



Apple IP Gateway Administrator's Guide

 Apple Computer, Inc.

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Preface

About This Guide

The Apple IP Gateway is software that allows communication between an AppleTalk network or internet and an Internet Protocol (IP) network or internet. This guide explains how to install, configure, and operate the Apple IP Gateway, both on its own and in conjunction with the Apple Internet Router or with an Apple Remote Access Personal or MultiPort Server. The guide also tells you how to prepare users to access the gateway, details several methods for making the gateway more secure, and provides solutions to problems that may come up.

What this guide contains

The chapters of this guide provide the following information:

- Chapter 1, “About the Apple IP Gateway,” gives a basic introduction to how the gateway works and how it can be used.
 - Chapter 2, “Installation and Setup,” covers software installation and configuration information for both MacTCP and the gateway itself. In addition, the chapter includes a section that covers the various options you have in preparing users to access the gateway.
 - Chapter 3, “Operating and Monitoring the Apple IP Gateway,” provides detailed information for operating the gateway and establishing gateway security. The chapter also covers viewing gateway statistics and monitoring the gateway with SNMP.
 - Chapter 4, “Troubleshooting,” offers solutions to problems that may come up.
 - The Appendix, “The Apple IP Gateway MIB,” lists the variables that can be monitored with SNMP.
-

On-screen help

The Apple IP Gateway includes Balloon Help, featuring balloons that provide descriptions of items on the Macintosh screen. To access Balloon Help, choose Show Balloons from the Help (?) menu. When you point to items on the screen, balloons appear explaining each item. To turn off Balloon Help, choose Hide Balloons from the Help menu.

What you need to know

This guide assumes that you are familiar with basic Macintosh operations. If you need more information, refer to the documentation that came with your computer. In addition, the Apple IP Gateway works in coordination with MacTCP, and, optionally, with the Apple Internet Router and the Apple Remote Access Personal or MultiPort Servers. Although much of the information that you'll need is repeated here, you'll find it helpful to have a thorough understanding of these products. To get that understanding, refer to the documentation supplied with each application program. Finally, a Macintosh SNMP agent is installed with the Apple IP software; to utilize this agent, you will need to install MacSNMP software, which is supplied with either the AppleTalk Administration for Macintosh or the TCP/IP Administration for Macintosh products. The *MacSNMP Administrator's Guide*, included with both Administration products, provides a basic introduction to network management with SNMP as well as detailed instructions for configuring the agent software.

For more information

The Apple IP Gateway provides access to services on IP networks, including the Internet. An introduction to Internet services is beyond the scope of this guide. There are, however, numerous books available if you want to learn more. Any of the following would provide a good introduction. There are literally hundreds of others, with more coming out each week.

Falk, Bennet, *The Internet Roadmap*, Sybex, San Francisco, 1994. A general introduction to Internet basics, covering how to use USENET, how to send E-mail, how to access the World-Wide Web, and how to master the most common Internet tools, such as FTP and Gopher.

Gaffin, Adam, *Big Dummy's Guide to the Internet*, MIT Press, Cambridge, 1994. A printed version of a widely used online guide.

Kehoe, Brendan P., *Zen and the Art of the Internet*, Prentice-Hall, Englewood Cliffs, New Jersey, 1993. Subtitled "A Beginner's Guide," this is a short treatment of Internet services and how to access them.

Krol, Ed, *The Whole Internet User's Guide and Catalog*, O'Reilly and Associates, Sebastapol, California, 1992. An all-in-one introduction, covering history and technical basics, plus detailed coverage of services available.

Lambert, Steve and Howe, Walt, *Internet Basics*, Random House, New York, 1993. A general introduction to history, use, and available services.

LaQuey, Tracey and Ryer, Jeanne C., *The Internet Companion*, Addison-Wesley, Reading, Massachusetts, 1993. A short and nontechnical introduction featuring a foreword by Vice-President Al Gore.

1

About the Apple IP Gateway

The Apple IP Gateway provides Macintosh computers on an AppleTalk network access to services on an Internet Protocol (IP) network—even if the computers themselves are on an AppleTalk system that does not directly support IP. Thus the gateway is particularly useful for Macintosh computers connected by LocalTalk cabling or through Apple Remote Access.

The Apple IP Gateway can be installed on a wide range of Macintosh computers. It can be used on its own or in conjunction with an Apple Remote Access MultiPort or Personal Server or with the Apple Internet Router. This chapter gives an overview of how the gateway works and explains the various options for its use.

About IP networks

The Internet Protocol (IP) and its companion, the Transmission Control Protocol (TCP), were first developed as part of a United States defense research effort some twenty years ago. Since then, TCP/IP has become the international standard for heterogeneous networking, in which many different computer types can interoperate and share information and services.

TCP/IP can be used for local area networking, in which, for example, clients access data from a UNIX[®] host. It can also be used for giant internetworks, composed of hundreds of local networks linked by a wide variety of communications methods. The best known of these giants is the Internet, which is often regarded as the prototype of the Information Superhighway. Like TCP/IP itself, the Internet began as a U.S. defense project. It has since grown into an international web linking universities, research centers, corporations, and, increasingly, private citizens, who are gaining access by the thousands every month. Note that this Internet is always spelled with a capital *I*. A lowercase *internet* can be any interconnected set of networks, whether based on TCP/IP, AppleTalk, or some other protocol. The Apple IP Gateway provides access to any TCP/IP network or internet, including the Internet itself.

How the gateway works

On both AppleTalk and IP networks, data is broken down into packets for transmission. The two network types use different sets of rules—protocols—for packet construction and for addressing packets to their correct destinations. Data can't ordinarily cross from one network type to the other. The Apple IP Gateway solves this problem. Installed on a Macintosh computer that is connected to both an IP network and an AppleTalk network, the Apple IP Gateway makes addressing transparent on both sides, so communications can pass freely.

IMPORTANT The gateway computer must be connected to IP by Ethernet cabling. Client computers may be networked by LocalTalk, Ethernet, or other AppleTalk-compatible cabling types. Both the client computers and the gateway computer must have MacTCP software installed. This allows them to “talk” IP, even though they are using AppleTalk as the underlying network protocol.

Users who want to access an IP service construct their requests in the appropriate IP format. The packets have all the information necessary for transport and reassembly on the IP side. Speaking metaphorically, the packets are enclosed in IP “envelopes.” To get this message to the gateway, the IP packets are encapsulated in Datagram Delivery Protocol (DDP) packets; DDP is the AppleTalk standard for data transport. The IP envelope, in other words, is put inside a DDP envelope for shipment to the gateway. On arrival, the gateway strips off the DDP envelope and sends the IP packet on its way.

When the IP host sends back a reply, the process is reversed. The gateway encapsulates the IP data in a DDP envelope and transmits it to the client over AppleTalk.

Figure 1 shows how the gateway makes it possible to move data from an AppleTalk network to an IP network.

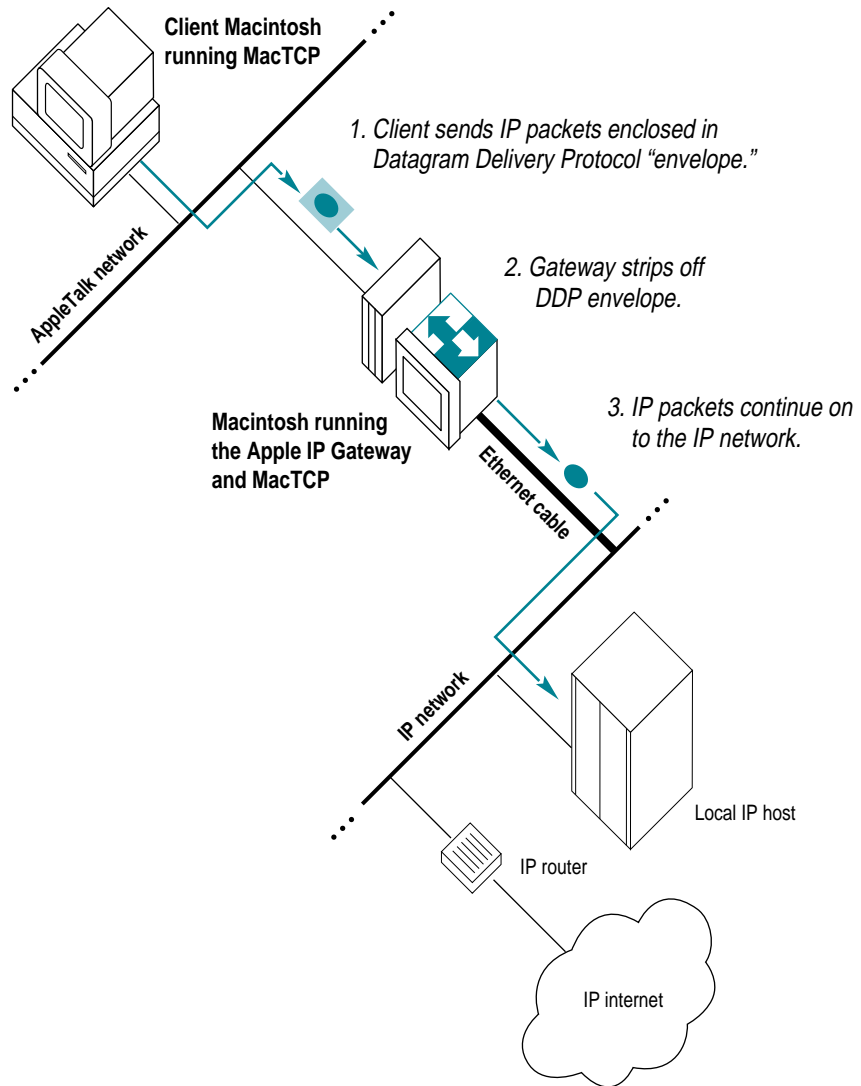


Figure 1 How the Apple IP Gateway works

How the gateway can be used

Depending on the type of AppleTalk network you are working with and the needs of your network users, you can run the gateway as a stand-alone product, or you can use the software in conjunction with either the Apple Internet Router or an Apple Remote Access Personal or MultiPort Server. Using these options is covered in detail in Chapter 3, “Operating and Monitoring the Apple IP Gateway.” The descriptions that follow give you an idea of overall functionality.

Using the gateway as a stand-alone product

When the Apple IP Gateway is installed on a Macintosh computer that is properly connected to both an IP and an AppleTalk network, any Macintosh computer on the AppleTalk network can access the IP internet through the gateway. All that is necessary is that the client computer have both MacTCP and any appropriate IP software installed.

Using the gateway with the Apple Internet Router

If the gateway is installed on a Macintosh computer that is also running the Apple Internet Router software, the gateway’s power is greatly expanded. Now any Macintosh computer on any AppleTalk network that is part of the router’s internet can use the Apple IP Gateway to access the IP network. Figure 2 shows how the router works with the gateway.

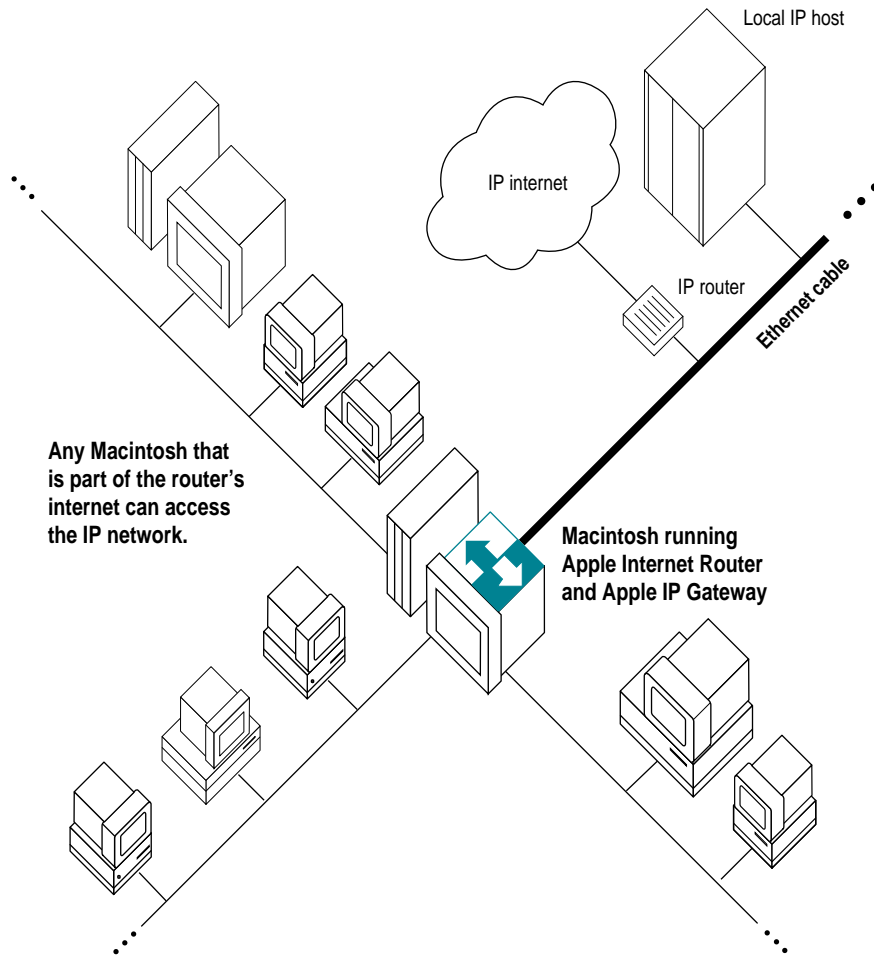


Figure 2 Combining an Apple Internet Router with the Apple IP Gateway lets you offer gateway services to all Macintosh computers served by the router.

