❖ Farallon®

Liaison™ Internet Router
User's Guide

Trademarks

The Farallon logo design, PhoneNET, TrafficWatch, and Timbuktu are registered trademarks of Farallon Computing, Inc. Farallon, Remote/V.32, CheckNet, NetAtlas, and Timbuktu/Remote are trademarks of Farallon Computing, Inc.

Apple, AppleFax, AppleShare, AppleTalk, EtherTalk, ImageWriter, LaserWriter, LocalTalk, Macintosh, and Responder are trademarks of Apple Computer, Inc.

CompuServe is a registered trademark of CompuServe Incorporated.

GEnie is a trademark of General Electric Corporation.

MacServe is a trademark of Infosphere, Inc.

FastPath is a trademark of Shiva Corporation.

All other trademarks are the property of their respective holders.

Credits

Engineering by Evan Solley. User's guide written by John Brewer. Edited by Jeff Swartz. Special thanks to Anne Washington, Diana J. Wynne, Ron Schmidt, Rob Stein, Jack Marsal, Ilene Sandler, Evan Solley, Fred Kaye, and Michael McGreevy.

Colophon

This manual was created using a Macintosh II computer, a Linotronic 300 printer, AppleTalk, a LaserWriter NTX printer, QuarkXPress, MockWrite, MacPaint, and MacDraw.

This manual is Farallon part number 6120055-00-03

This manual is printed on recycled paper.

50% Total Recycled Content
10% Post Consumer Waste

Contents

Chapter 1

Introduction

The Liaison™ Internet Router is part of the Farallon family of hardware and software products that speed the performance and ease the management of computer networks.

As you will learn in this chapter, Liaison offers a variety of solutions to problems typically experienced by users of local and wide area AppleTalk networks. Furthermore, you can set up Liaison to meet several networking needs simultaneously.

The chapter begins with a discussion of common networking scenarios in which Liaison and Liaisonet can play important roles. Following this, the chapter explains:

■   Farallon customer service

■   How this manual is organized

■   The hardware and software requirements of Liaison

■   How to use the online help system.

What Liaison can do for you

Liaison is a versatile software router that can connect up to five AppleTalk networks—including LocalTalk, EtherTalk, and TokenTalk—whether they are in the same building or hundreds of miles away.

Here are some of the problems Liaison can help you solve:

■   Your network is slow because so many devices are connected to it.

■   You have users on an EtherTalk network that need to print on LaserWriter printers, but LaserWriters don't work on EtherTalk.

■   You have users on a LocalTalk network that need to exchange files with an AppleShare server on an EtherTalk network.

■   You are updating your network from AppleTalk Phase 1 to Phase 2 and need to keep all users connected during the transition process.

■   Every time you need to select the LaserWriter nearest your office, you have to scroll through 25 names in the Chooser.

■   You have employees who need remote access to your network from home or while traveling so they can remotely read and send electronic mail or use other network services.

■   Your company has branch offices in other cities and would like all departments to be tied into the same internetwork.

The following six sections explain how Liaison solves each of these problems.

Relieving network traffic jams

Have you had any of the following experiences with your network recently?

■   You open electronic mail and it takes a long time to log on, or you repeatedly lose your connection to the mail server.

■   You attempt to select a printer in the Chooser, but the printer continually disappears from, then reappears in, the window.

■   You finally select your printer, but it takes unduly long to print.

■   You attempt to select an AppleShare server to obtain a file, but the server continually disappears from, then reappears in, the window.

■   You finally mount a volume from the file server, but file transfers take too long.

The cause could be too many users on a single network. The more users you add to a LocalTalk network, the slower the network responds to every command.

By dividing a large network into two or more smaller ones with a router, you can prevent the heavy traffic generated by the network-intensive users from jamming the rest of the network. For example, you can connect computers and printers involved in desktop publishing to a network on one port of the router and connect the rest of your users to a separate network on the other port.

Set up as a full router, Liaison can segment your LocalTalk network in the manner described and still allow traffic to flow between the newly created smaller networks when necessary. If you are also using Ethernet cabling, your existing LocalTalk routers can support EtherTalk networks as well. This is explained in the following section.

Connecting Ethernet to LocalTalk

Another way to speed up network response is to use a more sophisticated technology. Information can travel up to 10 times faster on Ethernet cabling than on LocalTalk cabling. A special implementation of AppleTalk, called EtherTalk, is used on Ethernet cabling. Because EtherTalk processes network requests more quickly than LocalTalk, the delays described in the previous section are often negligible.

Many organizations connect network-intensive groups of users, for whom speed is essential, to an EtherTalk network and use lower cost LocalTalk networks for the remainder of their users. Because the two types of networks transmit packets in different ways, they cannot be directly connected to each other. Problems arise when users on one kind of network need resources that are available only on the other cable:

■ Currently, LaserWriter printers can only be connected to LocalTalk networks, so the computers on Ethernet cable need a way to print.

■ To speed data exchange, file servers are often connected to an EtherTalk network, so users on LocalTalk networks need a way to access those servers.

Liaison can solve both problems.

A Liaison full router translates packets from LocalTalk to EtherTalk format and vice versa. Liaison can simultaneously route traffic between a LocalTalk network and two EtherTalk networks and still have two more ports available for additional cables, such as TokenTalk or dial-up networks. TokenTalk and dial-up networks are described in following sections.

Integrating cabling systems

Many organizations are in the process of upgrading from Phase 1 to Phase 2 AppleTalk protocols in order to create larger and more efficient computer networks and allow for grouping of devices in multiple zones within the same network. Phase 2 is built into System 7. System 6 users should have at least AppleTalk 53 installed to be compatible with Phase 2.

Running Phase 2 AppleTalk on Ethernet cable creates what is known as an *extended cable*. It requires Phase 2 routers, and EtherTalk 2.0 or TokenTalk drivers must be installed on all computers connected to the cable. Phase 2 protocols can also be used on a LocalTalk cable, but it does not allow the multiple network number and multiple zone features available on an extended cable.

Solving the transition riddle

Until recently, the upgrade transition was complicated by the technical necessity of isolating Phase 1 and Phase 2 networks from each other. Phase 1 users were cut off from Phase 2 users for days or weeks while the network manager installed EtherTalk 2.0 driver software where necessary, eventually reconnecting the entire network back together with Phase 2 routers.

With Liaison full routers, Phase 1 and Phase 2 users need not be cut off from each other during the transition. Liaison translates Phase 1 packets to Phase 2 format and vice versa, with certain temporary restrictions on the way network numbers and zones are defined in the Phase 2 network. These restrictions can be ignored once the entire network has been converted to Phase 2. For more details, see "Routing Between Phase 1 and Phase 2 Networks" in Chapter 4.

Adding TokenTalk

TokenTalk is a special implementation of AppleTalk that allows AppleTalk packets to be transmitted over cabling used by MS-DOS networks and IBM mainframes. By installing Liaison on a Macintosh equipped with token ring and Ethernet cards, you can connect users of a TokenTalk network to users on LocalTalk and EtherTalk networks.

Grouping network services by zone

Large networks usually include dozens of LaserWriter printers, print spoolers, mail servers, and file servers, collectively referred to as *network services*. Timbuktu®, a screen-sharing and file transfer program available from Farallon, is also a network service. Without routers in your network, it can be confusing and annoying to have to scroll through a long list in the Chooser every time you need to select a printer or server. A Timbuktu host list on Ethernet, for example, might contain hundreds names.

Using a router to segment a large network into smaller ones, you can group users together by department—for example, Sales, Accounting, and Research—giving each network a unique zone name. Although this adds a middle step to the Chooser procedure—selecting the zone before selecting the device—it greatly reduces the number of devices displayed at one time.

Long distance connections to your network

With advances in telecommunications technology, working at home has become more feasible and popular. In addition, people traveling on business often need to be in touch with the electronic resources at the office.

By taking Liaisonet™ home or anywhere you can connect a modem to the local telephone outlet, you can be back in your office, for computing purposes, at the click of a Dial button. Liaisonet is included with Liaison and can be distributed freely to other users.

Employees who are away from the office can dial in with Liaisonet and create a temporary connection with a Macintosh running Liaison on the office network. They can then read and send electronic mail, access file servers, and print documents.

A secure connection

To each dial-in user, the network manager can assign an individual account name and login password. For extra protection, the Liaison dial-back option can be switched on, causing Liaison to delay establishing a connection until redialing the calling party at a pre-assigned telephone number.

The network manager can also use Liaison's scope settings to control the portion of the network that will be accessible to each dial-in user, granting different levels of access to different users. A password can also be set to restrict access to the controls of both Liaison and Liaisonet.

Putting Timbuktu to work over Liaison links

With Liaison set up as a dial-up router, you can use Timbuktu, also from Farallon Computing, to provide direct screen-sharing and file transfer access between users in different cities.

With a combination of Liaison and Timbuktu you can, for example, dial in to your office network from home or while traveling to send or obtain files, join a screen-sharing conference, or inspect artwork for a brochure or catalog. Or you may need to obtain files from any number of firms that have Liaison and Timbuktu on their computer networks. A 10-minute call through the Liaison workstation on your network saves you the time, money, and inconvenience of having a disk shipped by express mail.

For more information about Timbuktu, contact your dealer or Farallon Technical Support representative.

Creating 24-hour dial-up networks

Many businesses start out in one location and grow to encompass branches in cities hundreds or thousands of miles away. To function smoothly and react quickly to changing conditions in the marketplace, such companies depend on reliable and efficient communication between branches. When each branch has a computer network, there is a natural desire to link these networks: information that would otherwise have to be sent through conventional or express mail can be transferred electronically at a considerable savings of time and money.

Liaison can connect computer networks across telephone lines.

You can connect geographically distant networks by using a high-performance modem and Liaison set up as a half-router on each network. The resulting wide area network can be set in operation on a permanent basis or switched on and off as necessary to conserve telephone charges. In either case, local users see the printers, file servers, and electronic mail addresses on the distant network as if they were in the same building. The scope options of Liaison give each network manager the flexibility of specifying which parts of the network the users on the other network can see: from a single computer, to network services (printers, file servers, mail servers) in the immediate zone, to all the services on the entire remote network.

Farallon Customer Service

Farallon Computing is committed to providing its customers with reliable products and excellent technical support. If you have any questions, concerns, or suggestions, please contact Farallon Customer Service by telephone, fax, or mail at:

(510) 596-9000
(510) 596-9023 fax
2000 Powell Street, Suite 600
Emeryville, California 94608 USA

You can also reach us online with the network services of CompuServe (ID: 75410,2702), or with America Online and AppleLink (ID for both: FARALLON), or through the Internet (ID: farallon@farallon.com). Product information and technical notes can be found in the Farallon bulletin boards on America Online and AppleLink, and on Internet (at the prompt, enter "ftp farallon.com"; the IP address is 192.100.87.10).

If you are located in Europe or the Pacific Rim, you can get service locally by contacting your nearest Farallon reseller or distributor. For a worldwide list of our distributors, see our AppleLink bulletin board or the back page of our product catalog—or contact Farallon directly.

About this manual

This manual is divided into twelve chapters and includes three appendixes, a glossary, and an index.

Chapter 1, "Introduction," describes scenarios in which Liaison and Liaisonet provide useful solutions. It also provides information on Farallon customer service, system requirements, memory usage, and the online help system.

Chapter 2, "The Six Faces of Liaison," contains short overviews of the different ways you can use Liaison and Liaisonet. It concludes with a decision chart that guides you to chapters specifically addressing the needs of your computer network.

Chapter 3, "Installing Liaison and Liaisonet," contains detailed instructions for installing a new AppleTalk version as well as procedures for installing, disabling, and removing Liaison and Liaisonet. The chapter also explains the Chooser password, Network Tuner, and Foreground Edit.

Chapter 4, "Setting Up a Full Router," contains detailed procedures for connecting various combinations of LocalTalk, EtherTalk, and TokenTalk networks. The chapter also discusses backbone networks, routing between AppleTalk Phase 1 and Phase 2 protocols, network seeding, and the benefits of dividing a network into zones.

Chapter 5, "Setting up a Calling Half-Router," shows you how to configure Liaison on the calling end of a dial-up link.

Chapter 6, "Setting up an Answering Half-Router," shows you how to configure Liaison on the answering end of a dial-up link.

Chapter 7, "Setting up a Relay Client and Relay Router," shows you how to use Liaisonet to dial through a Liaison workstation elsewhere on the network to establish a connection with a distant network.

Chapter 8, "Setting up a Personal Bridge," shows you how to use Liaisonet to call into a network from a stand-alone Macintosh.

Chapter 9, "Setting up a Semi-Router," shows you how to use Liaisonet to call into the office network from a home network.

Chapter 10, "Defining the Scope of a Dial-Up Connection," explains how to use Liaison's scope options to determine which parts of two distant networks will be able to share in the dial-up link.

Chapter 11, "Monitoring Liaison Activity," explains how Liaison lets you keep track of the activity of half-routers and full routers.

Chapter 12, "Troubleshooting," provides hints and solutions for problems occasionally experienced with Liaison routers.

Appendix A, "Networks and Network Planning," explains network terminology and provides tips for efficient network design.

Appendix B, "Modem Specifications," contains technical information about the modems listed in the Preferences dialog box.

Appendix C, "Liaison Scripting Guide," explains the Connection Control Language used in writing scripts (short programs) that control modems.

This manual assumes that you have read and are familiar with the owner's guide that came with your Macintosh. You should also have a basic knowledge of AppleTalk networks and be familiar with the network services that will be made available across Liaison routers.

System requirements

Liaison is used on Macintosh computers connected to AppleTalk networks.

Hardware

- You will need a Macintosh 512K Enhanced or greater.

- If you will be connecting your Macintosh to a LocalTalk network, you will need LocalTalk cabling (or equivalent).

- If you will be connecting to remote networks, you will need a modem on each end of the connection that supports at least 1200 baud, such as the Farallon Remote/V.32™ modem. For optimal performance, use 9600-baud modems or faster.

- If you plan on connecting your Macintosh network to an Ethernet, you will need an Ethernet card, such as Farallon's EtherMac Card.

- If you plan on connecting to a token ring network, you will need a token ring card.

Software

- Liaison can be used with System 4.2/Finder 6.0 or later versions.

- Liaison requires Chooser desk accessory version 3.2 or later.

- If applicable, use EtherTalk version 1.2 or 2.0 driver software for your Ethernet interface card.

- If applicable, use TokenTalk driver software for your token ring interface card.

Use of memory

Liaison uses less than 150K in any of its configurations. The resident Liaison software components are highly modular. Only those pieces needed to support your configuration are loaded into memory at startup. As a result, the amount of memory Liaison uses depends upon many factors, including the type of Macintosh you are using. The simplest measure of memory use is to compare an About the Finder display with and without Liaison in a particular configuration.

Most of the memory used for a router is allocated to buffers. On a Macintosh with 2MB or more, Liaison allocates additional buffer space to support the increased traffic forwarding requirements a larger Macintosh is likely to encounter.

Note to home Liaisonet users: You may discover that the non-Liaison software you install to communicate over a dial-up link with services on the office network, such as electronic mail, AppleShare, and Timbuktu, requires additional memory on your home computer.

Getting help with Liaison and Liaisonet

To display a help screen for any of the selections in the Configure menu:

1.   Hold down the Option key.

2.   Choose the desired item from the Configure menu. Liaison displays the corresponding Help screen.

3.   Release the Option key.

You can also browse through the help screens by choosing About Liaison from the Configure menu and clicking the Help button.

Chapter 2

The Six Faces of Liaison

Because there are so many ways to use Liaison, it's a good idea to know the different kinds of routing services Liaison can provide and decide which ones you need before you proceed with installation instructions in the next chapter. Most users require only one of the services described in this chapter, but Liaison is capable of providing two or more at the same time.

Liaison and Liaisonet

Liaison   Liaisonet

In the explanations that follow, you will be introduced to a form of Liaison called Liaisonet, which is used for dialing into or out of a network that already contains a Liaison installation. Liaison and Liaisonet have related but different functions, and in most cases you need to install only one or the other. Use Liaison to set up a full router, a calling half-router, an answering half-router, and a relay router. Use Liaisonet to set up a personal bridge, relay client, and semi-router.

Here are the principal differences between Liaison and Liaisonet:

■   You have to purchase each copy of Liaison separately, but you can make as many free copies of Liaisonet as you need.

■   When installing Liaisonet, you don't enter a serial number.

■   Liaison can always be substituted for Liaisonet, but Liaisonet cannot always be substituted for Liaison.

■   Liaisonet cannot be used as a full-router.

■   Liaisonet cannot be used to answer a call.

Full-router
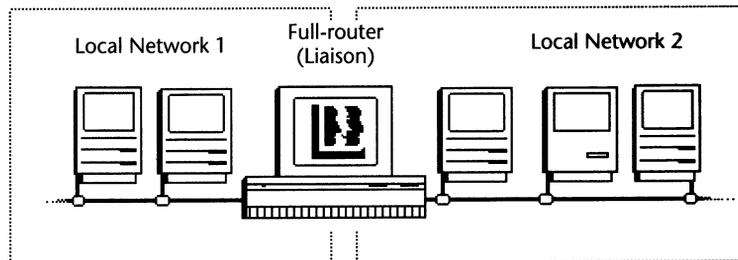
Use Liaison as a full-router to connect two or more networks in the same building or to divide a single overloaded LocalTalk network into smaller, connected ones to speed up network response. You can connect LocalTalk, EtherTalk, and TokenTalk networks together in any combination, and Liaison can support Phase 1 and Phase 2 AppleTalk simultaneously.

To learn more about the Liaison full-router, see Chapter 4.

Calling half-router
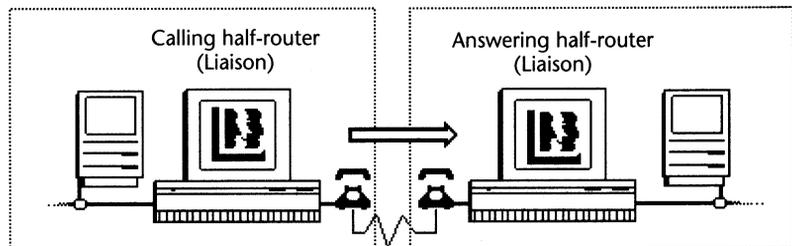
Use Liaison as a calling half-router to place calls through modems to a distant network. Such a connection makes it possible for users on either side of the dial-up link to access network services (such as electronic mail, print and file servers, and Timbuktu) on the other side of the connection. A calling half-router requires a copy of Liaison and a modem. When set up to relay outgoing calls from Liaisonet users on the network, a calling half-router can also be a relay router, explained on the following page.

For more information about the calling half-router, see Chapter 5.

Answering half-router
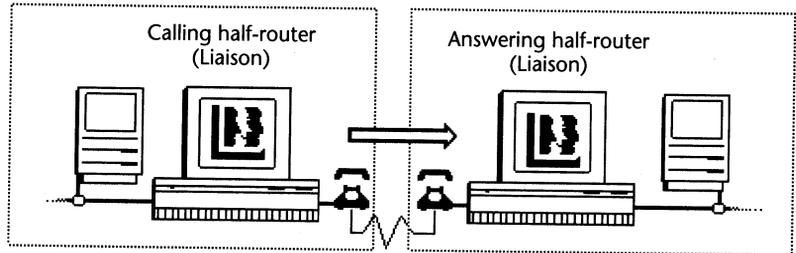
Use Liaison as an answering half-router to receive calls through modems from a distant network. Such a connection makes it possible for users on either side of the dial-up link to access network services (such as electronic mail, print and file servers, and Timbuktu) on the other side of the connection. An answering half-router requires a copy of Liaison and a modem. It can answer calls from a calling half-router, a relay router, a personal bridge, or a semi-router.

For more information about the answering half-router, see Chapter 6.

Relay client and relay router
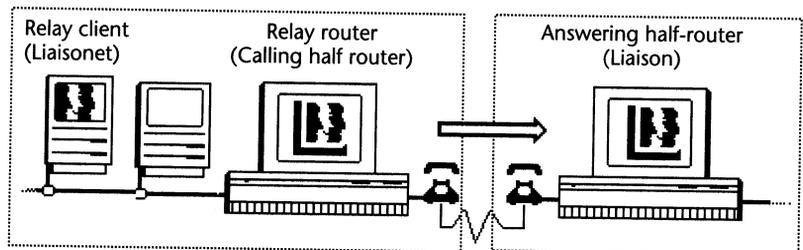
When a user on your network needs to initiate a dial-up connection but does not have a dedicated modem, you can create a **relay client** by installing Liaisonet on that user's computer. The user of the relay client can then select a calling half-router on the network, known in this function as a relay router. The relay router dials the number for the relay client and makes the connection.

For more information about relay router connections, see Chapter 7.

Personal bridge
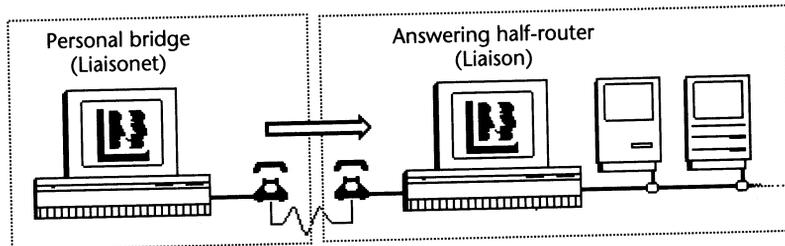
Use Liaisonet and a modem to call a Liaison half-router from home or while traveling. This configuration, known as a personal bridge, allows employees to check their electronic mail and use other network services when they cannot be at the office. A personal bridge can initiate a call but cannot answer one.

For more information about personal bridges, see Chapter 8.

Semi-router
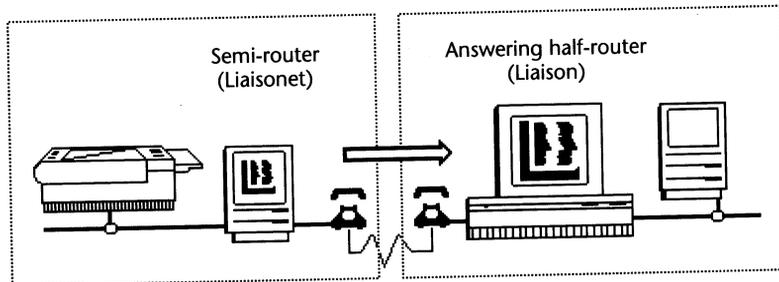
Use Liaisonet and a dedicated modem to call a distant network from a small (often a home) network.

■ A semi-router is similar to a personal bridge except that the calling Macintosh also has access to a local network, often an AppleTalk printer such as a LaserWriter.

■ A semi-router is similar to a calling half-router except that it uses Liaisonet instead of Liaison and does not permit communication between other users on the local network and the distant network. Because it uses Liaisonet, a semi-router cannot answer calls.

For more information about the semi-router, see Chapter 9.

Which use of Liaison is right for you?

If your Macintosh is... → ...**not** connected to a network → Set up a **personal bridge.** See Chapter 8.

↓

...connected to a network

and

the network you wish to connect to is... → ...a local network (or you want to split up a large net into smaller ones) → Set up a **full-router.** See Chapter 4.

↓

...a distant network (requiring a dial-up link)

and

the network that will initiate the call is... → ...the distant network → Set up an **answering half-router.** See Chapter 6.

↓

...your network

and

Liaison and a modem are installed on your network... → ...but *not* installed on your computer → Set up a **relay client** and **relay router**. See Chapter 7.

