

# PATHWORKS for Macintosh

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digital

DECnet for Macintosh User's Guide

Order Number: AA-PBG4B-TE

# **PATHWORKS for Macintosh**

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## **DECnet for Macintosh User's Guide**

Order Number AA-PBG4B-TE

**January 1991**

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**digital equipment corporation  
maynard, massachusetts**

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# About This Guide

## Objectives

This manual describes how you can use your Macintosh computer to participate in DECnet computer networks.

DECnet software for Macintosh computers allows you to do all of the following on any computer connected to DECnet networks:

- View and manipulate all network files and directories as files and folders on your Macintosh
- Access, list, delete, rename, and print files
- Back up and restore Macintosh files
- Initiate remote terminal sessions

You should be familiar with documents that describe the following:

- Operating a Macintosh (launching applications, double-clicking, dragging, selecting items, and pulling down lists of menus and folders)

If you are not familiar with operating a Macintosh, be sure to read through the instructional materials and use the Guided Tour provided by Apple Computer in your Macintosh distribution disk.

- Using Macintosh applications (launching applications, using menus and dialogs, using folders, and quitting)
- Using network services provided by DECnet networks

If you are not familiar with these network basics, be sure to read through this manual before using the software. You can find further information in the following documents:

- *Introducing the Apple-Digital Network Environment*
- *PATHWORKS for Macintosh Network Services User's Guide*

## Organization

The following table is a guide to the contents of this manual.

Chapter 1	Introduces and describes how to install DECnet software for Macintosh computers.
Chapter 2	Describes how to use NCP (Network Control Program) to configure your Macintosh computer as a DECnet node.
Chapter 3	Explains how to use NetCopy, a utility that provides your Macintosh computer access to files on other computers.
Chapter 4	Explains how to access the files on your Macintosh computer from other DECnet nodes.
Chapter 5	Provides additional details of how different types of files transfer between your Macintosh computer and other DECnet nodes.
Chapter 6	Describes how to back up your Macintosh computer to another DECnet node.
Chapter 7	Provides instructions for configuring a dynamic asynchronous connection to use your DECnet software over telephone lines.
Appendix A	Provides instructions for testing the DECnet connection to your Macintosh computer.
Appendix B	Provides guidelines for configuring a Macintosh node from a VMS system.
Appendix C	Provides instructions for configuring a dedicated serial line (static asynchronous connection).
Appendix D	Provides instructions for resetting the DECnet node address of your Macintosh computer.

## Conventions Used

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Convention	Meaning
black type	In examples of dialog between you and the workstation, what is displayed on the screen is printed in black.
teal blue type	In examples of dialog between you and the workstation, teal blue type indicates what you enter from the keyboard.
case	You can type commands and parameters either 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 Return or Enter, as appropriate.
<span style="border: 1px solid black; padding: 2px;">Command/Period</span>	Hold down the Command key on the Macintosh keyboard, and press the Period key. This simultaneous key sequence is referred to as Command-period in some Macintosh documentation.
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.
directory (folder)	The VMS documentation uses the term directory where Macintosh documentation uses the term folder. The terms are used interchangeably in this manual.
[directory.subdirectory]	The VMS format for a directory within a directory is [BOOK.CHAPTER1]; the Macintosh equivalent is :BOOK:CHAPTER1:. For remote specification, DECnet for Macintosh always uses the VMS format.

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# Getting Started

Chapter 1 helps you prepare to install and use DECnet software on your Macintosh. It explains:

- Why you would want to use DECnet software for Macintosh computers
- Basic information about a DECnet network
- How to connect your Macintosh computer to a DECnet network
- How to install DECnet software

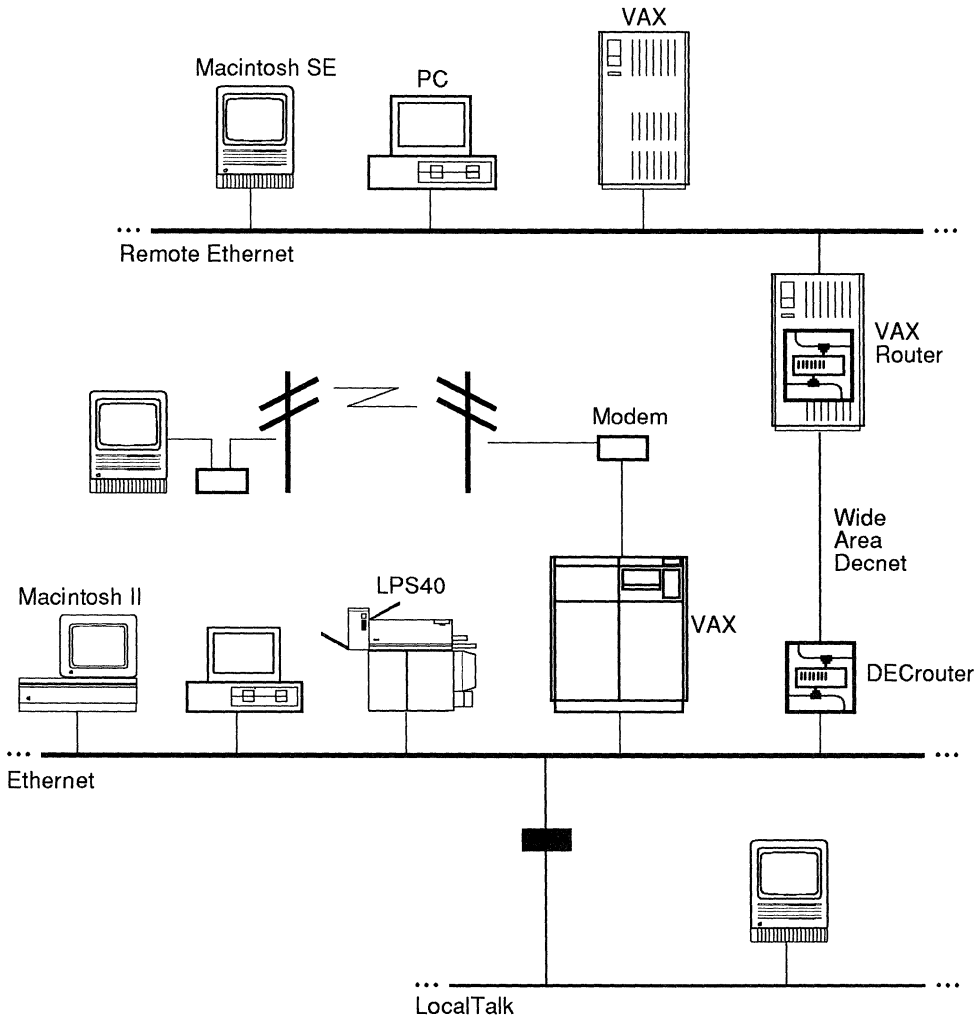
## Why DECnet Software for Macintosh Computers?

As a member of a DECnet network, a Macintosh computer can communicate within a network consisting of more than 64,000 different computers, including:

- All models of Macintosh computers and IBM personal computers that can connect to DECnet networks
- Operating systems that support DECnet software including ULTRIX, VMS, RSTS, RT-11, and RSX
- Every computer system made by Digital Equipment Corporation, including VAX computers and PDP-11 computers

The following diagram shows Macintosh computers connected to other computers and operating systems that participate in a DECnet network.

Figure 1-1 DECnet Computers in a Network



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Connecting to any other computer in a DECnet network is both quick and easy. When your Macintosh computer runs DECnet software, it can:

- Connect to any other system or computer that can connect to DECnet
- Access and manipulate files on the other systems by using Macintosh files and folders

- Send and receive electronic mail from windows on your Macintosh computer
- Use terminal services to connect to other computers from separate Macintosh windows

The DECnet functions available to your Macintosh computer depend directly upon the configuration of the entire network.

For example, Digital's implementation of DECnet software on DOS systems is limited due to the single-user nature of the operating system and restricts many of the server capabilities.

To understand how DECnet for Macintosh works, you must be familiar with how DECnet networks work. If you have never used network software before, you should read "Network Basics" in *PATHWORKS for Macintosh Network Services User's Guide*. If you need a quick review, read other portions of that book.

## About DECnet

DECnet is Digital's networking architecture that enables a large number of computers and operating systems to communicate with each other. DECnet for Macintosh software supports DECnet Phase IV.

DECnet for Macintosh software enables Macintosh computers to participate in a DECnet network, and makes DECnet nodes and services accessible to your Macintosh computer. DECnet services include remote file access, electronic mail, terminal services, and task-to-task communications.

DECnet transmission speeds depend upon hardware limitations and specific network configurations.

In DECnet networks, each VAX computer or connecting point on the network is a **node**. Every system in a DECnet network, including your Macintosh computer, has a unique name called a **node name** and unique number called a **node address**. Within DECnet, these node names begin with a letter and contain up to six letters and numbers.



*Examples of node names are PARIS, WESTON, TOKYO, VAX4, IBMPC, and X25GWY.*

Information is transferred between the nodes over communication links including Ethernet and serial RS-232C connections. DECnet nodes are given unique numbers and are grouped into areas.

DECnet nodes can be either **end nodes** or **router nodes**. As you use DECnet for Macintosh software, routing is transparent to you. As an end node, your Macintosh computer can send and receive information from any computer that can connect to a DECnet network.

## Connecting Your Macintosh Computer to DECnet

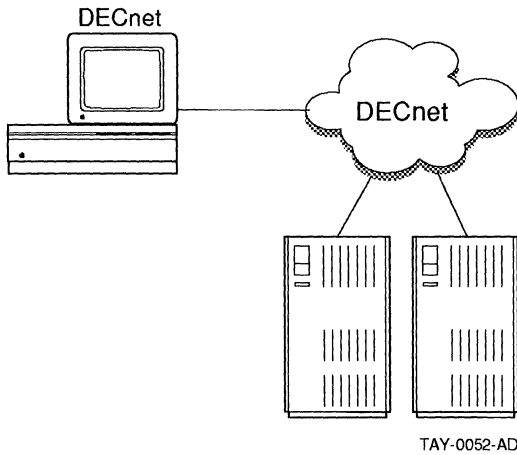
When installed, DECnet for Macintosh software enables a Macintosh computer to act as a DECnet end node that is capable of sending information to other DECnet systems and receiving information from them.

You can use DECnet for Macintosh software to connect to a wide variety of computer systems running different implementations of Digital's Network Architecture (DNA). To do so, you or your system administrator can connect your Macintosh to a DECnet network in one of the following ways:

- Ethernet
- Serial (Dynamic or Static Asynchronous)
- AppleTalk

Connecting to DECnet through Ethernet requires the Macintosh computer to have an Ethernet card installed with the proper Ethernet software drivers. An Ethernet connection is shown in Figure 1-2.

**Figure 1-2 Ethernet Connection**



An asynchronous connection is shown in Figure 1-3.

**Figure 1-3 Asynchronous Configuration**

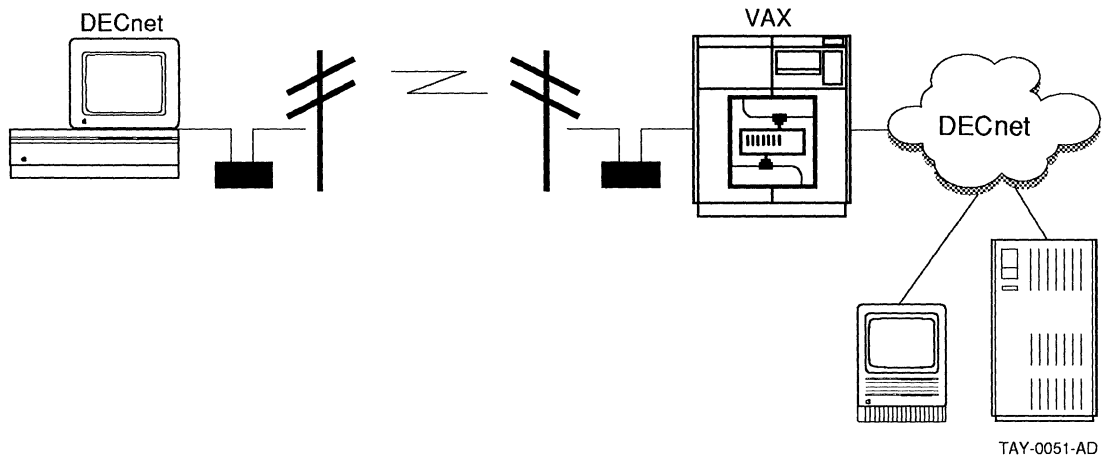


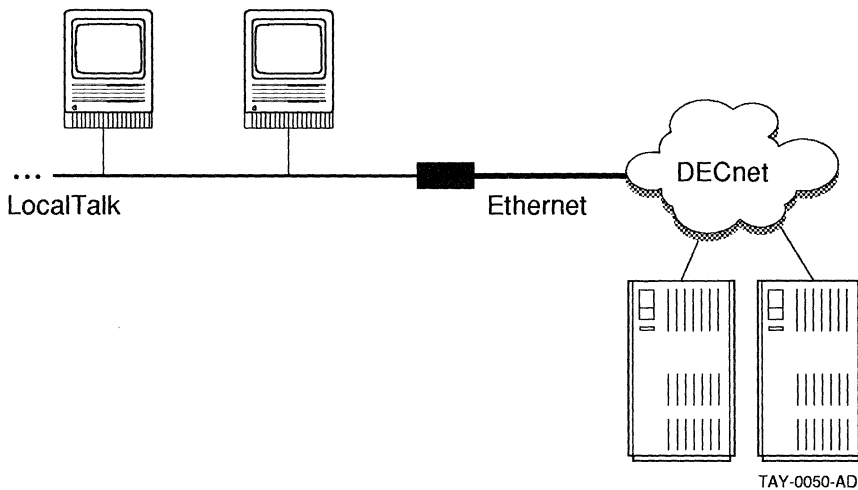
Figure 1-3 shows a typical asynchronous configuration. This configuration uses a telephone line between a Macintosh computer that runs DECnet software and a VAX computer that is a DECnet router. 2400 baud modems and RS-232C cables connect the computers to the telephone line.

For more information on setting up an asynchronous serial connection, see Chapter 7.

Connecting to DECnet software through AppleTalk requires your system to include a **multi-protocol router**. For example, you can use a LocalTalk to Ethernet router with DECnet communication capabilities, such as the Shiva FastPath 4.

A LocalTalk connection is shown in Figure 1-4.

**Figure 1-4 LocalTalk Connection**



For more information on configuring your Macintosh as a DECnet node, see Chapter 2 and Chapter 7.

## Using the DECnet and CTERM Tools

When your Macintosh computer is connected to DECnet software, you can connect to other computers on DECnet networks by using the DECnet and CTERM tools supplied with the DECnet for Macintosh kit. When installed in the communications toolbox of your Macintosh computer, the DECnet and CTERM tools allow you to:

- Open several sessions on other computers—even while running the NetCopy utilities described in Chapter 3.

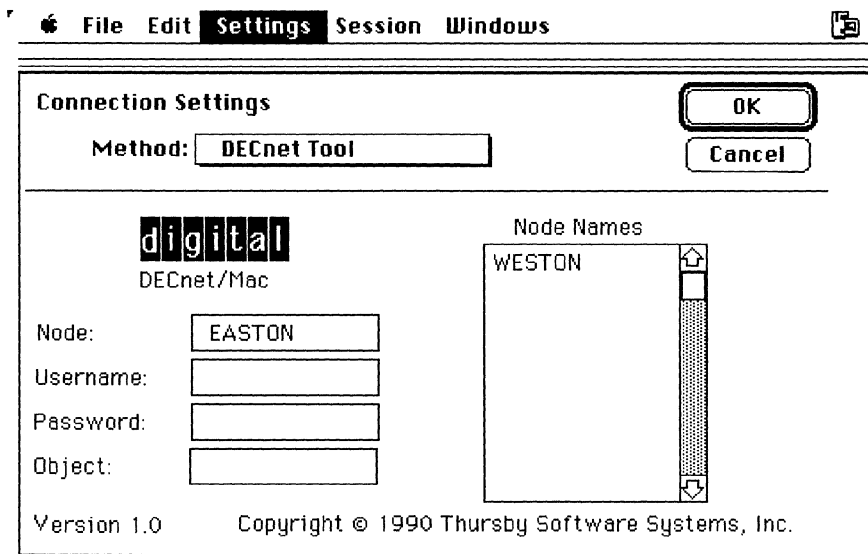
For example, you can open a CTERM session with a VAX computer in one window and use NetCopy with an MS-DOS system in another window.

- Make all connections by using just one physical connection between your Macintosh and the network. For example, the DECnet tool supports a serial line, an AppleTalk connection, or a very high-speed Ethernet connection.

The distribution volume of PATHWORKS for Macintosh software includes a version of MacTerminal software, a multi-window terminal emulator from Apple Computer that can be used with the CTERM tool in the DECnet for Macintosh kit.

MacTerminal supports Local (LAN) and wide area networks (WAN) using Digital's CTERM protocols. Figure 1-5 shows the CTERM tool selected for a MacTerminal connection.