The Apple Internet Router and the Apple IP Gateway software can run on the same computer, although they do not have to. Putting the two programs on the same computer is usually the convenient and cost-effective choice. One machine provides both services; the software is physically located where the cabling comes together; and there is only one place for something to go wrong, so errors are easier to find and correct.

The Apple IP Gateway and the Apple Internet Router AppleTalk/IP Wide Area Extension

Although it is easy to confuse the Apple IP Gateway and Apple Internet Router AppleTalk/IP Wide Area Extension, the two software programs actually provide two completely different services.

The Apple IP Gateway allows Macintosh computers on an AppleTalk network to communicate with computers of many different types on an IP network. The AppleTalk/IP Wide Area Extension allows Macintosh computers on an AppleTalk network to communicate with other Macintosh computers on another AppleTalk network located, figuratively speaking, on the other side of an IP internet.

The extension is based on a software file called IPTunnel, so named because it builds a tunnel between the two AppleTalk networks through the IP internet. Because IP internets span the globe, the AppleTalk/IP Wide Area Extension provides a fast, powerful, and cost-effective way for widely separated local-area AppleTalk networks to link up. The extension does not, however, provide access to IP services. That is the job of the Apple IP Gateway. The two programs can run on a single computer, offering users the full potential of both. Figure 3 shows their capabilities in graphic form.

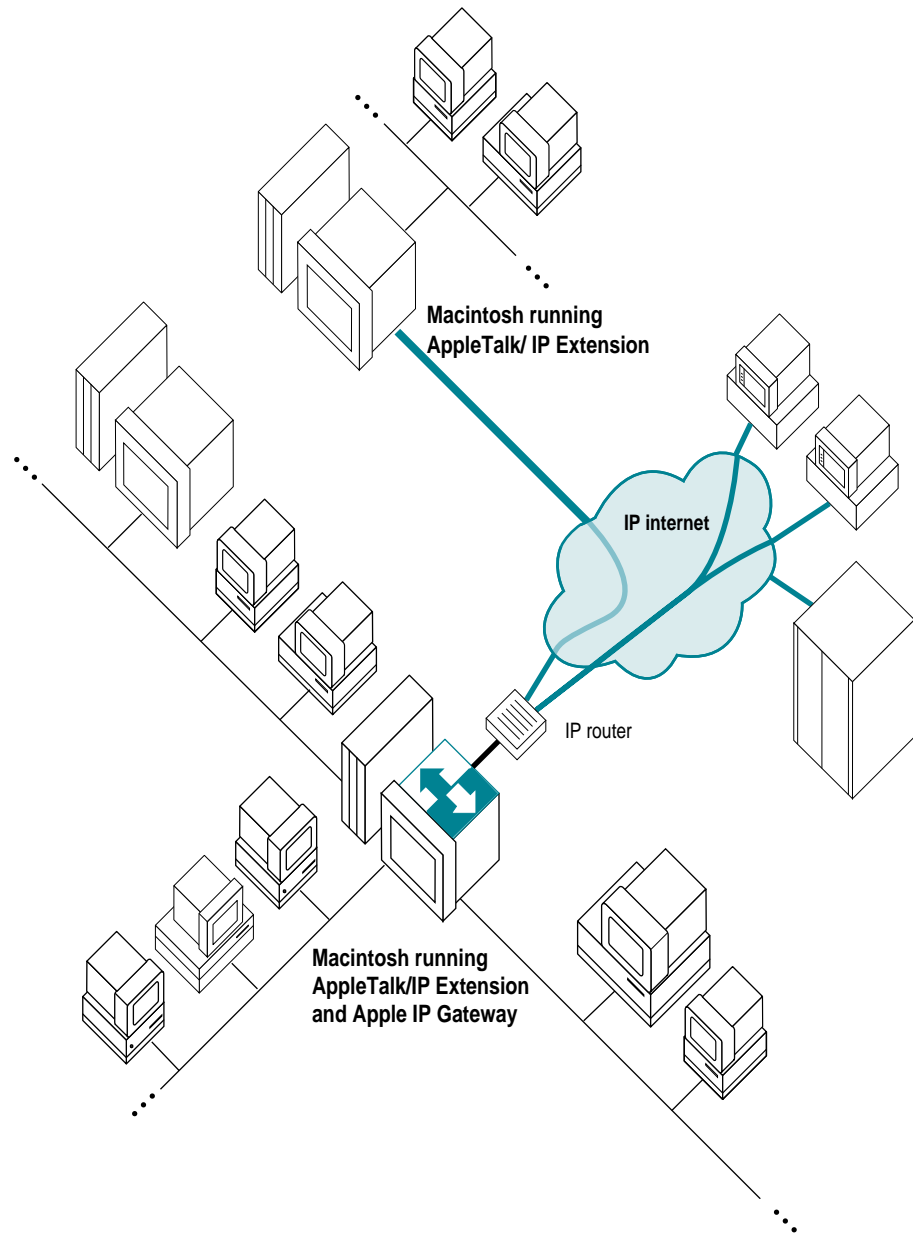


Figure 3 The Apple IP Gateway provides communication with IP computers; the Apple Internet Router AppleTalk/IP Wide Area Extension creates a tunnel through the IP internet, through which Macintosh computers can communicate.

Using the gateway with an Apple Remote Access server

Apple Remote Access software creates a remote extension of an AppleTalk network, with packets transmitted over telephone lines rather than over dedicated cables. Users who dial into an AppleTalk network through an Apple Remote Access Personal or MultiPort Server can access all network services as though they were locally connected. If the Apple Remote Access server computer has access to the Apple IP Gateway, server users can also access IP services, again as though they were locally connected.

Note: Remote users must be authorized to use the gateway by the Apple Remote Access server administrator. See your Apple Remote Access documentation for details on controlling network access.

Adding the remote-access option greatly extends the reach of the gateway, but setup and operation are essentially the same as for the stand-alone environment. Note that, as with the Apple Internet Router, it is often simplest and most cost-effective to install both software programs on a single computer, but this is not strictly necessary if it is more convenient for you to use two machines.

Figure 4 shows how Apple Remote Access clients use the gateway to access IP services.

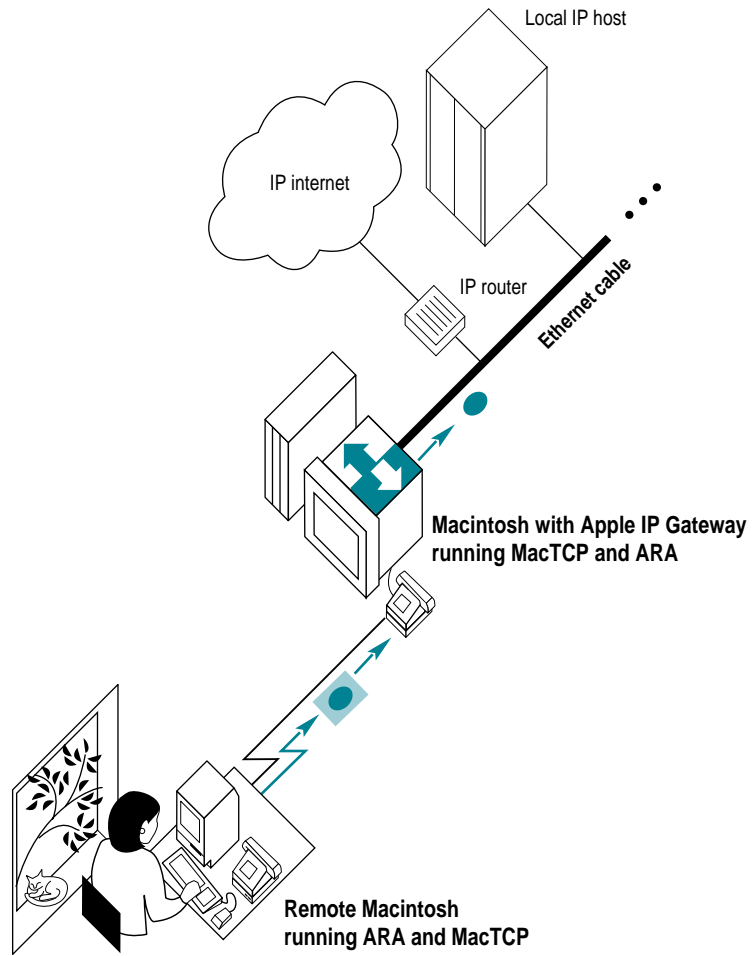


Figure 4 Apple Remote Access (ARA) client access to IP services

The Apple IP Gateway and the AppleSearch WAIS Gateway

AppleSearch 1.5 includes a WAIS Gateway that allows AppleSearch clients to search WAIS (wide area information server) computers on the Internet. Like the Apple IP Gateway, the WAIS Gateway requires a Macintosh with both AppleTalk and IP connections. The two gateways can run on the same machine, thus giving users the benefits of both approaches. However the benefits are different and should not be confused. The Apple IP Gateway is a general-purpose IP access tool that does not require the AppleSearch software. The WAIS Gateway is a specialized access tool that does.

Network management

The Apple IP Gateway is supplied with an SNMP IP Gateway Agent and related SNMP software that allow a set of variables (called a Management Information Base, or MIB) to be viewed. These variables are listed in the Appendix, “The Apple IP Gateway MIB.”

SNMP stands for Simple Network Management Protocol, and it is the standard mechanism for managing nodes, such as routers, hubs, and host computers, on a TCP/IP network. An SNMP agent may be thought of as a reporting device that supplies information about a particular MIB.

You can view the Apple IP Gateway MIB locally by installing either the MacSNMP Client or the MacSNMP Administration software. These programs are provided with the AppleTalk Administration for Macintosh and the TCP/IP Administration for Macintosh products.

If you want to view the MIB remotely, you’ll need a network-management console. Such consoles are available from a number of vendors.

Exploring these network-management options is beyond the scope of this book. The *MacSNMP Administrator’s Guide*, supplied with the MacSNMP software, provides information on using MacSNMP itself and also points you in the right direction if you wish to implement full network management. See your Apple-authorized reseller for more information.

Hardware and software requirements

The Apple IP Gateway may be installed on any Macintosh II or later Macintosh computer that is equipped with

- Ethernet on the IP side

If the gateway computer does not support NuBus™, it must have built-in Ethernet, a processor-direct slot (PDS) card, or a SCSI adapter. See the documentation supplied with the card or adapter for full information on installation, setup, and operation.

- any AppleTalk link, such as LocalTalk, EtherTalk, or Apple Remote Access, on the AppleTalk side

See the documentation supplied with the cabling or with the Remote Access software for full information on installation, setup, and operation.

- at least 4 megabytes of random-access memory (RAM)
- System 7.1 or later

MacTCP version 2.0.4, AppleTalk version 58.1.3, the MacSNMP agents, and other required networking software are all installed with the gateway. This software is discussed in “Installing the Gateway Software” in Chapter 2.

