PCSA

Network Troubleshooting Guide

Order Number AA–PAGVA–TK

December 1989

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Contents

5 Troubleshooting the Network Server

6 Troubleshooting Network Workstation Problems

A Ordering Parts

B ThinWire Network Topology Maps and Worksheets

Index

Figures

Tables

About This Manual

The Personal Computing Systems Architecture (PCSA) is an extension of the Digital systems and networking architecture that merges VMS and DOS environments. The PCSA network may include VAX or MicroVAX servers running VMS Services for DOS. It also includes the DECnet/PCSA Client software that runs on PC workstations as part of the Network Integration Kit. Other PCSA products include Thinwire Ethernet products, and other peripherals, such as the LN03 Plus and LA75 Companion printers.

The Digital PCSA network fully integrates all the elements of personal and corporate computing required for direct information access and sharing. Thus, it has computing and communication capabilities that are substantially better than those of conventional PC local area networks (LANs).

Manual Objectives

This guide contains information needed by a system administrator to install and troubleshoot a ThinWire Ethernet network in an office environment. It describes the hardware components found in ThinWire networks, some guidelines, and procedures for installing and troubleshooting simple ThinWire networks.

Appendix B contains worksheets and network topology maps for you to use to keep track of your network configurations. As you add or change a network configuration, you should update the worksheets and maps for future troubleshooting. Information from these topology maps and worksheets will be required by your authorized service representative.

Your hardware might look slightly different from the illustrations in this guide. The difference does not affect function. VAXmate workstations and personal workstations can be successfully installed in the configurations shown.

Intended Reader

This guide is intended for the system administrator, who should be an experienced user of the DOS operating system and, if troubleshooting a VMS server, should be familiar with:

- Using the DIGITAL Command Language (DCL)
- Configuring and monitoring the VAX computer's system performance
- Analyzing problems that might occur with a VAX computer
- The hardware and software configuration of the network
- The specific software needs of the users

The system administrator should have read:

- *Overview*
- *VMS Services for PCs Release Notes*
- *Server Administration with Commands*, if using a VMS server
- *Network Commands Reference Manual*
- *DECnet-DOS User's Guide*
- *DECnet-DOS Network Management Guide*
- *Memory Solutions*

Related Documents

Table 1 lists the part numbers of documents related to ThinWire Ethernet systems. To order any of these documents, contact your local Digital representative.

Table 1 Related Documents

Document	Order Number
Applications Installation Guide	EK-VAXIA-IN
DECconnect System General Description	EK-DECSY-GD
DECconnect System Requirements Evaluation Workbook	EK-DECSY-EG
DECconnect System Planning and Configuration Guide	EK-DECSY-CG
DECconnect System Installation and Verification Guide	EK-DECSY-VG
DECconnect System Stand-alone ThinWire Networks: Planning and Installation Guide	EK-DECSY-TG
DEPCA Owner's Manual	EK-DEPCA-OM
DESTA Installation Card	EK-DESTA-IN
DESTA Technical Description	EK-DESTA-TM
DEMPR Installation User's Guide	EK-DEMPR-UG
DEMPR Technical Manual	EK-DEMPR-TM
DEREP-AA Local Ethernet Repeater Installation/Owner's Manual	EK-DEREP-IN
DELNI Installation/Owner's Manual	EK-DELNI-IN
DELNI Technical Description	EK-DELNI-TM
Guide to DECnetVAX Networking	AA-LA47A-TE
H4091 ThinWire Adapter Installation Card	EK-ETHWR-IN
ThinWire Segment to Ethernet Connection Kit Installation Guide	EK-ETHWS-IN
ThinWire Ethernet Cable Connector Installation Procedure	EK-CABLE-IN
Technical Reference Manual for DECstation 210 Personal Computers	PC-41Y-AA
Technical Reference Manual for DECstation 316 Personal Computers	PC-42Y-AA

Table 1 (Cont.) Related Documents

Document	Order Number
Technical Reference Manual for DECstation 320 Personal Computers	PC-43Y-AA
VAXmate Expansion Box Installation Guide and Owner's Manual	EK-RCD31-OM
VMS Services for PCs Release Notes	AA-LB64D-TE
Server Administration with Commands	AA-PAGUA-TK
Network Commands Reference Manual	AA-PAFEA-TK

Manual Organization

The following table can help you find information in this manual.

Part I	Contains an overview of network hardware and its installation.
Chapter 1	Describes network components and guidelines for setting up a network.
Chapter 2	Discusses local area network installation tasks.
Part II	Contains procedures for network fault isolation.
Chapter 3	Presents a flowchart to guide you to the appropriate troubleshooting procedures depending on the network problem.
Chapter 4	Describes troubleshooting LAN network configuration and hardware.
Chapter 5	Describes troubleshooting LAN network servers.
Chapter 6	Describes troubleshooting LAN network workstations.
Appendix A	Presents network hardware part numbers and ordering information.
Appendix B	Contains worksheets and network topology maps.

Conventions Used

Follow these conventions while using this manual:

Convention	Meaning
/	A forward slash (/) indicates that a command qualifier follows.
[ ]	Square brackets in a command line indicate the optional command qualifiers. Do not type the brackets when entering information enclosed in the brackets.
vertical list of options	A vertical list of options without square brackets ([ ]) indicates that you can specify any number of options or in some cases, none, if the defaults apply.
Return	Press the Return or Enter key on your keyboard.
|	A vertical bar (|) in a command line indicates that you have a choice between two or more entries. You must select one entry unless the entries are optional.
. . .	An ellipsis following an entry in a command line indicates that the entry can be repeated any number of times. An ellipsis following a file name indicates that additional parameters, values, or information can be entered.
. . .	A vertical ellipsis means that not all the data is shown that the system would display in response to the command, or that not all the data is shown that a user would enter.
black type	In examples of dialog between you and the PC workstation, what the workstation displays on the screen is printed in black.
red type	In examples of dialog between you and the PC workstation, red type indicates information that you must enter from the keyboard. For online versions, user input is shown in **bold**.
case	You can enter commands and parameters in uppercase or lowercase letters, or in a combination of both.
enter	Enter all letters, spaces, and punctuation marks exactly as they are printed. Then press the Return or Enter key, as appropriate.
key labels	On the Digital LK250 keyboard, the keys on the two keypads on the right of the keyboard are referred to by their blue labels.
numbers	All numbers shown in this manual are in decimal form, unless otherwise noted.

Convention	Meaning
two-line commands	Some commands are continued on a second line. In VMS, a continued command may be indicated by a hyphen (-) at the end of the first line. Enter the hyphen, and press Return. The system displays the _$ prompt. Continue entering the text that follows the _$ prompt in your manual. In DOS, no hyphen is displayed at the end of the first line. Continue entering text without pressing the Return key.
NOTE	Contains information of special importance.
CAUTION	Contains information to prevent damage to equipment or software.
WARNING	Contains information essential to the safety of personnel.
VMS server	A short name for VMS Services for DOS.

Part I

1

Network Components and Guidelines

This chapter describes typical hardware components used in ThinWire Ethernet and standard Ethernet networks. It includes several standalone ThinWire network configurations you can use as examples when you install your network. This chapter also lists basic installation restrictions and guidelines.

This manual uses abbreviations to represent most network hardware components. These abbreviations and their associated component names are:

DELNI	Digital Ethernet local network interconnect
DEMPR	Digital Ethernet multiport repeater
DESTA	Digital ThinWire Ethernet station adapter
DEPCA	Digital Ethernet personal computer-bus adapter
DEREP	Digital local Ethernet repeater

Illustrations in this chapter show the Digital VAXmate workstation. PC workstations equipped with a DEPCA board can be installed in identical configurations. For a list of supported PC workstations, see the Software Product Description.

NOTE

Other PC workstation-compatible Ethernet controller option boards may be used in these configurations. For a list of supported Ethernet controller boards, see the Software Product Description.

To allow connection to standard Ethernet networks, you can also equip the DEPCA board with an attachment unit interface (AUI) option.

Typical Network Configurations

You can connect either Digital VAXmate workstations or PC workstations to a MicroVAX II server or a VAX server in various network configurations.

Figure 1–1 shows a simple standalone ThinWire network.

Figure 1–1 Standalone ThinWire Network

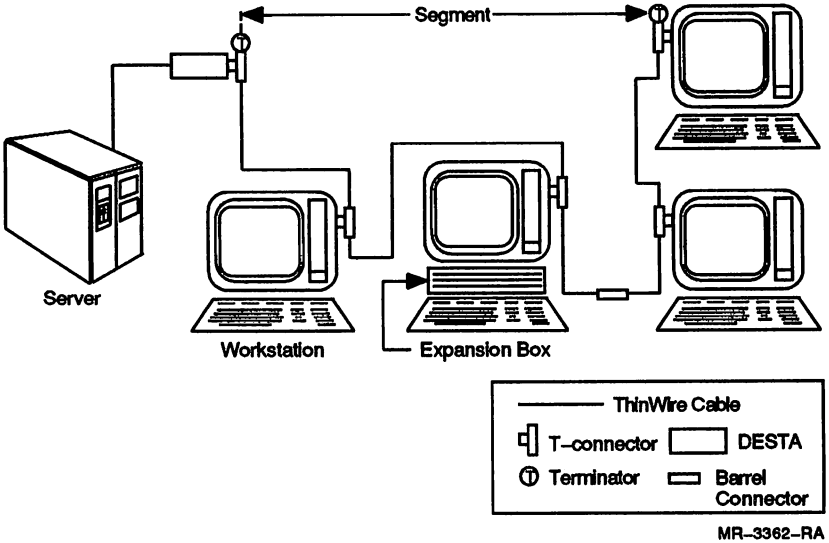


Figure 1–2 shows a ThinWire network that uses a DEMPR and a MicroVAX II server.

Figure 1–2 Standalone ThinWire Network with a DEMPR

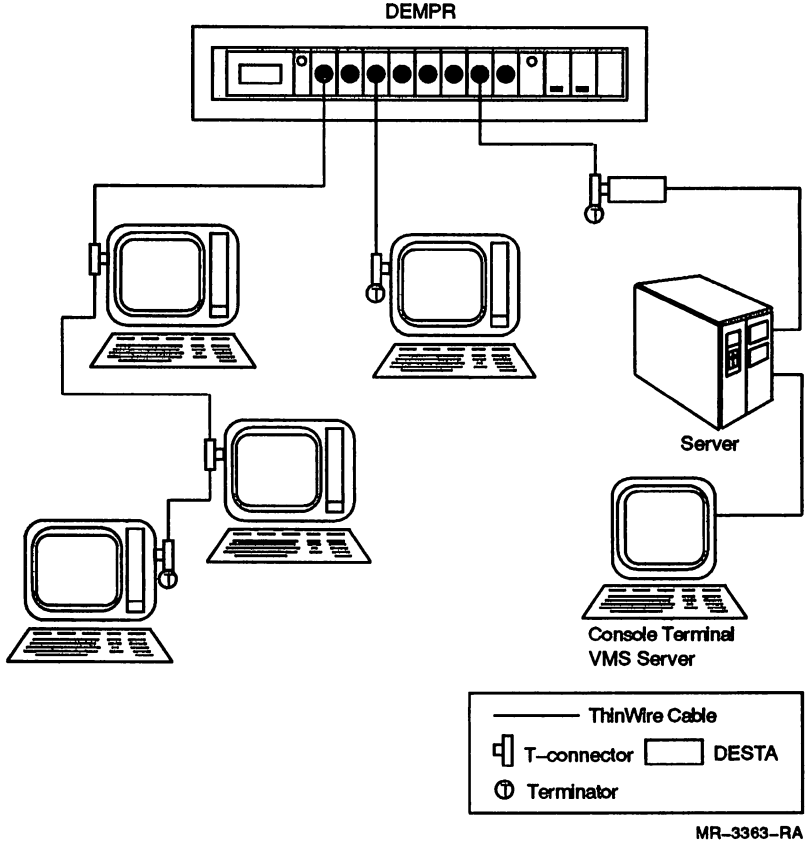
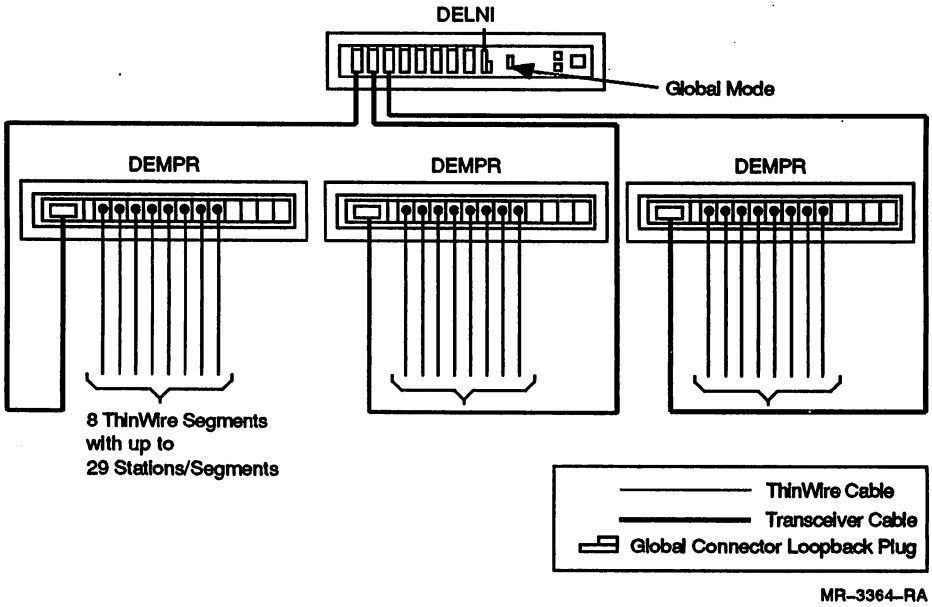


Figure 1–3 shows several DEMPR based networks connected to a DELNI to meet future growth needs.

Figure 1–3 Several DEMPRs Connected to a DELNI



You can also use a DELNI to network PC workstations equipped with the DEPCA/AUI option (see Figure 1–4).

Figure 1–4 PC Workstations Connected to a DELNI

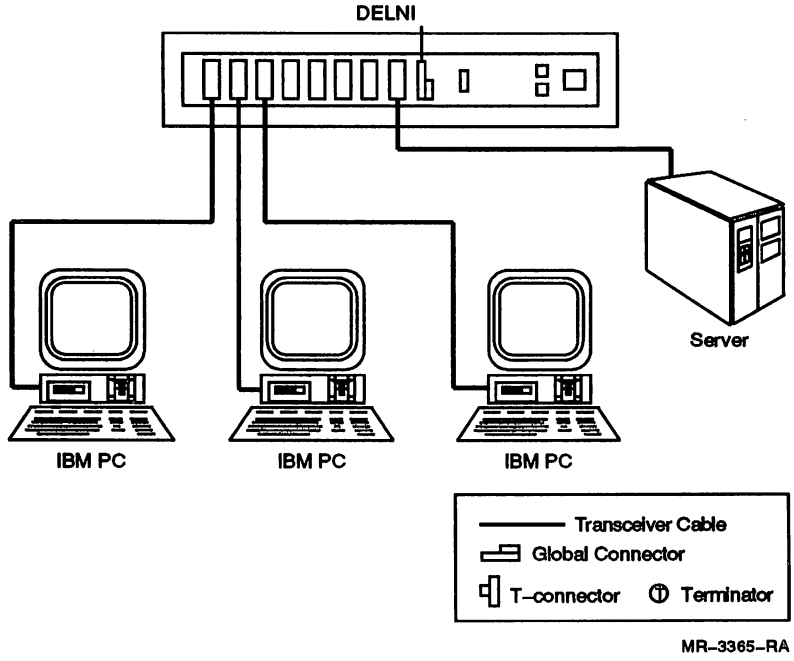
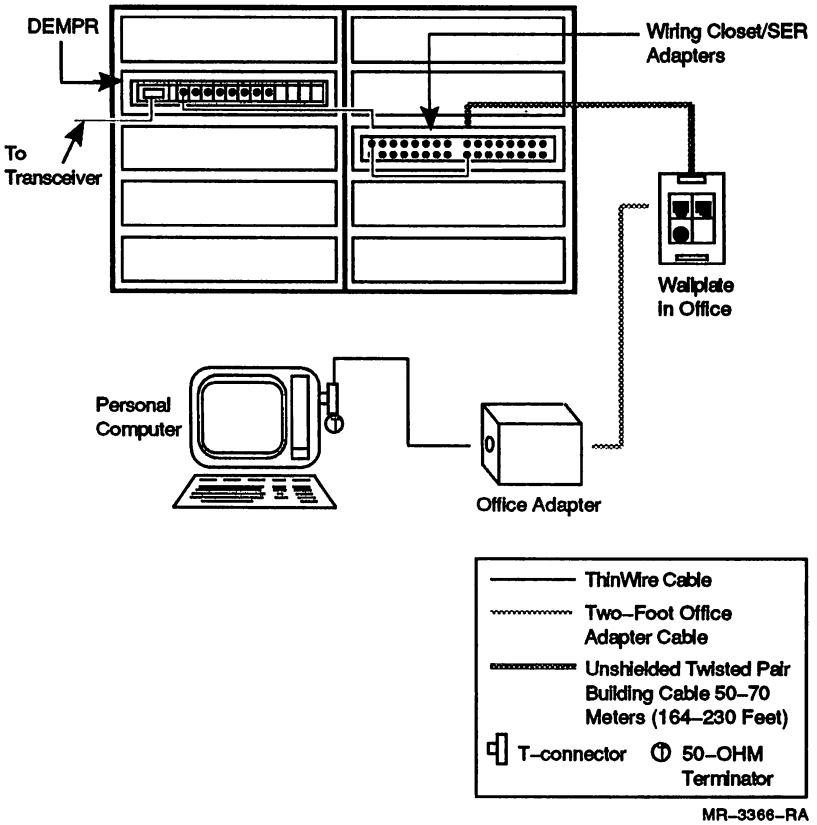


Figure 1–5 shows a PC workstation connected to a standard Ethernet network using an unshielded twisted-pair Ethernet adapter.

Figure 1–5 Unshielded Twisted-Pair Ethernet Configuration



You can connect some standalone ThinWire network configurations to standard Ethernet cable as shown Figure 1–6.

CAUTION

Some standalone ThinWire network configurations are not allowed with standard Ethernet. An improper configuration can cause the entire network to malfunction. For guidelines, see the *DECconnect System Planning and Configuration Guide.*

Figure 1–6 ThinWire Network Tied to Standard Ethernet

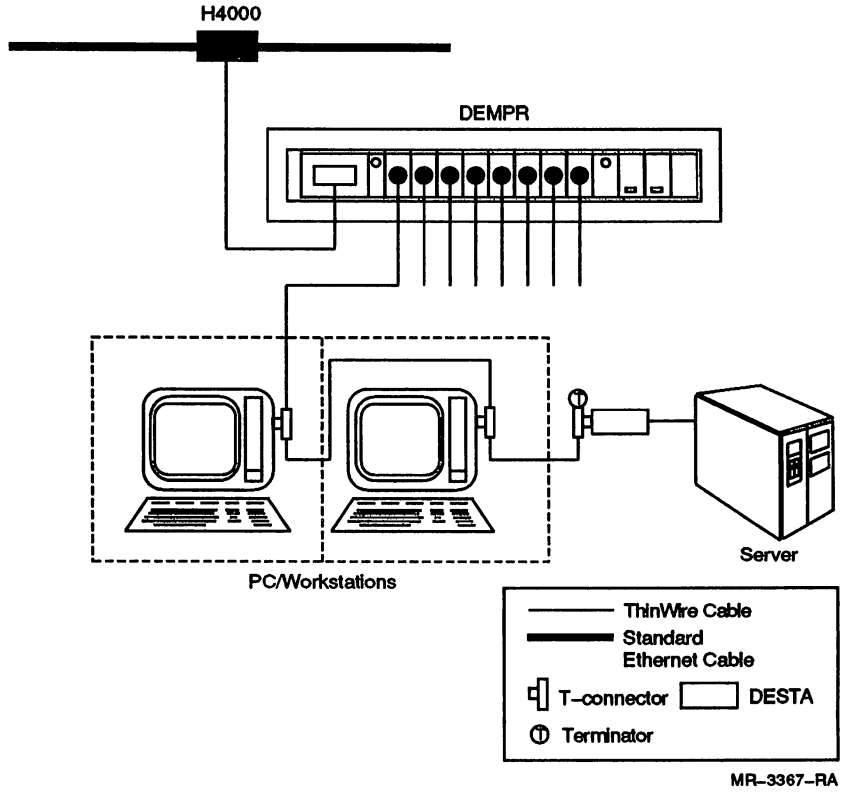
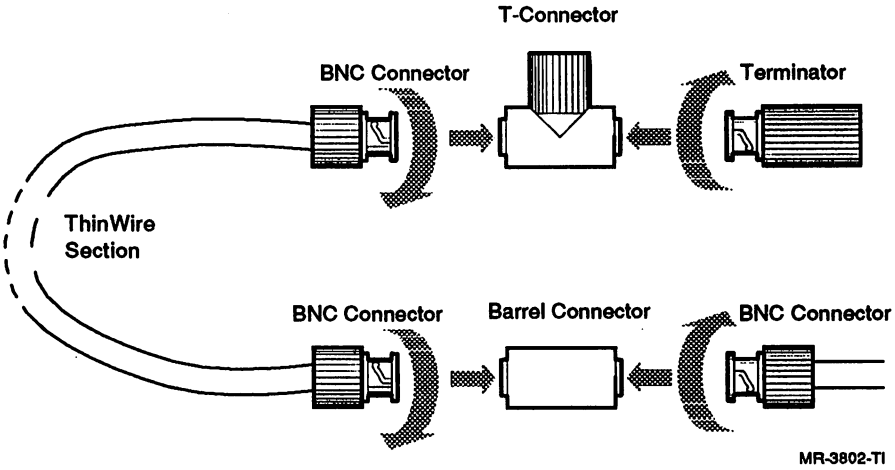


Figure 1–7 shows ThinWire Ethernet coaxial cable, connectors, and a terminator. Network components, except workstations or servers, are described in the following sections of this chapter.

Figure 1–7 ThinWire Cable with Connectors and a Terminator



NOTE

To ensure trouble-free operation of your ThinWire network, Digital recommends you use only Digital ThinWire Ethernet cable and connectors in your installation.

Network Hardware Components

The following sections provide descriptions of various hardware components that are used to configure a network.

ThinWire Cable

A *ThinWire cable* is an Ethernet coaxial cable with a Teflon or polyvinyl chloride (PVC) jacket. You can usually use PVC cable in an office area. However, you must use either Teflon cable or PVC cable in metal conduit in areas classified as environmental air space. Check your local building codes for more information.

A *ThinWire section* is a length of ThinWire cable with a BNC connector at each end. Sections are available in lengths of 1.9 meters (6 feet), 4.4 meters (15 feet), and 9.4 meters (30 feet). See Appendix A for part numbers. A 3.8 meter (12 feet) ThinWire section is available with BNC connectors, and a T-connector and terminator at one end. This is identical to the cable shipped with each workstation.

A *ThinWire segment* is one or more sections of ThinWire cable interconnected with barrel or T-connectors. The maximum length of a segment is 185 meters (606.9 feet). Each segment of ThinWire cable must have terminators at both ends (see Figure 1–1). A segment with multiple T-connectors is also called a *daisy chain*.

ThinWire Terminator and Connectors

A *terminator* is an electronic device that goes on the end of a cable to ensure correct network operation. Both ends of a ThinWire segment must have a terminator (see Figure 1–1). Removing a terminator from an operating segment will cause the network to malfunction. DEMPRs contain integral terminators at each connector.

A *T-connector* connects a workstation and two sections of ThinWire cable. The T-connector connected to the last station [1] or device on a segment must have a terminator (see Figure 1–1).

NOTE

Install T-connectors only when you connect ThinWire cable to stations or to a Digital ThinWire Ethernet station adapter (DESTA).

A *barrel connector* connects two sections of ThinWire cable. Do not use a T-connector in place of a barrel connector.

A *BNC connector* connects a section of ThinWire cable to a T-connector, barrel connector, faceplate, or DEMPR.

[1] A station is a single, addressable device (such as a PC workstation or a MicroVAX II computer) on a ThinWire segment.

Transceiver Cable

Transceiver cable is used to connect Ethernet/IEEE 802.3 transceiver devices and controllers to network components that have transceiver type connectors.

Transceiver cable is available in either low-loss or high-loss versions. Use high-loss transceiver cable (BNE4x) to connect devices up to 12.5 meters (41 feet). Use low-loss transceiver cable (BNE3x) to connect devices up to 50 meters (165 feet). Low-loss transceiver cable is available in FEP versions for use in areas designated as environmental air space and PVC versions for use in office areas. High-loss transceiver cable is available in only PVC versions for use in office areas.

DESTA (Digital ThinWire Ethernet Station Adapter)

A *DESTA station adapter* is an Ethernet/IEEE 802.3 transceiver that connects stations that have transceiver-type connectors to a ThinWire network. For example, the DESTA provides a direct link between a MicroVAX II computer and a ThinWire network. A DESTA has replaced the H4091 ThinWire Adapter.

DEMPR (Digital Ethernet Multiport Repeater)

The *DEMPR* retimes, amplifies, and repeats signals received from a ThinWire segment and passes the signals to all segments attached to the DEMPR. Use a DEMPR when you have several segments that need to share network resources. The DEMPR has eight BNC connectors for attaching ThinWire segments. Each connector has an integral terminator. You can also connect a DEMPR to standard Ethernet networks. A DEMPR has replaced the H4092 configuration.

DELNI (Digital Ethernet Local Network Interface)

A *DELNI* is a standalone concentrator that connects up to eight DEMPRs and other network devices, such as terminal servers or computer systems with Ethernet controllers. Devices attach to a DELNI through a transceiver cable, and communicate with each other as though they were attached to the same ThinWire Ethernet cable. Use a DELNI when you want to cluster devices in a small area (within 50 meters (165 feet) of the DELNI). You can also connect the DELNI network to standard Ethernet to meet future growth needs.

DEPCA (Digital Ethernet Personal Computer-bus Adapter)

A *DEPCA* is an option board that allows PC workstations to be connected to ThinWire networks by using Digital Personal Computing Systems Architecture (PCSA) software. For a list of PC workstations into which you can install a DEPCA, see the Software Product Description. A DEPCA is available with an attachment unit interface (AUI) option, which allows connection to a standard Ethernet network. The DEPCA is also available in a packaged kit containing a Digital VSXXX mouse and LK250 keyboard.

LAN Bridge 100

The *LAN Bridge 100* connects two or more Ethernet LANs, creating an extended local area network. The LAN Bridge 100 uses a store-and-forward technique to receive, regenerate and transmit packets. This feature allows users to build extended LANs several times larger than Ethernet guidelines would otherwise allow.

Unshielded Twisted-Pair Ethernet Adapter

The *unshielded twisted-pair Ethernet adapter* delivers 10 Mbps Ethernet performance to a remote workstation using 50-70 meters (164-230 feet) of twisted-pair building cable. You can use the unshielded twisted-pair Ethernet adapter to connect the following to a DEMPR:

- A single VAXmate workstation
- A PC workstation equipped with a DEPCA or compatible Ethernet Controller

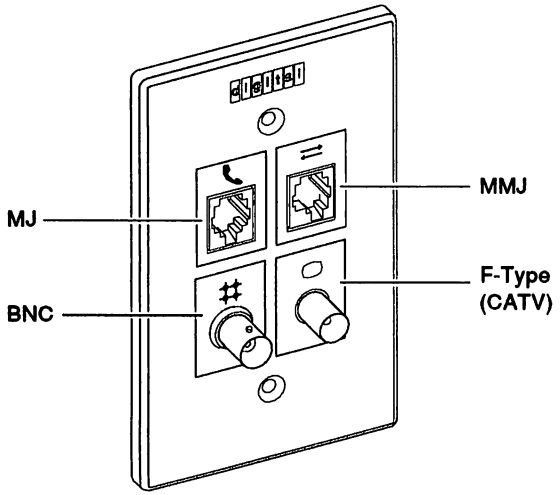
The unshielded twisted-pair Ethernet adapter consists of two components that operate together to match the 50-ohm impedance on a ThinWire Ethernet cable to the impedance of an unshielded twisted-pair cable. The two components are an unshielded twisted-pair office adapter and an unshielded twisted-pair wiring closet/SER adapter.

Digital Faceplates

The *Digital faceplate* (Figure 1–8) covers a standard electrical or wall mounted box installed by your DECconnect System installation contractor. These faceplates can have four connectors for connecting devices to previously installed communications networks.

BNC	A bayonet lock connector for connecting stations to the ThinWire network
F-Type	An F-Type connector for connecting video equipment to a cable TV (CATV) network.
MMJ	A modified modular jack for connecting printers and nonintelligent terminals to a twisted-pair data communications cable.
MJ	A modular jack for connecting telephone equipment, such as the VAXmate modem cable, to a private branch exchange (PBX) or to a general switch telephone network (GSTN).

Figure 1–8 Digital Faceplate

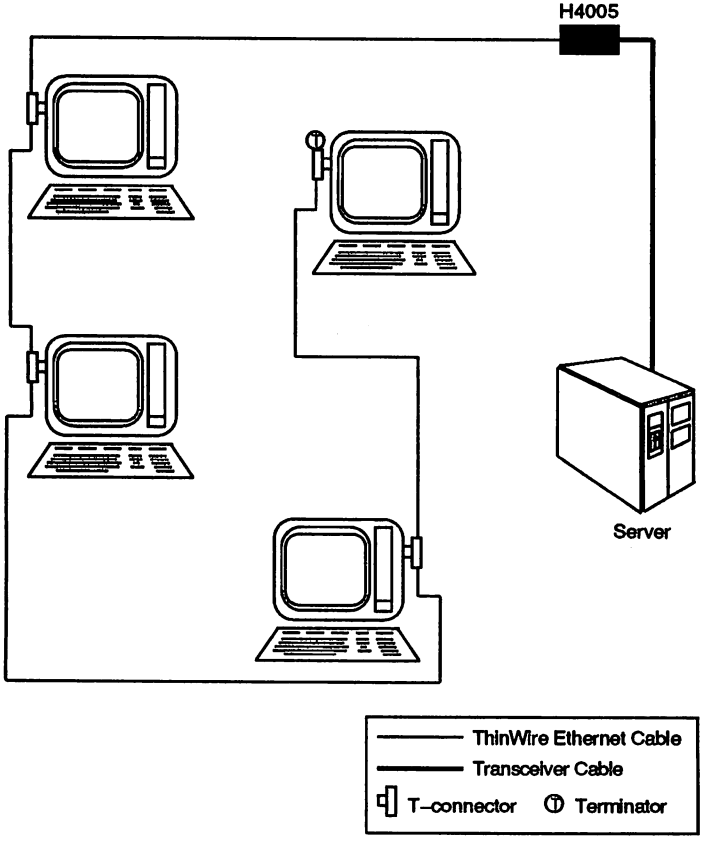


MR-3804-TI

H4091 ThinWire Adapter

An *H4091 ThinWire Adapter* is an Ethernet transceiver that passes signals to all stations attached to the segment. An H4091 was used in older standalone networks to connect a MicroVAX II computer and several workstations to share network resources. A DESTA is now used for this connection in all new installations. Figure 1–9 shows a typical H4091 ThinWire Adapter configuration.