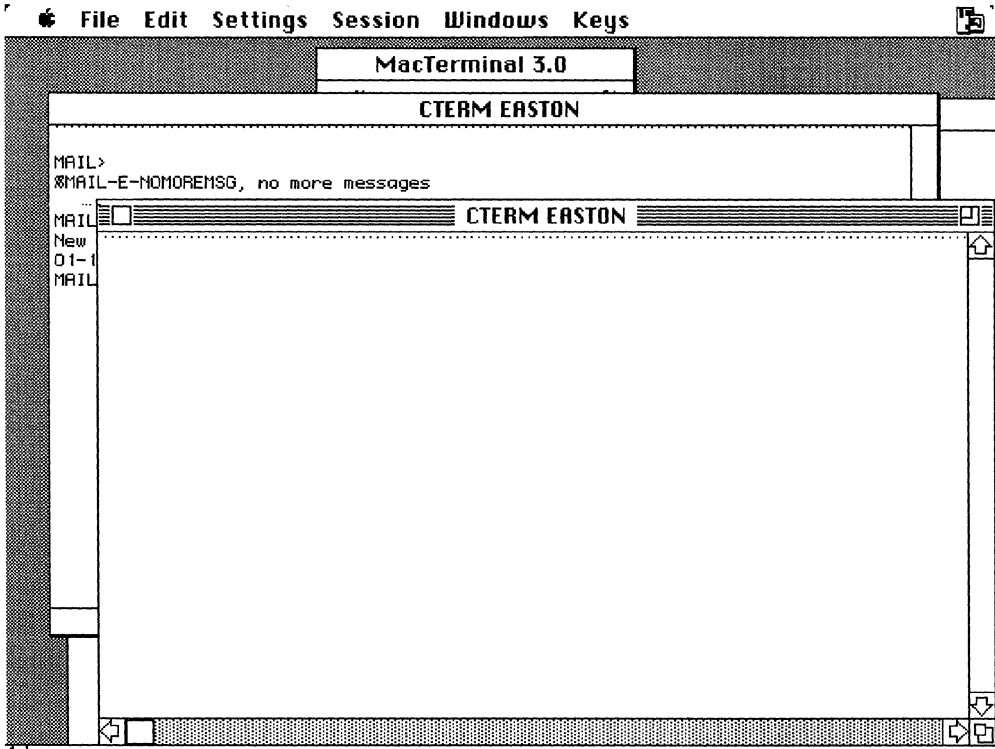
Figure 1-5 CTERM Tool in MacTerminal



With MacTerminal you can also have CTERM and standard serial sessions running simultaneously over different lines.

Figure 1-6 shows two CTERM sessions running simultaneously in MacTerminal windows.

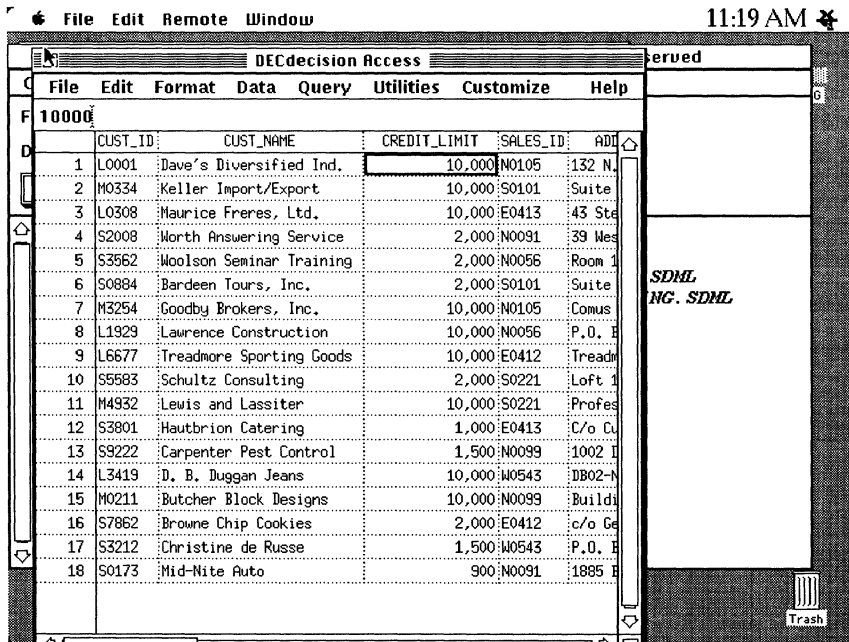
Figure 1-6 CTERM Sessions in MacTerminal Windows



DECnet for Macintosh also supplies a DECnet tool designed to work with the MacX software and other software. The MacX software is the X window system server for the Macintosh computer. The MacX software is included in the PATHWORKS for Macintosh product.

Figure 1-7 shows the DECnet tool making a connection to DECwindows application through the MacX software.

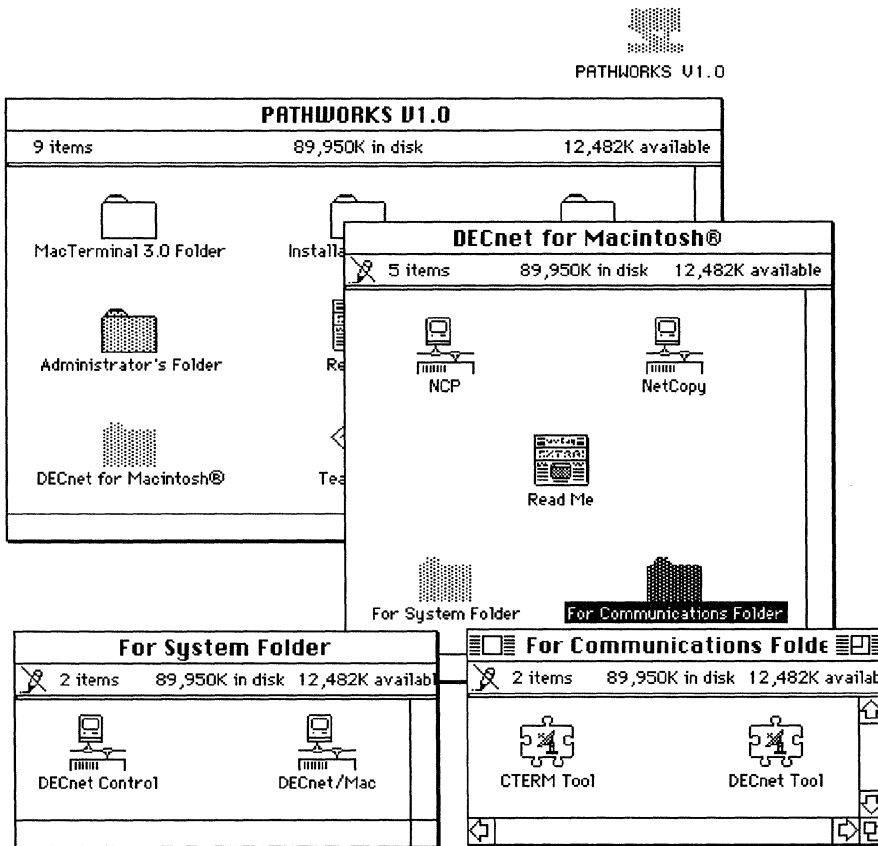
Figure 1-7 DECnet Tool Connection with MacX Software



## Installing DECnet Software

The DECnet for Macintosh installation involves copying and dragging the icons from the distribution disk to the appropriate places on your Macintosh disk. Figure 1-8 shows the folders, which contain DECnet for Macintosh **inits**, control panel devices, tools, and applications that reside on your local computer. You must install these components shown in Figure 1-8 by dragging them to your Macintosh disk from the VAXshare volume.

**Figure 1-8 DECnet for Macintosh Components**



Before you install DECnet for Macintosh, delete any files in the System folder of your hard disk named:

- TSSnet
- Net Control
- Network Data

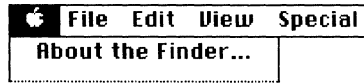
Delete any files on your hard disk named:

- NCP
- NetCopy

These files can be anywhere on your system. Use the Find File desk accessory to locate the files.

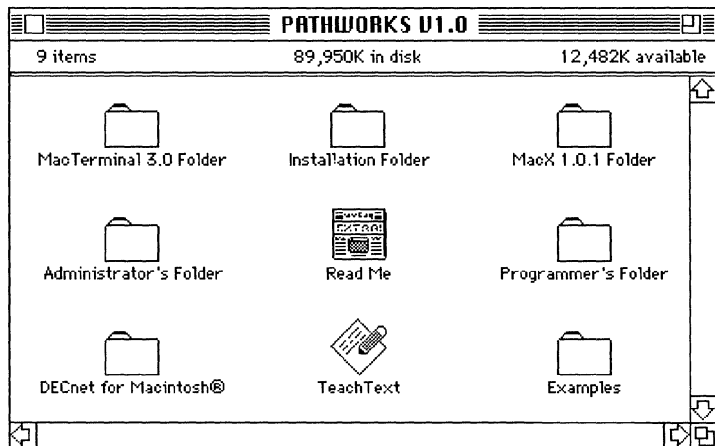
To install DECnet for Macintosh:

- 1 Select About the Finder from the Apple menu.



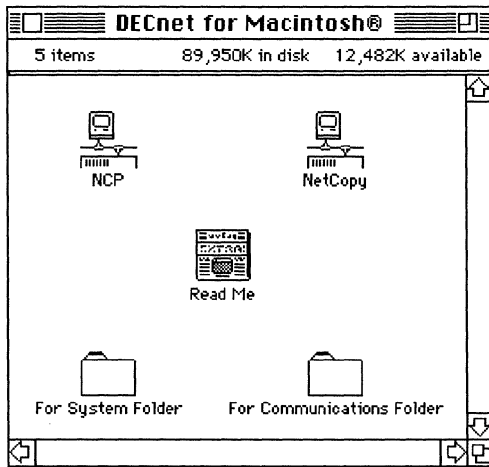
Determine that you have the correct version of the Macintosh software installed. DECnet for Macintosh software requires Macintosh System Version 6.0.4 or greater.

- 2 Mount the distribution volume from the Chooser.  
This volume, named PATHWORKS for Macintosh V1.0, must be installed on a VAXshare server. Your system administrator knows where you can find this volume and whatever password information you need.
- 3 Open the distribution volume.



- 4 Double click the DECnet for Macintosh folder on that volume.





- 5 Double click the folder named For System Folder.
- 6 Drag the entire contents of this folder to the System folder on your hard disk.  
Close the folder named For System Folder on the distribution volume.
- 7 Double click the folder named For Communications Folder.
- 8 Drag the entire contents of this folder to the Communications Folder (found within the system folder when the Communications Toolbox is installed) on your hard disk.

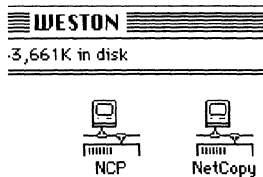
If the Communications Toolbox software is not installed on your Macintosh computer, you can copy the contents of this folder to your Macintosh hard disk at this time. When you install the Communications Toolbox on your Macintosh computer, you can then move these icons to the Communications Folder created during the toolbox installation.

Depending on your configuration, you can use any combination of the following:

- CTERM tool allows MacTerminal 3.0 and other terminal emulation applications to connect other systems in DECnet networks
- DECnet tool is a general-purpose tool that allows applications such as the MacX software to connect to DECnet networks

Close the folder named For Communications Folder on the distribution volume.

- 9 Select the NCP (Network Control Program) and NetCopy icons on the VAXshare server volume or floppy disk.



You can install these icons anywhere on your hard disk.

- 10 Drag the icons to your hard disk.

- 11 Restart your system.

The installation takes effect as soon as you have configured DECnet for Macintosh according to the steps in Chapter 2.



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## Connecting Your Macintosh to DECnet



Chapter 2 describes how to configure your Macintosh computer so that you can connect to a DECnet network.

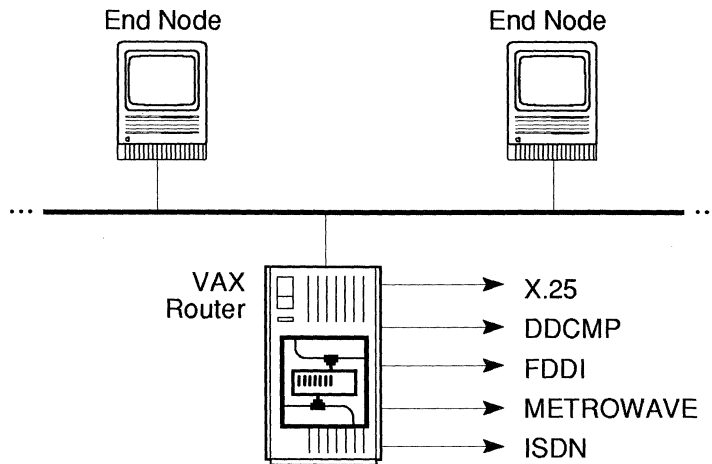
When the PATHWORKS for Macintosh software is installed, you can:

- Configure DECnet for Macintosh software by using a Macintosh version of the Network Control Program (NCP).
- Verify that DECnet software is active on your Macintosh computer.

### Configuring DECnet Software for Macintosh Computers

This section shows you how to configure your Macintosh computer as a DECnet end node by using the Network Control Program.

NCP is an application that allows you to configure your DECnet settings.



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To configure your Macintosh computer as a DECnet node:

- 1 Launch NCP.

*Hint: You can double-click on an icon to launch it.*

- 2 Enter the name and address of your node to the NCP.
- 3 Set up password protection for security.
- 4 Set the line speed.
- 5 Make your node known to other nodes.

The instructions in the following sections describe how to complete each of these steps. When you have completed all steps, your Macintosh computer is a fully configured **DECnet end node**.

### **Giving Your Node an Assigned Name and Address**

To connect to the network, you need to give your Macintosh computer a DECnet node name and address. Obtain this information from the network administrator, who assigns DECnet names and addresses for your site.

To give your node its name and address:

- 1 Verify that you have the network drivers. You can see which drivers are installed on your Macintosh when you select the Network icon in the Control Panel.

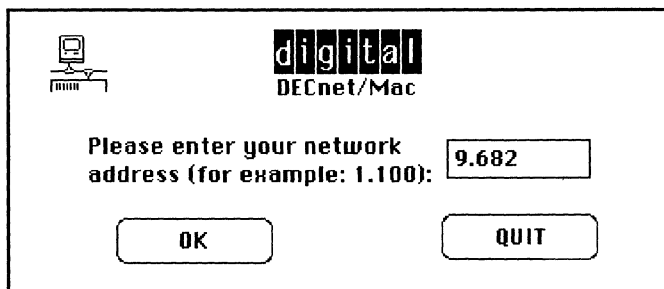
If you are using Ethernet, verify that you have installed an Ethernet driver.

If you have not already done so, install the Ethernet driver at this time. Then continue with Step 2.

- 2 Obtain an assigned DECnet node address and node name from your network administrator.

- 3 Launch NCP.

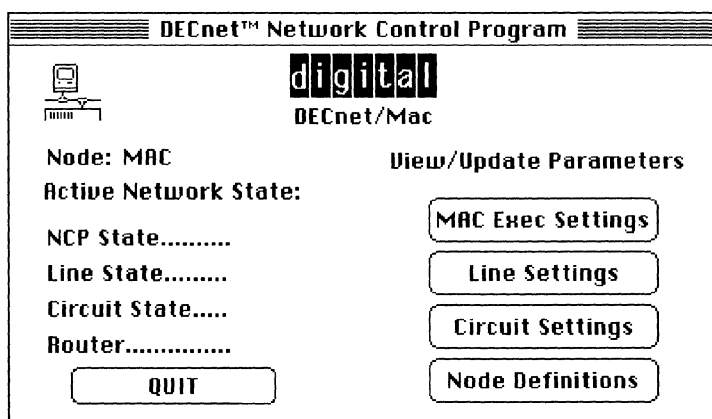
If this is the first time you are installing DECnet for Macintosh software, you see the following dialog.



This dialog is displayed only when you first configure your Macintosh computer as a DECnet node or when the configuration data file is absent.

- 4 Enter your **assigned** node address in response to the NCP prompt for a node number.

The NCP Update/View Parameters Window is displayed.



- 5 Click on the MAC Exec Settings button.  
The DECnet/Mac Executer Characteristics window is displayed.

DECnet/Mac Executer Characteristics

-- Node Name --      -- Node Address --

MAC      Area: 9    Node: 682

Current State

OFF     Shutdown     Restricted     ON

Buffers

Count: 20

Size: 576

Change

Security

User:

Change

DECnet Startup State

OFF     ON

Update    Cancel

The parameters that control the operation of the DECnet node are called **executer parameters**. You must use the fields in the MAC Exec Settings window to establish these values.

Until you enter a name for your Macintosh node, the name MAC is displayed.

- 6 Replace the entry in the Node Name field by entering the node name assigned to your Macintosh computer by the network administrator.
- 7 Verify that the ON button is selected in the Current State field.

Normally the ON button is selected for this field. (Clicking the OFF button disables DECnet for Macintosh software until you either restart your system or you manually turn on the DECnet software again.)

- 8 Verify that your node address appears to the right of the node name field.

The node address you entered earlier is displayed in a separate field. If the node address is incorrect, change the address by selecting the Reset Node Address option from the File menu in NCP.

**Update**

- 9 Click the Update button.

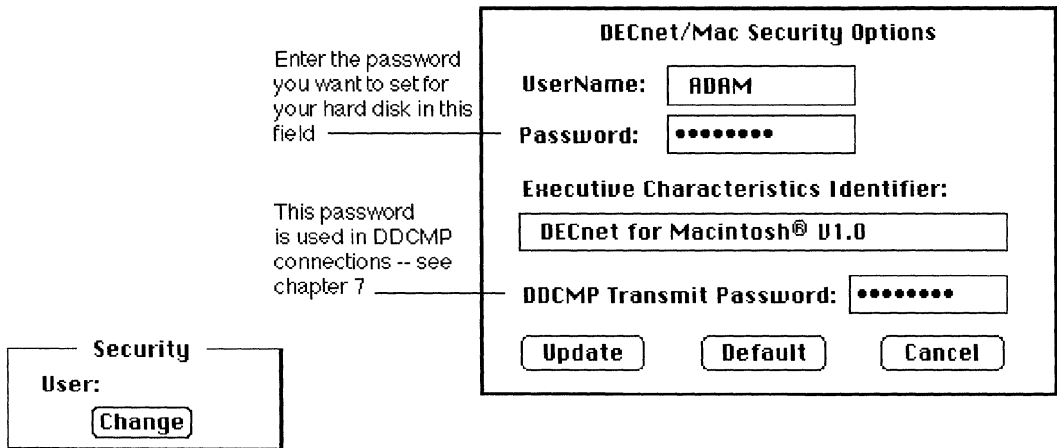
After you leave the Exec Settings window, you can set up security for your DECnet node, as described in the next section, or you can exit NCP.

## Providing Security

Now provide security for your Macintosh node. The following steps assume that you are at the Executor Characteristics window, so launch NCP if you have not already done so.