If the gateway computer is also supporting either the Apple Internet Router or an Apple Remote Access server, it must meet all hardware and software requirements for those products. You may need to increase RAM to provide adequate memory to run all services simultaneously. See the *Apple Internet Router Administrator's Guide*, the *Apple Remote Access MultiPort Server Administrator's Guide*, or the *Apple Remote Access Personal Server User's Guide* for full information.

2

Installation and Setup

This chapter covers all available options for installation of the Apple IP Gateway and describes the procedures for each. Proper setup varies according to network administrator preference and the kind of access you want to offer network users. Setup procedures require coordination between the Apple IP Gateway software itself and the MacTCP software on the gateway computer. This chapter shows you how to make them work together to achieve the desired result. Finally, the chapter tells you how to get users ready to access the gateway.

International users

If you are installing the Apple IP Gateway on a non–United States Macintosh computer, you should run the Network Software Installer (NSI) before proceeding with the rest of the installation process. The NSI installs the latest international versions of all networking software. The *Network Software Installer* disk is supplied in your Apple IP Gateway package.

Before running the NSI, you should make a backup copy of its disk. Put the original aside for safekeeping, and use the backup for installation.

Installing networking software using Easy Install

To run the NSI using Easy Install:

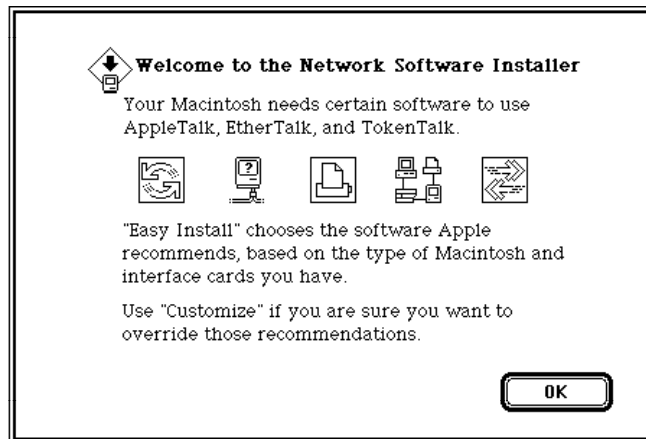
- 1 **Insert the backup copy of the *Network Software Installer* disk into your computer's floppy disk drive and double-click the disk icon to open it.**

The Installer icon is in the window that appears.



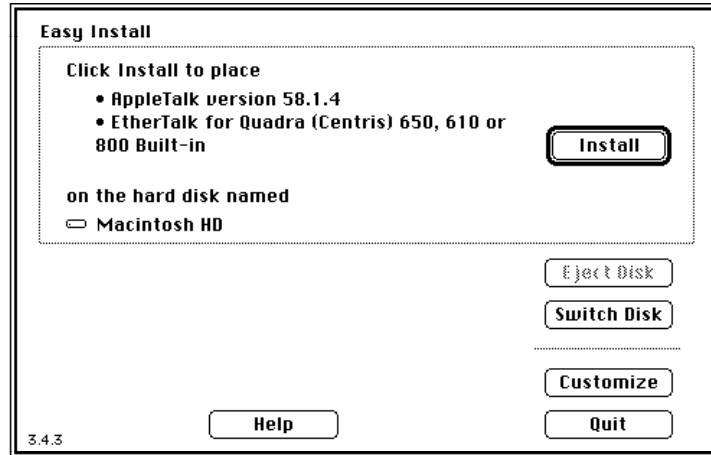
- 2 **Double-click the Installer icon to open the Installer program.**

An informational dialog box appears:



3 Click OK.

The Easy Install dialog box appears:



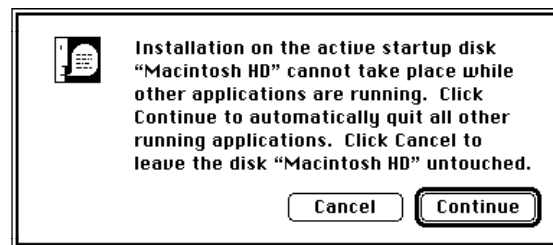
4 If necessary, click Switch Disk until the name of the disk you want to install on appears.

The Easy Install process is preset to install all the networking software contained on the *Network Software Installer* disk onto your current startup disk. By switching disks, you can install the networking software on any hard disk that has a System Folder.

IMPORTANT You must install the networking software on the same disk as the Apple IP Gateway.

5 Click Install to place the networking software on your hard disk.

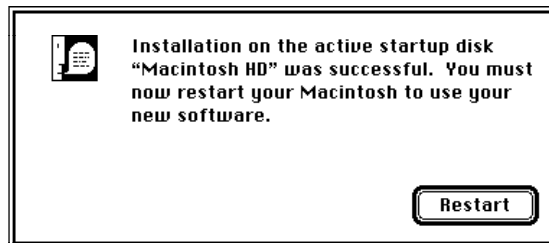
If other programs are currently running on your computer, the following dialog box appears:



Clicking Continue automatically quits all open programs and begins the installation. Clicking Cancel quits the Installer and leaves your hard disk unchanged.

The Installer begins the installation process, with on-screen messages reporting its progress. You can cancel the installation at any time, leaving the hard disk unchanged.

- 6 When you see a message reporting that installation was successful, click Restart.**



After you restart your computer, you can proceed to the section "Installing the Gateway Software," later in this chapter.

Installing networking software using the Customize option

The Customize option lets you pick and choose from the networking software contained on the NSI disk. It is particularly useful if disk space is at a premium and if you know there are software files you won't need.

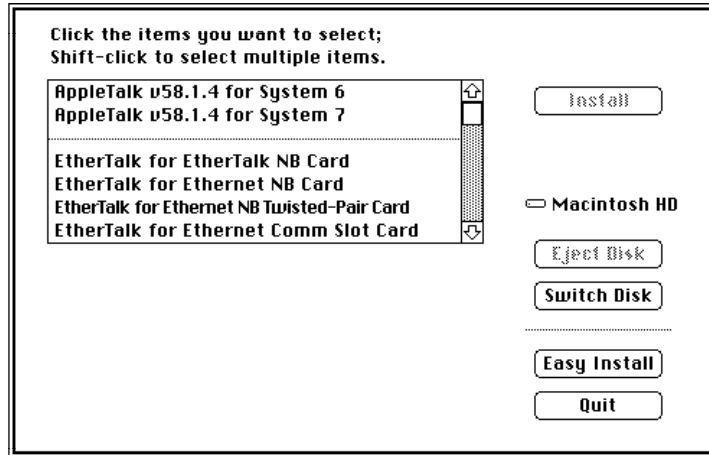
To use the Customize option:

- 1 Follow steps 1 through 3 in the preceding section, "Installing Networking Software Using Easy Install."**

The Easy Install dialog box appears.

2 Click Customize.

The Customize dialog box appears:



3 If necessary, click Switch Disk until the name of the disk you want to install on appears.

The Customize option is preset to install the designated networking software onto your current startup disk. By switching disks, you can install the networking software on any hard disk that has a System Folder.

IMPORTANT You must install the networking software on the same disk as the Apple IP Gateway.

4 Select the software you want to install.

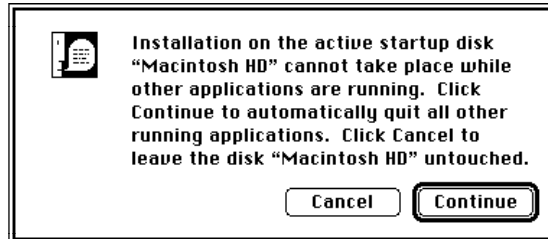
Select an item by clicking its name; select multiple items by Shift-clicking.

- You must select AppleTalk for System 7.
- You don't need AppleTalk for System 6.

You may or may not need the rest of the networking software. To be sure, it may be necessary to review your system or to ask for help from your network administrator.

5 Click Install to place the networking software on your hard disk.

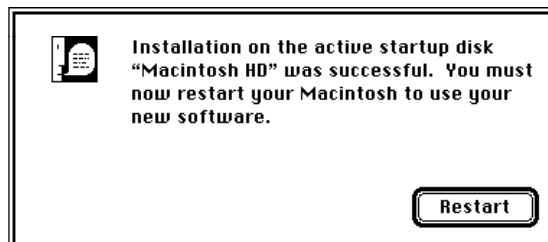
If other programs are currently running on your computer, the following dialog box appears:



Clicking Continue automatically quits all open programs and begins the installation. Clicking Cancel quits the Installer and leaves your hard disk unchanged.

The Installer begins the installation process, with on-screen messages reporting its progress. You can cancel the installation at any time, leaving the hard disk unchanged.

6 When you see a message reporting that installation was successful, click Restart.



After you restart your computer, you can proceed to the next section, "Installing the Gateway Software."

Installing the gateway software

Before installing your gateway software, you should make a backup copy of the installation disks, the *Apple IP Gateway Installer 1* and *Apple IP Gateway Installer 2*, which you will find in the Apple IP Gateway package. Put the originals aside for safekeeping, and use the backups for installation.

This section describes the Easy Install procedure that Apple recommends as well as the Custom Install procedure that you may want to use instead. The section also shows you how to specify locations for software installation if you don't want to use the default locations for which the Installer is set.

Using Easy Install

Easy Install places all the software Apple recommends in the appropriate locations on your startup disk. This includes

- the Gateway Manager
- the MacTCP control panel
- all necessary system extensions
- SNMP network-management software
- AppleTalk version 58.1.3 (for United States users)

Note: International users can use Easy Install. All software installed with the Network Software Installer will be retained.

To install this software:

- 1 **Insert the backup copy of the *Apple IP Gateway Installer 1* disk into your computer's floppy disk drive and double-click the Apple IP Gateway icon to open it.**

The Installer icon is in the window that appears.



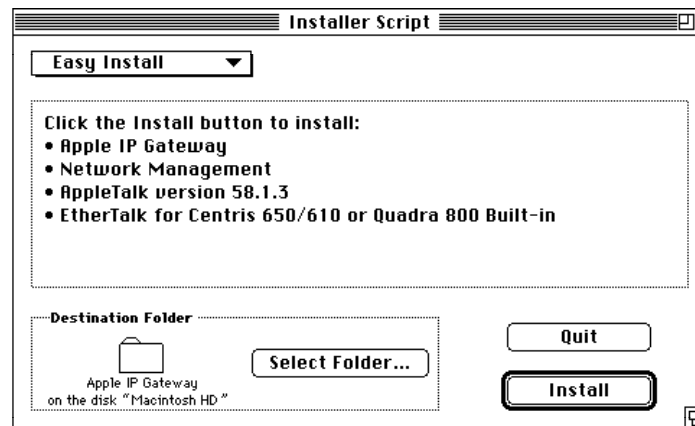
- 2 Double-click the Installer icon to open the Installer program.

An informational dialog box appears.



- 3 Click Continue.

The Installer dialog box appears, set for Easy Install.



When you click Install, the Installer automatically creates a folder on your startup disk called Apple IP Gateway and installs the Gateway Manager in that folder. It also automatically installs all other gateway software in the System Folder on your current startup disk. If you want to use those default locations,

proceed to step 4. If you want to install the Gateway Manager in an alternate location, or if you want to install the gateway extensions into a different System Folder, you should now follow the procedures in “Designating Software Locations,” later in this chapter. When you have completed those procedures, return here and go on to step 4.

4 Click Install to place the Apple IP Gateway software on your hard disk.

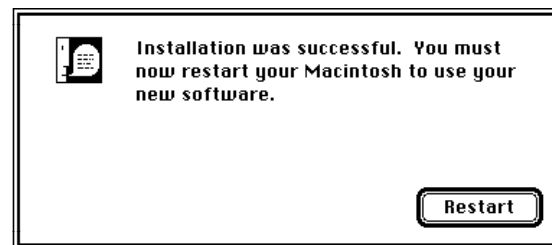
If other programs are currently running on your computer, the following dialog box appears:



Clicking Continue automatically quits all open programs and begins the installation. Clicking Cancel quits the Installer and leaves your hard disk unchanged.

The Installer begins the installation process, with on-screen messages reporting its progress. You will be prompted to switch disks when necessary. You can cancel the installation at any time, leaving the hard disk unchanged.

