

DECsystem 5100

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Installation Guide

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This guide describes how to install and test a DECsystem 5100. It also provides information on installing the operating system software.

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Preface

Purpose of This Guide

This guide describes how to install and test your DECsystem 5100. It also provides information on installing the operating system software.

Who Should Use This Guide

This guide is written for people who have little or no previous experience with computers. The new owner of a DECsystem 5100 uses this guide for installation and testing.

Structure of This Guide

This guide contains six chapters and two appendixes.

- Chapter 1 includes information on getting started, reviewing your site requirements, and unpacking your equipment.
- Chapter 2 provides instructions for installing new DECsystem 5100s.
- Chapter 3 provides information on starting your system, and inspecting the results of the power-up self-tests.
- Chapter 4 tells you how to connect the optional add-on storage, software loading devices, and other peripherals that you can use with your system.
- Chapter 5 discusses connecting your system to simple Ethernet networks.
- Chapter 6 describes how to install your operating system.

The appendixes provide complementary information on the following topics:

- System specifications
- Associated documentation

For More Information

See Appendix B for a list of associated documents to help you to become acquainted with 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.
Ctrl/C	A sequence such as Ctrl/C indicates that you hold down the Ctrl key while you press another key (indicated here by C).
blue-green ink	Blue-green ink in interactive examples indicates information that you must enter from the keyboard.
<i>italic type</i>	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.

Getting Started

This chapter tells you how to prepare for setting up your system, including how to:

- Choose the right location for your DECsystem 5100
- Make sure that the shipping carton contains everything you need.

1.1 Choosing the Right Location

Use the following checklist to keep your system operating at its best:

- Carefully read all installation instructions before you turn on the power.
- Keep the temperature between 10°C and 32°C (50°F and 90°F) if your system has a TZ30 tape drive installed. If the system does not have a TZ30 installed, keep the temperature between 10°C and 40°C (50°F and 104°F).
- Keep the relative humidity between 40% and 80% if your system has a TZ30 tape drive installed. Tape cartridges should also be stored at this relative humidity. If the system does not have a TZ30 installed, keep the relative humidity between 10% and 90%.
- 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.
- Before you set up your system, select a surface that is large enough to hold the system unit. Your desk or work table is a good choice.
- 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 will damage the 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 a dedicated, isolated grounded circuit.

If you have several pieces of equipment that need to be plugged into an electrical outlet, use a grounded power strip. Many power strips come with an on/off switch and a surge protector.

Do not exceed the voltage or current requirements of the circuit. Appendix A lists these requirements.

- To avoid damaging equipment that has been moved inside from a cold environment, let the equipment warm to room temperature before you turn it on. Let tape cartridges stabilize for 24 hours.

1.2 Unpacking

Caution *Because of the weight of the system unit, two people should lift the equipment out of the shipping carton and place it on a work surface.*

The shipping carton contains three boxes. The large box contains the system unit and the accessory tray. The other two boxes contain the power cord and documentation, and the software licences respectively. Figure 1–1 shows the contents of each box. When unpacking the boxes keep the contents of each box separate from the others. Expansion boxes are packed in separate cartons.

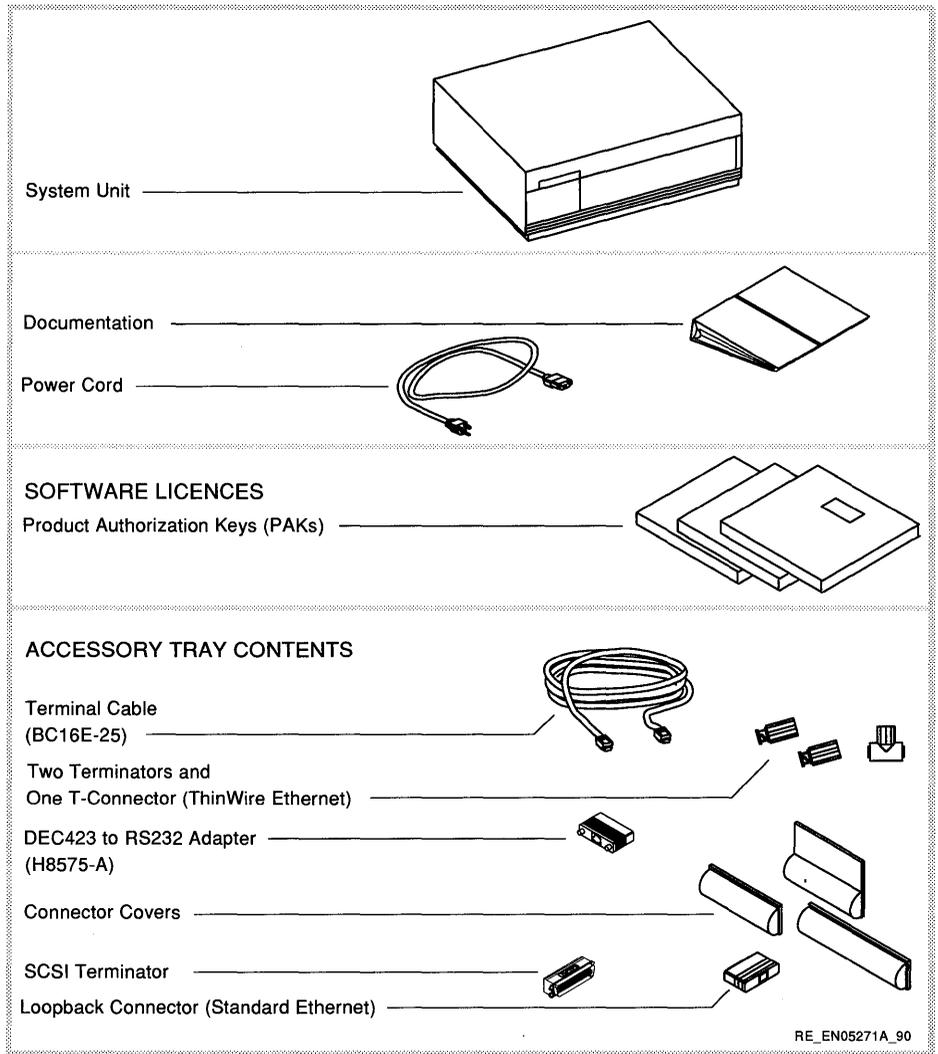
Check the contents of the shipping carton against the shipping list to make sure that it contains everything you ordered.

Inform the delivery agent and your Digital Sales representative if any items are missing or damaged.

Note *Depending on how you set up your system, you may not use all the components supplied with your system. Unused parts should be stored safely for future use.*

Always repack the system unit in its original packing material when moving or relocating your system. This precaution will protect the hard disks from damage.

Figure 1-1 Unpacking Your System



Installing Your DECsystem 5100

This chapter describes how to install your DECsystem 5100. It also describes how to connect the following:

- SCSI terminator
- Connector covers
- ThinWire Ethernet T-connector and terminators
- Standard Ethernet loopback connector
- Console terminal
- System power cord

You must connect each of these items to successfully complete, and examine the results of, the power-up self-tests. Chapter 3 describes the power-up self-tests.

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

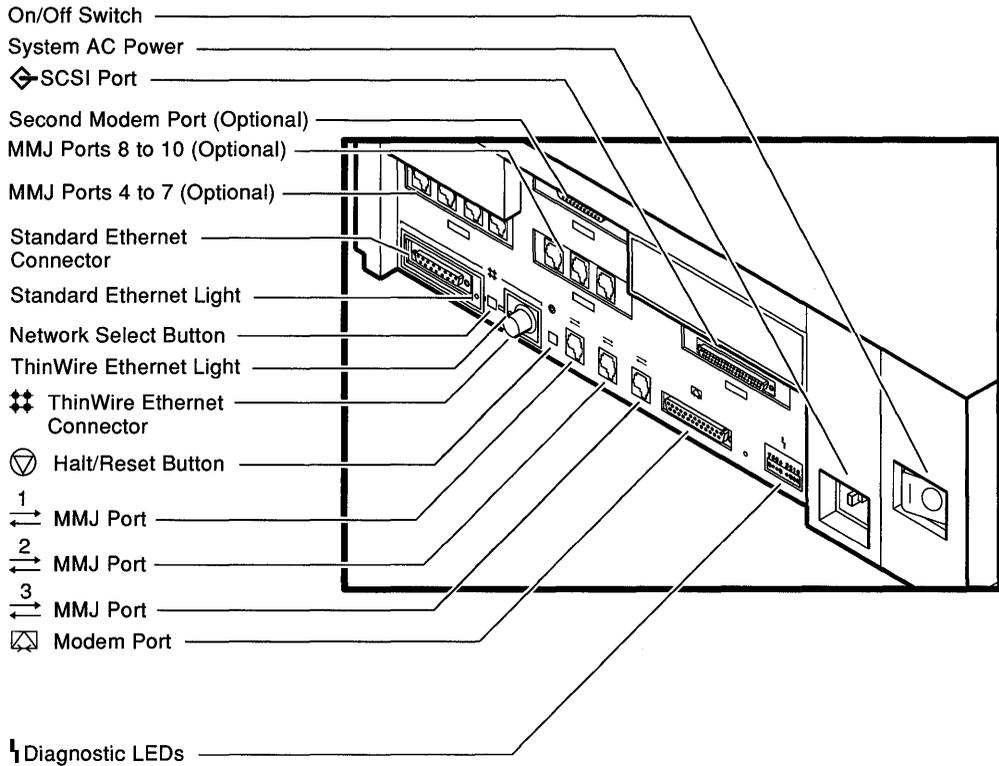
Make sure that you have positioned the system unit correctly before you connect anything to it. Use the following guidelines:

- Place the system on a flat surface.
- Leave space at the back of the system unit to allow you to connect the cables.
- Make sure that the system unit's on/off switch is set to the off (O) position. Figure 2-1 shows the location of the on/off switch.

2.1 Identifying the System Ports and Connectors

Figure 2-1 identifies all the system unit ports and connectors.

Figure 2-1 System Ports and Connectors

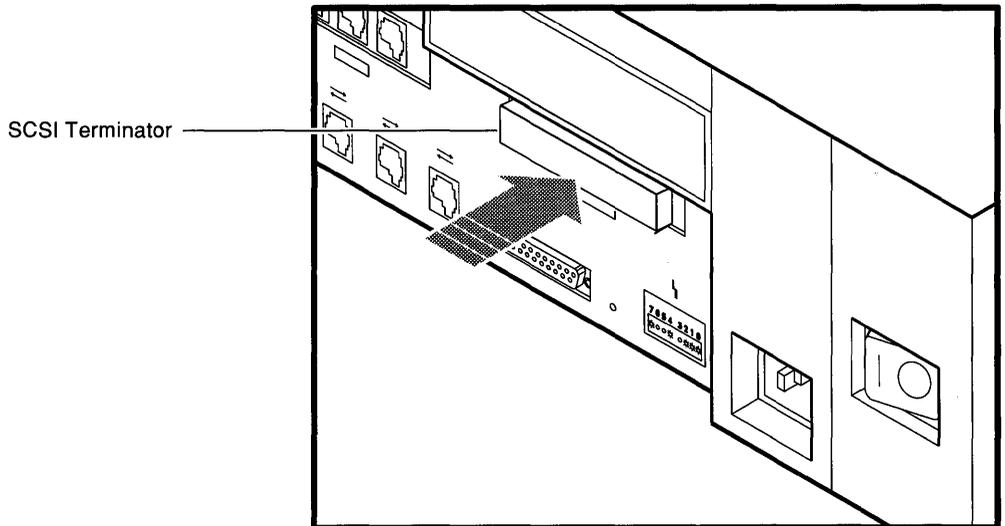


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2.2 Connecting the SCSI Terminator

If you do not intend to connect expansion boxes to your system, install the SCSI terminator (see Figure 1-1) on the SCSI port on the back of the system unit. Figure 2-2 shows how to connect the SCSI terminator.

Figure 2-2 Connecting the SCSI Terminator



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2.3 Installing Connector Covers

The three connector covers, provided with your system, protect the unused connectors on the back of the system unit. After you have identified the ports and connectors, you can install covers on the unused connectors as determined by your system configuration.

Note *If the DHT80 asynchronous module is installed, MMJ ports 4 to 10 are visible, see Figure 2-1.*

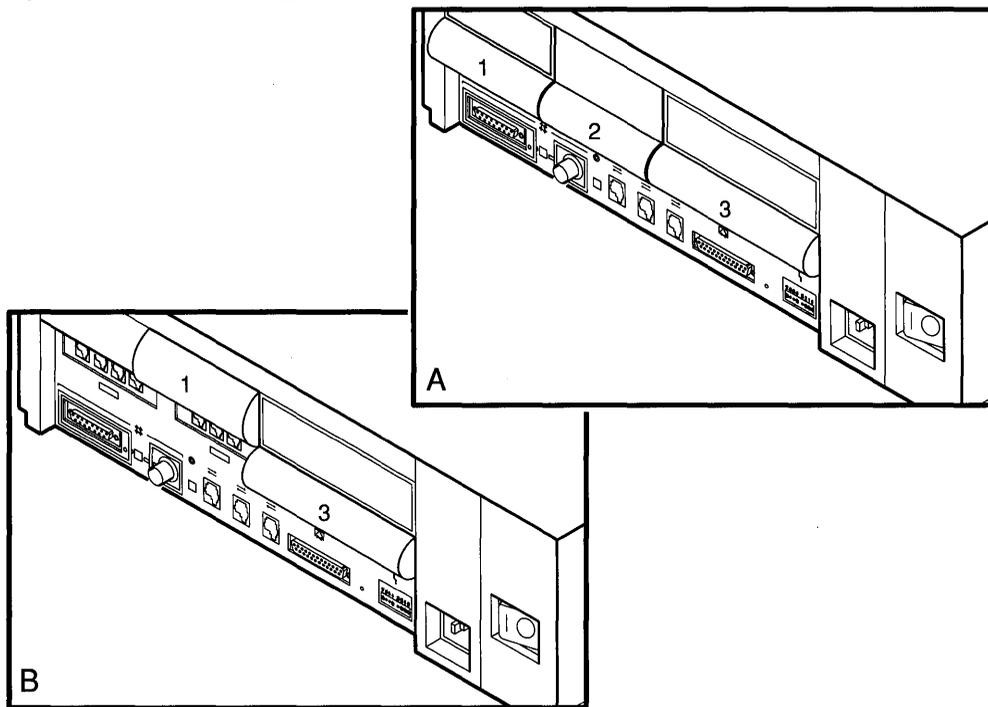
If the DHT80 asynchronous module is not installed, first install cover 2 (74-38973-01), then install cover 1 (74-38974-01). See Figure 2-3 A.

Note *Due to the construction of the covers, you must install cover 2 first.*

If the DHT80 asynchronous module is installed, but you are not using the second modem port (see Figure 2-1), you can cover it, using cover 1. See Figure 2-3 B.

If you do not want to use the external SCSI interface, install cover 3 (74-38975-01). See Figure 2-3 A and B.

Figure 2-3 **Installing Connector Covers**



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2.4 Connecting the Console Terminal to the System Unit

Note Make sure that the on/off switch on the terminal is in the off (O) position.

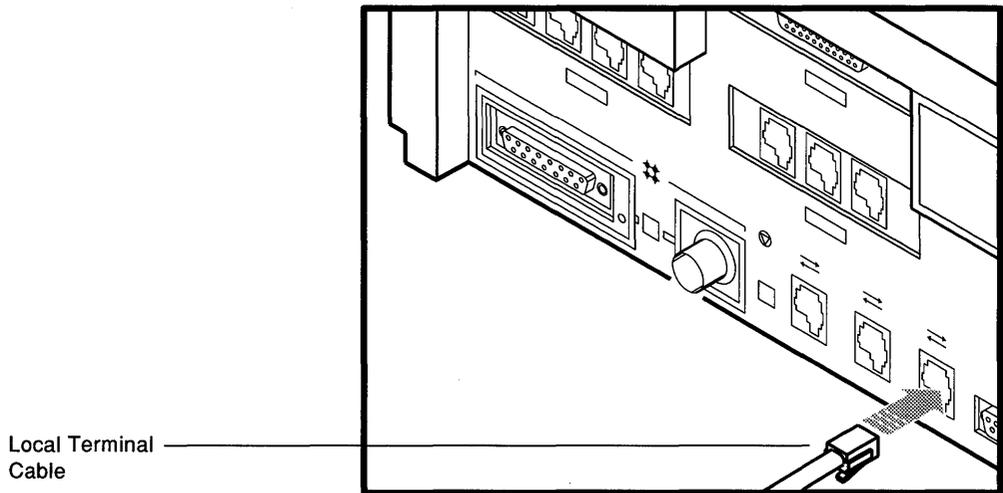
The terminal must be set at 9600 baud, with 8 bits, and no parity. On most terminals, this is the default setting. See your terminal documentation if you need information on setting up your terminal.