To set password protection:

- 1 Click the MAC Exec Settings button.



Under the Security box, you notice that the user name is blank.

- 2 Click the Change button in the Security box.  
You now see the DECnet/Mac Security Options dialog box.
- 3 Enter your user name (most likely your last name).  
Either press Tab to move to the password field, or click on the field.
- 4 Enter your password.



The password is used by DECnet software to determine whether other DECnet nodes can access the files on your Macintosh computer.

For example, if you have specified a username of ADAM, a password of KNOWLDGE, and node name of WESTON for your Macintosh computer, users on other DECnet nodes can access the topmost directory (folder) of the files on your Macintosh computer by issuing the command.

```
$ DIR WESTON"ADAM KNOWLDGE"::
```

- 5 Click on the Update button.

For the present, ignore the other fields in this window.

You are now back at the Executor Characteristics dialog box.

Note that the DECnet Startup State radio buttons are now set to ON. This setting is normal.

- 6 Click the Update button to complete your changes and return to the Update/View parameters window.

## Setting the Line Speed

DECnet for Macintosh software comes with the line speed set to 9600. For each type of connection, the Line Speed window displays information about:

- Line Speed
- Port used (Ethernet, Modem, or AppleTalk)
- State of the DECnet software (ON or OFF)

The following steps assume that you are at the View/Update parameters window, so launch NCP if you have not already done so.

Before you perform these steps, you need to know the line speed and port that DECnet for Macintosh software is using. Your system administrator knows this information.

To change the line speed setting:

- 1 Click on the Line Settings button.  
You now see the DECnet/Mac Line Settings window.
- 2 Set the line speed according to the configuration you are using:
  - If you are using an Ethernet configuration, click on the Ethernet button.

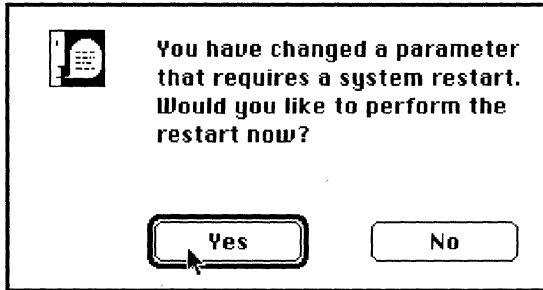
**DECnet/Mac Line Settings**

State:  ON Port: Ethernet

**Line Speed Selection:**

<input type="radio"/> 300	<input type="radio"/> 7200
<input type="radio"/> 1200	<input type="radio"/> 9600
<input type="radio"/> 1800	<input type="radio"/> 19200
<input type="radio"/> 2400	<input type="radio"/> 57600
<input type="radio"/> 3600	<input type="radio"/> AppleTalk
<input type="radio"/> 4800	<input checked="" type="radio"/> Ethernet

- If you are using DECnet for Macintosh software over an asynchronous serial connection, click the line-speed button to match the speed of the modem.
  - If you are using DECnet for Macintosh over LocalTalk with a multi-protocol router (such as Shiva FastPath 4), click the AppleTalk button.
- 3 Click the Update button.  
For the time being, do not change the Circuit Settings and other choices in the NCP Executor Characteristics window; they are already set.
  - 4 Click the Quit button.
  - 5 Restart your Macintosh to cause the change of parameters to take effect when you see this dialog:



You are now ready to verify that DECnet is active on your Macintosh computer.

## Verifying that DECnet Is Active

Now that you have installed DECnet for Macintosh, you can easily see whether DECnet software is active from the **Control Panel** of your Macintosh computer.

DECnet Control is called a **Cdev** because when you install it in your System Folder and restart your Macintosh computer, its icon is visible in the scrolling display of icons that you see when you select the Control Panel.

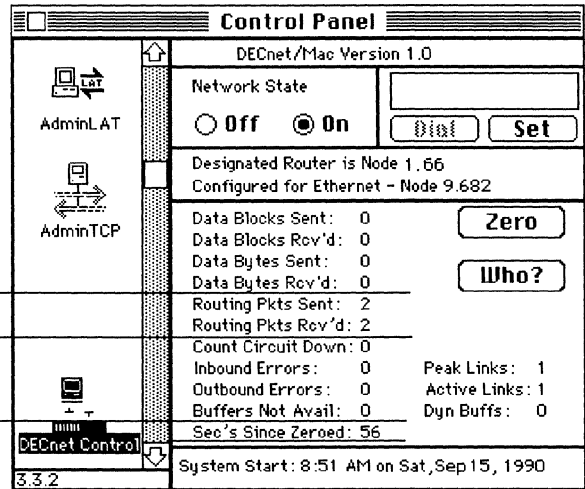
This control panel device does the following:

- Allows you to verify whether DECnet software is enabled and running on your Macintosh
- Displays useful information about the DECnet connection
- Allows you to enable and disable the state of your network

To verify that DECnet software is active:

- 1 Select Control Panel from the Apple menu.
- 2 Click the DECnet Control icon (on the scrolling display).  
The DECnet Control Panel is displayed.

Look here  
 to verify that  
 your Macintosh  
 computer is both  
 sending and  
 receiving packets  
 from the network  
 to check how  
 many seconds  
 since you last set  
 the counters to  
 zero



- 3 Click Zero.  
 When the counters are reset to zero, it is easier for you to see if the counters increment.
- 4 Look at the Routing Packets Sent counter.
- 5 If both counters increment, your Macintosh is sending and receiving routing packets from the network.
- 6 In some cases, it is normal for only the Routing Packets Sent counter to increment. For example, if your network does not include a DECnet router, the Routing Packets Rcv'd counter does not increment.
- 7 In some cases, it is normal for DECnet not to be active. For example, if you are using modem connections and have not called another computer, DECnet is not active until after the modem connection is established.  
 However, for Ethernet and LocalTalk connections, you can verify that your DECnet connection is active by noting if **packets** are sent.

For more information about testing your configuration from the DECnet Control panel, see Appendix A.

## Recognizing Other Nodes from Your Macintosh Node

You can connect to any DECnet node that is recognized by your Macintosh node.

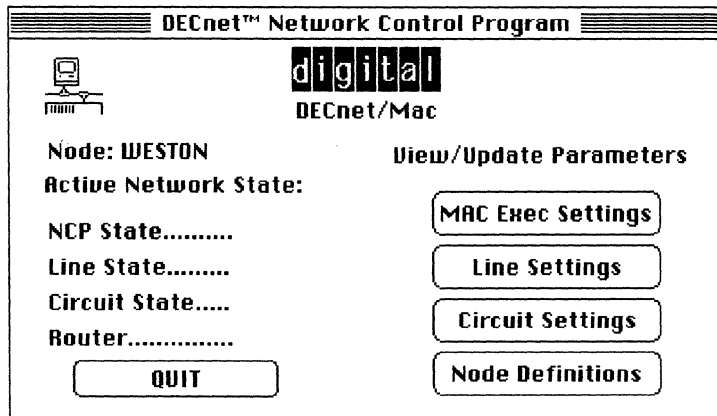
To recognize additional nodes and add them to your Node List, you can:

- Ask for this information over the network.
- Enter a name and node number that you know

To add additional nodes:

- 1 Launch NCP.
- 2 Click on the Node Definitions button.

If DECnet for Macintosh software has found an adjacent DECnet Router node, its node number is also displayed. For example, if node WESTON has found router 1.66, the screen displays:



**Note** The screen displays a series of blank characters:

-----

- When DECnet for Macintosh software has not exchanged the correct information with a DECnet routing node.
- When there is no routing node on the Ethernet.

*In either case, DECnet software can still be used to copy files with all the nonrouting nodes on your Ethernet.*

- 3 Verify that the node name and node address of your Macintosh computer are correct.

If they are incorrect, repeat the steps in the previous sections in this chapter. Also see Appendix A for more information on testing your DECnet connection.

If they are correct, your node is configured.

- 4 Click the Mac Exec Settings button.

The name and address of your Macintosh node is displayed.

The next sections describe how you can then ask about other DECnet nodes or enter the name and number of nodes to be recognized by your Macintosh node.

### **Asking the Name or Number of a Remote DECnet Node**

Asking about other nodes is the easy way to add nodes to the network database of your Macintosh computer.

To ask another DECnet system for the name or number of a remote node:

- 1 Launch NCP.
- 2 Click the Node Definitions button from the View/Update parameters window.
- 3 Select a node from the list.

If this node knows about the node whose information you want to enter, you can ask for the name and node number instead of having to look it up and enter the information.

**Ask**

- 4 Click the Ask button.  
Your Macintosh computer indicates that it is trying to connect to a remote system.
- 5 A dialog box is displayed.  
Enter either the name (in this example, PANAMA) or the area number of the node you want to inquire about.
- 6 Click the Inquire button.  
If the remote system knows about the node, you see the node name and address filled in, and the node name is automatically added to the Node List:

**DECnet/Mac Node Name Management**

Area Number:

Node Number:

Node Name:

Default UserID:

Default Password:

Default Device:

Default Directory:

Allow proxy access from:

Allow proxy access from:

No passwords required

EASTON  
 WESTON  
 PANAMA

You can then set any defaults for the node that you are about to add to your network database.

- You can enable proxy access from your user account or enable proxy access from additional user accounts. Check the proxy access boxes if you want to be able to access the files on your Macintosh computer without typing an access control string consisting of a user name and password. See Chapter 6 for examples of proxy access from remote systems.

You use proxy access to the files on your Macintosh computer from your accounts on other DECnet systems. With proxy access, users of other systems do not have to store a username-password combination in command procedure files.

See Chapter 6 for examples of proxy access from remote systems.

- You can allow DECnet users to access your files without passwords.

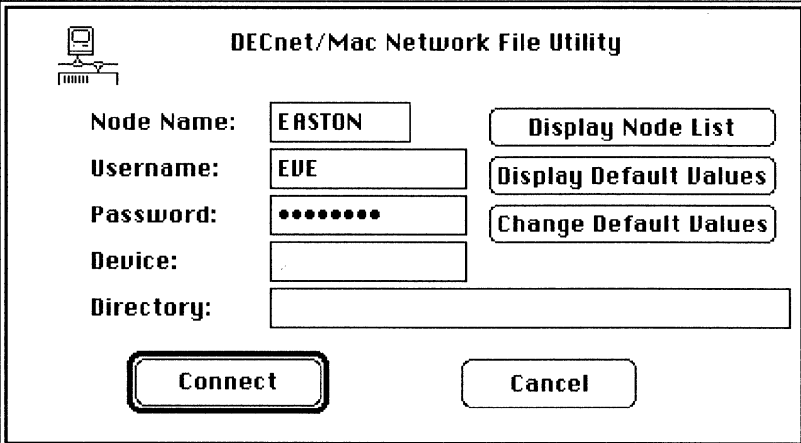
**Note** *Clicking the No Passwords Required box grants complete read, write, execute, and delete access to all files on your Macintosh computer.*

## Entering the Name and Number of a Remote DECnet Node

To enter the name and number of a remote node:

- 1 Launch NCP.
- 2 Click on the Node Definitions button.
- 3 Enter the DECnet node address and node name of a VAX computer on which you have an account. Your system administrator should know this information.

Move through the fields by pressing Tab, and enter the node name and address in the appropriate fields. For example, if the VAX computer that you have an account on has node number 9.6 and is named EASTON, if your username is EVE, and if your password is POWERUSR, then you enter the information shown on the screen:



**DECnet/Mac Network File Utility**

Node Name:

Username:

Password:

Device:

Directory:

When you enter your password, the entry is not visible. Instead you see a series of dots.

If you want to connect to another device or directory to which you have access, enter the information in either or both of those fields.



**Trying To Connect To Remote Object**

**... Please Wait**



For example, if you want to access files in the public directory DISK1:[EVE.PUBLIC], you can enter the default device as DISK1 and the default directory as [EVE.PUBLIC].

If you leave the device and directory fields blank, you connect to the topmost directory of the account for the user name that you enter.

Check the Allow Proxy Access box if you want to allow access without passwords from remote DCL commands. You can also enter additional proxy access usernames so that remote users or backup procedures do not have to type the password.

If you checked the box for username ADAM, the following DCL command accesses your Macintosh files:

```
$ DIR WESTON: :
```

If you check the No Password Required box, you indicate that any user on the network can access all of the files on your Macintosh computer. The No Password option indicates that any user on the remote computer can read, copy, write, and delete any file on the local Macintosh computer. Some Macintosh computers that contain public information may be set up with the No Password option.

- 4 Click the Add button.  
The NCP State should now read "ON". Line state and Circuit state should read "RUNNING".  
You can add additional nodes at this time by repeating the steps in this section.
- 5 Click the Finished button. Click the Quit button in the main NCP dialog box.

---

## Accessing Network Files from Your Macintosh



Chapter 3 describes the ways you can access and manipulate network files on your Macintosh computer.

DECnet for Macintosh software makes it easy to access files anywhere on the network from your Macintosh computer by using the NetCopy Utility.

NetCopy allows you to access, copy, and print either single files or groups of files anywhere on the network directly from your Macintosh computer.

For either single files or groups of files in the network, you can:

- Display (type) remote text files at your Macintosh computer
- Obtain directory listings from remote computers
- Print remote text or PostScript files on the printer connected to your Macintosh computer
- Copy files
- Submit command files for remote execution
- Rename, delete, and execute remote files
- Obtain dump displays of remote files in hexadecimal format

For more information on transferring files to and from your Macintosh computer, see Chapter 5.

The sections in this chapter describe how to:

- Connect to a remote system
- Use the Network File Transfer Window
- Disconnect from a remote system

## Connecting to a Remote System

This section describes how to start NetCopy. Later sections describe how to use NetCopy.

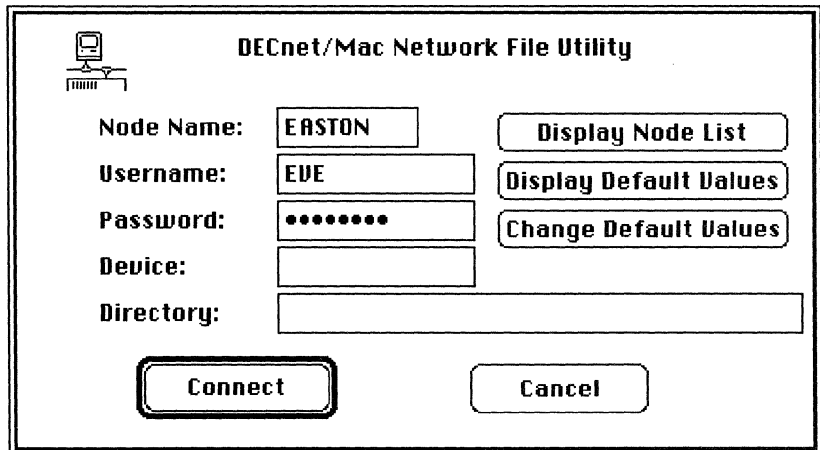


**Note** Do not run NCP while running NetCopy.

To connect to a remote system:

- 1 Launch NetCopy.

The Network File Utility dialog box is displayed.



The dialog box is titled "DECnet/Mac Network File Utility" and features a small computer icon in the top left corner. It contains the following fields and buttons:

Node Name:	<input type="text" value="EASTON"/>	<input type="button" value="Display Node List"/>
Username:	<input type="text" value="EVE"/>	<input type="button" value="Display Default Values"/>
Password:	<input type="password" value="••••••••"/>	<input type="button" value="Change Default Values"/>
Device:	<input type="text"/>	
Directory:	<input type="text"/>	
<input type="button" value="Connect"/>		<input type="button" value="Cancel"/>

- 2 Click the Display Node List button.

The node list for the DECnet for Macintosh File Utility is displayed.

- 3 Select the node you want to connect to from the list on the right. Then click Select.

Here you see the default information for the selected node. If you have previously stored a default username and password, that information is also recalled.

**Note** The password is represented by a series of eight dots, for security reasons. The number of dots represents the length only

*while you first enter the password information and not when you display the password field.*

**4** Make the connection.

The simplest way to connect is to change specific fields first, and then click the Connect button.

There are two ways you can connect to a remote system:

- As a registered user

To connect as a registered user, you must have an account and a password on the system to which you are connecting. Your system administrator should help you register on a system to which you can connect.

**Username:**   
**Password:**

- As a guest

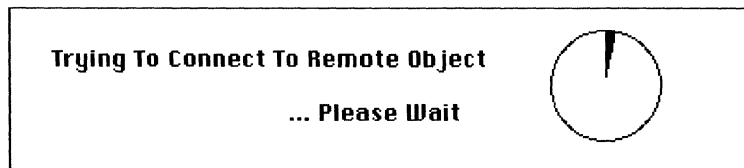
To connect as a guest, you should know the name of a public directory to which you have permission to connect. Your system administrator should know this information.

**Device:**   
**Directory:**

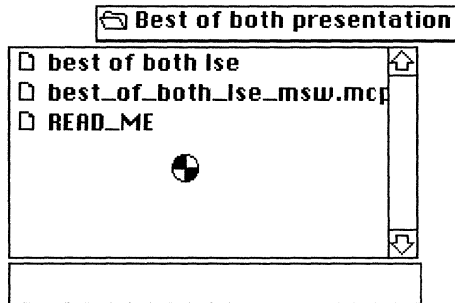
In either case, you can use the default information that was entered for the remote node, or you can change it prior to connecting.

**Hint** *The colon and bracket characters are optional.*

After you click the Connect button, the following window pops up and indicates that the connection to the remote node is pending.



Normally you should have to wait only a few seconds. The amount of time you wait depends on the amount of activity on the network and how heavily loaded the other node is. If the connection is successful, the dialog box disappears and the beach ball cursor is displayed with the Network File Transfer window again in view.