5 When you see a message reporting that installation was successful, click Restart.



Using Custom Install

Custom Install allows you to pick and choose which files you want for installation. The following software is the minimum necessary for the gateway to run successfully:

- the Apple IP Gateway software, including the Gateway Manager and MacTCP version 2.0.4 or later
- AppleTalk version 58.1.3 or later

You may want to use Custom Install if:

- you have all necessary software drivers
- you don't want to install any unnecessary drivers

IMPORTANT MacTCP is included with the Apple IP Gateway software under Custom Install. If you have a later version of MacTCP already installed, the Installer will automatically use those later files. You do not have to consider MacTCP in a custom installation. In addition, the Installer will not install AppleTalk version 58.1.3 over a later version of AppleTalk.

To use Custom Install:

- 1 **Insert the backup copy of the *Apple IP Gateway Installer 1* disk into a floppy disk drive and double-click the Apple IP Gateway icon to open it.**

The Installer icon is in the window that appears.



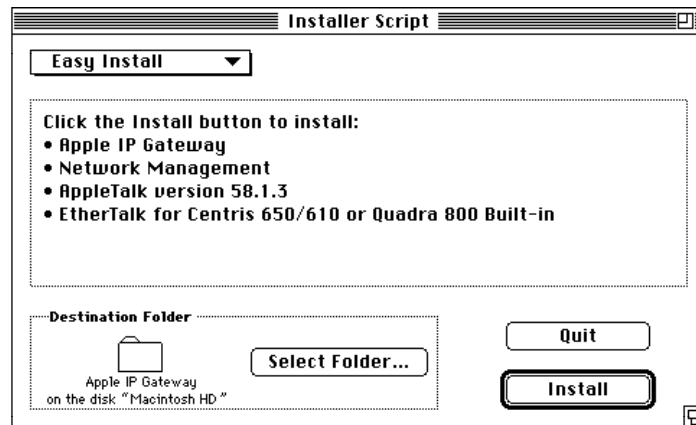
- 2 **Double-click the Installer icon to open the Installer program.**

An informational dialog box appears.



3 Click Continue.

The Installer dialog box appears, set for Easy Install.

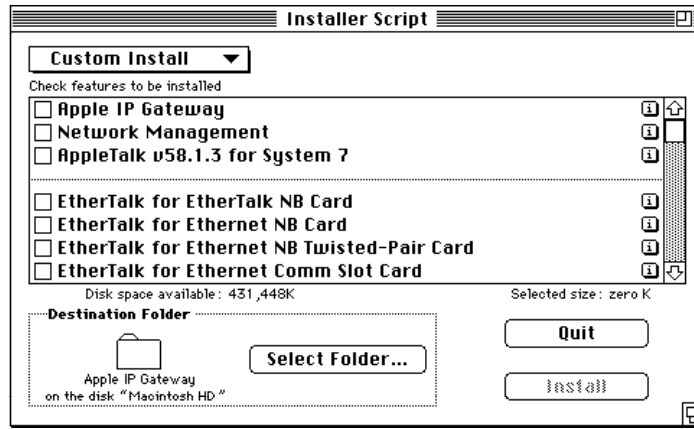


4 Choose Custom Install from the pop-up menu at the top of the Installer dialog box.



Note: The Custom Remove option allows you to remove installed files should this ever prove necessary.

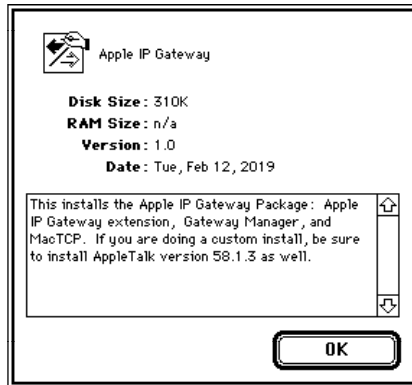
The Custom Install dialog box appears.



The Installer is set to create a folder on your startup disk called Apple IP Gateway and to install the Gateway Manager in that folder. It automatically installs all other gateway software in the System Folder on your current startup disk. If you want to use those default locations, proceed to step 5. If you want to install the Gateway Manager in an alternate location, or if you want to install the gateway extensions into a different System Folder, you should now follow the procedures in “Designating Software Locations,” later in this chapter. When you have completed those procedures, return here and go on to step 5.

5 Click the checkboxes to select those items you wish to install.

To understand more about any item, click the small *i* on the far right of the list. This opens an informational window, as shown by the following example, that tells you what each piece of software does and what subitems, if any, are included in the main listing.



Click OK when you're done reviewing the informational window.

6 Click Install to place the selected software on your hard disk.

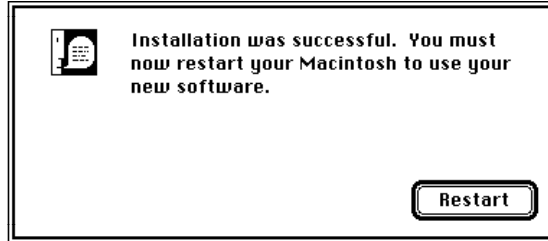
If other programs are currently running on your computer, the following dialog box appears:



Clicking Continue automatically quits all open programs and begins the installation. Clicking Cancel quits the Installer and leaves your hard disk unchanged.

The Installer begins the installation process, with on-screen messages reporting its progress. You will be prompted to switch disks when necessary. You can cancel the installation at any time, leaving the hard disk unchanged.

- 7 When you see a message reporting that installation was successful, click Restart.



Designating software locations

The Installer automatically installs the Gateway Manager on the current startup disk in a folder called Apple IP Gateway. The Installer places all other gateway software in the System Folder of the current startup disk. You can change these automatic locations using the Destination Folder section of either the Easy Install or the Custom Install dialog box.

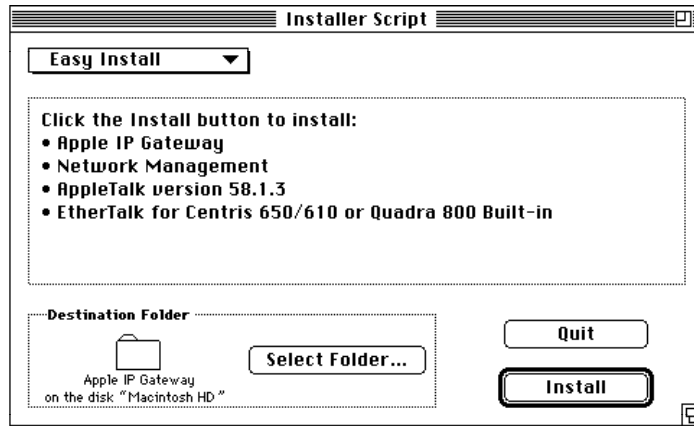
You can install the Gateway Manager in any folder on any hard disk. You can install the rest of the gateway software in any System Folder on any hard disk.

IMPORTANT If you do install the gateway System Folder software in the System Folder of any disk that is not the current startup disk, you will need to make that disk the current startup disk before you can run the gateway.

Designating a location for the Gateway Manager

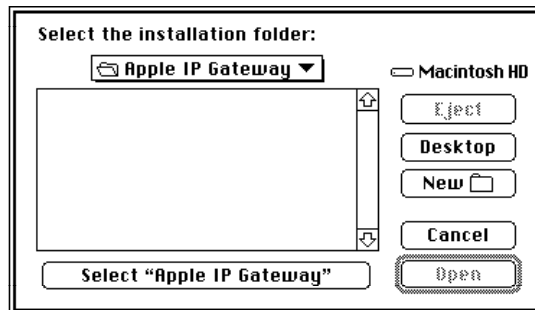
You can designate a folder for the Gateway Manager using the following procedure:

- 1 Click **Select Folder** in the **Destination Folder** section of the Installer dialog box, shown in the following figure.



Note: The process is the same whether the Installer is set for Easy Install or Custom Install.

The Folder Selection dialog box appears:



2 Using standard folder navigation techniques, locate the folder and hard disk for installation.

If you have any questions about folder navigation, see the documentation that came with your Macintosh computer. You can navigate to any folder or connected hard disk.

3 Designate a folder for the Gateway Manager installation.

You can select any folder on any hard disk, or you can create a new folder using the following procedure:

- a. Click the New Folder (📁) button on the right side of the dialog box. The New Folder dialog box appears:



- b. Type the name of the new folder.
- c. Click Create.

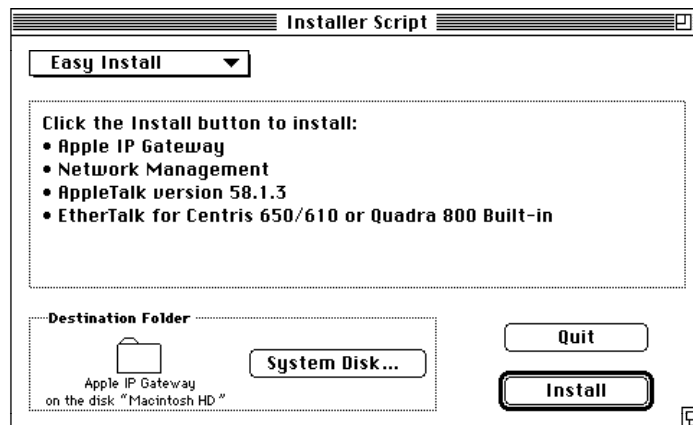
4 Click the Select "<name of folder>" button at the bottom of the dialog box.

When you click Install, the Gateway Manager will be installed in this folder.

Designating a System Folder for the gateway software

The gateway software, exclusive of the Gateway Manager, must be installed in a System Folder. It does, not, however, have to be installed in the System Folder on the active startup disk, although you will have to use the chosen disk as the active startup disk when you run the gateway. To choose a System Folder for the gateway software:

- 1 Holding down the Option key, click System Disk in the Destination Folder section of the Installer dialog box, shown in the following figure:**



Note: The process is the same whether the Installer is set for Easy Install or Custom Install.

The System Disk dialog box appears:



- 2 Choose a system disk from the pop-up menu.
- 3 Click OK.

The gateway software will be installed on the designated system disk.

Setting up the gateway

To set up the Apple IP Gateway, you first configure your MacTCP software, after which you configure the gateway itself.

Configuring MacTCP

You can access the MacTCP control panel from the Gateway Manager or directly from the Apple (🍏) menu in the Finder. To access the control panel from the Gateway Manager:

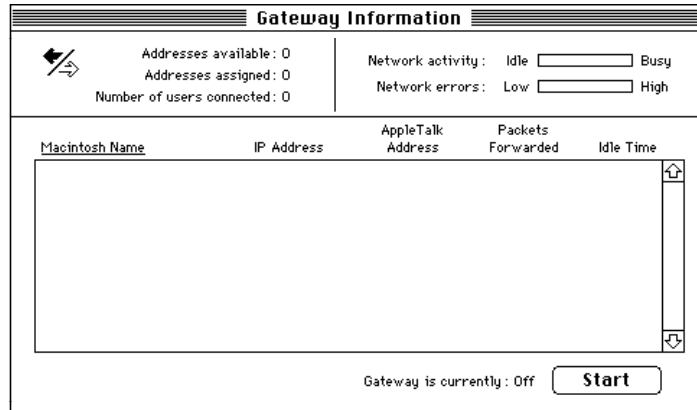
- 1 Double-click the Gateway Manager icon to open the program.

The Gateway Manager icon looks like the illustration shown here:



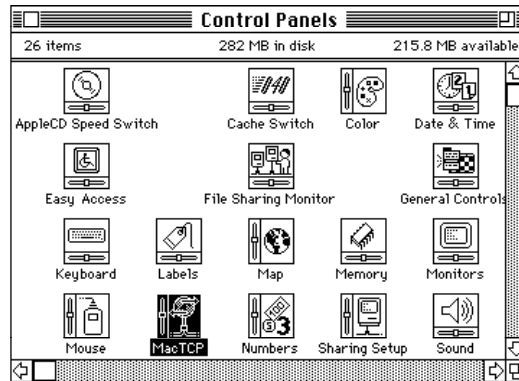
Gateway Manager

After you double-click the icon, the Gateway Information window and menus appear.

