

Note *Do not forget your password. If you do forget your password, contact your Digital Customer Service representative.*

When your system is in unprivileged console mode, you can use only three console commands:

- The boot command, without arguments

Using the DECsystem 5100 **2–5**

- The passwd command, without arguments
- The help (?) command

2.2.2 Putting Your DECsystem 5100 in Privileged Console Mode

You can put the DECsystem 5100 in privileged console mode only if you know the password. In privileged console mode, you can use all the console commands supported by the DECsystem 5100. Appendix A contains a description of all the console commands.

The following procedure describes how to put the DECsystem 5100 in privileged console mode:

1 Enter the following command at the unprivileged console mode console prompt:

```
S> passwd
Password:
```

2 Enter the password at the prompt and press Return. The system does not display the password as you enter it.

If the password is correct, the system responds with a display similar to the following:

```
Password accepted

KN230 Vx.x
08-00-2b-87-65-43
0x80000

>>
```

You are now in privileged mode and can enter all the console commands.

2.2.3 Exiting Privileged Console Mode

To return your system to unprivileged console mode, enter the following command:

```
>>  passwd -u
```

The system returns to unprivileged console mode, responding with a display similar to the following:

```
KN230 Vx.x
08-00-2b-87-65-43
0x80000

S>
```

2.2.4 Clearing the Security Password

The following procedure describes how to clear the security password:

1 Enter the following command at the unprivileged console mode prompt:

```
S> passwd
```

2 Enter the current security password at the prompt and press Return. The system does not display the password as you enter it.

If the password is correct, the system changes the unprivileged mode console prompt to the privileged mode console prompt:

```
>>
```

3 Enter the following command at the console prompt to clear the security password:

```
>> passwd -c
```

The DECsystem 5100 is now in console mode.

2.3 Using the Configuration Display

The configuration display contains useful information about your system. Enter the following command at the console prompt (>>) and press Return to view the configuration display:

```
>> conf -f
```

Your DECsystem 5100 responds with a display similar to the following:

```
hardware: revision 1                                         ❶
firmware: revision 1
cpu: revision 2.32
fpu: revision 3.32
security switch: secure mode                                 ❷
password: clear
eeprom: valid                                                ❸
ethernet hardware address: 08-00-2b-12-7f-58                 ❹
option board: Asynch Comm, 8 ports                           ❺
memory: total size  16MBs                                    ❻
     bank0   4MB SIMMs  size 8MBs           0 bad pages
     bank1   4MB SIMMs  size 8MBs           0 bad pages
scsi peripherals                                             ❼
  unit type            product             removable/fixed     capacity
    0   disk            RZ56    (C) DEC    fixed               634 MBs
    3   tape            TZK50              removable
    5   tape            TZ30               removable
    7   host adapter
```

```
>>
```

❶ Four lines, starting with this line, indicate the revision levels of the hardware, firmware, central processing unit (cpu), and the floating point unit (fpu).

❷ Two lines, starting with this line, indicate the security condition of the DECsystem 5100.

❸ This line indicates the condition of the EEPROM.

❹ This line indicates the Ethernet address of your DECsystem 5100.

❺ This line indicates whether an option board is installed. In this example, the DHT80 asynchronous module is installed.

❻ Three lines, starting with this line, indicate the amount of internal memory in the system. This line indicates the total size of memory in megabytes (MB). The lines indicate the following:

- The number of an occupied bank

- The type of the MS44 memory module in that bank

- The amount of memory in that bank

- The number of bad pages found in the memory in that bank

There are four banks available for memory, in this example, only two are occupied.

❼ This line and the lines following it, give information on the SCSI devices in, or connected to your system. The information provided by the conf -f command includes the following:

- The unit number (SCSI ID)

- The type of device

- The product name

- The type of media the device uses, removable or fixed

- The capacity of the fixed media

2.4 Using Console Commands

By entering commands at the console prompt (>>), you can learn important information about your DECsystem 5100 hardware.

Many of the console commands are used for diagnostics and debugging by your Digital Customer Service representatives. However, Table 2–2 describes some commands that you may find useful.

Table 2–2   Useful Console Commands

Command	Action
help (?)	Displays the list of console commands and tells you how to enter them.
init	Performs a full initialization of your system. Initialization prepares the system for startup.
printenv	Displays the environment variables. This display contains a list of variables, such as the baud rate for your communications devices, and gives you the current value for each variable.
test 0x0	Runs the DECsystem 5100 hardware self-test.
conf	Displays the current configuration of your system.

Appendix A contains a more comprehensive list of console commands.

2.4.1 The RZ23 and RZ24 Hard Disk Drives

A hard disk stores information on a nonremovable disk. The RZ23 disk drive has a storage capacity of 104MB, and the RZ24 disk drive has a storage capacity of 209MB.

RZ23 and RZ24 disks are mounted internally in the system unit. Your DECsystem 5100 can accommodate a maximum of five disk drives, depending on your system configuration. You can only add other disks if there is space available. To determine the number of disks in your system, enter the following command at the console prompt (>>), then press Return:

```
>>  conf -f
```

The configuration display contains information about the following:

- The memory contained in your DECsystem 5100.

- The Ethernet station address of your system. (You must know this address to be able to connect your DECsystem 5100 to a network.)

- The storage devices connected to your system and their assigned unit numbers.

Section 2.3 contains more information on the configuration display.

2.5 Booting the DECsystem 5100 Software

Boot the DECsystem 5100 software as follows:

- Enter the following command if you are booting the DECsystem 5100 to single-user mode (only the root partition is mounted), or if you are an unprivileged user using a system in privileged console mode:

  ```
  S> boot
  ```

  The DECsystem 5100 uses the bootpath environment variable stored in nonvolatile memory.

  You can enter the boot command in privileged console mode (at the >> prompt) if the bootpath is set. Enter the following command to set the bootpath:

  ```
  >> setenv bootpath rz(0,0,0)vmunix
  ```

  This command tells the system to boot from an RZ disk at SCSI ID 0.

- Enter the following command if you want to boot the DECsystem 5100 to single-user mode:

  ```
  >> boot -s
  ```

  The DECsystem 5100 always boots to multiuser mode unless you specify that it boots to single-user mode.

  Booting a standalone DECsystem 5100 from disk takes approximately three minutes.

- Enter the following command to boot the system, using an alternative bootpath:

  ```
  >> boot -f rz(0,0,0)vmunix
  ```

If the system autoboots, it boots using the default bootpath, stored in the bootpath environment variable.

2.5.1 Unsuccessful DECsystem 5100 Software Boot

If the DECsystem 5100 does not boot successfully, follow these steps:

1 Enter the printenv command to display the environment variables table. Check the bootmode and bootpath variables.

2 Enter the setenv command to set the bootpath variable to boot the operating system from the hard disk or the network.

3 Use the boot command to boot the operating system.

4 If you still cannot boot the operating system, contact your system manager.

2.6 The TZ30 Tape Drive

The TZ30 is a cartridge tape drive that can store up to 95MB (or characters) on each CompacTape or CompacTape II cartridge.

The TZ30 can read or write data from a tape that was written by a TK50. The TZ30, however, cannot read or write data from a tape that has been written by a TK70.

Use the TZ30 primarily to back up storage devices, and to load software onto your system. For example, the ULTRIX operating system may be loaded from the TZ30. The tape-distributed version of ULTRIX is on a TK50-formatted tape.

To access the TZ30 tape drive (if installed), position the system unit so that the front of it is facing you. Open the cover by pushing it and then releasing it (see Figure 2–2). Use the same procedure to close the cover when you have finished using the TZ30.

2.6.1 Tape Cartridges

The TZ30 uses a tape cartridge (labeled CompacTape or CompacTape II) that contains the magnetic tape on a single reel. You must understand the single reel concept, because it affects the use of the TZ30.

When you insert the tape cartridge into the drive and load it, the tape is automatically threaded onto a take-up reel inside the drive. A tape, wound fully onto the take-up reel, takes approximately 100 seconds to rewind completely.

Note *The tape must fully rewind before you can remove the tape cartridge from the tape drive.*

Appendix B contains information on the handling and storage of CompacTape and CompacTape II cartridges.

Figure 2–2   Accessing the TZ30 Tape Drive
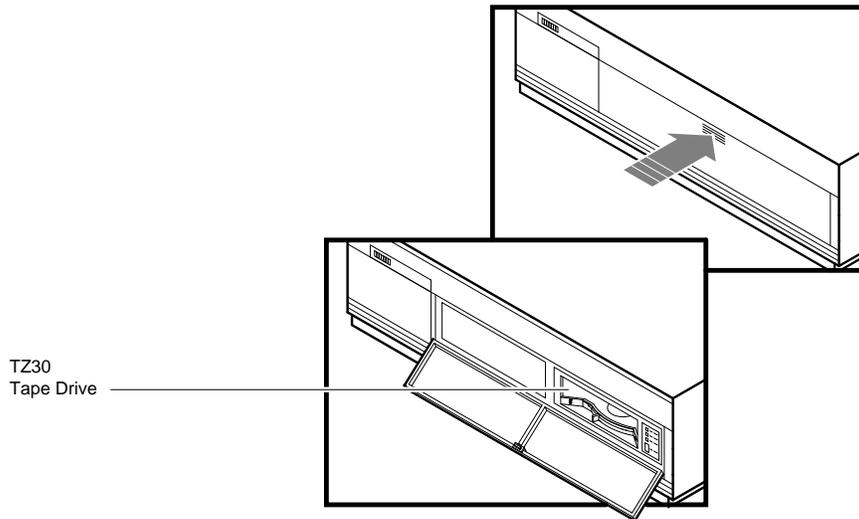
TZ30
Tape Drive

MLO-002744

2.6.2   TZ30 Controls and Indicators

The TZ30 tape drive has two controls, an unload button and a cartridge lever.
Table 2–3 explains the functions of the controls. The TZ30 tape drive also has
four indicators, three LEDs and a beeper. Table 2–4 explains the functions of
the indicators. Figure 2–3 shows the location of the controls and indicators on
the TZ30 tape drive.