↓

...and they are installed on your computer... → Set up a **calling half-router.** See Chapter 5.

except

...you have **Liaisonet** and a modem instead of **Liaison** and a modem... → Set up a **semi-router.** See Chapter 9.

Chapter 3

Installing Liaison and Liaisonet

This chapter includes installation procedures you will use with Liaison and Liaisonet no matter which configuration you choose from the later chapters in this manual.

Liaison and Liaisonet have related but different functions, and in most cases you need to install one or the other. Use Liaison to set up a full router, a calling half-router, an answering half-router, and a relay router. Use Liaisonet to set up a personal bridge, a relay client, and a semi-router.

The chapter is divided into the following sections:

- Installing the right version of AppleTalk for your system
- Installing Liaison
- Installing Liaisonet
- Installing Network Tuner and Foreground Edit
- Defining a Chooser password to restrict access to the controls of Liaison or Liaisonet on your computer
- Disabling Liaison or Liaisonet temporarily
- Removing Liaison or Liaisonet permanently from your system.

Choosing the right version of AppleTalk

The following criteria will help you decide whether you need to install newer AppleTalk software on your Macintosh to run Liaison and Liaisonet.

■   If you will be using Liaison or Liaisonet on a Macintosh 512K Enhanced or Plus and you do not have AppleTalk version 52 or later in your System Folder:

1.   Insert the Liaison disk and open the For Mac Plus Users folder.

2.   Copy AppleTalk version 52 to your System Folder and restart your computer.

■   If you have tried using Liaison or Liaisonet across a dial-up link and cannot see some zones on the distant network or the network services on those zones:

1.   Insert the Liaison Support disk.

2.   Double-click the AppleTalk Installer and install AppleTalk version 56.

3.   Restart your Macintosh.

Version 56 is built into System 7.0. It provides optimal performance for large and/or wide area networks when used in conjunction with Liaison.

Important: Once AppleTalk 56 is installed, you cannot backtrack to an earlier version. Removing the AppleTalk file from your System Folder will cause you to lose AppleTalk services.

If neither of the previous conditions apply to your situation, you do not need to install a newer version of AppleTalk. You already have a Liaison-compatible version of AppleTalk built into the ROM of your Macintosh.

Installing Liaison

There are four configurations that require Liaison:

- Full router
- Calling half-router
- Answering half-router
- Relay router.

If you start your Macintosh from a floppy disk, you'll need to install Liaison on each startup disk you use.

If you need to set up a relay client, personal bridge, or semi-router, use the procedure for installing Liaisonet later in this chapter.

Before you install Liaison

Have your serial number ready to enter during installation. You must use a separate serial number for each copy of Liaison that you install.

Make sure that you have entered an identifying name for your Macintosh:

- System 7 users—Enter your Owner Name in the Sharing Setup Control Panel.
- Pre-System 7 users—Enter your User Name in the Chooser.

In addition, if you are using a Macintosh IIfx and will be setting up a half-router or a relay router:

1. Locate the IIfx Serial Switch in the For Mac IIfx folder of your Liaison disk.

2. Drag the IIfx Serial Switch icon onto the System Folder icon.

3. Select the Serial Switch control panel and select Compatibility Mode.

Note: You can install and configure an upgrade of Liaison while a prior release is running in the background if your existing version is at least 3.0. If your existing version is earlier than 3.0, remove it from your System Folder before installing the upgrade.

To install Liaison software:

1.   Locate the Liaison file in the Liaison Files folder of the Liaison disk. Drag the Liaison icon onto the System Folder icon of your startup disk.

2.   Open the Chooser and select Liaison:

```
┌─────────────────────────────────────────────────────────┐
│▤□▦▦▦▦▦▦▦▦▦▦▦▦▦▦▦ Chooser ▦▦▦▦▦▦▦▦▦▦▦▦▦▦▦│
│  ┌──────────────────────┐⬆ ┌──────────────────────┐⬆ │
│  │   📁       🖨        │  │                      │  │
│  │                      │  │                      │  │
│  │ AppleShare LaserWriter│  │                      │  │
│  │                      │  │                      │⬇ │
│  │   👤                 │  └──────────────────────┘  │
│  │  Liaison             │  ·········                 │
│  │          ▶           │  User Name:                │
│  │                      │  ┌──────────────────────┐  │
│  │                      │  │ First Time User      │  │
│  │                      │  └──────────────────────┘  │
│  │                      │            ◉ Active        │
│  │                     ⬇ │  AppleTalk  ○ Inactive    │
│  └──────────────────────┘               3.3.1       │
└─────────────────────────────────────────────────────────┘
```

The following message appears:

```
┌──────────────────────────────────────────────────┐
│ ┌──┐   Setting default configuration... You may   │
│ │▐▌│   want to adjust your Preferences.           │
│ └──┘   ┌──────────┐          ┌──────────┐         │
│        │    OK    │          │  Cancel  │         │
│        └──────────┘          └──────────┘         │
└──────────────────────────────────────────────────┘
```
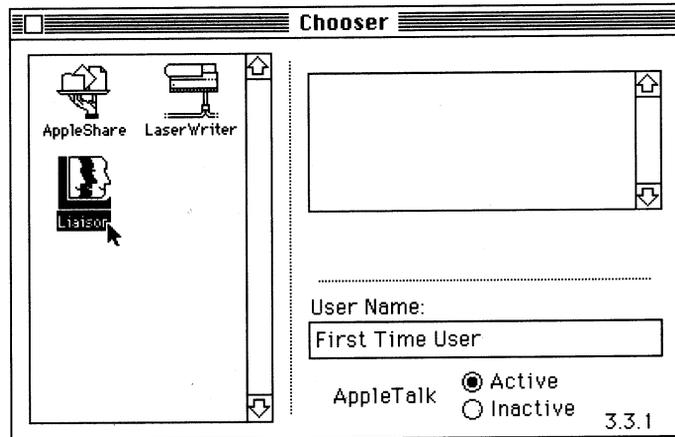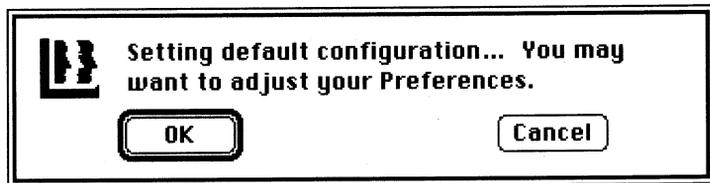
3.   Click OK. Liaison creates the Liaison Prep document in your System Folder with a number of default settings.

Liaison also modifies some of your system resources. Do not be alarmed if a virus detector reports this. The changes made to your system ensure that Liaison loads and activates prior to any AppleTalk activity.

The following dialog box appears:

Please enter the serial number from your Liaison distribution disk to create a Network bridge.

Or, click "Personal" for "calling-only" bridge use.

My registered serial number is:
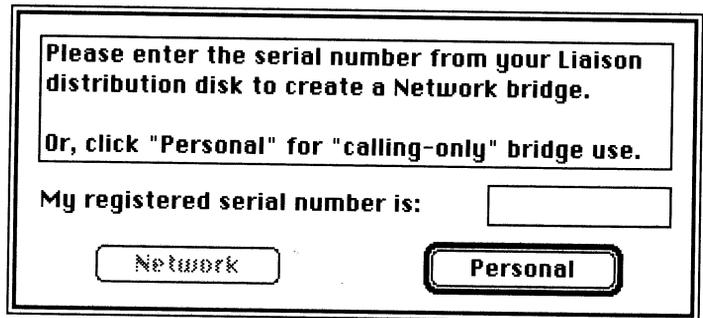
        [Network]   [**Personal**]

4. Type in the serial number from your Liaison disk. This enables the Network button. (If you do not enter a serial number, clicking the Personal button at this time will limit you to Liaisonet features.) Remember that all copies of Liaison must have unique serial numbers.

5. Click the Network button.

6. The Configure menu of Liaison now appears in the Chooser window:

Configure menu ———————

    Chooser

    AppleShare   LaserWriter

    Liaison

    [Configure]

    User Name:
    First Time User

    AppleTalk   ● Active
                ○ Inactive
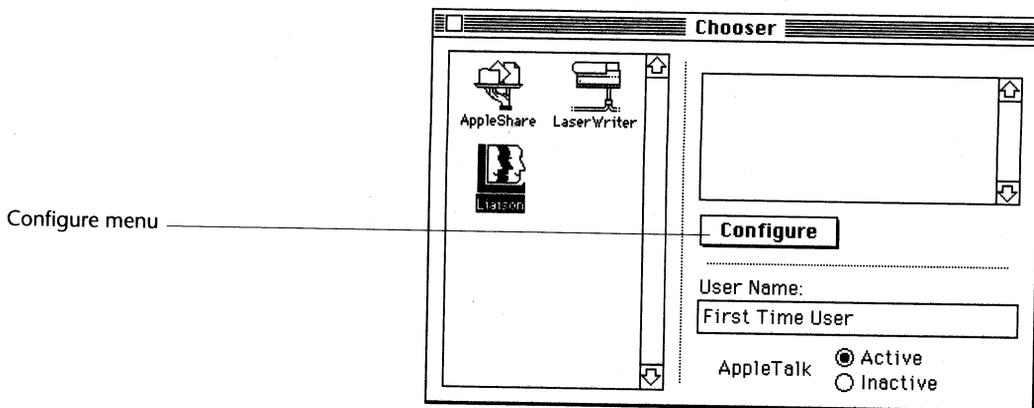
Liaison is now installed but not yet configured for a specific use. Liaison will have no effect on your computer or network until it is configured and you restart your Macintosh. To choose the configuration procedure that is suitable for your needs, see Chapter 2, "The Six Faces of Liaison."

Installing Liaisonet

There are three configurations that use Liaisonet software:

- Personal bridge

- Relay client

- Semi-router

If you need to set up a full-router, a calling half-router, an answering half-router, or a relay router, use the procedure for installing full Liaison software, described earlier in this chapter.

Before you install Liaisonet

Make sure that you have entered an identifying name for your Macintosh:

- System 7 users—Enter your Owner Name in the Sharing Setup Control Panel.

- Pre-System 7 users—Enter your User Name in the Chooser.

In addition, if you are using a Macintosh IIfx and will be setting up a personal bridge or semi-router:

1. Locate the IIfx Serial Switch in the For Mac IIfx folder of your Liaison disk.

2. Drag the IIfx Serial Switch icon onto the System Folder icon.

3. Select the Serial Switch Control Panel and select Compatibility Mode.

To install Liaisonet software:

1. Locate the Liaisonet file in the "Liaison Files" folder of the Liaison disk.

2. Drag the Liaisonet icon onto the System Folder icon of your startup disk.

3. Open the Chooser and select Liaisonet:
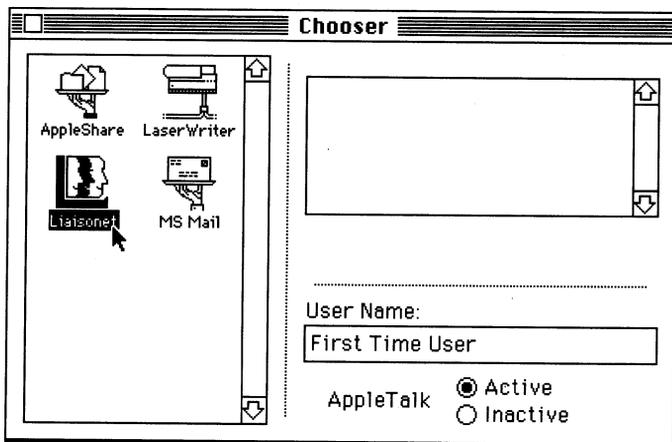
4. The following message appears:
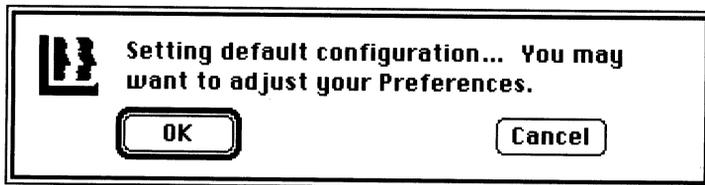
> Click OK. Liaisonet creates a Liaisonet Prep file in your System Folder with a number of default settings.

> Liaisonet also modifies some of your system resources. Do not be alarmed if a virus detector reports this. The changes made to your system ensure that Liaisonet loads and activates prior to any AppleTalk activity.

Liaisonet is now installed, but not yet configured for a specific use. Liaisonet cannot be used until it is configured and you restart your Macintosh. To choose the configuration procedure that is suitable for your needs, see Chapter 2, "The Six Faces of Liaison."

Installing Network Tuner and Foreground Edit

Network Tuner

If you will be setting Liaison up to be a half-router (including a relay router) or setting Liaisonet up to be a semi-router, copy Network Tuner to the System Folders of computers on your network if those computers:

■   Will not be running Liaison or Liaisonet

■   Will be participating in the dial-up connection (for example, if they will be exchanging electronic mail or files across the dial-up link).

This will speed up network responses.

Foreground Edit

If you need to inspect the Liaison Log or Networks documents generated by Liaison (see Chapter 11), you can use any word processor to open these files. Foreground Edit, included with Liaison, is especially suited to this task because it can be opened on an active AppleShare server. To do this:

1.   Copy Foreground Edit to the Server Folder of the AppleShare server.

2.   Choose Foreground Edit from the File menu of the server. Foreground Edit displays a directory dialog box.

3.   Open Liaison Log or Networks as desired. You can now inspect the file or save it to a floppy disk.

Restricting access with a Chooser password

By assigning a password to Liaison or Liaisonet, you can prevent other users from viewing or changing your Liaison or Liaisonet settings and from dialing up or hanging up a telephone connection. Once you define a Chooser password, each time you attempt to open Liaison or Liaisonet, a dialog box will ask you for the password.

To set the Chooser password:
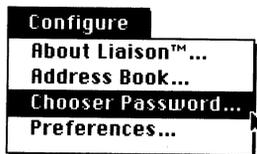
1. Choose Chooser Password from the Configure menu. The following dialog box appears:

```
Configure
  About Liaison™...
  Address Book...
  Chooser Password...
  Preferences...
```

```
Enter a new
Chooser password: [                    ]

         (  OK  )          ( Cancel )
```
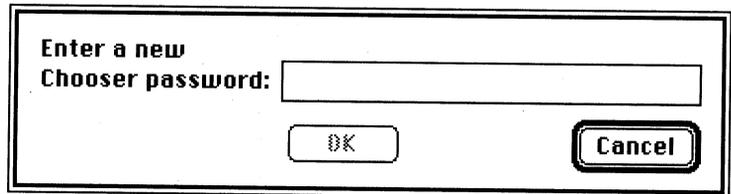
If you are changing an existing password, Liaison displays it as a line of dots.

2. Enter the new password. The Chooser password is not case sensitive.

    Important: There is no dialog box to confirm the new password. If you are not sure that you have entered it the way you want it to be saved, click Cancel and start again.

    When you are sure the password is entered correctly, click OK. Click Cancel if you are not sure.

3. Write down your Chooser password in a secure location. If you forget it, you will have to discard the Liaison Prep or Liaisonet Prep document from the System Folder and reconfigure Liaison.

Disabling Liaison or Liaisonet temporarily

You can disable Liaison or Liaisonet temporarily to switch it off or free up additional memory for another application.

To disable Liaison temporarily:

Use either of the following methods:

■   While starting your Macintosh, hold down the Command, Option, or Shift key, or hold down the mouse button. In a few seconds a dialog box will ask you to confirm that you do not want Liaison to be activated.

The next time you start your computer, the program will load as usual.

■   Drag the Liaison or Liaisonet INIT files and the Liaison or Liaisonet Prep files out of your System Folder and restart your computer.

With this method you will have to drag the Liaison or Liaisonet file back to your System Folder and restart your Macintosh before Liaison or Liaisonet can be active again.

Removing Liaison or Liaisonet

To remove Liaison or Liaisonet permanently from your Macintosh:

1.   Drag Liaison or Liaisonet from your System Folder to the Trash.

2.   If you wish to retain Address Book or Authorized User entries, drag Liaison Prep or Liaisonet Prep to a different folder. Otherwise, drag this file to the Trash.

3.   Empty the Trash and restart your Macintosh.

Chapter 4

Setting Up a Full Router

This chapter contains detailed instructions for setting up Liaison to connect various combinations of LocalTalk, EtherTalk, and TokenTalk networks or to divide an overloaded LocalTalk network into smaller, connected ones to speed up network response. A full router can also be used to hide one or more networks from the rest of the internetwork.

This use of Liaison, called a full router, does not involve modems or dial-up links, although a full router can also function simultaneously as a half-router to establish a dial-up link with a distant user or network.

Liaison can be a full router between networks that use:

■ Exclusively Phase 1 AppleTalk protocols, usually LocalTalk

■ Exclusively Phase 2 AppleTalk protocols, usually a combination of LocalTalk and EtherTalk

■ A combination of Phase 1 and Phase 2, although some restrictions must be observed to allow network information to flow between users of different protocols. These are explained in the section "Connecting Two EtherTalk Networks" in this chapter.

To learn more about AppleTalk Phase 1 and Phase 2 protocols, see Appendix A, "Networks and Network Planning."

How many networks can Liaison handle?

For simplicity, the configuration procedures in this chapter always describe a two-network router. However, because Liaison supports five network ports, you can combine the procedures, for example, to set up a five-way router, with a LocalTalk port, two EtherTalk ports, a TokenTalk port, and a dial-up LocalTalk port. Configuration of dial-up ports is described in Chapters 5 and 6.

Connecting two LocalTalk networks

Use these instructions:

■   To reduce traffic volume on a large LocalTalk network by dividing it into smaller networks connected by routers.

■   For groups of users on separate LocalTalk networks who need to share each other's network resources, such as electronic mail, printers, Timbuktu, or file servers.

Adding routers for traffic control

To speed up your network's response in an environment of high- and low-volume users, you can divide it into two or more smaller networks isolated from each other by routers. The routers forward traffic between the networks only when necessary. (To learn more about the source of network overload, see "Relieving Network Traffic Jams" in Appendix A.)

It's important that you plan carefully how to group your users and devices so that minimal traffic will cross the router:

■   Connect your high-volume users and the peripheral equipment (printers, servers) they use frequently to one or more LocalTalk cables, preferably with ten users or fewer per cable.

■   Connect low-volume users to a cable or cables of their own; a single cable should be adequate to support 20–25 low volume users.

■   Install the full router between the high-volume and low-volume cables. You'll need one router for two LocalTalk networks, two routers for three networks, and so forth.

■   Consider installing an extra router to allow for a trunk or backbone network. This arrangement ensures that no network is more than two routers (technically, *hops*) away from any other, as explained in the following section.

At first glance, the most straightforward way to segment a large LocalTalk network is to group related users and their network services into separate networks, as recommended in the previous section, and install a router between each network:

```
        |        |        |        |        |        |
        |   ┌──┐ |   ┌──┐ |   ┌──┐ |   ┌──┐ |   ┌──┐ |
        |   │R │ |   │R │ |   │R │ |   │R │ |   │R │ |
        |   │o │ |   │o │ |   │o │ |   │o │ |   │o │ |
  N     | ──│u │─── ──│u │─── ──│u │─── ──│u │─── ──│u │──
  e     |   │t │ N |  │t │ N |  │t │ N |  │t │ N |  │t │ N
  t     |   │e │ e |  │e │ e |  │e │ e |  │e │ e |  │e │ e
  w     |   │r │ t |  │r │ t |  │r │ t |  │r │ t |  │r │ t
  o     |   │  │ w |  │  │ w |  │  │ w |  │  │ w |  │  │ w
  r     |   │1 │ o |  │2 │ o |  │3 │ o |  │4 │ o |  │5 │ o
  k     |   └──┘ r |  └──┘ r |  └──┘ r |  └──┘ r |  └──┘ r
  A     |        k |       k |       k |       k |       k
        |        B |       C |       D |       E |       F
```
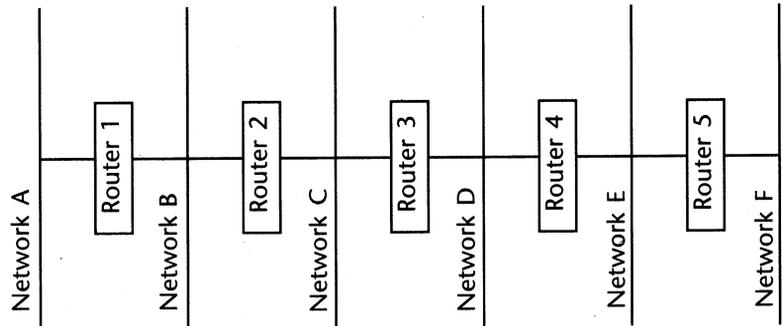
Internetwork without a backbone network

This arrangement is undoubtedly an improvement over the old overloaded LocalTalk network, especially so for users on adjacent networks. For example, when a sales representative on Network A needs to obtain a report from a file server in Network B, the server is just one hop away. To best serve users in this situation, you should try to keep router hopping to a minimum when you design the new network. Thus, for a single file server to be shared among the six networks in the illustration, the server should be in Network C or D. It would then be a maximum of three hops from any user.

But what happens when the user on Network A has to print on a LaserWriter in Network F? Five hops. Not a catastrophe, but not ideal: "reaching across the table" in this fashion generates additional traffic on all the intermediary networks, and the additional hops slow transmission time.

Adding a backbone

If you expect a fairly high volume of traffic between your new and smaller networks, consider the following arrangement:

Backbone Network

```
┌─────────┐   ┌─────────┐       ┌─────────┐
│ Router 4│   │ Router 5│       │ Router 6│
└─────────┘   └─────────┘       └─────────┘

  Network D     Network E         Network F
┌─────────┐   ┌─────────┐   ┌─────────┐
│ Router 1│   │ Router 2│   │ Router 3│
└─────────┘   └─────────┘   └─────────┘

 Network A       Network B     Network C
```
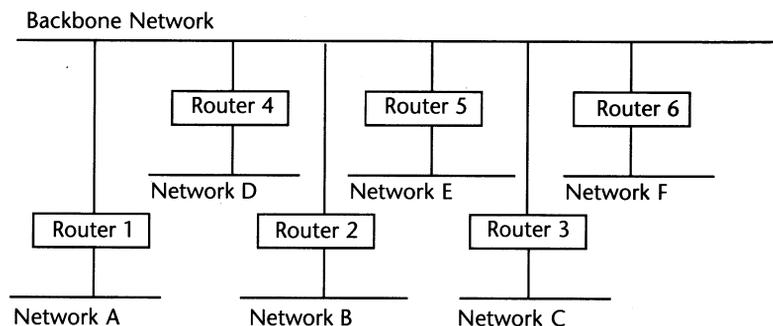
Internetwork with a backbone network

In this arrangement no network is more than two hops from any other. When the user in Network A prints to a LaserWriter in Network F, no additional traffic is generated on Networks B, C, D, or E. An extra router and an extra network (the backbone) have been added. In the illustration, the only devices connected to the backbone network are routers, but the backbone is an ideal location for central network services such as AppleShare and electronic mail servers because they are separated from any user on the network by a single hop.

Because the backbone arrangement assumes heavy internetwork traffic, many organizations install Ethernet cabling for this purpose and continue using LocalTalk for the outlying networks. Ethernet can carry up to 10 times the amount of traffic that LocalTalk can carry. Ethernet cabling is a much more expensive technology and requires special hardware and software installed on the computers connected to it. You'll find instructions for setting up LocalTalk/EtherTalk routers later in this chapter.