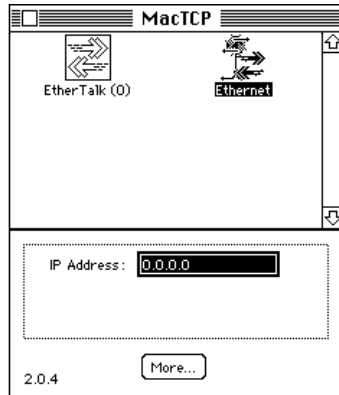


2 Choose “Set up MacTCP” from the Control menu.

Alternatively, choose Control Panels from the Apple menu and double-click the MacTCP control panel icon in the window that appears.



With either method, the MacTCP control panel opens.

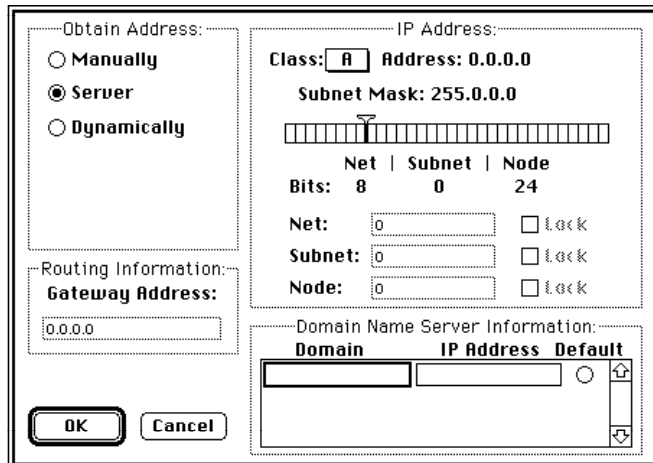


3 Click an Ethernet icon in the upper section of the control panel.

If you have multiple Ethernet connections, select the one that is connected to the IP network. The gateway will not run if you select EtherTalk or any other type of AppleTalk network connection.

4 Click More.

The Administrator dialog box appears.



5 Click Manually in the Obtain Address section of the dialog box, then click OK to return to the MacTCP control panel.

6 Enter the IP address of the gateway computer in the lower section of the control panel.
Obtain this address from your network administrator and type it exactly as specified.

7 Click More.

The Administrator dialog box reappears, with the following information now included:

- the IP address itself
- an address class indicated in the Class pop-up menu
- a network identifier
- a host (node) identifier

The address class and the network identifier are assigned to any network that accesses the Internet by the Internet's central authority, the Network Information Center. Classes range from A, for very large internets, to C, for small local area networks. Host identifiers are locally set.

8 If your network requires subnetwork addressing, set the subnet mask and subnet address by dragging the Subnet Mask slider.

Subnetwork addressing is a technique that allows groups of networks on an internet to share a single network number, in much the same manner as a large group of postal addresses share a zip code. Obtain the correct settings from your network administrator. When you slide the bar, the Subnet field fills in and the Node field changes. The Net field stays the same.

9 Fill out the Domain Name Server Information section of the dialog box.

The domain name system was created so that users could work with relatively easy-to-remember symbolic names instead of more opaque numerical addresses. A domain name server keeps a record of names assigned to networks and matches them to their numeric equivalents. Obtain the domains and IP addresses of your available domain name servers, as well as the correct server to use as the default setting, from your network administrator.

10 Enter the gateway address in the Routing Information section of the dialog box.

This is the address of the IP router that routes packets from your local IP subnet to other IP subnets. Don't confuse this with the Apple IP Gateway itself. Obtain the address from your network administrator.

11 Click OK.

The Administrator dialog box closes and the MacTCP control panel reappears.

12 Click the control panel close box.

If you are setting up MacTCP for the first time, the control panel closes. If you changed the configuration, and have used MacTCP with another configuration and have not restarted the computer since then, you will see a dialog box informing you that you will need to restart the computer to put your changes into effect.



13 Restart the computer if necessary.

Configuring the gateway

To configure the gateway, it's important to understand the types of addressing options available. All options refer to the type of address a user's computer must have when accessing the gateway.

- *Automatic addressing* means computers are assigned addresses by the gateway computer each time they access the gateway.
- *Manual addressing* means computers use preassigned addresses when they access the gateway.
- *Both* means either manual or automatic addresses are acceptable.

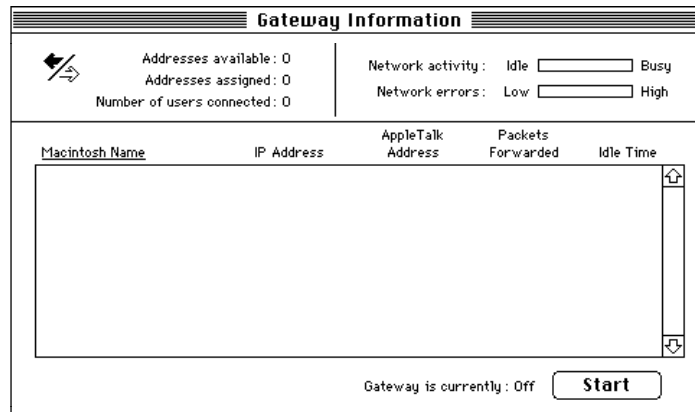
With either automatic or manual addressing, you specify a range of IP addresses that the gateway can provide, either dynamically or permanently. Automatic addressing allows you to limit the number of clients that can access the server at any one time. Manual addressing allows you to limit both the number of clients and the specific group of clients who have access. If you use both manual and automatic addressing at the same time, you must specify two separate ranges, one for each type.

IMPORTANT Manual addressing can only add security to the gateway if users agree to protect the addresses you assign. If the addresses are made available, either accidentally or by design, anyone can use them.

To configure the gateway:

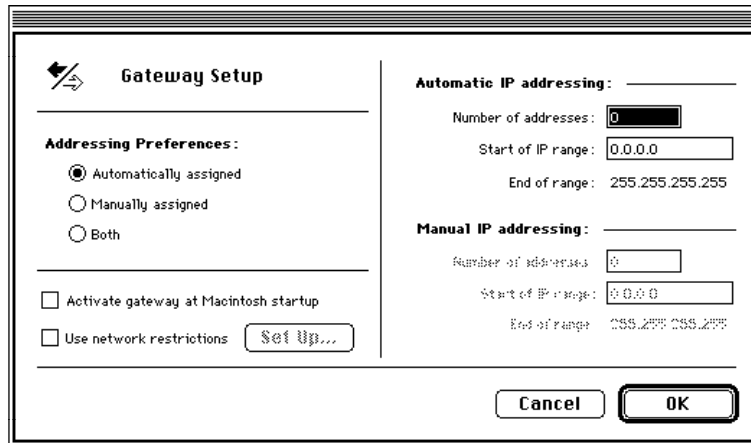
- 1 **Double-click the Gateway Manager icon to open the program.**

The Gateway Information window appears.



- 2 **Choose “Set up Gateway” from the Control menu.**

The Gateway Setup dialog box appears.



3 Click the radio button that represents your addressing choice.

You can configure for automatic addressing, manual addressing, or both.

4 Specify the number of addresses.

- If you are configuring for automatic addressing only, enter a value from 1 to 253 in the upper “Number of addresses” text box.
- If you are configuring for manual addressing only, enter a value from 1 to 253 in the lower “Number of addresses” text box.
- If you are configuring for both automatic and manual addressing, enter a value from 1 to 253 in each of the “Number of addresses” text boxes.

5 Enter the first address.

- If you are configuring for automatic addressing only, enter the first address in the upper “Start of IP range” text box.
- If you are configuring for manual addressing only, enter the first address in the lower “Start of IP range” text box.
- If you are configuring for both automatic and manual addressing, enter a first address in each of the “Start of IP range” text boxes.

Obtain these addresses from the network administrator. The end of the range is automatically determined by adding the number of addresses permitted to the starting address.

You can perform steps 4 and 5 in either order. The result is the same.

IMPORTANT If you are using both manual and automatic addressing, be sure that the address ranges do not overlap. The Apple IP Gateway cannot manage automatic and manual addresses from the same range.

- 6** If you want the gateway to start automatically when you start up the computer, click the “Activate gateway at Macintosh startup” box.

IMPORTANT Ignore the “Use network restrictions” checkbox for now. This is discussed in detail in the section “Establishing Gateway Security” in Chapter 3, “Operating and Monitoring the Apple IP Gateway.”

- 7** Click OK.

The Gateway Setup dialog box closes and the Gateway Information window reappears. The gateway is now fully configured and will begin operation when you click Start.

Getting users ready

To get users ready you will need to

- ensure that users have the minimum hardware and software required
- ensure that users have MacTCP correctly configured
- supply users with manual addresses if necessary

Users may also need various Internet access software programs or server accounts to accomplish their goals. These requirements, however, are too individualized to cover here. See any of the Internet introductions listed in the Preface for more information.

Hardware and software requirements

Most Macintosh computers in current use are adequate for accessing the Apple IP Gateway. Minimum requirements are:

- any Macintosh Plus or later Macintosh computer
- a minimum of 2 megabytes of RAM
- system software version 6.0.5 or later
- MacTCP version 1.1 or later
- AppleTalk version 57.0 or later

Users connecting remotely also need Apple Remote Access software in any version that is compatible with the Apple Remote Access Personal or MultiPort Server that the Apple IP Gateway is using. These users will also have to meet the hardware and software requirements for their Remote Access program.

MacTCP configuration requirements

If your users already have MacTCP installed, or if they are responsible for obtaining and installing MacTCP on their own, you can simply tell them the configuration information outlined in this section.

If you intend to supply users with MacTCP, Apple recommends that you obtain the TCP/IP Administration for Macintosh product along with its companion, TCP/IP Connection for Macintosh. TCP/IP Connection for Macintosh is primarily a licensing vehicle, and it is available in a range of licensing denominations. The *MacTCP Administrator's Guide*, supplied with TCP/IP Administration for Macintosh, contains full information on configuring and distributing MacTCP client software. TCP/IP Administration for Macintosh also contains the MacSNMP Admin software and the *MacSNMP Administrator's Guide*, so you will also need the product if you are planning to take advantage of network management.

See your Apple-authorized reseller for information about TCP/IP Connection and Administration products and software licensing.

IMPORTANT You are legally obligated to limit distribution of MacTCP in accordance with the distribution license that you purchase. This license is only available with the TCP/IP Connection for Macintosh.

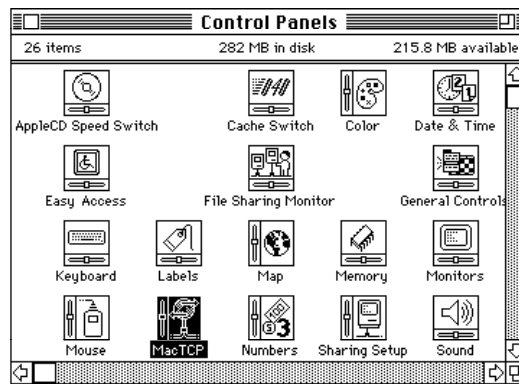
The following configuration information can serve as your guide if you are planning to distribute configured software. If users will be configuring their own software, you may find it convenient to photocopy one or both of these sets of directions and hand them out as appropriate.

Configuring MacTCP for automatic addressing

To configure the software for automatic addressing:

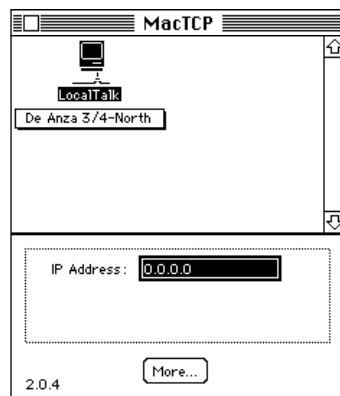
- 1 **Choose Control Panels from the Apple () menu.**

The Control Panels window opens.



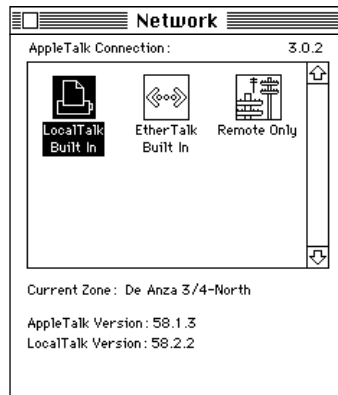
- 2 **Double-click the MacTCP control panel to open it.**

The following window appears:



- 3 Click the AppleTalk connection icon in the upper-left corner to select it (if it isn't selected already).

This icon indicates the connection method that your computer is currently using. The connection method is set in the Network control panel, shown in the following figure, and the MacTCP setting is determined by that setting.