Figure 2–3 TZ30 Tape Drive Controls and Indicators

Lever

Write-Protect Light

Tape in Use Light

Operate Lever Light

Unload Button
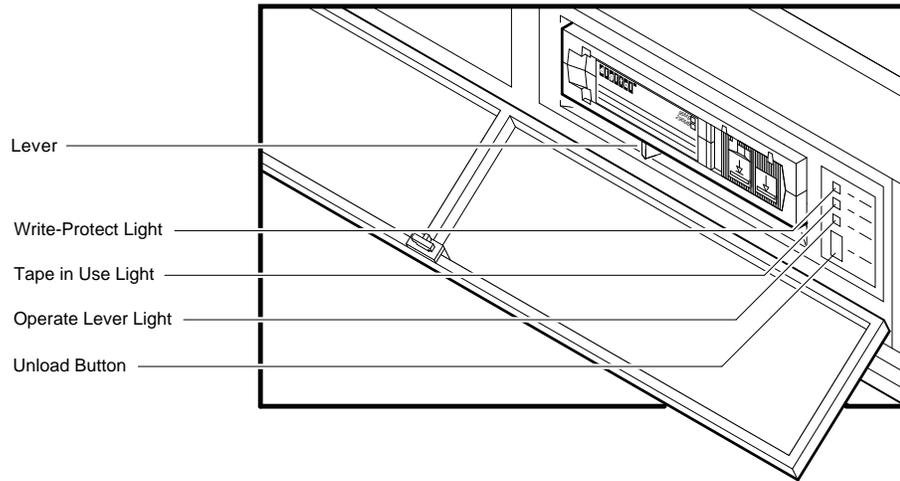
MLO-002745

Table 2–3 TZ30 Controls

Control	Function
Unload Button	The unload button rewinds and disengages the tape from the take-up reel inside the TZ30. The tape must be completely rewound and unloaded back into the tape cartridge before you can remove the tape cartridge from the drive.
Cartridge Lever[1]	Use the cartridge lever to lock or unlock a tape cartridge. To insert a tape cartridge, the cartridge lever must be in the unlock position. Once you insert a tape cartridge and the green LED is on, move the cartridge lever to the lock position. To eject the tape cartridge from the drive, (only when the green LED is on or blinking, and after the momentary beeper sounds), move the cartridge lever to the unlock position.

[1]When using the cartridge lever, be sure you position it completely in the lock or unlock position before beginning the next operation.

Table 2–4   TZ30 Indicators

Indicator	State	Condition
Green LED - Lever	On	Safe to operate the cartridge lever
	Off	Do not operate the cartridge lever
	Blinking	The drive has detected a tape cartridge or calibration error
Yellow LED - Tape in Use	Blinking[1]	Tape in use[2]
	On	Tape loaded and ready for use
Orange LED - Write Protected	On	Tape is write protected
	Off	Tape is write enabled
All three LEDs	On	The power-up diagnostic is in progress[3]
All three LEDs	Blinking	Drive fault
Beeper[4]	Two beeps	Indicate that the tape is unloaded and you can remove it from the drive

[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.

[2]LED blinks slowly for 10 seconds indicating drive initialization. This occurs only on power-up after the power-up diagnostic has run.

[3]All three LEDs light for a few seconds as the power-up diagnostic is running. If all three LEDs remain on, the power-up diagnostic has failed.

[4]The drive beeps once when it is powered-up. If a tape cartridge is not locked in the drive, it beeps twice after self-test diagnostics and drive initialization are completed. If a tape cartridge is locked into the drive before power-down, then when the system powers up, the drive beeps once and attempts to load the tape cartridge.

2.6.3   Inserting and Using a Tape Cartridge

To insert a tape cartridge, perform the following steps:

1   Be sure that the cartridge lever is in the unlock position.

2   Insert the tape cartridge.

> If you insert the tape cartridge more than halfway into the drive, you must complete this procedure. If you want to use another tape cartridge, complete this procedure and perform the unload procedure to remove the tape cartridge.

If you cannot insert the tape cartridge into the TZ30, move the cartridge lever to the lock position. Then move the cartridge lever to the unlock position and reinsert the tape cartridge. Do not push the tape cartridge into the TZ30 while moving the cartridge lever between the lock and unlock positions. If you do so, the TZ30 interprets this as an insertion of the tape cartridge.

3 The green LED lights.

4 Move the cartridge lever to the lock position to lock the tape cartridge in the drive. The green LED turns off and the yellow LED begins to blink, indicating that the tape is loading. When you load the tape and it is ready for use, the yellow LED remains on steadily. Whenever the yellow LED is on steadily and the green LED remains off, the tape is ready to use.

If the write-protect switch on the tape cartridge is set to the protected position, the orange write-protect LED is on and you cannot write data to the tape.

If you set the write-protect switch to the write-enable position during operation, the system software does not recognize that the tape is no longer write-protected. You must reload the tape cartridge again before the system software recognizes the tape cartridge as write-enabled.

Similarly, if you set the write-protect switch from the write-enabled position to the write-protected position during operation, the tape is not write-protected until the operating system dismounts and remounts the tape.

When the yellow LED is on steadily, you can continue your operation. For example, you can boot your operating system, or back up files onto the TZ30.

When the tape drive is reading, writing, or rewinding a tape cartridge, the yellow LED blinks rapidly.

If errors occur during an operation, all three LEDs blink. The green LED blinks if you insert a faulty tape cartridge. Section 2.6.5 outlines the steps you must take if this occurs.

Figure 2–4   Inserting a Tape Cartridge

Lever

MLO-002746
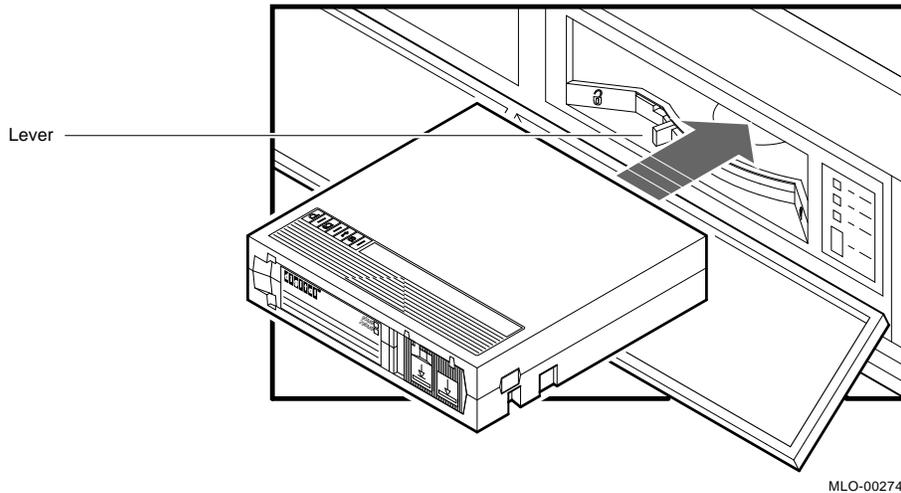
2.6.4   Removing a Tape Cartridge from the Drive

To remove a tape cartridge, perform the following steps:

1   Press the unload button (see Figure 2–3) or enter the appropriate system software command. The yellow LED blinks as the tape rewinds. Once the tape has rewound completely, the beeper sounds twice and the green LED lights.

2   Move the cartridge lever to the unlock position.

3   The tape cartridge ejects and you can remove it from the tape drive.

Caution   *Remove tape cartridges from the drive before turning off the drive's power. Failure to do this can result in damage to the tape cartridge and the tape drive.*

Figure 2–5   Removing a Tape Cartridge
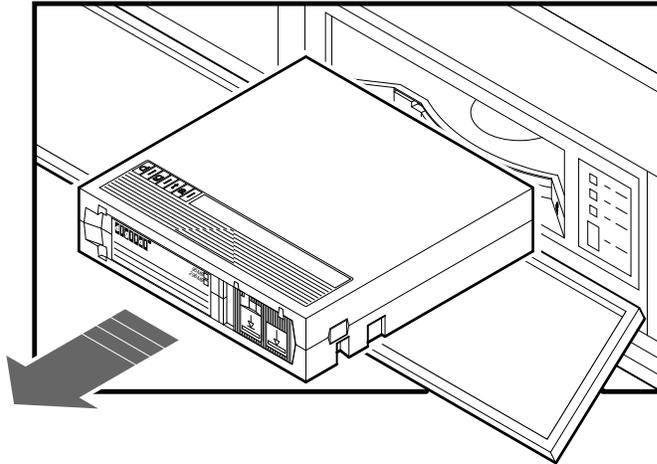
MLO-002747

2.6.5   If You Have Problems

If the TZ30 tape drive fails, read the following information. It may help you to solve the problem.

Recoverable Errors During Tape Motion

If a drive error occurs during an operation, you may be able to clear the fault, reset the drive, rewind, unload, and remove the tape cartridge. Try another tape cartridge to determine if the TZ30, or the tape cartridge is at fault.

Clearing a Recoverable Error

If all three LEDs are blinking (indicating that an error has occurred), press the unload button. If the detected error is recoverable, the tape begins to rewind. While the tape is rewinding, the yellow LED blinks. When the tape has unloaded, the drive beeps twice and the green LED lights. You can then move the cartridge lever to the unlock position to eject the tape cartridge.

Nonrecoverable Errors During Tape Motion

If the tape does not rewind when you press the unload button and the LEDs continue to blink, the error is not recoverable. Contact your authorized Digital Customer Service representative.

Errors During Tape Cartridge Insertion

When the tape cartridge is damaged, or if internal portions of the drive that handle the tape cartridge are not working, a tape cartridge fault occurs. If the green LED blinks and the tape does not move (the yellow LED does not blink), the TZ30 has detected a tape cartridge fault. Remove the tape cartridge and try another.