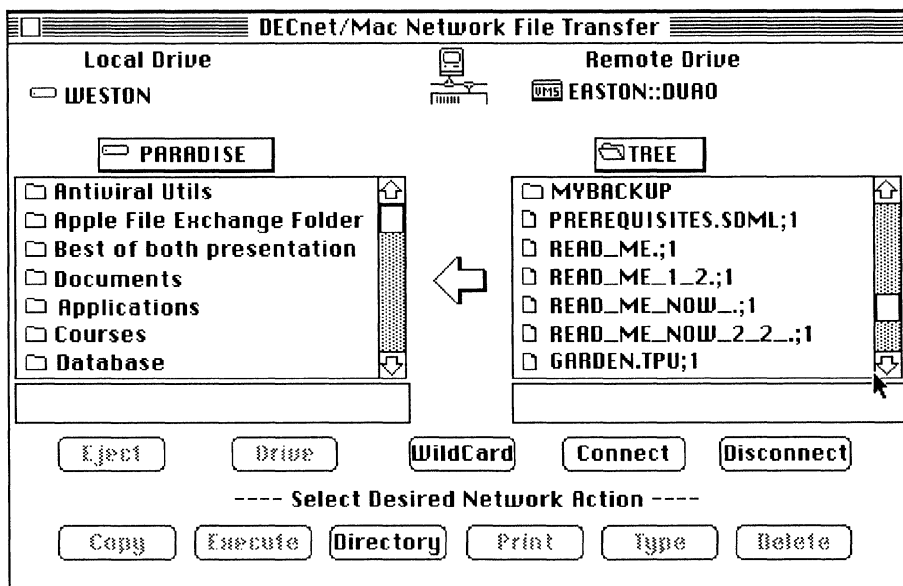


⌘.

- If the connection is delayed, the nearly full pie chart graphic indicates the delay. After 60 seconds, the clock times out and you can either try again or select another node.
- If the connection is delayed, the cursor changes shape to a Command-period symbol. While the Command-period cursor is visible, you can cancel the connection by typing Command-period.

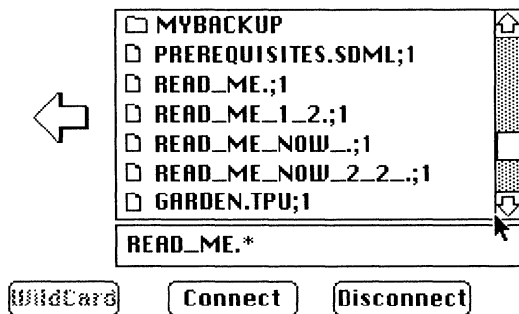
## Using the Network File Transfer Window

After you have successfully connected to another system, you see the main Network File Transfer window:



Within the main window are two scrolling windows, and between the two scrolling windows is an arrow icon. The scrolling window on the left shows you the local files on your Macintosh computer.

The scrolling window on the right shows you the files on a remote DECnet system. You can copy, print, type, delete, and obtain a directory listing of the files and folders, as if all of them are local to your Macintosh, computer by clicking in the window:



The arrow icon shows the direction of the transfer as it points away from the scrolling window currently selected.

The folder and file icons indicate folder and file names.

**Hint** *Double clicking on a folder icon opens its folder (directory).*

If you do not have permission to read a folder, or if the folder name has a period in it, you see an X through the folder icon indicating that you have no direct access to that folder's information through the NetCopy facility.

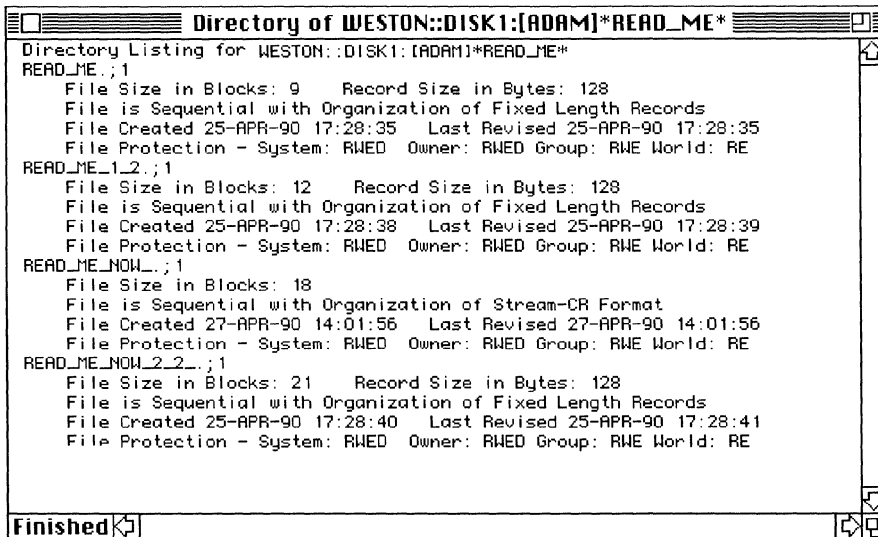
## **Obtaining a Directory of Files**

This section describes how to list a directory of the file or get information about the file to make sure you are accessing the correct file.

To obtain a directory of files on the remote system:

- 1** Click anywhere in the scrolling window on the right (remote file window).
- 2** Click the Directory button.  
NetCopy displays a list of files by name.

When you click the directory button, you receive either a brief or full list, according to what you select from the Options menu. For example, if you select a full listing of the files in `WESTON::DISK1:[ADAM]*READ_ME*`, the following directory is displayed in a separate window:



## Displaying Files

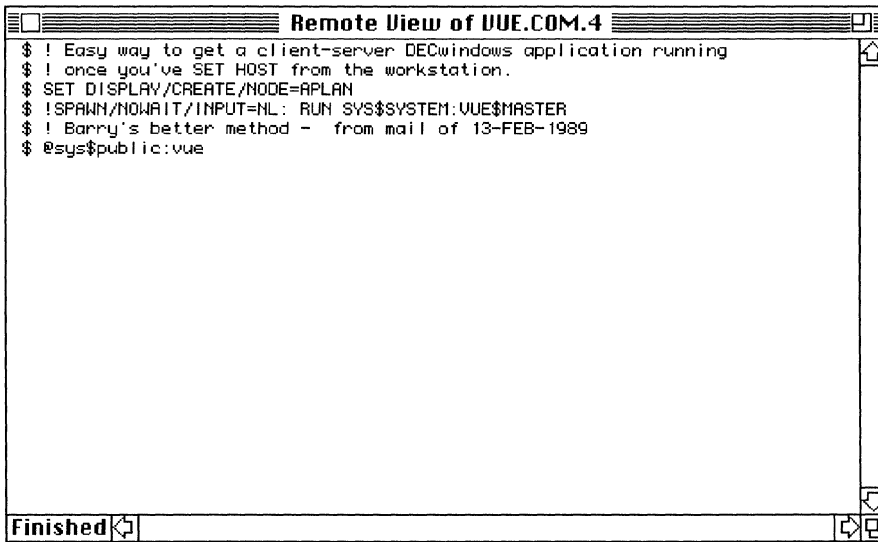
To display a file:

- 1 Select a file by clicking on its name.
- 2 Click the Type button.

*Hint* You can select more than one file at a time by holding down the *Shift* key as you click the name of each file.

For example, if you select the file UUE.COM.4, NetCopy displays the file in a separate window:





When NetCopy finishes displaying the file, the Finished message is displayed in the lower left corner of the window.

Although the number of characters scrolled is limited to 32,000, remote files are scrolled 32,000 characters at a time until they are complete. If the file is greater than 32,000 characters, the following messages are displayed in succession:

> 32K

Finished

The following notes apply to the Type command:

- When you select Tab is Set at X... from the Characteristics menu, a pop-up menu with tab settings is displayed. From this menu, you can change the default tab settings used by the Type command to display remote files.
- NetCopy ignores tabs for local files displayed by using the Type command.
- To close the window, hold down the Command key and type the period key.

- To obtain a dump of a file formatted in hexadecimal characters, choosing Hex Dump Type Files from the Options menu. A hexadecimal dump is useful for detecting characters that are not displayed in text files.

## Copying Files

From the Network File Transfer window, you can copy files in either direction between your Macintosh computer and the remote system.

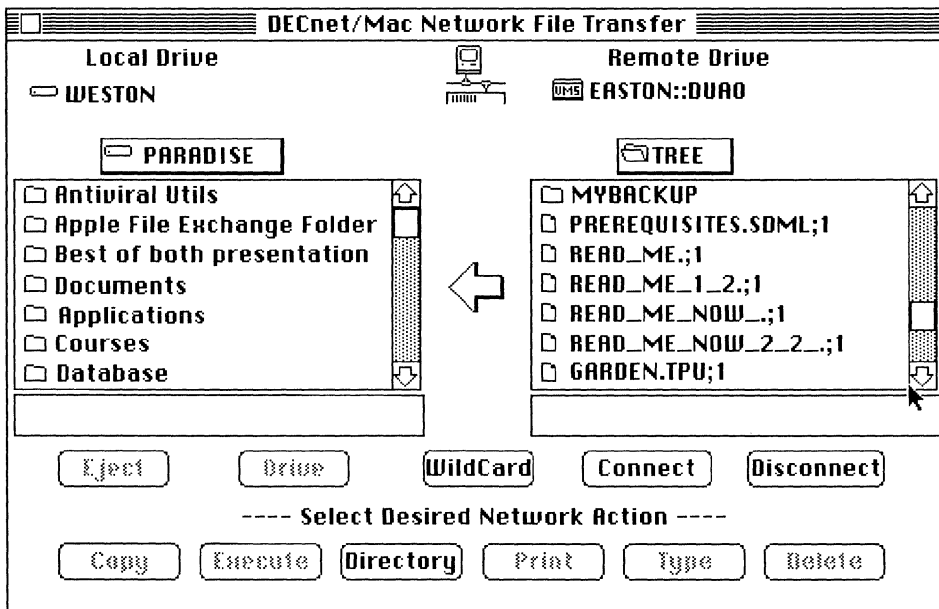
To copy files:

- 1 Click the arrow icon to select the direction of the copy.

*Hint* Click anywhere in the scrolling window of the system you are transferring files from. By clicking in the scrolling window, you cause the arrow to change direction if necessary.

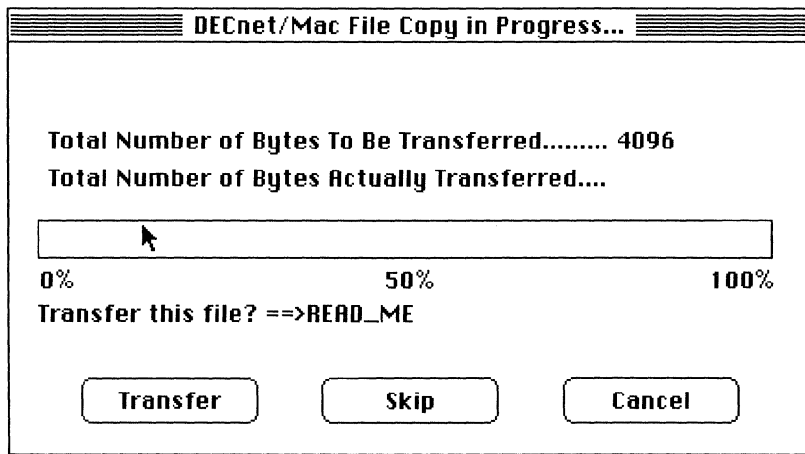
- 2 Select the files you wish to copy.

If you select the Ask Me First option from the Options menu, you see a dialog box before each file is transferred.



- 3 Click the Copy button.

If a dialog box is displayed, click the Transfer button to confirm that you want to copy the files.



You can also choose to skip a file or to cancel from this window. For more information about copying files, see Chapter 5.

## Printing Files

To print selected files on your local printer:

- 1 Select the files in either of the scrolling windows of the NetCopy window.
- 2 Click the Print button.
- 3 When the standard Macintosh print dialog box is displayed, click OK. After clicking the Print button, you can cancel by holding down the Command key and pressing the period key.

For more information on the print services available in PATHWORKS for Macintosh, see the *Network Services User's Guide*.

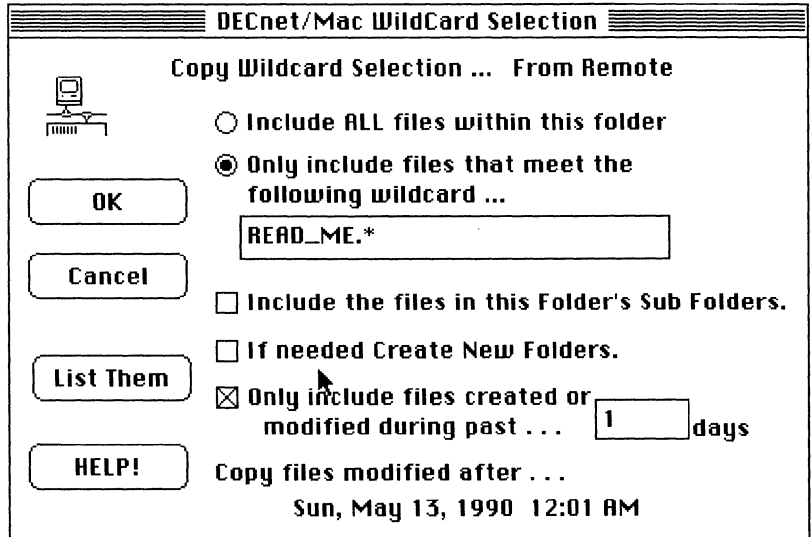
## Using Wildcards

In NetCopy, you can use wildcards to specify different groupings of files. You can enter wildcards:

- From the Network File Transfer window
- In the Wildcard Selection dialog box

From the Network File Transfer window, you can enter wildcards in the field directly below the scrolling window of the system you are copying files to.

The Copy Wildcard Selection dialog box makes wildcards easier to use:



A wildcard, a special character used in searches, stands for all of the characters of a file name or for just some of them.

For example, when you access a VMS system,

- Entering \*.\*;\* selects all files within a given directory.
- Entering \*.PAS selects only the most recent version of files that have the suffix of .PAS.
- Entering \*.%AS finds any file with a three-character suffix ending in AS.

DECnet for Macintosh treats the underscore ( \_ ) character the same as the percent sign ( % ).

Table 3-1 summarizes the meaning of the wildcard special characters.

**Table 3-1 Wildcard Characters in NetCopy**

Character	Meaning
*	Matches one or more characters
%	Matches a single-character
_ (Underscore)	Same as percent

To group files by using wildcards:

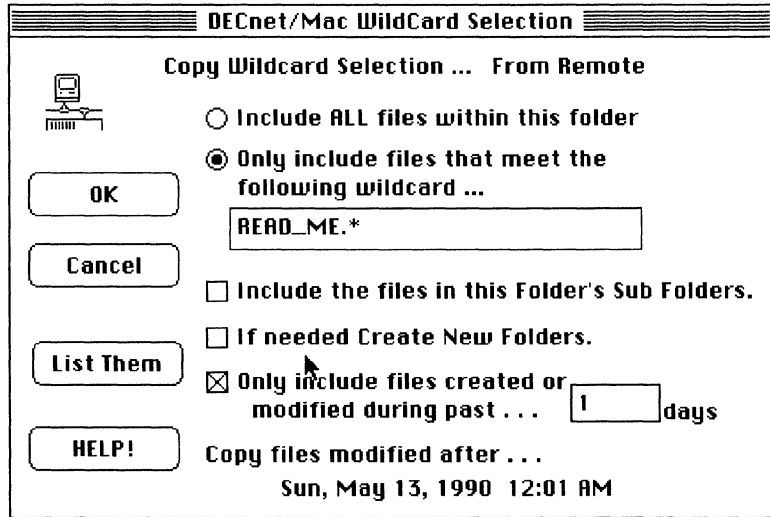
- 1 Click the Arrow icon to select the direction of the copy.  
You can change the wildcard expression from the Netcopy window.

**Note** *The wildcard expression applies to the files on the system that you are copying from.*

- 2 Click the Wildcard button.  
The Wildcard dialog box displays the options.
- 3 Click an option.
- 4 Enter the wildcard expression.

**Hint** *Clicking the Help button displays brief descriptions of the wildcard characters.*

- 5 Click the List Them button.  
If you click the OK button, the wildcard expression is enabled, but no list of files selected by the wildcard expression is displayed.  
If you click the List Them button, NetCopy displays a list of files in a separate window.



When you click the List Them button, you see which files the wildcard selects.

*Hint Use the List Them button to confirm that your expression correctly selects the files. You can avoid mistakes before you perform any action over the network such as copying or deleting files.*

At this point you have several options:

- Click the Cancel button to return to the main control window.  
If the wrong selection is displayed, click the Wildcard button and repeat the previous steps.
- Click OK if you are satisfied with the files grouped by the wildcard.  
The wildcard expression is now displayed in a field below the scrolling window to which you are copying files.  
The Wildcard button flashes on the main control window when wildcard use is enabled.
- Click a button on the Netcopy window to perform the desired network action.

You can now perform the action (such as copy or delete) on the files grouped by the wildcard.

Clicking the OK button does not perform any network action. It enables wildcard operations for the next network action, whether copying, deleting, typing, or executing files.

You must re-enable wildcard use for each time you perform a network action. You can cancel a wildcard that is in effect by:

- Clicking the Wildcard button and then clicking the Cancel button
- Clicking the Arrow icon on the main control window.

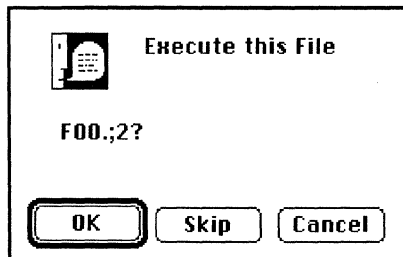
If you specify a wildcard string, it must be in a format supported by the remote system. DECnet for Macintosh nodes support most of the standard VMS wildcard characters.

### Submitting and Executing Files

Using this NetCopy option, you can submit a command file for execution on the remote system as follows:

- 1 Select a command procedure file in the remote window.
- 2 Click the Execute button.

The display depends on which files you apply it to. If you have selected a command file other than a kind NetCopy knows about (for example, in VMS an a file other than a COM file), a dialog box asks you whether you want to continue.



If you have selected local files:

- The button named Submit is displayed
- NetCopy lets you submit these files as command files to a remote system for batch execution.