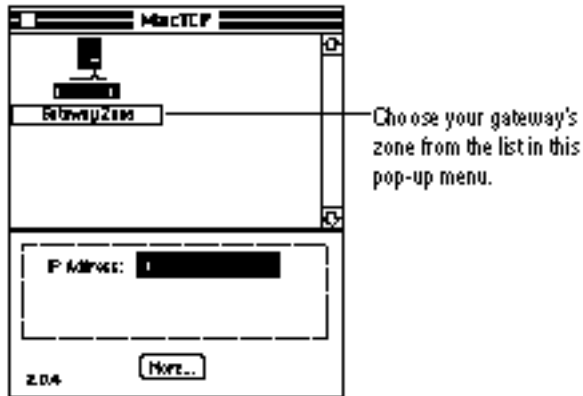


Note: If your computer has only one connection method, you may not have a Network control panel. In this case, only one icon appears in the MacTCP control panel window.

When the icon is selected, a pop-up menu of zones appears beneath it. (On some LocalTalk networks there are no zones and no menu. If this is the case, you can skip step 4.)

IMPORTANT Remote Access clients need to be connected to the Apple Remote Access server for the zone menu to appear.

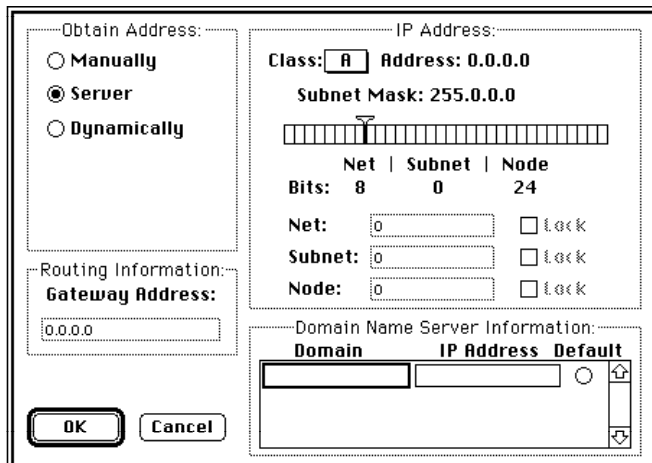
- 4 Choose the zone containing the Apple IP Gateway from the pop-up menu, as shown on the following page.



You do not need to enter an address.

5 Click More.

The Administrator dialog box appears.



6 Click Server in the upper-left section of the dialog box.

You do not need to enter a gateway address or any address class or subnet information.

7 If necessary, enter the domain name server information in the lower-right section of the dialog box.

If you do not enter information, the gateway computer will supply it to your computer. If you want to use more than one domain name server, it is useful to enter the domains and addresses. Obtain this information from your network administrator.

8 Click OK.

The Administrator dialog box closes and the MacTCP control panel reappears.

9 Click the control panel close box.

If you are setting up MacTCP for the first time, the control panel closes. If you changed the configuration, and have used MacTCP with another configuration and have not restarted the computer since then, you will see a dialog box informing you that you will need to restart the computer to put your changes into effect.



10 Restart the computer if necessary.

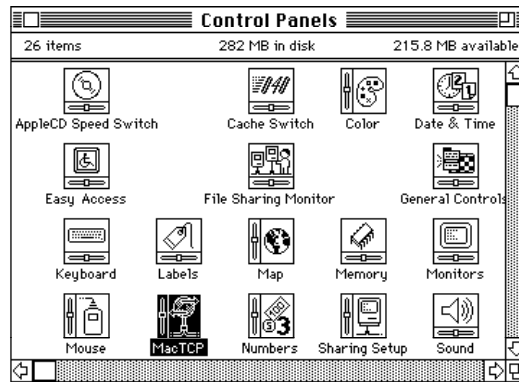
MacTCP is now ready for use or for distribution.

Configuring MacTCP for manual addressing

To configure the software for manual addressing:

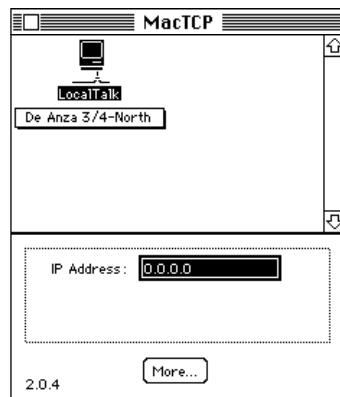
- 1 **Choose Control Panels from the Apple () menu.**

The Control Panels window opens.



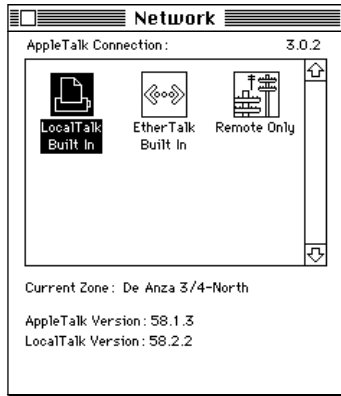
- 2 **Double-click the MacTCP control panel to open it.**

The following window appears:



- 3 **Click the AppleTalk connection icon in the upper-left corner.**

The icon indicates the connection method that your computer is currently using. The connection method is set in the Network control panel, shown in the following figure, and the MacTCP setting is determined by that setting.

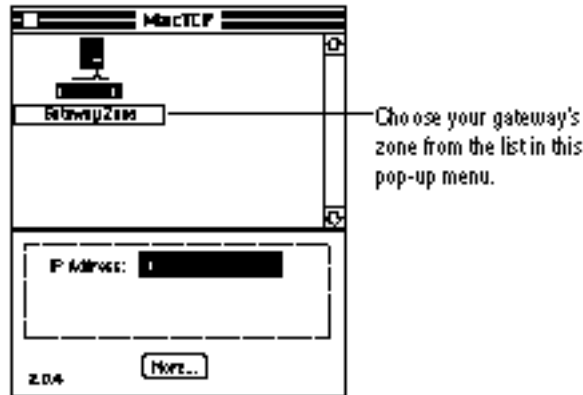


Note: If your computer has only one connection method, you may not have a Network control panel. In this case, only one icon appears in the MacTCP control panel window.

When you select the icon, a pop-up menu of zones appears beneath it. (On some LocalTalk networks there are no zones. If this is the case, you can skip step 4.)

IMPORTANT Remote Access clients need to be connected to the Apple Remote Access server for the zone menu to appear.

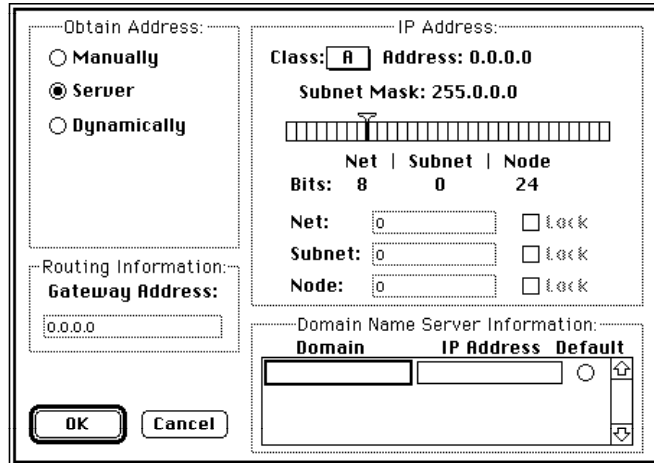
4 Choose the zone containing the Apple IP Gateway from the pop-up menu.



You do not need to enter an address yet.

5 Click More.

The Administrator dialog box appears.



6 Click Manually in the upper-left section of the dialog box, and then click OK.

The MacTCP control panel reappears.

7 Type the assigned address for this client in the IP Address text box.

The address must be one of the addresses in the designated manual range.

8 Click More.

The Administrator dialog box reappears, with address and class information now filled in.

9 If your network requires subnetwork addressing, set the subnet mask and subnet address by dragging the Subnet Mask slider.

Obtain the correct settings from your network administrator.

10 Fill out the Domain Name Server Information section of the dialog box.

Obtain this information from your network administrator.

11 Click OK.

The Administrator dialog box closes and the MacTCP control panel reappears.

12 Click the control panel close box.

If you are setting up MacTCP for the first time, the control panel closes. If you changed the configuration, and have used MacTCP with another configuration and have not restarted the computer since then, you will see a dialog box informing you that you will need to restart the computer to put your changes into effect.



13 Restart the computer if necessary.

MacTCP is now ready for use or for distribution.

3

Operating and Monitoring the Apple IP Gateway

Once the Apple IP Gateway and MacTCP have been successfully configured, operation is straightforward, whether the gateway is used on its own or in conjunction with the Apple Internet Router or an Apple Remote Access MultiPort or Personal Server. There are, of course, problems that can come up. These are covered in Chapter 4, “Troubleshooting.” This chapter explains how to start and stop the gateway, how to monitor its operation, and, if necessary, how to make it more secure.

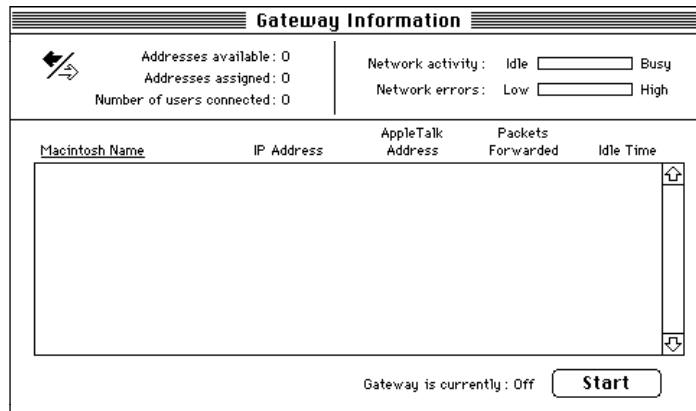
Starting and stopping the gateway

You start and stop the Apple IP Gateway from the Gateway Manager program.

To start the gateway:

- 1 **Open the Gateway Manager program.**

The Gateway Information window opens.



- 2 **Click Start or choose Start Gateway from the Control menu.**

The gateway automatically begins to run. You can see the level of activity from the Gateway Information window. The information in the window is discussed later in the next section, “Monitoring the Gateway.”

IMPORTANT It is not necessary to keep the Gateway Manager open while the gateway is running. If you want to close the Gateway Manager, choose Quit from the File menu. This does not stop the gateway. If the Gateway Manager is shut down, the gateway may be running, but there is no visible sign of it. If you want to make sure that the gateway is running, open the Gateway Manager. The text next to the Stop/Start button will confirm the gateway’s status.

To stop the gateway:

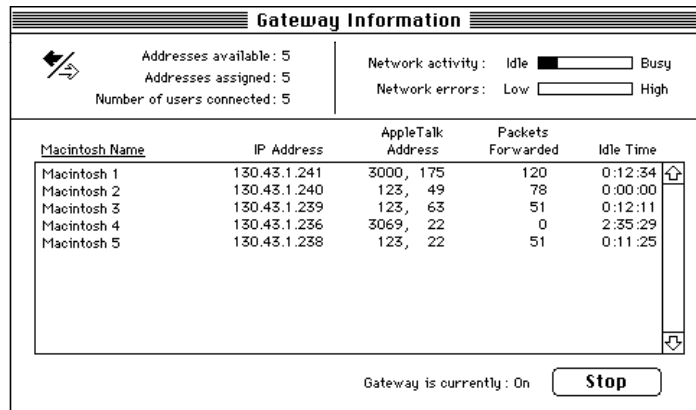
- 1 **Open the Gateway Manager program.**
- 2 **Click Stop or choose Stop Gateway from the Control menu.**

Monitoring the gateway

There are two main ways to monitor the gateway: with the statistics gathered in the Gateway Information window and with SNMP.

Viewing gateway statistics

The Gateway Manager window presents a dynamic picture of the gateway in operation.



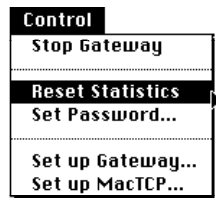
From the top section of the window you can determine:

- the number of automatic addresses available for assignment
- the number of automatic addresses already assigned
- the number of connected users
- the current level of gateway activity
- the current level of invalid or illegal packets received by the gateway

Note that manual addresses are not tracked, because they are, by definition, not available for automatic distribution.