Tape Cartridge Incompatibility

If you cannot read to or write from a tape cartridge, your tape cartridge may be incompatible with the TZ30. The green LED may also blink indicating that the TZ30 detected a tape cartridge error.

Testing

If you obtained diagnostics from Digital or your authorized Digital representative, follow the instructions you received with your diagnostic tape or diskette. These diagnostics help you to detect any problems with the TZ30, or other device on your system.

Inspecting the Tape Cartridge

If you have problems loading a tape cartridge, inspect the tape leader.

Figure 2–6 shows the correct position of the tape leader inside the tape cartridge. Before you try to use the tape cartridge, be sure the tape leader is in the correct position (see Figure 2–6). Lift the catch with your thumb and open the small door to expose the leader.

Caution *Do not touch exposed portions of magnetic tape. If the tape leader is not in the correct position, do not attempt to fix it. Use a new tape cartridge instead.*

Figure 2–6   Inspecting the Tape Leader

Door Lock
(Release by Lifting
Door Lock With Thumb)

MLO-002748
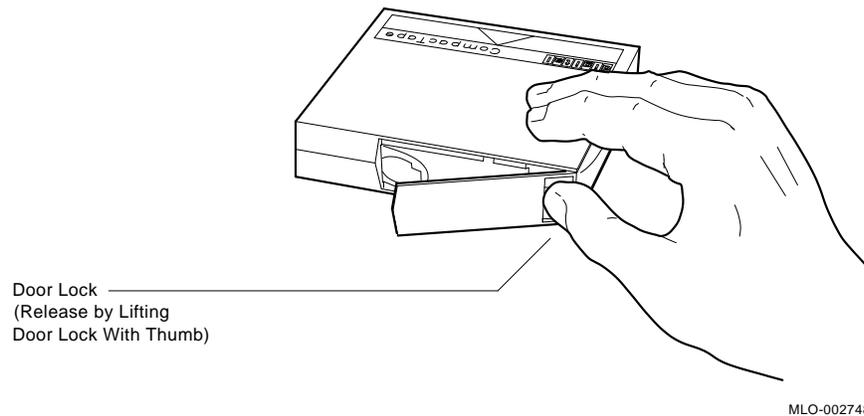
2.7 The RX23 Diskette Drive

Your system can include one or two RX23 diskette drives. These devices enable you to read information from, and write information to 3.5 inch removable diskettes.

To access the RX23 diskette drive, position the system unit so that the front of it is facing you. Open the cover by pushing it in and then releasing it (see Figure 2–7). Use the same procedure to close the cover when you have finished using the RX23.

Figure 2–7   Accessing the RX23 Diskette Drive

RX23
Diskette Drive

MLO-002769
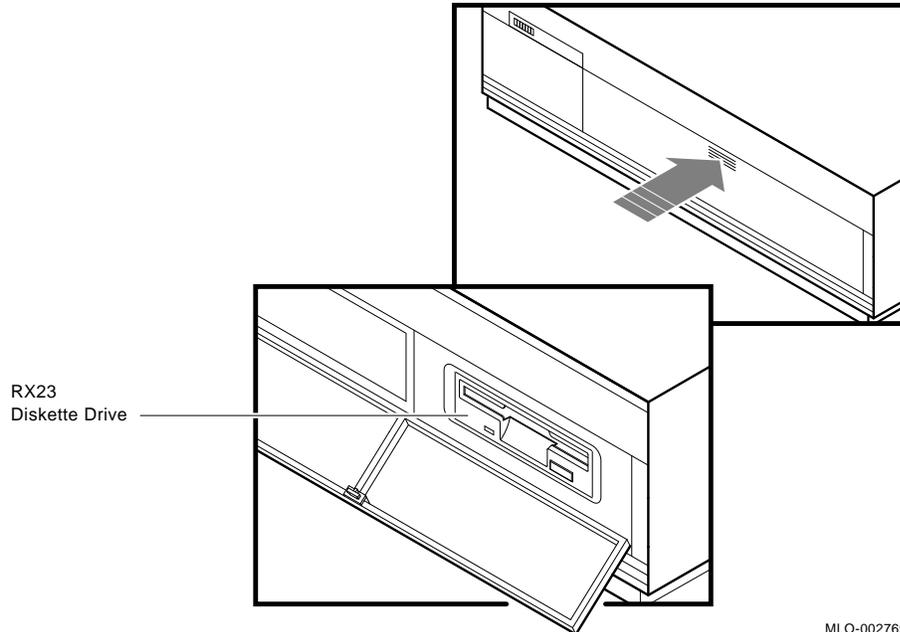
Note   *Figure 2–7 shows an RX23 diskette drive in the right compartment of your DECsystem 5100. An RX23 diskette drive may also be in the left compartment.*

2.7.1   Diskettes

The RX23 diskette drive uses RX23K diskettes that have a capacity of 1.4MB. Appendix B contains information on the handling and storage of diskettes.

2.7.2   Inserting a Diskette

The drive can hold one diskette.

Caution   *Never remove or insert a diskette while the diskette drive is performing a function. Inserting or removing a diskette while your system is using the diskette can cause incorrect data to be written to the diskette, and can cause damage to the diskette itself. Wait until the diskette drive completes its current operation. When the diskette drive is in use, the green light on the front of the diskette drive is on.*

To insert a diskette into the diskette drive, slide the diskette into the drive (see Figure 2–8).

The diskette slides straight in and drops down to its load position.

Figure 2–8   Inserting a Diskette

Diskette

MLO-002770
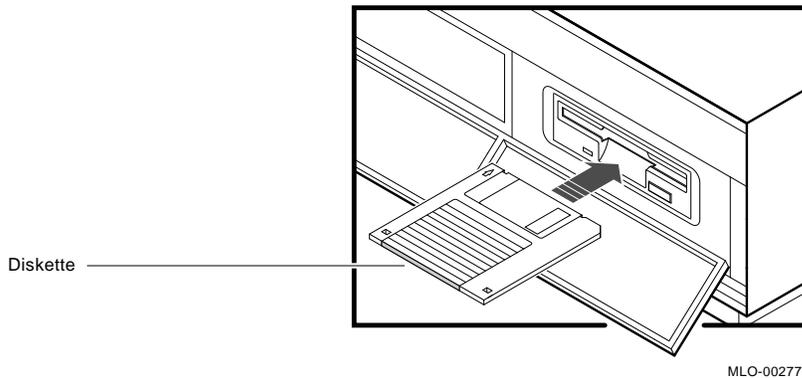
2.7.3   Removing a Diskette

You must dismount the diskette drive before removing a diskette. For information on dismounting, see your software documentation.

To remove a diskette from the diskette drive, press the eject button on the front of the diskette drive (see Figure 2–9).

Figure 2–9   Removing a Diskette

Diskette

Ejection Button

MLO-002938
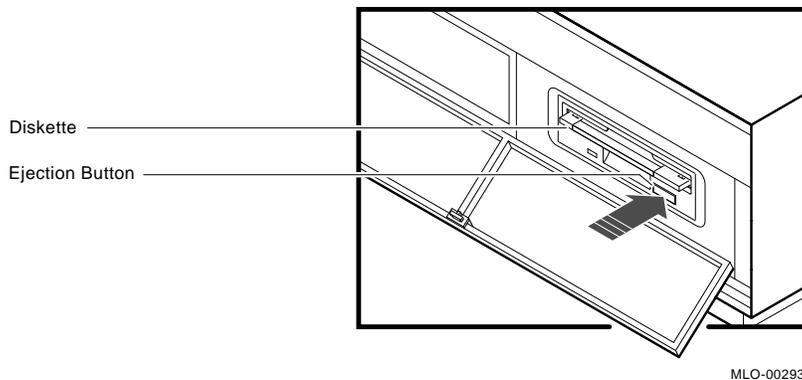
2.8 Shutting Down the DECsystem 5100 Software

Before running any diagnostic self-tests, perform the following steps:

1 Shut down the DECsystem 5100 software by logging in to an account that has superuser privileges.

2 Enter a shutdown command at the system prompt (#).

Table 2–5 contains a list of the shutdown commands that you can use.

Table 2–5   Shutdown Commands

Command	Result
/etc/shutdown -h now	This command starts the operating system software shutdown procedure immediately, without issuing warning messages.
/etc/shutdown -h hhmm	This command shuts down the operating system software at a specified time. In this table, **hh** indicates hours, **mm** indicates minutes. The system sends warning messages to all users on the Local Area Network (LAN) indicating shutdown time.
/etc/shutdown -h +n	This command shuts down the operating system software after a specified number of minutes. In this table, **n** indicates the number of minutes after which the operating system software shuts down. The system sends warning messages to all users on the LAN at an increasing frequency.

If you enter the following command before booting your system, you can also halt the operating system by pressing the halt/reset button:

```
>>  setenv bootmode h
```

If you halt your system in this way, you can enter the following command to return to the operating system:

```
>>  continue
```

2.9 Turning Off Your DECsystem 5100

Follow these steps to turn off your DECsystem 5100:

1 Shut down your operating system by following the instructions in your operating system software documentation.

2 Set the on/off switch on the back of the system unit to the off (O) position.

3

Hardware Options

This chapter contains information on the following:

- Memory and storage options available
- Terminals, printers, modems, and other communication devices available for your system
- Where to find out how to install them

3.1 Adding Memory

The DECsystem 5100 has four memory banks that can contain either 8MB or 16MB of memory in each bank. The basic DECsystem 5100 contains 8MB of memory in the first bank only. You can add either 8MB (MS44-BA) or 32MB (MS44-DA) increments to the basic system, up to a total of 128MB.

To determine how much memory you can add to your DECsystem 5100, use the configuration display (see Section 2.3).