Note If you connect the terminal cable to one of the MMJ ports on the back of a VT3xx terminal, you must set the port for DEC-423 operation. See your terminal documentation for details.

Connect the terminal cable supplied with the system (see Figure 1-1) to MMJ port 3 on the back of the system unit. See Figure 2-4. Connect the other end of the console cable to the communications port on the terminal.

Note Some terminal cables have grounding straps. You must connect this grounding strap to the grounding stud closest to MMJ port 3.

Figure 2-4 Connecting a Terminal



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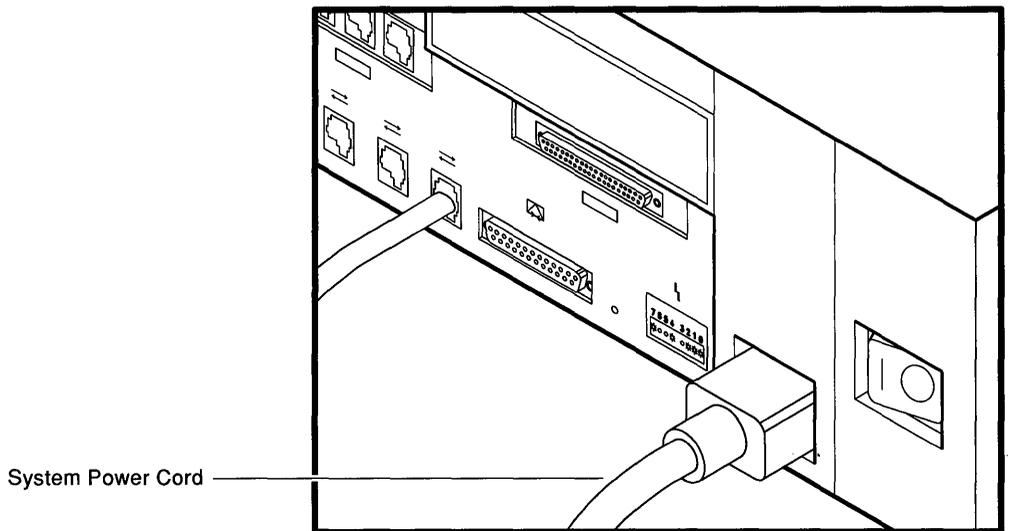
2.5 Connecting the System Unit Power Cord

Note Make sure that the on/off switch on the back of the system unit is in the off (O) position.

The system accepts power inputs in the ranges 100/120 Vac and 200/240 Vac at 50 or 60 Hertz. Within these limits the power supply is self-sensing and no selection or switching is required.

Connect the supplied power cord to the power socket on the back of the system unit. See Figure 2-5. Connect the other end of the power cord to a grounded power outlet.

Figure 2-5 Connecting the Power Cord



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Starting Your DECsystem 5100

This chapter describes how to start your system and inspect the results of the power-up self-test.

Caution *To avoid damaging equipment that has been moved inside from a cold environment, let it warm to room temperature before turning it on.*

3.1 Starting Your System

Perform the following steps to start your DECsystem 5100:

- 1 Turn on the console terminal connected to MMJ port 3 (see your terminal documentation).

Note *Allow time for the console terminal to complete its power-up sequence, otherwise you will not be able to view the system power-up self-test display.*

- 2 Turn on the system unit by setting the on/off switch on the back of the system unit to the on (|) position.

It takes approximately one and a half minutes for the initial power-up display to appear. Section 3.2 shows an example of the power-up display.

3.2 Checking the Power-Up Self-Test Display

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 3–1 shows equivalent hexadecimal memory sizes and decimal memory sizes.

Table 3-1 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

④ 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 ①  
>>
```

- ① 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.

3.3 Unsuccessful Power-Up Self-Test Display

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=bfcb00480 sr= 00000000
epc=bfcb20a70 badvaddr=00060000 cause=3000000

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

3.3.1 If a Test Fails

If you see a power-up self-test display similar to the one shown in Section 3.3, 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, see the *DECsystem 5100 Operator's Guide* for information on troubleshooting, and on contacting your Digital Customer Service representative.

Installing Peripheral Devices

This chapter tells you how to install the peripheral devices for your DECsystem 5100.

You may connect various peripheral devices to your DECsystem 5100. Among the supported peripheral devices are the following:

- SCSI expansion boxes
- Printers, terminals, and other devices that use DEC423 asynchronous connectors
- Modems and other devices that use RS232 synchronous connectors

Warning *Turning on power before you are instructed to do so can cause personal injury and damage equipment.*

Caution *Attaching a peripheral device to the wrong connector on the system unit can damage the system unit and the peripheral device.*

4.1 Guidelines for Connecting Expansion Boxes

Use the following guidelines when connecting expansion boxes:

- You can connect any combination of two expansion boxes. However, each device in the expansion boxes must have a unique SCSI ID.
- You must attach the 50-pin terminator that comes with your expansion box to an unused SCSI connector on the back of an expansion box.
- Plug all expansion boxes into the same grounded power strip or electrical outlet.

Caution *Some expansion boxes are restricted to either 110 Vac, or 220 Vac operation. Make sure that the voltage requirement of any expansion box used is compatible with the supply voltage.*

- Turn on all expansion boxes before you turn on your system unit.
This procedure ensures that the device in each expansion box is ready for use, and that the system firmware includes the device in its configuration.

4.2 Determining Available SCSI IDs on Your System

You must determine which SCSI IDs are available for use before connecting an expansion box. Use the configuration display to determine this information.

4.2.1 Reading the Configuration Display

Enter the following command at the console prompt (>>), and press Return to display the configuration table:

```
>> conf -b
```

The system displays its configuration, similar to the following:

Note *The terms SCSI ID and unit number have the same meaning and are interchangeable.*