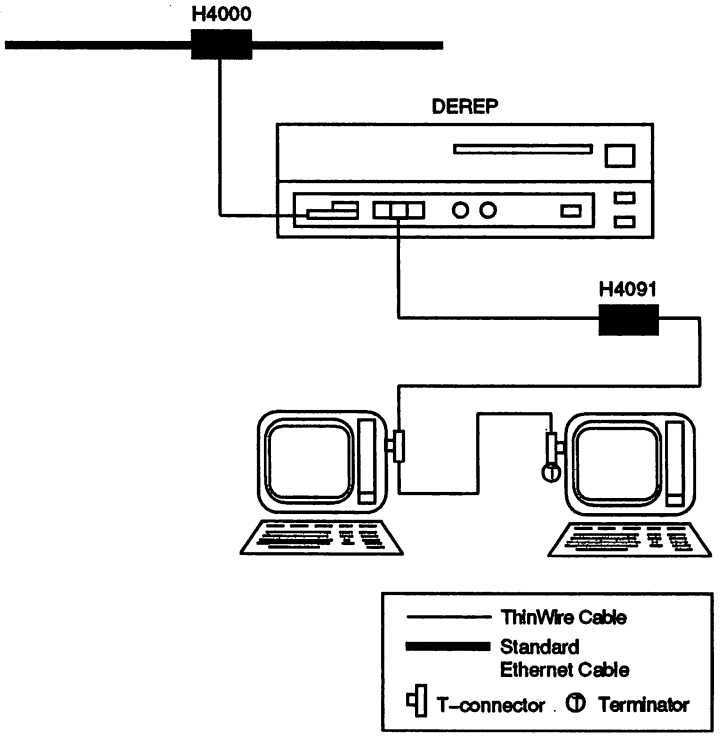
Figure 1–9 Typical H4091 ThinWire Adapter Configuration



H4092 ThinWire to Ethernet Connection Kit

An *H4092 ThinWire to Ethernet* connection kit was used in older network configurations to connect a ThinWire segment using an H4091 ThinWire adapter to standard Ethernet (Figure 1–10). This configuration required a DEREP (Digital Local Ethernet Repeater) to supply power to the H4000. A DEMPR is used for this connection in all new installations.

Figure 1–10 Typical Configuration Using an H4092 Ethernet Connection Kit



Installation Limits and Guidelines for ThinWire Networks

The following sections describe limits and guidelines to follow when you install a standalone ThinWire network.

CAUTION
Additional restrictions and guidelines apply if your network is connected to standard Ethernet. For more information, see the *DECconnect System Planning and Configuration Guide*.

Connectors and Stations

You can have up to 60 connector junctions[1] on a ThinWire segment. Barrel and T-connectors count as two connector junctions. Digital faceplate and DEMPR connections count as one junction.

You can have up to 30 stations on a ThinWire segment if the 60-connector junction limit is not exceeded. Segments connected to a faceplate or DEMPR contain fewer than 30 stations.

Cables

Observe the following cabling guidelines:

- Always keep Thinwire cable away from traffic areas where it could be stepped on.
- Never place furniture on top of ThinWire cable.
- The minimum bend radius of ThinWire cable is 4 centimeters (1.6 inches).
- The minimum cable length between devices connected to the network is 0.5 meter (1.6 feet).

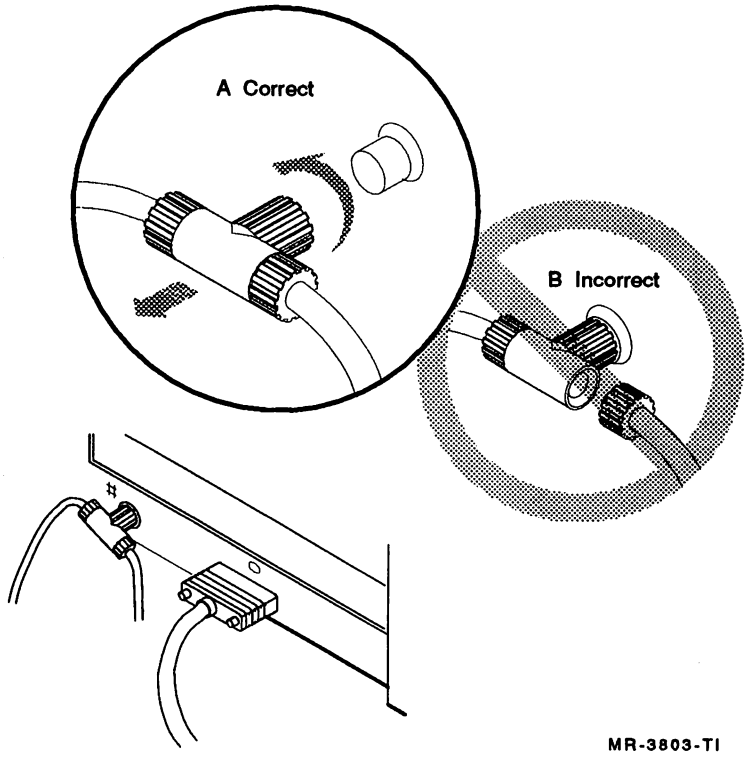
[1] A connector junction is the connection of a ThinWire cable's BNC connector with a T-connector, barrel connector, DEMPR, faceplate, or other networking device.

- The maximum segment length is 185 meters (606.9 feet). Each segment must have a terminator at each end.
- If you connect a ThinWire section to a Digital faceplate, you need to know the length of the ThinWire section behind the faceplate. This information is important if you plan to install more than one station on the faceplate segment.
  - If a segment contains a section behind a Digital faceplate, the section connects to a networking device. The networking device has an integral terminator that terminates that end of the segment.
  - When you connect a section to an existing DECconnect System network, see your network manager or installation contractor to obtain the floor and wiring plans and worksheets from that installation.
- Record cable lengths for your area on the Faceplate Worksheet.

Handling Connectors

Figure 1–11 shows how to remove a T-connector from a station.

Figure 1–11 Removing a T-Connector from a Station



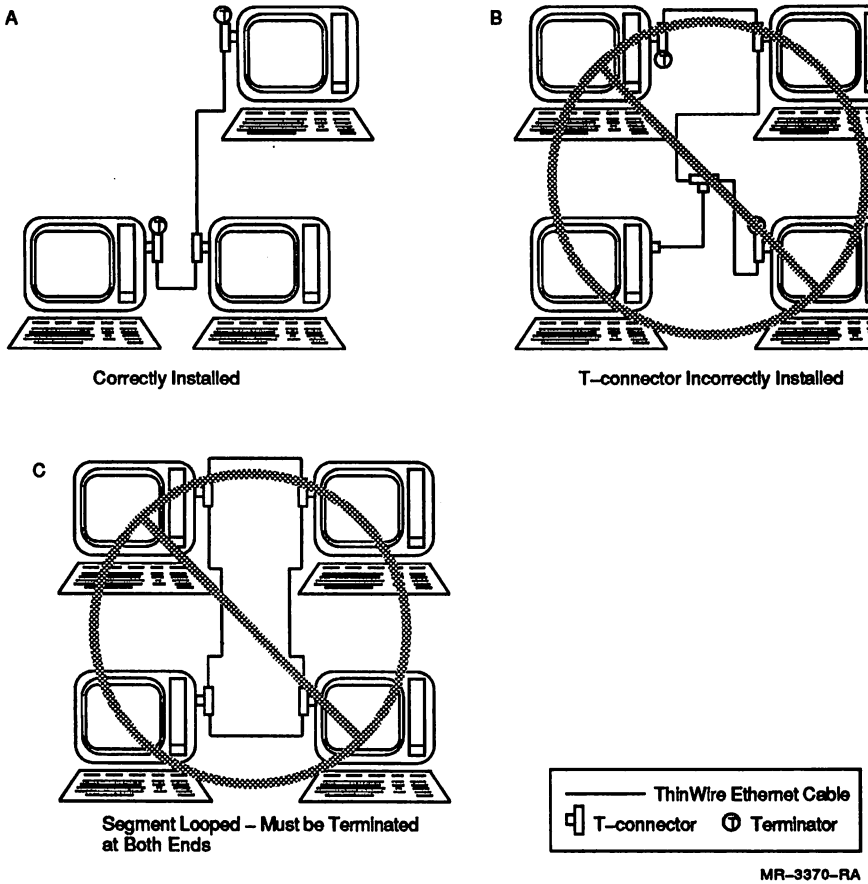
Observe the following guidelines when removing a connector from a station:

- Always disconnect a T-connector from the back of a station when you need to disconnect a station from an operating ThinWire segment (see Figure 1–11).
- Never disconnect a cable from a T-connector on an operating segment. This action disrupts the operation of the network and the communication path to other stations (see Figure 1–11).
- Never disconnect a terminator from a T-connector on an operating segment. This action will disrupt the operation of the network (see Figure 1–11).

Segment Configuration Guidelines

Figure 1–12 illustrates the installation of a ThinWire segment.

Figure 1–12 Correct and Incorrect Installations of a ThinWire Segment



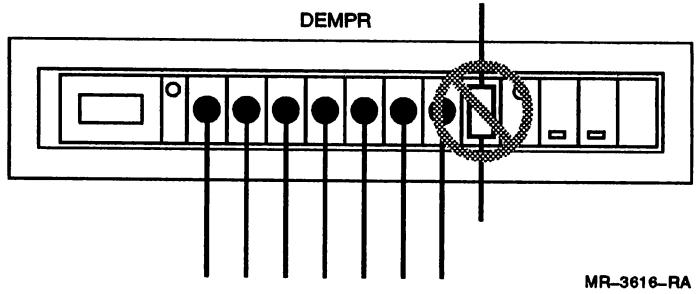
Observe the following segment configuration guidelines:

- Install ThinWire segments as shown in Figure 1–12, example A.
- Never install a cable between the T-connector and a station or DESTA (see Figure 1–12, example B).
- Never install a loop of ThinWire cable (see Figure 1–12, example C).

DEMPR Installation Guidelines

Figure 1–13 shows DEMPR connections.

Figure 1–13 Installing a DEMPR



Observe the following DEMPR guidelines:

- Never connect a T-connector to a DEMPR (see Figure 1–13).
- Never loop ThinWire cable segments connected to a DEMPR to another port on the same DEMPR.
- Never connect a DEMPR to the front of a faceplate.

CAUTION

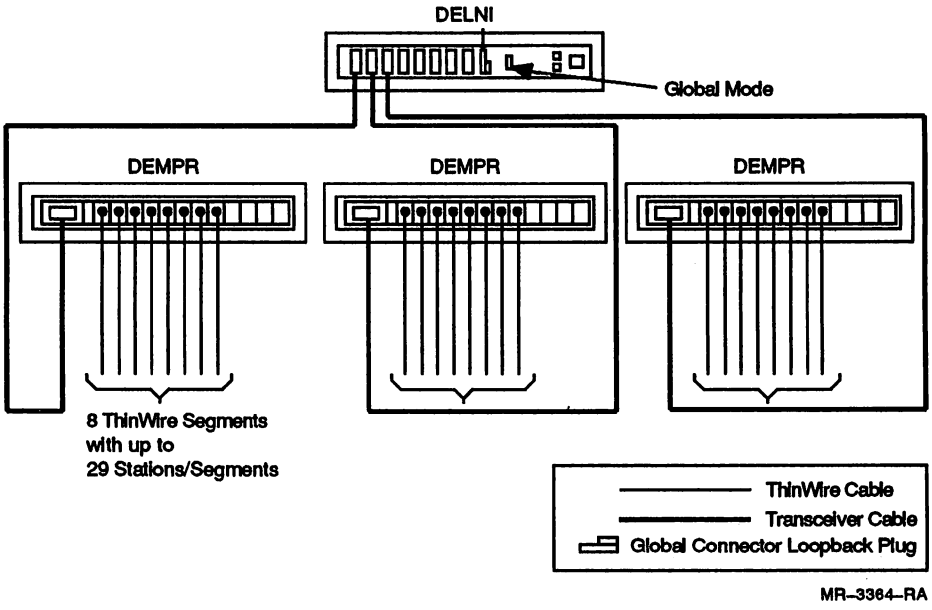
Do not connect any DEMPR to a standard Ethernet cable unless you are familiar with the rules and guidelines for connecting ThinWire networks to standard Ethernet. For more information, see the *DECconnect System Planning and Configuration Guide*.

DECconnect System Planning and Configuration Guide and *DEMPR Installation User's Guide* explain how to install more than one DEMPR in a ThinWire network.

DELNI/DEMPR Guidelines

A DELNI/DEMPR configuration consists of a DELNI and up to eight DEMPRs connected to the DELNI. Each DEMPR supports up to eight ThinWire segments. Figure 1–14 shows a typical DELNI/DEMPR configuration. You can connect the DELNI/DEMPR configuration to a standard Ethernet network to meet future growth needs.

Figure 1–14 Installing DELNI/DEMPR Configurations



CAUTION

Do not connect a DELNI to a standard Ethernet cable unless you are familiar with the rules and guidelines for connecting ThinWire networks to standard Ethernet. For more information, see the *DECconnect System Planning and Configuration Guide*.

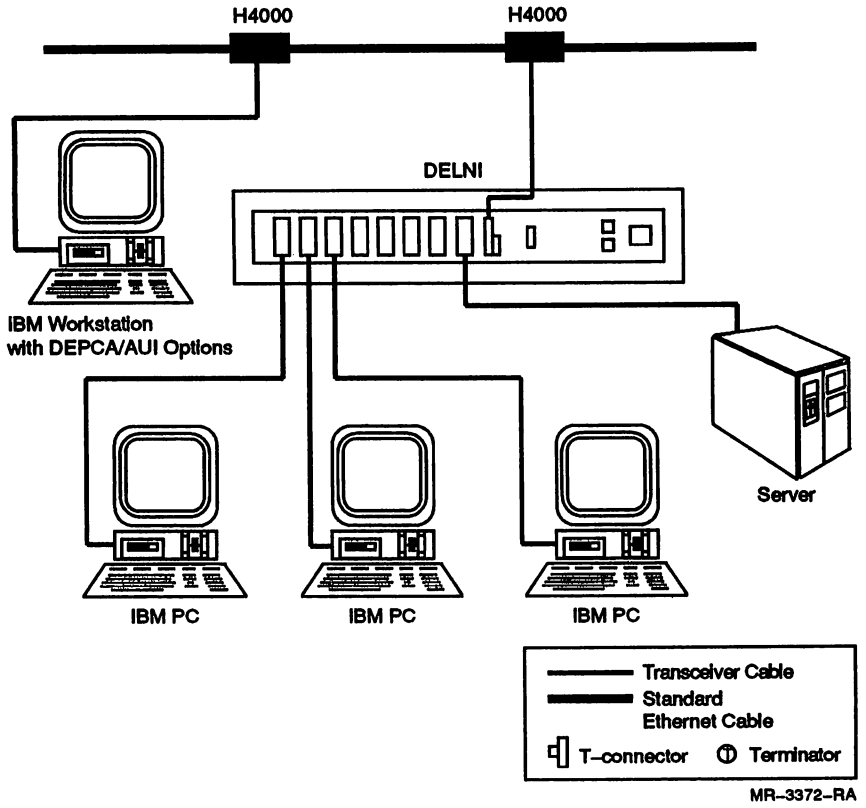
Observe the following DELNI/DEMPR guidelines:

- Use transceiver cable to connect a DEMPR to a DELNI.
- The DELNI must be in GLOBAL mode and it must have a special loopback connector (Digital part number 12-22196-01) attached to the global transceiver connector.
- Do not cascade a DEMPR on any of the 64 possible ThinWire segments in a DELNI/DEMPR configuration.
- Rules for the ThinWire cable segments connected to a DEMPR in a DELNI/DEMPR configuration are the same as those defined for a single DEMPR.
- You can configure up to 1024 stations in a DELNI/DEMPR network.

PC Workstation DEPCA/AUI Guidelines

You can connect PC workstations equipped with a DEPCA board having an AUI option to a standard Ethernet network through a DELNI or H4000 transceiver. Figure 1–15 illustrates such connections.

Figure 1–15 DEPCA/AUI Option Network Configurations



Observe the following DEPCA/AUI guidelines:

- Use transceiver cable (supplied with the DEPCA/AUI option) to connect the workstation to a DELNI or H4000 Ethernet transceiver.
- Follow DELNI or H4000 Installation guidelines.

CAUTION

Do not connect a PC workstation to standard Ethernet unless you are familiar with the rules and guidelines covered in the *DECconnect System Planning and Configuration Guide*.

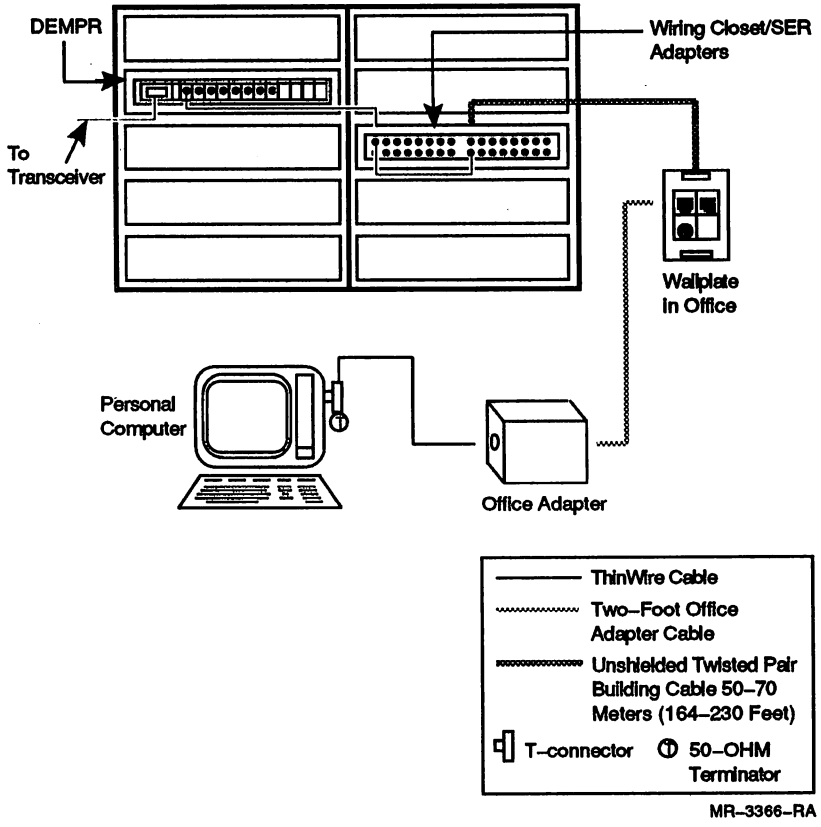
Unshielded Twisted-Pair Ethernet Adapter Guidelines

The unshielded twisted-pair Ethernet adapter consists of an unshielded twisted-pair Ethernet office adapter and an unshielded twisted-pair wiring closet/SER adapter that operates over 50-70 meters (164-230 feet) of unshielded twisted-pair building cable. You can use the unshielded twisted-pair Ethernet adapter to connect a single VAXmate workstation or PC workstation equipped with a DEPCA or compatible Ethernet controller to a DEMPR. Figure 1–16 shows a typical unshielded twisted-pair Ethernet adapter configuration.

CAUTION

Only qualified Digital field service personnel should install an unshielded twisted-pair Ethernet adapter. For more information, see the *Unshielded Twisted-Pair Ethernet Adapter Installation Guide.*

Figure 1–16 Unshielded Twisted-Pair Ethernet Configuration



2
Installation Procedures

This chapter describes five typical installation tasks:

- Installing a standalone ThinWire network with a MicroVAX server.
- Adding a station to the end of an existing ThinWire segment.
- Adding a station to the middle of an existing ThinWire segment.
- Adding segments to a DEMPR.
- Connecting standalone DEMPR networks to a DELNI.

The MicroVAX server mentioned in the first task could be one of several different types. It could be a MicroVAX II, a MicroVAX 2000, or a 3000-series MicroVAX. It could also be a VAXstation 3100. The illustrations in this chapter show a MicroVAX II, which is a representative type of server.

NOTE

When you install your ThinWire network, be sure to record the total cable length of each section you install.

See Appendix B for worksheets and topology maps to fill in as you install your network.

Illustrations in this chapter show VAXmate workstations. You can install PC workstations equipped with a DEPCA board in identical configurations.

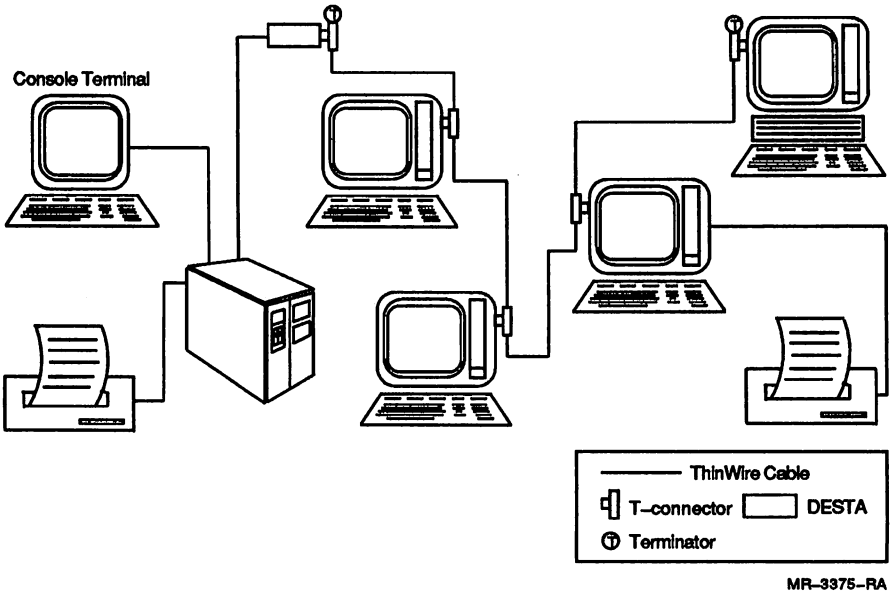
Installing a Standalone ThinWire Network with a MicroVAX II Server

Figure 2–1 shows a standalone ThinWire network that uses the following components:

- 4 workstations (more can be added)
- 2 printers (with printer cables)
- 5 T-connectors

- 1 MicroVAX II computer
- 2 terminators
- 1 DESTA (with DESTA cable)
- 4 sections of ThinWire cable (BNC connectors installed)
- 1 console terminal (with console terminal cable)

Figure 2–1 Standalone ThinWire Network With a MicroVAX II Server



The console terminal, shown in Figure 2–1, is used to install software and to run diagnostics. The terminal connects directly to the MicroVAX II computer. The printers connect directly to the MicroVAX II computer and to a workstation. The console terminal and printers are not considered workstations on the network; nor are their connectors considered connector junctions by the network.

To install a standalone ThinWire network with a MicroVAX server, use the following procedure:

1. Install the MicroVAX computer, console terminal, and printer. Follow the instructions in the system owner's manual that accompanied your server hardware.

   WARNING

   Dangerous voltages can exist within the MicroVAX II computer. An authorized service representative must install any option boards.

2. Connect the DESTA to the MicroVAX II computer, following the documentation included with your DEPCA.
3. Connect the T-connector shipped with the DESTA to the BNC connector on the DESTA.
4. Connect a terminator to the T-connector on the DESTA.
5. Connect one end of the ThinWire cable shipped with the first workstation to the T-connector on the DESTA.
6. Connect the next T-connector and terminator to the first workstation to be installed.
7. Install the VMS server software according to the instructions in the *Server Administration with Commands*.

   NOTE

   If you are installing more than one server on a segment, Digital recommends you install the server software immediately after you connect each server to the segment.

8. Test the first station. For instructions, see Chapter 3.
9. Add any additional stations. (For more information, see the section Adding a Station to the End of an Existing Segment in this chapter.)

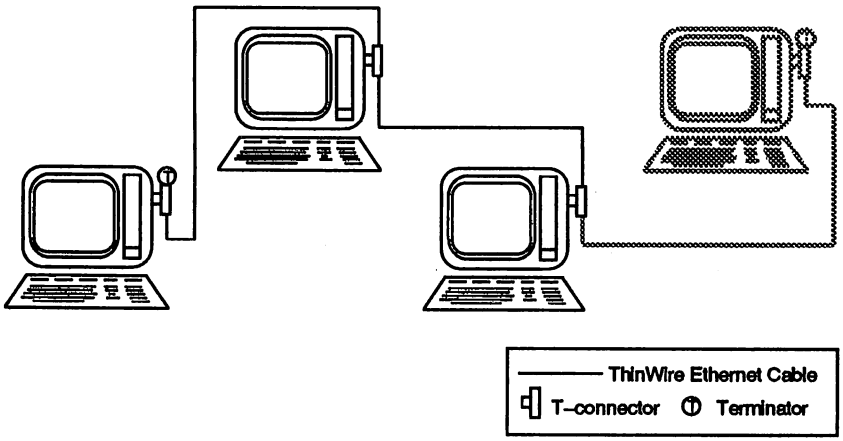
Adding a Station to the End of an Existing Segment

CAUTION

This procedure shuts down network operation on the segment.

Figure 2–2 shows a station added to the end of an existing segment.

Figure 2–2 Adding a Station to the End of an Existing Segment



To add a station to the end of an existing segment, use the following procedure:

1. Tell all users on the segment that the network is going to be shut down.
2. Shut down any server on the segment.
3. Remove the terminator from the last station on the segment. Save the terminator for future use.
4. Connect the end of the ThinWire cable that is shipped with the new station to the T-connector on the last station.
5. Connect the T-connector and terminator to the new station. Make sure a terminator is installed on this T-connector.
6. Restart any server on the segment.

7. Test the new station. For instructions, see Chapter 3, Network Troubleshooting Strategy.
8. Tell all users that the network is available.

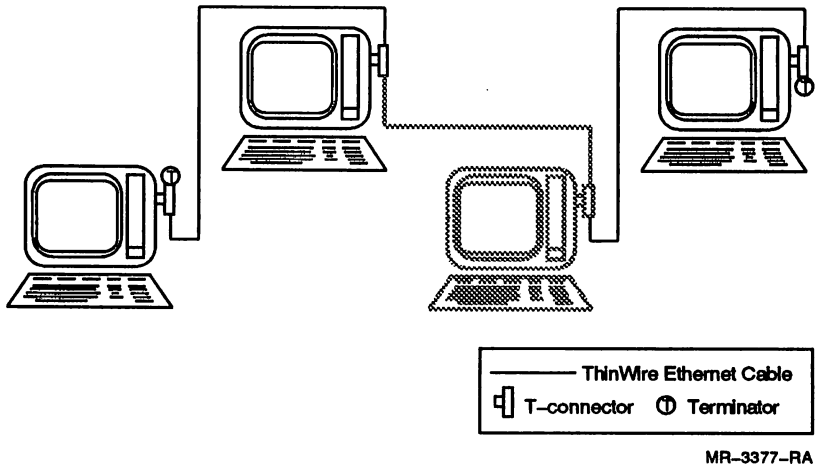
Adding a Station to the Middle of an Existing Segment

CAUTION

This procedure shuts down network operation on the segment.

Figure 2–3 shows a station being added to the middle of an existing segment.

Figure 2–3 Adding a Station to the Middle of an Existing Segment



NOTE

Digital recommends you test each station as you connect it to the network. See Chapter 3, Network Troubleshooting Strategy for instructions.

To add a station to the middle of an existing segment, use the following procedure:

1. Tell all users that the network is going to be shut down.
2. Shut down any server on the segment.

3. Remove the terminator from the ThinWire cable shipped with the new station. Save the terminator for future use.
4. Remove the end of the ThinWire cable from the T-connector on one adjacent station. (This divides the existing segment into two portions.)
5. Connect the end of the ThinWire cable you just removed to one side of the T-connector that is shipped with the new station. (The other end of this cable is still attached to another station.)
6. Connect the end of the ThinWire cable that is shipped with the new station to the T-connector on the other adjacent station.
7. Connect the new T-connector to the new station.
8. Restart any server on the segment.
9. Test the new station. For instructions, see Chapter 3, Network Troubleshooting Strategy.
10. Tell all users that the network is available.

Adding Segments to a DEMPR

CAUTION

Do not connect any DEMPR to a standard Ethernet cable unless you are familiar with the rules and guidelines for connecting ThinWire networks to a standard Ethernet network.

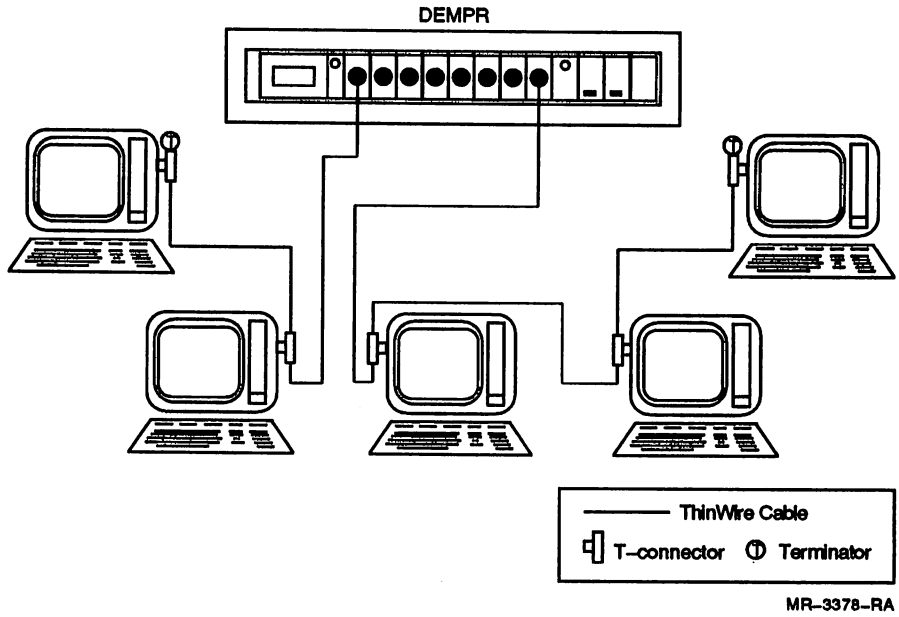
Configurations that are valid for a standalone DEMPR configuration might not be valid when connected to a standard Ethernet network. An invalid configuration can cause the entire network to malfunction. Refer to the *DECconnect System Planning and Configuration Guide* if you are connecting to a standard Ethernet cable.