Inspect the networks separately first

Before connecting your LocalTalk networks, check each one separately to make sure it is functioning satisfactorily in isolation. Go to a Macintosh on each network and:

■ Open the Chooser. Do AppleShare servers and printers appear where you expect them to? Try printing a page.

■ Open electronic mail and Timbuktu if you have these products. Do mail addresses and Timbuktu hosts display properly in their respective scroll lists?

You can troubleshoot your individual LocalTalk networks with such utilities as CheckNET™ or NetAtlas™ (both available from Farallon) until you can see all the network services that have been installed on them. Then continue with this procedure.

Install Liaison

Install Liaison on the computer that will act as the full router. See Chapter 3 for installation instructions. This can be a Macintosh on either network or one you are dedicating to network services.

Connect the cables

Connect one of your PhoneNET (or other LocalTalk) connectors to the printer port of your full router Macintosh, and connect the other cable to the modem port.

Modem port

Printer port

LocalTalk connectors
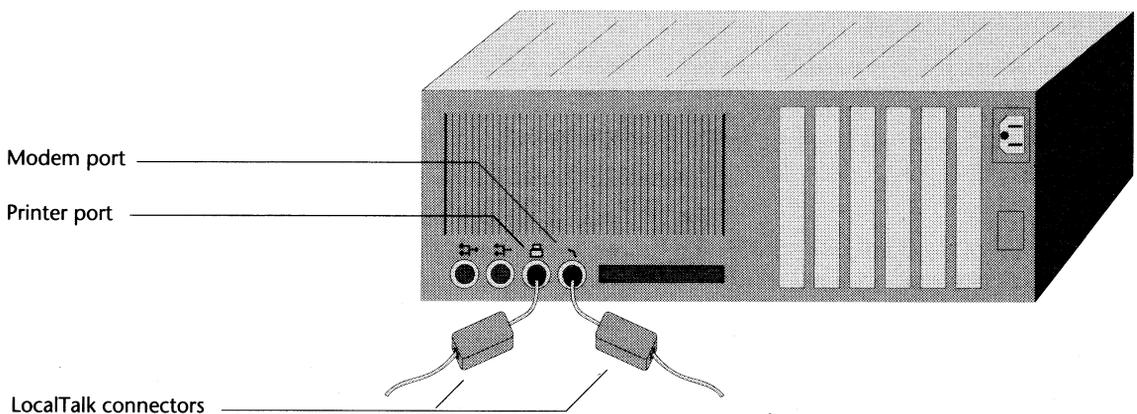
To configure Liaison as a LocalTalk/LocalTalk router:

1. Switch on the full router Macintosh, open the Chooser, and select Liaison. You may be asked to type a password.

2. Choose Preferences from the Configure menu. Liaison displays the Preferences dialog box.

```
┌─────────────────────────────────────────────────────────┐
│  Network interfaces:          Modem setup:               │
│  ┌──────────────────────┐⇧   ┌─────────────────────────┐ │
│  │ ☒ LocalTalk          │    │   Hayes Compatible      │ │
│  │ ☒ LocalTalk (modem)  │█   └─────────────────────────┘ │
│  │ ☐ Modem, dial-up     │░   ┌──────┐                    │
│  │ ☐ Null Network       │░   │ 2400 │ Baud (max)         │
│  │                      │░   └──────┘                    │
│  │                      │⇩   ☐ Auto-dial at startup.     │
│  └──────────────────────┘    ☒ Terminate idle calls.     │
│  ┌───────────────────────────────────────────────────┐   │
│  │ ☐ Report remote connection changes.               │   │
│  │ ☐ Support an optional printer port serial printer.│   │
│  └───────────────────────────────────────────────────┘   │
│      ┌──────────────┐        ┌──────────────┐            │
│      │     Save     │        │    Cancel    │            │
│      └──────────────┘        └──────────────┘            │
└─────────────────────────────────────────────────────────┘
```
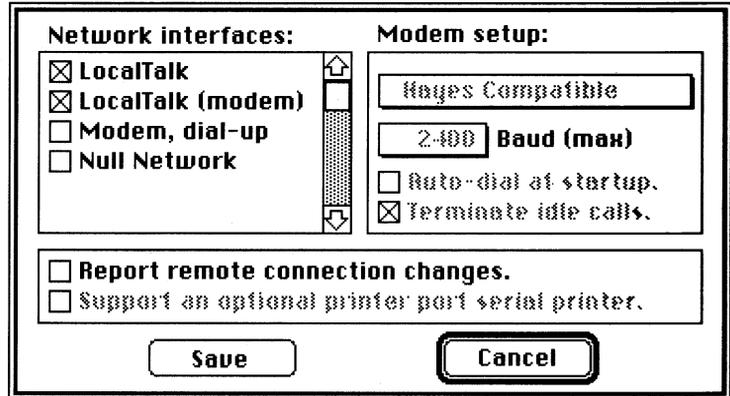
Preferences dialog box for a LocalTalk-to-LocalTalk router

▲   Note for TOPS FlashTalk users: FlashTalk options for modem and printer ports appear in the Network Interfaces list only if the TOPS FlashTalk driver file is in your System Folder. You can enable one or both of these options and attach the TOPS FlashBox to the respective port before starting up your Macintosh. Keep LocalTalk devices in one network and FlashTalk devices in another, and then connect the networks with a full router.

3. In the Network Interfaces scrolling list, select LocalTalk and LocalTalk (modem).

4. Click the Save button. Liaison displays the following message:
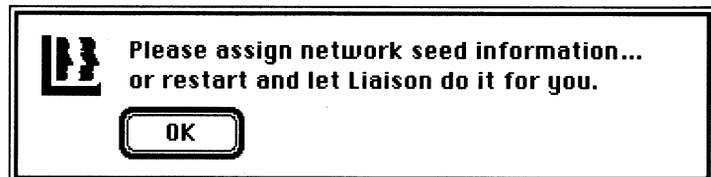
```
┌─────────────────────────────────────────────────────────┐
│   ▐▌    Please assign network seed information...         │
│   ▐▌    or restart and let Liaison do it for you.        │
│        ┌──────────┐                                       │
│        │    OK    │                                       │
│        └──────────┘                                       │
└─────────────────────────────────────────────────────────┘
```

5. Click OK.

6. To enter your own network numbers and zone names, choose Network Services from the Configure menu and enter the desired values for each seed port on your router. If your router has only nonseed ports—that is, it will not be supplying network numbers or zone names—you can skip this step; Liaison will obtain seeding information from other routers on your internet.

   To learn about seed ports and nonseed ports and how to enter seed information (network ID numbers and zone names) when it is required, see "Assigning Zone Names and Network ID Numbers" later in this chapter.

7. Restart your Macintosh to switch on the full router.

To confirm your setup:

1. Open the Chooser and select Liaison.

2. Choose About Liaison from the Configure menu. If the full router is working, "Active as a local router" appears in the status box:

> **PhoneNET**
>
> ⚡ **Farallon**® ⚡ ® L I A I S O N™
> *System*
>
> | Active as a local router. | Software: | Evan Solley |
> |---|---|---|
> | | Documentation: | Evan Solley |
> | | | John Brewer |
> | | Management: | Larry Jones |
> | **Help**   **OK** | Version: | 3.0.3 |
> | | Serial Number: | |
>
> Copyright © 1988-1991, Farallon Computing, Inc. / 2000 Powell St, Suite 600, Emeryville, CA 94608 / (510) 596-9000 / All rights reserved.
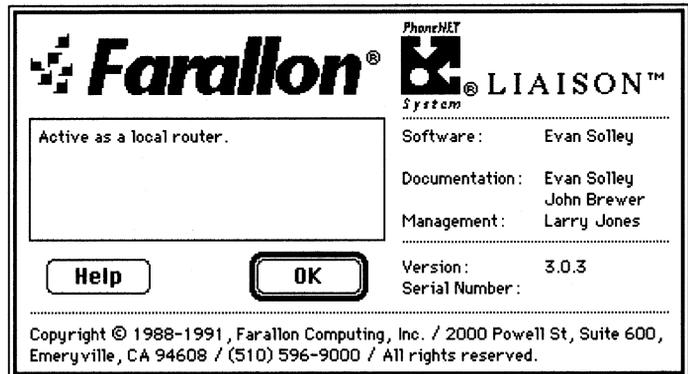
3. To test the full router, go to computers connected to each LocalTalk network and make sure you can see the network services on the other side of the router. For example, look for printers in the Chooser.

4. To inspect the amount of traffic that Liaison is routing between your networks, choose Network Services from the Configure menu and click the Statistics button. For a description of the Network Statistics dialog box, see Chapter 11.

Router ports

The following sections sometimes refer to *ports* on the router, specifically the *home port*. Each cable you connect to your Liaison full router through the hardware ports of your Macintosh is associated with one of Liaison's five "software" ports: Ports 0–4. Because every device on an internet must have a network number as part of its node address, you must choose one of the ports to be the home port (meaning "home network") of the router. From then on, the router's address will contain the network number assigned to that port. For more information see "The Home Button" later in this chapter.

Connecting LocalTalk and EtherTalk networks

Use these instructions if you have groups of users on LocalTalk and EtherTalk networks who need to share each other's network resources, such as electronic mail, printers, or file servers.

Inspect the networks separately first

Before connecting your LocalTalk and EtherTalk networks, check each network separately to make sure it is functioning satisfactorily in isolation. Go to a Macintosh on each network and:

- Open the Chooser. Do AppleShare servers and printers appear where you expect them to? Try printing a page.

- Open electronic mail and Timbuktu if you have these products. Do mail addresses and Timbuktu hosts display properly in their respective scroll lists?

You can troubleshoot your individual networks with such utilities as CheckNET™ or NetAtlas™ (both available from Farallon) until you can see all the network services that have been installed on them. Then continue with this procedure.

Install Liaison

Install Liaison on the computer that will act as the full router. (See Chapter 3 for installation instructions.) This can be a Macintosh already on the EtherTalk network or an additional computer you are dedicating to network services. In either case the full router Macintosh must have an EtherTalk card installed. You must also install the software driver for the card.

Connect the cables

Connect the LocalTalk cable to the printer port of your full router Macintosh and the EtherTalk cable to the port of the EtherTalk card, as shown:

EtherTalk card

Printer port

LocalTalk connector
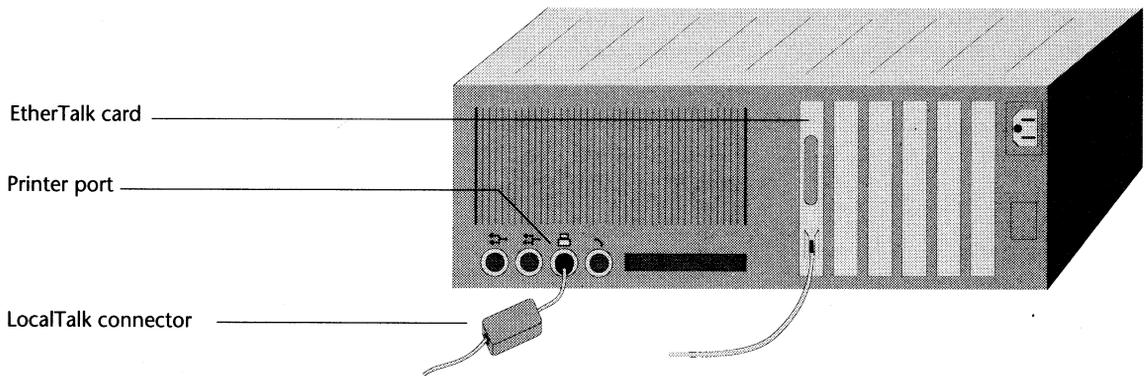
To configure Liaison as a LocalTalk/EtherTalk router:

1. Switch on the full router Macintosh, open the Chooser, and select Liaison. You may be asked to type a password.

2. Choose Preferences from the Configure menu. Liaison displays the Preferences dialog box.

3. In the Network Interfaces scrolling list, select EtherTalk2 and LocalTalk.

```
┌─────────────────────────────────────────────────────────┐
│  Network interfaces:        Modem setup:                 │
│  ┌──────────────────────┐   ┌──────────────────────────┐ │
│  │ ☒ EtherTalk2      △  │   │  Farallon Remote V.32    │ │
│  │ ☒ LocalTalk          │   └──────────────────────────┘ │
│  │ ☐ LocalTalk (modem)  │   │ 19200 │ Baud (max)          │
│  │ ☐ Modem, dial-up     │   ☐ Auto-dial at startup.      │
│  │ ☐ Null Network    ▽  │   ☐ Terminate idle calls.      │
│  └──────────────────────┘                                 │
│  ┌──────────────────────────────────────────────────────┐│
│  │ ☐ Report remote connection changes.                  ││
│  │ ☐ Support an optional printer port serial printer.   ││
│  └──────────────────────────────────────────────────────┘│
│       ┌──────────┐          ┌──────────────┐              │
│       │   Save   │          │    Cancel    │              │
│       └──────────┘          └──────────────┘              │
└─────────────────────────────────────────────────────────┘
```
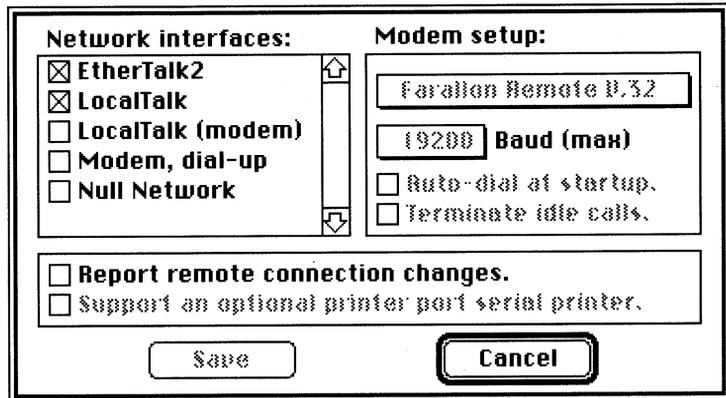
Preferences dialog box for a LocalTalk-EtherTalk router

If you are using EtherTalk 1.2, EtherTalk appears in the list instead of EtherTalk2.

4. Click the Save button. Liaison displays this message:

```
┌────────────────────────────────────────────────────────┐
│  ╔═╗  Please assign network seed information...         │
│  ╚═╝  or restart and let Liaison do it for you.         │
│       ┌────────┐                                         │
│       │   OK   │                                         │
│       └────────┘                                         │
└────────────────────────────────────────────────────────┘
```
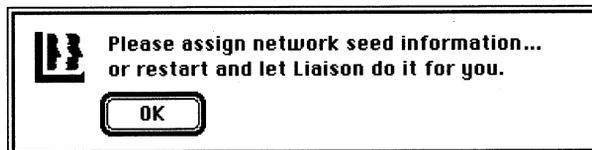
5. Click OK.

6. You have the option of configuring either the LocalTalk port or the EtherTalk port or both, although Liaison can do this for you automatically. However, if there is no other router connected to the EtherTalk network, you will need to choose Network Services and assign seed information to that network.

   If you wish to manually configure one or more ports, choose Network Services from the Configure menu and enter the desired values. To learn how to enter seed information (network ID numbers, ranges, and zone names), see "Assigning Network Numbers and Zone Names" later in this chapter.

7. Restart your Macintosh to switch on the full router.

Note on auto-configuration

Liaison can automatically configure the extended cable (EtherTalk 2.0) if that cable receives its seeding information from another router and is designated as your home port.

If the seed router on the EtherTalk 2.0 cable stops routing, the autoconfigured router retains network number, range, and default zone name of the extended network, allowing it to generate this information for the network. However, the auto-configured router does not retain zones names other than the default zone from the original seed router, so those zones may not appear until the original router is restarted.

To confirm your setup:

1. Open the Chooser and select Liaison.

2. Choose About Liaison from the Configure menu. If the full router is working, "Active as a local router" appears in the status box:

3. To test the full router, go to computers connected to the LocalTalk and EtherTalk networks and make sure you can see the network services on the other side of the router. For example, look for printers in the Chooser.

4. To inspect the amount of traffic that Liaison is routing between your networks, choose Network Services from the Configure menu and click the Statistics button. For a description of the Network Statistics dialog box, see Chapter 11.

Setting up a transition router

Use these instructions if you have a single Ethernet cable and are updating the EtherTalk software on the computers connected to this cable over a period of days or weeks. Without a router on this cable, users with EtherTalk 1.2 will not be able to see network services that have upgraded to EtherTalk 2.0, and vice versa. When configured as a transition router, Liaison solves this problem.

Install Liaison

Install Liaison on the computer that will act as the full router. See Chapter 3 for installation instructions. This can be a Macintosh already connected to the Ethernet cable or an additional computer you are dedicating to network services. The full router Macintosh must have an EtherTalk card and driver software for both EtherTalk 1.2 and EtherTalk 2.0. Be sure to use the most recent versions of the driver software.

Install the software drivers for the cards *after* connecting the cable. If you are not sure that your Ethernet card can support EtherTalk 1.2 and EtherTalk 2.0 simultaneously, check with your vendor. You may need to purchase a second card and set up separate EtherTalk 1.2 and EtherTalk 2.0 cables. You can still use the following instructions except that you will have two cards and two cables instead of one of each.

Connect the cable

Connect the EtherTalk cable to the port of the EtherTalk card, as shown:
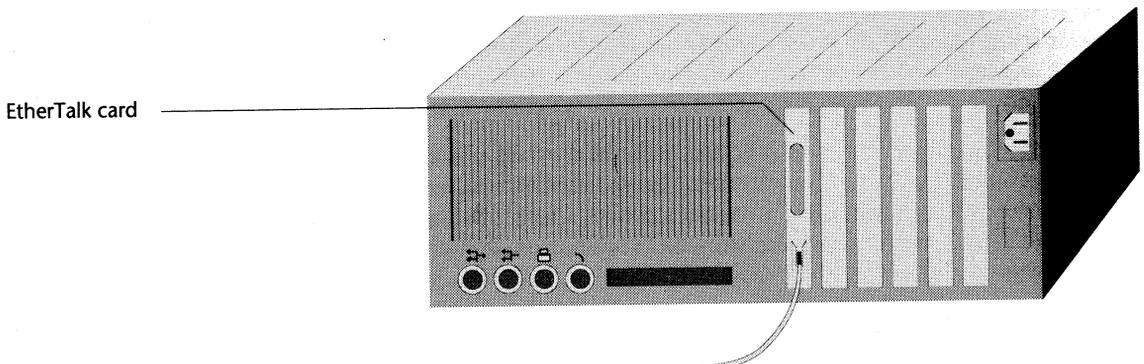
EtherTalk card

To configure Liaison:

1. Switch on the full router Macintosh, open the Chooser, and select Liaison. You may be asked to type a password.

2. Choose Preferences from the Configure menu. Liaison displays the Preferences dialog box.

   In the Network Interfaces scrolling list, a separate EtherTalk checkbox appears for each of the EtherTalk drivers you have installed. "EtherTalk" corresponds to the nodes on the cable that are using EtherTalk 1.2. "EtherTalk2" corresponds to the nodes using EtherTalk 2.0.

3. Select both EtherTalk boxes, as shown:

```
┌─────────────────────────────────────────────────────┐
│  Network interfaces:        Modem setup:             │
│  ☒ EtherTalk2        ⬆                                │
│  ☒ EtherTalk           ┌──────────────────────────┐  │
│  ☐ LocalTalk           │  Farallon Remote V.32    │  │
│  ☐ LocalTalk (modem)   ┌──────────┐                │  │
│  ☐ Modem, dial-up      │  19200   │ Baud (max)     │  │
│  ☐ Null Network     ⬇  ☐ Auto-dial at startup.     │  │
│                        ☐ Terminate idle calls.      │  │
│  ┌────────────────────────────────────────────────┐ │
│  │ ☐ Report remote connection changes.            │ │
│  │ ☐ Support an optional printer port serial printer. │
│  └────────────────────────────────────────────────┘ │
│        ┌──────────┐         ┌──────────┐             │
│        │   Save   │         │  Cancel  │             │
│        └──────────┘         └──────────┘             │
└─────────────────────────────────────────────────────┘
```
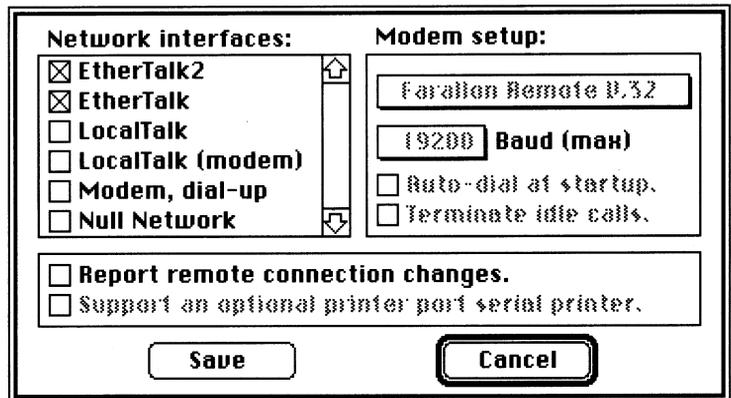
Preferences dialog box for an EtherTalk transition router

4. Click the Save button. Liaison displays this message:

```
┌─────────────────────────────────────────────────────┐
│  ▌▌    Please assign network seed information...     │
│        Configure extended cables manually.          │
│        ┌──────────┐                                  │
│        │    OK    │                                  │
│        └──────────┘                                  │
└─────────────────────────────────────────────────────┘
```
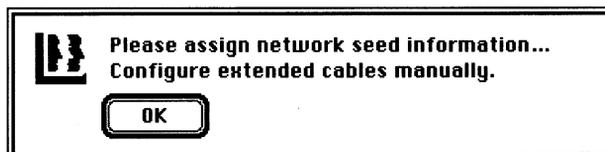
5. Click OK. You need to choose Network Services and manually configure the port that is not selected as the home network of the router. If there is no other router connected to the Ethernet cable, you will also need to assign seed information to the home network too.

6. To manually configure one or more ports, choose Network Services from the Configure menu.

7. In the EtherTalk row, enter a unique network number in the Net box. Select the zone box on the same line and enter the desired zone name.

8. In the EtherTalk2 row, enter a unique network number in the Net box. Enter the same number in the –Range box.

Port name	Hm	Net	-Range	Zone	Hide
EtherTalk	●	110		R & D	☐
EtherTalk2	○	210	210	R & D	☐

☐ **Answer in-bound calls**   ☐ **Forward user calls**
☒ **Defer to foreground**   ☐ **Log call activity**

[Statistics]   [Save]   [Cancel]

Network services dialog box for a transition router

9. Click the Zone box in the EtherTalk2 row. Liaison displays a dialog box for entry of multiple zone names.

10. Enter a single name under New Zone Name, click Add, and click Done. You can use the zone name entered for the EtherTalk (1.2) network if you want all nodes on the Ethernet cable to appear in the same zone.

11. Click Save. To switch on the full router, restart your Macintosh.

Note: When all EtherTalk 1.2 nodes have been updated to EtherTalk 2.0, you can deselect EtherTalk 1.2 in the Preferences dialog box, thereby changing the transition router to a single-cable, Phase 2 router. Follow the instructions in "Creating Zones on a Single Extended Cable" later in this chapter.

To learn more about seed ports and nonseed ports and how to enter seed information (network ID numbers and zone names) when it is required, see "Assigning Network Numbers and Zone Names" later in this chapter.

Note on auto-configuration

Liaison can automatically configure an EtherTalk 2.0 cable if that cable receives its seeding information from another router and is designated as your home port.