The lower section of the window is a table of connected users, listing their names, AppleTalk and IP addresses, packets forwarded, and idle time. To sort this table by any of its fields, click on that field's heading. The field currently being used for sorting is underlined.

The window monitors the gateway continuously. If you want to see its operation from a particular moment, choose Reset Statistics from the Control menu.



This sets all activity values to zero, including any variables monitored with SNMP, and begins counting them again.

Using MacSNMP

The Apple IP Gateway Installer automatically installs an SNMP agent on the gateway computer. If you install MacTCP on client computers using the TCP/IP Administration for Macintosh and TCP/IP Connection for Macintosh products, you have the option of installing SNMP agents on those computers as well.

The Administration product includes the MacSNMP Client and MacSNMP Administration software, which allow for agent configuration and local monitoring. Interested readers are referred to the *MacSNMP Administrator's Guide*, supplied with TCP/IP Administration for Macintosh.

The agents installed with the Apple IP Gateway and the TCP/IP Administration include an Apple IP agent and a Macintosh agent. For a complete list of all variables that can be monitored with the Apple IP agent, see the Appendix, "The Apple IP Gateway MIB." The Macintosh agent monitors the following information:

- all files in the System Folder
- all programs on the computer
- types of NuBus cards installed
- SCSI devices attached
- all services being managed on the computer

- details about all mounted volumes
- details about the currently selected printer

If you want to institute remote monitoring, you will need to purchase an SNMP console, available from a number of vendors. Again, interested readers are referred to the *MacSNMP Administrator's Guide*, and especially to the technical references listed therein.

Establishing gateway security

There are three basic elements of gateway security:

- preventing unauthorized use of the Gateway Manager
- preventing access by unauthorized AppleTalk clients
- preventing unauthorized access from the IP side of the gateway

The first two elements can be set in place with the Apple IP Gateway. The third must be approached from the IP side, and so specific instructions cannot be provided here.

Note: One of the simplest and yet most powerful security measures is to use manual addressing only. A manual address stays with a specific client, and, unless that client gives it away, it cannot be used by anyone else. See “Configuring the Gateway” and “Getting Users Ready” in Chapter 2 for more information on manual addressing.

Setting a password

To prevent unauthorized access to the Gateway Manager and therefore to the gateway software itself, you can set a password.

- 1 Open the Gateway Manager program.**
- 2 Choose Set Password from the Control menu.**

The Gateway Manager Password dialog box appears, as shown on the following page.



3 Type a password in the “New password” text box.

The password appears as dots rather than text. The password can be up to eight characters long, and it can include any combination of upper- or lowercase letters, numbers, or symbols. As with all passwords, the one you choose should be easy to remember and hard to guess.

4 Type the password again in the “Retype new password” text box.

5 Click OK.

You will be prompted for the password each time you launch the Gateway Manager.

Changing or removing a password

You can change your password at any time, and you can also remove password protection if you feel it is unnecessary.

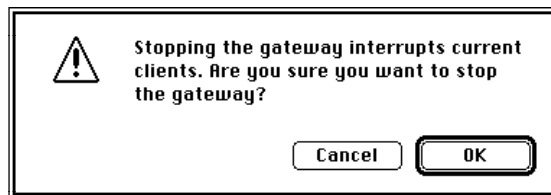
- To change a password, follow exactly the same procedure given earlier in “Setting a Password.”
- To remove password protection, follow exactly the same procedure given earlier in “Setting a Password,” leaving both the “New password” and the “Retype new password” text boxes blank.

Limiting network access

You can control which networks the gateway will accept users from with the network restrictions feature in the Gateway Setup dialog box.

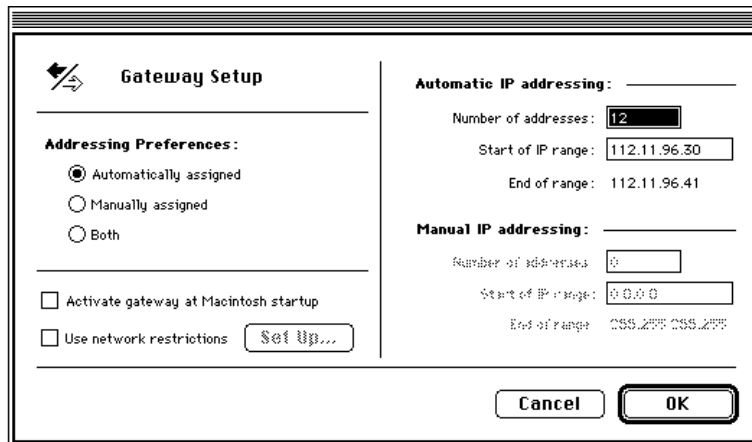
- 1 Open the Gateway Manager program.
- 2 Stop the gateway if it is running.

You cannot make changes to gateway setup while the gateway is running. When you click Stop the following dialog box appears:



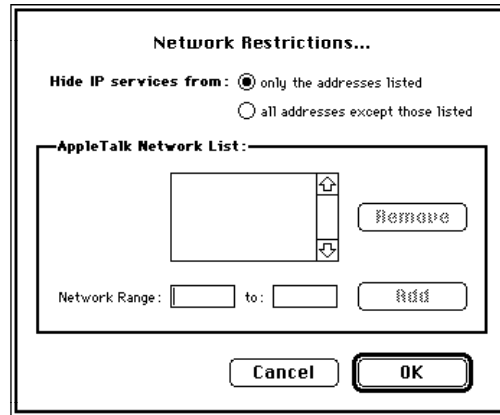
- 3 Click OK.
- 4 Choose "Set up Gateway" from the Control Menu.

The Gateway Setup dialog box appears.



- 5 Click the “Use network restrictions” checkbox to select it, and then click Set Up.

The Network Restrictions dialog box appears.



- 6 Choose the restriction method you want to use.

You can choose to hide IP services from only those AppleTalk networks listed or from all AppleTalk networks not listed. The first method is more practical when you want to exclude a small number of networks on your AppleTalk internet from access to IP services. The second is better when you want to extend IP services to just a few.

- 7 Enter the network number of the first network you wish to include or exclude in the Network Range text boxes at the bottom of the dialog box.

LocalTalk networks have a single network number. EtherTalk and TokenTalk networks have a network range, with a starting and ending number.

- For a LocalTalk network, enter the single network number in both text boxes.
- For an EtherTalk or TokenTalk network, enter the starting range number in the left text box, and the ending range number in the right text box.

You can learn a network’s number either directly from the routing table maintained by your routing software or from a network log maintained by your network administrator.

IMPORTANT You are not restricted to the actual network range numbers. If you enter range numbers that cover several contiguous networks, for example, you can give them all the same restrictions simultaneously. By entering a LocalTalk network number in the left box and a later number in the right box, you set

restrictions for all LocalTalk networks in that set of numbers. You can also pick range numbers that cover only a part of a network.

8 Click Add.

The network number appears in the Network List at the top of the dialog box.

9 Repeat steps 7 and 8 until you have listed all networks you want to include or exclude.

10 Click OK.

The dialog box closes. When you restart the gateway, your restrictions will be in effect.

Changing network access restrictions

You can add or remove restricted networks at any time, using a variation on the procedure described in the previous section, “Limiting Network Access.”

1 Open the Gateway Manager program.

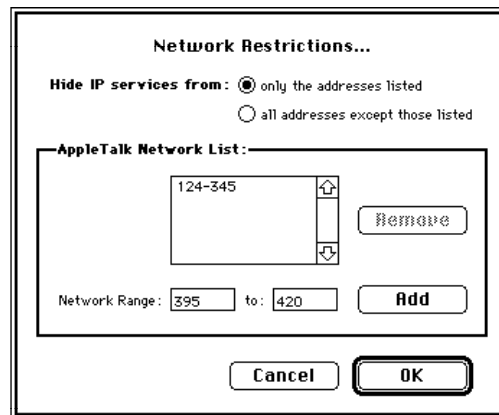
2 Stop the gateway if it is running.

You cannot make changes to gateway setup while the gateway is running.

3 Choose “Set up Gateway” from the Control Menu.

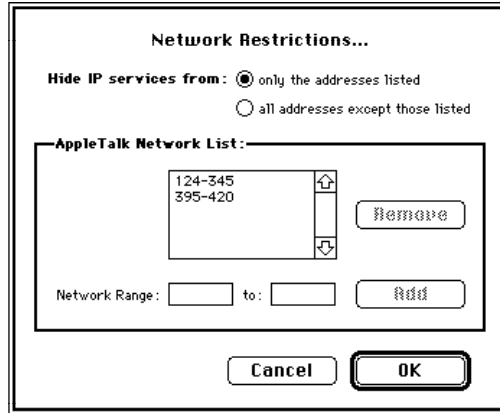
4 Click the “Use network restrictions” checkbox to select it, and then click Set Up.

5 If you want to add networks to the Network List, enter their numbers in the Network Range text boxes at the bottom of the dialog box.



6 Click Add after each addition.

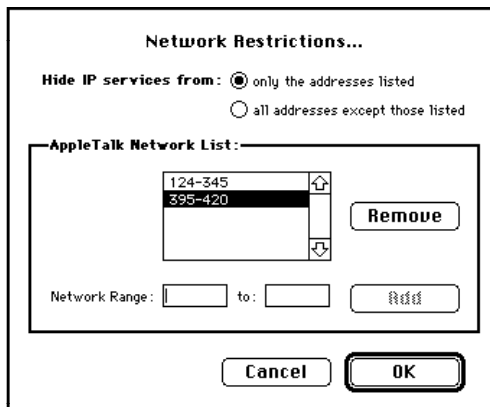
When you click Add, the network is added to the Network List.



7 Click OK when you're finished.

8 If you want to remove networks from the Network List, click their numbers in the Network List.

Shift-click for multiple selections.



9 Click Remove.

When you click Remove, the network is deleted from the Network List.

10 Click OK.

The dialog box closes. When you restart the gateway, your changes will be in effect.

Preventing unauthorized access by IP computers

The Apple IP Gateway works in both directions. Just as clients on the AppleTalk side have access to the IP network, IP computers have access to Macintosh computers on AppleTalk networks. Restricting this access cannot be done from the AppleTalk side. It can, however, be accomplished with most IP routers. See your IP router documentation to arrive at a suitable method.

4

Troubleshooting

The Apple IP Gateway links two complex network systems. Therefore operational errors are inevitable. This chapter suggests a basic approach to troubleshooting problems. Following that, the chapter lists some of the most common problems, along with ways to remedy them. Be aware, though, that if you are using the Apple Internet Router or an Apple Remote Access server with the gateway, the problem may lie with that software, rather than with the gateway itself. The *Apple Internet Router Administrator's Guide*, the *Apple Remote Access MultiPort Server Administrator's Guide*, and the *Apple Remote Access Personal Server User's Guide* all contain detailed troubleshooting sections that may help you solve problems when you're using the gateway with other software.

Diagnosing and solving problems

The following steps outline a troubleshooting strategy that you can use to isolate and solve problems as they come up.

1 Determine the symptoms.

Gather information from users to define the nature of the problem. If users are reporting multiple problems, handle each one separately.

2 Determine whether the network is the source of the problem.

The network is almost certainly the source of the problem if one or more of these conditions exists:

- Users cannot access a network service.
- Network access is intermittent.
- Devices cannot communicate.
- Network performance slows down.

The network is unlikely to be the source of the problem if one or more of these conditions exists:

- You can reproduce the problem after a device has been disconnected from the network.
- The problem is limited to a specific program.
- A hardware device has failed.
- A procedure has been performed incorrectly.

3 Determine the scope and location of the problem.

Examine progressively smaller network components to isolate the problem.

- Identify which networks are affected.
- If several networks are affected, determine if they are connected.
- If only one network is affected, determine if multiple devices are involved.
- Determine if the amount of traffic through the gateway is excessive.
- Determine whether a network exceeds the maximum cable length or number of devices.

- Determine whether the gateway Macintosh is the source of the problem.
 - Determine whether the Apple IP Gateway software is the source of the problem.
- 4 Identify the cause the problem.**

Once you've isolated the problem to a specific device:

- Verify that all cables are undamaged and connected correctly.
- Verify that all software is of the correct version number and has been installed correctly.