Your Digital Sales representative can tell you the various combinations of memory available, and which memory options you must order.

3.1.1 Installing Memory Modules

When you purchase memory modules, your Digital Customer Service representative will perform the installation for you.

3.2 Adding the DHT80 Asynchronous Module

Your DECsystem 5100 supports the optional DHT80 asynchronous module. This module provides seven MMJ ports (MMJ ports 4 to 10) and a second modem port. It is an internal module and your Digital Customer Service representative must install it for you .

3.2.1 Installing the DHT80 Asynchronous Module

When you purchase the DHT80 asynchronous module, your Digital Customer Service representative will perform the installation for you.

3.3 Adding Storage Devices

Depending on your system configuration, you can add either internal or external SCSI storage devices to your system. You can have up to seven SCSI devices. Your system unit can accommodate five half-height storage devices. You can connect up to two external expansion boxes.

Note *Some expansion boxes contain two devices.*

3.3.1 Installing Storage Devices

To install internal storage devices, contact your Digital Customer Service representative who will perform the installation for you.

To install external storage devices (expansion boxes), follow the instructions given in Chapter 4 of the *DECsystem 5100 Installation Guide*.

3.4 Adding a Printer

Table 3–1 describes the printers that you can use with your DECsystem 5100.

Table 3–1   Printers for Your DECsystem 5100

Printer	Description
LN03	A desktop nonimpact laser printer that produces letter-quality text at a rate of eight pages per minute
LN03 PLUS	An enhanced LN03 that prints documents with both text and graphics
LN03R ScriptPrinter	A nonimpact page printer that uses laser recording technology to produce high-quality text, graphics, and images
LA100	A desktop dot-matrix printing terminal
LA75	A desktop dot-matrix printer with pixel graphics
LA50	A desktop dot-matrix printer with bitmap or character cell graphics
LJ250 color	A desktop dot-matrix color printer
LPS20 PrintServer	A networked printer that functions as an independent system (or node) in a network
LPS40 PrintServer	A networked printer that functions as an independent system (or node) in a network

When you order a printer, you may need to order a serial line cable to connect it to your system unit. Your Digital Sales representative can tell you what you need.

3.4.1 Installing a Printer

For instructions on installing a printer, see the *DECsystem 5100 Installation Guide* and the documentation supplied with your printer.

3.5 Adding a Modem

Table 3–2 describes the modems available for your DECsystem 5100.

Table 3–2   Modems for Your DECsystem 5100

Modem	Description
DF242 Scholar Plus	A 300/1200/2400-bits-per-second, full-duplex, asynchronous modem
DF224	A 300/1200/2400-bits-per-second, full-duplex, asynchronous modem
DF212	A 300/600/1200-bits-per-second, full-duplex, asynchronous modem
DF112	A 300/1200-bits-per-second, full-duplex, asynchronous modem
DF03	A 300/1200-bits-per-second, full-duplex, asynchronous modem

Your software documentation describes other modems.

When you order your modem, you may need to order a serial line cable, or a DECconnect Passive Adapter, or both, to connect your modem cable to your system unit. Your Digital Sales representative can tell you what you need.

Note   *Auto-answer is not available. Data leads only are connected.*

3.5.1 Installing a Modem

For instructions on installing a modem, see the *DECsystem 5100 Installation Guide* and the documentation supplied with the modem.

3.6 Adding Terminals

You can connect any of the VT range of terminals to your DECsystem 5100, using the DEC423 MMJ ports 1, 2, and 3, and the MMJ ports on the optional DHT80 asynchronous module (ports 4 to 10). You can also connect terminals to the modem port, and to the optional modem port on the DHT80 asynchronous module, if you use a DEC423 to RS232 adapter (H8575-A). These ports are on the back of the system unit.

You can connect a total of 12 terminals to your system, using both the MMJ ports and the modem ports, if you have the optional DHT80 asynchronous module installed.

3.6.1 Installing Terminals

For instructions on installing terminals, see the *DECsystem 5100 Installation Guide* and the documentation supplied with the terminal.

4

Troubleshooting

This chapter gives information on the following:

- Using the self-test

- Correcting hardware problems and contacting your Digital Customer Service representative

- The information your Digital Customer Service representative needs from you

4.1 Using the Self-Test

The self-test consists of a number of tests that check the parts of your DECsystem 5100 and tell you whether they are working correctly.

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

- By turning on your system unit

- By pressing the halt/reset button on the back of the system unit when the system is in console mode. Figure 4–1 shows the location of the halt/reset button.

- By entering the following command at the console prompt (>>) and pressing Return:

  >> **test 0x0**

Figure 4–1   Halt/Reset Button

Halt/Reset Button
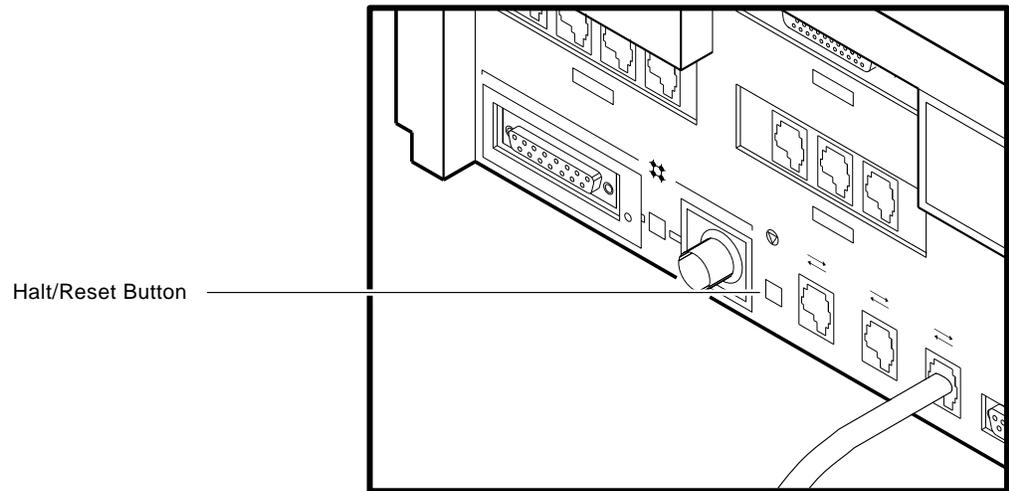
RE_EN05161A_90

Note   *The power-up tests are not displayed on the console terminal if you enter the following command at the console prompt:*

```
>>  setenv bootmode d
```

When you turn on your system, it displays the console banner immediately.

When you turn the system unit on, the self-test starts automatically. A self-test performed this way is called a power-up self-test.

When you turn on the system unit, a power-up display is displayed on the console terminal screen. The power-up self-test consists of a series of tests, each test having an identification number. The system displays the number of the currently executing test followed by two periods. As you can see from the following example, test 26 is the first test to execute, and the test sequence counts down to test 3, the last test.

If you see a display similar to the following, your system has passed all the power-up self-tests.

```
26..25..24..23..22..21..20..19..18..17..16..15..14..14..14..
13..12..11..10..9..8..7..6..5..4..3..
```

```
KN230 Vx.x
08-00-2b-55-55-55
0x1000000
>>
```

The numbers in the power-up self-test display correspond to groups of tests for specific system functions.

Console Banner

If the power-up self-test completes successfully, the system displays the console banner and prompt. The console banner is as follows:

```
KN230 Vx.x              ❶
08-00-2b-55-55-55       ❷
0x1000000               ❸
>>                      ❹
```

The significance of each line in the console banner is as follows:

❶ CPU name and the firmware version

❷ Ethernet address

❸ Internal memory size in hexadecimal format

Table 4–1 is a conversion table that translates hexadecimal memory sizes into decimal memory sizes.

Table 4–1   Memory Size Indication

Memory Size	Hexadecimal Value
8MB	0x800000
16MB	0x1000000
24MB	0x1800000
32MB	0x2000000
40MB	0x2800000
48MB	0x3000000
56MB	0x3800000
64MB	0x4000000
72MB	0x4800000
80MB	0x5000000

(continued on next page)

Table 4–1 (Cont.)   Memory Size Indication

Memory Size	Hexadecimal Value
96MB	0x6000000
104MB	0x6800000
128MB	0x8000000

❹ Console prompt

Unusable Memory Console Banner

When the power-up diagnostics find unusable memory, the console banner
message contains an information message showing the amount of unusable
memory. The system console banner looks similar to the following:

```
KN230 Vx.x
08-00-2b-55-55-55
0x1000000
bad mem: 0x1400    ❶
>>
```

❶ The size of the unusable memory, in hexadecimal format, found by the
   power-up diagnostics

You may still be able to use your system when you see a console banner of this
type, depending on how much of the memory is unusable.

4.2 Unsuccessful Power-Up Self-Test Display

Note *If the system does not display the power-up self-tests, the environment variable
bootmode d might be set. Enter the following command to cause the system to
run the power-up self-tests, then press the halt/reset button:*

```
>>  setenv bootmode h
```

If one of the self-tests fails after you initially turn on the system, the power-up
self-test halts after it displays the failing test number. The system displays
the contents of certain system registers, then performs the remaining power-up
self-tests. After completing the remaining tests in the sequence, the system
displays the console prompt.

The following display shows a sample power-up self-test failure, with test
group 21 failing:

```
26..25..24..23..22..21..
?1f 03 ff 0001

P1= 00000000 P2= 00000000 P3= 00000000 P4= 00000000 P5= 00000000
P6= 00000000 P7= 00000000 P8= 00000000 P9= 00000000 P10=00000000
gp= 17bcbcfc sp= a000f7b0 fp=bfc00480  sr= 00000000
epc=bfc20a70 badvaddr=00060000 cause=3000000

20..19..18..17..16..15..14..14..14..
13..12..11..10..9..8..7..6..5..4..3..

>>
```

4.2.1 If a Test Fails

If you see a power-up self-test display similar to the one shown in Section 4.2, perform the following checks:

1   Make sure that all external connections, cables, and power cords are secure.

2   Make sure that the standard Ethernet cable or ThinWire Ethernet cable, if installed, is properly connected.

3   If you have expansion boxes connected to your system, make sure that the SCSI cable is properly connected and that the last expansion box is properly terminated.