If the seed router on the EtherTalk 2.0 cable stops routing, the autoconfigured router retains network number, range and default zone name of the extended network, allowing it to generate this information for the network. However, the autoconfigured router does not retain zones names other than the default zone from the original seed router, so those zones may not appear until the original router is restarted.

To confirm your setup:

1. Open the Chooser and select Liaison.

2. Choose About Liaison from the Configure menu. If the full router is working, "Active as a local router" appears in the status box:

3. To test the full router, go to computers using each type of EtherTalk driver and make sure you can see the network services on the other side of the router. For example, look for printers in the Chooser.

4. To inspect the amount of traffic that Liaison is routing between your networks, choose Network Services from the Configure menu and click the Statistics button. For a description of the Network Statistics dialog box, see Chapter 11.

Connecting separate Ethernet cables

Because of the high transport speed made possible by Ethernet cable, it is unlikely that you will need a router between two EtherTalk 2.0 networks simply to reduce traffic jams. Nor is it necessary to attach two Ethernet cables to a Liaison full router simply to set up multiple zones. See the following section "Creating Zones on a Single Extended Cable."

There are only two situations that require routing for more than one Ethernet cable:

- You wish to use the router to hide one network from another. In this case, you would need to connect the nodes to be hidden to a single cable and connect all other (Ethernet) nodes to the other cable. See "Security Option: Hiding Networks" later in this chapter.

- You are using EtherTalk 1.2, you do not intend to upgrade to EtherTalk 2.0, and you have more nodes than Phase 1 AppleTalk will allow (254). Additional nodes must then be connected to a separate cable and connected to the original cable through a full router.

To set up a full router between two or more Ethernet cables, you will need to install a separate Ethernet card in the full router Macintosh for each cable you connect to that router.

Creating zones on a single extended cable

If you have only one extended (Phase 2) cable but would like to set up multiple zones on it, use the following procedure:

1. Follow all the steps for setting up a transition router but install only the EtherTalk2 driver software. This configuration assumes you do not have any users on the cable with EtherTalk 1.2 software.

2. In the Preferences dialog box, select EtherTalk2 and Null Network, and then click Save.

3. Follow the instructions for entering multiple zones in the "Manual Seeding" section later in this chapter. Give a network number and range to the Null Network that do not overlap the EtherTalk network number and range.

4. Assign a zone name to the Null Network that is already in use on an existing network. This prevents the appearance of a spurious zone in the AppleTalk Zones list.

Connecting LocalTalk and TokenTalk networks

Use these instructions if you have groups of users on LocalTalk and TokenTalk networks who need to share each other's network resources, such as electronic mail, printers, or file servers. Please read the section, "Routing Between Phase 1 and Phase 2 Networks" earlier in this chapter to learn of restrictions that may apply to your configuration. TokenTalk is always a Phase 2 network.

Inspect the networks separately first

Before connecting your LocalTalk and TokenTalk networks, check each one separately to make sure it is functioning satisfactorily in isolation. Go to a Macintosh on each network and:

■   Open the Chooser. Do AppleShare servers and printers appear where you expect them to? Try printing a page.

■   Open electronic mail and Timbuktu if you have these products. Do mail addresses and Timbuktu hosts display properly in their respective scroll lists?

You can troubleshoot your individual networks with such utilities as CheckNET™ or NetAtlas™ (both available from Farallon) until you can see all the network services that have been installed on them. Then continue with this procedure.

Install Liaison

Install Liaison on the computer that will act as the full router. See Chapter 3 for installation instructions. This can be a Macintosh already on the TokenTalk network or an additional computer you are dedicating to network services. In either case the full router Macintosh must have a TokenTalk card installed. You must also install the software driver for the card.

Connect the cables

Connect the PhoneNET (or other LocalTalk) connector to the printer
port of your full router Macintosh and the token ring cable to the port
of the TokenTalk card, as shown:
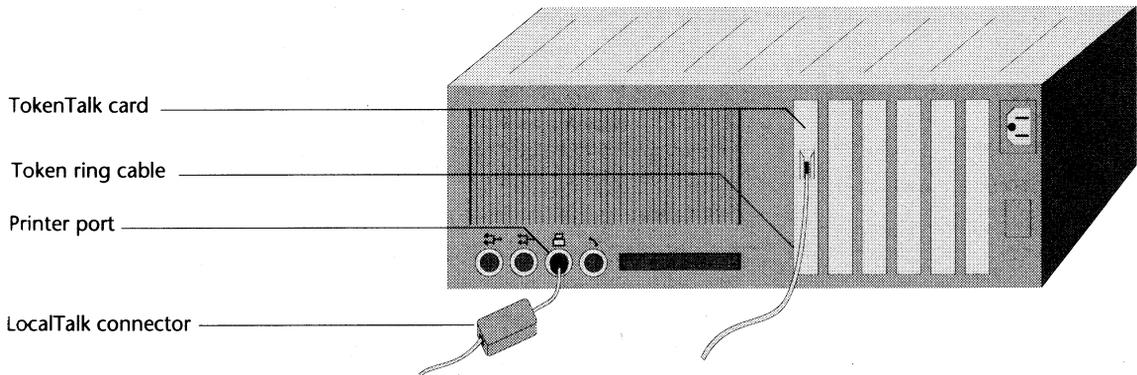
TokenTalk card

Token ring cable

Printer port

LocalTalk connector

To configure Liaison:

1. Switch on the full router Macintosh, open the Chooser, and
   select Liaison. You may be asked to type a password.

2. Choose Preferences from the Configure menu. Liaison displays
   the Preferences dialog box.

   Liaison displays the Preferences dialog box:

   Network interfaces: **Modem setup:**
   ☒ **LocalTalk**
   ☐ **LocalTalk (modem)**   ⌐ Farallon Remote V.32 ⌐
   ☐ **Modem, dial-up**
   ☐ **Null Network**   ⌐ 19200 ⌐ **Baud (max)**
   ☒ **TokenTalk**
                                    ☐ Auto-dial at startup.
                                    ☐ Terminate idle calls.

   ☐ **Report remote connection changes.**
   ☐ Support an optional printer port serial printer.

               ⌐ Save ⌐   ⌐ **Cancel** ⌐
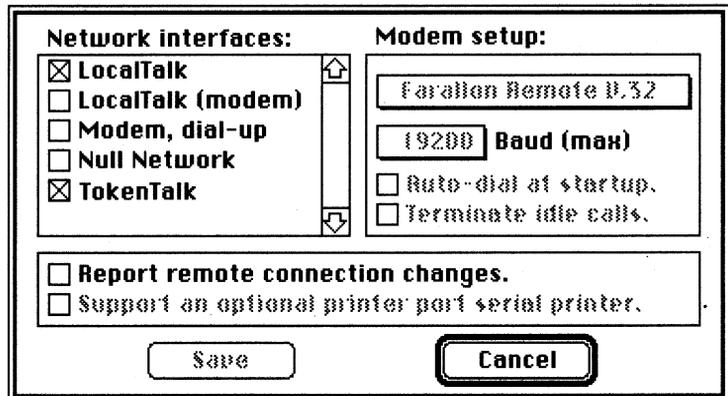
   Preferences dialog box for LocalTalk-TokenTalk router

3. In the Network Interfaces scrolling list, select LocalTalk and
   TokenTalk.

4. Select Remote Connection Changes if you are also using Liaison as a half-router or relay caller.

5. Click the Save button. Liaison displays the following message:

> **Please assign network seed information...**
> **or restart and let Liaison do it for you.**
>
> [**OK**]
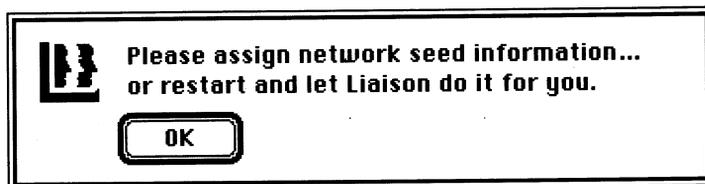
6. Click OK.

7. To enter your own network numbers and zone names, choose Network Services from the Configure menu and enter the desired values for each seed port on your router. If your router has only nonseed ports, you can skip this step; Liaison will obtain seeding information from other routers on your internet.

    Note: Liaison can automatically configure an extended cable (EtherTalk 2.0 or TokenTalk) if that cable receives it seeding information from another router. If not, you must enter network numbers and zone names manually.

    To learn about seed ports and nonseed ports and how to enter seed information (network ID numbers and zone names) when it is required, see "Assigning Zone Names and Network ID Numbers" later in this chapter.

8. Restart your Macintosh to switch on the full router.

To confirm your setup:

1. Open the Chooser and select Liaison.

2. Choose About Liaison from the Configure menu. If the full router is working, "Active as a local router" appears in the status box:

```
┌─────────────────────────────────────────────────────────────────┐
│                                              PhoneNET             │
│  ⁘ Farallon®     ⧓⧓®LIAISON™                                     │
│                   System                                          │
│  ┌──────────────────────────┐   Software:      Evan Solley        │
│  │ Active as a local router.│                                     │
│  │                          │   Documentation: Evan Solley        │
│  │                          │                  John Brewer        │
│  │                          │   Management:    Larry Jones        │
│  └──────────────────────────┘                                     │
│  ┌──────────┐   ┌──────────┐    Version:       3.0.3              │
│  │   Help   │   │    OK    │    Serial Number:                    │
│  └──────────┘   └──────────┘                                      │
│  Copyright © 1988-1991, Farallon Computing, Inc. / 2000 Powell St, Suite 600, │
│  Emeryville, CA 94608 / (510) 596-9000 / All rights reserved.     │
└─────────────────────────────────────────────────────────────────┘
```
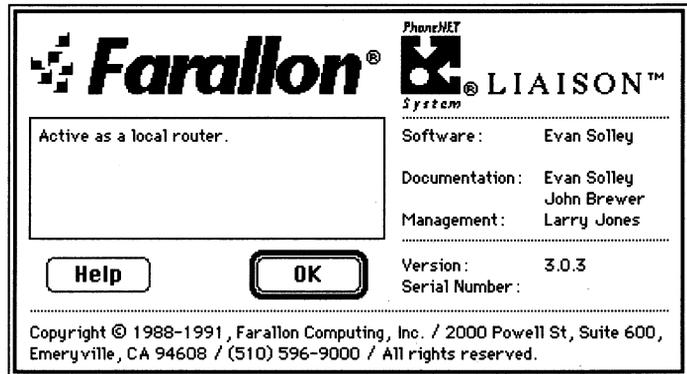
3. To test the full router, go to computers connected to the LocalTalk and TokenTalk networks and make sure you can see the network services on the other side of the router. For example, look for printers in the Chooser.

4. To inspect the amount of traffic that Liaison is routing between your networks, choose Network Services from the Configure menu and click the Statistics button. For a description of the Network Statistics dialog box, see Chapter 11.

Connecting EtherTalk and TokenTalk networks

Use these instructions if you have groups of users on EtherTalk and TokenTalk networks who need to share each other's network resources, such as electronic mail, printers, or file servers. Please read the section, "Routing Between Phase 1 and Phase 2 Networks" earlier in this chapter to learn of restrictions that may apply to your configuration. TokenTalk is always a Phase 2 network.

Inspect the networks separately first

Before connecting the networks, check each one separately to make sure it is functioning satisfactorily in isolation. Go to a Macintosh on each network and:

■   Open the Chooser. Do AppleShare servers and printers appear where you expect them to?

■   Open electronic mail and Timbuktu if you have these products. Do mail addresses and Timbuktu hosts display properly in their respective scroll lists?

You can troubleshoot your individual networks with such utilities as CheckNET™ or NetAtlas™ (both available from Farallon) until you can see all the network services that have been installed on them. Then continue with this procedure.

Install Liaison

Install Liaison on the computer that will act as the full router. See Chapter 3 for installation instructions. This can be a Macintosh on either network or an additional computer you are dedicating to network services. In either case the full router Macintosh must have both EtherTalk and TokenTalk cards installed. Install the software drivers for the cards *after* connecting the cables.

Connect the cables

Connect the EtherTalk and TokenTalk cables to the ports of their respective cards, as shown:
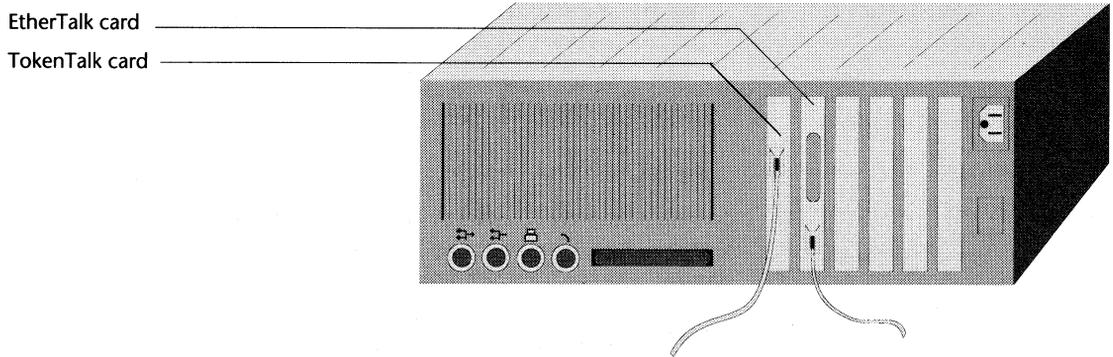
EtherTalk card

TokenTalk card

To configure Liaison:

1. Switch on the full router Macintosh, open the Chooser, and select Liaison. You may be asked to type a password.

2. Choose Preferences from the Configure menu. Liaison displays the Preferences dialog box:

```
┌─────────────────────────────────────────────────────────┐
│  Network interfaces:        Modem setup:                 │
│  ☒ EtherTalk2        ⬆  ┌──────────────────────────┐     │
│  ☐ LocalTalk            │  Farallon Remote V.32    │     │
│  ☐ LocalTalk (modem)    └──────────────────────────┘     │
│  ☐ Modem, dial-up       ┌─────┐                          │
│  ☐ Null Network         │19200│ Baud (max)               │
│  ☒ TokenTalk        ⬇  ☐ Auto-dial at startup.           │
│                         ☐ Terminate idle calls.          │
│  ┌────────────────────────────────────────────────────┐  │
│  │ ☐ Report remote connection changes.                │  │
│  │ ☐ Support an optional printer port serial printer. │  │
│  └────────────────────────────────────────────────────┘  │
│        ┌──────────┐         ┌──────────────┐             │
│        │   Save   │         │    Cancel    │             │
│        └──────────┘         └──────────────┘             │
└─────────────────────────────────────────────────────────┘
```
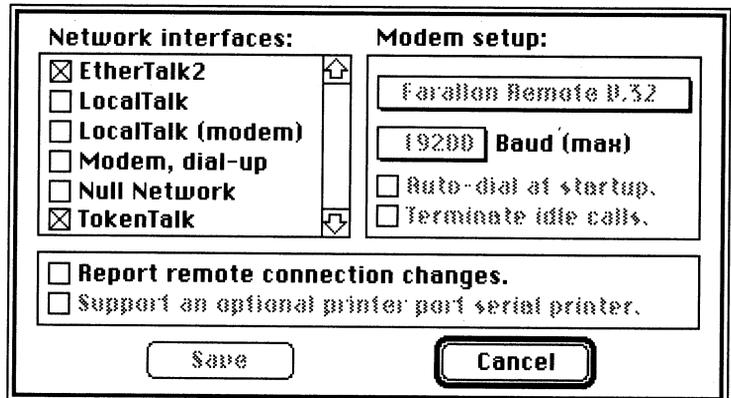
Preferences dialog box for an EtherTalk-TokenTalk router

If you are using EtherTalk 1.2, EtherTalk appears in the list instead of EtherTalk.

3. In the Network Interfaces scrolling list, select TokenTalk and EtherTalk.

4.   Click the Save button. Liaison displays the following message:

> **Please assign network seed information...**
> **Configure extended cables manually.**
>
> [**OK**]

5.   Click OK.

6.   To enter your own network numbers and zone names, choose
      Network Services from the Configure menu and enter the
      desired values for each seed port on your router. If your router
      has only nonseed ports, you can skip this step; Liaison will
      obtain seeding information from other routers on your internet.

      Note: Liaison can automatically configure an extended cable
      (EtherTalk 2.0 or TokenTalk) if that cable receives it seeding
      information from another router. If not, you must enter network
      numbers and zone names manually.

      To learn about seed ports and nonseed ports and how to enter
      seed information (network ID numbers and zone names) when it
      is required, see "Assigning Network Numbers and Zone Names"
      later in this chapter.

7.   Restart your Macintosh to switch on the full router.

To confirm your setup:

1. Open the Chooser and select Liaison.

2. Choose About Liaison from the Configure menu. If the full router is working, "Active as a local router" appears in the status box:

3. To test the full router, go to computers connected to the EtherTalk and TokenTalk networks and make sure you can see the network services on the other side of the router. For example, look for printers in the Chooser.

4. To inspect the amount of traffic that Liaison is routing between your networks, choose Network Services from the Configure menu and click the Statistics button. For a description of the Network Statistics dialog box, see Chapter 11.

Assigning network numbers and zone names

Networks depend on routers to provide *seeding information*, which means "zone names and unique network identification numbers." In the illustration below, Network A and Network B are connected by Router 1, and Network C is isolated. No other routers are connected to any network. Therefore, both ports of Router 1 must be *seed ports*. The router *seeds* both networks, that is, it provides network numbers and zone names. Nodes require network numbers as part of their addresses. They get zone names from the router to display network services in the Chooser and other network interfaces.

Seed port

Liaison router 1

Network A

Network B
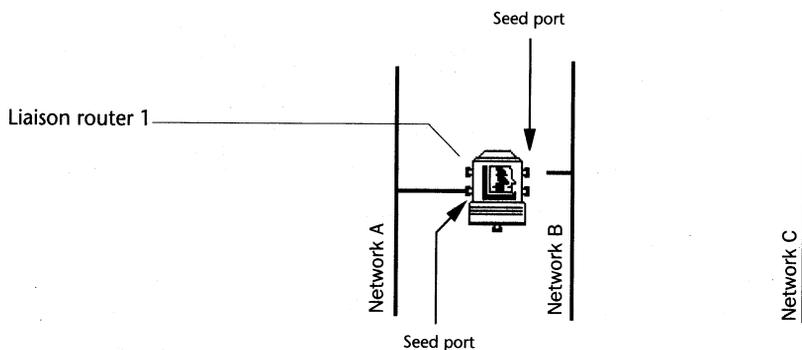
Network C

Seed port

In the second illustration Router 2 has been added to connect Networks B and C. Because Network B is already seeded by Router 1, it does not require seeding from Router 2. The port connecting Network B to Router 2 is a *nonseed port*.

Seed port   Seed port

Liaison routers 1 and 2

Network A

Network B

Network C

Seed port   Nonseed port
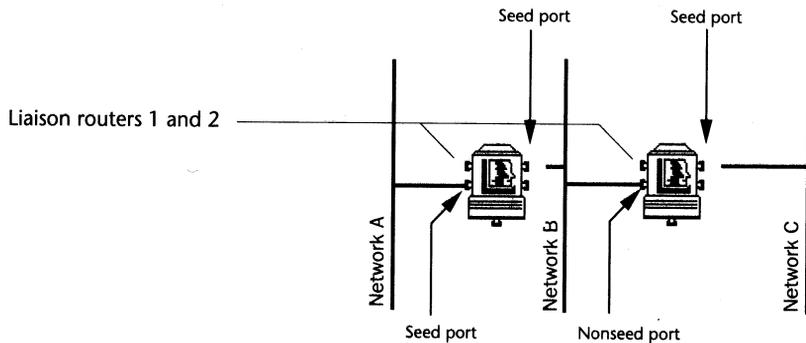
However, Network C has only one router and must get its seeding information from Router 2. Therefore the port connecting Network C to that router must be a seed port.

When Router 2 is started up, it will copy and save the seeding information for Network B that it receives from Router 1. If Router 1 is then switched off, the Router 2 can seed Network B with the same information. This automatic copying of seeding information makes it unnecessary for you to manually enter the seeding for any network more than once.

Be careful to create seed ports *only where they are needed.* If, by chance, two seed ports send different network ID numbers or different zone names to nodes on the same network, routing is disrupted. If Liaison detects that two routers are seeding network range information that does not match, it will report this during startup. Liaison cannot repair mismatches between network numbers and zone names.

Default seeding values provided by Liaison

If a Phase 1 network requires seeding from the router you have installed and you choose not to enter the seeding information manually, the Liaison full router will automatically seed the network with the following information when it is activated:

- For the network number, Liaison first compiles a list of network numbers already in use on the internet. It then generates random numbers and chooses the first one not in use as the new network number.

- For the zone name, Liaison enters "Un-Named."

Important: If your Liaison full router has any Phase 2 network port that is not the home port, you should enter seeding for that port manually during configuration. If other routers are already installed on this network, you should copy precise network range values and multiple zone names from the existing routers to the new one. See the following two sections for background and detailed instructions.

Using zones

In a large network without zones, users may be confronted with long lists of network services:

```
═════════════════════ Chooser ═════════════════════
  ┌───────────────────┐  Select a file server:
  │  [AppleShare]     │  ┌────────────────────────┐
  │  AppleShare  LaserWriter │ 1st Floor South     ⬆ │
  │                   │  │ 1st Floor NW           │
  │  [Liaison]   [Ms Mail] │ 2nd Floor South        │
  │  Liaison    Ms Mail │  │ 3rd Floor North        │
  │                   │  │ 3rd Floor NE          ⬇ │
  │                   │  └────────────────────────┘
  │                   │        ┌──────────┐
  │                   │        │    OK    │
  │                   │        └──────────┘
  │                   │
  │                   │  User Name:
  │                   │  ┌────────────────────────┐
  │                   │  │ Well Connected Mac     │
  │                   │  └────────────────────────┘
  │                   │              ◉ Active
  │                   │  AppleTalk   ○ Inactive    3.6
  └───────────────────┘
```
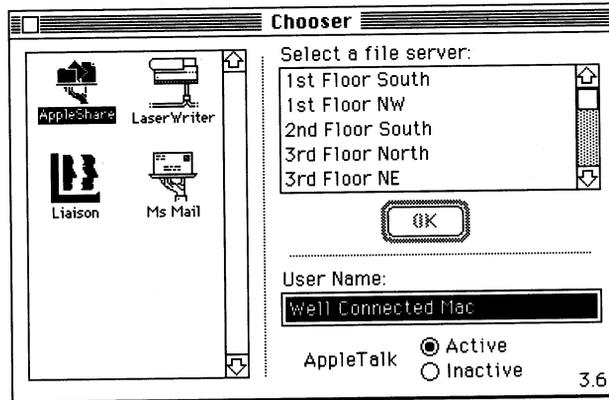
The illustration shows the Chooser window with AppleShare selected and loads of file servers listed. The problem of too many devices or services listed could well occur when choosing mail servers, printers, or print spoolers. Each time a user needs to reselect a network service, he or she must scroll through one of these long lists.