If you have selected remote command files:

- The button named Execute is displayed
- When you click the Execute button, NetCopy causes the other system to execute them on that same remote system.

After the command procedure executes, you can determine the results of the command procedure on the remote system from the log of the batch job.

For more information on writing, submitting, and executing command procedures, see the documentation of the remote system you are connecting to.

## Changing a Connection

A previous section in Chapter 3, *Connecting to a Remote System*, describes how to launch NetCopy and connect to a remote node.

To change a connection:

- 1 Click the Connect button.

The connection window is displayed to allow you to change your connection.

- 2 Select the system from the node list.

The Network file utility screen is displayed.

- 3 Enter the information you typically use to access this system.

You can specify any user account and password to which you have access. You can also specify any device and directory (for example, to a public directory). Your system administrator should know to which accounts and directories you have access and should provide this information to you.

You can:

- Click the Connect button to use the default information in the Username and Password fields.
- Type an explicit username and password combination to override the default information in the Username and Password fields. After typing the new information, click the Connect button.

To access a device and directory:

- Click the Connect button to use the default information in the Device and Directory fields.





- Type an explicit username and password combination to override the default information in the Device and Directory fields. After typing the new information, click the Connect button.

You can hold down the Command key and press the period key to break the connection.

If there is a delay in connecting, the cursor may change to the shape of the command-period symbol.

When the cursor changes to a rotating beach ball, the beach ball spins a number of times and the drive and file names are displayed in the right-hand window.

If you click the Disconnect button, NetCopy breaks your connection to the remote system.

**Hint** Click the Connect button. When you connect to another system, NetCopy automatically breaks your previous connection.

You can either select another connection or quit.

For more information see, Connecting to a Remote System in this chapter.

## Deleting Files

To delete selected files on your system:

- 1 Select the files to be deleted. Hold down the shift key to select more than one file.

You can delete either local or remote files and directories (folders). Directories (folders) can be deleted only if they are empty. You can enable or disable warning messages from the Options menu. Enabling warning messages helps to prevent accidental deletions. You can enable messages by selecting either the Ask First or the Ask on Delete Only options from the Options menu.

Options	Characteristics
	Supersede Existing Files
	Ask Me First!
✓	Ask Me For Delete Only!
<hr/>	
	Print Directory Locally
✓	Full Directory Listing
	Hex Dump Type Files

- 2 Click the Delete button.

If you have enabled warning messages, you can also skip a file or cancel from this window.

In addition to deleting files, you can rename and make other changes to files directly from NetCopy. For more information, see Chapter 5.

## **Disconnecting from a Remote System**

To disconnect from a remote system:

- 1 Click the Disconnect button.  
A dialog box asks where to connect to next.

*Hint* Click directly on the close box.

- 2 Click the OK button.



---

## Accessing Macintosh Files from Other Computers on DECnet

Any other computer connected to a DECnet network can access the files on your Macintosh if you allow it to do so.

Chapter 4 shows access techniques from remote nodes including:

- Viewing a directory on a remote node
- Copying files from a VMS system to a Macintosh computer
- Searching Remote Nodes
- Using the DIRECTORY Command to Search Remote Nodes

The examples in this chapter show a VAX computer as the other computer, but they could use an MS-DOS system, a PDP-11 computer, an ULTRIX system, or any other computer system connected to DECnet.

Any DECnet computer user who accesses your Macintosh computer running DECnet for Macintosh software must have one of the following access methods:

- A username and password combination
- A device and directory (public directory)
- Proxy access allowed
- A system without passwords (No Password option)

These access methods are set up for each Macintosh system through the NCP utility. To access a particular node, check with the user of that Macintosh computer.

## Viewing a Directory on a Remote Node

To view a remote directory on a Macintosh computer from the VMS System, use the DCL `DIRECTORY` command:

```
$ DIRECTORY node::device:[directory]
```

The parts of this DCL command follow:

- Node is the name of your Macintosh computer. This example assumes that proxy access has been set up for this remote user, so no username-password combination is needed.
- Device is the name of the disk (usually the name of the Macintosh hard drive)
- Directory is the name of the folder on the Macintosh

Refer to the VAX documentation on using DCL commands for further information on allowable file specifications.

***Hint** The device name may be specified by the logical number of your Macintosh drive as `DRn`: where `n` is the drive number. Drive numbers depend upon your particular configuration.*

*Spaces in Macintosh filenames translate to underscores in VMS filenames. For example, `Fractal Toolkit` on the Macintosh becomes `Fractal_Toolkit` in a VMS directory of Macintosh files.*

The following example shows how you can obtain a directory listing of files on your Macintosh computer from a VMS system. In this example, the name of the node to be accessed is `WESTON` and the folder to be accessed is the `Chaos Games` folder, which resides inside the `Fractal Toolkit` folder.

To obtain a directory:

- 1 Log in to the VAX computer with your username and password. This example assumes that proxy access has been set up for the username and password of your account. That is why no username and password is embedded in the DCL command in this example.
- 2 Enter the following DCL command:

```
$ dir weston:[fractal_toolkit.chaos_games]/size/date
```

This command obtains a listing of all files located in the `Chaos Games` folder for that remote node:

```

Directory WESTON::PARADISE:[Fractal_Toolkit.Chaos_Games]
Chaos_Game_Sampler          5  16-MAY-1989 06:40:01.00
IFS_Study_Tool__1          2  10-JAN-1990 18:02:01.00
IFS_Study_Tool__2          4  1-JAN-1990 21:06:12.00
The_Chaos_Game              1  10-JAN-1990 19:42:19.00

```

## Copying Files from a VMS System to a Macintosh Computer

To copy a file from a VMS system to a remote Macintosh computer, use the DCL COPY command.

```
$ COPY file node"username password":::device:[directory]destination file
```

This command assumes that no proxy access is granted the remote user. In this case, the user embeds his username-password combination in the DCL command. The elements of this DCL command are as follows:

- File (if you want to name the VMS file differently from the Macintosh file)
- Node is the name of the node you want to access.
- Username is the remote access username for that node.
- Password is the remote access password for that node.
- Device is the name of the disk (usually the Macintosh hard drive name)
- Directory is the name of the directory you want to access.
- File is the complete file-specification for the VMS file

Refer to the VMS documentation on using DCL commands for further information on allowable file specifications and access control strings.

The following example shows how you can copy a VMS file to a remote Macintosh computer. In this example, the name of the file is SQUARES.PAS, the device name is DR0:, the node to be accessed is WESTON, the username is ADAM, and the password is KNOWLDGE.

To copy a file:

- 1 Log in to the VAX computer with your username and password.
- 2 Enter the following DCL command:

```
$ COPY SQUARES.PAS WESTON"EVE KNOWLDGE":::DR0:[EXAMPLES]SQUARES.PAS
```

After entering this command, you find a file called SQUARES.PAS in the Examples folder on the remote node WESTON.

You can use most DCL commands and VMS programs with files transferred to your Macintosh computer.

If you create a new file on the Macintosh, you need to be aware of the lack of support for file version numbers.

*Hint* You can access a TEXT type file on your Macintosh through the EVE or any VMS utility, but when you are finished, you must create a new copy of the file with a different name (TEST1 instead of TEST) because Macintosh files do not support version numbers.

## Searching Remote Nodes

This search routines in this section are typical of a wide range of actions you can perform using DCL commands.

### Example 1

To search for a remote Macintosh file or for a file that contains a certain text-string from a VMS system, use the DCL SEARCH command:

```
$ SEARCH node::device:[directory]file search-string
```

This example assumes that the Macintosh computer has been set up with the No Password Required option min NCP. The No Password option in this case allows any user on any remote DECnet node to search the files on this Macintosh node without embedding a username-password combination in the DCL SEARCH command.

The elements of this DCL command are:

- Directory is the name of the directory you want to access.
- File is the complete file-specification for the VMS file.
- Node is the name of the node you want to access.
- Device is the name of the disk (usually the Macintosh hard-drive name).
- Directory is the name of the directory you want to access.
- Search-string is the text string to be located in the specified files.

In the following example, you search the Macintosh folder (directory) named Fractal Toolkit for lines containing the text-string "FRACTAL".

To find lines that meet these criteria:

- 1 Log in to the VAX system, using your username and password.
- 2 Enter the following DCL command:

```
$ SEARCH WESTON:[FRACTAL_TOOLKIT] "FRACTAL"
```

The output from a sample search command is as follows

```
B[1]: Barnsley, M., Fractals Everywhere, Acadmic Press,1989
D[1]: Devaney, R., Chaos, Fractals and Dynamics:
K[1]: Kaye, B., A Random Walk Through Fractal Dimensions, VCH. 1989
M[1]: Mandelbrot, B., The Fractal Geometry of Nature, Freeman,1982
P[2]: Peitgen, H.-O. & Richter,P., The Beauty of Fractals
P[3]: Peitgen, H.-O. @ Saupe, D., The Science of Fractal Images
```

## Example 2

To list the remote Macintosh folders and files from a VMS system, use the DCL DIRECTORY command:

You can use the VMS wildcard function to extend the capabilities of the directory command.

In the following example, you search the directory of any top-level folder whose name starts with the letters "FR" character.

To find files that meet these criteria:

- 1 Log in to the VAX system, using your username and password.
- 2 Enter the following DCL command:

```
$ DIR WESTON"ADAM KNOWLGE"::[FR*]/SIZE
```

This command displays output as follows:

```
Directory WESTON"adam password"::PARADISE:[Fractal_Toolkit]
Chaos_Games.DIR          1
Empty_Folder.DIR        1
Fractal_Toolkit_Instructions
                               11
Iterated_Quadratics.DIR  1
Linear_Fractals.DIR     1
Mandelbrot___Julia_Sets.DIR
                               1
Total of 6 files, 16 blocks.
$
```



### Example 3

The following example uses the DCL DIRECTORY command to obtain a listing of the number of directories (folders) and files and the total number of blocks taken up on the remote Macintosh system. This example assumes that there is a proxy enabled.

- 1 Log in to the VAX computer using your username and password.
- 2 Enter the following DCL command:

```
$ DIRECTORY/GRAND_TOTAL/SIZE WESTON::[...]
```

```
Grand total of 110 directories, 1258 files, 66321 blocks.
```

The output displays the total directories, file size and block size (in 512-byte blocks) of the files that meet the search criteria.

These examples demonstrate a number of DCL commands that can be used with your Macintosh computer over DECnet networks. Refer to the *Introduction to DCL* for further information on allowable file specifications.

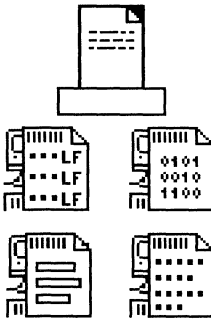
---

## Transferring Files

Chapter 5 describes how to transfer files between your Macintosh computer and other computers connected to a DECnet network.

Most files convert automatically between your Macintosh computer and other computers connected to a DECnet network. However, from time to time, you may have to obtain more information about the types of files you are transferring.

The names of the five Macintosh file types (and their VMS counterparts) mentioned throughout this chapter are:



- **TEXT** (text)
- **BINA** (fixed length)
- **VARI** (variable length)
- **STRM** (stream)
- **STLF** (Stream LF)

The following examples illustrate when you might need more information about the files you transfer between systems

- *Example 1: Binary file transfer*

When you transfer a file from a spreadsheet on the Macintosh to a report generator on the VAX, you may want to retain the same formatting at both ends of the file transfer process.

- *Example 2: Text file transfer*

When you transfer a program file from a Macintosh text editor to the VMS development environment, you may want to retain the same line breaks on the Macintosh and on the VAX. The file types that you use depend on what you need to accomplish at both ends of the transfer process.

- *Example 3: Image file transfer*

When you transfer an EXE (executable) program file from the VMS to your Macintosh computer, you depend on a form of image file transfer. Again, the method of transfer depends on the specifics of the applications.

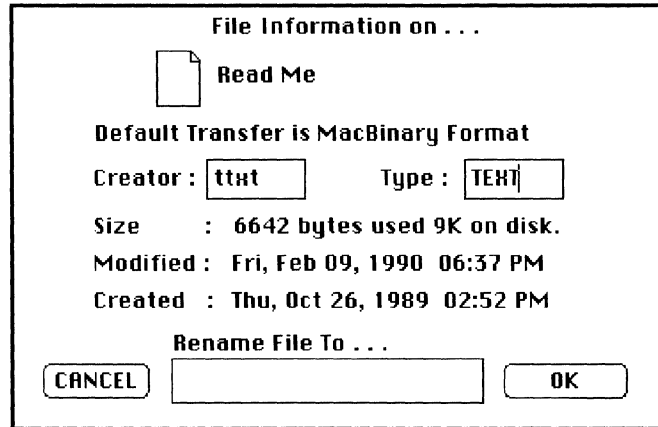
In each of the preceding examples, to determine whether that file successfully transfers, you usually need to know more about the **creator**, the **type**, the **default transfer method**, or other **characteristics** of the file.

If you need more information about a particular file, DECnet for Macintosh software allows you to obtain this information and change the default transfer method. The following sections describe:

- How to get information about the current files on your Macintosh or on a remote system that you are connected to
- How to change file characteristics
- How to decide when it is necessary to change file characteristics
- How to recognize the basic differences between Macintosh files and files of other computer systems, including details you need to know about Macintosh and VMS file types
- How to set DECnet for Macintosh to best accommodate the file types that you commonly transfer
- How to check the Error Window to see if NetCopy has logged file transfer errors

## Getting Information About File Characteristics

When you have selected either a local or remote file, you can ask NetCopy to get additional information for you on this file. To get or change information, select Get Info from the File Menu. The following dialog is displayed:



The Get Info window information about a file depends on its system of origin. The information provided for Macintosh files is somewhat different from the information for VMS files.

If the file resides on another Macintosh computer, the display includes information on:

- The method NetCopy uses to copy the file (default transfer method)
- The creator  
In this example, the default creator for text files, **ttxx** and the default creator for image files **DECB** are displayed. The **ttxx** creator signifies a TeachText application and the **DECB** creator signifies a NetCopy file.
- The default type  
The default file type is **TEXT** for text files and **BINA** for image files.
- The size of the file
- The number of 1,024 (1K) segments of disk space that are used by the file

## Changing File Characteristics

You can change any of the file characteristics displayed in the File Information dialog, including:

- Creator of the file
- File type
- File name

After selecting Get Info from the File menu:

- 1 Enter new information in the Creator and Type fields.

*Hint* If you make a mistake as you edit the existing fields, click the Cancel button to return the original information to the fields.

- 2 Click OK.

The information about a file displayed in the Get Info window depends on its system of origin. For example, the information provided for Macintosh files is somewhat different from the information for VMS files. The next sections explain how to understand the information displayed from the Get Info window, depending on whether a Macintosh or a VMS file is selected.

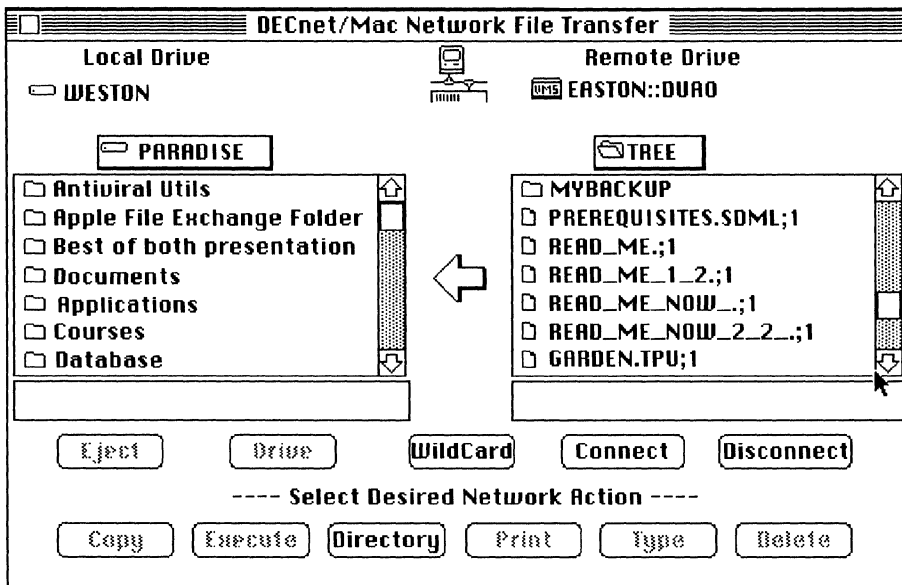
## Deciding When To Change File Characteristics

For most applications, DECnet for Macintosh transfers and converts files automatically, using the correct file type, whether the file is text, image, or binary.

To decide when to change file characteristics:

- 1 Choose the type of files to be transferred from the Characteristics menu. If you are unsure, take the Default type.
- 2 Click the Arrow icon to select the direction of the copy.
- 3 Select the files you wish to copy.
- 4 Click the Copy button.
- 5 Click the Transfer button in the dialog box to confirm that you want to copy the files.

The dialog box is displayed if the Ask Me option is selected from the Options menu.



A dialog box indicates the success of the file transfer or the reasons for an unsuccessful transfer.

If the file transfer is not successful, you can:

- Get more information about the type of file from the Get Info selection of the File menu.
- Consult the NetCopy status window for more information about why the file transfer failed and specify the appropriate actions
- Select a different transfer option from the Characteristics Menu and try again. The next section describes setting transfer options in more detail.

The Characteristics menu lists options for setting the file type and record of files retrieved by NetCopy. Normally, you should always leave Default checked.

**Note** *Connections to ULTRIX, RSX, and DOS systems require you explicitly to select the transfer type.*

NetCopy looks at each file to determine the file's attributes. NetCopy then selects the proper record and file type for the file. For example, you can use NetCopy to retrieve files from remote systems when the files have been created by other utilities and

have not been stored in a format recognized by NetCopy as a MacBinary file.