Run the power-up self-tests again. To run the power-up tests again, press the halt/reset button or enter the following command at the console prompt:

```
>> test 0x0
```

If the error remains, contact your Digital Customer Service representative (see Section 4.4).

4.3 Solving Hardware Problems

Table 4–2 offers solutions to some common hardware problems. If you follow the suggestions listed in Table 4–2 and your problem remains unresolved, contact your system manager, or your Digital Customer Service representative.

Table 4–2   Basic Troubleshooting

Symptom	Possible Cause	Suggested Solution
System Problems		
System unit fan is off. Power light is off.	Power cord not connected. Power socket may not be working.	Make sure that all the power cords are connected properly at both ends. Test the power socket with an appliance that works.
		Turn the system off for 10 seconds and then turn it back on. Unplug the terminal cable, communications cable, and printer. Then plug in all cables and power up the system.
Terminal does not operate.	Terminal cable not properly connected.	Make sure that all the cables are connected properly at both ends.
	Problem with the MMJ ports 1 to 3.	Try connecting the terminal to another system. If that works, the port to which the terminal was connected is faulty. If the terminal still does not operate, it is faulty. In either case, contact your Digital Customer Service representative.
	Faulty cable.	Connect the cable and the terminal to another system. If the connected terminal works, the asynchronous module or MMJ connector is faulty. Otherwise, the cable is faulty. Contact your Digital Customer Service representative.
Power-up display is not displayed after 20 seconds.	Terminal cable not connected.	Make sure that the terminal cable is plugged in at both ends.
	The environment variable bootmode d is set.	This is not a system fault. You can operate the system as soon as it displays the console banner and prompt.
	System unit turned on before terminal.	Turn off the terminal and the system unit. Turn on the terminal, allowing enough time for it to complete its power-up tests. Now turn on the system unit.

(continued on next page)

Table 4–2 (Cont.)   Basic Troubleshooting

Symptom	Possible Cause	Suggested Solution
System Problems		
	The terminal may not be working.	Try another terminal if one is available.
	Power socket may not be working.	Use a correctly functioning appliance to test the power socket.
	The terminal fuse may have blown.	Adjust the brightness and contrast controls. Replace blown terminal fuse.
	Terminal settings may be incorrect.	See the terminal documentation. The terminal should be set at 9600 baud, 8 bits, and no parity.
	Self-test errors.	Contact your Digital Customer Service Representative.
Power-up self-test contains an error summary.	Self-test errors.	See Section 4.2 in this chapter for more instructions.
Operating system software display is not displayed on the screen.	System environment variables have to be set.	See Appendix A.
	Operating system software is not installed.	See the operating system software documentation for installation instructions.
	Power cable and data cable are not installed correctly.	Make sure that the power cable and data cable are installed correctly at both ends.

Table 4–2 (Cont.)   Basic Troubleshooting

Symptom	Possible Cause	Suggested Solution
DHT80 Asynchronous Module Problems		
Peripheral connected to one of the MMJ ports 4 to 10 does not operate.	Cable not properly connected.	Make sure that all the cables are connected properly at both ends.
	Problem with the MMJ ports on the optional asynchronous module.	Try connecting the terminal to another system. If that works, the port to which the terminal was connected is faulty. If the terminal still does not operate, it is faulty. In either case, contact your Digital Customer Service representative.
	Faulty cable.	Connect the cable and the terminal to another system. If the connected terminal works, the asynchronous module or MMJ connector is faulty. Otherwise, the cable is faulty. Contact your Digital Customer Service representative.

Table 4–2 (Cont.)   Basic Troubleshooting

Symptom	Possible Cause	Suggested Solution
TZ30 Tape Drive Problems		
TZ30 tape drive green light flashes rapidly.	The drive mechanism is faulty or the tape cartridge is damaged.	Press and release the unload button to clear the fault. If the condition persists, do not try to remove the tape cartridge or use the tape drive. Contact your Digital Customer Service representative.
TZ30 passes power-up test but does not operate.	No tape cartridge in drive or the tape cartridge is not loaded.	Insert the tape cartridge and press the unload button.
Cartridge release lever does not slide.	Tape cartridge is in use.	Wait for green light to go on and try again. If the problem persists, do not use the drive. Contact your Digital Customer Service representative.
Cartridge release level does not lock.	Tape cartridge is not inserted properly.	Reinsert the tape cartridge. If the problem persists, contact your Digital Customer Service representative.
Tape does not load.		Press and release the unload button. Wait for green light to go on before sliding lever and removing tape. If the light blinks, contact your Digital Customer Service representative.

4.4 Contacting Your Digital Customer Service Representative

If you have followed the suggestions in this chapter and your problem remains unsolved, your Digital Customer Service representative can help you.

Before you place your call, follow these steps:

- Write down a description of the problem, including any error messages you have received and the number of any self-test that failed.

- Look at the status LED display on the back of the system unit and write down the numbers of the LEDs that are on.

- List the steps you have taken to correct the problem and the results you got.

■ Write down the serial and model numbers of your system and any peripheral device involved. These numbers are usually located on a label on the back of the device.

A

Console Commands

This appendix describes the console commands that you can enter when your system is in console mode.

Note *If the system is in unprivileged console mode (that is, the console prompt is S>), you can enter only three valid commands (without arguments). The three commands are as follows:*

- *boot*

- *passwd*

- *help (?)*

Note *The console commands are case sensitive. You must enter lowercase commands in lowercase on your console terminal.*

A.1 Boot Command (boot)

This command specifies a file from which the system loads the operating system software. The format for this command is as follows:

boot [-f FILE] [-(s | m)] [-n] [ARG...]

- The -f option followed by the FILE parameter specifies the file you want to use during a boot procedure. If you do not specify the -f option and a FILE, then the system uses the file specified by the environment variable, *bootpath*. Section A.14 contains more information on the *bootpath* variable.

  The FILE parameter has the following format:

    dev(controller,unit,lbn)filename

- dev - specifies the device from which you are booting the operating system software. Typical device types are as follows: hard disk (rz), tape (tz), and network using the MOP protocol (mop) or the BOOTP protocol (tftp).

- controller - specifies the ID number of the controller.

- unit - specifies the unit number of the device from which you are booting the operating system software.

- lbn - specifies the logical block number that specifies the absolute block number from the beginning of the disk.

- filename - specifies the name of the operating system software file.

Note *When you do not enter values for controller, unit, or lbn, the system uses default values of zero.*

- The -s option specifies that the operating system software file boots in single-user mode.

- The -m option specifies that the operating system software file boots in multiuser mode.

Note *When you do not specify the -m option or the -s option, the system uses the default option, -m.*

- The -n option specifies that the file is loaded but not executed.

- The parameter arg represents data that you want to pass to the booted operating system file.

A.2 Configuration Command (conf)

This command displays the system configuration. The format of this command is as follows:

conf [-(b | f | m | s | g)]

- The -b option directs the system to display a brief system configuration. Example A–1 shows an example of a brief configuration display.

Example A–1   Brief System Configuration Display

```
>> conf -b

hardware: revision 1
firmware: revision 1
ethernet hardware address: 08-00-2b-12-7f-58
option board: Asynch Comm, 8 ports
memory: total size 16MBs
scsi peripherals
  unit type           product             removable/fixed
     0  disk          RZ56      (C) DEC   fixed
     2  cdrom         RRD40      TM DEC   removable
     3  tape          TZK50               removable
     5  tape          TZ30                removable
     7  host adapter
```

■ The -f option directs the system to display a full system configuration display. Example A–2 shows an example of a full system configuration display.

Example A–2   Full System Configuration Display

```
>> conf -f

hardware: revision 1
firmware: revision 1
cpu: revision 2.32
fpu: revision 3.32
security switch: unsecure mode
password: clear
eeprom: valid
ethernet hardware address: 08-00-2b-12-7f-58
option board: Asynch Comm, 8 ports
memory: total size  16MBs
     bank0   4MB SIMMs  size:  8MBs     0 bad pages
     bank1   4MB SIMMs  size:  8MBs     0 bad pages
scsi peripherals
  unit type           product             removable/fixed    capacity
     0  disk          RZ56      (C) DEC   fixed              634 MBs
     2  cdrom         RRD40      TM DEC   removable          571 MBs
     3  tape          TZK50               removable
     5  tape          TZ30                removable
     7  host adapter
```

- The -m option directs the system to display the memory configuration. The memory configuration shows the bad memory pages in each memory bank. Example A–3 shows an example of a memory configuration display.

Example A–3   Memory Configuration Display

```
>> conf -m

memory: total size 104MBs
      bank0  16MB SIMMs  size: 32MBs           0 bad pages
      bank1  16MB SIMMs  size: 32MBs           0 bad pages
      bank2  16MB SIMMs  size: 32MBs           0 bad pages
      bank3   4MB SIMMs  size:  8MBs           0 bad pages
```

- The -s option directs the system to display the SCSI device table. Example A–4 shows an example of a SCSI device table.

Example A–4   SCSI Device Table

```
>> conf -s

scsi peripherals
  unit type            product              removable/fixed   capacity
    0  disk             RZ56    (C) DEC     fixed             634 MBs
    2  cdrom            RRD40    TM DEC     removable         571 MBs
    3  tape             TZK50               removable
    5  tape             TZ30                removable
    7  host adapter
```

- The -g option directs the system to display the general information display. Example A–5 shows an example of a general information display.