By grouping networks into zones, the user's search task is simplified:

```
═════════════════════ Chooser ═════════════════════
  ┌───────────────────┐  Select a file server:
  │  [AppleShare]     │  ┌────────────────────────┐
  │  AppleShare  LaserWriter │ 3rd Floor North     ⬆ │
  │                   │  │ 3rd Floor NE           │
  │  [Liaison]   [Ms Mail] │                        │
  │  Liaison    Ms Mail │  │                      ⬇ │
  │                   │  └────────────────────────┘
  ├───────────────────┤        ┌──────────┐
  AppleTalk Zones:            │    OK    │
  ┌─────────────────┐        └──────────┘
  │ 1st Floor     ⬆ │
  │ 2nd Floor     │  User Name:
  │ 3rd Floor     │  ┌────────────────────────┐
  │ 4th Floor     │  │ Well Connected Mac     │
  │ 5th Floor    ⬇ │  └────────────────────────┘
  └─────────────────┘              ◉ Active
                      AppleTalk    ○ Inactive    3.6
```
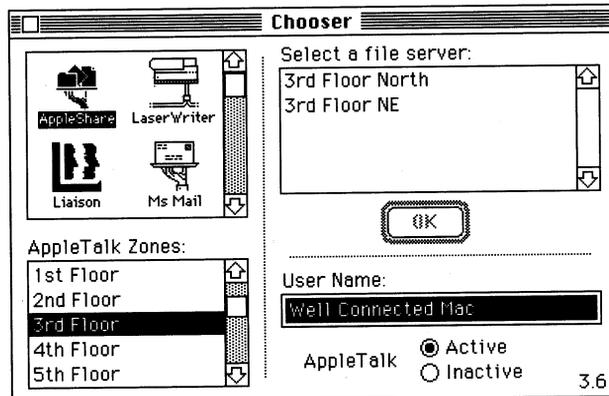
Most importantly, defining zones segments traffic flow. In this example, when the AppleShare icon is selected, only 2 servers (instead of 6) need to reply, cutting back on the traffic generated on the network.

After selecting a zone from the AppleTalk Zones list, the user can then choose from only those services assigned to that zone, which may require no scrolling at all. Of course, to take advantage of this convenience, the user must still learn the zone in which the desired network service resides.

A careful design of zones on a large internet can group those workstations and network services that function as a unit. For example, a Marketing zone might include the file server, printers, and mail server for all marketing employees.

Different approaches to network zoning

When you install a router between two networks, each network is assigned at least one zone name, which need not be unique. You can organize zones in one of three ways or use a combination of these:

■   Each network has a unique zone name; this is probably the most common approach.

■   Multiple networks with identical zone names, often used where the overall number of network services is small, but the *services reside on different networks. Pooling the networks into* one zone eliminates scrolling through a zone list when multiple zones are not needed.

■   Multiple zone names in the same network (Phase 2 only); this is useful where numerous network services reside on the same physical network and especially helpful under System 7.0, which allows individual users to publish portions of their disks as if they were AppleShare volumes. Without zones, this feature could create long scrolling lists in the Chooser.

All three of these alternatives are available on networks using AppleTalk Phase 2 protocols, but only the first two are available under Phase 1.

Avoid generic zone names

If two networks are connected across a dial-up link and both networks have a zone called "1st Floor," Liaison will display them as a single zone in the Chooser window. While it is not "illegal" to have duplicate zone names between distant networks, it could give rise to confusion when users see printers from Atlanta and Houston, for example, in the same zone.

For this reason, it's a good idea to choose zone names that are both meaningful and unlikely to be used on other networks. A network in Kansas, for example, could have a zone called "Tornado Alley."

Manual seeding

When you have decided which ports, if any, of your router must be seed ports, follow the procedure below to enter the seeding information. Complete the configuration of the Preferences dialog box and click the Save button in that box before following these instructions.

To enter network numbers:

1. Choose Network Services from the Configure menu and select the port name that requires seeding information. The following illustration assumes that the two LocalTalk networks require seeding, but the EtherTalk network will be seeded by another router.

```
┌─────────────────────────────────────────────────────┐
│  Port name        Hm  Net  -Range Zone         Hide │
│  EtherTalk2        ◉  [0  ] [0  ] [          ]   ☐   │
│  LocalTalk         ○  [0  ]       [          ]   ☐   │
│  LocalTalk (modem) ○  [0  ]       [          ]   ☐   │
│                                                       │
│  ☐ Answer in-bound calls    ☐ Forward user calls     │
│  ☒ Defer to foreground      ☐ Log call activity      │
│  ( Statistics )     ( Save )        ( Cancel )        │
└─────────────────────────────────────────────────────┘
```

Network services dialog box

2. Enter the network number in the Net box:

- If a Phase 1 network is connected to this port, enter a single number. (The –Range column does not have fields for Phase 1 networks.)

- If a Phase 2 network is connected to this port, a field will also appear in the –Range column. In the Net box type the lower limit of the network range you have designated for this network. Type the upper limit in the –Range box.

Note: A network range can be one network number or a contiguous set of network numbers anywhere between 1 and 65,278. This feature, available only in Phase 2 AppleTalk, vastly increases the number of devices (or *nodes*) that can be connected to a single network. Each network number can include up to 253 nodes.

Example 1: Entering 110 and 110 for Net and –Range would designate a single network number, 110, and permit the resulting network to contain 1 x 253 nodes, or 253 nodes.

Example 2: Entering 111 and 113 for Net and –Range would designate three network numbers, 111, 112, and 113, and permit the resulting network to contain 3 x 253 nodes, or 759 nodes.

▲ **Be wary of duplicate network numbers!**

No two networks in an internet can have the same number or, in a Phase 2 network, have overlapping ranges. If your full router is also routing traffic from a modem, dial-up port (See Chapters 5 and 6), check with the manager of the distant network to resolve any duplicate network numbers. (Liaison will display a message if it detects duplicate network numbers on the dial-up port.)

3. Enter a zone name or zone names for the port, as described in the following procedure. A zone name can include up to 32 characters.

Hint: If you do *not* want a port to be capable of seeding its network under any circumstances, enter an asterisk (∗) for the zone name.

To enter zone names:

Choose Network Services from the Configure menu. Click the Zone box for the port that requires seeding information.

■   If the port you are configuring is connected to a Phase 1 network, enter a single name in the Zone box. Normally, each network has a unique zone name, but you can include several networks in one zone by entering the same zone name for other networks that require seeding. For more information, see "Using Zones" earlier in this chapter.

Type the zone name and skip to the "Home Button" section.

■   If the port you are configuring is connected to a Phase 2 network, Liaison displays a dialog box in which you can enter multiple zone names for the network:
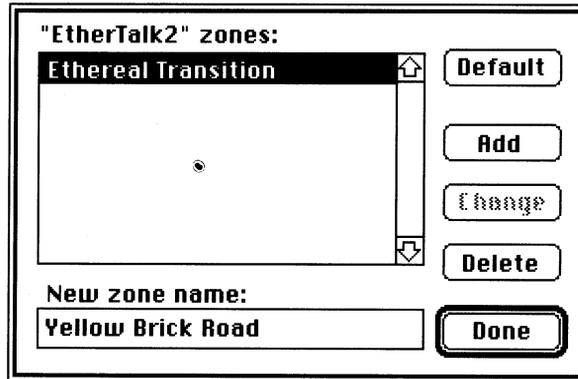
Entering multiple zone names

To enter several zone names:

1. Type in the new zone name.

2. Click the Add button and return to Step 1 until you have added all zone names.

3. Choose the default zone name for the port by selecting the desired name and clicking the Default button. For more information, see the discussion of the default zone below.

4. Click Done to return to the Network Interfaces dialog box

The default zone

The default zone is used for devices on extended networks—such as printers and file servers—which have no user interface and are thus unable to select their own zones. The Liaison router assigns them to the default zone. The default zone is also the zone that normally appears in the Zone column of the Network Services dialog box. If you do not choose a default zone, the top one in the list will be used.

The Home button

If your full router shares a Macintosh with another network service, such as AppleShare, that must be located by other users (for example, through the Chooser, TOPS, or Timbuktu interfaces), the following question arises: which of the networks being routed through this computer does a specific service reside on?

To answer this question, go to the Hm (Home) column and select the network on which these services should be registered. All network services residing on the full router—additional examples are electronic mail and print spoolers—must be associated with a single network in the Network Interfaces dialog box.

The network you select as the home network will also be selected in the Network Control Panel, as explained in the following procedure.

If you do not specify a Home port, Liaison chooses as a default Home Port the first connected network from the following precedence list:

(1) EtherTalk 1.2
(2) EtherTalk 2.0
(3) LocalTalk
(4) Modem, Dial-up

If the home network is an extended network with multiple zones, your home zone is the default zone unless you designate a different one.

To designate a home zone (Phase 2 networks only):

1.   Make sure the Chooser is closed, then open the Network Control Panel.

```
┌─────────────────────────────────────────────┐
│ ▤░░░░░░░░░░░░ Control Panel ░░░░░░░░░░░░░░░░  │
│ ┌──────────────────────────────────────┬──┐ │
│                                         ⬆   │
│  [Network]   [Built-in] [EtherTalk] [EtherTalk] │
│                                             │
│  [SCSIProbe 2...]  [LocalTalk (m...]        │
│                                             │
│     [Sound]                                 │
│                                         ⬇   │
│                                             │
│  [Startup Device]                           │
│ 3.3.3                                        │
└─────────────────────────────────────────────┘
```
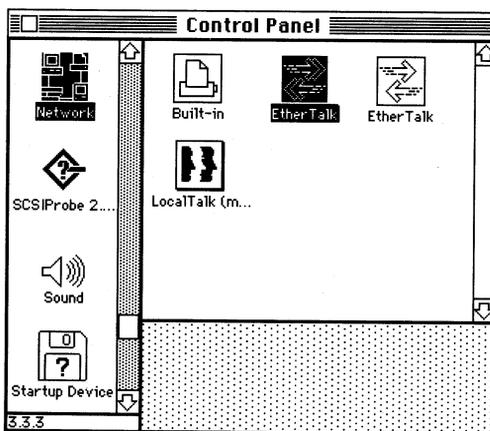
Network Control Panel showing two LocalTalk networks, an EtherTalk 2.0 network (selected), and an EtherTalk 1.2 network

One icon is displayed for each active port of your full router. Icons for other ports may also appear. The highlighted icon is the network connected to the home port that you designated in the Network Services dialog box.

2.   Double-click the highlighted icon. You will see a scrolling list of the zones created for this network:

```
┌──────────────────────────────────────────┐
│ ┌────────────────┐                        │
│ │ Suite 2001   ⬆ │  Please select         │
│ │ Suite 2008     │  this computer's       │
│ │ Suite 2010     │  AppleTalk zone.       │
│ │ Suite 2060     │                        │
│ │ Travel Center  │                        │
│ │ Twilight Vanities ⬇ │                   │
│ └────────────────┘                        │
│     ┌──────────┐      ┌──────────┐         │
│     │    OK    │      │  Cancel  │         │
│     └──────────┘      └──────────┘         │
└──────────────────────────────────────────┘
```
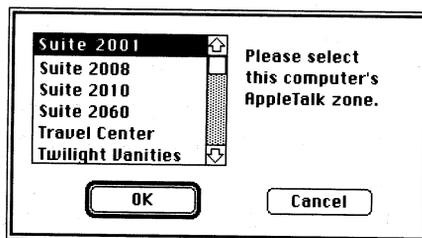
3.   Select the zone in which the network services on the full router —this Macintosh—should appear.

4.   Click OK. Remember to notify other users who may need to send files to your Macintosh each time you change zones.

Security option: hiding networks

When configuring Liaison as a full router, you have the option of hiding any of the networks served by this router. The Hide option appears in the far right column of the Network Services dialog box:

Hide option

Port name	Hm	Net	-Range	Zone	Hide
LocalTalk	○	101		Astros	⊠
EtherTalk2	⊙	1010	1012	Rockets	☐
LocalTalk (modem)	○	201		Oilers	☐

☐ **Answer in-bound calls**   ☐ **Forward user calls**
⊠ **Defer to foreground**   ☐ **Log call activity**

[**Statistics**]   [**Save**]   [**Cancel**]

Hiding network 101 from users on networks 201, 1010–1012

Selecting Hide for a given port creates a hidden network on that port. It has the effect of turning your router into a one-way mirror between the hidden network and other networks receiving routing service from your Macintosh:

■ Users on the other networks will not be able to see any of the devices on the hidden network; *networks connect to the hidden network by other routers are also hidden.*

■ Zone names in the hidden networks will appear to other users but no device names are displayed.

■ Users on the hidden network(s) *will* be able to see all the devices on the unhidden networks.

■ If the full router is sharing a Macintosh with a network service such as a print spooler or file server, this service will remain visible to all networks.

Selecting Hide creates a hidden network on both seed ports and nonseed ports.

Warning: If the hidden network is served by other routers, there may be alternate paths by which the hidden network can be discovered by other users. To keep it hidden, it must be hidden by all routers.

Foreground and background processing

Any Liaison router can be set up on a Macintosh that is already providing another network service or on a non-dedicated computer. Liaison and the other application(s) are said to be *co-resident*. The router and the co-resident application(s) must take turns using the CPU (central processing unit) of the Macintosh. If network traffic is light and the co-resident application does not make heavy demands of the CPU, performance is not degraded on either side.

However, if the router and the co-resident application must compete for CPU time, either the router or the application is forced to wait. Liaison normally waits in this situation, that is, it gives deference to the application in the foreground. This is because its Defer to Foreground option is selected by default in the Network Services dialog box:

Defer to Foreground ——————

Port name	Hm	Net	–Range	Zone	Hide
LocalTalk	◉	0			☐
LocalTalk (modem)	◯	0			☐
EtherTalk2	◯	0	0		☐

☐ **Answer in-bound calls**   ☐ **Forward user calls**
☒ **Defer to foreground**   ☐ **Log call activity**

[**Statistics**]   [**Save**]   [**Cancel**]
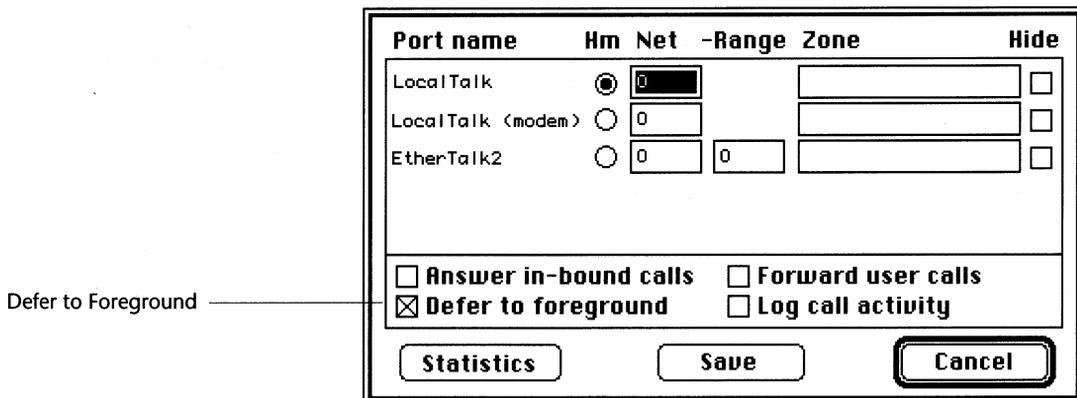
If you need to speed up routing, deselect Defer to Foreground, but remember that the co-resident application may behave sluggishly if Liaison's traffic load is high.

Before installing a full router on a workstation on which a person is routinely using other applications, consider the following factors. How heavy will be the demands placed on the router by the network? How heavy will be the demands of the foreground application? How powerful is the CPU in the computer? A Macintosh IIfx, for example, could support heavy demands from coresident applications much more easily than a Macintosh SE.

Chapter 5

Setting up a Calling Half-Router

This chapter contains detailed instructions for setting up Liaison as a calling half-router, the configuration used to place calls from a local network to a distant one. Such a connection makes it possible for users on either side of the dial-up link to access network services— electronic mail, printers, file servers, Timbuktu—from the other side of the connection. A calling half-router is also a *relay router* when used to forward calls from a relay client elsewhere on your local network. These terms are explained in Chapter 2.
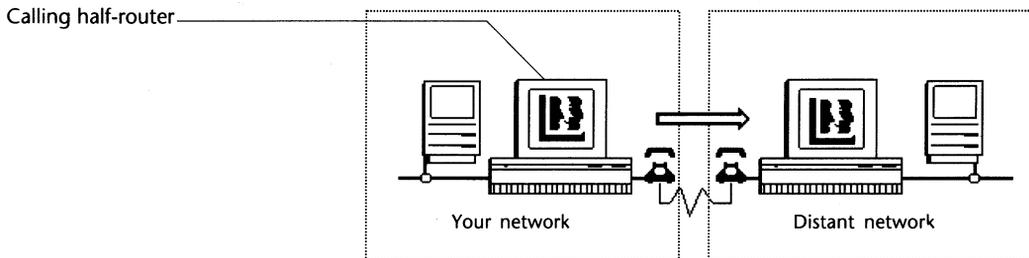
Calling half-router

Your network   Distant network

A half-router configuration requires copies of Liaison (including unique serial numbers) and modems on both sides of the dial-up link. The Macintosh on the other side of the link should be configured as an answering half-router. That configuration is explained in the following chapter.

A calling half-router can also act as an answering half-router or even a full router. You can configure a Macintosh to combine all of these functions by following the appropriate procedures in Chapters 4–6.

If you need to connect to the office network from home or while travelling, see Chapter 8 (for a non-networked Macintosh) or Chapter 9 (for a Macintosh on a small home network).

Setup procedures

Inspect the networks separately first

Before connecting networks across a dial-up link, check each network separately to make sure it is functioning satisfactorily in isolation. Go to a Macintosh on each network and:

- Open the Chooser. Do AppleShare servers and printers appear where you expect them to?

- Open electronic mail and Timbuktu if you have these products. Do mail addresses and Timbuktu hosts display properly in their respective scroll lists?

If the answer to either of these questions is No, you should troubleshoot your individual networks with such utilities as CheckNET™ or NetAtlas™ (both available from Farallon) until you can see all the network services that have been installed on them. Then continue with this procedure.

Install Liaison

Install Liaison on the Macintosh that will be the calling half-router. (See Chapter 3 for installation instructions.) This can be a Macintosh already on your local network or an additional computer you are adding to the network and dedicating as the dial-up computer.

### Install Network Tuner on other computers

Copy Network Tuner to the System Folders (Extensions folders for System 7 computers) of workstations on your network that:

- Do not have Liaison or Liaisonet installed

- Will be participating in the dial-up connection.

Network Tuner dynamically adjusts each computer's ability to send traffic across a dial-up link at a frequency suitable to the speed of the modem in use. This prevents AppleTalk from "giving up" too quickly when attempting to send information across a slow link. Network Tuner does not slow down your access speed to other nodes on the local network.

Connect the cables

Connect the modem cable to the modem port of your Macintosh and the network cable to its appropriate port or adapter:

Modem port

Printer port

LocalTalk connector

Modem
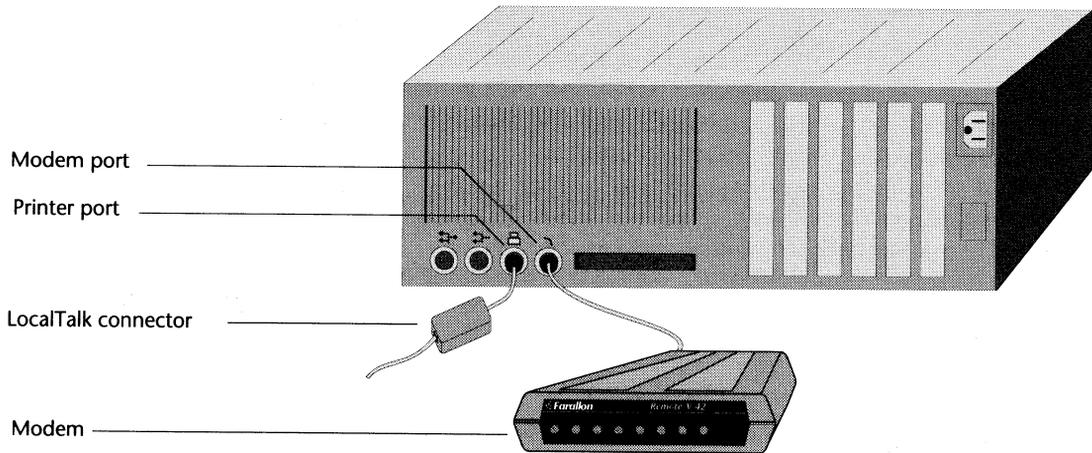
The illustration shows a LocalTalk network cable connected to the printer port. If the calling half-router is on EtherTalk or TokenTalk instead of LocalTalk, the network cable will be attached to the connector on the EtherTalk or TokenTalk adapter.

To configure Liaison as a calling half-router:

1. Switch on the half-router Macintosh, open the Chooser, and select Liaison. You may be asked to type a password.

2. Choose Preferences from the Configure menu. Liaison displays the Preferences dialog box:

```
Network interfaces:        Modem setup:
⊠ LocalTalk            ⬆
☐ LocalTalk (modem)       ┌─────────────────────┐
⊠ Modem, dial-up          │   Hayes Compatible  │
☐ Null Network            └─────────────────────┘
                          ┌──────┐
                          │ 2400 │ Baud (max)
                          └──────┘
                          ☐ Auto-dial at startup.
                       ⬇  ⊠ Terminate idle calls.

⊠ Report remote connection changes.
☐ Support an optional printer port serial printer.

    ┌──────────┐      ┌──────────────┐
    │   Save   │      │    Cancel    │
    └──────────┘      └──────────────┘
```
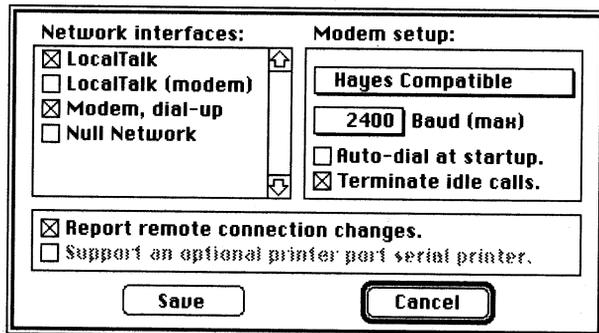
Preferences dialog box for a calling half-router

3. In the Network Interfaces scrolling list, select the local network or networks that you wish to connect to the network at the distant site. Also select Modem dial-up. This enables the menus and options in the right panel of the dialog box.

4. Under Modem Setup, click the upper pop-up menu to choose the modem script to match the modem attached to your Macintosh. If you have installed a custom script, choose Liaison Script. For more information, see Appendix B, "Modem Specifications."

5. Click the Baud (Max) pop-up menu to choose the maximum speed at which your modem can communicate.

    Note: Calling and answering modems communicate at the fastest baud rate they have in common. If necessary, you can choose a lower baud rate to slow down connections.

6. Select your dial-up options:

    ■   If you want Liaison to dial the other network automatically each time you start up your Macintosh, select Auto-Dial at Startup. Liaison will automatically dial the entry last selected from your Address Book the next time you start up your Macintosh. Make sure that you leave the desired entry selected when you close Liaison.

    ■   If you want Liaison to hang up after a dial-up connection has been inactive for 3 consecutive minutes, select Terminate Idle Calls. (Liaison will *not* hang up if a remote AppleShare volume is mounted.)

    ■   If you want Liaison to display an alert message whenever the distant network hangs up or when a relay client on your network is using your Macintosh as a relay router, select Report Remote Connection Changes.

7. Click the Save button. Liaison closes the Preferences dialog box.

8. Restart your Macintosh and create an Address Book entry for the answering half-router, as explained in the following procedure.

Create an Address Book entry

Before you can use Liaison to dial another network, you need to create an entry for that site in your Liaison Address Book. If you will be calling several sites, create an entry for each.

1. Open the Chooser and select Liaison.

2. Choose Address Book from the Configure menu. The Address book may be blank when you first select it or it may contain the Farallon Technical Support number for testing purposes. You will be typing over the information in this entry; however, the original entry will be preserved if you click the New button (rather than the Change button) when you are finished.