Figure 2–4 shows a ThinWire network that uses the following components:

- 1 DEMPR
- 2 Terminators
- 5 Workstations

- 5 Sections ThinWire cable (with BNC connectors)
- 1 Expansion Box

Figure 2–4 Adding Segments to a DEMPR



Use the following general procedure to install segments on a standalone DEMPR.

NOTE

If you are installing one or more servers on a segment, Digital recommends you install the server software immediately after you connect each server to the segment.

1. Install the DEMPR. See the documentation shipped with the DEMPR for instructions.
2. Connect the end of the cable shipped with the first station to a port on the DEMPR.

3. Connect the T-connector to the first station.
4. Test the first station. For instructions, see Chapter 3.
5. Add any additional stations. (For more information, see the section Adding a Station to the End of an Existing Segment in this chapter.)

NOTE
During operation of the DEMPR the error light (located next to each port) will flash on any unused ports. This will not affect normal operation of the remaining DEMPR ports connected to network devices. You can install a terminator on any unused port if you wish to disable the error light.

Connecting Standalone DEMPR Networks to a DELNI

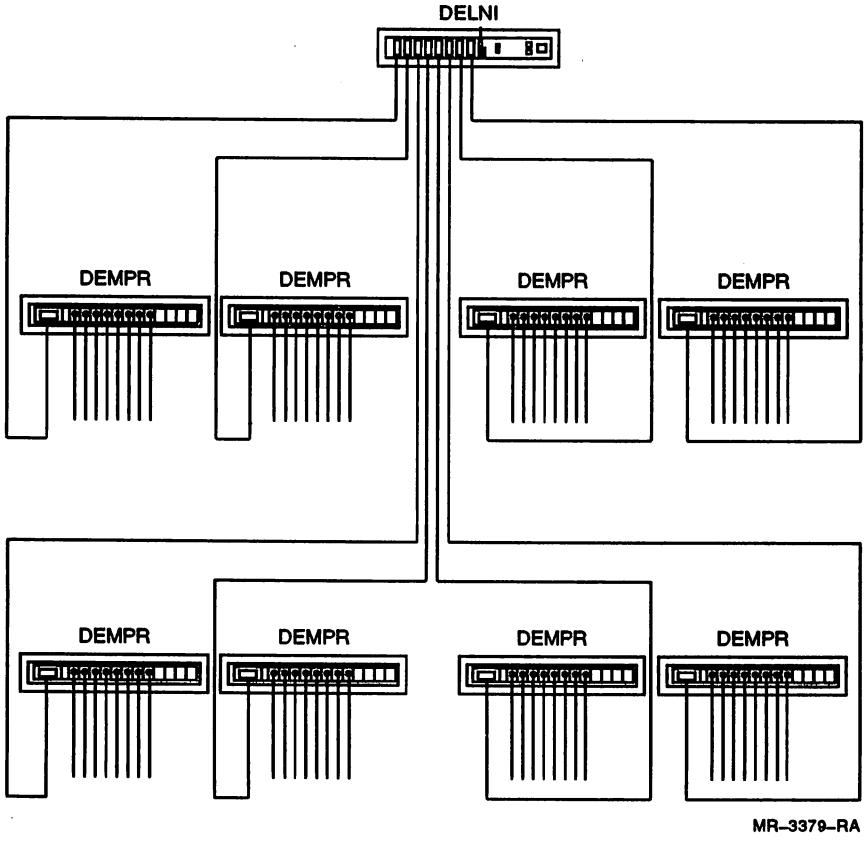
Up to eight standalone DEMPR networks can be connected to a DELNI to allow workstations connected to each DEMPR to communicate with each other as though they were connected to the same ThinWire network. In addition, the DELNI can be connected to standard Ethernet to meet future growth needs.

CAUTION
Do not connect a DELNI/DEMPR configuration to standard Ethernet unless you are familiar with the rules and guidelines for connecting ThinWire networks to standard Ethernet.

Configurations that are legal for standalone DELNI/DEMPR networks may not be legal when connected to standard Ethernet. An illegal configuration can cause the entire network to malfunction. See the *DECconnect System Planning and Configuration Guide.*

Figure 2–5 shows a typical DELNI/DEMPR configuration.

Figure 2–5 Connecting Standalone DEMPRs to a DELNI



To connect a standalone DEMPR network to a DELNI, use the following procedure:

1. Follow the instructions provided in the previous section for adding segments to a DEMPR.
2. Install the DELNI. For instructions, see documentation shipped with the DELNI.

3. Use transceiver cable to connect each DEMPR to the DELNI.
4. Switch the DELNI to the GLOBAL mode and connect the special loopback connector (Digital part number 12-22196-01) to the GLOBAL connector on the rear panel of the DELNI.
5. Power-up and test the system. See Chapter 3, Network Troubleshooting Strategy.

Part II

3
Network Troubleshooting Strategy

This chapter introduces the strategy for diagnosing, isolating, and correcting network problems. A flowchart is included that directs you to one or more of the checklists in the following chapters. Each one of these chapters describes one aspect of network troubleshooting. Chapter 4 covers hardware troubleshooting, Chapter 5 is about troubleshooting network problems at the server, and Chapter 6 covers workstation-related network problems.

By adhering to the step-by-step procedures that the flowchart refers you to, you can locate network malfunctions and take appropriate corrective measures. Before you begin, you should have a diagram or schematic that shows your network topology. Refer to the maps and worksheets in Appendix B.

NOTE

If you need additional information about the procedures described in this and the following chapters, Digital offers consulting services for these products. For more information about the services that Digital offers, see the Software Product Description.

Figure 3–1 is an example of a network topology that includes a VMS server, a Digital ThinWire Ethernet Multiport Repeater (DEMPR), a Digital ThinWire Ethernet Station Adapter (DESTA), and workstations.

Figure 3–1 Example of a VMS Server Network Topology

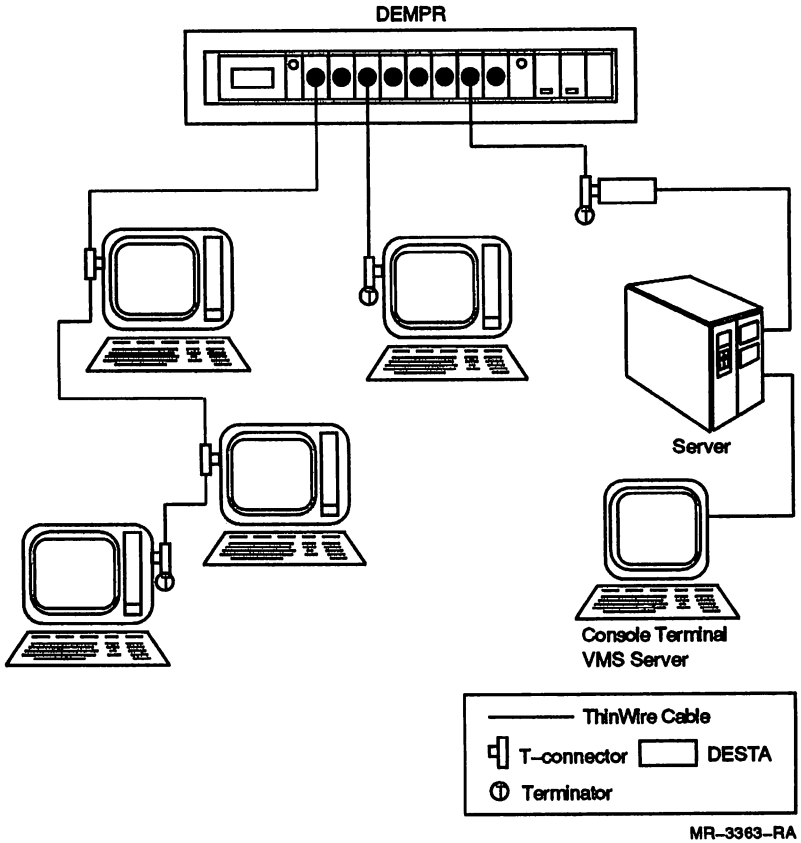
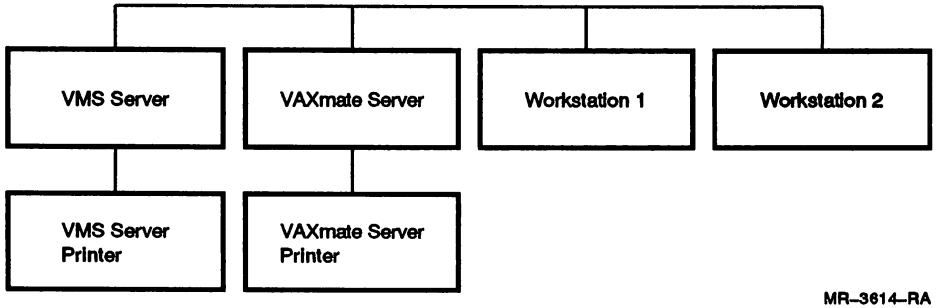


Figure 3–2 is a block diagram of a simplified network. Your network can have a VMS server and a VAXmate server, or only a VMS server, connected to several workstations.

NOTE

VMS Services for PCs Version 3.0 cannot be installed on VAXmate workstations. It is possible to include a VAXmate server running Version 2.2 of PCSA server software in a network that has other servers running Version 3.0. Workstations running DECnet PCSA Client for DOS Version 3.0 can still make use of VAXmate servers running Version 2.2 software. To troubleshoot problems involving VAXmate servers, however, you need to refer to the Network Troubleshooting Guide for the Version 2.2 (or earlier) product, since this manual is applicable only for Version 3.0 PCSA systems.

Figure 3–2 Network Block Diagram



Relationships of Computers, Network Software, and Communication Media

The Digital Personal Computer System Architecture (PCSA) network environment includes a wide range of computers, software components, and communication media. Table 3–1 through Table 3–2 provide information about the supported combinations.

Table 3–1 Software Component Versus Server Computer Type

Software	VAX	MicroVAX	VAXmate†
DECnet	Yes	Yes	Yes
LAT	Yes	Yes	No
CTERM	Yes	Yes	No
Directory Services	Yes	Yes	Yes
Remote Printing	Yes	Yes	Yes
Virtual Disk Services	Yes	Yes	No
Remote Boot	Yes	Yes	No

†Table entries refer to VAXmate servers running Version 2.2 of PCSA software. VMS Services for PCs Version 3.0 does not run on VAXmates.

Whether you have a PC workstation with a DEPCA, 3COM, or Interlan network interface or a VAXmate with a LANCE interface, your PCSA network environment includes the following capabilities:

- DECnet
- LAT
- Directory Services
- Remote Printing
- Disk Services
- Remote Boot

Table 3–2 Software Component Versus Type of Network Connection

Software	WAN†	LAN
DECnet	Yes	Yes
LAT	No	Yes
CTERM	Yes	Yes
Directory Services	Yes	Yes

†If the network connection is through an asynchronous line or a network segment that uses a non-Ethernet protocol (for example, a DECnet router), then the connection is subject to Wide Area Network (WAN) restrictions.

Table 3–2 (Cont.) Software Component Versus Type of Network Connection

Software	WAN†	LAN
Remote Printing	Yes	Yes
Disk Services	No	Yes
Remote Boot	No	Yes

†If the network connection is through an asynchronous line or a network segment that uses a non-Ethernet protocol (for example, a DECnet router), then the connection is subject to Wide Area Network (WAN) restrictions.

Network Troubleshooting Strategy

Figure 3–3 through Figure 3–11 make up a flow chart that is an aid in the troubleshooting of a PCSA network. The flow chart can help determine the nature of the problem and guide you to the appropriate checklists. You can expand this strategy and apply it to other network configurations by following the same procedures.

Preparation Checklist

Before beginning the troubleshooting procedures:

- Confirm that all cable connections are secure and that terminators are in place at the ends of the network. If corrections were made to cable connections or terminators, try restarting the system.
- Have available the following items:
  - An external loopback connector that is appropriate for the type of network connection to be tested
  - A key diskette to start the workstation
  - A PCSA TROUBLESHOOTING V3.0 diskette
  - A PCSA FLOPPY REMOTE BOOT V3.0 diskette
- Ensure that two or more workstations are not connected to the network with the same address and node name. This might happen, for example, if the same key diskette is used to start a second workstation while the first workstation is still connected to the network.

Figure 3–3 Network Troubleshooting Strategy Flowchart (1 of 9)

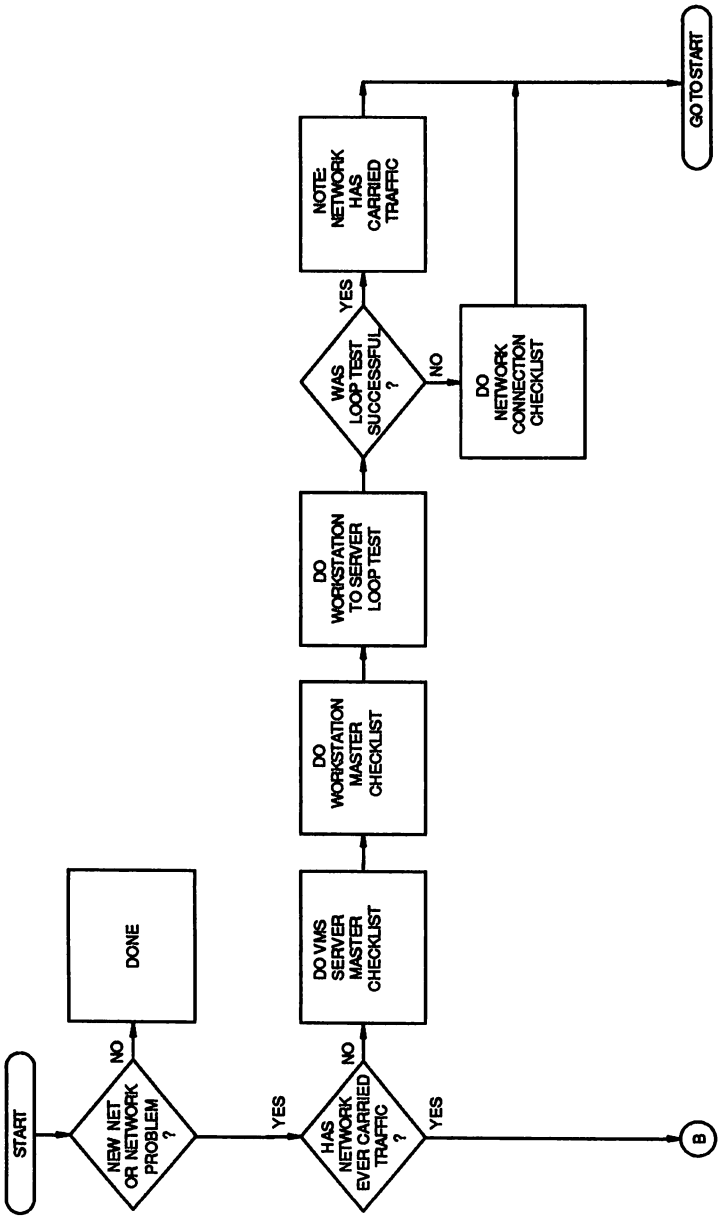


Figure 3–4 Network Troubleshooting Strategy Flowchart (2 of 9)

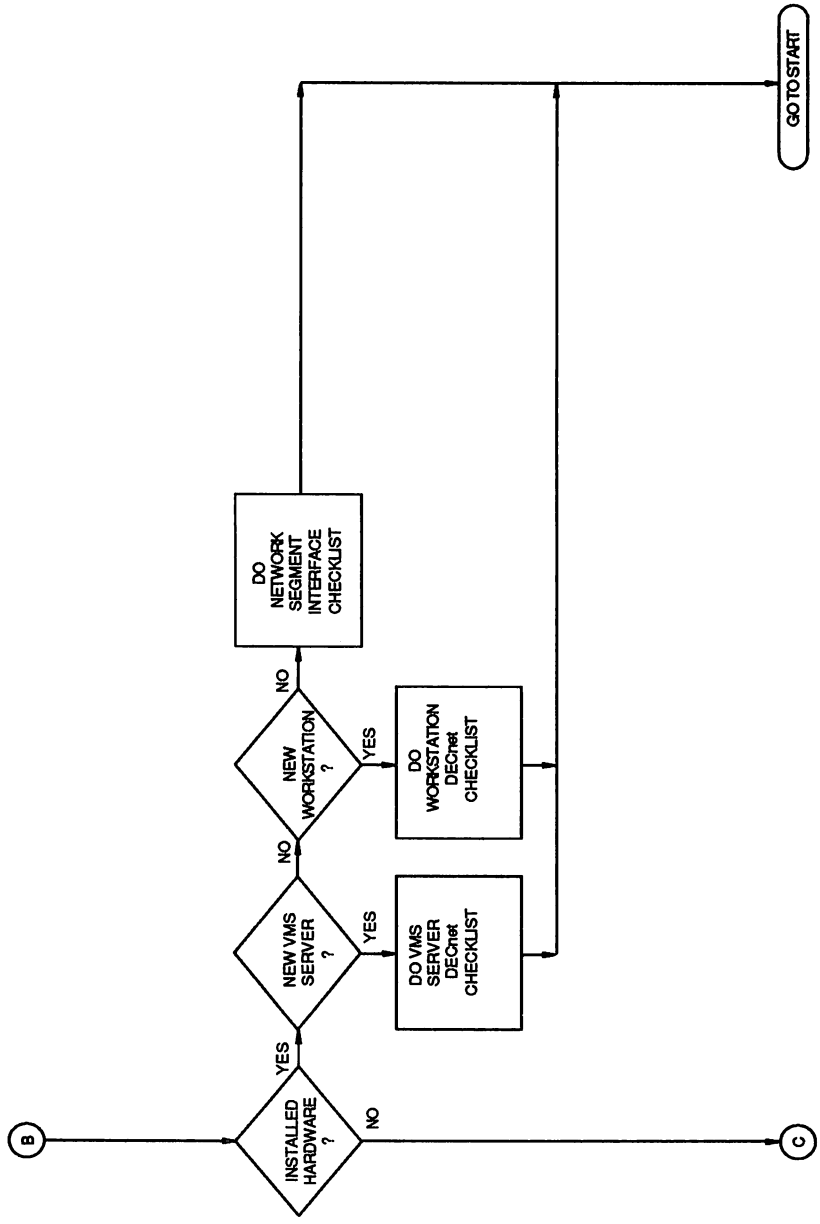


Figure 3–5 Network Troubleshooting Strategy Flowchart (3 of 9)

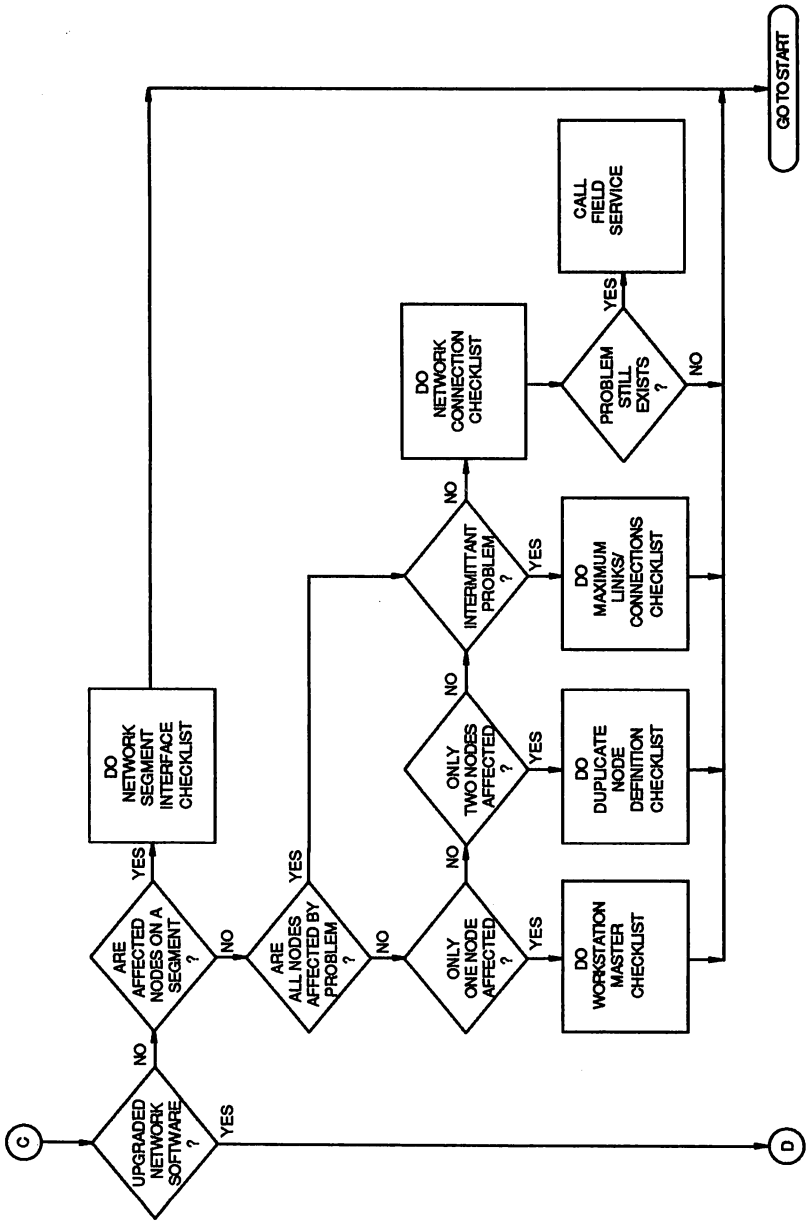


Figure 3–6 Network Troubleshooting Strategy Flowchart (4 of 9)

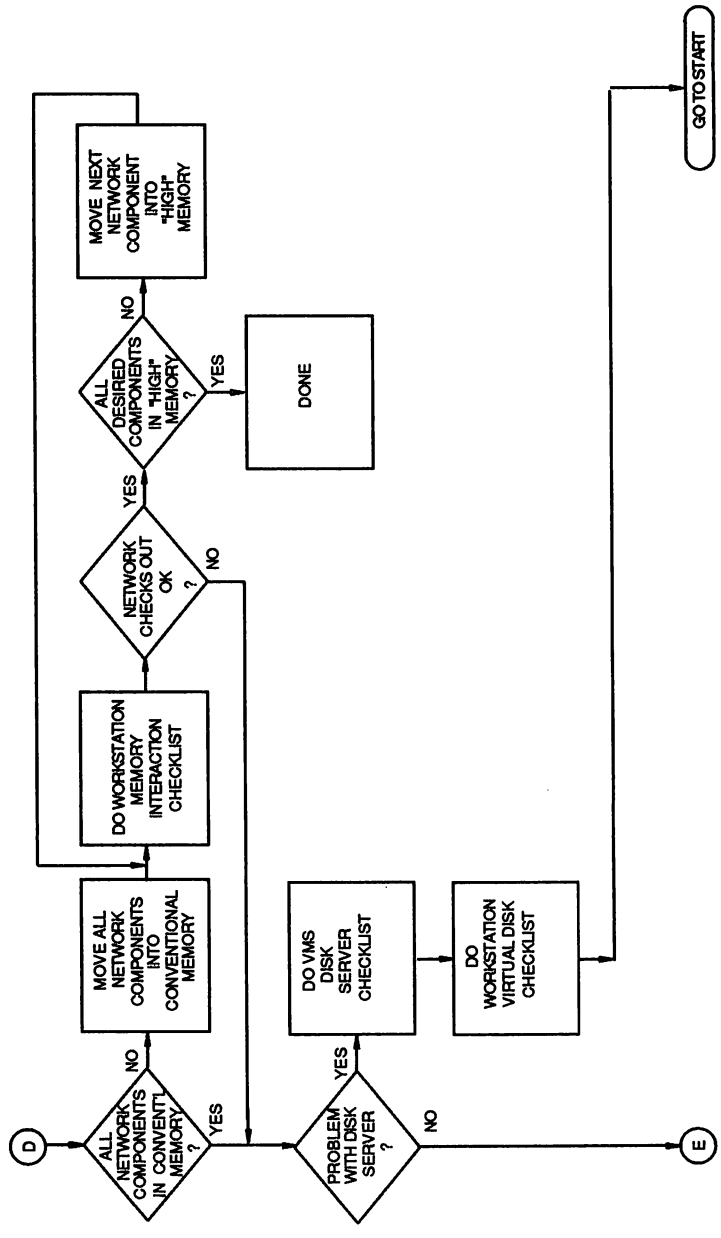


Figure 3–7 Network Troubleshooting Strategy Flowchart (5 of 9)

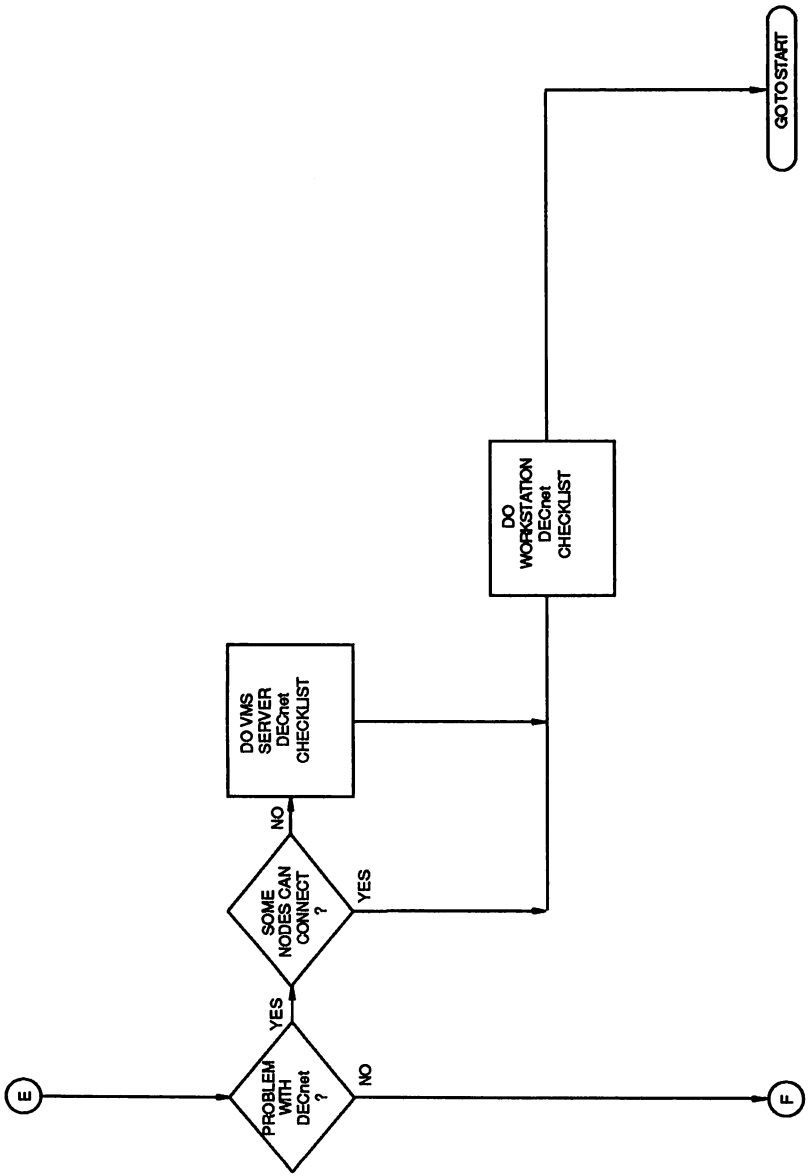


Figure 3–8 Network Troubleshooting Strategy Flowchart (6 of 9)

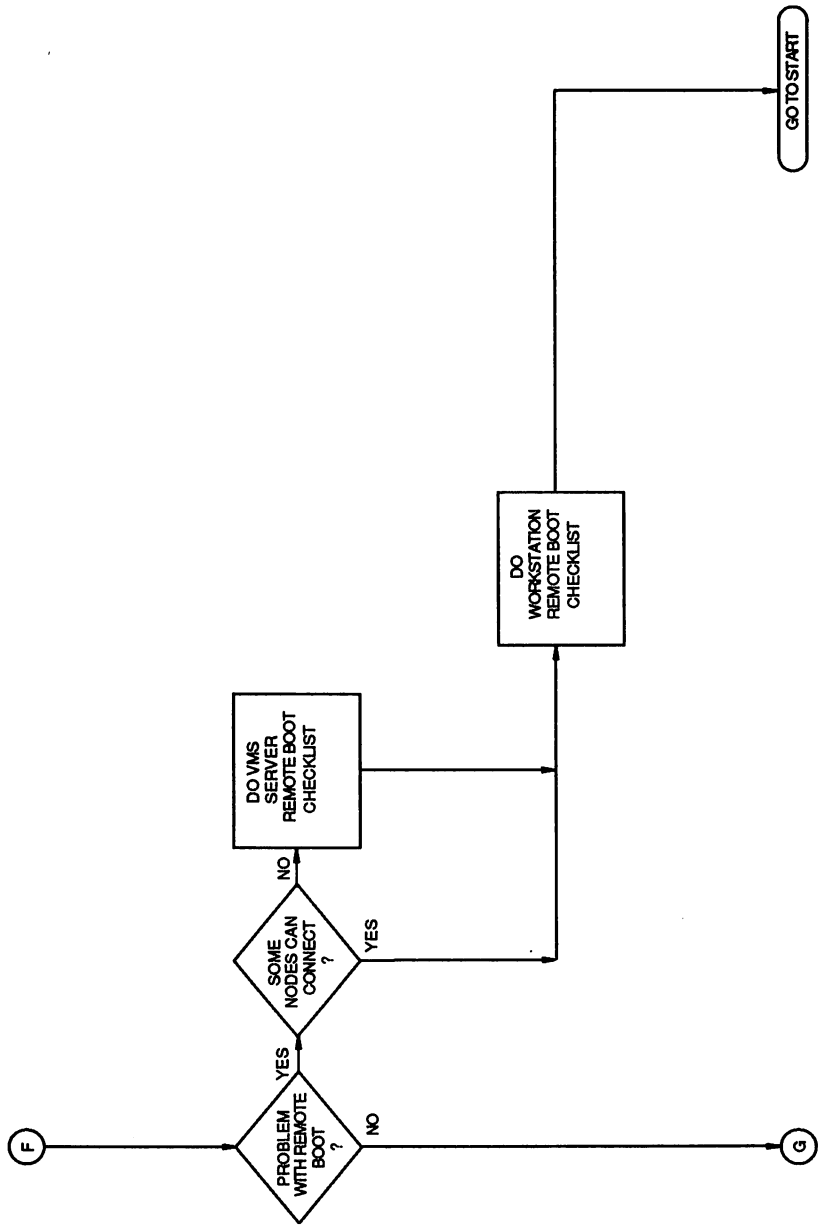


Figure 3–9 Network Troubleshooting Strategy Flowchart (7 of 9)