```
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             RZ24 (c)DEC     fixed           ❶
  3 disk             RZ24 (c)DEC     fixed           ❶
  7 host adapter
```

- ❶ SCSI IDs 0 and 3 are occupied by internal RZ24 hard disk drives.
- ❷ SCSI ID 7 is reserved for the host adapter (KN230).

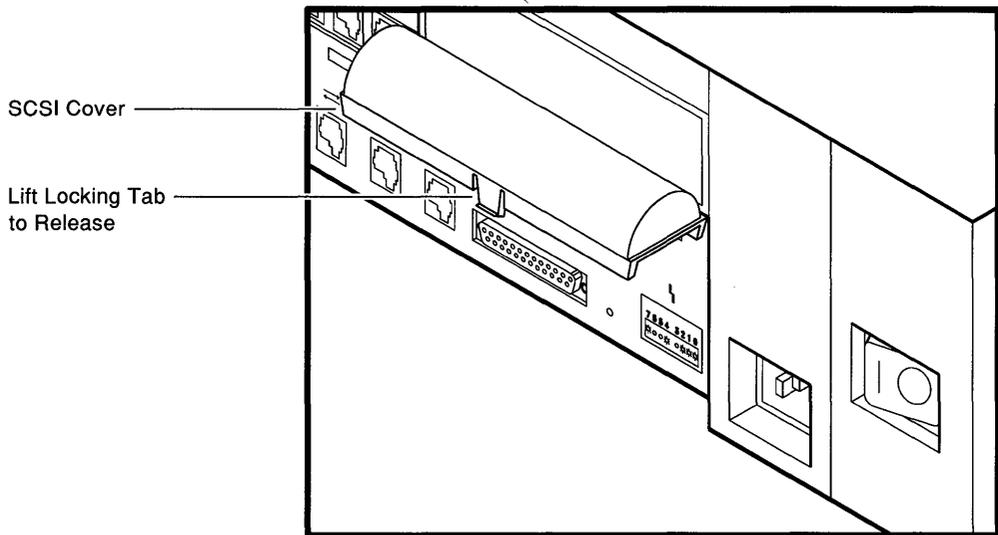
There are eight possible SCSI IDs, 0 to 7. In the previous example, three SCSI IDs (0, 3, and 7) are occupied. A new expansion box or internal device can occupy any one of the remaining five SCSI IDs (1, 2, 4, 5, or 6).

4.3 Preparing Your System for an Expansion Box

If you plan to add an expansion box to your system, you must first remove the SCSI cover and the terminator connected to the SCSI port.

- 1 Turn off your system by setting the on/off switch to the off (O) position.
- 2 Place your fingers under the locking tab on the SCSI port cover and lift the cover to release it. See Figure 4-1.

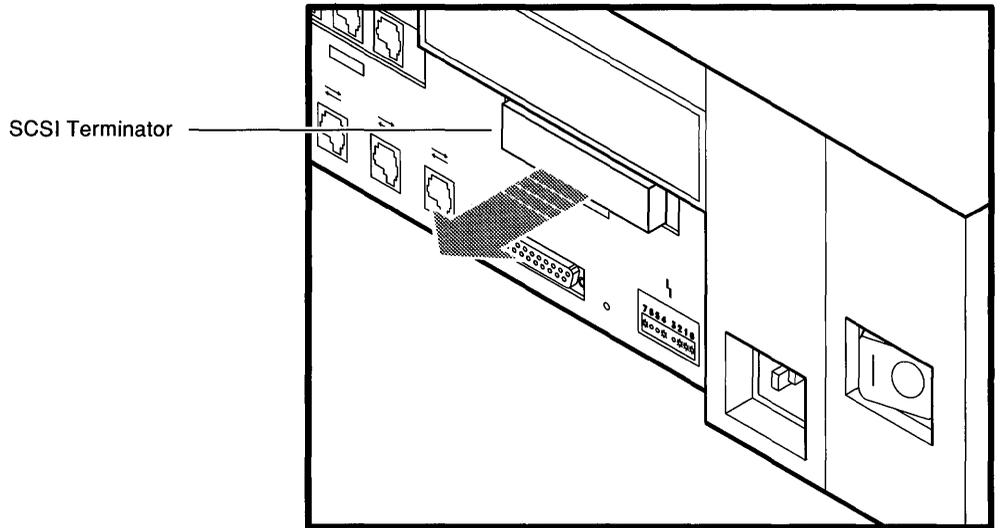
Figure 4-1 Removing the SCSI Cover



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- 3 Remove the SCSI terminator. Figure 4-2 shows you how to remove the terminator.

Figure 4-2 Removing the SCSI Terminator



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

4.4 Unpacking an Expansion Box

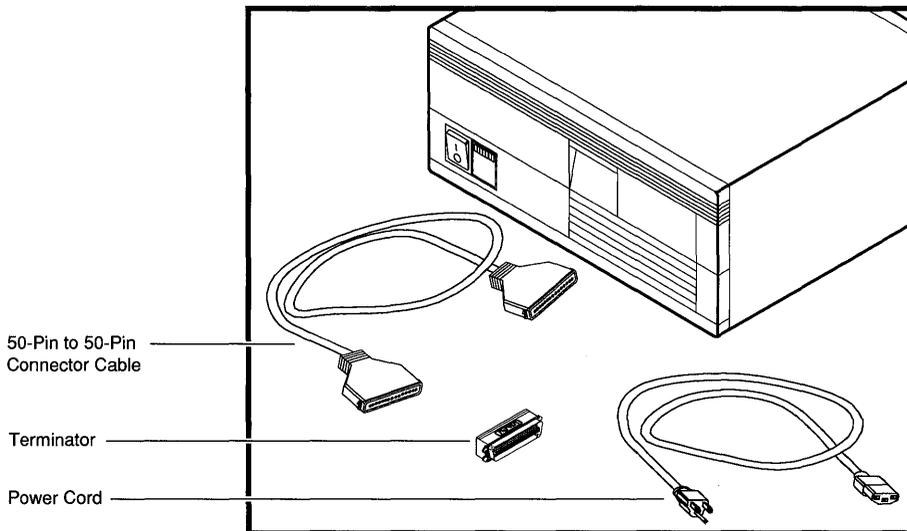
Each expansion box is shipped from the factory with the following accessories:

- One 50-pin to 50-pin cable. Use this cable to connect the expansion box to the system unit or to other expansion boxes.
- One power cord.
- One 50-pin terminator. Use this to terminate the last expansion box.
- One cable with a 68-pin connector at one end and a 50-pin connector at the other end. This cable is not used with DECsystem 5100.
- Some expansion boxes are shipped with test media. For example, the TK50Z tape drive expansion box is shipped with a blank tape.

Note *The figures in this chapter show one example of an expansion box. Your expansion box might be different.*

Figure 4-3 shows all the parts that you need to set up your expansion box. Make sure that you have each part shown.

Figure 4-3 Expansion Box and Accessories



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4.5 Connecting One Expansion Box

To connect a single expansion box to your system unit, perform the following steps:

- 1 Set the on/off switches on the system unit and expansion box to the off (O) position.
- 2 Turn the expansion box so that the back is facing you.
- 3 Verify the SCSI ID switch positions.

Each device is shipped from the factory with the SCSI switches set in a default position. See the documentation supplied with your expansion box to determine the default SCSI ID for that device.

Note *Dual drive expansion boxes contain two devices and have two sets of SCSI ID switches that must be set to different IDs. Remember, no two devices on the SCSI bus can occupy the same SCSI ID. See the documentation supplied with your expansion box for more information on setting SCSI IDs.*

- 4 Set the SCSI ID on the expansion box to an open ID if the default ID is occupied by another device on the bus.
- 5 Connect the expansion box cable as follows:

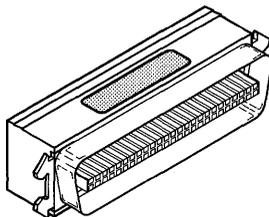
Connect one end of the 50-pin to 50-pin connector cable to the SCSI port on the back of the system unit and snap the bail lock loops in place.

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

- 6 Connect a 50-pin terminator to the unused port on the expansion box.

Figure 4-4 shows you what the 50-pin terminator looks like.

Figure 4-4 50-pin Terminator



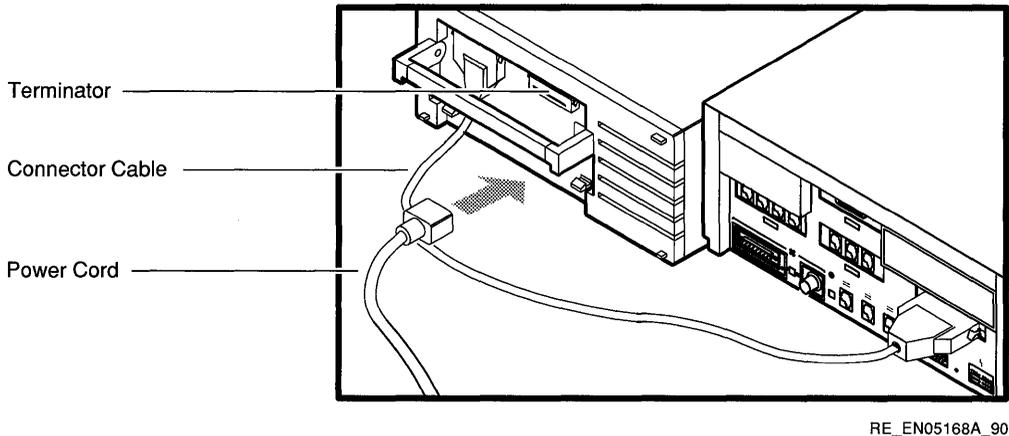
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Caution *Make sure that the voltage requirement of the expansion box is compatible with the supply voltage.*

- 7 Connect the power cord to the expansion box receptacle and plug the other end into an electrical outlet.

Figure 4-5 shows how to connect the SCSI cable from an expansion box to your system unit.

Figure 4-5 Connecting One Expansion Box



- 8 Enter the following command to determine whether the system has included the expansion box in the configuration display:

```
>> conf -b
```

If you connected the expansion box correctly, the resulting display has an extra line giving the unit number, device type, device name, and media type of the expansion box that you connected.

4.6 Connecting Two Expansion Boxes

You can add an additional expansion box at a later time and daisy-chain the second box to the first. To daisy-chain (link two expansion boxes together in series), perform the following steps:

- 1 Make sure the on/off switches on the system unit and all expansion boxes are set to the off (O) position.
- 2 Remove the 50-pin terminator on the first expansion box. Store the terminator for future use.
- 3 Connect one end of the 50-pin to 50-pin connector cable to the second expansion box.

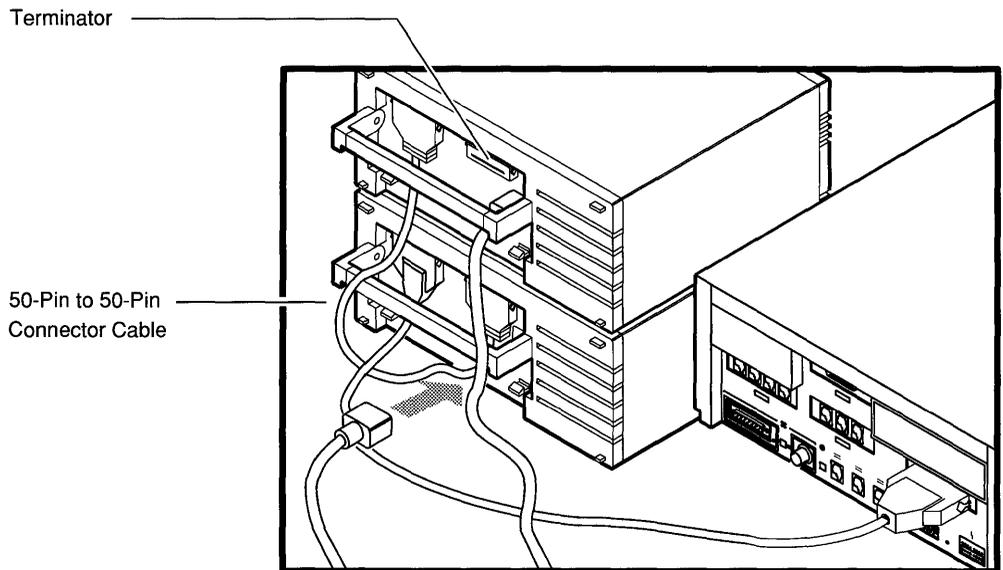
- 4 If the default ID is occupied by another device on the bus, set the SCSI ID on the expansion box to an open ID.

Note *Dual drive expansion boxes contain two devices and have two sets of SCSI ID switches that must be set to different IDs. Remember, no two devices on any single SCSI bus can occupy the same SCSI ID. See the documentation supplied with your expansion box for more information on setting SCSI IDs.*

- 5 Connect the other end of the 50-pin to 50-pin connector cable to an available port on the first expansion box.
- 6 Attach a 50-pin terminator to the unused SCSI port on the second expansion box.
- 7 Connect the power cord of the second expansion box to the expansion power receptacle and plug the other end into an electrical outlet. Each expansion box needs its own source of power.

Figure 4–6 shows how to daisy-chain two expansion boxes.

Figure 4–6 Connecting Two Expansion Boxes



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- 8 Enter the following command to determine whether the system has included the expansion boxes in the configuration display:

```
>> conf -b
```

If you connected the expansion boxes correctly, the resulting display has two extra lines giving the unit numbers, device types, device names, and media types of the expansion boxes that you connected.

4.7 Connecting Peripherals

You can connect a wide variety of peripherals to your DECsystem 5100: terminals, printers, modems, or other devices that use either the RS232 25-pin D-sub connector or DEC423 MMJ connector.

The basic DECsystem 5100, without the DHT80 asynchronous module, provides three MMJ ports and one modem (25-pin D-sub) port. MMJ port 3 is reserved for the console terminal. You can use any of the other three ports to connect peripherals.

The optional DHT80 asynchronous module (if installed) provides a further seven MMJ ports, and a second modem port.

If you need a further DEC423 MMJ port and if you are not using one of the modem ports, you can convert the modem port to an MMJ port, using a DEC423 to RS232 adapter (H8575-A).

4.7.1 Connecting a Peripheral to a DEC423 MMJ Port

Your DECsystem 5100 has a minimum of three MMJ ports. MMJ port 3 is reserved for the console terminal. Use any of the other two MMJ ports to connect peripherals.

The optional DHT80 asynchronous module (if installed) provides a further seven MMJ ports.

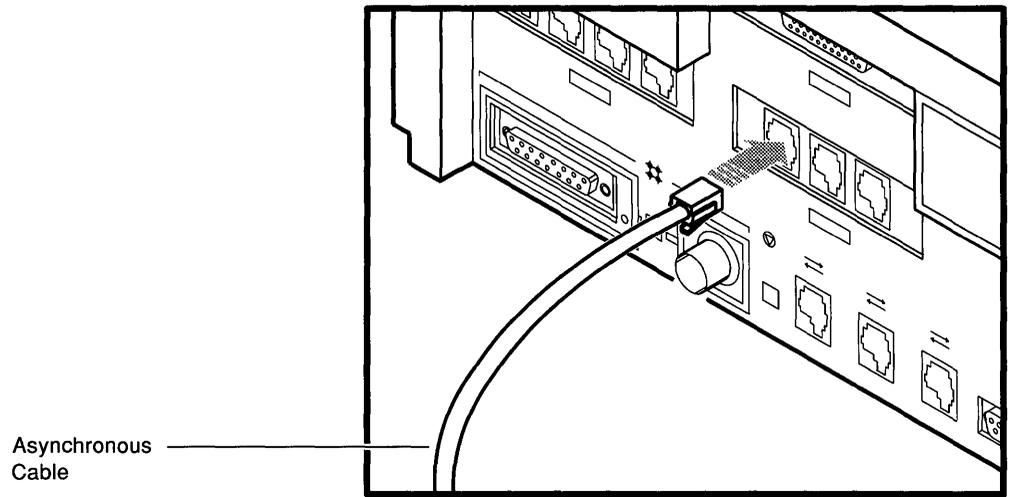
The following procedure describes how to connect a peripheral to one of the MMJ ports on the back of the system unit:

Note *Some peripheral cables have grounding straps. You must connect these grounding straps to the grounding stud closest to the port that you are using.*

- 1** Turn off the DECsystem 5100 and the peripheral, by setting the on/off switches to the off (O) position.
- 2** Choose an unused MMJ port. If you are using all the MMJ ports, and you have a DEC423 to RS232 adapter, you can convert one of the modem ports to an MMJ port. Use steps 2, 3, and 4 of the procedure outlined in Section 4.7.2 to connect the adapter, then return to this procedure at step 3.
- 3** Press the MMJ connector, on the peripheral cable, into the chosen MMJ port until the tab on the connector clicks.
- 4** Turn on the peripheral by setting its on/off switch to the on (I) position.
- 5** Turn on the DECsystem 5100 by setting its on/off switch to the on (I) position.

Figure 4-7 shows how to connect an MMJ cable to MMJ port 8 on the DHT80 asynchronous module.

Figure 4-7 Connecting a Peripheral to MMJ Port 8



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4.7.2 Connecting a Peripheral to a Modem Port

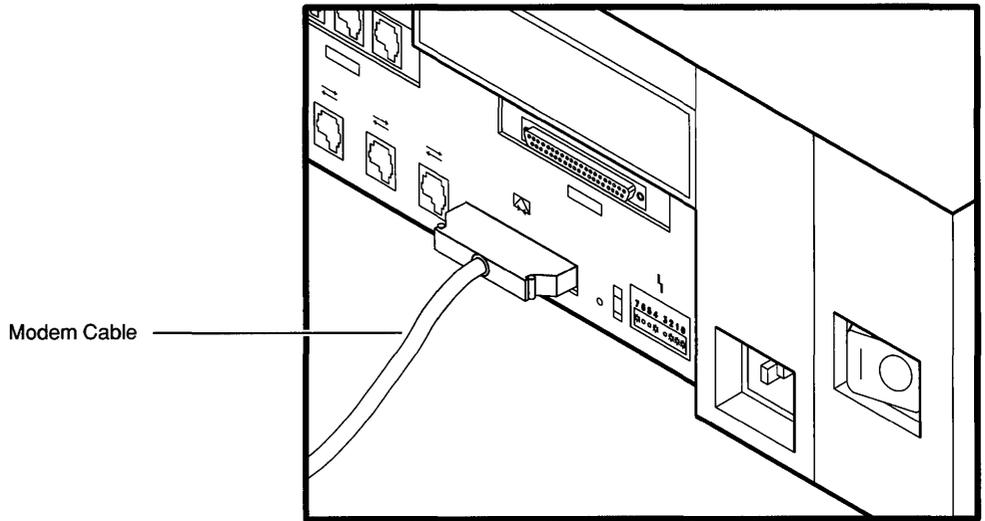
The basic DECsystem 5100 has one modem port, situated between MMJ port 3 and the status LED display. The optional DHT80 asynchronous module (if installed) provides a second modem port.

The following procedure describes how to connect a peripheral to one of the modem ports on the back of the system unit:

- 1 Turn off the DECsystem 5100 and the peripheral, by setting the on/off switches to the off (O) position.
- 2 Choose an unused modem port.
- 3 Press the 25-pin D-sub connector on the peripheral cable into the chosen modem port.
- 4 If the connector has screws on either side, tighten them with a small screwdriver.
- 5 Turn on the peripheral by setting its on/off switch to the on (I) position.
- 6 Turn on the DECsystem 5100 by setting its on/off switch to the on (I) position.

Figure 4-8 shows how to connect a peripheral cable to the modem port.

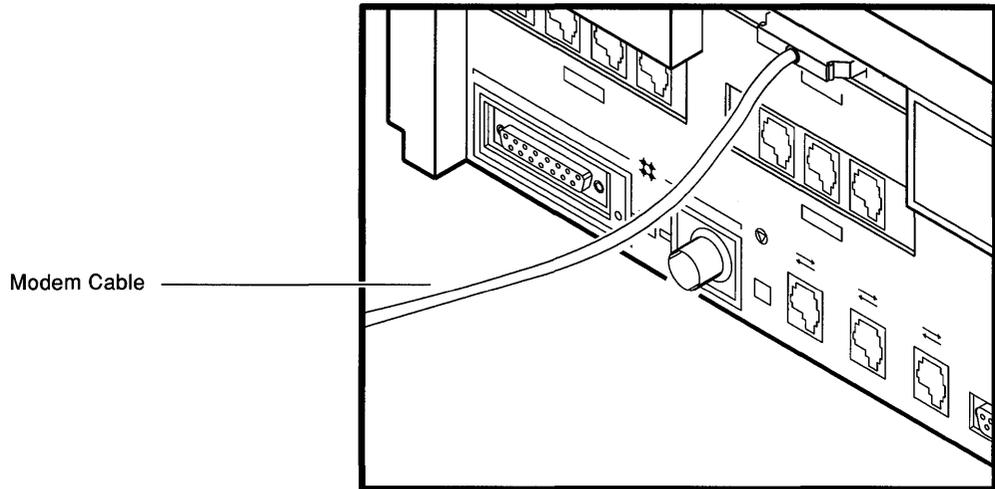
Figure 4-8 Connecting a Peripheral to the Modem Port



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Figure 4–9 shows how to connect a peripheral cable to the optional modem port on the DHT80 asynchronous module.

Figure 4–9 Connecting a Peripheral to the Optional Modem Port



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Connecting to a Network

This chapter contains information on how to:

- Connect and test your system with a T-connector and loopback connector in preparation for connecting to a network
- Create a simple daisy-chain work group

When you daisy-chain systems together to form a work group, you connect systems together sequentially with cables and connectors.

Connecting a system to a ThinWire Ethernet network or a Standard Ethernet network takes only a few minutes for an experienced user, slightly longer for a new user.

5.1 A Brief Introduction to Networks

Networks are useful to people who need to work together and share information. People like working cooperatively on projects; they need to communicate and exchange information, share common databases, share files and disk storage, share printers, or use a mail system. Digital networking lets them do all these.

For network installation instructions, proceed to Section 5.2. For users who want more background, here are a few networking definitions to help you get started:

- **Network**—A network is a group of computers, connected by communications lines, that share information and resources. A network can span a small office, a department, a building, a country, or it can be worldwide. Digital hardware and DECnet software enable computers to form a network.
- **Local Area Network (LAN)**—A local area network is a high-speed communications network that covers a limited geographical area, such as an office area, a department, a building, or a campus (group of buildings).
- **Ethernet**—Ethernet is the Digital local area network. In 1980, Digital Equipment Corporation, Xerox Corporation, and Intel Corporation came up with 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.
- **ThinWire Ethernet**—All Digital Ethernet products can connect to ThinWire cable. ThinWire cable can be used in any size environment; it is flexible, fully compatible with standard Ethernet, inexpensive, and offers 10 megabit-per-second communication. ThinWire is ideal for small daisy-chain standalone networks in which the users share resources, such as printers and storage devices.
- **Standard Ethernet**—Standard Ethernet coaxial cable is used to connect wiring centers and computer facilities, floors of buildings, and standalone ThinWire segments. It is of rugged construction, reliable, and immune to external factors that might otherwise limit high-speed 10 megabit-per-second data communication.
- **DECnet**—DECnet networking software enables many Digital computer systems to form a network. It runs on systems in both local area networks and wide-area networks.
- **DECnet-ULTRIX**—ULTRIX software is Digital's version of the UNIX operating system. DECnet-ULTRIX provides an Ethernet-based communication link between the VMS and ULTRIX operating systems.

ULTRIX also uses Transmission Control Protocol/Internet Protocols (TCP/IP) to facilitate interaction with Internet networks.