3. Type the Site Name. This is a name you have given to the answering network or workstation; it is displayed in the Address Book list in the Chooser. Liaison does not check Site Name during the dialing process.

4. Type the Phone Number, the telephone number of the modem *on the other side of the dial-up link. Include any prefixes (such* as "9") required to dial out of your local telephone exchange. You can include hyphens for legibility; they are ignored by Liaison. Including a comma causes Liaison to pause one second before continuing. Each additional comma adds one second to the pause.

5. Type the Account Name. Obtain the Account Name from the network manager responsible for configuring the answering half-router. The Account Name you enter must exactly match the entry in the Authorized Users dialog box of the answering half-router.

Site name:	**Farallon Technical Support**
Phone number:	**1-510-596-9078**
Account name:	**First Time User**
Login password:	**••••**
Connection:	○ **Private** ◉ **Shared with group**

[**New**]   [Change]   [Delete]   [**Cancel**]

6.   Type the Login Password. Obtain the Password from the network manager responsible for configuring the answering half-router. The Password you enter must exactly match the entry in the Authorized Users dialog box of the answering half-router.

■   The answering Macintosh will prompt you for a password if you leave the Login Password box empty. Make sure the box contains no blank (space bar) characters. Passwords are not case sensitive.

■   If the answering Macintosh does not require a password, you can prevent the calling computer from prompting you by entering a dummy password in the Login Password box.

7.   Click Shared With Group to allow other users on your network to see the network services on the distant network in their Chooser, electronic mail, and Timbuktu interfaces. If you click Private, these services will be hidden from the rest of your network.

8.   Click the New button when the Address Book entry is complete. You are now ready to dial the other network.

Using a half-router to create zones on an extended cable

Even when the calling half-router is not connected to a distant network, it can provide a useful service to the local network by maintaining zones on any extended cable that is connected to it. A half-router on an extended cable with no other routers connected to it automatically acts as a full router for that network until additional routers are added.

If there are any local extended networks (EtherTalk 2.0 or TokenTalk) connected to your calling half-router, you can create multiple zones on those networks with the following procedure:

1.   Follow all the steps for setting up the calling half-router as explained earlier in this chapter.

2.   Follow the instructions for entering multiple zones in the "Manual Seeding" section in Chapter 4.

How Liaison verifies account name and password

It's a good idea to telephone the manager of the answering half-router to make sure that the information you have entered in the Address Book entry for that site matches up with the information that was entered for your site in the Authorized Users dialog box of the answering half-router. Also make sure that the network numbers on both sides of the dial-up connection are unique.

Use the following illustration as a guide to the information that must match exactly:

Address Book entry at the calling half-router ——————

Authorized Users entry at the answering half-router ——————

Site name:	Chicago Stock Exchange
Phone number:	1-312-555-4454
Account name:	Southside Investments ←
Login password:	●●●●● ←
Connection:	◉ Private ○ Shared with group

[New]   [Update]   [Delete]   [Cancel]

—— These entries must match

Authorized users:	User:
Southside Investments	Southside Investments ←
Turner Isuzu	With password:
West J Feed Co	●●●●● ←
Zimmerman Steel	

User's access privileges:
○ Only this node   ☐ Force "Private" use
○ Services in this zone ☐ Dial-back @ [Phone#]
◉ This whole internet   ☐ Relay outbound calls

[New]   [Change]   [Delete]   [Done]

—— These entries must match

Connecting to the distant network

Before connecting, you may want to:

■ Read Chapter 10, "Defining the Scope of a Dial-Up Connection," to ensure that your dial-up link encompasses the desired zones and users in both networks.

■ Double-check with the manager of the answering half-router to make sure there are no duplicate network numbers among your networks. For more information, see the "Manual Seeding" section of Chapter 4.

To dial the other network:

1.   Open the Chooser and select Liaison.

2.   Select the site you wish to dial from the scrolling list under Establish a Liaison With.

3.   Click Dial:

```
┌─────────────────────── Chooser ───────────────────────┐
│ ☐                        Establish a Liaison™ with:    │
│   ┌──────┐  ┌──────┐  ⬆  ┌─────────────────────────┐⬆ │
│   │      │  │      │     │ Chicago Sales Office    │  │
│  AppleShare LaserWriter  │ Chicago Stock Exchange  │  │
│   ┌──────┐  ┌──────┐     │ Denver Sales Office     │  │
│   │      │  │      │     │ London – European Sales │  │
│   │Liaison│  │Ms Mail│⬇  │ San Francisco Sales     │⬇ │
│                          └─────────────────────────┘  │
│  AppleTalk Zones:        ┌──────────┐  ┌──────────┐   │
│  ┌────────────────┐⬆     │ Configure│  │   Dial   │   │
│  │ Big Machines   │      └──────────┘  └──────────┘   │
│  │ NY Management  │      User Name:                    │
│                          ┌─────────────────────────┐  │
│                   ⬇      │ Well Connected Mac      │  │
│  └────────────────┘               ● Active            │
│                          AppleTalk ○ Inactive         │
│                                              3.6       │
└────────────────────────────────────────────────────────┘
```
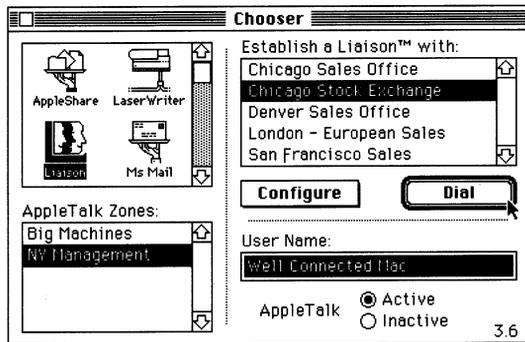
If your Address Book does not contain a password for a particular site, Liaison asks for one before proceeding with your call. Liaison then dials the selected site and attempts to make a connection. It then displays a series of messages monitoring the progress of the call.

If the connection is made, the final message reports whether the connection is private or shared. (See Chapter 10.) Then the zone list in the Chooser window is updated to include the services available on the remote network. The Dial button changes to a Hang-up button to confirm that you are connected. You can now close the Chooser.

▲   Remember to return to the Chooser to Hang Up when you have finished using the dial-up link.

Note: If the zone names on the calling side are identical to those on the answering side, the AppleTalk Zones list will not be updated. In addition, if only one zone exists between the two networks, the AppleTalk Zones list will not appear.

Using a wide area network

When connected across a dial-up link, your local area network (LAN) and the distant network are joined to form a wide area network (WAN).

Assuming that Liaison has been configured to allow maximum scope of access between the two networks, users on the local network will see the zones of the distant network added to their Chooser windows and other network interfaces. By the same token, users on the distant network will see the zones of your network in addition to their own. (See Chapter 10 for information on the scope of access.)

Here are some examples of wide area network capabilities:

- You can use electronic mail to exchange memos with users on the distant network.

- By choosing a printer from a zone on the distant network, you can print a document at the other location.

- By choosing a file server from a zone on the distant network, you can obtain files from the distant network.

- By choosing a Timbuktu host list from a zone on the distant network, you conduct both screen-sharing and file transfer sessions with a Macintosh on the distant network.

Dial-up connections perform more slowly than LocalTalk connections. Dial-up transfer rates are 1 to 20 kilobits per second, whereas local networks run in excess of 200 kilobits per second.

Terminating a dial-up link

Once you have finished using the services of the distant network, either side of the link can end the connection:

1. **Important**—Bring to a normal close all current activity you have initiated involving network services across the dial-up link. Some examples are:

   ■ Dismount all file server volumes from the distant network by dragging their icons (on your desktop) to the Trash. Network services such as AppleShare, MacServe, and TOPS can be disrupted if you disconnect from a wide area network without first releasing their resources.

   ■ If you are printing a document over the dial-up link, allow the printing to finish or cancel the print job manually.

   ■ If you are conducting a screen-sharing or file transfer session using Timbuktu, cancel these through the appropriate Timbuktu procedures.

2. Open the Chooser and select Liaison.

3. Click the Hang-Up button or press the Return key. A dialog asks you to confirm that you want to break the connection.

4. Click OK to terminate the connection.

Chapter 6

Setting up an Answering Half-Router

This chapter contains detailed instructions for setting up Liaison as an answering half-router, the configuration you should use for one network to receive calls from a distant network. Such a connection makes it possible for users on either side of the dial-up link to access network services—electronic mail, print and file servers, Timbuktu—from the other side of the connection.

Answering half-router ——————
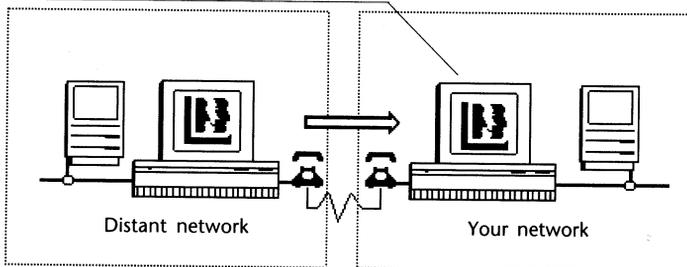
Distant network   Your network

A half-router configuration requires copies of Liaison (including unique serial numbers) and modems on both sides of the dial-up link. The Macintosh on the other side of the link can be configured a calling half-router, personal bridge, or semi-router.

An answering half-router can also act as a calling half-router or even a full router. You can configure a Macintosh to combine all of these functions by following the appropriate procedures in Chapters 4–6.

A word of caution

Before you activate an answering half-router, you should read:

■   "Security Options," at the end of this chapter, to determine which security precautions are appropriate for your situation.

■   Chapter 10, "Defining the Scope of a Dial-Up Connection, "to ensure that your dial-up link encompasses the desired zones and users in both networks.

Setup procedures

Inspect the networks separately first

Before connecting networks across a dial-up link, check each network separately to make sure it is functioning satisfactorily in isolation. Go to a Macintosh on each network and:

■   Open the Chooser. Do AppleShare servers and printers appear where you expect them to?

■   Open electronic mail and Timbuktu if you have these products. Do mail addresses and Timbuktu hosts display properly in their respective scroll lists?

If the answer to either of these questions is No, you should troubleshoot your individual networks with such utilities as CheckNET™ or NetAtlas™ (both available from Farallon) until you can see all the network services that have been installed on them. Then continue with this procedure.

Install Liaison

Install Liaison on the Macintosh that will be the answering half-router. See Chapter 3 for installation instructions. This can be a Macintosh already on your local network or an additional computer you are adding to the network and dedicating as the dial-up computer.

Install Network Tuner on other computers

Drag Network Tuner onto the System Folder icons of workstations on your network that will be participating in the dial-up connection and do not have Liaison or Liaisonet installed. For more information on Network Tuner, see "Setup Procedures" in Chapter 5.

Connect the cables:

Connect the modem cable to the modem port of your Macintosh:

Modem port ——————

Printer port ——————

LocalTalk connector ——————

Modem ——————
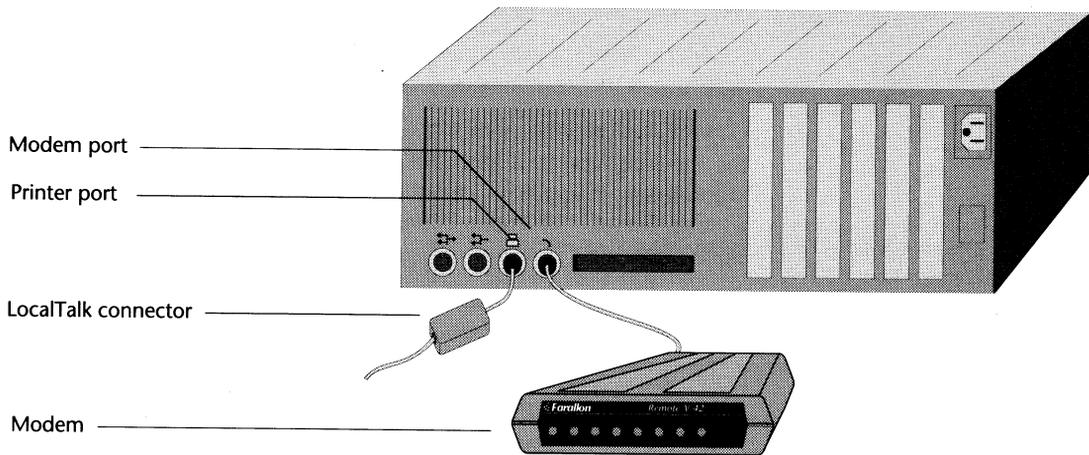
The illustration shows a LocalTalk network cable connected to the printer port. If the answering half-router is on EtherTalk or TokenTalk instead of LocalTalk, the network cable will be attached to the connector on the EtherTalk or TokenTalk adapter.

To configure Liaison:

1. Switch on the half-router Macintosh, open the Chooser, and select Liaison. You may be asked to type a password.

2. Choose Preferences from the Configure menu. Liaison displays the Preferences dialog box:

Network interfaces:
- ☒ LocalTalk
- ☐ LocalTalk (modem)
- ☒ Modem, dial-up
- ☐ Null Network

Modem setup:

Hayes Compatible

2400 Baud (max)

- ☐ Auto-dial at startup.
- ☒ Terminate idle calls.

☒ Report remote connection changes.
☐ Support an optional printer port serial printer.

Save   Cancel
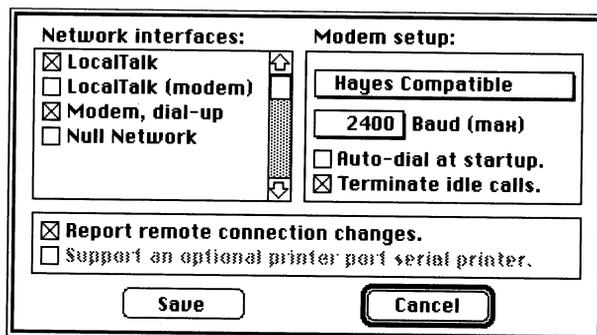
Preferences dialog box for an answering half-router

3.   In the Network Interfaces scroll list, select the local network or networks that you wish to connect to the network at the distant site. Also select Modem dial-up.

Selecting Modem Dial-up enables the menus and options in the right panel of the dialog box.

4.   Under Modem Setup, click the upper pop-up menu to choose the modem type to match the modem attached to your Macintosh. If you have installed a custom script, choose Liaison Script. For more information, see Appendix B, "Modem Specifications."

5.   Click the Baud (Max) pop-up menu to choose the maximum speed at which your modem can communicate.

Note: Calling and answering modems communicate at the fastest baud rate they have in common. If necessary, you can choose a lower baud rate to slow down connections.

6.   Select your dial-up options:

■   If you want Liaison to hang up after a dial-up connection has been inactive for 3 minutes, select Terminate Idle Calls. (Neither Liaison nor Liaisonet will hang up if a remote AppleShare volume is mounted.)

■   If you want Liaison to display an alert message whenever the distant network hangs up, select Report Remote Connection Changes.

7.   Click the Save button. Liaison closes the Preferences dialog box.

8.   Restart your Macintosh and create an Authorized Users entry for the calling half-router, personal bridge, or semi-router, as explained in the following procedure.

To configure Liaison as an answering half-router:

1. Choose Network Services from the Configure menu:

Port name	Hm	Net	-Range	Zone	Hide
LocalTalk	○	101		Astros	☐
EtherTalk2	◉	1010	1012	Rockets	☐
Modem, dial-up	○	901		ComLink	☐

☒ **Answer in-bound calls**   ☒ **Forward user calls**
☒ **Defer to foreground**   ☒ **Log call activity**

[**Statistics**]   [**Save**]   [**Cancel**]

2. Locate the box corresponding to Modem, Dial-Up in the Net column and enter a unique network number.

3. Locate the box corresponding to Modem, Dial-Up in the Zone column and enter the desired zone name.

    This is the zone name under which the calling computer will appear in the Chooser on both sides of the connection if the calling computer is a semi-router that has no full-router on its local network or is a personal bridge.

    ■   If you want a special zone to appear in the Chooser whenever the dial-up link is active, enter a unique zone name. An example is "ComLink" in the illustration above. ComLink would appear in the AppleTalk Zones list in the Choosers of both the answering network and the calling personal bridge or semi-router when (and only when) a dial-up connection is established.

    ■   If you want the distant computer to appear in the Chooser under one of your regular zone names when the dial-up link is active, enter the desired zone name. In the illustration, entering "Astros" for the Modem, Dial-Up zone would cause the calling computer to appear as an additional name in the Astros zone on the answering network. "Astros" would also temporarily appear as a zone in the *Chooser of the calling personal bridge or semi-router.*

4. *Click Save.*

To create or modify an Authorized User entry:

Before Liaison can establish a connection with a calling network, you need to create an entry in your list of Authorized Users. If more than one site will be calling your network, create an entry for each.

1. Open the Chooser and select Liaison.

2. Choose Authorized Users from the Configure menu. (If the menu command is dimmed, return to the Preferences dialog box and make sure you have selected Modem, Dial-Up.)

```
Authorized users:          User:
┌─────────────────┐ ⬆    ┌─────────────────┐
│                 │      └─────────────────┘
│                 │ ▒
│                 │       With password:
│                 │      ┌─────────────────┐
└─────────────────┘ ⬇    └─────────────────┘

User access privileges:
○ Only this node            ☐ Force "Private" use
○ Services in this zone      ☐ Dial-back @ [Phone#]
◉ This whole internet        ☐ Relay outbound calls

┌─────────┐    ┌─────────┐    ┌─────────┐    ┌─────────┐
│  New    │    │ Update  │    │ Delete  │    │  Done   │
└─────────┘    └─────────┘    └─────────┘    └─────────┘
```

3. In the User box type the Account name you would like to authorize. The name can include as many as 31 characters. Be sure to give this exact name to the user who will be dialing in.

    The answering half-router will recognize a calling half-router (or personal bridge or semi-router) as an authorized user only if it can match the caller's Account Name to an entry in the Authorized Users list. If no match can be found, the connection will be terminated.

4. Type the login password, if one is required, in the With Password box. Be sure to give this exact password to the user who will be dialing in. Passwords are not case sensitive—capital letters are not distinguished from lowercase letters.

6. Click This Whole Internet to allow users on the distant network to see all the network services on your network in their Chooser, electronic mail, and Timbuktu interfaces. If you click Services in This Zone or Only This Node, you will reduce the number of services available to the distant network. For more information, see Chapter 10, "Defining the Scope of a Dial-Up Connection."

    For information on Force "Private" Use and Dial-Back, see "Security Options" at the end of this chapter.

7. Save the information:

    ■   If this is the first time you have entered this account name, click New.

    ■   If you have been editing an earlier entry, click Update to replace the previous information for this entry.

8. Repeat Steps 3–7 for other account names you wish to create or modify. When you have finished, click Done.

Using a half-router to create zones on an extended cable

Even when the answering half-router is not connected to a distant network, it can provide a useful service to the local network by maintaining zones on any extended cable that is connected to it. A half-router on an extended cable with no other routers connected to it automatically acts as a full router for that network until additional routers are added.

If there are any local extended networks (EtherTalk 2.0 or TokenTalk) connected to your answering half-router, you can create multiple zones on those networks with the following procedure:

1. Follow all the steps for setting up the answering half-router as explained earlier in this chapter.

2. Follow the instructions for entering multiple zones in the "Manual Seeding" section in Chapter 4.

How Liaison verifies account name and password

If this is the first time you are attempting to answer a call from a new site, it's a good idea to telephone the manager of the calling half-router to make sure that the information you have entered in your Authorized Users entry for that site matches up with the information that was entered for your site in the Address Book of the calling half-router.

Use the following illustration as a guide to the information that must match exactly:

Address Book entry at
the calling half-router ————————

Site name:	Chicago Stock Exchange
Phone number:	1-312-555-4454
Account name:	Southside Investments ◀
Login password:	●●●●● ◀
Connection:	◉ Private ○ Shared with group

[New]   [Update]   [Delete]   [Cancel]

————These entries
must match

Authorized Users entry at
the answering half-router ————————

Authorized users:	User:
Southside Investments ⬆	Southside Investments ◀
Turner Isuzu	With password:
West J Feed Co	●●●●● ◀
Zimmerman Steel ⬇	

————These entries
must match

User's access privileges:
○ Only this node   ☐ Force "Private" use
○ Services in this zone   ☐ Dial-back @ [Phone#]
◉ This whole internet   ☐ Relay outbound calls

[New]   [Change]   [Delete]   [Done]

A final precaution: double-check network numbers

No two networks in an internet can have the same number or, in a Phase 2 network, have overlapping ranges. This rule applies to dial-up (wide area) networks as well as local ones. Check with the manager of the distant network to resolve any duplicate network numbers. (Liaison will display a message if it detects duplicate network numbers on the dial-up port at the beginning of a call.)

Switching the answering half-router on and off

Read this section when you have finished configuring Liaison as an answering half-router, defined your list of Authorized Users, and checked all desired security options.

To switch Liaison on to answer calls, choose Network Services from the Configure menu and select Answer In-Bound Calls.

To stop Liaison from answering calls, choose Network Services from the Configure menu and deselect Answer In-Bound Calls.

When a distant network calls

If you selected Report Remote Connection Changes in the Preferences dialog box when configuring your answering half-router, Liaison will display a message notifying you of an accepted call:

≡□≡≡≡≡ **News from Liaison** ≡≡≡≡≡≡
I have accepted an inbound call from: "Southside Investments"
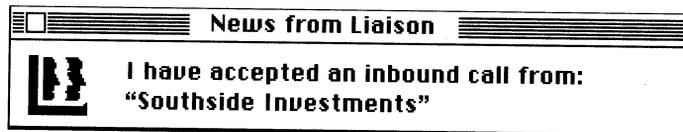
The caller is identified by Account Name. Shortly thereafter you will notice that the zone list in your Chooser window is updated to include the services available on the distant network. If you open the Chooser and select Liaison, you will see that a Hang-up button is displayed.

Using a wide area network

When connected across a dial-up link, your local area network (LAN) and the distant network are joined to form a wide area network (WAN).

Assuming that Liaison has been configured to allow maximum scope of access between the two networks (see Chapter 10), users on the local network will see the zones of the distant network added to their Chooser windows and other network interfaces. By the same token, users on the distant network will see the zones of your network in addition to their own.

Here are some examples of wide area network capabilities:

■   You can use electronic mail to exchange memos with users on the distant network.

■   By choosing a printer from a zone on the distant network, you can print a document at the other location without first having to transfer the file.

■   By choosing a file server from a zone on the distant network, you can obtain files from the distant network.

■   By choosing a Timbuktu host list from a zone on the distant network, you conduct both screen-sharing and file transfer sessions with a Macintosh on the distant network.

Dial-up connections perform more slowly than LocalTalk connections. Dial-up transfer rates are 1–20 kilobits per second, whereas local networks run in excess of 200 kilobits per second.

Terminating a dial-up link

Once you have finished using the services of the distant network, either side of the link can end the connection.

1. **Important:** Bring to a normal close all current activity you have initiated involving network services across the dial-up link. Some examples are:

    ■ Unmount all file server volumes from the distant network by dragging their icons (on your desktop) to the Trash. Network services such as AppleShare, MacServe, and TOPS can be disrupted if you disconnect from a wide area network without first releasing their resources.

    ■ If you are printing a document over the dial-up link, allow the printing to finish or cancel the print job manually.

    ■ If you are conducting a screen-sharing or file transfer session using Timbuktu, cancel these through the appropriate Timbuktu procedures.