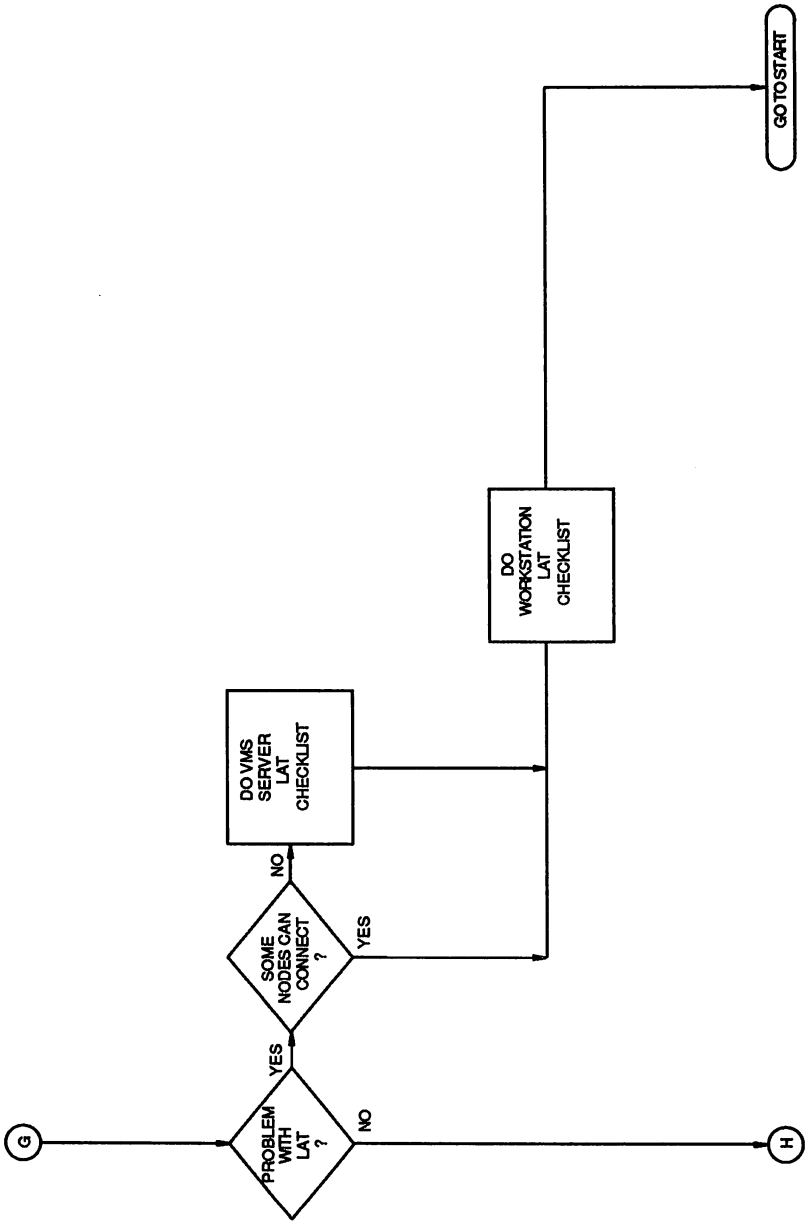


Figure 3–10 Network Troubleshooting Strategy Flowchart (8 of 9)

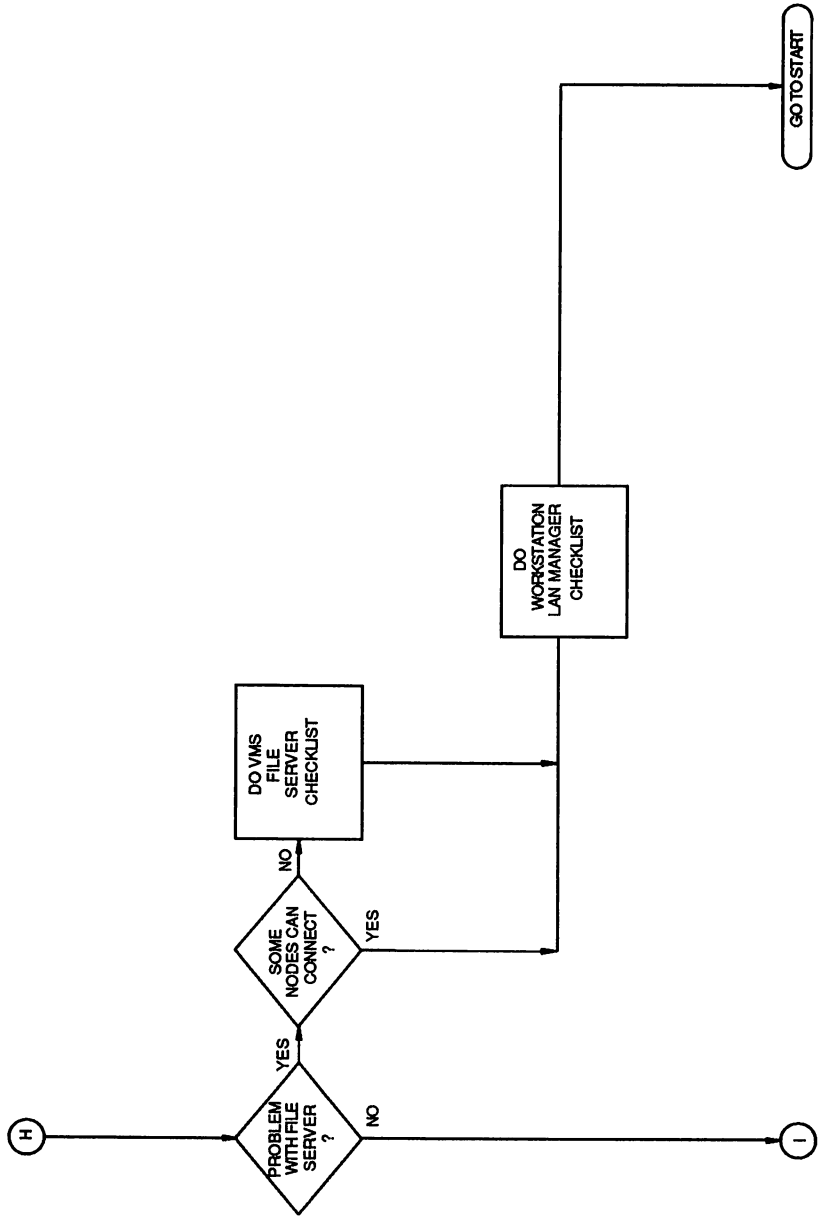
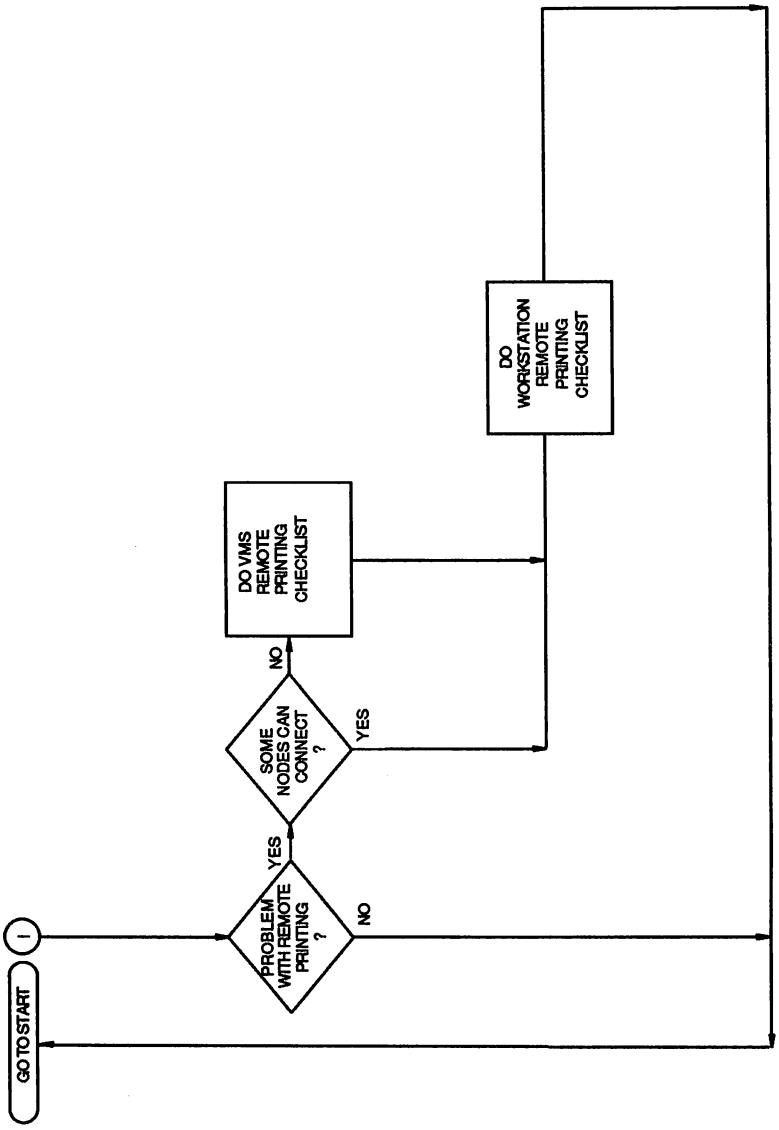


Figure 3–11 Network Troubleshooting Strategy Flowchart (9 of 9)



The Checklists

The checklists referred to in the flowchart of Figure 3–3 through Figure 3–11 are contained in the three following chapters. Chapter 4 contains the following:

- Duplicate node definition checklist
- Maximum links/connections checklist
- Loop tests
- Network connection checklist
- Network segment interface checklist

Chapter 5 contains:

- The VMS server troubleshooting master checklist, which includes
  - VMS DECnet checklist
  - VMS file server checklist
  - VMS disk server checklist
  - VMS remote boot checklist
  - VMS LAT checklist
  - VMS remote printing checklist

Chapter 6 contains the following:

- Workstation master checklist, which includes
  - Workstation memory interaction checklist
  - Workstation remote boot checklist
  - Workstation virtual disk checklist
  - Workstation DECnet checklist
  - Workstation basic LAN manager checklist
  - Workstation remote printing checklist
  - Workstation LAT checklist
- Workstation loopback test

4

Troubleshooting Hardware and Configuration

This chapter contains a set of checklists to use for isolating problems with the configuration of your network or with network hardware. Use it in conjunction with Figure 3–5 in Chapter 3. The following checklists and tests are included:

- Duplicate node definition checklist
- Maximum links/connections checklist
- Loop tests
- Network connection checklist
- Network segment interface checklist

Duplicate Node Definition Checklist

Use this checklist to confirm that two nodes do not have the same node names and/or node addresses. The following are example node databases for the nodes in the simplified network in Figure 3–2.

Figure 4–1 Example Node Databases

	VMS Server		Workstation 1		Workstation 2	
	Name	Addr	Name	Addr	Name	Addr
Executor	VVSVR	8.200	WKSONE	8.101	WKSTWO	8.102
Known Nodes	WKSONE WKSTWO	8.101 8.102	VVSVR WKSTWO	8.200 8.102	VVSVR WKSONE	8.200 8.101

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Ensure that the node names and node addresses are consistent at all nodes on the network.

1. Ensure that the same key diskette was not used to boot two workstations. Also, ensure that a copy of a key diskette was not used to boot a workstation while the original key diskette was used to boot another workstation.

   This applies to network key diskettes as well as physical key diskettes.

2. On each node, use the NCP Show Executor command to display the node's name and address. Enter the data you collect in a table similar to that in Figure 4–1. Use this table to verify that node names and addresses are set up as expected.

Maximum Links/Connections Checklist

This checklist verifies that the number of allowed links, connections, or sessions has not been exceeded.

1. **VMS File Servers:** Use the NCP command SHOW EXECUTOR CHARACTERISTICS to determine the maximum number of DECnet links. Then use the PCSA Manager command SHOW FILE_SERVER CHARACTERISTICS to determine the maximum limit for total server-wide sessions.

   The number of links that the server must support is three times the number of PC workstations on the network plus the number of nodes in the cluster plus the number of additional links required by individual applications. Ensure that the maximum limit for total server-wide sessions is larger than this number, and ensure that the number of file server total server-wide sessions is at least two less than the DECnet maximum links.

2. **VMS Disk Servers:** Use the PCSA Manager command SHOW DISK_SERVER SERVICES /TYPE=ALL to determine the limits and number of actual users on a per service basis.

Loop Tests

The loop tests are composed of the following specific loop tests:

- Server to Server Loop Test
- Workstation to Server Loop Test
- Workstation to Workstation Loop Test

If the loop test fails, do the appropriate DECnet checklist for each node. If no problem is found, do the "Network Connection Checklist."

Server to Server Loop Test

To execute a loop test between two servers, at one server enter:

```
NCP>LOOP NODE node_id
```

Where:

node_id Is the DECnet node address of the other server.

Workstation to Server Loop Test

To execute a loop test between a workstation and a server, at the workstation enter:

```
NCP>LOOP NODE node_id
```

Where:

node_id Is the DECnet node address of the server.

Workstation to Workstation Loop Test

To execute a loop test between two workstations, at one workstation enter:

```
NCP>MIRROR
```

At the other workstation, enter:

```
NCP>LOOP NODE node_id
```

Where:

node_id	Is the DECnet node address of the workstation running the mirror program.

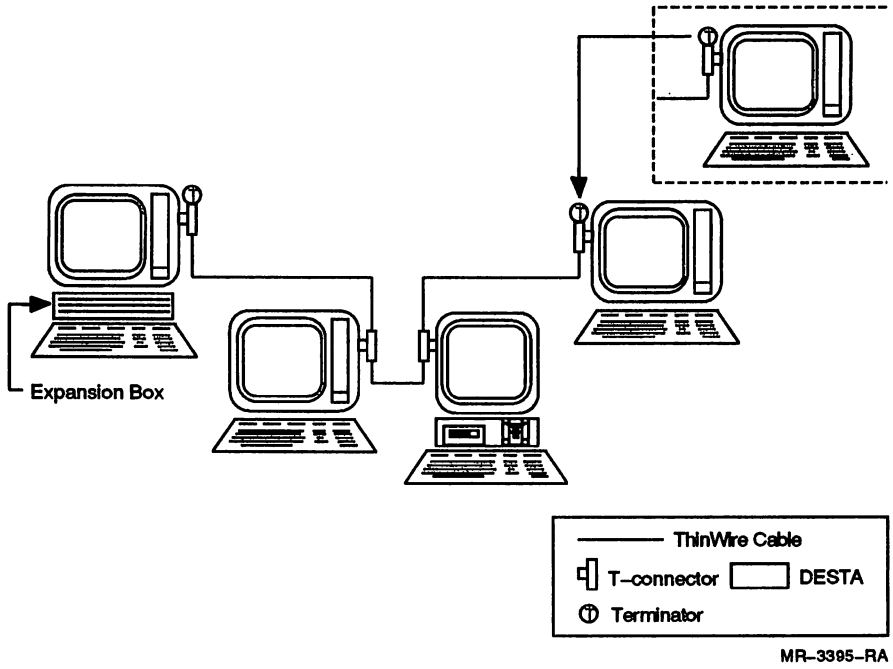
Network Connection Checklist

To troubleshoot a problem on the cable, follow the instructions for either the Daisy Chain or Digital ThinWire Ethernet Multiport Repeater (DEMPR) configuration segment test. Before doing either test, make sure that the server is cabled to the network correctly.

Daisy Chain Segment Test

Figure 4–2 shows a daisy chain configuration segment.

Figure 4–2 Checking Daisy Chain Configuration Segments



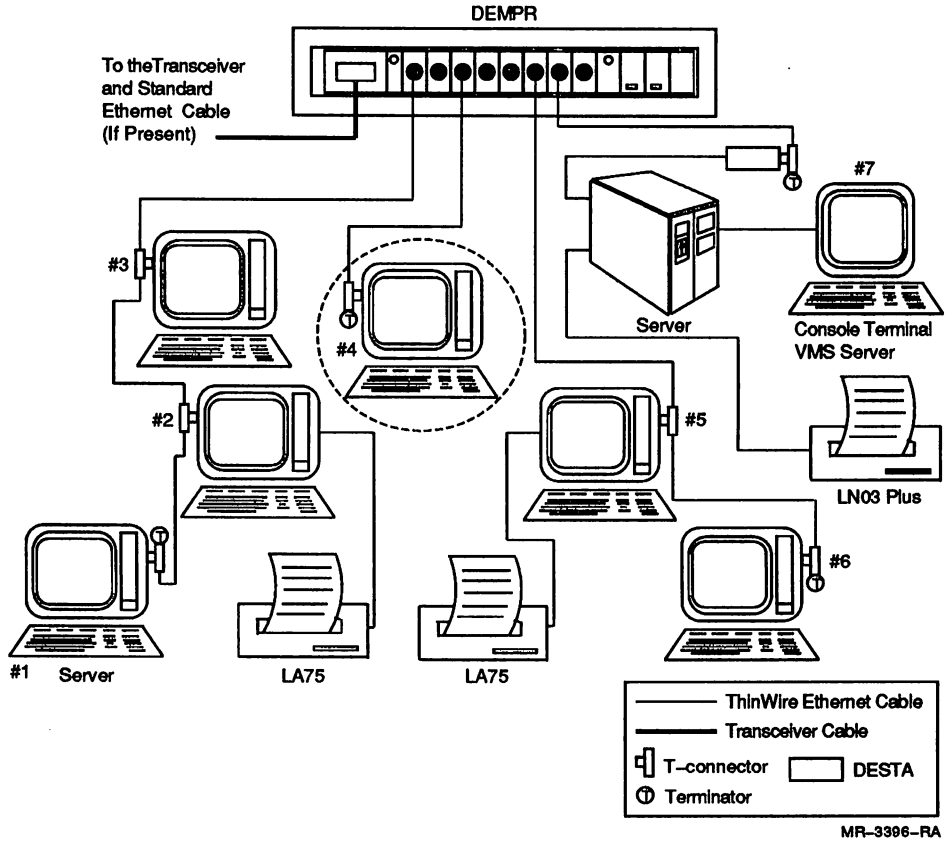
Starting at the end of a segment:

1. Remove the terminator from the end of the chain.
2. Insert the terminator at the next T-connector (Figure 4–2).
3. Run the "Workstation Loopback Test" on the last node in the chain.
4. Run the appropriate server troubleshooting test from the server node to the last node.
   - If successful, the segment removed was bad. Replace that segment and retest. (A bad T-connector or terminator can cause a problem.)
   - If failure still occurs, return to step 1 above. Repeat these steps until you find the bad segment or network component.

DEMPR Configuration Segment Test

Refer to the example shown in Figure 4–3 to perform the DEMPR configuration segment test.

Figure 4–3 Checking DEMPR Configuration Segments



From the point of failure (node 4) to node 1:

1. Reset the DEMPR if any lights are on or blinking.
2. Follow the daisy chain segment test for nodes 1, 2, and 3.
3. Use the following DEMPR segment test:
   - Remove the connection from the DEMPR port for the failing segment (in this example, node 4).
   - Connect the failing segment to another DEMPR port.

- Run the "Workstation Loopback Test" and the "Workstation Remote Boot Checklist" on this node (node 4).
- Reset the DEMPR to make sure that the segment is not disconnected. If the light remains on or blinking after the reset, the segment is not properly connected.
- Run the appropriate server troubleshooting test from node 1 to node 4, which is now connected to a new port.
  - — If successful, reconnect the segment to the original port and retest. If this is successful, resetting the cable connections and the DEMPR may have fixed the problem. Go to the section Adding Segments to a DEMPR in this book. If this fails, the original port is faulty. Replace the bad component.
  - — If the new port fails, replace the cable between the workstation and the DEMPR and retest. If successful, then the original cable was faulty. If the test fails, the DEMPR has a hardware failure. You can test other DEMPR ports or contact your authorized service representative.

For more information about network cabling, see Chapter 1, Network Components and Guidelines and Chapter 2, Installation Procedures in this book and the *DECconnect System General Description* manual.

Network Segment Interface Checklist

This checklist verifies that the nodes on a network segment can communicate on the network segment and that the network segment interface is suspect.

If two or more nodes are daisy chained on a network segment, disconnect the end of the ThinWire nearest the network segment interface and install a terminator. Using the appropriate loop test (server to server, workstation to workstation, or workstation to server), do a loop test between the two nodes at either end of the segment.

If the loop test is successful, the network segment interface, H4000, DEMPR, or DEREP, is probably faulty. If you have a similar component somewhere else in the network, try temporarily substituting the similar component for the suspect unit.

If the loop test fails, check the terminators at both ends of the network segment. If no problem is observed, disconnect one of the tested nodes and move the terminator to the new end of the segment. Repeat the loop test between the two nodes at either end of the segment. Repeat this process until the loop test is successful or until only two nodes remain.

If after removing a node, the loop test is successful, the removed node is probably faulty.

If the loop test has failed and you are down to two nodes, try connecting and testing, in turn, each of the two remaining nodes with a third node. If one loop test completes successfully, the remaining node is probably faulty.

5

Troubleshooting the Network Server

VMS Server Master Checklist

This chapter contains a set of subsidiary checklists, which together comprise the VMS server master checklist. Use these checklists in conjunction with Figures 3–3 through Figure 3–11 in Chapter 3. The VMS server master checklist is composed of the following:

- VMS DECnet checklist
- VMS file server checklist
- VMS disk server checklist
- VMS remote boot checklist
- VMS LAT checklist
- VMS remote printing checklist

Use the complete suite of VMS server checklists to verify that your VMS server is operational. First, verify that DECnet is operational. Then, verify that the appropriate services are operational.

VMS DECnet Checklist

This checklist verifies that DECnet is operating correctly on a VMS server.

1. Log into the system manager's account. After logging in, determine the version of VMS by entering the following:

   ```
   $SHOW SYSTEM
   ```

   The first line of the response contains the version number of the VMS operating system. If the version of the VMS operating system is less than 5.1 you must upgrade your VMS operating system.

2. Ensure that DECnet is running by checking that the DECnet executor state is on. Enter:

```
$ RUN SYS$SYSTEM:NCP
NCP>SHOW EXECUTOR

Node Volatile Summary as of  9-AUG-1989 10:00:52

Executor node = 8.200 (VVSRV)

State                     = on
Identification            = DECnet-VAX V5.2,  VMS V5.2
Active links              = 2
```

If the SHOW EXECUTOR command returns an error message, DECnet is not running. Restart DECnet with your network startup command file:

```
NCP>EXIT
$ @SYS$STARTUP:STARTNET
```

If the SHOW EXECUTOR command does not return an error message, and if the response indicates that the executor state is "off," DECnet is not running.

If the executor state is "off," set the executor to "on" in the volatile database and define it as "on" in the permanent database, using the following commands:

```
NCP>SET EXECUTOR STATE ON
NCP>DEFINE EXECUTOR STATE ON
```

If the response indicates that the executor state is "on," DECnet is running. Ensure that the response contains the correct node name and address. Record the node name and address for future reference.

3. If the response is not similar to the example and if you receive the following system error message, your DECnet license is not installed.

```
%SYSTEM-F-NOLICENSE, Operation requires software license
```

If you do not own a license, you must purchase one. Otherwise, install your DECnet license according to the instructions that you received with it.

If DECnet is started successfully once you have installed your license, go back to step 1. Otherwise, see the installation instructions that you received with the DECnet software.

4. Ensure that the executor is operating correctly by entering:

```
NCP>LOOP EXECUTOR
NCP>
```

If the response is an error message, ensure that the executor state is on.

5. Ensure that the appropriate lines are on and running by checking that the line state is "on". Enter:

```
NCP>SHOW KNOWN LINES


Known Line Volatile Summary as of  9-AUG-1989 10:02:57


   Line                  State


  QNA-0                  on
  TT-0-0                 on
```

The previous example shows an Ethernet line, QNA-0, and an asynchronous line, TT-0-0.

If the SHOW KNOWN LINES command returns the message "No information in database" enter the following commands:

```
NCP>SET LINE device STATE ON
NCP>DEFINE LINE device STATE ON
NCP>SHOW LINE device STATUS



Line Volatile Status as of  9-AUG-1989 10:03:57


   Line                  State


  QNA-0                  on
```

Where:

device — Indicates the type of controller.

For a 8xxx series VAX computer, the first Ethernet device is BNT-0 and the second is BNT-1. For DECnet-VAX version 5.0 and greater, the first Ethernet device is BNT-0 or BNA-0 and the second is BNT-1 or BNA-1.

For a 7xx series VAX computer, the first Ethernet device is UNA-0 and the second is UNA-1.

For a MicroVAX I or MicroVAX II computer, the first Ethernet device is QNA-0 and the second is QNA-1.

For a MicroVAX 2000 computer, the first Ethernet device is SVA-0 and the second is SVA-1.

For asynchronous devices, TXA0 through TXA3, are referred to as TX-0-0 through TX-0-3; TXB0 through TXB3 are referred to as TX-1-0 through TX-1-3; TTA0 through TTA3, are referred to as TT-0-0 through TT-0-3; TTB0 through TTB3 are referred to as TT-1-0 through TT-1-3.

If the response indicates that the line is an unknown component and the indicated device is BNT-x, UNA-x, QNA-x, or SVA-x, ensure that the physical device is installed.

If the response indicates that the line is an unknown component and the indicated device is TX-x-x or TT-x-x, the device may not be defined as DDCMP line. A DDCMP line can be either static or dynamic:

- A static DDCMP line always carries a DECnet protocol. A line configured as a static DDCMP line can not be used as a terminal port. To set device TTA0: as a static DDCMP line, enter the following:

```
NCP>EXIT
$ RUN SYS$SYSTEM:SYSGEN
SYSGEN> CONNECT NOA0/NOADAPTER
SYSGEN> EXIT
$ SET TERMINAL TTA0: /SPEED=9600 /MODEM /PROTOCOL=DDCMP /PERM
$ RUN SYS$SYSTEM:NCP
NCP>SET LINE TT-0-0 LINE SPEED 9600 RECEIVE BUFFER 4
NCP>SET LINE TT-0-0 PROTOCOL DDCMP POINT STATE ON
NCP>SET CIRCUIT TT-0-0 STATE ON
NCP>SHOW LINE TT-0-0 STATUS


Line Volatile Status as of  9-AUG-1989 10:04:07

  Line              State

 TT-0-0             on
```

- A dynamic DDCMP line can be switched between DECnet and terminal protocols. However, both protocols must use the same device characteristics such as baud rate and parity. To set device TTA0: as a dynamic DDCMP line:

```
NCP>EXIT
$ RUN SYS$SYSTEM:SYSGEN
SYSGEN> CONNECT NOA0/NOADAPTER
SYSGEN> EXIT
$ INSTALL CREATE SYS$LIBRARY:DYNSWITCH/SHARE/PROTECT/HEADER/OPEN
$ RUN SYS$SYSTEM:SYSGEN
SYSGEN> CONNECT VTA0:/NOADAPTER/DRIVER=TTDRIVER
$ SET TERMINAL TTA0:/EIGHT_BIT/PARITY=NONE/DISCONNECT/PERM
$ SET TERMINAL TTA0:/NOTYPEAHEAD/SPEED=1200/MODEM/PERM
$ SET TERMINAL TTA0:/NOHANGUP/PROTOCOL=DDCMP/SWITCH=DECNET/MANUAL
$ RUN SYS$SYSTEM:NCP
NCP>SET LINE TT-0-0 LINE SPEED 1200 RECEIVE BUFFER 4
NCP>SET LINE TT-0-0 PROTOCOL DDCMP POINT
NCP>SET CIRCUIT TT-0-0 STATE ON
NCP>SET NODE node_address INBOUND inbound
NCP>SET NODE node_address RECEIVE PASSWORD password
```

  Where:

inbound	Is either ENDNODE or ROUTER.
password	Is the same as the remote nodes' EXECUTOR TRANSMIT PASSWORD (For example, DECNET).

  In the previous example, the use of 1200 bps baud rate assumes a remote connection through a modem. It is acceptable to use a 9600 baud, dynamic, direct line. After entering the last command, exit from the terminal emulator and set the workstation line state to "on."

Your hardware configuration may contain multiple physical ports such as:

- Two Ethernet controllers

  NOTE
  DECnet cannot operate two Ethernet controllers connected to the same Ethernet segment.

- Two or more asynchronous ports
- A combination of one or more Ethernet controllers and one or more asynchronous ports

If you wish to make simultaneous connections to these devices using the DECnet protocol, DECnet must be configured as a router. (You may have to upgrade your DECnet license.) To configure DECnet as a router:

```
NCP>DEFINE EXECUTOR TYPE ROUTING IV
NCP>SET EXECUTOR STATE OFF
NCP>EXIT
$ @SYS$STARTUP:STARTNET
```

NOTE

If the line state is "on" for only one device, DECnet does not have to be configured as a router. For example, on a MicroVAX that has two Ethernet controllers, the line state for QNA-0 is "on" and the line state for QNA-1 is "off." Thus, DECnet is not required to be a router, but can operate on QNA-0. Additionally, the LASTDRIVER could be operating on QNA-1 or QNA-0 and QNA-1.