- **Work group**—A work group consists of cooperating systems; Ethernet cable connects each of the computers together. Work groups are formed using ULTRIX software or VAX/VMS and DECnet software.
- **DECconnect**—DECconnect is a family of networking products that includes network electronics, cabling, and connections.

5.2 Selecting Your Ethernet Option

All Ethernet connections are either ThinWire or standard Ethernet. ThinWire Ethernet is generally used for geographically small (local area) networks. Standard Ethernet is generally used for geographically large networks.

Your DECsystem 5100 has a network select button that determines the type of Ethernet connection used. You must set this button to the correct position before connecting your system to the network.

The button positions corresponding to the network connection types are as follows:

- In — ThinWire Ethernet
- Out — standard Ethernet

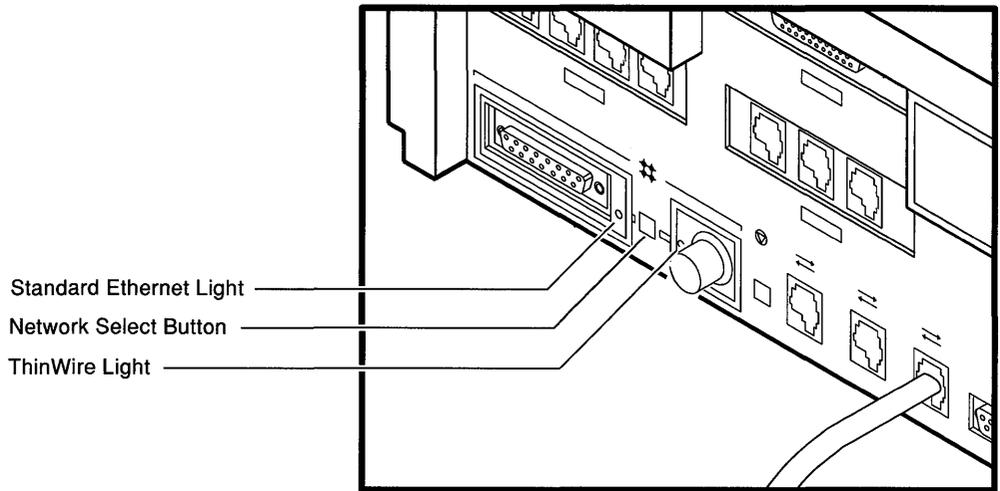
Use the tip of a pen or a similar pointed instrument to change the position of this button.

When you turn on your system, with the button set to the in position, the green light to the right of the network select button should be on, indicating that you are ready to connect to ThinWire Ethernet.

When you turn on your system, with the button set to the out position, the green light to the left of the network select button should be on, indicating that you are ready to connect to standard Ethernet.

Figure 5-1 shows the location of the network select button and the ThinWire and standard Ethernet lights.

Figure 5-1 Network Select Button and Ethernet Lights



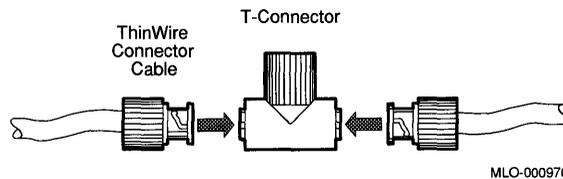
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5.3 Connecting Your System to ThinWire Ethernet Cable

To connect a DECsystem 5100 to ThinWire Ethernet cable:

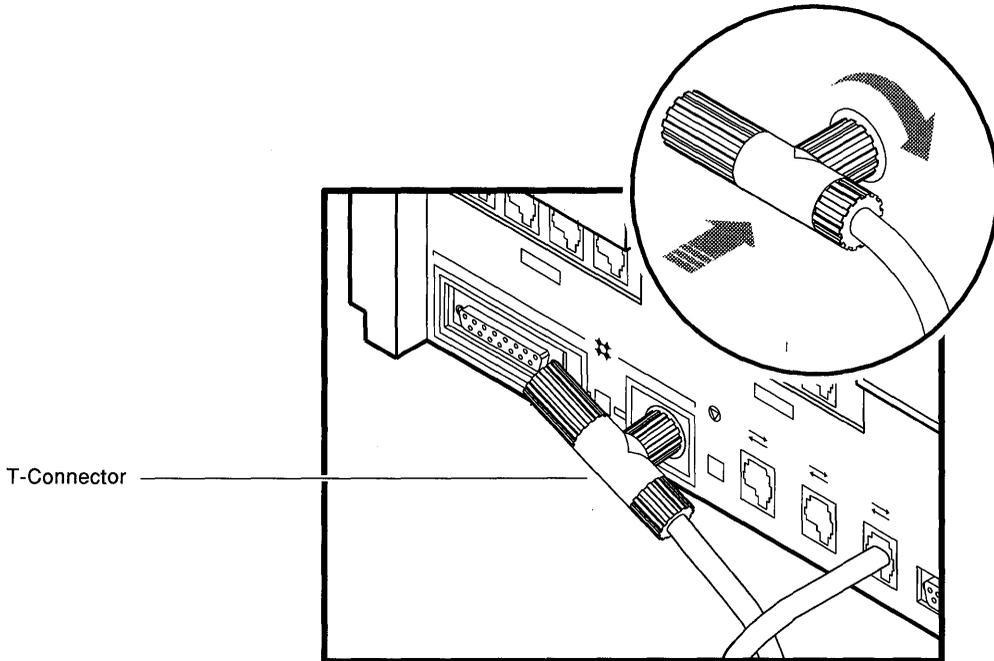
- 1 Set your system unit on/off switch to the off (O) position.
- 2 Attach ThinWire cable to one side of the T-connector.
- 3 If your system is the first or last system in a single ThinWire segment, leave the terminator attached to one side of the T-connector.
A segment is a length of cable made up of one or more cable sections connected with barrel connectors or T-connectors.
- 4 If your system is not the first or last system and you want to connect another system to the ThinWire cable, add another section of cable to the T-connector. See Figure 5–2.

Figure 5–2 Adding ThinWire Cable



- 5 Make sure that a T-connector is attached to the back of your system. Push the T-connector onto the system unit BNC connector and then turn it clockwise until it locks in place. See Figure 5–3.

Figure 5-3 Connecting the T-Connector to the Back of the System Unit



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5.4 Connecting to a Standard Ethernet Network

If you are connecting a work group to an existing network, ask the network coordinator for the best way to connect your work group to the larger network. Have the network coordinator make sure that all node names and node addresses are unique and do not already exist in the larger network.

5.4.1 Setting the Network Select Button for Standard Ethernet

To use standard Ethernet on your system, set the network select button on the back of the system unit to the out position. When you turn on your system, the green light beside the standard Ethernet connector comes on and the light beside the ThinWire Ethernet is off. You are ready to connect to standard Ethernet.

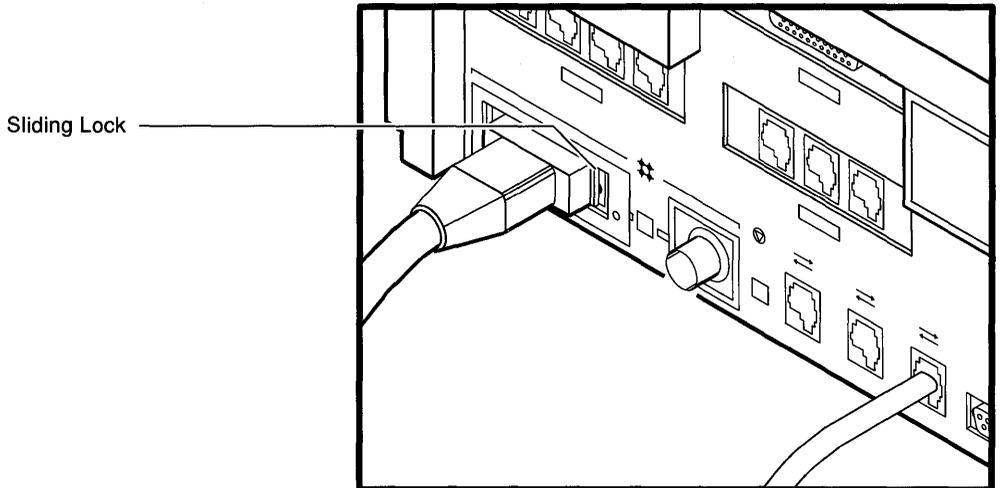
5.4.2 Connecting a Transceiver Cable to Your System

A transceiver cable is the physical connection between a standard Ethernet network interface and a DECsystem 5100. You use a transceiver cable when you want to connect your system to an H4000 transceiver or DELNI which is attached to the standard Ethernet cable. To connect a transceiver cable to your system:

- 1 Set the system unit on/off switch to the off (O) position.
- 2 Attach the 15-pin connector on the standard Ethernet transceiver cable to the back of the system unit.
- 3 Use a screwdriver to move the sliding lock (part of standard Ethernet connector) and make the standard Ethernet connection secure.

Figure 5-4 shows the correct connection.

Figure 5-4 Connecting a Transceiver Cable



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5.5 Creating a Daisy-Chained Work Group

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

The daisy-chain configuration lowers the cost of wiring, but there is a risk that someone might improperly unplug a system and make the network connections inoperative between systems on the same ThinWire segment.

5.5.1 Connecting Your System to a DECconnect Faceplate

If your office has been wired with Digital DECconnect products, then connect your system to the DECconnect faceplate in your office. A faceplate is a wall receptacle that provides a single network connection for your system.

DECconnect cabling components support network configurations ranging from simple standalone ThinWire networks to multimedia LANs that connect PCs, workstations, and other VAX systems. No matter how large or how small your network, the most visible DECconnect component in your office is the faceplate.

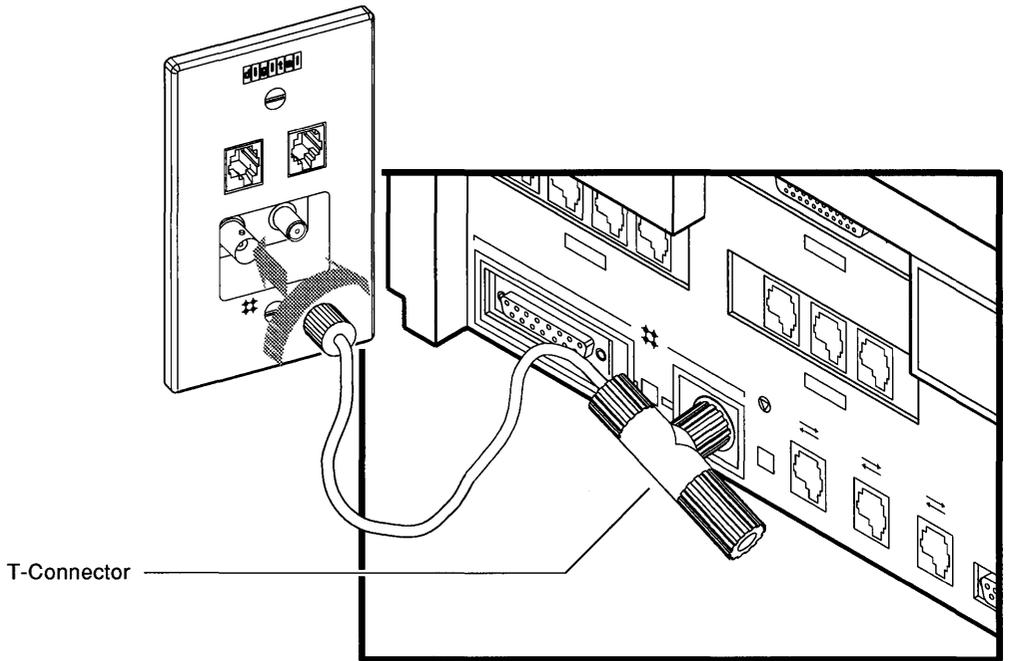
- A faceplate may contain a single ThinWire BNC connector which permits several systems, including DECsystem 5100s, to be daisy-chained one to the other on the office side of the faceplate.
- A faceplate may contain a ThinWire Ethernet daisy-chain connector which permits behind-the-wall daisy-chaining of multiple faceplates to a single segment of ThinWire cable. One system can be attached to each faceplate.

Your network coordinator will know which type of DECconnect faceplate you have in your office.

To connect your system, attach one end of the ThinWire cable to the office side of the DECconnect faceplate. Attach the other end of the ThinWire cable to the ThinWire port on the back of your system unit.

Figure 5-5 shows a DECsystem 5100 plugged into a DECconnect office faceplate.

Figure 5-5 Connecting Your System to a DECconnect Faceplate



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5.6 Completing Your Ethernet Installation

Once you have connected either your standard Ethernet cable, or your ThinWire Ethernet cable, ask your system manager or the person responsible for the work group to include your DECsystem 5100 in that work group.

To include your system in the network, your system manager must know your system's Ethernet address. Enter the following command at the console prompt to view the configuration display, which contains your Ethernet address:

```
>> conf -b
```

Look for a line similar to the following in the resulting display:

```
ethernet hardware address: 08-00-2b-12-7f-58
```

In the previous example, the hexadecimal number 08-00-2b-12-7f-58 is the Ethernet address. The Ethernet address of your system may be different but has the same format (xx-xx-xx-xx-xx-xx).

Write down this number and give it to your system manager.

5.6.1 If the Network Installation Fails

If you do not succeed in connecting and including your DECsystem 5100 in the work group, contact your Digital Customer Service representative.

Installing Software

This chapter tells you how to:

- Gather the information you need to begin installing your DECsystem 5100 ULTRIX operating system
- Install your applications software

6.1 Installing Your DECsystem 5100 Software on Hard Disk

6.1.1 Using a Tape Drive

When using a tape drive to install your DECsystem 5100 software on a hard disk, you need:

- A TZ30 tape drive or a TK50Z tape drive expansion box
- The *ULTRIX TK50 Tape Cartridge Kit*
- An internal hard disk drive (RZ24), or a disk drive expansion box (RZ55, RZ56, or RZ57)

Note *Your hard disk is formatted (ready to receive information) when you receive it from the factory.*

In addition, you need to know the following:

- The unit number of your tape drive
- How to use tape cartridges

See the *DECsystem 5100 Operator's Guide* or the documentation that came with your tape drive for instructions on using tape cartridges.

To find the unit number of your tape drive:

- 1 Enter the following command at the console prompt (>>) and press Return.

```
>> conf -b
```

The system displays its configuration, similar to the following:

```
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
    3 tape        TZK50
    5 tape        TZ30
    7 host adapter
```

```
>>
```

- 2 Examine the configuration display for either of the following lines, and make a note of the unit number associated with it:

```
    5 tape        TZ30        removable
```

or

```
    3 tape        TZK50        removable
```

In the configuration display shown previously, you can see that the TZ30 tape drive has the unit number 5, and the TK50Z tape drive expansion box has the unit number 3.

To install your ULTRIX software, see Section 6.2.

6.1.2 Using Ethernet

When using Ethernet to install your ULTRIX software on a hard disk, you need to have the following:

- A connection to Ethernet
- An internal hard disk drive (RZ24), or a disk drive expansion box (RZ55, RZ56, or RZ57).

To install your ULTRIX software, see Section 6.2.

6.2 Where to Go from Here

The *ULTRIX Documentation Overview for RISC Processors* describes the documentation kits available for your DECsystem 5100.

6.2.1 Installing the ULTRIX Software

Read the release notes and follow the instructions provided in the installation guides that came with the operating system software.

6.2.2 Installing Application Software Products

Follow the instructions provided in the installation guides that came with the software product.

A

System Specifications

Table A-1 System Specifications

Subject	Description
Processor	KN230 (20 MHz)
EPROM	256KB
EEPROM	32KB
Instruction Cache	64KB
Data Cache	64KB
DRAM memory	8MB, expandable to 32MB or 128MB
Hard disk	RZ23 (102MB) or RZ24 (209MB), 5 devices maximum ¹
Tape drive	TZ30
Diskette drive	RX23 ¹
Terminals	Supports the VT Series
Interfaces	1 SCSI port, 1 ThinWire Ethernet port ² , 1 standard Ethernet port ² , 4 to 12 asynchronous lines (two of which are full modem control lines)
Input voltage	Automatically adjusting ac input. Range: 100-120 Vac to 220-240 Vac
Input current	Typically 2.83 A in a 110 Vac circuit; 1.55 A in a 220 Vac circuit
Power	Typically 170 W
Frequency	47 Hz to 63 Hz

¹Depends on configuration

²Both Ethernet types cannot be used simultaneously

Table A-2 System Unit Metrics

Weight ¹	Height	Width	Depth
20.5 kg	14.99 cm	46.38 cm	40.00 cm
45 lb	5.90 in	18.26 in	15.75 in

¹Depends on configuration

Table A-3 System Storage Conditions

Temperature range	5°C to 50°C (41°F to 122°F)
Relative humidity	10% to 95% at 66°C (noncondensing)
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 A-4 System Operating Conditions 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 (20°F) degree per hour maximum
Relative humidity	10% to 90% noncondensing
Maximum wet bulb temperature	28°C (82°F)
Minimum dew point	2°C (36°F)
Altitude	2400 m (8000 ft) at 36°C (96°F)

Nonoperating Conditions

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 A-5 RZ23 and RZ24 Hard Disk Drive Specifications

Formatted Storage Capacity	RZ23	RZ24
Per drive	105MB	209MB
Per surface	13MB	26.2MB
Bytes per track	16,896	19,456
Bytes per block	512	512
Blocks per track	33	38 and 1 spare
Blocks per drive	204,864	409,792
Spare blocks per track	1	-
Spare tracks	-	0
Spare blocks per drive	6,208	10,944
Performance	RZ23	RZ24
Transfer rate to/from media	1.25MB/sec	1.5MB/sec
Transfer rate to/from buffer (asynchronous)	1.5MB/sec	3MB/sec
Transfer rate to/from buffer (synchronous)	1.5MB/sec	4MB/sec
Seek time track to track	≤ 8 msec	≤ 5 msec
Seek time average	≤ 25 msec	≤ 16 msec
Seek time maximum (full stroke)	≤ 45 msec	≤ 35 msec
Average latency	8.4 msec	8.6 msec
Rotational speed	3575 RPM ±0.1%	3497 RPM ±0.5%
Start time (maximum)	20 sec	20 sec
Stop time (maximum)	20 sec	20 sec
Interleave	1:1	1:1
Functional Specifications	RZ23	RZ24
Recording Density (bpi at ID)	23,441	31,800
Flux Density (fci at ID)	15,627	21,200
Track Density (tpi)	1150	1700
Tracks/Surface	776	1348
R/W Heads	8	8
Disks	4	4
Time to Process ECC (512B)	<100 msec	<100 msec

Table A-6 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 (at host)	62.5Kb per second
Tape speed	190 cm/s (75 in/s)
Track format	Multiple track serpentine recording
Cartridge capacity	95MB, formatted (approx.)

Table A-7 RX23 Diskette Drive Specifications

Subject	Description
Diskette size	9 cm (3.5 in)
Diskettes/diskette drive	1
Data capacity	1.4MB (RX23K)
Track density	135 TPI
Storage capacity (high density)	600KB

B

Associated Documentation

Table B-1 Documentation

Item	Order Number
DECsystem 5100 Documentation	
<i>DECsystem 5100 Operator's Guide</i>	EK-421AA-OG.001
<i>DECsystem 5100 Maintenance Guide</i>	EK-422AA-MG.001
ULTRIX Software	
<i>The ULTRIX Worksystem User Kit</i>	QA-VV1AD-GZ
<i>The ULTRIX Worksystem Programming Kit</i>	QA-VV1AE-GZ
<i>The ULTRIX Worksystem Full Kit</i>	QA-VV1AA-GZ
<i>Release Notes for RISC Processors</i>	AA-ML77A-TE
<i>Technical Summary for RISC Processors</i>	AA-MM35A-TE
<i>Documentation Overview for RISC Processors</i>	AA-MMO5A-TE
<i>Guide to Server Kit Installation for RISC Processors</i>	AA-ML74A-TE
<i>The Little Gray Book: An ULTRIX Primer</i>	AA-MG64A-TE
DECconnect and Standard Ethernet	
<i>DECconnect System General Description</i>	EK-DECSY-GD
<i>DECconnect System Requirements Evaluation Workbook</i>	EK-DECSY-EG
<i>DECconnect System Installation and Verification Guide</i>	EK-DECSY-VG
<i>DECconnect System Standalone ThinWire Networks: Planning and Installation Guide</i>	EK-DECSY-TG
<i>DECconnect System Planning and Configuration Guide</i>	EK-DECSY-CG
<i>Remote System Manager Server Documentation Kit</i>	QLB13-GZ
<i>Remote System Manager Client Documentation Kit</i>	QLB14-GZ
<i>Ethernet ThinWire Repeaters (DEMPR/DESPR) Installation and User's Guide</i>	EK-THNRP-UG

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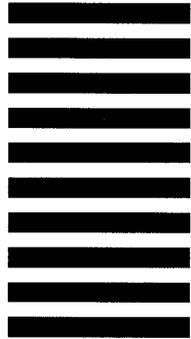
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