2. Open the Chooser and select Liaison.

3. Click the Hang-up button or press the Return key. A dialog box asks you to confirm that you want to break the connection.

4. Click OK to terminate the connection.

Security options

The following options let you impose special restrictions on users who dial in to your answering half-router.

Dial-Back @ Phone#

This option, in the Authorized Users dialog box, can be used to reject calls that are dialed from unauthorized telephone numbers. It adds an extra layer of security to the Account Name and Login Password requirements.

If Dial-Back @ Phone# is selected for a specific user in your Authorized Users list, you must click the Phone# button and type the telephone number Liaison should use to dial back to that user.

When the answering half-router receives a call from this user, it will first verify the Account Name and Login Password. If the Account Name and Login Password are valid, Liaison will then hang up the telephone and dial the user at the number you have specified.

Note to personal bridge and semi-router users: Although Liaison usually cannot answer calls, an answering half-router with Dial-Back selected for your Account Name will signal Liaisonet on your computer so that it is temporarily capable of answering calls.

To use Dial Back:

1. Choose Authorized Users from the Configure menu and select the desired account. The Dial-Back option is dimmed:

    User access privileges:

○ Only this node	☐ Force "Private" use
○ Services in this zone	☐ Dial-back ↷ (Phone#)
⦿ This whole internet	☐ Relay outbound calls

2. Click the Phone# button. Liaison displays a box for the Dial-Back telephone number:

User's dial-back phone number:	1-510-596-9078

    (OK)   ((Cancel))

3.   Type the number. You can include hyphens for legibility; they are ignored by Liaison. Including a comma causes Liaison to pause one second before continuing.

4.   Click OK. The Dial-Back option is now enabled in the Authorized Users entry.

5.   Select Dial-Back:

User access privileges:

○ **Only this node**	☐ **Force "Private" use**
○ **Services in this zone**	☒ **Dial-back @** Phone#
⦿ **This whole internet**	☐ **Relay outbound calls**

6.   If this is a new Authorized User account, click New. If you are updating an existing account, click Update.

Force "Private" Use

This option, in the Authorized Users dialog box, can be used to override the "Shared With Group" setting in the Address Book entry of a user who is calling your network. It is not a global control: it must be checked for each entry in the Authorized Users list on which you wish to apply this restriction.

When a user for whom you have checked Force "Private" Use connects to your network, the connection will be Private: no other users on the distant network will be made aware of the dial-up link. Their zone lists will not be updated to show the zones of your network. In addition, no devices on the distant network, other than the calling half-router, will be visible to users on your network.

Setting up a stand-alone answering half-router

If your Macintosh is not connected to a network (for example, at home or while you are traveling), and you need to answer a call from a distant Liaison or Liaisonet user, you need to make two changes in the Preferences dialog box when you are setting up the half-router.

If you need a free serial port, deselect LocalTalk and select Null Network:

```
╔══════════════════════════════════════════════════╗
║  Network interfaces:        Modem setup:          ║
║  ☐ LocalTalk            ⬆                          ║
║  ☐ LocalTalk (modem)   ▓   ┌─────────────────────┐║
║  ☒ Modem, dial-up      ▓   │  Hayes Compatible   │║
║  ☒ Null Network        ▓   └─────────────────────┘║
║                        ▓   ┌──────┐               ║
║                        ▓   │ 2400 │ Baud (max)    ║
║                        ▓   └──────┘               ║
║                        ▓   ☐ Auto-dial at startup.║
║                        ⬇   ☒ Terminate idle calls.║
║  ┌────────────────────────────────────────────┐   ║
║  │ ☒ Report remote connection changes.        │   ║
║  │ ☐ Support an optional printer port serial printer.│║
║  └────────────────────────────────────────────┘   ║
║        ┌──────────┐      ┌──────────┐             ║
║        │   Save   │      │  Cancel  │             ║
║        └──────────┘      └──────────┘             ║
╚══════════════════════════════════════════════════╝
```
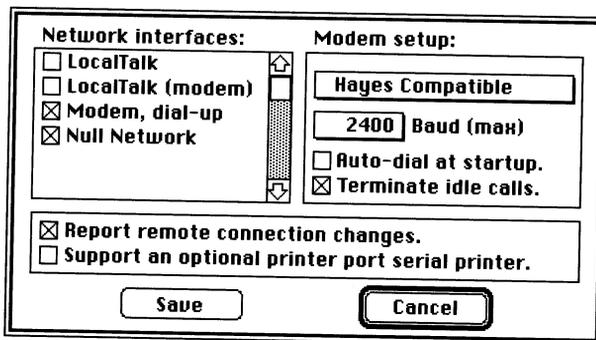
Preferences dialog box for a stand-alone answering half-router

Selecting the Null Network port enables your half-router to answer calls when not connected to a network. If you wish to print to a serial printer (not a LaserWriter) through the printer port of your Macintosh, select Support an Option Printer Port Serial Printer.

> ⚠ **ImageWriter cannot be used on the Printer port while AppleTalk is active, but AppleTalk cannot be changed now. Try turning off programs that use AppleTalk and Restarting.**
>
> [**Continue**]

ImageWriter Users: When you select the ImageWriter icon in the Chooser, you'll notice that the modem icon is highlighted under "Select a Printer Port." Liaison's configuration of the printer port generates this display, which you can disregard.

Do not attempt to select the printer icon. If you do, the message shown at left appears. If this happens, click Continue. Your ImageWriter will function normally.

Chapter 7

Setting up a Relay Client and Relay Router

This chapter contains detailed instructions for setting up a relay router connection.

Relay router ————

Relay client ————

Answering half-router ————
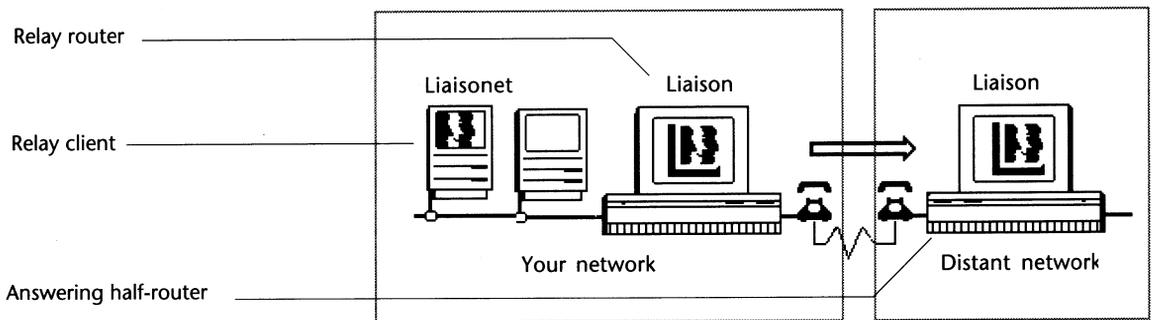
Use this configuration when a user on your network needs to initiate a dial-up connection to a distant network but that user does not have a dedicated modem. The instructions are divided into three sections:

■   Setting up a relay client

■   Setting up a relay router

■   Using a relay router connection.

Setting up a relay client

A relay client is a Macintosh that is connected to your local network
and has Liaisonet installed but does not have a modem connected to
it. A user with a relay client can dial out to a distant network by going
through an intermediary computer called a relay router. Setup
instructions for a relay router follow this section.

Install Liaisonet

Install Liaisonet on the Macintosh that will be the relay client. See
Chapter 3 for installation instructions.

To configure Liaisonet:

1. Switch on the relay client Macintosh, open the Chooser, and
    select Liaisonet. You may be asked to type a password.

2. Choose Preferences from the Configure menu. Liaisonet
    displays the Preferences dialog box.

```
┌──────────────────────────────────────────────────┐
│ Network interfaces:        Modem setup:            │
│ ⊠ EtherTalk2          ⇧   ┌──────────────────────┐ │
│ ☐ LocalTalk              │ Hayes Compatible      │ │
│ ☐ LocalTalk (modem)      └──────────────────────┘ │
│ ☐ Modem, dial-up          ┌──────┐               │
│                           │ 2-400 │ Baud (max)    │
│                           └──────┘               │
│                        ⇩   ☐ Auto-dial at startup. │
│                            ⊠ Terminate idle calls. │
│ ┌────────────────────────────────────────────────┐ │
│ │ ⊠ Report remote connection changes.             │ │
│ │ ☐ Support an optional printer port serial printer.│ │
│ └────────────────────────────────────────────────┘ │
│      ┌──────────┐        ┌──────────┐             │
│      │   Save   │        │  Cancel  │             │
│      └──────────┘        └──────────┘             │
└──────────────────────────────────────────────────┘
```
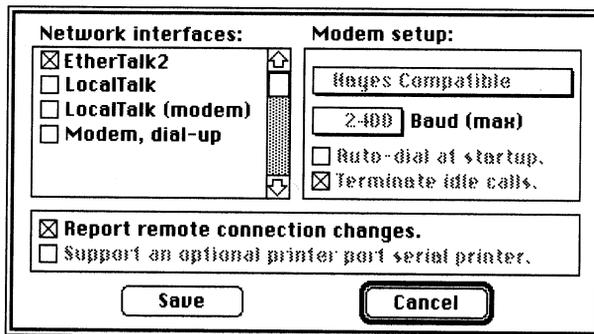
Preferences dialog box for a relay client

3. In the Network Interfaces scroll list select only the network to
    which your Macintosh is connected.

    ▲   Make sure that Modem, Dial-Up is *not* selected.

4. Click Save.

5. Restart your Macintosh and create an Address Book entry for
    the network you wish to call, as explained in the following
    procedure.

Create an Address Book entry:

Before you can use Liaisonet to dial through a relay router to another network, you need to create an entry for that site in your Liaisonet Address Book. If you will be calling several sites, create an entry for each.

1. Open the Chooser and select Liaisonet.

2. Choose Address Book from the Configure menu. Liaisonet displays the entry (if any) that is currently selected in the Chooser window. You will be typing over the information in this entry; however, the original entry will be preserved if you click the New button (rather than the Change button) when you are finished.

3. Type the Site Name. This is a name you have given to the answering network or workstation; it is displayed in the Address Book list in the Chooser. Liaisonet does not check Site Name during the dialing process.

4. Type the Phone Number, the telephone number of the modem connected to the answering network or workstation.

5. Type the Account Name. Obtain the Account Name from the network manager responsible for configuring the answering half-router on the distant network. The Account Name you enter must exactly match the entry in the Authorized Users dialog box of the answering half-router.

Site name:	Farallon Technical Support
Phone number:	1-510-596-9078
Account name:	Ben Lombardo
Login password:	••••
Connection:	○ Private ● Shared with group

[New]   [Change]   [Delete]   [Cancel]

Note: The answering half-router does not check the Account Name or Login Password of the relay router.

6.   Type the Login Password. Obtain the password from the network manager responsible for configuring the answering half-router. The password you enter must exactly match the entry in the Authorized Users dialog box of the answering half-router. Passwords are not case sensitive.

   ■   The calling Macintosh will prompt you for a required password if you leave the Login Password box empty. Make sure the box contains no blank (space bar) characters.

   ■   If the answering Macintosh does not require a password, you can prevent Liaisonet from prompting you by entering a dummy password in the Login Password box.

7.   Select Private if you do not want other users on your network to see the network services of the distant network in their Chooser windows.

   ▲   The Private option cannot always be guaranteed during a relay router connection. If the link must pass through any other local routers, a Private connection is converted to Shared With Group.

8.   Click the New button when the Address Book entry is complete.

9.   Your Macintosh is now ready to dial the other network, but its User or Owner Name must be entered as an Authorized User on the relay router, as explained in the following section.

Setting up a relay router

A relay router is a calling half-router that has been configured to relay outbound calls. As such, it can serve as an intermediary between relay clients and distant networks. Users of relay clients must be entered as Authorized Users on the relay router in order to dial out through its modem.

To set up a relay router:

1. Set up the Macintosh as a calling half-router, as explained in Chapter 5. Remember to install Network Tuner on the computers that are not running Liaison or Liaisonet.

2. Open the Chooser and select Liaison. You may be asked to type a password.

3. Choose Authorized Users from the Configure menu. (If the menu command is dimmed, return to the Preferences dialog box and make sure you have selected Modem, Dial-Up.)

4. In the User box type the User Name or Owner Name (in System 7) of the relay client that will be dialing through this Macintosh.

5. Leave Login password blank.

6. Select Relay Outbound Calls. This option exists exclusively for the purpose of accommodating relay clients.

```
┌──────────────────────────────────────────────┐
│ Authorized users:          User:              │
│ ┌──────────────────┐ ⬆   ┌──────────────────┐ │
│ │ Andrew Scuolar   │     │ Ben Lombardo     │ │
│ │ Ian Drewmeyer    │     └──────────────────┘ │
│ │ Robert Ramp      │     With password:       │
│ │                  │ ⬇   ┌──────────────────┐ │
│ └──────────────────┘     │                  │ │
│                          └──────────────────┘ │
│ User access privileges:                       │
│ ○ Only this node        ☐ Force "Private" use │
│ ○ Services in this zone ☐ Dial-back @ (Phone#)│
│ ◉ This whole internet   ☒ Relay outbound calls│
│                                               │
│ ( New )   ( Update )    ( Delete )   ( Done ) │
└──────────────────────────────────────────────┘
```

The relay router's Authorized User entry for a relay client

7. Click New. The User name will appear in the Authorized Users list.

8. Repeat Steps 5–8 to create entries for any other relay clients.

9. Click Done. Liaison then asks you to enable the Forward User Calls option in the Network Services dialog box.

10. Choose Network Services from the Configure menu and select Forward User Calls. The relay router is now configured.

11. If you want to keep track of calls made through the relay router, choose Network Services from the Configure menu and select Log Call Activity. This creates a Liaison Log text file in your System Folder.

Double checking your entries

Use the following illustrations as a guide. The fields connected by arrows must match exactly.
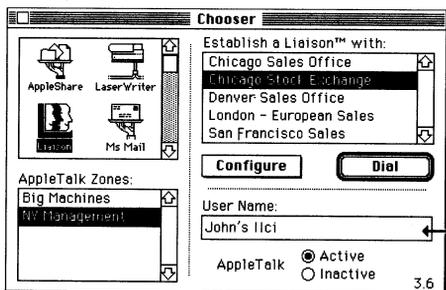
Chooser window of the relay client
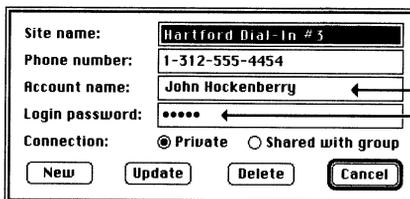
Address Book entry at the relay client
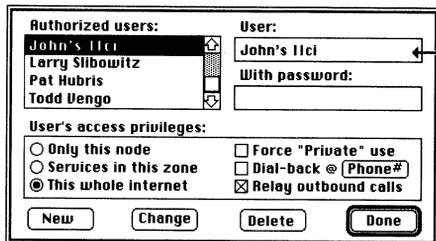
Authorized Users entry at the relay router
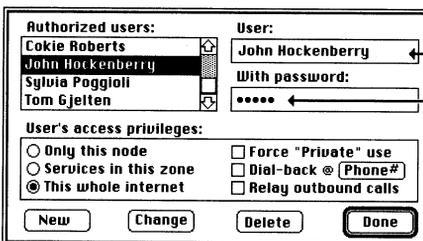
Authorized Users entry at the answering half-router

To stop Liaison from relaying all calls:

Choose Network Services from the Configure menu and deselect Forward User Calls. When you are ready to switch the relay router on again, return to this dialog box and select Forward User Calls again.

To stop Liaison from relaying calls from a specific computer:

If you only need to stop relaying calls from one relay client:

1.   Choose Authorized Users from the Configure menu.

2.   Select the desired user.

3.   When the user's entry is displayed, deselect Relay Outbound Calls.

4.   Click the Update button.

5.   Click Done.

You can reinstate the user's dialing privilege by repeating this procedure and reselecting Relay Outbound Calls in Step 3.

Dialing through a relay router

After your relay client and the relay router have been configured, as explained in the first two sections of this chapter, use the following procedure to connect to a distant network from a relay client.

1. Open the Chooser and select Liaisonet.

2. If necessary, go to the AppleTalk Zones list and select the zone of the relay router.

3. Your Address Book entries are displayed in the upper right corner of the Chooser window under the heading Establish a Liaison With. Select the site you want to call.

Dial

4. Click the Dial button or press the Return key. You can also double-click the site name. A dialog box displays a list of the relay routers in the selected zone, identified by their User (or Owner) Names, and asks you to select one:
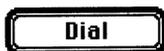
Selected zone ————————————————————

Relay routers ————

Please select a relay router in "3rd Floor EtherTalk"

Location:	Modem Type:	Current User:
Copier Room	Hayes 2400+	
Corner Office	Hayes 2400+	The Boss
File Server	Hayes Compat...	
Kansas Dial-In	Farallon V.32 ...	

OK   Cancel
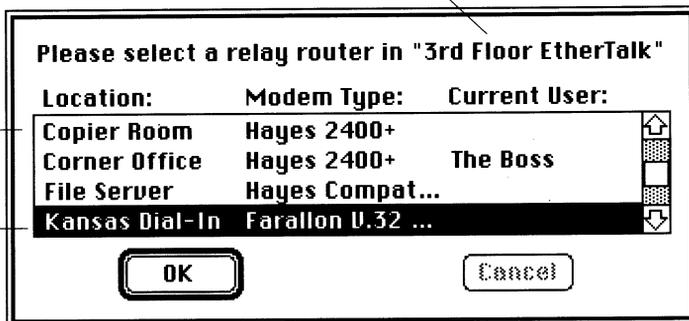
The dialog box also shows who is using each router if it is not available.

5. Select a relay router and click OK. The relay router dials the distant network and establishes a connection.

Using a wide area network

When connected to a distant network through a relay router, you will have access to some or all of the network services provided by that network. Here are some of the tasks you can perform across the wide area link:

■ You can use electronic mail to exchange memos with users on the distant network.

■ By choosing a printer from a zone on the distant network, you can print a document at the other location without first having to transfer the file.

■ By choosing a file server from a zone on the distant network, you can obtain files from the distant network.

■ By choosing a Timbuktu host list from a zone on the distant network, you conduct both screen-sharing and file transfer sessions with a Macintosh on the distant network.

Dial-up connections perform more slowly than LocalTalk connections. Dial-up rates are 1–20 kilobits per second, whereas local networks run in excess of 200 kilobits per second.

Terminating a dial-up link

Once you have finished using the services of the distant network, either side of the link can end the connection.

1. **Important:** Bring to a normal close all current activity you have initiated involving network services across the dial-up link. Some examples are:

    ■   Unmount all file server volumes from the distant network by dragging their icons to the Trash. Network services such as AppleShare, MacServe, and TOPS can be disrupted if you disconnect from a wide area network without first releasing their resources.

    ■   If you are printing a document over the dial-up link, allow the printing to finish or cancel the print job manually.

    ■   If you are conducting a screen-sharing or file transfer session using Timbuktu, cancel these through the appropriate Timbuktu procedures.

2. Open the Chooser and select Liaison.

3. Click the Hang-up button or press the Return key. A dialog box asks you to confirm that you want to break the connection.

4. Click OK to terminate the connection.

Chapter 8

Setting Up a Personal Bridge

This chapter contains detailed instructions for setting up Liaisonet as a personal bridge, the configuration you should use to dial in to a network (through an answering half-router) from home or while traveling. Liaisonet is a part of Liaison that can be distributed freely to any users that want to dial in to a Liaison answering half-router. For more information on Liaisonet, see Chapter 2.

The personal bridge lets you check electronic mail, print documents, and use other services on the distant network when you cannot be at the office. It requires Liaisonet and a modem directly connected to your Macintosh.
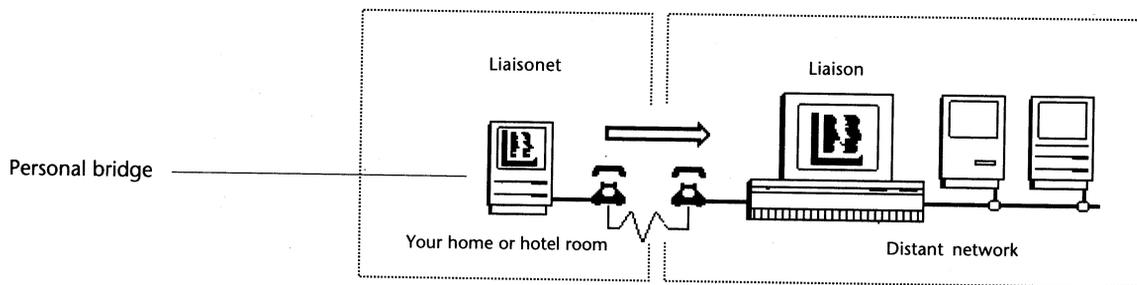
Note: A personal bridge can initiate calls but cannot answer them. To be able to answer calls at a remote site, you would have to set up an answering half-router. For more information, see Chapter 6.

You can connect a serial printer, such as an ImageWriter, to a personal bridge. However, a LaserWriter cannot be connected to a personal bridge because it requires a LocalTalk network. If your computer is connected to a network, configure Liaisonet as a semi-router, which is described in the following chapter.

Setup procedure for one site

Use this procedure if you are setting up a personal bridge for your own remote location. It's a good idea to bring your home computer into the office to load the required software and test the connection.

If you are preparing personal bridges for distribution to users at several remote sites, use the procedure "Setting Up Multiple Personal Bridges" at the end of this chapter.

Install Liaisonet

Install Liaisonet on the Macintosh that will be the personal bridge. See Chapter 3 for installation instructions.

To configure Liaisonet:

1. Switch on your personal bridge Macintosh, open the Chooser, and select Liaisonet. You may be asked to type a password.

2. Choose Preferences from the Configure menu. Liaisonet displays the Preferences dialog box:

```
┌─────────────────────────────────────────────────┐
│  Network interfaces:      Modem setup:           │
│  ☐ EtherTalk2        ⬆                           │
│  ☐ LocalTalk            ┌─────────────────────┐  │
│  ☐ LocalTalk (modem)    │ Hayes Compatible    │  │
│  ☒ Modem, dial-up       └─────────────────────┘  │
│  ☐ Null Network           ┌──────┐               │
│                           │ 2400 │ Baud (maH)    │
│                           └──────┘               │
│                         ☐ Auto-dial at startup.  │
│                      ⬇  ☒ Terminate idle calls.  │
│  ┌─────────────────────────────────────────────┐ │
│  │ ☒ Report remote connection changes.         │ │
│  │ ☒ Support an optional printer port serial printer. │ │
│  └─────────────────────────────────────────────┘ │
│        ┌──────────┐        ┌──────────┐          │
│        │  Save    │        │  Cancel  │          │
│        └──────────┘        └──────────┘          │
└─────────────────────────────────────────────────┘
```
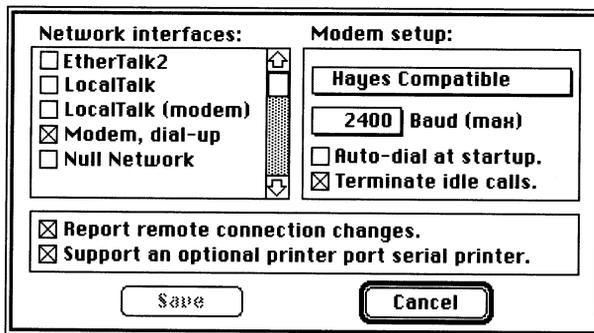
Preferences dialog box for a personal bridge

3. In the Network Interfaces scrolling list, select Modem, Dial-Up.

4. Under Modem Setup, click the upper pop-up menu to choose the modem type to match the modem attached to your Macintosh. If you have installed a custom script, choose Liaison Script. For more information, see Appendix B, "Modem Specifications."