6. Ensure that the appropriate circuits are "on" and running:

```
NCP>SHOW KNOWN CIRCUITS


Known Circuit Volatile Summary as of  9-AUG-1989 10:05:24

   Circuit           State          Loopback      Adjacent
                                      Name          Node


  QNA-0              on                        8.999 (VVROUT)
  TT-0-0             on                        8.101 (WRKONE)
```

If the circuit state is "off," set the circuit state "on":

```
NCP>SET CIRCUIT device STATE ON
NCP>DEFINE CIRCUIT device STATE ON
```

If the circuit state is "on," but the substate is synchronizing or starting, check the physical connections for this circuit. If the connection is an asynchronous connection, check the executor, line, and circuit states at the workstation.

7. Ensure that the VMS server network interface hardware is operating correctly. Disconnect the network cable, Ethernet or asynchronous, and install the appropriate loopback connector. For example, on a MicroVAX with a DESTA, disconnect the BNC connector from the DESTA and install a ThinWire loopback connector (A ThinWire loopback connector includes a T-connector and two terminators, as shown in Figure 6–3).

   If the interface hardware being tested is an Ethernet interface, enter:

```
$ RUN SYS$SYSTEM:DTSEND


DTS Version 3.00 initiated on  9-AUG-1989 13:44:31.27


_Test:   CONNECT
%DTS-S-NORMAL, normal successful completion


_Test:   DATA
%DTS-S-NORMAL, normal successful completion


Test parameters:
   Test duration (sec)  30
   Target nodename      ""
   Line speed (baud)    1000000
   Message size (bytes) 128


Summary statistics:
   Total messages XMIT  5493    RECV    0
   Total bytes XMIT     703104
   Messages per second  183.1
   Bytes per second     23437
   Line thruput (baud)  187494
   % Line utilization   18.7
```

```
_Test:   INTERRUPT
%DTS-S-NORMAL, normal successful completion


Test parameters:
   Test duration (sec)  30
   Target nodename      ""
   Line speed (baud)    1000000
   Message size (bytes) 16


Summary statistics:
   Total messages XMIT  2525    RECV    0
   Total bytes XMIT     40400
   Messages per second  84.2
   Bytes per second     1347
   Line thruput (baud)  10773
   % Line utilization   1.0


_Test:   EXIT


DTS terminated on  9-AUG-1989 13:46:22.13
$
```

If a device timeout or other error message is displayed, there may be a hardware problem. Contact your authorized service representative.

If the interface hardware being tested is an asynchronous interface, enter:

```
NCP>SHOW CIRCUIT device



Circuit Volatile Summary as of 9-AUG-1989 18:29:59

   Circuit          State          Loopback      Adjacent
                                     Name          Node

  TT-0-0            on                        8.999 (VVROUT)
```

If the state is starting, repeat the SHOW CIRCUIT command. Within thirty seconds, the state should change to "on." If, in thirty seconds, the state does not change to "on," ensure that:

- The line is configured as static DDCMP line
- The loopback plug is in place
- The line state is "on"
- The circuit state is "on"

When the line state is "on," the SHOW CIRCUIT command response should indicate that the adjacent node is VMS server node being tested. If so, the line is operating correctly.

Disconnect the loopback connector and connect the network cable.

8. Ensure that the workstation is registered in the server's network database by entering (at the server node):

```
NCP>LIST NODE node_name
```

Where:

node_name	Is the DECnet node name of the workstation (For example, WRKONE).

If the NCP response contains the correct workstation node name and address, then the workstation is registered.

If the NCP response is an error message stating that the node is an "unrecognized component," then the workstation is not registered. To register the node, use PCSA Manager menu.

Alternatively, if the node is not a remote boot node, you can use NCP to define the node as follows:

```
NCP>DEFINE NODE node_address NAME node_name
```

Where:

node_address	Is the DECnet node address of the workstation (For example: 8.101).
node_name	Is the DECnet node name of the workstation (For example, WRKONE).

9. If there is a DECnet router on the network, ensure that the router maximum area and node values in the DECnet router node database are greater than or equal to the values for all the server nodes and workstations on the network. To check the values, use the following procedures.

   Restart the workstation that malfunctioned. At the workstation, enter:

```
A:\>NCP READ LOG


        Events Logged as of  9-AUG-1989  10:10:32


        Event type  6.6  Line state on
        Occurred   9-AUG-1989  8:00:29
        Reason:  Operator command


        Event type  4.15  Adjacency up
        Occurred   9-AUG-1989  8:01:37
        Designated router:  8.999


        End of log
```

   The NCP response in the previous example is a normal response. In this case, the designated router is node 8.999.

Go to the node that is the designated router and determine the router characteristics by entering:

```
$ RUN SYS$SYSTEM:NCP
NCP>SHOW EXECUTOR CHARACTERISTICS


Node Volatile Characteristics as of  9-AUG-1989 11:38:18


Executor node = 8.200 (VVSRV)


Identification            = DECnet-VAX V5.2,  VMS V5.2
Management version        = V4.0.0
Incoming timer            = 45
Outgoing timer            = 60
NSP version               = V4.0.0
Maximum links             = 32
Delay factor              = 80
Delay weight              = 5
Inactivity timer          = 60
Retransmit factor         = 10
Routing version           = V2.0.0
Type                      = routing IV
Routing timer             = 600
Broadcast routing timer   = 180
Maximum address           = 1023
Maximum circuits          = 16
Maximum cost              = 1022
Maximum hops              = 30
Maximum visits            = 63
Maximum area              = 63
Max broadcast nonrouters  = 64
Max broadcast routers     = 32
Area maximum cost         = 1022
Area maximum hops         = 30
Maximum buffers           = 100
Buffer size               = 576
Nonprivileged user id     = DECNET
Nonprivileged password    = DECNET
Default access            = incoming and outgoing
Pipeline quota            = 10000
Default proxy access      = incoming and outgoing
Alias maximum links       = 32
Path split policy         = Normal
```

The maximum area number and maximum address are listed on the lines beginning with:

Maximum area =	The area number is displayed before the "." in the node address. The number listed here should be greater than, or equal to, the area numbers for all server nodes and workstations.
Maximum address =	The value listed here should be greater than or equal to the node address for all server nodes and workstations.

If any server or workstation node address or area number exceeds the maximum value listed by the routing node, increase the maximum value at the router by entering the following commands at the router node:

```
$ RUN SYS$SYSTEM:NCP
NCP>DEFINE EXECUTOR MAXIMUM ADDRESS max_address
NCP>SET EXECUTOR MAXIMUM ADDRESS max_address
NCP>DEFINE EXECUTOR MAXIMUM AREA max_area
NCP>SET EXECUTOR MAXIMUM AREA max_area
```

Where:

max_address	Is the highest address (that part of the node_address to the right of the ".") in the network.
max_area	Is the highest area (that part of the node_address to the left of the ".") in the network.

10. If there is no DECnet router on the network, ensure that the server DECnet node address has the same area number as the workstation DECnet node address.

    To check the server area number, at the terminal connected to the VAX computer, enter:

    ```
    $ RUN SYS$SYSTEM:NCP
    NCP>SHOW EXECUTOR
    ```

    To check the workstation area number, at the operating system prompt, enter:

    ```
    A:\>NCP SHOW EXECUTOR
    ```

    In both cases, the area number is displayed before the "." in the node address.

If the area numbers are not the same, redefine the area number for either the server or the workstation. For more information about defining the workstation node address with NCP, refer to the DECnet-DOS Network Management module.

NOTE

These procedures are only valid for VMS routers; other routers are similar, but you must refer to the appropriate router documentation.

11. Ensure that the node names and node address are consistent at all nodes on the network. The following are example node databases for the nodes in the simplified network of Figure 3–2.

Figure 5–1 Example Node Databases

	VMS Server		Workstation 1		Workstation 2	
	Name	Addr	Name	Addr	Name	Addr
Executor	VVSVR	8.200	WKSONE	8.101	WKSTWO	8.102
Known Nodes	WKSONE WKSTWO	8.101 8.102	VVSVR WKSTWO	8.200 8.102	VVSVR WKSONE	8.200 8.101

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The VMS DECnet checklist is complete. Successfully completing this checklist indicates that DECnet is set up correctly on the VMS server.

VMS File Server Checklist

This checklist verifies that the file server is operating correctly on a VMS server. Before using this checklist, ensure that DECnet is operating properly. If DECnet is not operating properly, the file server will not operate properly.

1. Ensure the VMS file server object type is defined by entering:

```
$ RUN SYS$SYSTEM:NCP
NCP>SHOW OBJECT PCFS


Object Volatile Summary as of  9-AUG-1989 11:00:44

   Object   Number  File/PID          User Id          Password

  PCFS          64  00000042
```

   If the NCP response indicates that object name PCFS is known and that it is defined as number 64, then the VMS file server object type is defined correctly. However, if the File/PID field is blank, then the PCFS image is not running. This step and step two of the checklist contain examples of how to start the file server.

   If the File/PID field is not blank, one of the following conditions can exist:

   - The NCP response is an error message that the object is an unrecognized component. In this case, the object type PCFS is undefined. The file server may or may not be running, with the default object name OBJ_64 and the number 64.
   - The object type PCFS is defined with a number other than 64. The file server may or may not be running, with the default object name OBJ_64 and the number 64.

   In either case, to determine all object types that are defined, enter the following command:

```
NCP> SHOW KNOWN OBJECTS
```

If the NCP response indicates that PCFS is a defined object type with a number other than 64, the VMS file server object type is defined incorrectly. To remove the incorrect definition enter:

```
NCP>CLEAR OBJECT PCFS ALL
NCP>PURGE OBJECT PCFS ALL
```

If the NCP response indicates that an object type OBJ_64 is defined with a number 64, the VMS file server object type is defined incorrectly. If the File/PID is not blank, the file server is running. To stop the file server, enter:

```
NCP>EXIT
$ ADMINISTER /PCSA
PCSA_MANAGER> STOP FILE_SERVER CONNECTIONS /ALL_SERVICES
%PCSA-I-FSVRSTOPPED, all connections stopped, File Server process
terminated
PCSA_MANAGER>EXIT
$ RUN SYS$SYSTEM:NCP
```

To define the object type, PCFS, and start the file server, enter:

```
NCP>SET OBJECT PCFS NUMBER 64 PROXY NONE
NCP>DEFINE OBJECT PCFS NUMBER 64 PROXY NONE
NCP>EXIT
$ SET DEFAULT SYS$STARTUP
$ @PCFS_STARTUP
```

2. Ensure that the object type, PCSA$RMI, is defined correctly by entering:

```
NCP>SHOW OBJECT PCSA$RMI



Object Volatile Summary as of  9-AUG-1989 11:00:44

   Object    Number  File/PID            User Id          Password

  PCSA$RMI        0  SYS$SYSTEM:[PCSA]PCSA_RMI.COM
```

If the object type, PCSA$RMI, is not defined, define it by entering:

```
NCP>PURGE OBJECT PCSA$RMI ALL
NCP>CLEAR OBJECT PCSA$RMI ALL
NCP>SET OBJECT PCSA$RMI NUMBER 0 FILE SYS$SYSTEM:PCSA_RMI.COM
NCP>DEFINE OBJECT PCSA$RMI NUMBER 0 FILE SYS$SYSTEM:PCSA_RMI.COM
```

3. Ensure that the VMS file server is running and accepting connections by entering:

```
$ ADMINISTER /PCSA
PCSA_MANAGER> SHOW FILE_SERVER STATUS


File Server status:


Server is accepting connection requests.
Server will refuse unregistered users.


File Server logging status:


Logfile : PCFS$LOG_FILES:PCFS_SERVER.LOG
Logging events : CONNECTIONS, ERRORS, FATAL, LOCKS, OPENS, OPERATOR,
                 PROTOCOL, READS, SECURITY, SESSIONS, SMBS
```

If the PCSA Manager response indicates that the file server is accepting (or not accepting) connections, the server is running.

If the response is the error message:

```
%PCSA-E-NOFSVRLINK, unable to establish link to File Server
%PCSA-E-FILESRVNOTRUN, File Server not running
```

Then, the file server is not running. To start the file server, enter:

```
$ @SYS$STARTUP:PCFS_STARTUP
```

If the server is running, but not accepting connections, allow only registered connections by using the following PCSA Manager command:

```
$ ADMINISTER /PCSA
PCSA_MANAGER> START FILE_SERVER CONNECTIONS /REGISTERED
```

If the file server is set to refuse unregistered connections, use PCSA Manager to register nodes. Alternatively, if the node is not a remote boot node, you can use NCP to register the node as follows:

```
$ RUN SYS$SYSTEM:NCP
NCP>DEFINE NODE node_address NAME node_name
```

Where:

node_address	Is the DECnet node address of the unregistered node (For example, 8.101).
node_name	Is the DECnet node name of the unregistered node (For example, WRKONE).

4. To ensure that the service you are attempting to connect to exists, enter:

```
$ ADMINISTER /PCSA
PCSA_MANAGER>SHOW FILE_SERVER SERVICES /AUTHORIZED


File Server Authorized Services:


User name      Alias name    Service name  Access  RMS protection
------------  ------------  ------------  ------  --------------------
<PUBLIC>       LN03_DPORT    LN03_DPORT    RWC     S:AWED,O:AWED,G:,W:
<PUBLIC>       PCAPPS        PCAPPS        R       S:AWED,O:AWED,G:,W:
SYSTEM         PCAPPS        PCAPPS        RWC     S:AWED,O:AWED,G:,W:
SARRO          WRITERS       WRITERS       RWC     S:AWED,O:AWED,G:,W:
```

If the service you are trying to connect to is not listed, use PCSA Manager to register the service.

It is not necessary to register the default directory or subdirectories of an authorized VMS user's account. It is only necessary that the VMS directory exist and that the VMS account name and password provide access to the directory at the desired RMS protection level.

On a properly registered workstation node:

server_node	Indicates a valid VMS server node on which the workstation operator is an authorized VMS user.
alias	Indicates the account name as defined in the VMS User Authorization File (UAF).
user_name	Is a valid VMS user name.
password	Is a valid password for the user name.

Thus, the following command can connect to the default login directory:

```
A:\>USE \\server_node\alias%user_name password
```

5. If the service is not a PUBLIC service, ensure that the user (SARRO) is authorized to use the service:

```
$ ADMINISTER /PCSA
PCSA_MANAGER> SHOW FILE_SERVER SERVICES /AUTHORIZED /USERNAME=SARRO


File Server Authorized Services:


User name      Alias name    Service name  Access  RMS protection
------------  ------------  ------------  ------  --------------------
SARRO          WRITERS       WRITERS       RWC     S:AWED,O:AWED,G:,W:
```

If the user (SARRO) is not authorized to connect to the desired service, use the GRANT command to authorize the connection:

```
PCSA_MANAGER>GRANT SARRO WRITERS WRITERS /ACCESS=(READ,WRITE,CREATE)
%PCSA-I-SERGRANTED, service "WRITERS" granted to user/group "SARRO"


PCSA_MANAGER>
```

6. Ensure that the VMS file server has not reached its limit for the number of sessions or connections. Determine the server limits by entering:

```
PCSA_MANAGER> SHOW FILE_SERVER CHARACTERISTICS


File Server characteristics:
Total server wide sessions       : 32
Total server wide connections    : NO LIMIT
Total connections per session    : NO LIMIT
Total server wide open files     : NO LIMIT
Total open files per session     : NO LIMIT
File server buffer size in Kbyte :        8
Open file buffer cache enabled   :     TRUE
File read on seek enabled        :     TRUE
Server default account         : PCFS$ACCOUNT
```

To list the current sessions or connections established with the server, enter the following commands:

```
PCSA_MANAGER> SHOW FILE_SERVER SESSIONS
PCSA_MANAGER> SHOW FILE_SERVER CONNECTIONS
```

The server limit is reached if the number of sessions or connections displayed by the above commands are equal to the number of session or connection limits, as displayed by the PCSA Manager SHOW FILE_SERVER CHARACTERISTICS command.

If the server session or connection limit has been reached, new sessions or connections cannot be established until enough of the existing sessions or connections are closed to reduce the number(s) to less than the limit(s).

7. Ensure that the value "Total server wide sessions" is at least two less than the DECnet executor parameter "maximum links."

The VMS file server checklist is complete. Successfully completing this checklist indicates that the file server is set up correctly on the VMS server.

VMS Disk Server Checklist

This checklist verifies that the disk server is operating correctly on a VMS server. The disk server's process name is LAD$KERNEL. The disk server requires that DECnet be started before the disk server is started.

1. Ensure that the disk server is running:

```
$ ADMINISTER /PCSA
PCSA_MANAGER> SHOW DISK_SERVER SERVICES /TYPE=ALL


Disk server services:
Service name  Type  Server  Limit  Users  Acc  Rating  Status
------------  ----  ------  -----  -----  ---  ------  -------------
MSWINV21      USER  VVSRV      30      0  RO        1  MNT PERM
PCSA$DOS_SYSTEM_V22
              SYST  VVSRV    NONE      0  RO        1  MNT PERM
PCSA$DOS_SYSTEM_V30
              SYST  VVSRV    NONE      0  RO        1  MNT PERM
```

   The previous example contains a normal response, which indicates that the disk server is running. If PCSA Manager returns the following error messages, the disk server is not running;

```
%PCSA-E-NODSRVLINK, unable to establish link to Disk Server
%PCSA-E-DISKSRVNOTRUN, Disk Server is not running
```

   The disk server must be started as follows:

```
PCSA_MANAGER> EXIT
$ @SYS$STARTUP:LAD_STARTUP
```

2. Ensure that the service you are trying to connect to exists and is mounted. In the following example, the service name is MSWINV21.

```
$ ADMINISTER /PCSA
PCSA_MANAGER>SHOW DISK_SERVER SERVICES /SERVICE=service_name


Disk server services:


Service name  Type  Server  Limit  Users  Acc  Rating  Status
------------  ----  ------  -----  -----  ---  ------  -------------
MSWINV21      USER  VVSRV      30      0   RO        1  MNT PERM
```

   Where:

   service_name — Is the name used at the workstation in the USE command to connect to the disk service. In the following example, MSWINV21 is the service:

```
A:\>USE E: MSWINV21/V
```

If the PCSA Manager shows the following response, the disk service was not mounted or it was dismounted with the /PERMANENT switch.

```
%PCSA-E-NOACTSERMATCH, no active services match user constraints
```

If a container file exists and you know the location of the container file, you can mount the disk service as follows:

```
PCSA_MANAGER> MOUNT DISK file_name service_name -
_PCSA_MANAGER> /ACCESS=access_type /CONNECTIONS=connections -
_PCSA_MANAGER> /TYPE=mount_type /PASSWORD=password -
_PCSA_MANAGER> /PERMANENT
```

Where:

file_name	Is a valid VMS file name and is the name of the container file created using PCSA Manager (For example, DUA0:[PCSA.LAD]MSWINV21.DSK).
service_ name	Is the service name used at the workstation to connect to the service (For example, MSWINV21).
connections	Is the number of users allowed to connect to a service at one time. If the the access_type is WRITE, connections cannot be specified.
access_type	Is READ or WRITE. Write access implies read access. If the optional switch, /ACCESS, is omitted, access defaults to read only.
password	Is the password that must be used at the workstation to allow connections to the service. If the optional switch, /PASSWORD, is omitted, a password is not assigned and a password is not required at the workstation.

If a container file does not exist, you can create a container file using the following command line:

```
PCSA_MANAGER>CREATE DISK file_name /CONTIGUOUS /SIZE=size /TYPE=type
```

Where:

file_name	Is a valid VMS file name and is the name of the container file created using PCSA Manager (For example, DUA0:[PCSA.LAD]MSWINV21.DSK).
size	Is one of 360KB, 720KB, 1.2MB, 1.44MB, 5MB, 10MB, 2MB, or 2MB. If the TYPE is boot, 360KB, 720KB, 1.2MB, and 1.44MB are valid sizes. If the optional switch, /SIZE, is omitted, size defaults to 1.2MB.
type	Is one of APPLICATION, BOOT, SYSTEM, or USER. If the optional switch, /TYPE, is omitted, the type defaults to USER.

3. Ensure that the server node and the workstation node are communicating as follows:

```
PCSA_MANAGER> EXIT
$ RUN SYS$SYSTEM:LASTCP
%LASTCP-I-VERSION, LASTDRIVER V.4 is running
LASTCP> SHOW NODE node_name
 Node            Node            Physical        Active      Start
 Name             Id             Address          Links       Time


WRKONE          08002B07BC4F-5D07  AA-00-04-00-D6-24     0        -
```

Where:

node_name	Is the DECnet node name of the workstation. In the previous example, the node name is WRKONE.

When starting LASTCP, notice the state of the LASTDRIVER in the version message. If the state is stopped, you must restart the LASTDRIVER with the command file LAD_STARTUP.COM.

If the response is the following error message:

```
%LASTCP-W-NOSUCHNODE, Node "node_name" not found
```

Then, one of two problems exists:

- The LAST driver is not running on the workstation. If this is the case, at the workstation enter:

  ```
  A:\>STARTNET
  ```

  Refer to the workstation virtual disk checklist for more information about starting up the LAST driver.

- Between the server and the workstation, there is a physical connection problem in the Ethernet.

The VMS disk server checklist is complete. Successfully completing this checklist indicates that the disk server is set up correctly on the VMS server.

VMS Remote Boot Checklist

This checklist verifies that the remote boot disk service is operating correctly on a VMS server. To use the remote boot disk service, the disk server must be operating properly.

1. Ensure that you know the hardware address of the workstation. The hardware address is six pairs of hexadecimal digits separated by dashes. An example of a hardware address is 08-00-2B-07-BC-4F.

   During remote boot, a workstation has only minimal network communications facilities available, and cannot be identified by its DECnet node name and address. Each DEPCA network interface card or VAXmate contains a unique hardware address in ROM. When providing remote boot disk services, the PCSA software uses this hardware address to identify the workstation.

If the workstation hardware has been repaired, changed, or upgraded, the hardware address may have changed.

To determine the hardware address of a PC workstation, use your Floppy Remote Boot diskette or create a key disk according to the instructions in *Installation and Configuration Guide: DECnet PCSA Client for DOS (VMS Media)*. Using the Floppy Remote Boot diskette, proceed through the queries until you come to the question "Read hardware address?" The hardware address is displayed when you answer "Y". Using the key diskette, start the workstation. After the workstation is started, use the USE /STATUS command to determine the hardware address. For information on the USE command, see the *Network Commands Reference Manual*.

```
A:\>USE /STATUS
USE version V3.0  PCSA Network Connection Manager
Copyright (c) 1989 by Digital Equipment Corporation

Component Information

    Scheduler is installed
    Datalink is installed and is running
    DECnet is not installed
    Session is not installed
    Redirector is not installed
    LAT is not installed
    LAST is not installed
    LAD is not installed
    CTERM is not installed

Client Information

    Station address:   AA-00-04-00-64-24
    Hardware address:  02-60-8C-09-24-07
    Ethernet hardware: 3-COM board
    Physical drives:    7 (A:-G:)
    Logical drives:    26 (A:-Z:)
    Virtual drives:     4 (D:-G:)

A:\>
```

As indicated in the previous example, the minimum network components that must be installed and running are the scheduler and the data link.

2. Ensure that the circuit service state is enabled by entering the following at the server:

```
$ RUN SYS$SYSTEM:NCP
NCP>DEFINE CIRCUIT device SERVICE ENABLED
NCP>SET CIRCUIT device STATE OFF
NCP>SET CIRCUIT device SERVICE ENABLED STATE ON
NCP>EXIT
```

Where:

device	Is the Ethernet device to which the workstation is connected (For example, QNA-0).

NOTE

The commands in the following example must be executed from the system console, or must be executed by a command procedure with verify "off."

3. Ensure that the node is registered as a boot node. Using PCSA Manager, select, in the following order, Workstation Options, Remote Boot Workstation Options, and List Remote Boot Workstations. Also, ensure that:

   - The node address is correct.
   - The node name is correct.
   - The Ethernet address is correct.
   - The load file is correct for the type of workstation.
   - The disk size (360KB, 720KB, 1.2MB, and 1.44MB) is adequate.

   If the workstation is not in the displayed list, select Add Remote Boot Workstation and enter the information.

   If any of the information is incorrect, select Modify Remote Boot Workstation and correct the information.

   When the information is correct, select Return to Previous Menu until the Exit Menu selection is available. Then, select Exit Menu.

4. **Ensure that the boot service exists and is mounted by entering:**

```
$ SET DEFAULT SYS$SYSTEM
$ ADMINISTER /PCSA
PCSA_MANAGER> SHOW DISK_SERVER SERVICES /SERVICE=ethernet_address


Disk server services:


Service name  Type  Server  Limit  Users  Acc  Rating  Status
------------  ----  ------  -----  -----  ---  ------  -------------
08-00-2B-07-BC-4F (WRKONE)
              BOOT  VVSRV       1      0   RO       1  MNT PERM
```

Where:

ethernet_address	**Is the hardware address of the workstation as established in step 1.**

5. **Ensure that the remote boot disk service contains the required files. Using a workstation that has a diskette drive and can connect to the disk server, connect to the remote boot disk service in one of the following ways.**

If the workstation's address is registered, enter:

```
A:\>USE drive: /X
```

If the workstation's address is not registered, enter:

```
A:\>USE drive: \\node\ethernet_address password /V
Command completed successfully.
```

Where:

drive	**Is a one of the LAD drives listed as such by the USE /STATUS command. The examples that follow use drive C as the network drive.**
node	**Is the node name of the VMS server.**
ethernet_address	**Is the hardware address established during step 1, (not the hardware address of the current workstation, unless they are the same workstation).**
password	**If a password was established when the remote boot workstation was registered, use that password. If a password was not established, leave this field blank. For the purpose of troubleshooting, it is best if no password is established.**

Confirm that the two hidden files, IO.SYS and MSDOS.SYS, and the file COMMAND.COM are on the disk by entering:

```
A:\>CHKDSK C:


  1213952 bytes total disk space
    47616 bytes in 2 hidden files
      512 bytes in 1 directories
   112640 bytes in 17 user files
  1053184 bytes available on disk


   655360 bytes total memory
   507920 bytes free


A:\>DIR C:COMMAND.COM


 Volume in drive C has no label
 Directory of  C:\


COMMAND  COM     26073  11-17-87  10:45a


 Total of 25.48 Kbytes used in 1 Files
```

If the required files are not present on the LAD drive, they can be placed there manually or by using the NETSETUP utility. For additional information on the NETSETUP utility, or manually configuring your system, refer to *Installation and Configuration Guide: DECnet PCSA Client for DOS (VMS Media).*

NOTE

Transferring the files with the DOS utility SYS can create an unusable disk service. Always use the DOS utility FORMAT with the /S qualifier.

6. Ensure that the following workstation boot images are available for downloading:
   - 3C501.TSK
   - 3C503.TSK
   - 3C523.TSK
   - DEPCA.TSK

- DEPCARAM.TSK
- IL5010.TSK
- VAXMATE.TSK

To ensure that they are available, enter:

```
$ DIR SYS$COMMON:[PCSA]*.TSK

Directory SYS$COMMON:[PCSA]

3C501.TSK;1      3C503.TSK;1      3C523.TSK;1      DEPCARAM.TSK
DEPCA.TSK;1      IL5010.TSK;1     VAXMATE.TSK;1

Total of 6 files.
```

If one of the files is missing or you receive the following error message, you must re-install the server software according to the instructions that you received with it.

```
%DIRECT-W-NOFILES, no files found
```

The VMS remote boot checklist is complete. Successfully completing this checklist indicates that the remote boot disk services are set up correctly on the VMS server.

VMS Remote Printing Checklist

This checklist verifies that remote printing is operating correctly on a VMS server. For remote printing to operate properly, the file server must be operating properly.

1. To ensure that the printer is ready to print, verify that:
   - The printer is connected to a power source.
   - The printer is connected to the VAX computer.
   - The printer has an adequate supply of paper.
   - The paper passes through the printer correctly.
   - The printer is online.
2. Log into the system manager's account on the server node.

3. Ensure that the printer queue is defined and running by entering:

```
$ SHOW QUEUE queuename
```

Where:

queuename	Is the name of the server print queue (for example, PCFS$LN03).

The response should indicate that the queue is a generic printer queue.

If the response from the command is "no such queue," the print queue should be set up. Use PCSA Manager to set up the printer queue.

If the response indicates that the queue is "stopped," the queue should be started with the START/QUEUE command.

```
$ START/QUEUE queuename
```

Where:

queuename	Is the queue name of the printer device (for example, TTA0).

4. Ensure that you can print with the VMS PRINT command, specifying a queue that the VMS server uses. For example, to print a file and specify the queue LN03_DPORT, enter:

```
$ PRINT/QUEUE=LN03_DPORT filename.ext
```

5. Ensure that the VMS file server is running and accepting connections by entering:

```
$ ADMINISTER /PCSA
PCSA_MANAGER> SHOW FILE_SERVER STATUS


File Server status:


Server is accepting connection requests.
Server will refuse unregistered users.


File Server logging status:


Logfile : PCFS$LOG_FILES:PCFS_SERVER.LOG
Logging events : CONNECTIONS, ERRORS, FATAL, LOCKS, OPENS, OPERATOR,
                 PROTOCOL, READS, SECURITY, SESSIONS, SMBS
```

If the PCSA Manager response indicates that the file server is accepting (or not accepting) connections, the server is running.

If the response contains the following error message, the file server is not running.

```
PCSA_MANAGER>SHOW FILE_SERVER STATUS
%PCSA-E-NOSVRLINK, unable to establish link to File Server
%PCSA-E-FILESRVNOTRUN, File Server is not running
```

For help on starting the file server and ensuring that it is operating properly, see the section File Server Checklist in this chapter.

If the server is not accepting connections, allow only registered connections by using the following PCSA Manager command:

```
$ SET DEFAULT SYS$SYSTEM
$ ADMINISTER /PCSA
PCSA_MANAGER> START FILE_SERVER CONNECTIONS /REGISTERED
```

6. Ensure that the service you are attempting to connect to exists and that the alias is correct by entering:

```
$ SET DEFAULT SYS$SYSTEM
$ ADMINISTER /PCSA
PCSA_MANAGER>SHOW FILE_SERVER SERVICES /AUTHORIZED /ALIAS=alias


File Server Authorized Services:


User name     Alias name    Service name  Access  RMS protection
------------  ------------  ------------  ------  --------------------
<PUBLIC>      LN03_DPORT    LN03_DPORT    RWC     S:AWED,O:AWED,G:,W:
```

The VMS remote printing checklist is complete. Successfully completing this checklist indicates that the printer services are set up correctly on the VMS server.