Solutions to common problems

The following sentences in boldface indicate symptoms or problems you may encounter when running the gateway. After each symptom or problem, a possible cause is presented, followed by a suggestion for solving the problem.

A user gets an error on startup of an IP program indicating that the client does not have an IP address.

- The gateway is not configured to assign IP addresses automatically. Stop the gateway and configure it to assign IP addresses automatically.
- The gateway is out of IP addresses as indicated by the Gateway Information window text "Addresses available: 0." Stop the gateway and configure it to have a larger range of automatic addresses.
- The user is on a restricted network. Remove (or add) the user's network number to the Network List in the Network Restrictions dialog box.

A computer with a manual address is not accessible from the IP network.

- The computer has not yet communicated with the gateway and therefore the gateway does not know how to find the computer to send packets to it. Have the user initiate an IP connection so that the gateway knows where the client is.

Note: This problem should occur only when the gateway and the client are in different zones. If possible, put all clients in the same zone as the gateway.

A user who has previously accessed the gateway can no longer do so.

- The client's IP address has been assigned to another client by the gateway.
Have the user restart the Macintosh to get another address.

Note: This will only happen when the gateway is in a different zone than the client and the gateway is restarted after the client is assigned an address. The gateway loses the information about the previously assigned addresses when it is restarted, and it cannot find the client computer because it is in a different zone.

The Gateway Information window indicates an address conflict, and the gateway will not assign that address to a user.

- A node on the IP network is using the IP address listed. Find the node and change its address or use an automatic range that does not include that address.

Appendix The Apple IP Gateway MIB

This appendix includes the Management Information Base (MIB) for the Apple IP Gateway. The MIB includes a list of all variables that can be monitored and managed with MacSNMP.



```

MacIP-MIB DEFINITIONS ::= BEGIN

IMPORTS
    mgmt, experimental, Counter
        FROM RFC1155-SMI
    OBJECT-TYPE
        FROM RFC1212-MIB;

-- This MIB module uses the extended OBJECT-TYPE macro
-- as defined in RFC1212
-- MacIP MIB

mib-2      OBJECT IDENTIFIER ::= { mgmt 1 }
appletalk OBJECT IDENTIFIER ::= { mib-2 13 }
apple     OBJECT IDENTIFIER ::= { enterprises 63 }
macip     OBJECT IDENTIFIER ::= { apple ?? }

macipNumStaticAddresses OBJECT-TYPE
    SYNTAX INTEGER
    ACCESS read-write
    STATUS mandatory
    DESCRIPTION
        "The number of static addresses configured on
        the gateway."
    ::= { macip 1 }

macipStaticRangeStart OBJECT-TYPE
    SYNTAX IpAddress
    ACCESS read-write
    STATUS mandatory
    DESCRIPTION
        "The first IP address in the range of static IP
        addresses configured on the gateway."
    ::= { macip 2 }

```



```

macipNumDynamicAddresses OBJECT-TYPE
    SYNTAX INTEGER
    ACCESS read-write
    STATUS mandatory
    DESCRIPTION
        "The number of dynamic addresses configured on
        the gateway."
    ::= { macip 3 }

macipDynamicRangeStart OBJECT-TYPE
    SYNTAX IpAddress
    ACCESS read-write
    STATUS mandatory
    DESCRIPTION
        "The first IP address in the range of dynamic
        IP addresses configured on the gateway."
    ::= { macip 4 }

macipUseIdleTimeOut OBJECT-TYPE
    SYNTAX INTEGER {
        true(1),
        false(2)
    }
    ACCESS read-write
    STATUS mandatory
    DESCRIPTION
        "If true(1), the idle time out value will be
        used to time out dynamic addresses."
    ::= { macip 5 }

```

Continued on following page ►

```

macipUseNBPConfirmTimeOut OBJECT-TYPE
    SYNTAX INTEGER {
        true(1),
        false(2)
    }
    ACCESS read-write
    STATUS mandatory
    DESCRIPTION
        "If true(1), the NBP Confirm time out value
        will be used to time out dynamic addresses."
    ::= { macip 6 }

macipUsePINGTimeOut OBJECT-TYPE
    SYNTAX INTEGER {
        true(1),
        false(2)
    }
    ACCESS read-write
    STATUS mandatory
    DESCRIPTION
        "If true(1), the PING time out value will be
        used to time out dynamic addresses."
    ::= { macip 7 }

macipIdleTimeOut OBJECT-TYPE
    SYNTAX INTEGER
    ACCESS read-write
    STATUS mandatory
    DESCRIPTION
        "Dynamic addresses will be made available to be
        reassigned after they have been idle for this
        length of time in minutes."
    ::= { macip 8 }

```

```

macipNBPCConfirmTimeOut OBJECT-TYPE
    SYNTAX INTEGER
    ACCESS read-write
    STATUS mandatory
    DESCRIPTION
        "Dynamic addresses will be made available to be
        reassigned after they have not answered
        NBPCConfirm for this length of time in minutes."
    ::= { macip 9 }

macipPINGTimeOut OBJECT-TYPE
    SYNTAX INTEGER
    ACCESS read-write
    STATUS mandatory
    DESCRIPTION
        "Dynamic addresses will be made available to be
        reassigned after they have not answered ICMP
        Echo (PING) for this length of time in
        minutes."
    ::= { macip 10 }

macipUseNetworkRestrictions OBJECT-TYPE
    SYNTAX INTEGER {
        true(1),
        false(2)
    }
    ACCESS read-write
    STATUS mandatory
    DESCRIPTION
        "If true(1), the network restrictions list will
        be used to restrict access to the gateway."
    ::= { macip 11 }

```

Continued on following page ►

```

macipAddressesInUse OBJECT-TYPE
    SYNTAX INTEGER
    ACCESS read-only
    STATUS mandatory
    DESCRIPTION
        "The number of dynamic addresses that have been
        assigned."
    ::= { macip 12 }

macipNumClientsConnected OBJECT-TYPE
    SYNTAX INTEGER
    ACCESS read-only
    STATUS mandatory
    DESCRIPTION
        "The total number of clients (dynamic and
        static) that are currently using the gateway."
    ::= { macip 13 }

macipPacketsForwardedIP OBJECT-TYPE
    SYNTAX Counter
    ACCESS read-only
    STATUS mandatory
    DESCRIPTION
        "The number of packets forwarded to the IP
        internet. This number includes unknown IP
        errors."
    ::= { macip 14 }

macipPacketsForwardedAppleTalk OBJECT-TYPE
    SYNTAX Counter
    ACCESS read-only
    STATUS mandatory
    DESCRIPTION
        "The number of packets forwarded to the
        AppleTalk internet. This number includes
        unknown AppleTalk errors."
    ::= { macip 15 }

```

```

macipAssignRequestsRefusedErrs OBJECT-TYPE
    SYNTAX Counter
    ACCESS read-only
    STATUS mandatory
    DESCRIPTION
        "The number of times an attempt to get a
        dynamic address failed due to the address table
        being full."
    ::= { macip 16 }

macipInvalidIPAddressErrs OBJECT-TYPE
    SYNTAX Counter
    ACCESS read-only
    STATUS mandatory
    DESCRIPTION
        "The number of packets encountered from a
        client with an unknown or invalid IP address."
    ::= { macip 17 }

macipUnknownIPErrs OBJECT-TYPE
    SYNTAX Counter
    ACCESS read-only
    STATUS mandatory
    DESCRIPTION
        "The number of times the gateway failed to
        successfully forward an IP packet to the
        destination IP address."
    ::= { macip 18 }

macipUnknownAppleTalkErrs OBJECT-TYPE
    SYNTAX Counter
    ACCESS read-only
    STATUS mandatory
    DESCRIPTION
        "The number of times the gateway failed to
        successfully forward an IP packet to the
        destination AppleTalk address."
    ::= { macip 19 }

```

Continued on following page ►

```

macipRunAtStartup OBJECT-TYPE
    SYNTAX INTEGER {
        true(1),
        false(2)
    }
    ACCESS read-write
    STATUS optional
    DESCRIPTION
        "If true(1), the gateway will run when the
        Macintosh starts up."
    ::= { macip 20 }

macipStatus OBJECT-TYPE
    SYNTAX INTEGER {
        enabled(1),
        disabled(2)
    }
    ACCESS read-only
    STATUS optional
    DESCRIPTION
        "The current status of the gateway."
    ::= { macip 21 }

macipNetRestrictionsTable OBJECT-TYPE
    SYNTAX SEQUENCE OF netRestrictionsEntry
    ACCESS not-accessible
    STATUS optional
    DESCRIPTION
        "The list of networks being restricted from or
        allowed to use the gateway."
    ::= { macip 22 }

```

```

netRestrictionsEntry OBJECT-TYPE
    SYNTAX NetRestrictionsEntry
    ACCESS not-accessible
    STATUS optional
    DESCRIPTION
        "The description of one of the gateway's
        network restrictions."
    INDEX { netRestrictionsRangeStart }
    ::= { macipClientInfoTable 1 }
NetRestrictionsEntry ::= SEQUENCE {
    netRestrictionsRangeStart    ATNetworkNumber,
    netRestrictionsRangeEnd      ATNetworkNumber,
    netRestrictionsMode          INTEGER
}

netRestrictionsRangeStart OBJECT-TYPE
    SYNTAX ATNetworkNumber
    ACCESS read-write
    STATUS optional
    DESCRIPTION
        "The start of the range of networks to be
        restricted from using or allowed to use the
        gateway."
    ::= { netRestrictionsEntry 1 }

netRestrictionsRangeEnd OBJECT-TYPE
    SYNTAX ATNetworkNumber
    ACCESS read-write
    STATUS optional
    DESCRIPTION
        "The end of the range of networks to be
        restricted from using or allowed to use the
        gateway."
    ::= { netRestrictionsEntry 2 }

```

Continued on following page ►

```

netRestrictionsMode OBJECT-TYPE
    SYNTAX INTEGER {
        allow(1),
        restrict(2)
    }
    ACCESS read-write
    STATUS optional
    DESCRIPTION
        "If allow(1), nodes on this network are allowed
        to use the gateway. If restrict(2), nodes on
        this network are restricted from using the
        gateway."
    ::= { netRestrictionsEntry 3 }

macipClientInfoTable OBJECT-TYPE
    SYNTAX SEQUENCE OF clientInfoEntry
    ACCESS not-accessible
    STATUS optional
    DESCRIPTION
        "The list of clients currently using this
        gateway."
    ::= { macip 23 }

clientInfoEntry OBJECT-TYPE
    SYNTAX ClientInfoEntry
    ACCESS not-accessible
    STATUS optional
    DESCRIPTION
        "The description of one of the clients using
        this gateway."
    INDEX { dynamicAddrIPAddr }
    ::= { macipClientInfoTable 1 }

```



```

ClientInfoEntry ::= SEQUENCE {
    clientInfoIPAddr      IPAddress,
    clientInfoAppleTalkAddr DdpNodeAddress,
    clientInfoOwnerName   OCTET STRING,
    clientInfoPacketsForwarded Counter,
    clientInfoIdleTime    INTEGER
}

clientInfoIPAddr OBJECT-TYPE
    SYNTAX IPAddress
    ACCESS read-only
    STATUS optional
    DESCRIPTION
        "The IP address assigned to the client."
    ::= { clientInfoEntry 1 }

clientInfoAppleTalkAddr OBJECT-TYPE
    SYNTAX DdpNodeAddress
    ACCESS read-only
    STATUS optional
    DESCRIPTION
        "The AppleTalk address of the client."
    ::= { clientInfoEntry 2 }

clientInfoOwnerName OBJECT-TYPE
    SYNTAX OCTET STRING
    ACCESS read-only
    STATUS optional
    DESCRIPTION
        "The client's owner name."
    ::= { clientInfoEntry 3 }

```

Continued on following page ►

```
clientInfoPacketsForwarded OBJECT-TYPE
    SYNTAX Counter
    ACCESS read-only
    STATUS optional
    DESCRIPTION
        "The number of packets forward to the IP
        internet for this client plus the number of
        packets forwarded to the client."
    ::= { clientInfoEntry 4 }

clientInfoIdleTime OBJECT-TYPE
    SYNTAX INTEGER
    ACCESS read-only
    STATUS optional
    DESCRIPTION
        "The length of time in seconds that the client
        has been idle."
    ::= { clientInfoEntry 5 }
```

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