***Hint** If you selected Ask Me First from the Options menu, the Transfer and Skip buttons are highlighted before the transfer is started. As each file name is displayed, you click either the Skip button or the Transfer button. NetCopy asks whether to transfer each selected file until all files have been either transferred or skipped.*

The Created As field shows how the file was named on the remote system. If the remote system supports file version numbers, these numbers are included in the display of files, as shown in the following example:

```
READ_ME.TXT; 2  
READ_ME.TXT; 1
```

***Note** Macintosh files do not have version numbers.*

If you select any file option other than Default, NetCopy attempts to process the file in the form that you request it. The supported file types are discussed in more detail in the next several sections.

## Understanding File Differences

Most Macintosh files are very different from VMS files.

On the one hand, Macintosh files are distinct from the files of other operating systems in that they have two forks to every file:

- A data fork, which is simply a stream of bytes with no record structure imposed by the file system
- A resource fork, which is a feature specific to the file system of the Macintosh computer.

On the other hand, the VMS Record Management System (RMS) supports a variety of different file and record organizations.

Table 5-1 and Table 5-2 compare the different Macintosh and VMS file types.

Even with these very different file systems, DECnet for Macintosh transfers files from system to system with a minimum loss of file structure.

For example, the data fork of Macintosh text file is the same as a VMS Stream CR file. It is a stream of bytes with the lines of text separated by carriage return characters. The Macintosh file may also have information in the resource fork such as:

- Tab settings

- Font size
- Font types

This additional information stored in the resource fork is lost when files are transferred as text files.

The next section explains default methods of file conversions.

## Understanding Macintosh to VMS File Type Conversions

Table 5–1 lists the various kinds of files and the default method that NetCopy uses to convert each type from Macintosh file format to VMS file format.

**Table 5–1 Macintosh to VMS File Conversions**

Macintosh File Type	VMS File Type
BINA	Fixed Length - record is length maintained
TEXT	Stream CR
VARI	Variable Length, no attributes
STRM	Stream
STLF	Stream LF
Except when Special Backup† transfers are used	

†Special Backup format is not found on the Macintosh; only on VMS. Special Backup format files have:

- Version ;999
- Fixed-length 128-byte records with backup contents
- Format similar to standard MacBinary files but includes additional information on the entire file path including all related folders

## Understanding VMS to Macintosh File Type Conversions

DECnet for Macintosh supports the transfer of both fixed and variable length record files. DECnet for Macintosh stores these files in such a way that they can be copied from a Macintosh back to a VMS system without loss of record structure. To do so,



DECnet for Macintosh uses the Macintosh resource fork to store additional record information and the file's type field to determine a method of interpreting the file data.

Table 5-2 lists the five file types and default method that NetCopy uses to convert each type from VMS file format to Macintosh file format.

**Table 5-2 VMS to Macintosh File Conversions**

VMS File Type	Macintosh File Type
Fixed Length	BINA - Record Structure is maintained. Records of 128 bytes are examined for MacBinary or backup contents. If either of these two special formats is found, then the file is restored to original format and contents.
Variable Length	VARI - Record structure is maintained
Variable Length, implied CR/LF	TEXT (Stream CR)
Stream	STRM (no data conversion)
Stream, implied CR/LF	TEXT (CR's added if needed)
Stream LF	STLF (no data conversion)
Stream LF, implied CR/LF	TEXT (CR's added after each record)
Stream CR	TEXT (no data conversion)
Stream CR, implied CR/LF	TEXT (CR's added after each record)
Indexed Sequential Files (ISAM)	Not Supported

For example, when a fixed length record file MYPROG.EXE is copied from VMS to a Macintosh, the file created by DECnet for Macintosh has its file type set to BINA to indicate that it contains binary image data. If the records are fixed length of 128 bytes, DECnet for Macintosh then look at the contents of the file to determine if the file is a MacBinary file instead of just VMS data of some unknown format. If it is a MacBinary file, DECnet for Macintosh converts the file and recreates the original Macintosh file, registering the file creator and file type.

If the file is a type other than a MacBinary file and its record size is other than the default of 512 bytes, DECnet for Macintosh stores the record size within the resource fork. DECnet for Macintosh supports fixed length records of up to the 32,768 bytes

in size, allowing you to backup a VAX, using the Macintosh to store the save set.

Variable length ASCII files are typically stored as TEXT (Stream CR) files on the Macintosh computer.

A problem occurs when these files contain variable length binary records with no specific record attributes. In this case DECnet for Macintosh assigns a special file type of "VARI" and precedes each record with a two byte size count for each record stored so that the records can be retrieved later. VMS files that have the extension "OBJ" are typical of this type of file.

## Setting Up Default File Characteristics

NetCopy uses a default set of file characteristics (size, creator, and type).

To change defaults:

- 1 Select Parameters from the Characteristics menu.  
The Parameters dialog is displayed.
- 2 Enter the file type and Creator for both text and image Files.
- 3 Click OK.

**File Transfer Characteristics**

**Text File Parameters . . .**

Type  Creator

**Image File Parameters . . .**

Type  Creator

Use Original Macbinary File Name?

Use Multinational Translation?

Select an internal buffer size of . . . txt

1,450     4,096     32,768

( A default size of 4096 is recommended )

Using this dialog, you can configure some of the internal defaults of NetCopy:

- **Type (Text File Parameters)**

Normally, NetCopy copies text files to your Macintosh computer and assigns them a creator and type that corresponds to the TeachText utility included with DECnet for Macintosh. When you double-click on these new files, they automatically launch the TeachText utility for you. If you use another standard editor (for example, Microsoft Word), you can change the following values to correspond to those required by that application.
- **Type (Image File Parameters)**

When DECnet for Macintosh copies image files of fixed-length records, it assigns them a creator of DECB and type of BINA unless you modify the Image File Parameters.
- **Defaults**

Change the defaults in the File Transfer Characteristics dialog:

  - If you find that you are repeatedly copying image or text files from image or text applications from remote systems.
  - If remote files require a special creator and type for the corresponding Macintosh program to understand them.

**Note** *The above options not only change the defaults for NetCopy but for FAL (File Access Listener) as well. FAL is the program that listens to DECnet so that it can allow access to your Macintosh files from remote systems. FAL always treats files of creator DECB as the image files. FAL changes occur only after the next system restart.*

- **Use Original MacBinary File Name**

When you copy a file that is in MacBinary format, you may choose to have it stored using the name it has on the remote system or the name embedded within the file itself. FAL always uses the embedded file name, but with NetCopy you have control over this attribute on files being copied to your Macintosh.

- Use Multinational Translation

Normally you should have Use Multinational Translation checked. NetCopy translates all of the characters within text files to and from the Digital Multinational character set whenever possible. FAL always does this but in some rare cases you may not want this to occur for you. NetCopy allows you to control this.

## Understanding NetCopy Errors

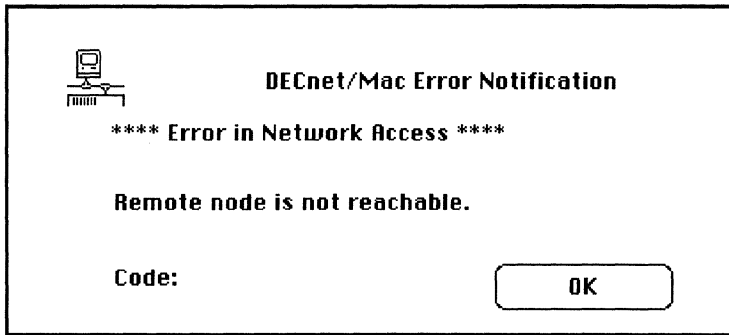
If anything goes wrong during a file transfer or other operation, NetCopy notifies you in two ways of any error that occurs: an alert box is displayed on the screen, and the error message information is recorded in the Error Log Window.

The Error Window is a special window where errors are logged during your NetCopy session. Even after clicking the Close box, you can recall the Error Log window by using this menu. If no errors have been reported, then the Error Log Window option is dimmed in the menu.

Both the alert box and the Error Log Window contain the following information:

- A primary error message telling you the category of the error
- A secondary message giving you more specific information
- An error code that further classifies the error

In the example given below, a network copy was in progress when the network link was terminated forcing the link with the remote node to be broken. This specific error indicates an error caused elsewhere in the network that was probably beyond your control. Here the primary message is “Error in Network Access” and the secondary message is that the “Remote node is not reachable.”



To understand technical reasons for an error, you can look up the error code and the primary message in Table 5-3.

Table 5-3 contains what is known as MAC errors in the Data Access Protocol (DAP). Most users need not be concerned with this table.

**Table 5-3 Error Messages**

MAC	Primary Error Message	Comments
2	Remote DAP Does Not Support Option	Error Code is MAC Code
4	Error in Opening Remote File	Error Code is MAC Code
5	Error in Transferring File	Error Code is MAC Code
6	Warning While Transferring File	Error Code is MAC Code
8	Message Format Error	Internal NetCopy Error
9	Protocol Error	Internal NetCopy Error
10	DAP Sync Error	Internal NetCopy Error
-	Error While Trying to Print	Macintosh Error Code
-	Error In Network Access	Macintosh or DECnet Error Code

---

## Backing Up Files

Chapter 6 presents several ways to back up the files on a computer running DECnet for Macintosh software to a remote system:

- Using NetCopy Utility wildcards
- Using a command procedure to perform unattended backup (executed by a VMS DCL command procedure).
- Use the VMS DCL command COPY/SINCE.

These items are discussed in this chapter along with examples of sample backups. Your requirements should determine which form of backup you use.

For example, if you have several folders on the Macintosh that you need to back up manually, you can create VMS directories corresponding to each Macintosh folder. You can then use the NetCopy Utility to back up the folders as often as you need to.

If you require other ways of backing up your Macintosh computer, you can choose a backup scheme such as the example shown in this chapter, a VMS DCL command procedure that performs an unattended backup of the files on your Macintosh.

### Using NetCopy Wildcards

Wildcards give you a powerful tool with which to back up your Macintosh over the network.

A wildcard is a special character used in searches to stand for all or some characters of a file name. Wildcards allow you to use a single file specification to select ranges of files, instead of having to transfer one file at a time. For example, when you backup your

files using wildcards, you can specify which folders to search and what modification dates to look for.

For Macintosh users not familiar with the VMS operating system, NetCopy provides a number of ways to back up files with wildcards from the Wildcard dialog box.

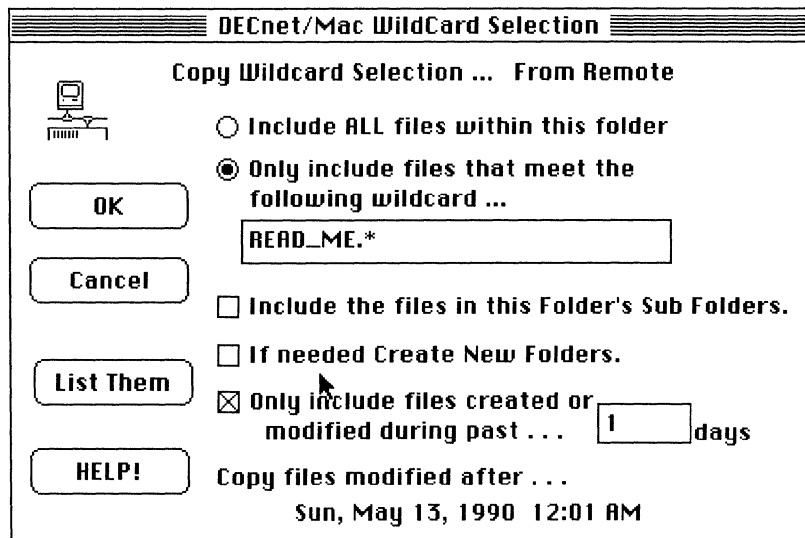
To use the NetCopy wildcards to perform backups:

- 1 Click the WildCard button.

NetCopy displays the dialog including any previous selections.

The heading of the WildCard Selection dialog indicates whether the wildcard specifications apply to remote files or to local files.

- 2 Click the wildcard option you require.



By clicking on the appropriate button, you can:

- Include All Files Within This Folder  
Clicking this button is equivalent to \*.\* in a VMS system.
- Include All Folders if you want subfolders transferred under the selected folder (directory).  
Clicking this button is equivalent to [...] in a VMS system.

- **Create New Folders**

If the remote system supports the creation of new directories or folders, the If Needed Create New Folders selection is displayed. Currently only Macintosh computers that are DECnet nodes support this feature; the selection is dimmed for all other operating systems.

If this selection is not made, all copied files will reside in a single folder. If this selection is made for copies between Macintosh computers, DECnet for Macintosh keeps all copied files within their correct folders and creates these folders on the remote machine if necessary.

- **Include only files created or modified during the number of days that you specify**

You can restrict your selection of files to those that have been modified during the past n days. Notice that NetCopy automatically displays the date as you enter the number of days.

***Hint** If you click this option but do not enter a number of days, your wildcard selection includes only the files created since the beginning of the current day.*

## Using DCL Copy

You can use the DCL COPY command to back up any or all of the files on the remote Macintosh to a specially created directory on the VAX.

```
$ COPY node"username password":;device:[directory...];999 destination-file
```

The elements of this DCL command are as follows:

- Node is the name of the node you want to back up
- Username is the remote access username for that node
- Password is the remote access password for that node
- Device is the name of the disk (usually the Macintosh hard drive name)
- Directory is the name of the directory you want to access. (The top-level folder on the Macintosh computer has the same name as the VMS volume and is not specified.)
- ;999 version number



In the preceding DCL command, the special version number 999 informs DECnet for Macintosh to transfer the files in a special format so that the corresponding disk and directory path is stored within the file. With the ;999 feature, DECnet for Macintosh includes the full Macintosh file name within the file as well as its disk and folder path, so that the file can be restored in its original format. Additionally, DECnet for Macintosh modifies the resultant file name on the VMS system, so that files with identical names on the Macintosh computer will have different names on the VAX computer. If you omit the version number, DECnet for Macintosh transfers these files in standard MacBinary format. The ;999 version number is used only for backups.

- Destination-file is the full specification of the VMS directory to which you are backing up.

Refer to Digital documentation on using DCL commands for further information on allowable file specifications.

In the following example, we back up files on the node WESTON that have been modified today, and we specify that we want a log of this transaction.

- 1 Log in to the VMS system using your user name and password.
- 2 Enter the following DCL command:

```
$ CREATE/DIR [ .MYBACKUP ]
```

This command creates a local directory called MYBACKUP in which to store files.

- 3 Enter the following DCL command to back up all files on the remote node WESTON:

```
$ COPY/LOG/MOD/SINCE=TODAY WESTON"MAC SECRET"::[...] *.*;999 DISK1:[EVE.MYBACKUP] *.*
```

If you had backed up only the files in a folder called Documents on the drive PARADISE on the node WESTON, you see a transaction log similar to the following:

```

%COPY-S-COPIED, WESTON::PARADISE:[DOCUMENTS]CHAPTER_1;99
copied to DISK1:[EVE.MYBACKUP]CHAPTER_1;999 (35 blocks)
%COPY-S-COPIED, WESTON::PARADISE:[DOCUMENTS]CHAPTER_3;999
copied to DISK1:[EVE.MYBACKUP]CHAPTER_3;999 (196 blocks)
%COPY-S-COPIED, WESTON::PARADISE:[DOCUMENTS]CHAPTER_4;999
copied to DISK1:[EVE.MYBACKUP]CHAPTER_4;999 (245 blocks)
%COPY-S-COPIED, WESTON::PARADISE:[DOCUMENTS]CHAPTER_8;999
copied to DISK1:[EVE.MYBACKUP]CHAPTER_8;999 (164 blocks)
%COPY-E-OPENOUT, error opening
DISK1:[EVE.MYBACKUP]CODE_FORMAT;999 as output
-RMS-E-FEX, file already exists, not superseded
%COPY-S-COPIED, WESTON::PARADISE:[DOCUMENTS]COVER_PAGE;999
copied to DISK1:[EVE.MYBACKUP]COVER_PAGE;999 (49 blocks)
%COPY-S-COPIED, WESTON::PARADISE:[DOCUMENTS]EDIT;999 copied
to DISK1:[EVE.MYBACKUP]EDIT_;999 (131 blocks)
%COPY-S-COPIED,
WESTON::PARADISE:[DOCUMENTS]MANUAL_COVER;999
  copied to DISK1:[EVE.MYBACKUP]MANUAL_COVER;999 (33 blocks)
%COPY-S-NEWFILES, 7 files created

```

Notice that the log file explains that the COPY command was not able to replace a file that already existed; it also notes how many new files were created in the directory. This information is useful to verify your backup procedure.

## Performing an Unattended Backup

This section presents a sample procedure that uses the DECnet for Macintosh backup format to do a periodic unattended backup of a Macintosh computer from a VAX computer.

To perform an unattended backup of your Macintosh:

- 1 Log in to the VAX computer.
- 2 Create an empty directory. If you do not specify one, the procedure copies files to your current default directory.  

```
$ CREATE/DIRECTORY [EVE.FULL]
```
- 3 Invoke the command procedure by using the following syntax:

```
$ @Backup-Mac source destination copy-qualifier resubmit-date
```

### Example 1

This example assumes that you have allowed proxy access to EVE, and the backup is performed from her account.

To back up the files on Macintosh WESTON modified since yesterday, type:

```
$ @Backup-Mac WESTON DISK1:[eve.full_back]/modified/since=yesterday
```

The only required parameter is the node name of the Macintosh computer.

If the procedure executes successfully, you receive the following messages:

```
Backing up from WESTON::<...>*.*;999
  Backing up to DISK1: <EVE.FULL>*.*;
  Copy options: /MODIFIED/SINCE=YESTERDAY
  Resubmit for: Tomorrow+01:00
```

If you have set a password and username for the Macintosh computer, you must enable proxy access by using the Macintosh rather than embed these in the command, or enable proxy access by using the Macintosh NCP program. (See the section *Recognizing Other Nodes from Your Macintosh Node* for details).