VMS LAT Checklist

This checklist verifies that the LAT server is operating correctly on a VMS server. The LAT server requires that DECnet is started before the LAT server.

1. To confirm that the LAT server is running, enter:

```
$ RUN SYS$SYSTEM:LATCP
LCP> SHOW CHARACTERISTICS


LCP Characteristics
Node name = \VVSRV\
Node Identification = \Welcome to VAX/VMS V5.2\
Groups = (0)
Multicast timer = 60 seconds
LAT Version = 5.1                LAT Protocol is active


 Service Names and Ids:


Service name : \VVSRV\              dynamic rating : 83
          id : \Welcome to VAX/VMS V5.2\
Node Links:
Link name = \LAT$LINK\
Link device = \XQA0:\
Groups = ()
Sink-specific services:
Status = Active
```

The previous example shows the response of a normally operating LAT server. If you received the following response, the LAT driver is not running.

```
$ RUN SYS$SYSTEM:LATCP
LCP> SHOW CHARACTERISTICS


LCP Characteristics


Node name = \\
Node Identification = \\
Groups = ()
Multicast timer = 0 seconds
LAT Version = 5.2                LAT Protocol is inactive
```

To start the LAT driver with the default node name SYS$NODE and the default identification SYS$ANNOUNCE, enter:

```
LCP>SET NODE /IDENTIFICATION /NOLOG
LCP>CREATE SERVICE /IDENTIFICATION /NOLOG
LCP>START NODE


LCP Characteristics


Node name = \VVSRV\
Node Identification = \Welcome to VAX/VMS V5.2\
Groups = (0)
Multicast timer = 60 seconds
LAT Version = 5.2                LAT Protocol is active



 Service Names and Ids:


Service name : \VVSRV\              Dynamic rating : 83
          id : \Welcome to VAX/VMS V5.2\
```

In the previous example, SYS$NODE is defined as "VVSRV" and SYS$ANNOUNCE is defined as "Welcome to VAX/VMS V5.2."

If you receive the following response, the LAT driver is not loaded.

```
$RUN SYS$SYSTEM:LATCP
%LATCP-E-NOTLOADED, LAT terminal port driver (LTDRIVER) is not loaded
$
```

To load and start the the LAT driver with the default node name SYS$NODE and the default identification SYS$ANNOUNCE, enter:

```
$ @SYS$STARTUP:LTLOAD
```

2. If LAT driver is loaded and running and the workstation cannot connect, ensure that the server node data base contains a correct node name and address definition for the workstation and that the workstation contains a correct node name and address definition for the server.

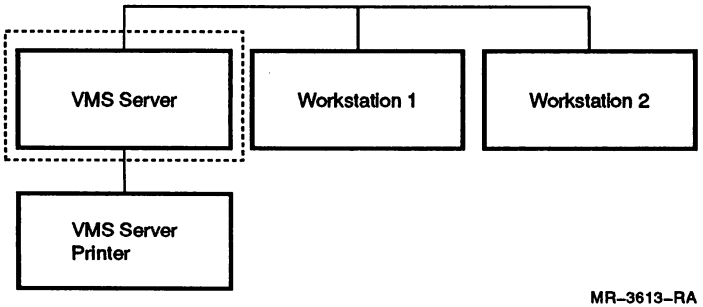
   If the node data bases are correct, use the DECnet checklist for the server and the workstation to confirm that the two nodes can communicate.

The VMS LAT checklist is complete. Successfully completing this checklist indicates that LAT is set up correctly on the VMS server.

VMS Server Checklist Completion

The VMS server checklist is complete. If successful, you know that the VMS server on your network, shown within the dashed lines in Figure 5–2, is set up correctly.

Figure 5–2 VMS Server Set Up Correctly



6

Troubleshooting Network Workstation Problems

Using the Workstation Master Checklist

This chapter contains a set of subsidiary checklists, which together comprise the workstation master checklist. Use these checklists in conjunction with Figures 3–3 through Figure 3–11. In addition, at the end of the chapter a section on the workstation loopback test explains how to test a workstation's network controller. The workstation master checklist is composed of the following:

- Workstation memory interaction checklist
- Workstation remote boot checklist
- Workstation virtual disk checklist
- Workstation DECnet checklist
- Workstation LAN manager checklist
- Workstation remote printing checklist
- Workstation LAT checklist

Use these checklists to verify that your workstation is operational. First, verify that remote boot and the virtual disk are operational. Then, connect to a system virtual disk and verify that the appropriate services are operational.

If you have a problem completing the workstation remote boot checklist or the workstation virtual disk checklist, then you may have to perform one or more of the following tests:

- Workstation to server loop test
- Workstation to workstation loop test
- Daisy-chain segment test (Chapter 4)

- DEMPR configuration segment test (Chapter 4)
- Workstation loopback test

To perform these tests, boot the workstation with the key diskette. Then insert the PCSA TROUBLESHOOTING V3.0 diskette and perform the indicated test.

Troubleshooting Considerations

DECnet PCSA Client for DOS Version 3.0 includes a wider variety of options for configuration of network software than previous versions. The workstation user can choose to load selected network components into extended memory or into expanded memory and can choose not to load certain components at all or to load and unload them as needed. This introduces two considerations into troubleshooting workstation network problems.

The first consideration involves the use of nonconventional, that is, extended or expanded memory. When components of PCSA network software occupy extended or expanded memory, problems may arise due to conflicts with other software. For example, if any part of the network software is in extended memory, TSR applications that use hot keys may hang. Because of this potential for conflicts, we recommend that you remove all network components from extended and expanded memory and reload them into conventional memory before performing the tests in the workstation checklists. The workstation memory interaction checklist explains how to do this.

The second consideration involves the loading and unloading of components. In general, the checklists include procedures for making sure that the components required for correct operation of each type of service are present.

Workstation Memory Interaction Checklist

This set of tests constitutes a minimal checkout of the three independent parts of PCSA network client software: local area transport (LAT), the virtual disk service (LAD/LAST), and DECnet file services (DECnet/REDIR). Use these tests to identify problems caused by having some network components running in nonconventional memory. By nonconventional memory, we mean either expanded memory or extended memory. This is called "high" memory in the Network Troubleshooting Strategy Flowchart of Chapter 3.

The testing strategy is to load client network components one at a time into conventional memory, verifying each component as it is loaded, and then to repeat the procedure with individual components loaded one-by-one into nonconventional memory.

Before running these tests, you should:

- Perform the tests in the server master checklist or otherwise verify that your PCSA server is configured and operating correctly.
- Be aware of the different types of memory available on your PC workstation and where in memory your PCSA components should be loaded. These concepts are covered in *Memory Solutions*.
- Have access to a server account that has PCSA management privileges.
- Run Netsetup in order to create a STARTNET.BAT file and a DECNODE.TXT file.
- Verify that you have the following components of PCSA Version 3.0 available locally, either on diskettes or on your local hard disk:
  - SCH.EXE and SCH.HLP
  - DLL.EXE and DLL.HLP
  - LAT.EXE and LAT.HLP
  - LATCP.EXE and LATCP.HLP
  - LAST.EXE and LAST.HLP
  - LAD.EXE and LAT.HLP
  - REDIR.EXE, or REDIR400.EXE for DOS 4.0, and REDIR.HLP
  - The appropriate DECnet Network Process (DNP) file for your workstation:

    For a PC/AT: DNNETHAT.EXE
    For any PC running Ethernet: DNNETHPC.EXE
    For a PC using asynchronous communication: DNNDCPPC.EXE

    NOTE
    If you installed your PCSA/DECnet components using the DECnet Installation Procedure (DIP), the DNP file name is DNP.EXE.

Make sure that these are PCSA Version 3.0 components by checking the dates on the files. They should be later than September 1989.

In the checklist, you are instructed to load and test DECnet/PCSA components in the following order: SCH, DLL, LAT, LAST, LAD, DNP, REDIR. This order was chosen arbitrarily. You must load SCH and DLL first. Once these are loaded, you can test any one part of the services, either LAT or LAST/LAD or DECnet/REDIR separately.

Here is the workstation memory interaction checklist.

1. If your workstation has been set up to use the high memory area (HMA) extended memory (XMS), reconfigure it not to do so. To do this, edit your CONFIG.SYS file and delete or comment out the line "device=himem.sys." Also delete or comment out any lines that enable the use of a memory extender.
2. Prevent your STARTNET.BAT file from automatically loading network components by renaming that file:

```
C:\>RENAME STARTNET.BAT STARTNET.BAK
```

3. Boot your workstation.
4. Load the scheduler, data link layer, local area transport, and local area transport control program into conventional memory:

```
C:\>SCH /A
C:\>DLL /FAST
C:\>LAT
C:\>LATCP
```

5. Verify that the local area transport is working by issuing a LATCP show services command. The presence of either of the following indicates that the LAT is working:
   - Services other than preferred services, that is, services listed as "Available"
   - A preferred service with a rating greater than 0

```
LATCP>SHOW SERVICES

Known LAT services as of 8-May-1989 10:56:35
4 services offered by 3 nodes

Service Name  Rating  Node Name  Ethernet Address   Status
------------  ------  ---------  -----------------  -----------------
VVSRV              0  VVSRV      AA-00-04-00-48-25  Preferred service
PCCOMMON           4  VASRV      AA-00-04-00-22-27  Preferred service
PCCOMMON           0  VBSRV      AA-00-04-00-4B-26  Available
VCSRV             18  VCSRV      AA-00-04-00-34-24  Available

LATCP>EXIT
```

In the above example, the presence of the two non-preferred services and the rating of 4 for one of the preferred services indicate that the scheduler, the data link layer, the Ethernet hardware, and LAT are working.

If only preferred services are listed and the ratings of these services are are listed as 0, then either the DLL or LAT may not be working properly on your workstation.

NOTE

If your Ethernet adapter has only a single buffer or if multicast is somehow disabled or if there are no systems in your network other than those included as preferred services in your service table, then you will not see any services listed as "Available." You should, however, see preferred services with nonzero ratings.

6. Load the workstation local area system transport and virtual disk components:

```
C:\>LAST /N:node_name /M:E
C:\>LAD
```

Where:

node_name	Is the DECnet node name of the workstation.

7. Enter the following command to see a list of system services currently being offered by servers on the network:

```
C:\>USE PCSA$DOS_SYSTEM_V30
```

If a list of services is displayed, then the network is running, the servers listed are configured correctly and are offering the system service.

If no list of services is displayed, follow the procedures in the troubleshooting master checklist to find the problem.

8. Load the DECnet Network Process component appropriate for your workstation. For a PC using Ethernet, enter:

```
C:\>DNNETHPC
```

For a PC/AT using Ethernet, enter:

```
C:\>DNNETHAT
```

For any PC using asynchronous communication, enter:

```
C:\>DNNDCPPC
```

If you receive an error message indicating that your node is undefined, issue the following command:

```
C:\>NCP > \DECNET\DECNODE.TXT
```

The piped NCP command defines your node name and address in the DECnet database. You must reboot and start again at the beginning of this checklist after issuing it.

At this point, having loaded the DNP successfully, you can use NCP commands to see if DECnet is working. For example,

```
C:\>NCP TELL server_name SHOW EXECUTOR
```

9. Load the redirector. Enter:

```
C:\>REDIR /L:10
```

10. Connect to a PCSA manager service on a server. Enter:

```
C:\>USE\\host_name%user_name password /PCSA
```

Where:

host_name	Is the DECnet node name of the server.
user_name	Is your user name.
password	Is the password for your account on the server.

11. Check to see that file services are offered by the server. Enter:

```
PCSA_MANAGER>SHOW FILE SERVICES
```

If a list of file services is displayed, then the redirector and DNP are functioning correctly and the server is set up correctly to offer file service.

If no list of services is displayed, follow the procedures in the troubleshooting master checklist to find the problem.

At this point, you have verified the functioning of the network with all workstation network components running in conventional memory. If you do not want to run any workstation network component in extended or expanded memory, you are finished with this checklist.

If you do wish to run any network components in nonconventional memory, perform all the preceding steps again once for each such component with that component loaded into extended or expanded memory. Refer to the Network Troubleshooting Strategy Flowchart in Chapter 3. See Figure 3-6 specifically.

The following set of steps is an example of the procedure you would follow if you wanted to loaded every component that you possibly could into nonconventional memory.

1. Do the workstation memory interaction checklist up to step 4.
2. Instead of loading the local area transport component into conventional memory, load it into expanded memory (EMS) using the command shown in Table 6–1.
3. Finish the workstation memory interaction checklist. If it is successful, continue this procedure. If it is not successful, then there is a problem with running the LAT in EMS. Leave the LAT in conventional memory. In this case, you may not be able to run the LAST, virtual disk service (LAD), or the broadcast receiver in EMS. You can test them, however, by restoring the LAT to conventional memory and continuing this procedure.
4. Do the workstation memory interaction checklist up to step 6, loading the LAT in into EMS if the previous step was successful.
5. Load the LAST into EMS using the command shown in Table 6–1.
6. Finish the workstation memory interaction checklist. If it is successful, continue this procedure. If it is not successful, then there is a problem with running the LAST in EMS. Leave the LAST in conventional memory. In this case, you may not be able to run the virtual disk service or the broadcast receiver in EMS. You can test them, however, by restoring the LAST to conventional memory and continuing this procedure.
7. Do the workstation memory interaction checklist up to step 6, loading the LAT and LAST into EMS, using the command shown in Table 6–1, if the preceding steps were successful.
8. Load the virtual disk component (LAD) into EMS using the command shown in Table 6–1.
9. Finish the workstation memory interaction checklist. If it is successful, continue this procedure. If it is not successful, then there is a problem with running the virtual disk component in EMS. Leave it in conventional memory.
10. Do the workstation memory interaction checklist up to step 8, loading the LAT, LAST, and virtual disk components into EMS if the preceding steps were successful.
11. Load the DECnet Network Process component (DNP) into EMS using the command shown in Table 6–1.

12. Finish the workstation memory interaction checklist. If it is successful, continue this procedure. If it is not successful, then there is a problem with running the DNP in EMS. Leave it in conventional memory.
13. Edit your CONFIG.SYS file to restore the line "DEVICE=HIMEM.SYS" and boot your workstation.
14. Do the workstation memory interaction checklist up to step 9, loading the LAT, LAST, virtual disk, and DNP components into EMS if the preceding steps were successful.
15. Load the redirector into XMS using the command shown in Table 6–1.
16. Finish the workstation memory interaction checklist. If it is successful, continue this procedure. If it is not successful, then there is a problem with running the redirector in XMS. Leave it in conventional memory.

Table 6–1 Commands for Loading Components into Nonconventional Memory

Element	Load Command
LAT	EMSLOAD LAT[1]
LAST	EMSLOAD LAST /N:node_name /M:E
Virtual disk	EMSLOAD LAD
DNP	DNNETHLD[2]
Redirector	REDIR /L:10 /himem:yes[3]

[1]LAT can not be unloaded from EMS as it can in conventional memory.

[2]For workstations using Ethernet. Use DNPDCPLD for workstations using asynchronous communications. Note that this works only for DECnet-DOS, not for PCSA. In systems installed with the DIP, DNPETHLD is renamed to DNPEMSLD.

[3]To use this command, you must have edited your CONFIG.SYS file to include HIMEM.SYS as described at the start of this section.

When you have finished testing the interaction of your network components in conventional and nonconventional memory, rename your STARTNET.BAK file back to STARTNET.BAT. Run Netsetup if you need to change the way network components are loaded and then boot the workstation.

Workstation Remote Boot Checklist

To use remote boot, the workstation must have a supported Ethernet card, such as a DEPCA. If the Ethernet card is not a DEPCA, you must have a PCSA FLOPPY REMOTE BOOT V3.0 diskette.

This checklist verifies that remote boot is operating correctly on a workstation.

1. Ensure that the workstation is configured for remote boot.

   On a workstation with a DEPCA, ensure that jumper W16 is removed from the DEPCA network interface card.

2. Ensure that no hardware errors occur during the power-up tests. However, if you did not install a Digital mouse and therefore removed jumper W1 from the DEPCA, the error message, DEPCA 72, is acceptable. Press the F1 key when prompted to do so.

3. Ensure that you know the hardware address of the workstation. The hardware address is six pairs of hexadecimal digits separated by dashes. An example of a hardware address is 08-00-2B-07-BC-4F.

   During remote boot, a workstation has only minimal network communications facilities available, and cannot be identified by its DECnet node name and address. Each Ethernet controller contains a unique hardware address in ROM. When providing remote boot disk services, the PCSA software uses this hardware address to identify the workstation.

   If the workstation hardware has been repaired, changed, or upgraded, the hardware address may have changed.

   To determine the hardware address of a PC workstation, create a copy of the PCSA FLOPPY REMOTE BOOT V3.0 diskette. Using the key diskette, boot the workstation. Then insert the copy of the PCSA FLOPPY REMOTE BOOT V3.0 diskette and run the remote boot configuration utility. When the utility inquires if it should read the hardware address, press *Y*. If the network interface adapter is operating correctly and you entered the data correctly, the remote boot utility will display the hardware address.

4. To start the boot sequence on a PC workstation with a DEPCA adapter, ensure that the drive A door is open. Then press the three key combination, Ctrl/Alt/Del.

To start the boot sequence on any other PC workstation, insert the configured copy of the PCSA FLOPPY REMOTE BOOT V3.0 diskette in drive A and close the drive door. Then press the three key combination, Ctrl/Alt/Del.

NOTE

On a PC workstation with a DEPCA adapter, you can also use the PCSA FLOPPY REMOTE BOOT V3.0 diskette.

If the workstation comes up in BASIC or continuously tries to boot from the diskette drive or boots from the hard disk drive, then:

- The DEPCA is not connected to the network.
- There is a problem with the network.
- There is a problem with the DEPCA.
- There is a problem with the boot image, that is the .TSK file on the server.
- Line service is not enabled at the VMS system on which the workstation is registered.

If the workstation display contains the following message, the workstation is communicating on the network, but no server on the network is offering a boot service, that is, a LAD drive, with an alias that is the same as the workstation hardware address.

```
.1.2.3.4.5.6.7
Service not offered


PCSA Version 3.0 Remote Boot V0.9
Type 'HELP' for help
Default Boot Service: XX-XX-XX-XX-XX-XX
Boot>
```

See the section VMS remote boot checklist in the the previous chapter for a procedure for checking out the server side of the remote boot setup.

If the workstation display contains the following message, the workstation is communicating on the network and a server on the network is offering a boot service with the correct alias but the virtual disk boot disk has not been formatted as a bootable disk.

```
.1.2.3.4.5.6.7.8.11
Not system disk.Press any key


PCSA Version 2.0 Remote Boot V0.9
Type 'HELP' for help
Default Boot Service: XX-XX-XX-XX-XX-XX
Boot>
```

See the section VMS Remote Boot Checklist in the the previous chapter for a procedure for checking out the server side of the remote boot setup.

NOTE

Transferring the system files with the DOS utility, SYS, can create an unusable disk service. Always use the DOS utility, FORMAT, with the /S qualifier. Also, you can not boot from a virtual drive that is larger than 1.2 Mbytes.

The first time a workstation successfully completes a remote boot, the display will contain the string of numeric digits, .1.2.3.4.5.6.7.8.11, and whatever else that the execution of the AUTOEXEC.BAT file might generate. It will then execute a reboot. After the reboot and for all subsequent normal boots, the string of numeric digits will contain .1.2.3.4.5.6.7.8.9.10.11. This indicates that the DECnet database was not initialized prior to the first boot sequence.

The following list describes the meaning of the digits in the boot sequence:

1. The remote boot code and data have been loaded.
2. The scheduler has been initialized.
3. The data link layer has been initialized.
4. LAST has been initialized.
5. Virtual disk (LAD) has been initialized.
6. All responses to the solicit for the default service have been received.
7. The next operation is to check for the manual boot key, Ctrl/C.
8. The first connection to the boot service is complete.

9. The DECnet parameter file, DECPARM.DAT, has been found and parsed correctly.
10. The first connection has been broken. DLL and LAST have been re-initialized.
11. Remote Boot has reconnected to the boot service, read in the first block (boot block), and is about to transfer control to the boot block.

The Workstation remote boot checklist is complete. Successfully completing this checklist indicates that remote boot is set up correctly on the workstation.

Workstation Virtual Disk Checklist

This checklist verifies that the virtual disk service, sometimes referred to as the Local Area Disk (LAD) is operating correctly on the workstation.

1. Ensure that the virtual disk driver is running by entering:

```
A:\>USE /STATUS
USE version V3.0.11  PCSA Network Connection Manager
Copyright (c) 1989 by Digital Equipment Corporation

Component Information

     Scheduler is installed
     Datalink is installed and is running
     DECnet is not installed
     Session is not installed
     Redirector is not installed
     LAT is not installed
     LAST is installed
     LAD is installed
     CTERM is not installed

Client Information

     DECnet node name:  WKSONE (8.101)
     Station address:   AA-00-04-00-64-24
     Hardware address:  02-60-8C-09-24-07
     Ethernet hardware: 3-COM board
     Physical drives:    2 (A:-B:)
     Logical drives:    26 (A:-Z:)
     Virtual drives:     4 (C:-F:)

A:\>
```

The response in the previous example indicates that the virtual disk driver is running and that the virtual disk drives are C through F.

If the response indicates that the virtual disk driver is not running, confirm that the system file, CONFIG.SYS, contains a pointer to the virtual disk driver by entering:

```
A:\>TYPE CONFIG.SYS
BUFFERS=8
FILES=20
LASTDRIVE=Z
DEVICE=LADDRV.SYS /D:4
DEVICE=MOUSE.SYS
SHELL=\COMMAND.COM /E:512 /P
```

The exact location of the virtual disk driver, LADDRV.SYS, may not be the same as in the example.

NOTE

Ensure that the LADDRV.SYS qualifier /D: is correctly entered.

Start the virtual disk driver by entering:

```
A:\>STARTNET
```

If the virtual disk driver is now running, review the steps that you followed when you configured the workstation to ensure that the virtual disk driver will start automatically.

2. Ensure that the workstation node name and address match the workstation node name and address known to the server. If DECnet is running you can do this by entering:

```
A:\>NCP
NCP>SHOW EXECUTOR


Executor Summary as of  9-AUG-1989 10:00:52


Executor node                = 8.101 (WKSONE)


State                          on
Identification                 DECnet-DOS V2.1
```

DECnet does not have to be running in order for the virtual disk to be running. If DECnet is not running, you can determine your node name and address by entering:

```
A:\>USE/STATUS
```

If the node name and number are not the same at the workstation and at the server, reregister the workstation with the server or redefine the node name and address of the workstation executor.

If the workstation executor node name and address are incorrect or undefined, enter:

```
NCP>DEFINE EXECUTOR ADDRESS node_address NAME node_name STATE ON
```

Where:

node_address	Is the DECnet node address of the workstation (For example, 8.101).
node_name	Is the DECnet node name of the workstation (For example, WKSONE).

For the redefined executor node name and node address to take effect, the workstation must be re-booted.

3. Ensure the server node name and address are correctly entered at the workstation. At the workstation, enter:

```
NCP> LIST NODE node_name


Known Permanent Nodes as of 8-AUG-1989 19:27:08


Node       Node     Active  LAT/     Account
Address    Name     Links   MS-NET   Information


8.200      VVSRV    0       M L
```

Where:

node_name	Is the DECnet node name of the server (For example, VVSRV).

Make sure that the node name and address listed match the values listed at the server node.

4. Ensure that the service you are attempting to connect to is offered by the VMS server node. At the workstation enter:

```
A:\>NET DISK \\server_node%user_name password


Disk server services:


Service name  Type  Server  Limit  Users  Acc  Rating  Status
------------  ----  ------  -----  -----  ---  ------  ---------
08-00-2B-07-BC-4F (WKSONE)
              BOOT  VVSRV       1      0   RO       1  MNT PERM
PCSA$DOS_SYSTEM_V30
              SYST  VVSRV    NONE      6   RO       1  MNT PERM
Command completed successfully.
```

Where:

server_node	Indicates a valid VMS server node.
user_name	Is a valid VMS user name.
password	Is a valid password for the user name.

The workstation virtual disk checklist is complete. Successfully completing this checklist indicates that virtual disk is set up correctly on the workstation.

Workstation DECnet Checklist

This checklist verifies that DECnet is operating correctly on a workstation.

1. To ensure that DECnet is operational, at the workstation prompt, enter:

```
A:\>NCP
NCP>SHOW EXECUTOR


Executor Summary as of  9-AUG-1989 10:00:52


Executor node                 = 8.101 (WKSONE)


State                           on
Identification                  DECnet-DOS V2.1
```

If the response is the error message "Network error: Network is unreachable," then DECnet is not operational. To start DECnet, enter the following commands:

```
NCP>EXIT
A:\>REDIR
```

If you are running DOS Version 4.0, use:

```
A:\>REDIR400
```

2. Ensure that the correct driver, Ethernet or asynchronous, is installed by entering:

```
A:\>NCP
NCP>SHOW LINE
```

If the Ethernet driver is installed, the NCP response will indicate that the line name is ETHER-1 as in the following example:

```
Line Summary as of 19-AUG-1989 12:09:02


Line              State/Substate


ETHER-1           On/Running
```

If the asynchronous driver is installed, the NCP response will indicate that the line name is ASYNC-1 as in the following example:

```
Line Summary as of 19-AUG-1989 12:09:02


Line              State/Substate


ASYNC-1           On/Running
```

If the workstation is configured with the wrong driver, you can reconfigure the workstation.

When reconfiguring the workstation, you cannot use the same DECPARM.DAT parameter file with both drivers. You might want to save the current DECPARM.DAT. If the current driver is the Ethernet driver, rename DECPARM.DAT to DECPARM.ETH. If the current driver is the asynchronous driver, rename DECPARM.DAT to DECPARM.DCP.

If you are configuring the workstation to use the asynchronous driver and the workstation STARTNET.BAT file contains commands to load LAT, LAST, or LAD, remove those commands or put remark (REM) statements in front of them.

To configure the workstation to use the asynchronous driver, enter:

```
A:\>RENAME AUTOEXEC.BAT AUTOEXEC.SAV
A:\>CD DECNET
A:\DECNET>COPY MSNET.ETH MSNET.INI
A:\DECNET>DEL DECPARM.DAT
```

Press Ctrl/Alt/Del to reboot.

```
.
.    system reboots
.
```

```
A:CD DECNET
A:NET INSTALL node_name node_address baud modem ON
A:CD ..
A:RENAME AUTOEXEC.SAV AUTOEXEC.BAT
A:AUTOEXEC
```

Where:

node_name	Is the DECnet node name of the workstation executor.
node_address	Is the DECnet node address of the workstation executor.
baud	Is the baud rate to use when communicating over the asynchronous line.
modem	Is either FULL or NULL.

To configure the workstation to use the Ethernet driver, enter:

```
A:\>RENAME AUTOEXEC.BAT AUTOEXEC.SAV
A:\>CD DECNET
A:\DECNET>COPY MSNET.DCP MSNET.INI
A:\DECNET>DEL DECPARM.DAT
```

Press Ctrl/Alt/Del to reboot.

```
.
.     system reboots
.
```

```
A>CD DECNET
A>NET INSTALL node_name node_address
A>CD ..
A>RENAME AUTOEXEC.SAV AUTOEXEC.BAT
A>AUTOEXEC
```

Where:

node_name	Is the DECnet node name of the workstation executor.
node_address	Is the DECnet node address of the workstation executor.

3. Ensure that the line state is on by entering:

```
A:\>NCP
NCP>SHOW LINE

Line Summary as of 19-AUG-1989 12:09:02

Line            State/Substate

ETHER-1         On/Running
```

4. Ensure that the circuit state is on by entering:

```
A:\>NCP
NCP>SHOW CIRCUIT


Circuit Summary as of 19-AUG-1989 12:10:02

Circuit          State/Substate      Designated        Block
                                     Router            Size

ETHER-1          On/Running          8.999    (VVROUT) 1498
```

5. If the workstation is configured with an asynchronous driver, ensure that the line and circuit characteristics are set correctly by entering:

```
NCP>SHOW LINE CHARACTERISTICS


Line Characteristics as of 19-AUG-1989 12:11:02


Line =  ASYNC-1


Line state                      = On
Line substate                   = Running
Device Id                       = COM-1
Duplex                          = Full-Duplex
Protocol type                   = DDCMP
Line speed                      = 9600
Communication mode              = 0
Stop bits                       = 1
Modem type                      = Null
```

```
NCP>SHOW CIRCUIT CHARACTERISTICS

Circuit Characteristics as of 19-AUG-1989 12:12:02

Circuit =  ASYNC-1

Circuit state                    = On
Circuit substate                 = Running
Service                          = Enabled
Adjacent node                    = 8.990 (VVROUT)
Block size                       = 576
Hello timer                      = 30
Listen timer                     = 33
Verification                     = 0
User                             = DECnet
Owner                            = DECnet
Line Id                          = ASYNC-1
Protocol type                    = DDCMP
```

6. **Ensure that the workstation node name and address match the workstation node name and address as known to the server by entering the SHOW EXECUTOR command as in step 1.**

   If the node name and number are not the same at the workstation and at the server, reregister the workstation with the server or redefine the node name and address of the workstation executor.

   If the workstation executor node name and address are incorrect or undefined, enter:

   ```
   A:\>NCP
   NCP>DEFINE EXECUTOR ADDRESS node_address NAME node_name STATE ON
   ```

   Where:

node_name	**Is the DECnet node name of the workstation executor (For example, 8.101).**
node_address	**Is the DECnet node address of the workstation executor (For example, WKSONE).**

   For the redefined executor node name and node address to take effect, the workstation must be re-booted.

7. Ensure the server node name and address are correctly defined at the workstation. At the workstation, enter:

```
NCP> LIST NODE node_name


Known Permanent Nodes as of 8-AUG-1989 19:27:08



Node        Node     Active  LAT/     Account
Address     Name     Links   MS-NET   Information


8.200       VVSRV    0       M L
```

Where:

node_name	Is the node name of the server node (For example, VVSRV).