Example A–5   General Information Display

```
>>  conf -g

hardware: revision 1
firmware: revision 1
cpu: revision 2.32
fpu: revision 3.32
security switch: unsecure mode
password: clear
eeprom: valid
ethernet hardware address: 08-00-2b-12-7f-58
option board: not present
```

A.3 Continue Command (continue)

This command causes the CPU to begin executing instructions from the
address currently stored in the program counter. The format of this command
is as follows:

>   **continue**

Note   *You can use this command to return to the operating system from the console
mode. This works only if you have set the variable* bootmode *so that you entered
console mode by pressing the halt/reset button.*

A.4 Deposit Command (d)

This command deposits a single byte, halfword or word value at the specified
address. The format for this command is as follows:

>   **d [[[-(b | h | w)] [ADDR]] | [-H reg-name]] VAL**

- The -b option indicates a single byte.

- The -h option indicates a halfword.

- The -w option indicates a word.

Note   *If you do not specify any of these options, the system uses the default option,
-w.*

- The parameter ADDR represents a virtual address. For example, to
  examine physical address location 0, enter an ADDR value of 0x80000000.

Note   *When you do not enter an address, the default address is the address
one location above the last address accessed by the last e (examine), or d
(deposit) command.*

- The -H option indicates that you are depositing the value to a register in
  the halt state memory block.

- The parameter reg-name represents the name of a particular R3000 internal register.

- The parameter VAL represents a specific numeric value.

A.5 Disable Command (disable)

This command removes a console device from the current list of enabled console devices.

disable DEV

- The parameter DEV is an ASCII string representing the console device you want to disable. You can enter the following values:

  - tty(0)

  - tty(1)

  - tty(2)

  - tty(3)

If you do not enter a value for DEV, the system displays the current list of enabled console devices.

A.6 Dump Command (dump)

This command shows a formatted display of the contents of memory. The format of this command is as follows:

dump [-H] | [[[[-(b | h | w)] [-(o | d | u | x | c | B)]] | [-I]] RNG]

- The -H option displays the contents of the halt state memory block.

- The -b option displays memory in bytes.

- The -h option displays memory in halfwords.

- The -w option displays memory in words.

Note *When you do not specify any of the options -b, -h, or -w, the system uses the default option, -w.*

- The -o option displays memory in octal format.

- The -d option displays memory in decimal format.

- The -u option displays memory in unsigned decimal format.

- The -x option displays memory in hexadecimal format.

- The -c option displays memory in ASCII format.

- The -B option displays memory in binary format.

- The -I option displays the contents of memory in R3000 assembly language format. Example A–6 shows an example of the dump -I display.

Example A–6   The dump -I Display

```
>>  dump -I 0x80030200:0x80030220

0x80030200:      c048228    jal            0x801208a0
0x80030204:         2021    addu           a0,zero,zero
0x80030208:     8fbf0014    lw             ra,0x14(sp)
0x8003020c:     27bd0018    addiu          sp,0x18
0x80030210:      3e00008    jr             ra
0x80030214:            0    nop
0x80030218:     27bdffe8    addiu          sp,0xffe8
0x8003021c:     afbf0014    sw             ra,0x14(sp)
```

The parameter RNG indicates a range of memory contents that the system displays. You can specify the memory range in three different ways:

- ADDR - displays the contents of a single address location specified by the parameter ADDR.

- ADDR#CNT - displays the contents of a number of address locations. The parameter ADDR specifies the address of the first location that is displayed. The parameter CNT specifies the number of address locations to be displayed after the starting address.

- ADDR1:ADDR2 - displays the contents of the address locations between the two addresses specified by ADDR1 and ADDR2.

A.7 Examine Command (e)

This command displays the byte, halfword, or word at a specified address. The format of this command is as follows:

e [-(b | h | w)] [ADDR]

- The -b option indicates a single byte.

- The -h option indicates a halfword.

- The -w option indicates a word.

Note *When you do not specify any of the options -b, -h, or -w, the system uses the default option, -w.*

- The parameter ADDR represents a virtual address. For example, when you want to examine the contents of physical address location 0, enter an ADDR value of 0x80000000.

A.8 Enable Command (enable)

This command adds a console device to the current list of enabled console devices.

enable DEV

- The parameter DEV is an ASCII string representing the console device you want to enable. You can enter the following values:

  - tty(0)
  - tty(1)
  - tty(2)
  - tty(3)

If you do not enter a value for DEV, the system displays the current list of enabled console devices.

A.9 Fill Command (fill)

This command places the value that you specify in the range of memory locations that you specify. When you do not specify a value, the system puts zeros in the range of memory locations that you specify. The format of this command is as follows:

fill [-(b | h | w)] [-v VAL] RNG

- The -b option indicates a single byte.
- The -h option indicates a halfword.
- The -w option indicates a word.

- The -v option specifies that you are putting the numeric value, represented by the parameter VAL, into the memory locations that you specified.
- The parameter RNG indicates the range of memory into which the system places the value represented by the parameter VAL. You can specify the memory range in three different ways:

  - ADDR - specifies a single address location.

- ADDR#CNT - displays the contents of a number of address locations. The parameter ADDR specifies the address of the first location that is displayed and the parameter CNT specifies the number of address locations to be displayed after the starting address.

- ADDR1:ADDR2 - specifies a range of address locations. The parameter ADDR1 specifies the first address of the range. The parameter ADDR2 specifies the last address of the range.

A.10 Go Command (go)

This command transfers program control to the specified address. The format of this command is as follows:

go [PC]

The parameter PC is the entry point address to which you want to transfer control.

When you do not specify an entry point address, the system uses the entry point address of the program module that the system loaded most recently. If the system has not loaded a program module, it uses address 0 as the entry point address.

A.11 Help Command (help) (?)

This command displays the correct format of a specified command. The format of this command is as follows:

help [CMD]

or,

? [CMD]

The parameter CMD represents the command for which you need information. When you do not specify a command, the system displays the complete console menu. Example A–7 shows the console menu.

Example A–7   Console Menu

```
CMD:
  boot [-f FILE] [-(s|m)] [-n] [ARG...]
  conf [-(b|f|m|s|g)]
  continue
  d [[[-(b|h|w)] [ADDR]] | [-H reg-name]] VAL
  disable DEV
  dump [-H] | [[[[-(b|h|w)] [-(o|d|u|x|c|B)]] | [-I]] RNG]
  e [-(b|h|w)] [ADDR]
  enable DEV
  fill [-(b|h|w)] [-v VAL] RNG
  go [PC]]
  help [CMD]
  init
  passwd [-(c|s|u)]
  printenv [EVAR...]
  setenv EVAR STR
  scsi [?]
  test [?] | [[-v] [-(f|h)] [-r[REPS]] [-s] TNUM [parm1 parm2 parm3 ....]]
  unsetenv EVAR
  ? [CMD]
RNG:
  ADDR#CNT
  ADDR:ADDR
```

A.12 Init Command (init)

This command performs a full system initialization. The format of this command is as follows:

> **init**

The init command performs the same initialization procedure that is performed when you turn on the system unit, or when you press the halt/reset button. However, the system does not execute the power-up self-test.

A.13 Password Command (passwd)

This command allows you to perform the following:

- Enter privileged console mode

- Set a new password

- Clear the currently stored password

- Exit privileged console mode

The format of the command is as follows:

> **passwd [-(c | s | u)]**

When you do not specify any of the options in the command, the system prompts you for the system password. Enter the password.

Note *The system does not display the password as you enter it.*

When the password you enter matches the current system password, you enter privileged console mode.

When the password you enter does not match the current system password, you remain in unprivileged console mode. Also, the system maintains a record of the number of incorrect passwords entered.

- The -c option allows you to clear the system password. This is equivalent to disabling system security.

- The -s option allows you to set the system password. The system prompts you for a password twice. When you enter the same password each time, the system accepts the password you enter as the new system password.

- The -u option assigns you an unprivileged status.

A.14 Print Environment Command (printenv)

This command displays the current value of the specified environment variable. The format of this command is as follows:

printenv [EVAR...]

The parameter EVAR represents the variable, the value of which, you want to display. When you do not specify a variable, the system displays a table showing the values of all the environment variables. Example A–8 is a typical environment variable table.

Example A–8   Environment Variable Table

```
bootpath=rz()vmunix
bootmode=a
console=0
scsiid0=7
iooption=0x0
baud0=9600
systype=0x820c0101
inetaddr=0
baud1=9600
baud2=9600
baud3=9600
bitmap=0xa07ff800
bitmaplen=0x200
```

The system puts environment variables into classes according to the type of memory in which they reside as follows:

- volatile - the system stores the value of the variable in memory that is lost when you switch the power off

- nonvolatile - the system stores the value of the variable in memory that is not lost when you switch the power off

- initialized - the console program automatically initializes the memory that stores the values of these variables.

Table A–1 describes the types of the default environment variables.

Table A–1   Default Environment Variables

Variable	Type	Description
baud0	Nonvolatile	Baud rate of the tty(0) terminal line. The allowed values are as follows: 75, 110, 134, 150, 300, 600, 1200, 2400, 4800, 9600 (default). The system enables this terminal line at power-up.
baud1	Initialized	Baud rate of the tty(1) terminal line. The allowed values are as follows: 75, 110, 134, 150, 300, 600, 1200, 2400, 4800, 9600 (default). The system disables this terminal line at power-up.
baud2	Initialized	Baud rate of the tty(2) terminal line. The allowed values are as follows: 75, 110, 134, 150, 300, 600, 1200, 2400, 4800, 9600 (default). The system disables this terminal line at power-up.