**Note** *If your VMS system is part of a cluster, the batch job can run on any node in the cluster. To allow for this, either define proxy access from each node in the cluster or modify the command procedure to specify the batch queue of a single node from which you have proxy access.*

### Example 2

Assume that you have specified proxy access for user ADAM on EASTON, but proxy access is not specified for any other node in the cluster. In this case, you can omit the username, ADAM, and the password, KNOWLDGE, from the command line. You must specify a queue (in this case EASTON\$BATCH) on the system from which ADAM has proxy access.

```
$ @Backup-Mac WESTON DISK1:[EVE.FULL]
/MODIFIED/SINCE=YESTERDAY-
_ $ /queue=EASTON$BATCH

$ @backup-mac WESTON DISK1:[EVE.FULL BACK]
  Backing up from WESTON::<...>*.*;999
  Backing up to DISK1:<EVE.FULL_BACK>*.*;
  Copy options: /MODIFIED/SINCE=YESTERDAY
  Resubmit for: Tomorrow+01:00
.
.
.
Job BACKUP-MAC (queue EASTON$BATCH, entry 869) holding until
26-OCT-1990 01:00
.
.
.
```

#### 4 List the directory.

```
$ DIRECTORY *.* /size/date
CLIPBOARD_FILE_TSSB1523.;1
      2 30-APR-1990 11:25:56.00
CTERM_EASTON_TSSB1658.;1
      97 16-MAY-1990 17:20:47.00
MY_GLOSSARY.MSW_TSSB2198;1
      45 16-MAY-1990 15:25:30.00
MY_FILE.SDML_TSSB2198;1
      33  4-MAY-1990 14:05:08.00
GATEKEEPER_LOG_TSSB1523.;1
      14 27-APR-1990 17:49:55.00
LASERWRITER_TSSB1523.;1
      127 30-APR-1988 12:00:00.00
MY_STATUS_524.MSW_TSSB1454;1
      16 24-MAY-1990 11:13:22.00
POPCHAR_TSSB1523.;1
      16 21-JAN-1990 21:12:22.00
SYSTEM_TSSB1523.;1 1918  5-SEP-1989 12:00:00.00
USERLAT_TSSB1523.;1
      107 22-NOV-1989 15:11:04.00
_ATM_68020_030_TSSB1523.;1
      194 10-OCT-1989 17:40:23.00
```

Total of 11 files, 2569 blocks.

If necessary, consult the batch-job log to see if the backup was successful.

For example, if the name of the Macintosh node is WESTON, its hard disk PARADISE, the VAX computer EASTON, and the batch queue EASTON\$BATCH, the log indicates that all files were backed up except the following files in use at the time of the backup:

```

$ copy /MODIFIED/SINCE=YESTERDAY WESTON:<...>*.*;999
$!$DJA6:<EVE.TEST>*.*;
.
.
.
%COPY-E-OPENIN, error opening
WESTON::PARADISE:[Font_DA_Mover_Folder.uninstalled_DAs]
Sampler_TSSB1414;999 as input
%COPY-E-OPENIN, error opening
WESTON::PARADISE:[MacTerminal_3_0_Folder]
Lat_Egypt_TSSB1658;999 as input
-RMS-E-FLK, file currently locked by another user
%COPY-E-OPENIN, error opening
WESTON::PARADISE:[MacTerminal_3_0_Folder]
Lat_Rainbo_TSSB1658;999 as input
-RMS-E-FLK, file currently locked by another user
%COPY-E-OPENIN, error opening
WESTON::PARADISE:[System_Folder]Network_Data_TSSB1523;999 as
input
-RMS-E-PRV, insufficient privilege or file protection violation
%COPY-E-OPENIN, error opening
WESTON::PARADISE:[System_Folder]Word_Temp_1_TSSB1523;999 as
input

```

## Customizing Your Backup

This section presents the source of the sample procedure that performs an unattended backup.

You can use this sample procedure to perform a daily, weekly, or one-time backup of the files on your Macintosh computer, or customize it for your own needs

```

$! Backup-Mac.Com
$!
$! This procedure uses DECnet for Macintosh's backup format to do a
$! periodic unattended backup of a Macintosh computer. The
$! Macintosh computer must be running DECnet for Macintosh or
$! TSSnet.
$!
$! Invocation:
$!
$! @Backup-Mac source [destination] [copy-qualifier] [resubmitdate]
$!
$! Paramters:
$!
$! source
$!
$! The only required paramter is the node name of the Macintosh.
$! The rest of the source file specification is defaulted as
$! follows:
$!
$! Field Default
$!
$! Device The system boot disk
$! Directory <...> All folders
$! File *
$! Type .*
$!
$! The version cannot be specified both because the Macintosh
$! file system doesn't support file generations and because a
$! version of ;999 is used by DECnet for Macintosh as a flag
$! to indicate that the copy is to be done in backup format.
$!
$! destination
$!
$! The file specification of the device and directory to back files
$! up into.The default is the current default directory
$! SYSSDISK:<>.
$!
$! copy-qualifier
$!
$! The COPY qualifiers used to select the files to be backed up.
$! The default is /MODIFIED/SINCE=YESTERDAY, to backup all files
$! that were mdified since the beginning of the day yesterday.
$! Any valid qualifiers for the COPY command may be used.
$! Additionally, the /ALL qualifier
$! may be specified to indicate that no qualifiers are to be
$! applied.
$!
$! resubmit-date
$!
$! A VMS time and date specification that is used to resubmit the
$! command procedure. The default is TOMORROW+01:00,tomorrow
$! at 1:00 AM. This results in a backup of the files created in the
$! previous 25 hours being done every 24 hours. Files created on
$! the Macintosh between midnight and 1:00 AM will be backed up
$! twice.
$!
$! Resubmission can be disabled by supplying the value
$! NO or NONE.
$!
$! Examples:
$!
$! To start a daily backup specify either of the following:
$!
$! $ @Backup-Mac MAC:: $DISK:[MAC] /MODIFIED/SINCE=YESTERDAY
$! TOMORROW+01:00
$! or
$! $ SET DEFAULT $DISK:[MAC]
$! $ @Backup-Mac MAC::

```

```

$!
$! To start a weekly full backup:
$!
$! $ @Backup-Mac MAC:: $DISK:[MAC.FULL] /ALL "01:00+7-"
$!
$! to do a one-time full backup:
$!
$! $ @Backup-Mac MAC:: $DISK:[MAC.FULL] /ALL NO
$!
$ save_proc_verify = f$environment("verify_procedure")
$ save_image_verify = f$environment("verify_image")
$ set noverify
$ copy := copy
$!
$! Demand the source specification
$!
$set_mac:
$ if p1 .nes. "" then goto got_mac
$ inquire p1 "Please enter the name of the Macintosh to backup"
$ goto $set_mac
$got_mac:
$ if f$parse (p1, "", "", "node", "syntax_only") .eqs. "" then -
  p1 = p1 + ":@"
$ macintosh = f$parse (p1, "", "", "node", "syntax_only")
$ if macintosh .eqs. ""
$ then
$ write sys$error "Node name specification error"
$ exit 18
$ endif
$!
$! Apply all of the parameter defaults.
$!
$ mac_file_spec = f$parse (";999", p1, "<...>*.")
$ destination = f$parse (p2, "sys$disk:<*. *; ", "", , "syntax_only")
$ if p3 .eqs. "" then p3 = "/MODIFIED/SINCE=YESTERDAY"
$ options = f$edit (p3, "UPCASE") - "/ALL"
$ if p4 .eqs. "" then p4 = "Tomorrow+01:00"
$!
$! Tell 'em what we're doing...
$!
$ write sys$output " Backing up from " + mac_file_spec
$ write sys$output " Backing up to " + destination
$ write sys$output " Copy options: " + options
$ write sys$output " Resubmit for: " + p4
$!
$! And do it...
$!
$ set verify
$ if f$edit (f$extract (0, 2, p4), "UPCASE") .nes. "NO" then -
  submit 'f$environment("PROCEDURE") -
    /parameters = ( "'mac_file_spec'", -
      "'destination'", -
      "'options'" ) -
    /AFTER="'p4'" -
    /noprint -
    /notify
$ copy 'options 'mac_file_spec 'destination
$!
$! Done
$!
$ temp = f$verify(save_proc_verify, save_image_verify)

```

## Other Examples of Backup

With DECnet for Macintosh you can devise various backup plans that meet your needs.

You may find that you need to back up only files within a specific folder (in which case you would modify the [...] specifier), or that you do not need multiple versions of files maintained on the VAX computer each time you perform the backup.

*Hint* If you do not need to maintain multiple versions of files on the VAX computer, use the */REPLACE* qualifier to write over existing copies.

You should be aware of a few potential limitations of this backup scheme.

- There is no way of knowing that a file has been deleted. Therefore, when you do an incremental copy, you will never automatically delete a file that was previously backed up on your VAX computer.
- Renaming folders will not automatically flag, as changed, all of the files contained within the folders. Backed up files will be restored using the folder name that was in place at the time of backup.
- You must also maintain your own scheme of determining the date of the last incremental backup (the last date that you apply the */SINCE* qualifier).
- You must maintain a copy of the Network Data file in the System folder.  
For security reasons, this file is never copied.
- You must restore files to a disk with the same name, if you initiate the restore operation from a VMS system. If you restore the files to a disk with any other name, the restore operation produces a series of "Failure to Rename" error messages. DECnet for Macintosh provides this message to prevent restoring data to the wrong disk. You can use the NetCopy utility to restore these files anywhere you wish.





---

## Setting Up a Dynamic Asynchronous Line

Chapter 7 describes how you connect your Macintosh computer to the DECnet network by using a **dynamic asynchronous connection** over a serial line. The reasons for using this type of serial connection include:

- To allow your Macintosh to exchange files with another DECnet node over the same telephone line
- To connect your Macintosh computer to more than one VAX computer
- To connect several Macintosh computers to the same VAX computer

This type of connection is sometimes referred to as **DDCMP** (Digital Data Communications Protocol). DDCMP is the name of the protocol used by DECnet software over serial lines.

See Appendix C for more information on static asynchronous connections.

See the *Guide to DECnet-VAX Networking* for information on other types of asynchronous connections used by DECnet software.

The sections in this chapter provide step-by-step instructions for

- Configuring the line
- Starting up the line

## Configuring the Line

This section presents a sample procedure for configuring a dynamic asynchronous line on the VAX computer. You can:

- Use this sample procedure as a starting-point for your configuration
- Insert a procedure similar to this one into your SYS\$STARTUP file to make your configuration permanent.

See the Configuring the Dynamic Asynchronous Line section in this chapter for details of the steps contained in this procedure.

```
$ set noon
$ on control_y then goto cleanup
$!!!!!! Load the asynchronous driver NODRIVER (NOA0)
$ MCR SYSGEN
    CONNECT NOA0/NOADAPTER
    EXIT
$!!!!!! install the DYN SWITCH software as a shareable image
$ INSTALL :=$$SYSSYSTEM:INSTALL
$ INSTALL/COMMAND
    CREATE SYSS$LIBRARY:DYN SWITCH/SHARE/PROTECT/HEADER/OPEN
    EXIT
$!!!!!! Enable the virtual terminal
$ mc sysgen
    CONNECT VTA0/NOADAPTER/DRIVER=TTDRIVER
    EXIT
$!!!!!! set options on the virtual terminal line
$ SET TERMINAL/PERMANENT/DISCONNECT/SPEED=2400 -
TTA2:/MANUAL/MODEM/DIALUP/EIGHT
$!!!!!! Make sure your PC node is recognized and the passwords are set
$ MCR NCP
    DEF NODE WESTON RECEIVE PASSWORD WESTON
    DEF NODE WESTON TRANSMIT PASSWORD WESTON
    DEF NODEWESTON INBOUND ENDNODE ACCESS BOTH
    SET NODE WESTON RECEIVE PASSWORD WESTON
    SET NODE WESTON TRANSMIT PASSWORD WESTON
    SET NODE WESTON INBOUND ENDNODE ACCESS BOTH
    EXIT
$ EXIT
```

## Configuring the Dynamic Asynchronous Line

This section describes the steps for configuring a dynamic asynchronous connection between your Macintosh and a DECnet routing node (in this case a VAX computer).

The following commands assume that the asynchronous line being configured is TTA2: for a 9600 baud connection. The Macintosh has a node name of WESTON and an address of 9.682.

**Note** *Make sure that the VAX is a DECnet router before you begin this procedure. Your Macintosh computer can see the rest of the network only if the other node is a routing node.)*

- 1 Log in to the VAX computer.
- 2 Load the asynchronous driver software, NODRIVER (NOA0) by entering the following commands:

```
$ RUN SYS$SYSTEM:SYSGEN
SYSGEN> CONNECT NOA0:/NOADAPTER
SYSGEN> EXIT
$
```

- 3 Install the shareable image DYNSWITCH software in the system by entering the following commands:

```
$ INSTALL:= $SYS$SYSTEM:INSTALL
$ INSTALL/COMMAND
INSTALL> CREATE SYS$LIBRARY:DYNSWITCH/SHARE/PROTECT/HEADER/OPEN
INSTALL> EXIT
```

- 4 Enable virtual terminals by entering the following command:

```
$ RUN SYS$SYSTEM:SYSGEN
SYSGEN> CONNECT VTA0:/NOADAPTER/DRIVER=VTC/DRIVER
SYSGEN> EXIT
```

- 5 Set the disconnect option on the terminal line by entering the following command:

```
$ SET TERMINAL/PERM/DISCONNECT/SPEED=9600 TTY2:
```

- 6 Log off and log on again.  
If you are setting this option for the terminal line you are currently using, you must log off for the option to take effect.
- 7 In NCP on the Macintosh computer, set the Macintosh DDCMP password (also known as the routing initialization password on the VMS system) before you attempt to access the VMS system.

**DECnet/Mac Security Options**

**UserName:**

**Password:**

**Executive Characteristics Identifier:**

**DDCMP Transmit Password:**

In this example, the default password is set to “WESTON” (note that you or the system administrator can change this password by using NCP on the VAX computer).

To change the password:

```
$ RUN SYSS$SYSTEM:NCP
NCP> DEFINE NODE WESTON ADDRESS 9.682
NCP> DEFINE NODE WESTON RECEIVE PASSWORD WESTON
NCP> DEFINE NODE WESTON INBOUND ENDNODE ACCESS BOTH
NCP> SET NODE WESTON ADDRESS 9.682
NCP> SET NODE WESTON RECEIVE PASSWORD WESTON
NCP> SET NODE WESTON INBOUND ENDNODE ACCESS BOTH
NCP> EXIT
$
```

**8** Verify that your DECnet for Macintosh node is recognized by the VAX node as shown in the following example:

```
$ MCR NCP
NCP> SHOW NODE WESTON

Node Volatile Summary as of 13-JUN-1990 15:47:43

      Node           State      Active  Delay   Circuit   Next node
      Node           State      Links
      9.682 (WESTON)          1       1     QNA-0     9.66 (LJ2RT6)

NCP> EXIT
```

## Starting Up the Dynamic Asynchronous Line

This section describes how to start up the dynamic asynchronous connection line. Before you start you need to know how to:

- Log on to the VAX computer using MacTerminal 3.0 on the Macintosh computer.
- Maintain **Data Terminal Ready** in the high state when you exit the terminal emulator program

See the *MacTerminal User's Guide* for more information.

**Note** *Some emulators like Apple Computer's MacTerminal 3.0 allow you to maintain DTR high when you exit the program. If your terminal program does not allow you to maintain the DTR signal in the high state, you may need to set your modem to maintain the high DTR signal. Consult the documentation of your terminal program and your modem to see if either allows you to maintain the high DTR signal.*

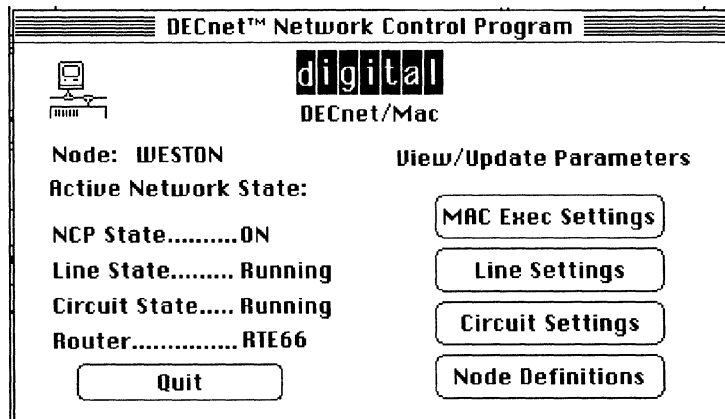
*In MacTerminal 3.0 software, the Serial tool can maintain the high DTR signal; the Modem tool cannot.*

To start the dynamic asynchronous line on the Macintosh side:

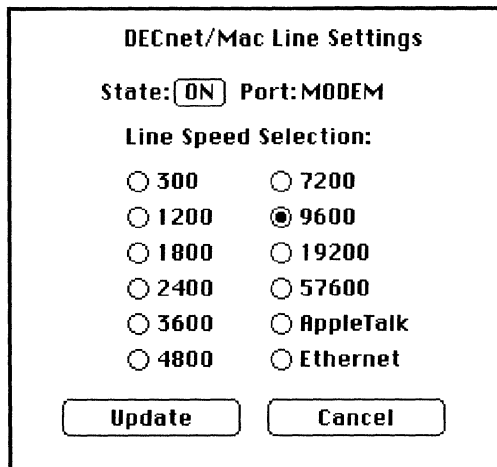
- 1 Log on to the VAX computer.

**Hint** When using MacTerminal 3.0, select the Serial Tool from the Connections menu, and click Hold Connection in the Serial Tool dialog.

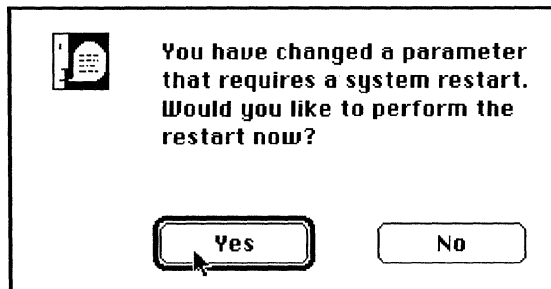
- 2 Launch the NCP application on your Macintosh.
- 3 Click EXEC in the main NCP window.