Ensure sure that:

- The node name and address listed match the values listed at the server node.
- The workstation recognizes the server as a LAN manager node, that is, in the column labeled LAT/MS-NET, there is an M for the given node.

If the node name and address are incorrect at the workstation or if the server node is not recognized as a LAN manager node (in the column labeled LAT/MS-NET, there is no M for the given node), clear the workstation definition of the server node by entering:

```
A:\>NCP
NCP>CLEAR NODE node_name
NCP>PURGE NODE node_name
NCP>DEFINE NODE node_address NAME node_name MS-NET LAT
```

Where:

node_address	Is the DECnet node address of the server (For example, 8.200).
node_name	Is the DECnet node name of the server (For example, VVSRV).

8. Ensure that the workstation network interface hardware is operating correctly by entering[1] :

```
NCP>LOOP LINE CONTROLLER

LOOP LINE CONTROLLER (Ethernet)

   1.  Unplug network cable from Controller on back of PC.
   2.  Place the loopback plug on the Controller.  Test will
       fail if loopback plug is not in place.
   3.  Press any key to begin test.
   4.  At the end of the test, reconnect the Controller to
       the network.


LOOP LINE CONTROLLER test started at 9-AUG-1989 16:03:37

LOOP LINE CONTROLLER test finished successfully at 9-AUG-1989 16:03:37

Please remove loopback plug and reconnect your node to the network.
Press any key to continue.
```

   If the loopback test is unsuccessful, a hardware problem exists. For repair, contact your authorized service representative. For additional information about loopback tests on a workstation, see the section, "Workstation Loopback Test," in this chapter.

9. If there is no DECnet router on the network, ensure that the server DECnet node address has the same area number as the workstation DECnet node address.)

   To check the workstation or the server area number, enter:

```
NCP>SHOW EXECUTOR
```

   In both cases, the area number is displayed before the "." in the node address. If the area numbers are not the same, redefine the area number for either the server or the workstation.

10. Ensure that the node names and node address are consistent at all nodes on the network. The following are example node databases for the nodes in the simplified network of Figure 3–2.

---

[1] unless you are using a 3C503 Ethernet controller. This does not support LOOP LINE CONTROLLER.

Figure 6–1 Example Node Databases

	VMS Server		Workstation 1		Workstation 2	
	Name	Addr	Name	Addr	Name	Addr
Executor	VVSVR	8.200	WKSONE	8.101	WKSTWO	8.102
Known Nodes	WKSONE WKSTWO	8.101 8.102	VVSVR WKSTWO	8.200 8.102	VVSVR WKSONE	8.200 8.101

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The workstation DECnet checklist is complete. Successfully completing this checklist indicates that DECnet is set up correctly on the workstation.

Workstation Basic LAN Manager Checklist

This checklist verifies that the basic LAN manager is operating correctly on the workstation. To use the basic LAN manager, DECnet must operating correctly.

1. Ensure that the basic LAN manager is running by entering:

```
A:\>USE /STATUS
USE version V3.0.11  PCSA Network Connection Manager
Copyright (c) 1989 by Digital Equipment Corporation

Component Information

    Scheduler is installed
    Datalink is installed and is running
    DECnet is installed
    Session is installed
    Redirector is installed
    LAT is installed
    LAST is installed
    LAD is installed
    CTERM is not installed
```

```
Client Information

    DECnet node name:  WKSONE (8.101)
    Station address:   AA-00-04-00-64-24
    Hardware address:  02-60-8C-09-24-07
    Ethernet hardware: 3-COM board
    Physical drives:    2 (A:-B:)
    Logical drives:    26 (A:-Z:)
    Virtual drives:     4 (C:-F:)

A:\>
```

The response in the previous example indicates that the basic LAN manager is running. The following example indicates that the basic LAN manager is not running.

```
A:\>USE /STATUS
USE version V3.0.11  PCSA Network Connection Manager
Copyright (c) 1989 by Digital Equipment Corporation

Component Information

    Scheduler is installed
    Datalink is installed and is running
    DECnet is not installed
    Session is not installed
    Redirector is not installed
    LAT is installed
    LAST is installed
    LAD is installed
    CTERM is not installed

Client Information

    DECnet node name:  WKSONE (8.101)
    Station address:   AA-00-04-00-64-24
    Hardware address:  02-60-8C-09-24-07
    Ethernet hardware: 3-COM board
    Physical drives:    2 (A:-B:)
    Logical drives:    26 (A:-Z:)

A:\>
```

If the response indicates that the basic LAN manager is not running, run STARTNET.BAT to load DECnet/PCSA components:

```
A:\>STARTNET
```

The system displays a series of messages indicating that network components are loaded. The display ends with a suggestion that you enter the Login command. At this point, enter the USE/STATUS command again to check whether all components are installed.

2. Ensure that the workstation node name and address match the workstation node name and address as known to the server by entering:

```
A:\>NCP
NCP>SHOW EXECUTOR


Executor Summary as of  9-AUG-1989 10:00:52

Executor node                = 8.101 (WKSONE)

State                          on
Identification                 DECnet-DOS V2.1
```

If the node name and number are not the same at the workstation and at the server, reregister the workstation with the server or redefine the node name and address of the workstation executor.

If the workstation executor node name and address are incorrect or undefined, enter:

```
NCP>DEFINE EXECUTOR ADDRESS node_address NAME node_name STATE ON
```

Where:

node_address	Is the DECnet node address of the workstation (For example, 8.101).
node_name	Is the DECnet node name of the workstation (For example, WKSONE).

For the redefined executor node name and node address to take effect, the workstation must be re-booted.

3. Ensure the server node name and address are correctly entered at the workstation. At the workstation, enter:

```
NCP> LIST NODE node_name


Known Permanent Nodes as of 8-Aug-1989 19:27:08



Node       Node     Active  LAT/     Account
Address    Name     Links   MS-NET   Information


8.200      VVSRV    0       M L
```

Where:

node_name — Is the node name of the server node (For example, VVSRV).

Make sure that:

- The node name and address listed match the values listed at the server node.
- The workstation recognizes the server as a basic LAN manager node, that is, in the column labeled LAT/MS-NET, there is an M for the given node.

If the node name and address are incorrect at the workstation or if the server node is not recognized as an basic LAN manager node (in the column labeled LAT/MS-NET, there is no M for the given node), clear the workstation definition of the server node by entering:

```
NCP>CLEAR NODE node_name
NCP>PURGE NODE node_name
NCP>DEFINE NODE node_address NAME node_name MS-NET LAT
```

Where:

node_address — Is the DECnet node address of the server (For example, 8.200).

node_name — Is the DECnet node name of the server (For example, VVSRV).

4. Ensure that the service you are attempting to connect to is offered by the server node.

   If the server is a VMS server, at the workstation enter:

```
A:\>NET FILE \\server_node%user_name password

File Server Authorized Services:

User name     Alias name    Service name  Access  RMS protection
------------  ------------  ------------  ------  --------------------
<PUBLIC>      LN03_DPORT    LN03_DPORT    RWC     S:RWED,O:RWED,G:,W:
<PUBLIC>      PCAPPS        PCAPPS        R       S:RWED,O:RWED,G:,W:

File Server Authorized Services:

User name     Alias name    Service name  Access  RMS protection
------------  ------------  ------------  ------  --------------------
SARRO         WRITERS       WRITERS       RWC     S:RWED,O:RWED,G:,W:
Command completed successfully.
```

   Where:

server_node	Is DECnet node name of a valid server node.
user_name	Is a valid user name.
password	Is a valid password for the user name.

5. Ensure that the system file, CONFIG.SYS, contains commands for increasing the number of available I/O buffers, file descriptors, and logical drive names by entering:

```
A:\>TYPE CONFIG.SYS
BUFFERS=8
FILES=20
LASTDRIVE=Z
DEVICE=LADDRV.SYS /D:4
DEVICE=DECMOUSE.SYS
SHELL=\COMMAND.COM /E:512 /P
```

NOTE

Ensure that the LADDRV.SYS qualifier /D: is correctly entered.

The workstation basic LAN manager checklist is complete. Successfully completing this checklist indicates that the basic LAN manager is set up correctly on the workstation.

Workstation Remote Printing Checklist

This checklist verifies that remote printing is operating correctly on a workstation. To use remote printing, the basic LAN manager must be operating correctly.

1. To ensure that the printer is ready to print, verify that:
   - The printer is connected to a power source.
   - The printer is connected to the server.
   - The printer has an adequate supply of paper.
   - The paper passes through the printer correctly.
   - The printer is online.
2. Ensure that the service you are attempting to connect to is offered by the server node.

   If the server is a VMS server, at the workstation enter:

```
A:\>NET FILE \\server_node%user_name password

File Server Authorized Services:

User name     Alias name    Service name  Access  RMS protection
------------  ------------  ------------  ------  --------------------
<PUBLIC>      LN03_DPORT    LN03_DPORT    RWC     S:RWED,O:RWED,G:,W:
<PUBLIC>      PCAPPS        PCAPPS        R       S:RWED,O:RWED,G:,W:

File Server Authorized Services:

User name     Alias name    Service name  Access  RMS protection
------------  ------------  ------------  ------  --------------------
SARRO         WRITERS       WRITERS       RWC     S:RWED,O:RWED,G:,W:
Command completed successfully.
```

   Where:

server_node	Is DECnet node name of a valid server node.
user_name	Is a valid user name.
password	Is a valid password for the user name.

3. At the system prompt, enter:

```
A:\>USE print_device \\server_node\print_service%user_name password
A:\>NET PRINT /D:print_device
```

Where:

print_device	Is one the valid MS-DOS print devices (For example, LPT1, LPT2, LPT3, PRN).
server_node	Is the DECnet node name of a valid server node.
print_service	Is the name of the remote printing service on the indicated server node.(The name must end with a colon.)
user_name	Is a valid user name.
password	Is a valid password for the user name.

You can use the MS-DOS COPY command to copy a file to the remote printing service.

In MS-WINDOWS, use the configuration aide to select the redirected print device and printer type.

4. Use the USE command to determine the print devices that are redirected and the remote printing services to which they are redirected.

The workstation remote printing checklist is complete. Successfully completing this checklist indicates that remote printing is set up correctly on the workstation.

Workstation LAT Checklist

This checklist verifies that LAT is operating correctly on a workstation.

1. Ensure that the LAT driver is running by entering:

```
A:\>LATCP
LATCP>SHOW COUNTERS


LAT counters as of 9-Aug-1989 12:43:15


Seconds since last zeroed          = 5483
Messages transmitted               = 4455
Messages received                  = 5092
```

```
Messages retransmitted              = 0
Messages received out of sequence   = 3
Illegal messages received           = 0
Illegal slots received              = 0
Queue entry unavailable for receive= 0
Transmit buffers unavailable        = 0
Invalid messages received           = 1
Invalid slots received              = 0
Invalid multicast messages          = 0
```

If the response is: "LAT is not installed." then the LAT driver is not running. To start the LAT driver, enter:

```
LATCP>EXIT
A:\>LAT
```

2. Ensure that the service is correctly defined in the LAT database by entering:

```
LATCP
LATCP>SHOW SERVICES
```

If the name of the server you want to connect to is not listed, then you need to add the server name and node to the LAT data base. To do this, enter:

```
LATCP>ADD node_address node_name
```

Where:

node_address	Is the DECnet node address of the LAT server (For example, 8.200).
node_name	Is the DECnet node name of the workstation (For example, VVSRV).

Alternatively, you can just enter ADD at the LATCP prompt and then choose a server from the menu as directed.

NOTE

If the LAT service table is smaller than the number of nodes offering a LAT service, the extra nodes are not entered in the LAT service table. The LAT service table is also referred to as the network terminal services directory.

A node defined as a LAT server in the database file DECLAT.DAT indicates that it is a preferred service. At startup, the preferred services are immediately entered in the LAT service table. For instructions on increasing the size of the LAT service table and for an explanation of the relationship between the database files DECLAT.DAT and

DECNODE.DAT, refer to the LAT command entry in the *Network Commands Reference Manual.*

NOTE

The SETHOST command dynamically loads and unloads the LAT module. You do not have to explicitly load it, except to perform the tests described here or if you want to load LAT into EMS or if you want to have a larger service table.

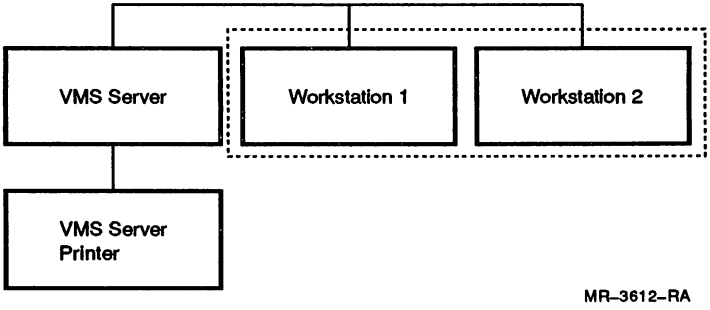
As a final test of the LAT, you can use SETHOST to connect to two nodes, exit to DOS, and use the LATCP Show Char command to verify that there are indeed two virtual circuits and two sessions.

The workstation LAT checklist is complete. Successfully completing this checklist indicates that the LAT is set up correctly on the workstation.

Workstation Checklist Completion

The workstation checklist is complete. If successful, you know that the workstation on your network, shown within the dashed lines in Figure 6–2, is set up correctly. The following section presents additional information on the workstation loopback test.

Figure 6–2 Workstation Set Up Correctly

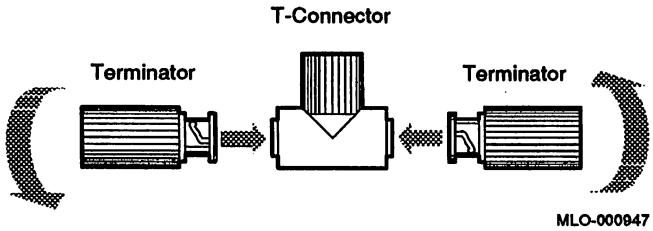


Workstation Loopback Test

The workstation loopback test requires a ThinWire loopback connector, which includes one T-connector and two terminators. These are provided with your server.

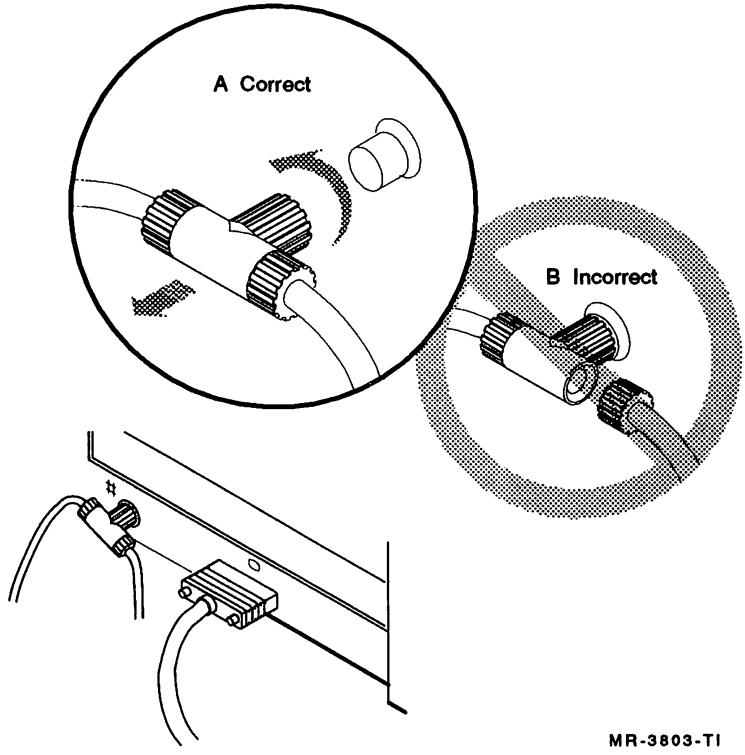
1. Assemble the loopback connector. Attach the two terminators to the opposite ends of the T-connector (Figure 6–3).

Figure 6–3 Loopback Connector Assembly



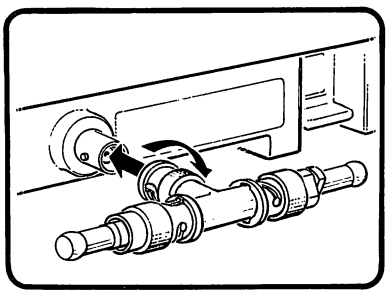
2. Disconnect the workstation from the network (Figure 6–4).

Figure 6–4 Disconnecting ThinWire Cabling From Workstation



3. Plug the loopback connector into the workstation (Figure 6–5).

Figure 6–5 Loopback Connector Installation



4. To test a VAXmate workstation ensure that the key diskette is in drive A and run the Extended Self-Test. The configuration screen is displayed when the Extended Self-Test is complete. Press any key to continue. If the Extended Self-Test fails, there is a hardware problem; contact your authorized service representative.

   To test a PC workstation, turn off the system unit and turn it on again to run the powerup test. If the powerup test fails, there is a hardware problem; refer to the workstation documentation.

   With the loopback connector on your workstation, the network connection will fail, displaying a network error code, and you will be at the operating system prompt. Continue to step 5.

   If you cannot start the operating system, turn off the workstation, reinsert the key diskette, turn on the workstation, and try to reboot the system. If the operating system still fails to start, then the diskette is probably bad; create a new key diskette.

5. Using a MS-DOS system diskette, reboot the workstation. When the operating system prompt appears, remove the system diskette and insert the PCSA TROUBLESHOOTING V3.0 diskette. At the operating system prompt, enter:

```
A:\> NCP
NCP> LOOP LINE CONTROLLER
```

If the workstation loopback test is successful, a network cabling problem may exist. The following is an example of a successful loopback test.

```
LOOP LINE CONTROLLER (Ethernet)


   1.  Unplug network cable from Controller on back of PC.
   2.  Place the loopback plug on the Controller.  Test will
       fail if loopback plug is not in place.
   3.  Press any key to begin test.
   4.  At the end of the test, reconnect the Controller to
       the network.



LOOP LINE CONTROLLER test started at 6-AUG-1989 16:03:37


LOOP LINE CONTROLLER test finished successfully at 6-AUG-1989 16:03:37


Please remove loopback plug and reconnect your node to the network.
Press any key to continue.
```

If the workstation loopback test is unsuccessful, a hardware problem exists. For repair, contact your authorized service representative. The following is an example of an unsuccessful loopback test.

```
LOOP LINE CONTROLLER (Ethernet)


1.  Unplug network cable from Controller on back of PC.
2.  Place the loopback plug on the Controller.  Test will
    fail if loopback plug is not in place.
3.  Press any key to begin test.
4.  At the end of the test, reconnect the Controller to
    the network.


LOOP LINE CONTROLLER test started at 6-AUG-1989 16:07:04


LOOP LINE CONTROLLER test failed at 6-AUG-1989 16:07:05


Please remove loopback plug and reconnect your node to the network.
Press and key to continue.
```

6. **Remove the loopback connector from the back of the workstation.**
7. **Reconnect the ThinWire Ethernet cable to your workstation.**

The workstation loopback test is complete. If the loopback test was successful, you now know the workstation is operational.

A
Ordering Parts

Parts Lists

- Table A–1 lists the connectors and standard length cables to use with ThinWire networks.
- Table A–2 lists the cable part numbers and necessary tools to create your own cable. These connectors and cables comply with the IEEE 802.3 standard.
- Table A–3 lists options you can order for the DECstation.

CAUTION
Use only these Digital parts and cables for any ThinWire installation.

Table A–1 Ordering ThinWire Connectors and Cable Sections

Part	Part Number
BNC connector	H8222
T-connector	H8223
Terminator (50 ohm)	H8225
Barrel connector	H8224
Reducer	12-27252-01
N-barrel connector	12-19817-01
Ethernet Turnaround Connectors	H4080
LAN cable assembly 3.8 m (12 ft)[1]	PC50X-CB
ThinWire cable, PVC, 1.9 m (6 ft)[2]	BC16M-06

[1]Includes an installed T-connector, terminator, and BNC connector
[2]Includes two installed BNC connectors

Table A–1 (Cont.) Ordering ThinWire Connectors and Cable Sections

Part	Part Number
ThinWire cable, PVC, 4.4 m (15 ft)[2]	BC16M-15
ThinWire cable, PVC, 9.4 m (30 ft)[2]	BC16M-30
Transceiver cable, PVC, straight connectors	BNE3H-05
Transceiver cable, PVC, straight connectors	BNE3H-10

[2]Includes two installed BNC connectors

The following table lists the part numbers of ThinWire Ethernet components that you might need to obtain if, for example, you are expanding your network.

Table A–2 Ordering Long Lengths of ThinWire Cable and Tools

Part	Length	Part Number
ThinWire cable, PVC	304.8 m (1000 ft) spool	H8243-A
ThinWire cable, Teflon	304.8 m (1000) ft spool	H8244-A
ThinWire cable installation kit	–	H8224

Table A–3 DECstation Options

Option	Part Number
	210/316/320
3.5-inch 1.44 Mbyte Floppy Disk	PC41R-AA/PC42R-AA/PC43R-AA
80387 Coprocessor	PC41R-AA/PC42R-AA/PC43R-AA
1200/300 bps Modem Adaptor	PC4XD-AA
2400 bps Modem Adaptor	PC4XD-CA
Serial Parallel Adapter	PC4XD-AA
DECstation PC Network Integration	DEPCA-CA
SCSI Adaptor	PC4XR-AA

Table A–3 (Cont.) DECstation Options

Option	Part Number
40 Mbyte SCSI Hard Disk Kit	PC4XR-BA
80 Mbyte 5.25-inch SCSI Hard Disk Kit	PC4XR-CA
170 Mbyte 5.25-inch SCSI Hard Disk Kit	PC4XR-DA
DECstation 5.25-inch 1.2 Mbyte Disk Drive Option	PC4XR-EA
150 Mbyte 5.25-inch SCSI Tape Cartridge System	PC4XT-AA

B

ThinWire Network Topology Maps and Worksheets

This appendix includes:

- Directions on how to fill in and use the different topology maps and worksheets
- Sample completed topology maps and worksheets to use as guides
- Blank topology maps and worksheets

Introduction

The ThinWire network topology maps and worksheets allow for future expansion of your network. They complement the Digital DECconnect System worksheets and "as built" plans (which usually refer to cables and equipment installed in conduits or in satellite equipment rooms) available from your network manager or network installation contractor.

Keep your worksheets and topology maps up to date as you install, add to, or change your network configuration. Use these worksheets to locate the components and users on your network and to aid network troubleshooting. Make sure the network manager in your building has a copy of all maps and worksheets you fill in.

NOTE

If you call for service, this information will be required by your authorized service representative.

See the following documents or people if you are connecting ThinWire segments to a previously installed DECconnect System network:

- *DECconnect System General Description* and *DECconnect System Planning and Configuration Guide*, DECconnect worksheets, and "as built" plans
- The network manager or network installation contractor for your building

Terms

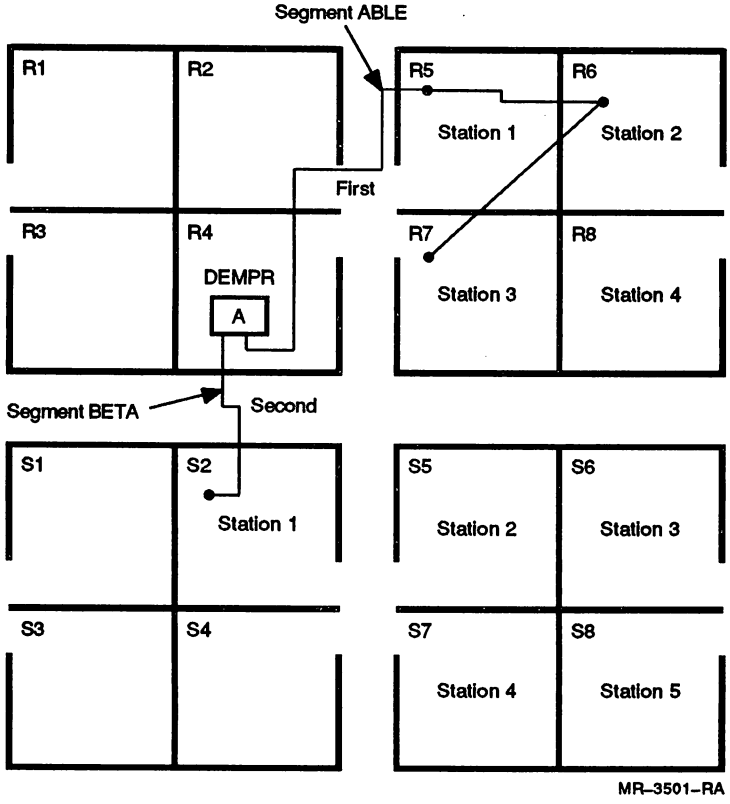
Because the topology maps and worksheets refer only to segments (networks) installed in an office environment, "segment" is included in all map and worksheet titles. This helps distinguish these topology maps and worksheets from the DECconnect system worksheets and "as built" plans.

To simplify filling in the topology maps and worksheets, Digital recommends you read all the instructions before you start. Refer to a copy of each topology map and worksheet as you read the following terms and their definitions:

- Segment ID—A unique name, letter, or number that you assign to each segment. This identification is carried forward from sheet to sheet.
- System administrator—A person responsible for the particular faceplate, DEMPR, or segment.
- Server type—The kind of server (for example, VMS or MicroVAX VMS) used by the system administrator who is responsible for the particular faceplate, DEMPR, or segment.
- Drop # (number)—A number assigned to a connector on a DEMPR to which a segment can be attached.

Digital recommends that you keep a floor plan of your office area that identifies the location of each station and, where appropriate, DEMPRs. Figure B–1 shows a sample floor plan.

Figure B–1 Sample Floor Plan with Station Location



Filling in the Segment (Faceplate) Topology Map and Worksheet

Fill in the Segment (Faceplate) Topology Map (see Figure B–2 and Figure B–3) only when you connect a single workstation or multiple workstations to a Digital faceplate. Fill in a Segment (Faceplate) Topology Map for each faceplate. Then, fill in the Segment (Faceplate) Worksheet (see Figure B–9 and Figure B–10). You can fill in some information as you install the segment. You can fill in the remainder after you install your server software.

Using the Segment (Faceplate) Topology Map

Using the completed topology map shown in Figure B–2 as a guide, fill in the Segment (Faceplate) Topology Map (Figure B–3).

1. Fill in the top portion of the topology map:
   - Date—Fill in the current date.
   - Faceplate number—Fill in the faceplate number recorded on the DECconnect Faceplate Worksheet and "as built" plans provided by your building's network manager or network installation contractor.
   - Segment ID—Assign a name, letter, or number for this segment if your building's network manager has not already done so. Carry this identification forward to the Segment (Chain) Topology Map and Segment (Chain) Worksheet.
2. Fill in the body of the topology map:
   - Cable length A—Fill in the length of the ThinWire cable going to the back of the faceplate. This length is recorded on the DECconnect Faceplate Worksheet. If the ThinWire cable length recorded on the "as built" plan differs from the worksheet, use the length recorded on the plan.
   - Cable length B—Fill in the total cable length from the faceplate to station 1. If you install a barrel connector between the faceplate and station 1, fill in each cable length and then add. Station 1 is the first computing device connected to the faceplate.
   - Total cable length C—Add cable lengths A and B and fill in the total here. Carry this figure forward to the Segment (Chain) Topology Map and Segment (Chain) Worksheet as the previous total cable length.

Using the Segment (Faceplate) Worksheet

Using the completed worksheet shown in Figure B–9 as a guide, fill in the Segment (Faceplate) Worksheet (Figure B–10).

1. Fill in the top portion of the worksheet:
   - Date—Fill in the current date.
   - System administrator and telephone number—Fill in the system administrator's name and telephone number.

- Server type—Fill in the server type (for example, MicroVAX server) assigned to the system administrator for this segment.
- Server node name—Fill in the server node name; for example, FLOWER.
- Node address—Fill in the server node address. The node address consists of the area and node number; for example, 3.17.

2. Fill in the columns as follows:
   - Faceplate number—Fill in the faceplate number for this segment.
   - Number of connector junctions to faceplate—See the "as built" plans or your building's network manager to determine the number of connector junctions. In most cases, there is only one connector junction. If a patch panel (not discussed in this book, see the *DECconnect System General Description*) is present, it counts as two connector junctions, for a total of three connector junctions to the faceplate.
   - Number of connector junctions to station 1—Fill in the total number of connector junctions from the faceplate to station 1. A faceplate counts as one junction. If you installed a barrel connector, it counts as two junctions, for a total of three connector junctions.
   - Total number connector junctions—Add the number of junctions recorded in columns 2 and 3, and record the total. Carry this total forward to the Segment (Chain) Worksheet as the previous total number of connector junctions.
   - Cable length A (to back of faceplate)—Fill in the value recorded on the Segment (Faceplate) Topology Map.
   - Cable length B (to station 1)—Fill in the value recorded on the Segment (Faceplate) Topology Map.
   - Total cable length C—Fill in the value recorded on the Segment (Faceplate) Topology Map.
   - Segment ID—Fill in the name, letter, or number recorded on the Segment (Faceplate) Topology Map.

Filling in the Segment (DEMPR) Topology Map and Worksheet

Fill in the Segment (DEMPR) Topology Map when you connect one or more segments to a DEMPR installed in a open office environment (see Figure B–6). Using the completed worksheet shown in Figure B–7 as a guide, fill in the Segment (DEMPR) Worksheet (Figure B–8).

You can fill in some information on the Segment (DEMPR) Worksheet as you physically connect segments to the DEMPR. You will be able to fill in the remainder of the information after you install your server software and all the segments.

Using the Segment (DEMPR) Topology Map

Fill in the Segment (DEMPR) Topology Map (Figure B–6).

1. Fill in the top portion of the topology map:
   - Date—Fill in the current date.
   - Office location—Identify the office where the DEMPR is located.
   - DEMPR ID—Assign a unique name, letter, or number. Digital recommends that you attach an identification label to each DEMPR you install.
2. Fill in the lower portion of the topology map. Digital has prenumbered the drops (1 to 8) on this map. The drop number identifies the specific connector on the DEMPR to which the ThinWire cable (segment) is attached.
   - Segment ID—Assign a different name, letter, or number for each segment. Carry this identification forward to the Segment (Chain) Topology Map and Segment (Chain) Worksheet.
   - Cable length—Fill in the total cable length from the DEMPR to station 1. Station 1 is the computing device on the segment closest to the DEMPR. If you install a barrel connector between the DEMPR and station 1, fill in each cable length and then add. Carry this figure forward to the (Segment Chain) Topology Map and Segment (Chain) Worksheet as the previous total cable length.