Table A–1 (Cont.)   Default Environment Variables

Variable	Type	Description
baud3	Initialized	Baud rate of the tty(3) terminal line. The allowed values are as follows: 75, 110, 134, 150, 300, 600, 1200, 2400, 4800, 9600 (default). The system enables this terminal line at power-up.
bootpath	Nonvolatile	A string containing the complete boot path specification. The boot path has two fields: the boot device and the boot file (see Section A.1)
bootmode	Nonvolatile	A one character control code that specifies the action taken by the console program at power-up or when you press the halt/reset button. The allowed control characters are as follows: ■ a - automatically boots the system from the device and file specified in the bootpath variable ■ d - halts the system before running the power-up diagnostics ■ h - enables the halt interrupt mechanism
bitmap	Initialized	The hexadecimal address of the memory bitmap table. The memory bitmap table is a vector of words. Each bit in each word corresponds to a page in memory. If the bit is set to 1, the memory page is good and available to the system. If the bit is set to 0, the page is bad. Do not change the value of this variable.
bitmaplen	Initialized	The length of the memory bitmap in words. Do not change the value of this variable.
inetaddr	Initialized	Specifies the internet address that BOOTP uses. The default value is 0.
iooption	Nonvolatile	Specifies the type of Input/Output Option present.
console	Nonvolatile	Always selects tty (0).
scsiid0	Nonvolatile	Specifies the SCSI ID number assigned to the SCSI bus adapter. The default value is 7.

(continued on next page)

Table A–1 (Cont.)   Default Environment Variables

Variable	Type	Description
systype	Initialized	Provides information identifying the CPU type, the firmware revision level, and the hardware revision level. Do not change the value of this variable.

A.15 Set Environment Command (setenv)

This command assigns a new value to the specified environment variable. The format of this command is as follows:

setenv EVAR STR

- The parameter EVAR is the variable that you want to set.

- The parameter STR is the string value, to which you want to set the variable.

Table A–1 provides descriptions of the default environmental variables that the system sets up. You can add your own environment variables but these variables are stored in volatile memory. The environment variables table can contain up to 16 variables, a total of 256 characters.

A.16 SCSI Command (scsi)

This command allows you to inquire, test, and reset devices on the SCSI bus. The format of this command is as follows:

scsi [?]

When you enter the command scsi ?, the system displays a summary of the scsi commands that you can enter. Example A–9 shows the scsi command summary that the system displays.

Example A–9   SCSI Command Summary

```
scsi   a1        a2        a3

       rs                            Reset the SCSI bus
       ri                            Reset the sii
       st                            Dump the sii status registers
       du                            Dump all sii registers
       cd        unit      [r]       Read/write test for SCSI hard drives
       ct        unit      [r]       Read/write test for TZ30 tape drive
       cr        unit      [r]       Read only self test for RRD40 ROM disk drive
       fm        unit                Format fixed disk using default parameters
       iq        unit                Show inquiry response from <UNIT>
       ms        unit                Show mode sense response from <UNIT>
       ry        unit                Show ready status from <UNIT>
       sn        unit                Show request sense response from <UNIT>
       sp        unit                Stop <UNIT>
       sr        unit                Start <UNIT>
       su        unit                Setup <UNIT>, wait for ready status
```

A.17 Test Command (test)

This command allows you to run the ROM based diagnostic test identified by
its test number. The format of this command is as follows:

> **test [?] | [[-v] [-(f | h)] [-r[REPS]] [-s] TNUM [parm1 parm2 parm3
> ....]]**

- The ? option displays a list of the tests and test scripts (groups of tests)
  that the system can run.

- The -v option activates the diagnostic report mode for the duration of test
  execution.

- The -f option forces the test to continue even if an error is detected. In
  general, the default is to stop the test on error detection. The exception is
  test 0x0, which always attempts to run to completion.

- The -h option causes the test command to halt execution when a test
  failure occurs. There are no exceptions.

- The -r option allows you to repeat a test or test script. The parameter
  REPS defines the number of times the test repeats. If you do not specify
  a value for REPS, the test repeats continuously. Press Ctrl/C to stop a
  repeating test.

- The -s option allows you to create and execute a script of tests. When you
  specify this option, the system prompts you to enter each test number of
  the script, one line at a time. End the script by pressing Return twice.

- The parameter TNUM is the number of the test that you want to run. You
  must enter this number in hexadecimal format.

- The parameter parm1, parm2, and so on, are the parameters that you want to pass to the test.

A.18 Unset Environment Command (unsetenv)

This command removes the specified variable from the environment variables table. The format of this command is as follows:

unsetenv EVAR

The parameter EVAR represents the variable that you want to remove. Table A–1 contains a description of the environment variables that the system sets up by default.

Note *The unsetenv command has no effect on environment variables that are stored in nonvolatile memory.*

B

Removable Storage Media

The TZ30 tape drive and RX23 diskette drive, which are options in the DECsystem 5100 system unit, use removable storage media. This appendix contains information on the use and storage of the media used by these devices: tape cartridges and diskettes.

B.1 Tape Cartridges

The CompacTape cartridge (see Figure B–1) is a 10 cm by 10 cm (4 in. by 4 in.) plastic tape cartridge that can be used by TZ30 or TK50 tape drives. The TZ30 tape drive is supplied with a CompacTape. The CompacTape II is the successor to the CompacTape cartridge. The CompacTape II has tighter tolerances than the CompacTape to support the higher recording densities of the TK70.

The TZ30 can use either CompacTape or CompacTape II cartridge originally written by the TK50. If a CompacTape II cartridge written by a TK70 is used on a TZ30, the TZ30 automatically unloads the tape cartridge, since the TZ30 cannot read the tape cartridge. The green LED will then blink indicating a tape error.

Figure B–1   The CompacTape Cartridge
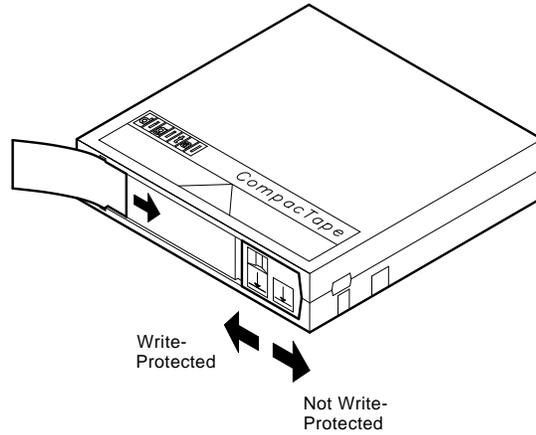
MLO-002758

Table B–2 and Table B–1 show the compatibility of CompacTape and CompacTape II tape cartridges to TZ30, TK50, and TK70 tape drives.

Table B–1   Noninitialized Cartridge Compatibility

	CompacTape (TK50-K)	CompacTape II (TK52-K)
TZ30 Drive	Yes	Yes
TK50 Drive	Yes	Yes
TK70 Drive	No	Yes

Table B–2   Initialized Cartridge Compatibility

	TK50 Drive	TK70 Drive	TZ30 Drive
TZ30 Initialized Cartridge	R/W	R	R/W
TK50 Initialized Cartridge	R/W	R	R/W
TK70 Initialized Cartridge	NC	R/W	NC

Key

R = Read Only
R/W = Read/Write
NC = Not Compatible

B.1.1 Labeling a Tape Cartridge

Always label tape cartridges. A slot for the label is provided on the front of the cartridge (see Figure B–2). This 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 a pen, pencil, or other marking instrument.

The labels supplied with the CompacTape or CompacTape II cartridges have spaces to mark the capacity of the tape cartridge. If data was written to the tape cartridge with a TK50 or a TZ30, tick the 95MB block on the label. If data was written to the tape cartridge with a TK70, tick the 296MB block on the label.

If you use both TK70 and TZ30 drives, remember that the TZ30 is unable to read or write tapes that have originally been written to by the TK70. However, the TK70 can read tapes written by the TZ30 or the TK50.

Figure B–2   Labeling a Tape Cartridge

Label Slot

MLO-000960
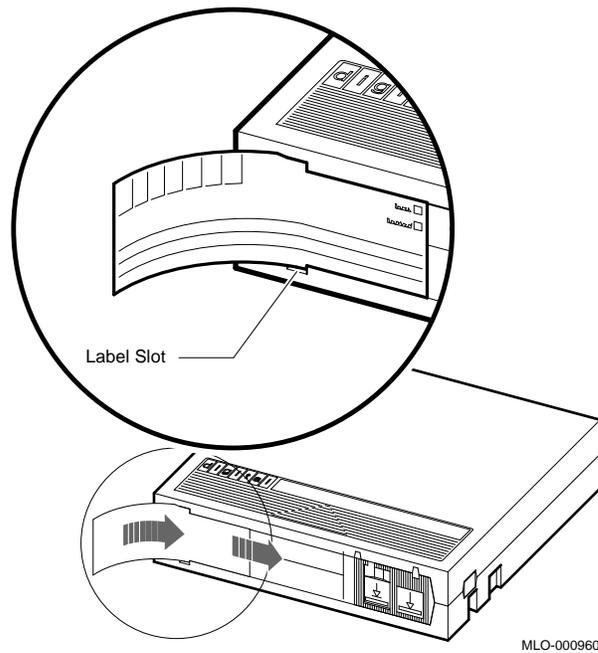
B.1.2 Writing to and Protecting Tape Cartridges

CompacTape and CompacTape II cartridges have a write-protect switch
to prevent accidental over-write of data. Write-protecting a tape prevents
accidental erasure of information. The system can read information on the
tape regardless of the position of the write-protect switch. However, the system
cannot write data to a write-protected tape.

B.1.2.1 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, set the write-protect switch to the write-protect position
by sliding it left toward the label until it locks in place (see Figure B–3).
An orange rectangle appears when the write-protect switch locks in the
write-protect position.