- 4 Make sure that DECnet for Macintosh is in the NCP Off state. If not, click Off in the EXEC control window.
- 5 Click the Line Settings button.  
You now see the "DECnet/Mac Line Settings" window.
- 6 Click a line speed button that matches the speed of the modem that you are using.  
The MODEM port is displayed.
- 7 Click the Update button.



- 8 Restart your Macintosh to cause the change of parameters to take effect when you see this dialog:



- 9 Quit from NCP and launch your terminal emulator's icon to start emulation.
- 10 Log in to the VAX computer, after successful connection

**11** Enter the following DCL command:

```
$ SET TERM/PROTOCOL=DDCMP/SWITCH=DECNET/MANUAL/DISCONNECT
```

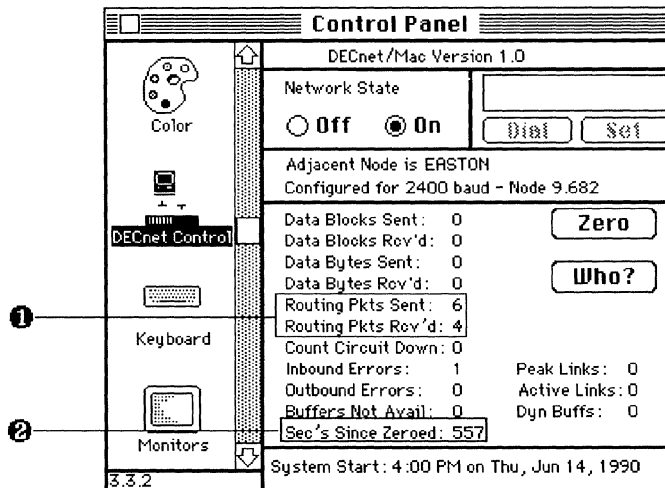
You should then receive a message that the line that you are currently logged in over is becoming a DECnet line:

```
%SET-I-SWINPRG The Line you are currently logged over is becoming a DECnet line
```

**12** Quit from your terminal emulator.

**13** Select Control Panel from the Apple (desk accessory) Menu.

**14** When the Control Panel is displayed, click on DECnet Control and the DECnet Control window is displayed.



**15** Click the ON button (Network State).

**16** Click Zero. ②

When the counters are reset to zero, it is easier for you to see if the counters increment.

**17** Look at the Routing Packets Sent counter. ①

From the DECnet control panel device, you can monitor the state of the DECnet circuit.

**Note** *The Dial feature of the DECnet Control Panel works with static Asynchronous Lines.*



If the line does not come up within 60 seconds, there may be a problem. Review the following checklist and try again.

- Make sure that the installation was properly followed.
- Make sure that the Node Receive password was defined on the VAX. This error most likely shows up as the line state staying in an ON/Starting State.
- If you are using a modem, make sure that your terminal emulator is not hanging up the line when you exit the program.
- Ensure that the line speed of DECnet for Macintosh that was set using NCP on the Macintosh, is the same as the line speed used for the terminal emulator.
- Ensure that the address of your Macintosh node is not greater than the Exec maximum address.
- Check with your network manager about any DECnet errors reported on the VMS system.

---

## Testing the DECnet Connection

Appendix A is designed to help you test and troubleshoot the operation of DECnet for Macintosh.

Because operating this product involves the Macintosh and other computer systems, you should be familiar with both DECnet and the other networking environments that are part of your configuration, such as AppleTalk for VMS and the mail application. Therefore, a system administrator who knows the details of your particular configuration can help you perform these troubleshooting techniques.

If for some reason you find that DECnet for Macintosh is not functioning or is not functioning properly, first check your connection to the network.

To make sure DECnet software is running:

- 1** Select Control Panel desk accessory from the Apple Menu.
- 2** Click the Net Control icon display Net Control window.
- 3** Verify that the Network State button is on.

In the center of this panel is information about the designated router and your Macintosh node type and address.

**Table A-1 Configuration Check List**

To configure for:	Is the router node:	Is the Macintosh node:
Ethernet	The node name of a router in the Macintosh node's DECnet area?	Configured for Ethernet?  Set to the correct DECnet address?
Asynchronous	A node name to which an asynchronous line is connected	Set for a correct line speed?
AppleTalk	The node name or area node of the AppleTalk router/gateway?	Set to the correct DECnet address?

**4** If any of the preceding information is incorrect, close the Control Panel and launch NCP (Network Control Program) on your Macintosh computer. Then reconfigure your Macintosh computer as described in Chapter 2.

If the configuration is correct, continue with the next step.

**5** Open the Control Panel and click the DECnet Control icon.

**6** Click the Zero button.

Check the Routing Packets Rcv'd and Routing Packets Sent counters in the lower half of the DECnet Control Panel window.

**7** Wait at least 30 seconds.

You can tell how much time has passed by looking at the Sec's Since Zeroed counter at the bottom.

The two Routing Packets numbers should increment. Take the following actions:

- If your Macintosh is sending and receiving routing packets, quit the Control Panel and again attempt the operation that did not previously work.

In some cases, it is normal for only the Routing Packets Sent counter to increment. For example, if your network does not include a DECnet router, the Routing Packets Rcv'd counter does not increment.

- If the Routing Packets Sent counter does not increment, continue with the next step.

- 8 Check all the network connections. You may need the help of your system administrator to complete this step.
  - Is the cabling properly installed?
  - If you are using an Ethernet connection, do you have the Ethernet card properly installed, and have you installed the correct software from the board's manufacturer?

You will probably need to look at the documentation that comes with the board to verify these items.
  - If you are using LocalTalk, does the router have the appropriate DECnet software installed on it? The name of the router is displayed in the Network Control Panel window.
  - Find out what zone your router is in, and make sure that your Macintosh node is in the same zone as the router. Use the network management utility provided with your multi-protocol router to verify the zone numbers.
  - If you find a problem in your network connections, correct it as described by the hardware manufacturer and try the operation again.
  - If you do not find a problem in your network connections continue to the next step.
- 9 If you verify that both the DECnet for Macintosh software and your network hardware are properly installed, next verify that your Macintosh can communicate with the desired remote node.



---

## Defining Your Node on Other Nodes

The following is provided as a guideline for adding a Macintosh node to an Ethernet or LocalTalk local area network. This information is subject to change by Digital; therefore you should always refer to the DECnet documentation for your specific software release.

You may wish for other network members to know you by your name instead of by just your network address. In this case your name is added to the VMS network database by using the NCP utility.

To show the node name and address of a DECnet for Macintosh node from a VAX node:

(Assume the Macintosh computer has a node name of WESTON.)

Run NCP and enter the following command:

```
$ MCR NCP SHOW NODE WESTON
```

```
Node Volatile Summary as of 12-JUN-1990 13:30:22
```

Node	State	Active Links	Delay	Circuit	Next node
9.682 (WESTON)	reachable	0	2	QNA-0	9.66 (RTE66)

NCP also shows you the router's name, RTE66, and address, 1.66.

To add a Macintosh computer to the network database of a VAX node:

(Assume that the Macintosh has a node name of WESTON and an address of 9.682.)

Run NCP and enter the following lines:

```
$ RUN SYS$SYSTEM:NCP
NCP> DEFINE NODE WESTONADDRESS 9.682
NCP> SET NODE WESTON ADDRESS 9.682
NCP> EXIT
$
```

**Note** *If you are adding your Macintosh to an AppleTalk network, that network must be connected to a router that uses both the AppleTalk and DECnet protocols. Check with your system administrator if you are unsure of your network configuration and you are installing this software.*

---

# Setting Up a Static Asynchronous DECnet Connection

A static asynchronous DECnet connection is a permanent connection between two DECnet nodes. This type of connection can be made in one of two ways:

- The nodes can be connected by a physical line (a null modem cable) attached to a terminal port at each system. No modems are required. You can communicate with the other system at any time.
- The connection can be made over a dialup line by using modems at both ends of the line. For example, your VMS system can establish a static asynchronous connection to a remote node over a telephone line.

The following commands assume that the asynchronous line being configured is TTA2: for a 9600 baud connection. The Macintosh has a node name of WESTON and an address of 9.684. Because you are configuring the line for exclusive use by DECnet software, the line cannot already be allocated for a terminal session. For more information:

- 1 Load the asynchronous DDCMP driver, NODRIVER (NOA0). Enter the commands in the following example (or include them in the file SYS\$MANAGER:SYSTARTUP\_V5.COM command procedure before you boot the system):

```
$ RUN SYS$SYSTEM:SYSGEN
SYSGEN> CONNECT NOA0/NOADAPTER
SYSGEN> EXIT
```



- 2 Set the terminal line to run the DDCMP protocols. To do so, issue the following DCL Command:

```
$ SET TERMINAL/PERMANENT/PROTOCOL=DDCMP/SPEED=9600 TTA2:
```

In this command TTA2: is the name of the terminal port that is connected to the line that you want to make a static asynchronous DECnet line.

You can ensure that these SET TERMINAL commands will be executed automatically each time the network is started in the future. Modify your SYS\$MANAGER:SYSTARTUP\_V5.COM command procedure to include all required SET TERMINAL commands before the command @SYSMANAGER:STARTNET is executed.

- 3 Define the new line and circuit to the VMS system.

To do so, enter the following NCP commands to enable the line:

```
$ RUN SYS$SYSTEM:NCP
NCP> DEFINE LINE TT-0-2 RECEIVE BUFFERS 4 STATE ON
NCP> DEFINE CIRCUIT TT-0-2 STATE ON
NCP> SET LINE TT-0-2 RECEIVE BUFFERS 4 STATE ON
NCP> SET CIRCUIT TT-0-2 STATE ON
NCP> EXIT
```

- 4 Set the Macintosh DDCMP (routing initialization) password using the DECnet for Macintosh NCP utility before access is made. In this example, the default password is set to "WESTON".

**Note** You can change the password using NCP on the VMS system.

To change the password on the VMS system, issue the following commands:

```
$ RUN SYS$SYSTEM:NCP
NCP> DEFINE NODE WESTON ADDRESS 9.682
NCP> DEFINE NODE WESTON RECEIVE PASSWORD WESTON
NCP> DEFINE NODE WESTON INBOUND ENDNODE ACCESS BOTH
NCP> SET NODE WESTON ADDRESS 9.682
NCP> SET NODE WESTON RECEIVE PASSWORD WESTON
NCP> SET NODE WESTON INBOUND ENDNODE ACCESS BOTH
NCP> EXIT
$
```

- 5 If the network is not already on, turn on the network at the VMS system by issuing the following command:

```
$ @SYS$MANAGER:STARTNET
```

- 6 If you want to turn off the asynchronous lines temporarily, run NCP and enter the following commands:

```
$ RUN SYSS$SYSTEM:NCP
NCP> SET LINE TT-0-2 STATE OFF
NCP> SET CIRCUIT TT-0-2 STATE OFF
NCP> CLEAR LINE TT-0-2 ALL
NCP> CLEAR CIRCUIT TT-0-2 ALL
NCP> EXIT
```

For more information on configuring static asynchronous lines see the *DECnet-VAX Network User's Guide*.



---

## Resetting Your DECnet Address

Appendix D contains information about resetting your DECnet address of your Macintosh node or deactivating the configuration.

### Resetting Your DECnet Address

You may want to reconfigure your DECnet node if you change your network node address or the node name when you change your office location.

To reconfigure your DECnet node:

- 1 Launch the DECnet for Macintosh NCP (Network Control Program).
- 2 Select Reset Node Address from the File menu.
- 3 Restart your system.
- 4 Follow the instructions in Chapter 2 to configure your node.

The next section describes how to remove DECnet temporarily to reconfigure DECnet.

### Deactivating Your DECnet Node

To deactivate DECnet for Macintosh:

- 1 Drag the DECnet for Macintosh icon from the System folder.

**Note** *If you are deactivating an Ethernet connection, launch NCP, and select a line type other than Ethernet (for example, a 9600 baud line) from the Line Settings window in NCP. Changing the line setting will remove a DECnet special Ethernet address from your system.*

**2** Restart your system.

When you restart your system, DECnet for Macintosh is no longer installed.

**Hint** *To remove DECnet permanently from your Macintosh computer, remove all the files described in Chapter 1.*

---

# Glossary

## A

### **adjacent node**

Designated router in Ethernet and AppleTalk connections; the node at the other end of the line in point-to-point asynchronous connections.

### **AppleTalk for VMS**

Networking software that allows a VMS system to communicate with an AppleTalk network.

### **AppleShare**

Apple's file and print server software that runs on a Macintosh computer and services Macintosh computers on an AppleTalk network.

### **AppleTalk/DECnet Transport Gateway**

The gateway that provides AppleTalk users with access to applications based on DECnet.

## B

### **backup**

The operation of duplicating files or volumes of files to protect data from loss or corruption.

See restore.

**bridge**

A way of connecting networks. AppleTalk networks can be one or more local area networks connected by bridges.

**button**

A standard Macintosh control that causes some immediate or continuous action when clicked or pressed with the mouse.

**buffer**

Area of computer memory available to receive data (incoming and outgoing). You can monitor the size of network buffers by using the DECnet Control Panel desk accessory and change the buffer size by using the NCP program.

**C****CTERM**

A protocol used with DECnet software for remote terminal sessions.

**Chooser**

A desk accessory that allows Macintosh users to select specific network devices and services.

**client**

A hardware or software process that makes use of the services of another process. An example of a client is a Macintosh workstation connected to a network.

**Control panel device (Cdev)**

Software that, when installed in the System Folder of the Macintosh, can be activated from the Macintosh Control Panel.

**Control Panel**

A desk accessory that allows Macintosh users to monitor and control specific devices and services.

See Control panel device (Cdev).

## D

### **DCL (DIGITAL Command Language)**

A command interpreter in a VMS system. It provides a means of communication between the user and the operating system.

### **DDCMP (Digital Data Communications Protocol) connection**

See dynamic asynchronous connection.

### **PATHWORKS for Macintosh**

Digital's software that connects Macintosh computers to VAX computers and allows users to share file and print services.

### **DECnet tunnel**

A DECnet logical link used to connect two or more geographically separate AppleTalk internets.

### **default**

A setting or value automatically used by a program if the user does not specify the value. For example, a default directory and device are the directory and disk drive that you commonly access in your account on the VAX computer. You can provide one or both of these settings to the NetCopy program.

### **directory**

A VMS file that contains other files. In the DECnet for Macintosh NetCopy program, a VMS directory is displayed with a folder icon to the left of the directory name.

See folder.

### **dynamic asynchronous connection**

A connection between two DECnet nodes over a telephone line that is normally switched on for network use only for the duration of a dialup connection between the two nodes.



## **E**

### **Ethernet**

A high-speed local area network system that uses specific cables and protocols. Ethernet interconnects different kinds of computers, information processing products, and office equipment at a local site without requiring a switching logic or control by a central computer.

### **executor**

The node at which an NCP command actually executes.

## **F**

### **FAL (File Access Listener)**

A program that listens for requests for your files without your having to know about it. FAL constantly listens for requests from remote systems to access your local disk files and handles all security access.

### **file server**

Software that provides file services to network users.

### **Finder**

A Macintosh application that allows access to documents and other applications; the Finder uses icons to represent objects on a disk or volume. You use it to manage documents and applications and to move information between disks.

### **folder**

A container that can hold documents, applications and other folders on the Macintosh desktop. Folders act as directories, keeping files organized for the user.

See directory.

### **fork**

Macintosh files have two parts known as forks. The data fork stores text and binary data. The resource fork contains items that are specific to Macintosh computers such as icons, menus, and program code.

## H

### **hierarchical file system (HFS)**

The file system of files and folders used on Macintosh hard disk drives. You can click in a dialog box on folder icons to enter the next lower level in the hierarchy. You can pull down list of folders in the title bar to enter the next higher level.

## I

### **init**

A startup document.

### **image files**

Non-Macintosh files that are stored on your Macintosh. Image files are transferred byte-for-byte.

See binary and text files.

## L

### **LAT**

See Local Area Transport.

### **link**

Communication path between 2 nodes.

### **Local Area Network**

A privately owned network that offers a high-speed, reliable communication channel. LANs span a limited distance, such as a building or cluster of buildings, but can be connected to wide area networks (WANs) with routers.

### **logging**

Recording information about an event. NetCopy Error Window maintains such a log about network connections and file transfers.

## N

### **node name**

A name that begins with a letter and contains six or fewer letters and numbers that uniquely identifies your DECnet node. Node names are assigned by the network administrator

**node number**

A number assigned by the network administrator that uniquely identifies your DECnet node.

**P****packet**

A unit of data to be transmitted from a source node to a destination node.

See router.

**partner**

In a DECnet tunnel, the DECnet partner at the opposite end of the DECnet logical link.

**permanent database**

The file containing information that is retained after network startup across system shutdowns. In DECnet for Macintosh this file is called "Network Data" and is found in your system folder.

**port**

The socket or connector on the back of the computer to which a communication device is connected.

**print server**

Software that provides print services to network users.

**proxy access**

An option that equates one or more users on a remote node to users on your local node. With a proxy access enabled, a user on a remote node can access any data from the local node.

**R****restore**

An operation that return files to their original state after they have been copied by a backup utility. DECnet for Macintosh includes the full Macintosh file name within the file as well as its disk and folder path so that the file can be restored to its original location.

See backup.

**root**

The base or topmost directory in volume catalog or Macintosh hard disk.

**router**

A node that can send and receive packets and can route packets from one node to another.

**T****text files**

Simple files that use binary codes to represent letters, numbers, and other printable characters.

See binary files.

**V****VAXshare**

The component of PATHWORKS for Macintosh that provides file and print services compatible with AppleShare.

**volume**

The largest logical unit of the file structure. A volume can be part of a disk, an entire disk (for example, a Macintosh hard disk), or multiple disks (for example, some VMS volumes).

**Z****zeroing**

Setting the counters on the Network Control Panel to zero.

**zone**

A conceptual way of organizing devices in an AppleTalk network that makes it easier to locate network services.



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# Reader's Comments

PATHWORKS for Macintosh  
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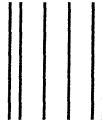
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