Using the Segment (DEMPR) Worksheet

Using the completed worksheet shown in Figure B–7 as a guide, fill in the Segment (DEMPR) Worksheet (Figure B–8).

1. Fill in the top portion of the worksheet. More than one server can be connected to a DEMPR. In this case, there may be more than one system administrator. Fill in the appropriate name, segment ID, and server information for the system administrator responsible for the DEMPR.
   - Date—Fill in the current date.
   - DEMPR ID—Fill in the DEMPR ID recorded on the DEMPR topology map.
   - Office Location—Fill in the office location recorded on the DEMPR topology map.
   - System administrator and telephone number—Fill in the name and telephone number for the system administrator responsible for the DEMPR.
   - Drop number and segment ID—Fill in the appropriate drop number and segment ID for the system administrator responsible for the DEMPR.
   - Server type—Fill in the server type (for example, MicroVAX server) for the system administrator responsible for the DEMPR.
   - Server Node Name—Fill in the server node name; for example, FLOWER.
   - Node address—Fill in the server node address. The node address consists of the area and node number; for example, 3.17.
2. Fill in the columns as follows. Digital has numbered the drops for you.
   - Connector junction(s) to station 1—Fill in the total number of connector junctions from the DEMPR to station 1. A DEMPR connection counts as one junction. If you install a barrel connector, it counts as two junctions, for a total of three. Carry this total forward to the Segment (Chain) Worksheet as the previous total of connector junctions.
   - Total cable length to station 1—Fill in the appropriate total cable length recorded on the Segment (DEMPR) Topology Map. Carry this total forward to the Segment (Chain) Topology Map and Segment (Chain) Worksheet as the previous total cable length.

- Segment ID—Fill in the appropriate segment ID recorded on the Segment (DEMPR) Topology Map. Carry this identification forward to the Segment Chain Worksheet.
- Contact person—Fill in the name of the contact person for each segment. In some cases, this may also be a system administrator.
- Telephone—Fill in the telephone number of the contact person for each segment.
- Terminator—Fill in a YES if you install a terminator on this drop. Fill in a NO if you install a segment on this drop. Be sure you install a terminator to each unused drop. Do not use a T-connector.

Filling in Segment (Chain) Topology Map and Worksheet

Using the completed topology map shown in Figure B–4 as a guide, fill in the Segment (Chain) Topology Map (Figure B–5) as you connect stations to the segment. Then, using the completed worksheet shown in Figure B–11 as a guide, fill in the Segment (Chain) Worksheet (Figure B–12). Fill in a Device List for each station on the segment.

You can fill in some columns on the Segment (Chain) Worksheet as you connect stations to the segment. You can to fill in the remainder of the columns after you install your server software.

Using the Segment (Chain) Topology Map

Using the completed topology map shown in Figure B–4 as a guide, fill in the Segment (Chain) Topology Map (Figure B–5).

1. Fill in the top portion of the Segment (Chain) Topology Map:
   - Date—Fill in the current date.
   - Segment ID—If neither a faceplate nor a DEMPR is present, assign a different name, letter, or number for each segment. Otherwise, fill in the segment ID recorded on the Segment (DEMPR) or Segment (Faceplate) Worksheet.
   - DEMPR ID and drop number—If no standalone DEMPR is present, fill in N/A (not appropriate). Otherwise, carry the DEMPR ID and drop number for this segment forward from the Segment (DEMPR) Worksheet.

- Faceplate number—If no faceplate is present, fill in N/A. Otherwise, carry this information forward from the Segment (Faceplate) Worksheet.
- Sheet ___ of ___—Fill in the sheet number (1 to 3). Each ThinWire segment can contain a maximum of 30 stations or 3 segment worksheets.

2. Fill in the lower portion of the Segment (Chain) Topology Map:
   - Previous total cable length—Fill in N/A if neither a standalone DEMPR nor a faceplate is present. Otherwise, carry this information forward from the Segment (DEMPR) or Segment (Faceplate) Worksheet.
   - Station—Fill in the station number (1 to 30) as you install each station on the segment. Start with station 1. If a DEMPR or faceplate is present, station 1 is always the closest computing device to the DEMPR or faceplate.
   - Cable length—Fill in the total cable length from station 1 to station 2. If you install a barrel connector between station 1 and station 2, fill in each cable length and add.

Using the Segment (Chain) Worksheet

Using the completed worksheet shown in Figure B–11 as a guide, fill in the Segment (Chain) Worksheet (Figure B–12).

1. Fill in the information at the top of the worksheet:
   - Date—Fill in the current date.
   - Segment ID—Fill in the identification recorded on the Segment (Chain) Topology Map.
   - System administrator and telephone number—Fill in the name and telephone number of the system administrator responsible for this segment.
   - DEMPR ID and drop number—Fill in as recorded on the Segment (Chain) Topology Map.
   - Faceplate number—Fill in as recorded on the Segment (Chain) Topology Map.
   - Sheet ___ of ___—Fill in the sheet number (1 to 3). Each ThinWire segment can contain a maximum of 30 stations or 3 segment worksheets.

2. Fill in the previous total cable length and total connector junctions:
   - Total cable length (Previous total feet)—Fill in N/A if neither a DEMPR nor a faceplate is present. Otherwise, fill in as recorded on the Segment Topology Map.
   - Total no. connector junctions (Previous total number)—Fill in N/A if neither a DEMPR nor a faceplate is present. Otherwise, fill in the number of connector junctions recorded on the Segment (DEMPR) or Segment (Faceplate) Worksheet.
3. Fill in the following columns:
   - Station number—Fill in the station number as recorded on the Segment (Chain) Topology Map. Start your Segment (Chain) Worksheet with station 1.
   - Node name—Fill in the node name assigned to the station; for example, FLOWER.
   - DESTA ID—Fill in N/A if no DESTA is connected to the station. Otherwise, assign a number or name as the ID. Attach an identification label to any DESTA you install.
   - Node address—Fill in the station node address. The node address consists of the area and node number; for example, 3.17.
   - Server—Fill in a check mark if this station is a server. Otherwise, leave this column blank. More than one server can be on a segment.
   - Server type—Fill in this column only if this station is a server. For example, VAXmate (running PCSA Version 2.2) or MicroVAX VMS.
   - Machine type—Fill in the name of the station's computing device; for example, VAXmate or MicroVAX.
   - Device list—Fill out a Device List for each station on the segment. Enter a check mark in this column when you have completed this task.
   - User name—Fill in the user's name; for example, John Smithfield.
   - User telephone number—Fill in the user's telephone number, if any.
   - Office location—Fill in the office location for each station.

- Total cable length station to station—Fill in the value recorded on the Segment (Chain) Topology Map for each station. For example, for station 1, fill in the total cable length from station 1 to station 2.
- Total cable length—For station 1, add any previous total cable length from the Segment (Chain) Topology Map to the station-to-station length and record the sum. Otherwise, fill in the same cable length as station-to-station. To determine the total cable length for each segment, add the last recorded total length to the current station-to-station length and record the sum; this gives you a running total cable length.
- Number of connector junctions—Fill in the total number of connector junctions for the station. A T-connector counts as two connector junctions. A barrel connector installed between this station and the next counts as an additional two junctions, for a total of four.
- Total connector junctions—For station 1, add any previous total number (from the Segment (Faceplate) or Segment (DEMPR) Worksheet) to the number for station 1 and record the sum. Otherwise, fill in the same number as for station 1. To determine the total connector junctions for each segment, add the last recorded total number to the current number of connector junctions and record the sum.
- Terminator—For station 1, fill in N/A if the segment is connected to a faceplate or standalone DEMPR. Otherwise, record a check. In this case, be sure you install a terminator on station 1. For all other stations, fill in N/A except for the last station you install on the segment. Install a terminator on the last station, and check the appropriate box.

Using the Device List

Using the completed Device List shown in Figure B–13 as a guide, fill in the Device List (Figure B–14).

Fill in a Device List for each station on the segment.

1. Fill in the top portion:
   - Date—Fill in the current date.
   - Contact person, telephone number, and office location—Fill in the name and telephone number of the person responsible for this station. Fill in the office location of the station.

- Segment ID, station number, and machine type—Fill in the segment ID, station number, and machine type recorded on the Segment (Chain) Worksheet.
- Hardware address—Fill in the hardware address. The hardware address (sometimes referred to as the Ethernet address) consists of 17 characters and dashes; for example, 08-00-2B-02-78-79. This address is part of the firmware of all networking devices.
- Sheet ____ of ____—Fill in the number of sheets you need for each station.

2. Fill in the bottom of the worksheet:
   - Physical name—Fill in as appropriate. List each device associated with this station. For example, a VAXmate workstation can have an LA75 printer and an expansion box with a hard disk. If an expansion box is present, list any industry-standard option installed in the expansion box.

Figure B–2 Completed Segment (Faceplate) Topology Map

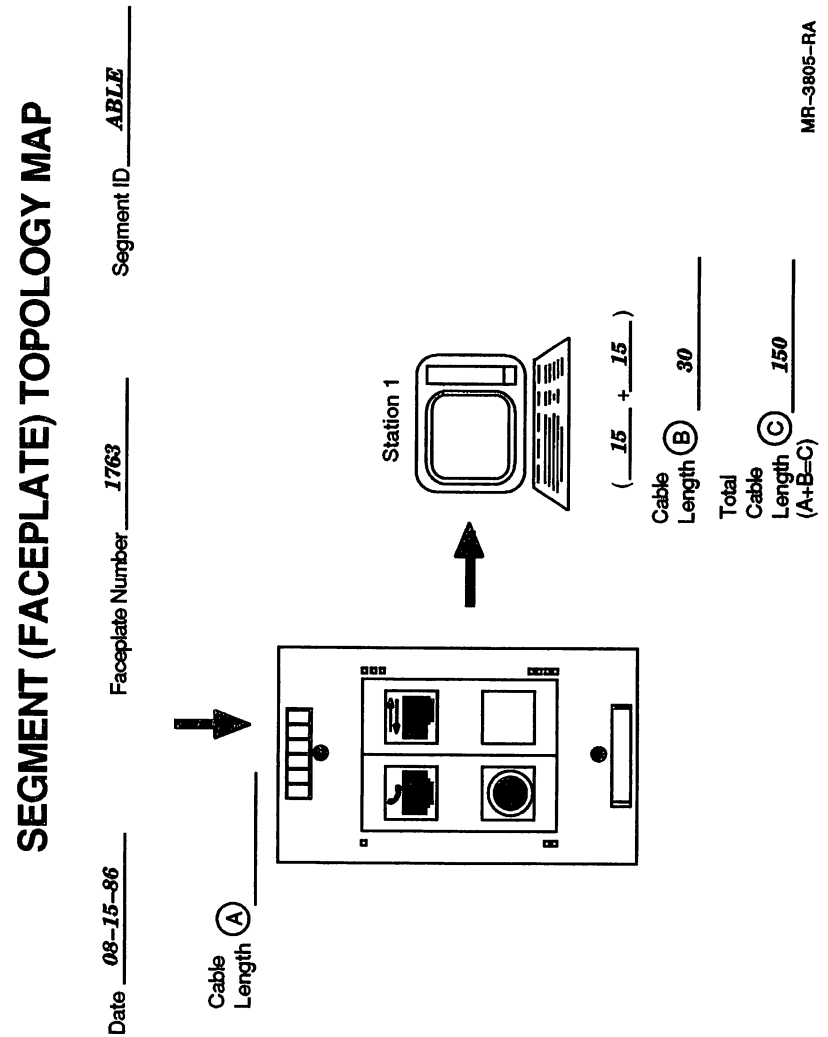
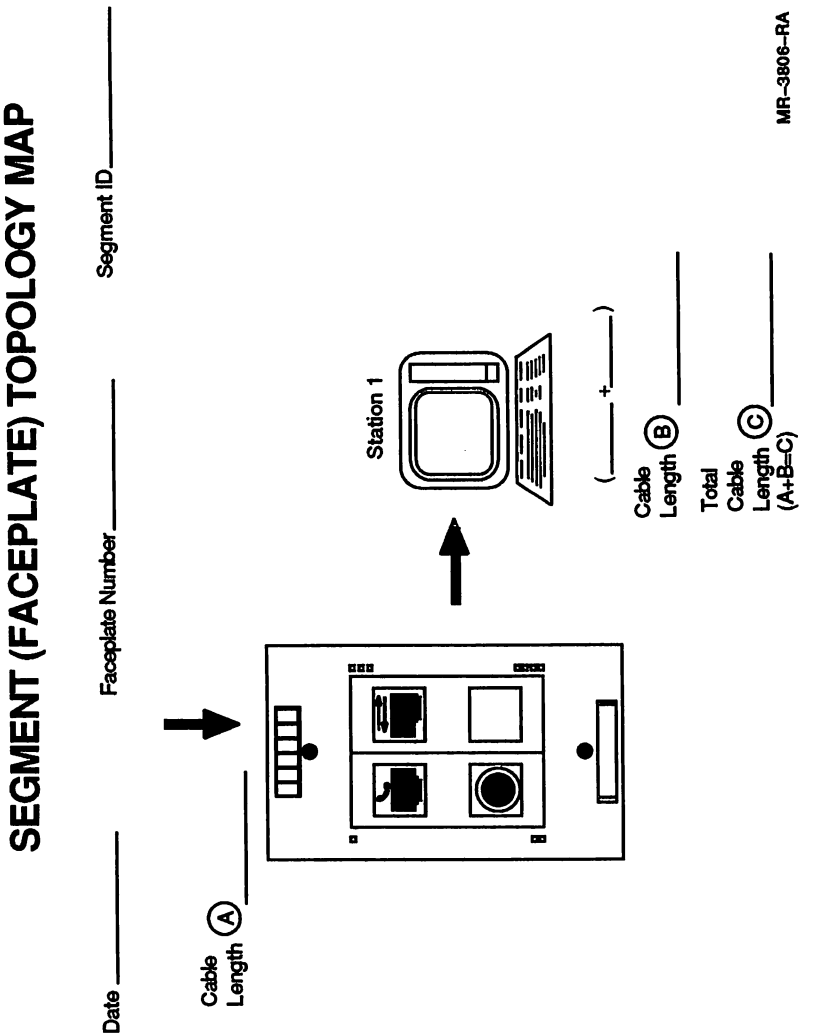


Figure B–3 Blank Segment (Faceplate) Topology Map



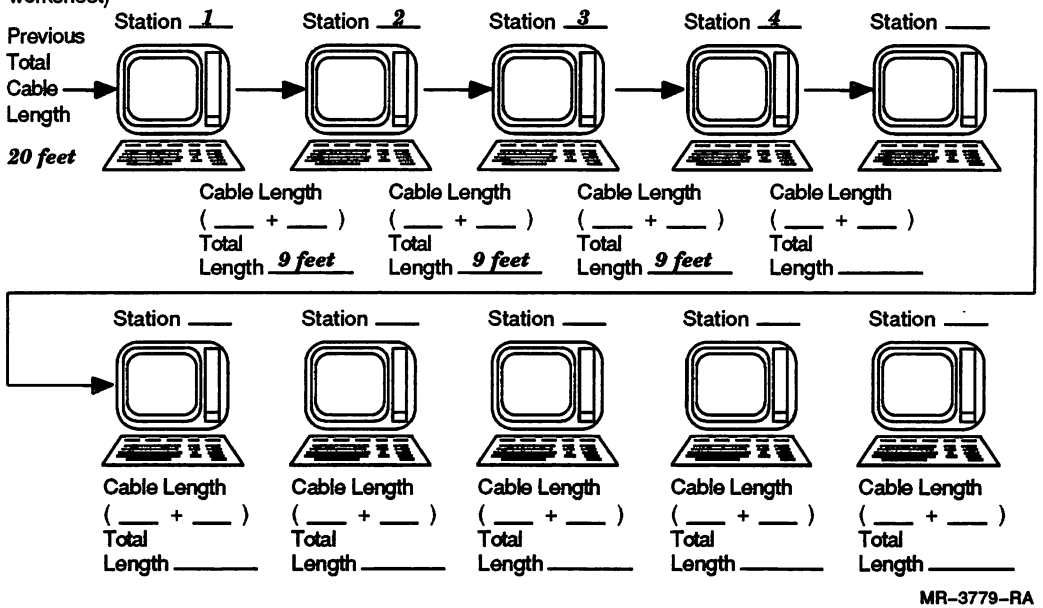
SEGMENT (CHAIN) TOPOLOGY MAP

Date *08–15–86*

(From DEMPR or Faceplate worksheet)

Segment ID *Delta*

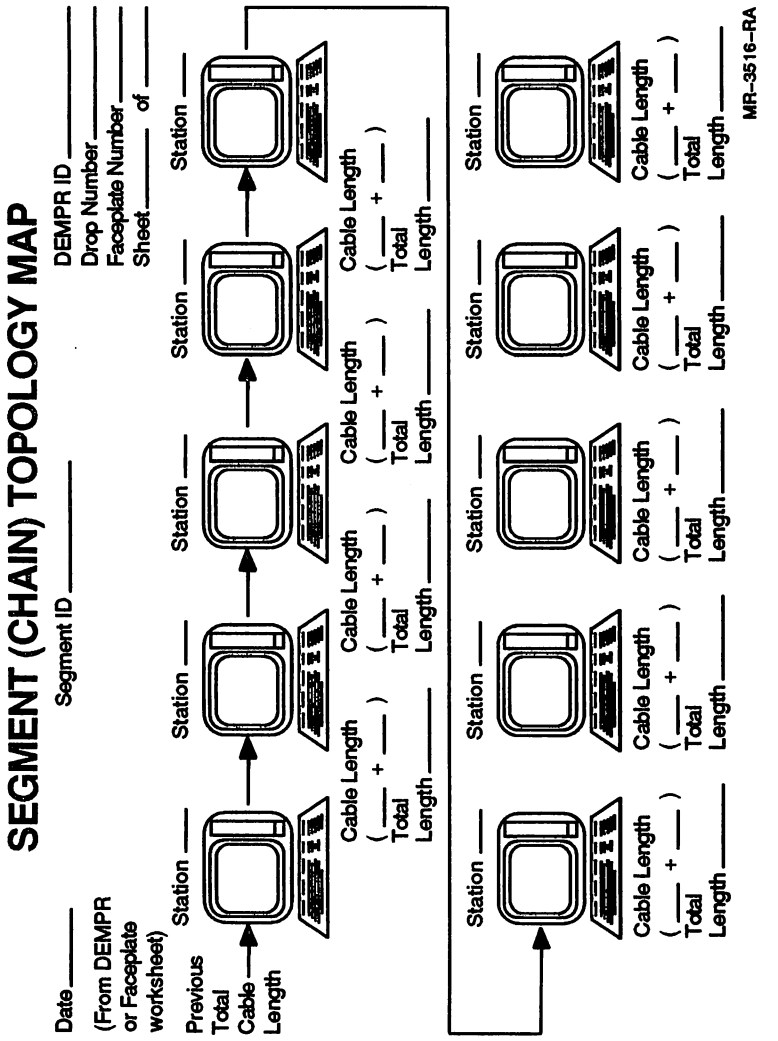
DEMPR ID *Charlie*
Drop Number *2*
Faceplate Number *N/A*
Sheet *1* of *1*



MR–3779–RA

Figure B–4 Completed Segment (Chain) Topology Map

Figure B–5 Blank Segment (Chain) Topology Map



SEGMENT (DEMPR) TOPOLOGY MAP

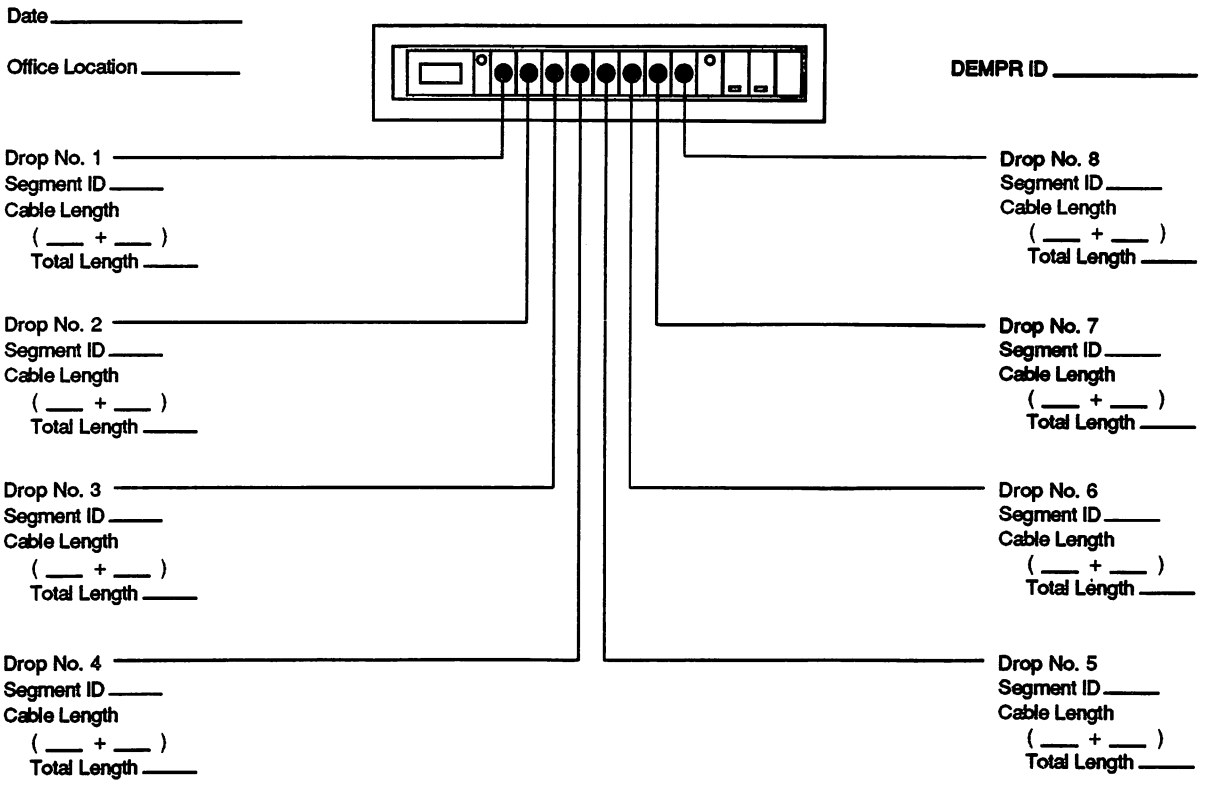


Figure B–6 Blank Segment (DEMPR) Topology Map

SEGMENT (DEMPR) WORKSHEET

Date *08–15–86*

DEMPR ID *Charlie*

Office Location *R12*

John Smith
System Administrator

123–4567
Telephone Number

Drop Number *1*

Segment ID *Delta*

Server Type *VAXmate*

Server Node Name *Rose*

Node Address *3.20*

Drop Number	Connector Junctions Station 1	Cable Length Length to Station 1	Segment ID	Contact Person	Telephone	Terminator	Notes
1							
2							
3							
4							
5							
6							
7							
8							

MR–3562–RA

Figure B–7 Completed Segment (DEMPR) Worksheet

SEGMENT (DEMPR) WORKSHEET

Date _____

DEMPR ID _____

Office Location _____

Drop Number _____

Segment ID _____

Server Type _____

Server Node Name _____

Node Address _____

_____
System Administrator

_____
Telephone Number

Drop Number	Connector Junctions Station 1	Cable Length Length to Station 1	Segment ID	Contact Person	Telephone	Terminator	Notes
1							
2							
3							
4							
5							
6							
7							
8							

MR–3563–RA

Figure B–8 Blank Segment (DEMPR) Worksheet

SEGMENT (FACEPLATE) WORKSHEET

Date *08–15–86*

John Smith
System Administrator

123–4567
Telephone Number

Server Type *MicroVAX*

Server Node Name *Flower*

Node Address *3.17*

Faceplate Number	Number Connector Junctions to Faceplate	Number Connector Junctions to Station 1	Total Number Connector Junctions	Cable Length A to Faceplate	Cable Length B to Station 1	Total Cable Length C	Segment ID	Notes
1763	*1*	*3*	*4*	*120 feet*	*30 feet*	*150 feet*	*Able*	
1764	*1*	*1*	*2*	*90 feet*	*15 feet*	*105 feet*	*Beta*	

MR–3564–RA

Figure B–9 Completed Segment (Faceplate) Worksheet

SEGMENT (FACEPLATE) WORKSHEET

Date _____

_____
System Administrator

_____
Telephone Number

Server Type _____

Server Node Name _____

Node Address _____

Faceplate Number	Number Connector Junctions to Faceplate	Number Connector Junctions to Station 1	Total Number Connector Junctions	Cable Length A to Faceplate	Cable Length B to Station 1	Total Cable Length C	Segment ID	Notes

MR–3565–RA

Figure B–10 Blank Segment (Faceplate) Worksheet

Figure B–11 Completed Segment (Chain) Worksheet

SEGMENT (CHAIN) WORKSHEET

Date *08–15–86*

John Smith
System Administrator

123–4567
Telephone Number

Segment ID *Delta*

DEMPR ID *Charlie*

Drop No. *1*

Faceplate No. *N/A*

Sheet *1* of *1*

Station No.	Node Name	DESTA ID	Node Address: Area	Node Address: Node No.	Node Address: Server	Server Type	Machine Type *	Device List	User Name	User Telephone No.	Office Location	Total Cable Length Station to Station	Total Cable Length / Prev. Total Ft.	No. Connector Junctions	Total No. Connector Junctions / Prev. Total No.	Terminator

* Hardware address located on Device List for this Station

Max. 185 M (606.9 Ft.)

Max. 60

MR–3566–RA

SEGMENT (CHAIN) WORKSHEET

Date _____

_____
System Administrator

_____
Telephone Number

Segment ID _____

DEMPR ID _____

Drop No. _____

Faceplate No. _____

Sheet ____ of ____

Station No.	Node Name	DESTA ID	Node Address: Area	Node Address: Node No.	Node Address: Server	Server Type	Machine Type *	Device List	User Name	User Telephone No.	Office Location	Total Cable Length Station to Station	Total Cable Length / Prev. Total Ft.	No. Connector Junctions	Total No. Connector Junctions / Prev. Total No.	Terminator

* Hardware address located on Device List for this Station

Max. 185 M (606.9 Ft.)

Max. 60

MR–3567–RA

Figure B–12 Blank Segment (Chain) Worksheet

DEVICE LIST

Date *08–15–86*

Ann Smith
Contact Person

123–4566
Telephone Number

R13
Office Location

Segment ID *Charlie*

Station Number *2*

Machine Type *VAXmate*

Hardware Address *00–08–00–0000*

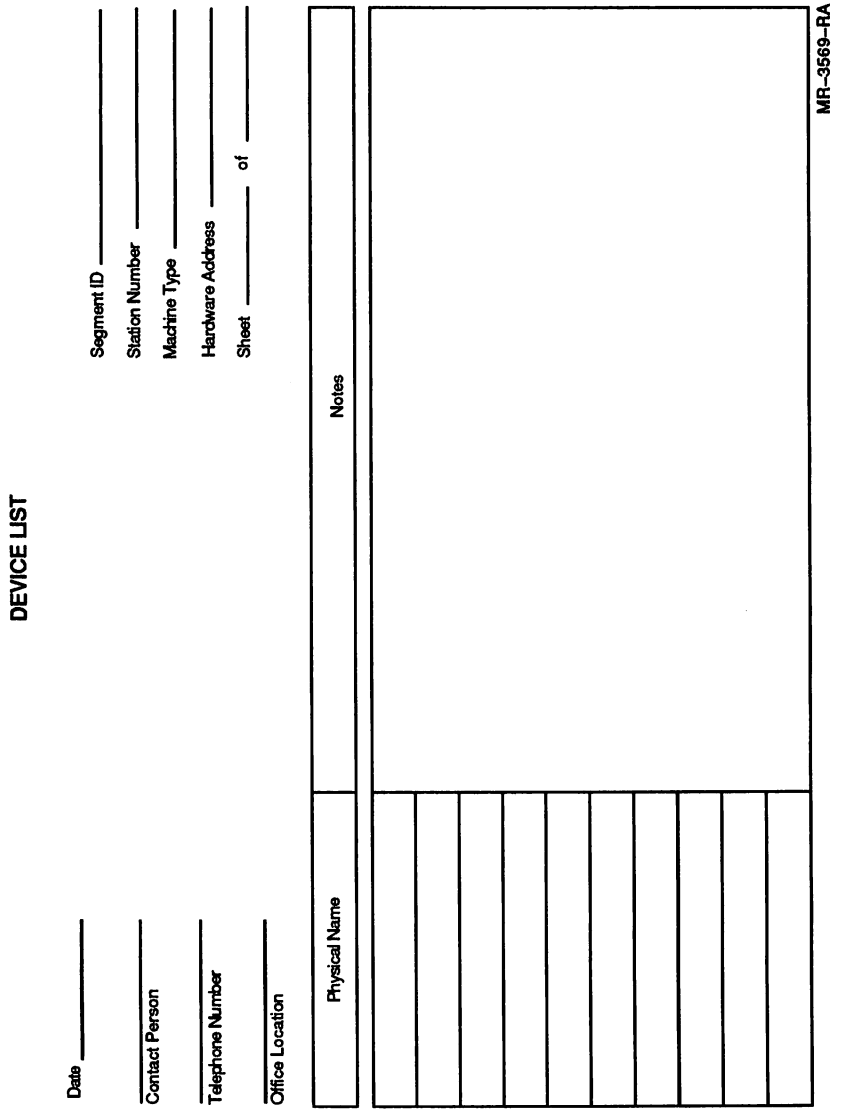
Sheet *1* of *1*

Physical Name	Notes
Expansion Box	
LA75 Printer	
2 Mb Memory	

MR–3568–RA

Figure B–13 Completed Device List

Figure B–14 Blank Device List



Index

H

I

L

M

N

P

S

T

U

V

W

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Completeness (enough information)	☐	☐	☐	☐
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Organization (structure of subject matter)	☐	☐	☐	☐
Figures (useful)	☐	☐	☐	☐
Examples (useful)	☐	☐	☐	☐
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