Figure B–3   Write-Protecting a Tape

MLO-000961
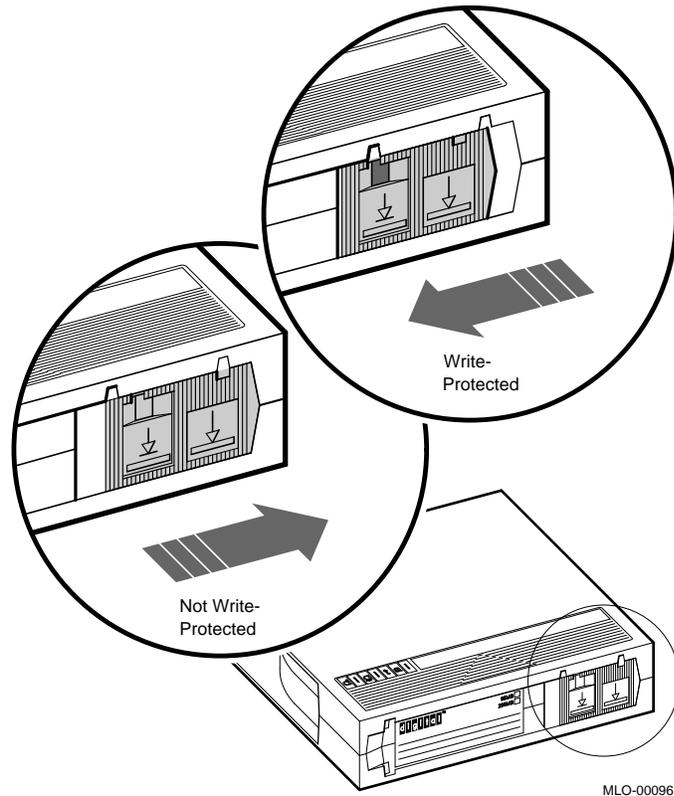
B.1.2.2   Writing to a Tape   When you use a tape to make a backup copy or to write out data, set the write-protect switch to enable writing to the tape.

To enable writing, set the switch to the write-enabled position by sliding it to the right, away from the label, until the switch locks in place.

B.1.3   Handling and Storing Tape Cartridges

Inside the cartridge, a 600-foot single reel of magnetic tape stores data. A plastic tape leader is at the beginning of the tape. Take the following precautions when handling and storing tapes:

- Do not touch the exposed surface of the tape.

- Avoid dropping the tape cartridge. The impact can cause damage.

- Allow tape cartridges to reach 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 tape 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 tape cartridges where the relative humidity is between 20% and 80%.

- Keep tape cartridges away from magnets and equipment that generate magnetic fields, such as motors, transformers, video monitors, and terminals.

- Keep tapes away from X-ray equipment.

B.2 Diskettes

Diskettes are magnetic disks that store information. Digital recommends that you use high-density (HD) diskettes.

Keep your diskettes dry, out of extreme temperatures and direct sunlight, and away from anything that contains a magnet, such as a telephone.

Caution *Do not place diskettes or magnetic media on or near your terminal. The electromagnetism from your terminal may damage diskettes by distorting or erasing the magnetic patterns.*

B.2.1 Writing to and Protecting Diskettes

Write-protecting a diskette prevents accidental erasure of information. The RX23 diskette drive (included in some DECsystem 5100 configurations) can read information on the diskette regardless of the position of the write-protect switch. However, the system cannot write data to a write-protected diskette.

B.2.1.1 Write-Protecting a Diskette When you use a diskette to install application software on your system, or to protect information on the diskette, set the write-protect switch on the back of the diskette in the write-protect position by moving it down until it locks in place (see Figure B–4).

Figure B–4   Write-Protecting a Diskette

Write-Protect Switch ————————————————————————   MLO-002056
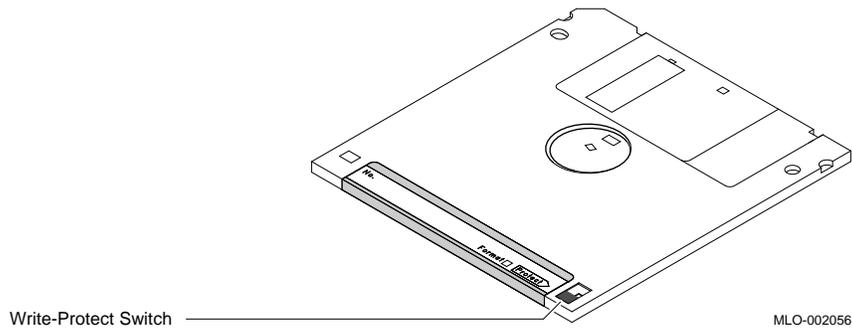
B.2.1.2   Writing to a Diskette   When you use a diskette to make a backup copy of a file or to write out data, set the write-protect switch to enable writing to the diskette.

To enable writing, set the switch to the write-enable position by moving it up, until it locks in place.

Glossary

application software

Software that performs an end-user task. Financial spreadsheet programs are examples of application software.

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 copy

A copy of data stored on your disk.

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. You make backup copies on tape cartridges or on another disk.

baud rate

The speed at which signals are serially transmitted along a communications line. One baud equals one bit/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.

boot

See bootstrap.

boot device

The device that is booted at system startup. (See bootstrap and device.)

bootstrap (or boot)

To boot is when an internal program attempts to load the operating system software from a mass storage device.

bus

A channel (a set of wires) along which communication signals in a computer system travel.

byte

A group of eight binary digits (bits). A byte is one-quarter of a VAX system longword.

cartridge insert/release lever

This lever sets internal TZ30 mechanisms to accept or eject the tape cartridge. Move the lever to the left to insert a tape. Move it to the right to use the tape. Move it to the left again to eject the cartridge after the tape has been completely rewound.

cartridge leader

A plastic leader at the beginning of magnetic tape.

central processing unit (CPU)

The part of the system that controls the interpretation and execution of instructions.

communications cable

A cable along which electrical signals are transmitted. Devices or systems that are connected by a communications line can share information and resources.

computer system

A combination of system hardware, software, and external devices performing operations and tasks.

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/reset button on the back of the system unit. Console mode is indicated by the console prompts ((>>) or S>) on the console terminal. (Compare with program mode.)

console terminal

The device on which you enter, and view the results of, console commands.

console prompt

A prompt used for communication between the system manager and the computer.

controller

A system component, usually a printed circuit board, that regulates the operation of one or more peripheral devices.

CPU

Abbreviation for central processing unit. (See central processing unit.)

data

A formal representation of information suitable for communication, interpretation, and processing by humans or computers.

debugging

Detecting, locating, and correcting errors (bugs) in hardware or software.

DECconnect

Digital's simple, cost-effective cabling system for extending Ethernet and terminal interconnections to offices and work areas.

default

A value or setting that in most cases is "normal" or "expected".

device

The general name for any unit connected to the system that is capable of receiving, storing, or transmitting data.

diagnostics

Programs, located in read-only memory, that detect and identify abnormal system hardware operation. (See read-only memory.)

disk, hard

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.

diskette

A flat circular plate with a coating on which data is magnetically stored in concentric circles (tracks). A diskette is removable from the 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.

tape leader

A plastic leader that is inside the TZ30 tape drive. The tape 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 type of local area network based on Carrier Sense Multiple Access with Collision Detection (CSMA/CD).

file

A collection of related information treated by the system as a single unit.

format

To prepare a diskette to accept data.

hard disk

A hard disk resides permanently inside a disk drive. See disk.

hardware

The physical components—mechanical and electrical—that make up a system. (Compare with software.)

head

The part of a fixed disk drive, diskette drive, or tape drive that reads, records, and erases data. Also called read/write head.

LED

Light-emitting diode. LEDs are used as indicators on the system enclosure.

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.

magnetic tape

A tape used for storing data that is made of plastic and coated with magnetic oxide. Also called magtape.

megabyte

1,048,576 (2^{20}) bytes. Megabyte is abbreviated to MB.

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.

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.

network

A group of individual computer systems that are connected by communications lines to share information and resources.

node

An individual information-processing unit, such as a computer, workstation, or peripheral device, that is connected to a network. A node is an end point to any branch of a network or a junction common to two or more branches.

operating system

A collection of system programs that controls the operation of the system and allows 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.

peripheral device

A device that provides the CPU with additional memory storage or communication capability. Examples are disk and diskette drives, video terminals, and printers.

port

The name of the socket or connector at the back of the computer to which a terminal, printer, or other communication devices are connected.

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.

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. (See console mode.)

prompt

Words or characters that the system displays to indicate that it is waiting for you to enter a command.

read-only memory (ROM)

A memory whose contents cannot be modified. The system can use the data contained in a ROM but cannot change it.

ROM

Abbreviation for read-only memory. (See read-only memory (ROM).)

run

A single continuous execution of a program (noun). To execute a program (verb).

SCSI

See Small Computer System Interface.

server

Hardware or software that provides a specific set of services to a client.

Small Computer System Interface (SCSI)

It is 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 throughout the industry.

software

Programs executed by the system to perform a chosen or required function. (Compare with hardware.)

standard Ethernet

IEEE standard 802.3 compliant Ethernet network composed of standard Ethernet cable as opposed to ThinWire Ethernet cable.

station

A single addressable device on a local area network.

storage media

Devices capable of recording information; for example, diskettes.

store

To enter data into a storage device, such as a disk, or into memory.

system

A combination of system hardware, software, and peripheral devices performing specific processing operations.

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. The connector also has a connector that is attached directly to a system.

terminal

An input/output device that lets you communicate with the system. Terminals are divided into two categories: video and hard copy.

ThinWire

A Digital trademark used to describe its 10 base 2 (IEEE standard 802.3 compliant) Ethernet products used for local distribution of data.

ThinWire Ethernet connector

The connector on the back of the system unit to which the ThinWire Ethernet cable is attached.

unload button

A button on the front of the TZ30 tape drive that rewinds and unloads the tape.

ULTRIX, ULTRIX–32, ULTRIX–32w

A Digital implementation of the UNIX operating system.

write protect

To protect a disk, diskette, or other storage medium from the addition, revision, or deletion of information.

write-protect switch

The switch that you slide down on a CompacTape and CompacTape II cartridge to prevent loss of data by accidental overwriting.

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