5. Click the Baud (Max) pop-up menu to choose the maximum speed at which your modem can communicate.

    Note: Calling and answering modems communicate at the fastest baud rate they have in common. If necessary, you can choose a lower baud rate to slow down connections.

6. Select your dial-up options:

    ■ To dial the other network automatically each time you start up your Macintosh, select Auto-Dial at Startup. Liaisonet will automatically dial the entry last selected from your Address Book the next time you start up your Macintosh.

    ■ To hang up after a dial-up connection has been inactive for 3 minutes, select Terminate Idle Calls. (Liaisonet will not hang up if a remote AppleShare volume is mounted.)

    ■ To display an alert message whenever the distant network hangs up, select Report Remote Connection Changes.

7. Select Support an Optional Printer Port Serial Printer if you wish to have a serial printer, such as an ImageWriter, connected to your Macintosh while you are using the personal bridge.

ImageWriter Users: When you select the ImageWriter icon in the Chooser, you'll notice that the modem icon is highlighted under "Select a Printer Port." Liaison's configuration of the printer port generates this display, which you can disregard.

Do not attempt to select the printer icon. If you do, the message shown at left appears. If this happens, click Continue. Your ImageWriter will function normally.

> ⚠ **ImageWriter cannot be used on the Printer port while AppleTalk is active, but AppleTalk cannot be changed now. Try turning off programs that use AppleTalk and Restarting.**
>
> [**Continue**]

8.   Click Save.

9.   Restart your Macintosh and create an Address Book entry for
     the network you wish to call, as explained in the following
     procedure.

Create Address Book entries

Before you can use your personal bridge to dial in to a network, you
need to create an entry corresponding to the answering half-router in
your Liaisonet Address Book. If you will be calling different networks,
create a separate entry for each.

1.   Open the Chooser and select Liaisonet.

2.   Choose Address Book from the Configure menu.

```
┌──────────────────────────────────────────────────────┐
│  Site name:        │ Farallon Technical Support     │ │
│                     └────────────────────────────────┘ │
│  Phone number:     │ 1-510-596-9078                  │ │
│                     └────────────────────────────────┘ │
│  Account name:     │ First Time User                 │ │
│                     └────────────────────────────────┘ │
│  Login password:   │                                 │ │
│                     └────────────────────────────────┘ │
│  Connection:        ● Private    ○ Shared with group   │
│  ┌───────┐   ┌────────┐    ┌────────┐    ┌────────┐    │
│  │  New  │   │ Change │    │ Delete │    │ Cancel │    │
│  └───────┘   └────────┘    └────────┘    └────────┘    │
└──────────────────────────────────────────────────────┘
```

Sample Address Book entry

3.   Type the Site Name. This is a name you have given to the
     answering network or workstation; it is displayed in the Address
     Book list in the Chooser. Liaisonet does not check Site Name
     during the dialing process.

4.   Type the Phone Number, the telephone number of the
     answering modem.

     Note: If you have call waiting on your home telephone, it is a
     good idea to turn it off so your dial-up connection will not be
     interrupted. In many areas, you can include the code *70 in
     your Address Book entry to disable call waiting, for example,
     *70,596-9078. Remember to turn it on again after you have
     ended your connection.

5. Type the Account Name. Obtain the Account Name from the network manager responsible for configuring the answering half-router. The Account Name you enter must exactly match the entry in the Authorized Users dialog box of the answering half-router.

6. Type the Login Password. Obtain the Password from the network manager responsible for configuring the answering half-router. The Password you enter must exactly match the entry in the Authorized Users dialog box of the answering half-router. Passwords are not case sensitive.

   ■ The answering Macintosh will prompt you for a required password if you leave the Login Password box empty. Make sure the box contains no blank (space bar) characters.

   ■ If the answering Macintosh does not require a password, you can prevent the calling Macintosh from prompting you (for a blank password) by entering a dummy password in the Login Password box.

7. Click the New button when the Address Book entry is complete.

8. Repeat Steps 2–7 for each additional Address Book entry.

How Liaison verifies account name and password

If this is the first time you are attempting to call a new site in your Address Book, it's a good idea to telephone the manager of the answering half-router to make sure that the information you have entered in your Address Book entry for that site matches up with the information that was entered for your site in the Authorized Users dialog box of the answering half-router.

Use the following illustration as a guide to the information that must match exactly:

Address Book entry at
the personal bridge —————

Authorized Users entry at
the answering half-router —————

Site name:	Chicago Stock Exchange
Phone number:	1-312-555-4454
Account name:	Southside Investments ←
Login password:	••••• ←
Connection:	● Private ○ Shared with group

[New]   [Update]   [Delete]   [Cancel]

—These entries
must match

Authorized users:
Southside Investments
Turner Isuzu
West J Feed Co
Zimmerman Steel

User:
Southside Investments ←

With password:
••••• ←

—These entries
must match

User's access privileges:
○ Only this node   ☐ Force "Private" use
○ Services in this zone   ☐ Dial-back @ [Phone#]
● This whole internet   ☐ Relay outbound calls

[New]   [Change]   [Delete]   [Done]

To dial the other network:

1. Open the Chooser and select Liaisonet.

2. Select the site you wish to dial from the scrolling list under Establish a Liaison With.

3. Click Dial:

If your Address Book does not contain a password for a particular site, the calling half-router asks for one before proceeding with your call. Liaisonet then dials the selected site and attempts to make a connection.

When the connection is made, the final message reports that the connection is private. The Dial button changes to a Hang-up button to confirm that you are connected.

Using a personal bridge connection

When your Macintosh is connected to the distant network across a
personal bridge, you may see zones of the distant network—if it has
more than one zone—added to your Chooser window and other
network interfaces, such as electronic mail and Timbuktu:

Zone list ——————
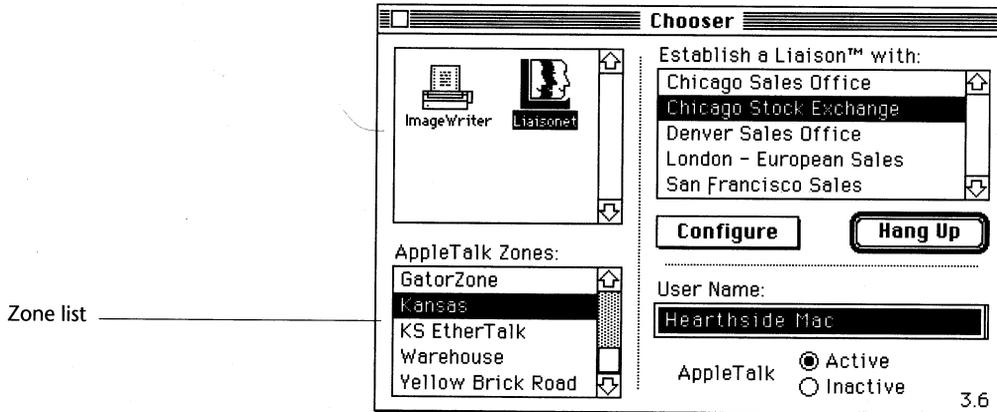
Depending on the scope of your connection, one or more users on
the distant network will see your Macintosh in a unique zone or
added to one of the local zones. See Chapter 10 for information on
scope options.

Here are some of the uses of the personal bridge connection:

■   You can use electronic mail to exchange memos with users on
     the distant network.

■   By choosing a printer from a zone on the distant network, you
     can print a document at the other location without first having to
     transfer the file

■   By choosing a file server from a zone on the distant network,
     you can obtain files from the distant network

■   By choosing a Timbuktu host list from a zone on the distant
     network, you conduct both screen-sharing and file transfer
     sessions with a Macintosh on the distant network.

Dial-up connections perform more slowly than LocalTalk connections.
Dial-up transfer rates are 1–20 kilobits per second, whereas local
networks run in excess of 200 kilobits per second.

Terminating a dial-up link

Once you have finished using the services of the distant network, either side of the link can end the connection.

1. **Important:** Bring to a normal close all current activity you have initiated involving network services across the dial-up link. Some examples are:

   ■ Dismount all file server volumes from the distant network by dragging their icons to the Trash. Network services such as AppleShare, MacServe, and TOPS can be disrupted if you disconnect from a wide area network without first releasing their resources.

   ■ If you are printing a document over the dial-up link, allow the printing to finish or cancel the print job manually.

   ■ If you are conducting a screen-sharing or file transfer session using Timbuktu, cancel these through the appropriate Timbuktu procedures.

2. Open the Chooser and select Liaisonet.

3. Click the Hang-Up button or press the Return key. A dialog box asks you to confirm that you want to break the connection.

4. Click OK to terminate the connection.

Note: Your call will be terminated automatically after 3 minutes of no activity if either the personal bridge or the answering half-router has been configured to do this. However, this will not happen if the remote user has mounted an AppleShare volume on the network.

Setting up multiple personal bridges

As the manager of a network that will be called by Liaisonet users from remote sites, you may find it convenient to create ready-to-use personal bridge disks for users who will be calling your answering half-router. All the personal bridge users will then need to do is start up from the prepared disk, select Liaisonet, and click the Dial button.

This procedure is divided into three phases:

■   Removing Liaison temporarily

■   Configuring the desired Liaisonet Prep file

■   Reinstating Liaison and creating Authorized User entries.

Remove Liaison temporarily

Drag your Liaison file out of the System Folder. You will return it at the end of this procedure.

Configure the Liaisonet Prep file:

1.   Copy Liaisonet from the Liaison Files folder of your Liaison disk to your System Folder.

2.   Select Liaisonet in the Chooser.

3.   Set the Preferences for the guest users' computers: select Modem, Dial-Up, and set the Baud rate.

4.   Create Address Book entries.

The Liaisonet Prep file is now configured in your System Folder. Drag copies of this file and Liaisonet to the System Folder of each disk that will be distributed to remote users. You may also need to supply the personal bridge users with the appropriate software— electronic mail, AppleShare client software, Timbuktu—for use with your network's services to conform to the respective vendors' licensing provisions.

Reinstall Liaison and create Authorized User entries

1. Restore the Liaison file to the System Folder and restart your Macintosh.

2. Add entries to your Authorized Users list for each of the personal bridge users that will be dialing your answering half-router.

3. If you require Dial-Back security, see "Security Options" in Chapter 6. If a user will call from more than one site, enter a separate account name and dial-back number for each site the *user will call from*.

Distribute the Liaisonet and Liaisonet Prep files to the remote users.
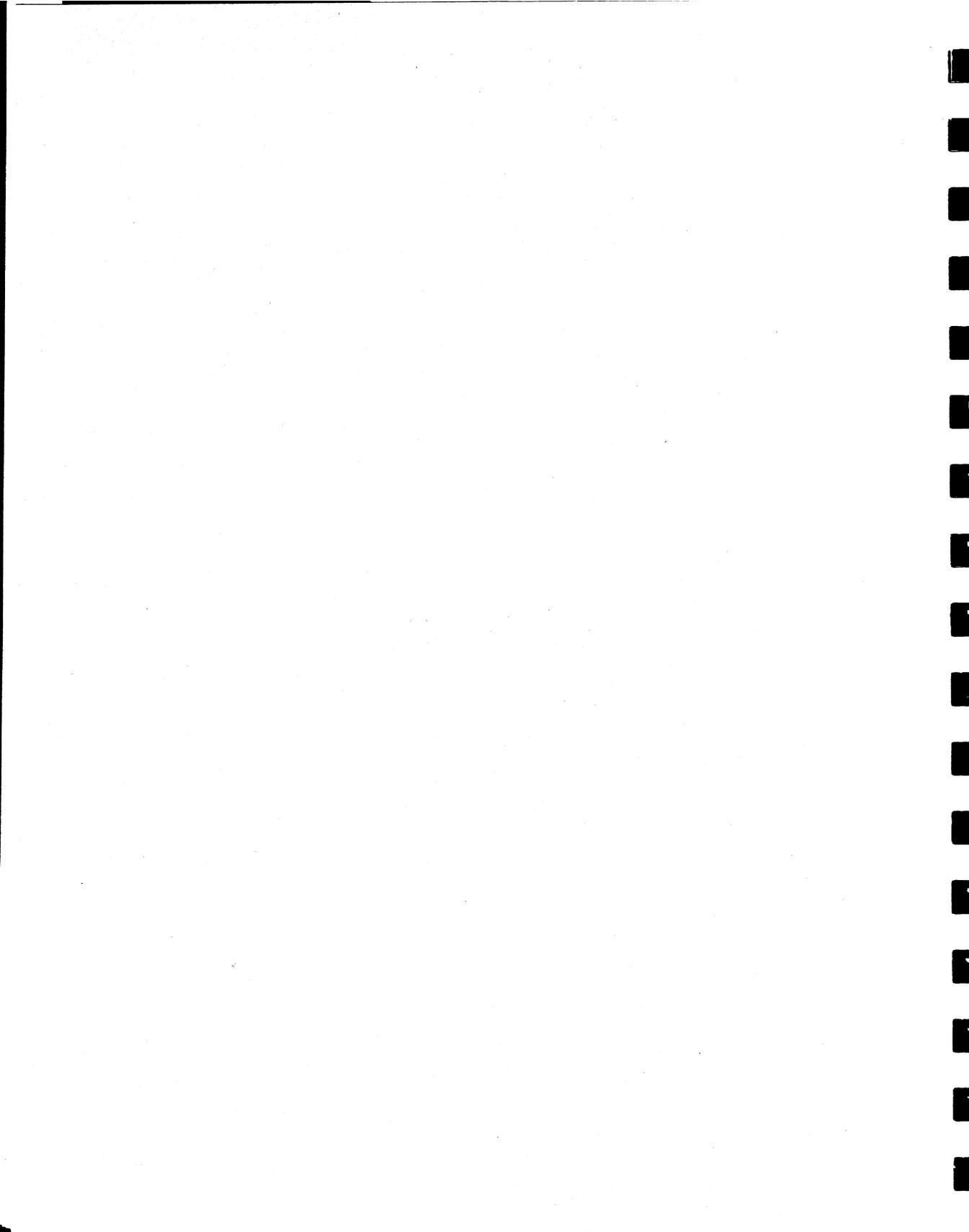
Chapter 9

Setting up a Semi-Router

A semi-router is the configuration you should use to establish a dial-up link from one network, often at the user's home, to another when the calling network must use Liaisonet instead of Liaison.
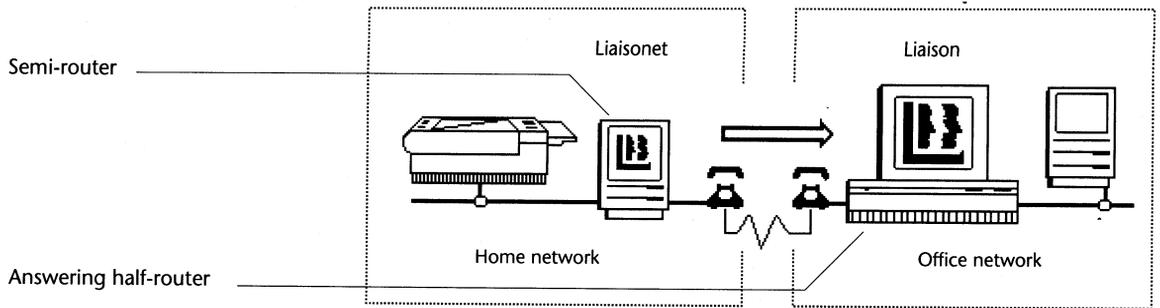
Because it uses Liaisonet instead of Liaison, a semi-router differs from a calling half-router in that:

- It does not require you to purchase a second copy of Liaison.

- It cannot be configured as an answering half-router. Liaisonet can only dial out.

- It allows only a private connection to the calling computer. The answering network cannot see any of the other devices on the calling network nor can other users on the calling network see the answering network.

A semi-router differs from a personal bridge in that it allows you to remain connected to other network devices, such as a LaserWriter, while you are using the dial-up link to the office network. (A personal bridge *can* remain connected to a serial printer, such as an ImageWriter.)

Setup procedure

Install Liaisonet

Install Liaisonet on the Macintosh that will be the semi-router on your home network. See Chapter 3 for installation instructions.

Connect the cables

Connect the modem cable to the modem port of your Macintosh and the PhoneNET (or other AppleTalk) connector to the printer port:

Modem port

Printer port

LocalTalk connector

Modem
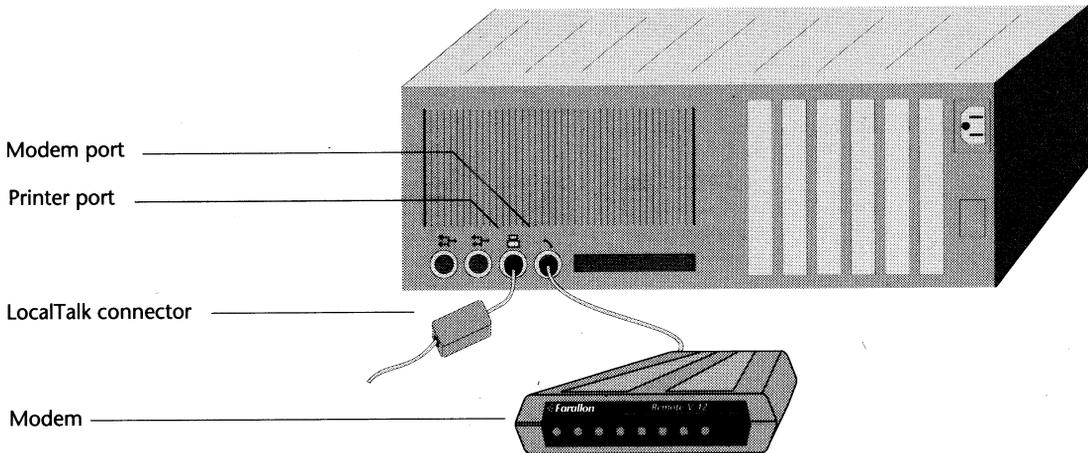
Important: If your home (or calling) network is using Ethernet cabling instead of LocalTalk, it is important that you use EtherTalk 1.2 instead of EtherTalk 2.0 with the semi-router.

To configure Liaisonet:

1. Switch on your semi-router Macintosh, open the Chooser, and select Liaisonet. You may be asked to type a password.

2. Choose Preferences from the Configure menu. Liaisonet displays the Preferences dialog box.

3. In the Network Interfaces scrolling list, select LocalTalk (or EtherTalk) and Modem, Dial-Up:

```
┌────────────────────────────────────────────────────┐
│  Network interfaces:        Modem setup:           │
│  ┌──────────────────┐ ⬆    ┌─────────────────────┐ │
│  │ ☐ EtherTalk2     │      │ Hayes Compatible    │ │
│  │ ☒ LocalTalk      │      └─────────────────────┘ │
│  │ ☐ LocalTalk (modem)│    ┌──────┐                │
│  │ ☒ Modem, dial-up │      │ 2400 │ Baud (max)     │
│  │ ☐ Null Network   │      └──────┘                │
│  │                  │      ☐ Auto-dial at startup. │
│  └──────────────────┘ ⬇    ☒ Terminate idle calls. │
│  ┌──────────────────────────────────────────────┐  │
│  │ ☒ Report remote connection changes.          │  │
│  │ ☐ Support an optional printer port serial printer.│
│  └──────────────────────────────────────────────┘  │
│        ┌─────────┐          ┌──────────┐           │
│        │  Save   │          │  Cancel  │           │
│        └─────────┘          └──────────┘           │
└────────────────────────────────────────────────────┘
```
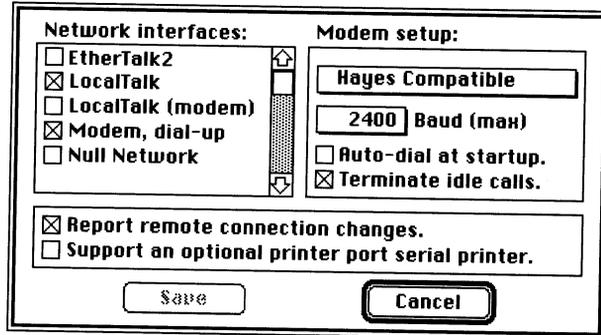
Preferences dialog box for a semi-router

4. Under Modem Setup, click the upper pop-up menu to choose the modem type to match the modem attached to your Macintosh. If you have installed a custom script, choose Liaison Script. For more information, see Appendix B, "Modem Specifications."

5. Click the Baud (Max) pop-up menu to choose the maximum speed at which your modem can communicate.

    Note: Calling and answering modems communicate at the fastest baud rate they have in common.

6.   Select your dial-up options:

■   If you want Liaisonet to dial the other network automatically each time you start up your Macintosh, select Auto-Dial at Startup. Liaisonet will automatically dial the entry last selected from your Address Book the next time you start up your Macintosh.

■   If you want Liaisonet to hang up after a dial-up connection has been inactive for 3 minutes, select Terminate Idle Calls. (Liaisonet will not hang up if a remote AppleShare volume is mounted.)

■   If you want Liaisonet to display an alert message whenever the distant network hangs up, select Report Remote Connection Changes.

7.   Click Save.

8.   Restart your Macintosh and create an Address Book entry for the network you wish to call, as explained in the following procedure.

Create Address Book entries

Before you can use your semi-router to dial in to a network, you need to create an entry for the answering half-router in your Liaisonet Address Book. If you will be calling different networks, create a separate entry for each.

1.   Open the Chooser and select Liaisonet.

2.   Choose Address Book from the Configure menu.

Site name:	Farallon Technical Support
Phone number:	1-510-596-9078
Account name:	Ben Lombardo
Login password:	••••
Connection:	◉ Private ○ Shared with group

New   Change   Delete   Cancel

Sample Address Book entry

3. Type the Site Name. This is a name you have given to the answering network or workstation; it is displayed in the Address Book list in the Chooser. Liaisonet does not check Site Name during the dialing process.

4. Type the Phone Number, the telephone number of the answering modem.

    Note: If you have call waiting on your home telephone, it is a good idea to turn it off so your dial-up connection will not be interrupted. In many areas, you can include the code *70 in your Address Book entry to disable call waiting, for example, *70,596-9078. Remember to turn it on again after you have ended your connection.

5. Type the Account Name. Obtain the Account Name from the network manager responsible for configuring the answering half-router. The Account Name you enter must exactly match the entry in the Authorized Users dialog box of the answering half-router. Passwords are case sensitive—capital letters are distinguished from lowercase letters.

6. Type the Login Password. Obtain the Password from the network manager responsible for configuring the answering half-router. The Password you enter must exactly match the entry in the Authorized Users dialog box of the answering half-router.

    ■   The calling Macintosh will prompt you for a password if you leave the Login Password box empty. Make sure the box contains no blank (space bar) characters.

    ■   If the answering Macintosh does not require a password, you can prevent the calling Macintosh from prompting you by entering a dummy password in the Login Password box.

7. Click the New button when the Address Book entry is complete.

8. Repeat Steps 3–7 for each additional Address Book entry.

How Liaison verifies account name and password

If this is the first time you are attempting to call a new site in your Address Book, it's a good idea to telephone the manager of the answering half-router to make sure that the information you have entered in your Address Book entry for that site matches up with the information that was entered for your site in the Authorized Users dialog box of the answering half-router.

Use the following illustration as a guide to the information that must match exactly:
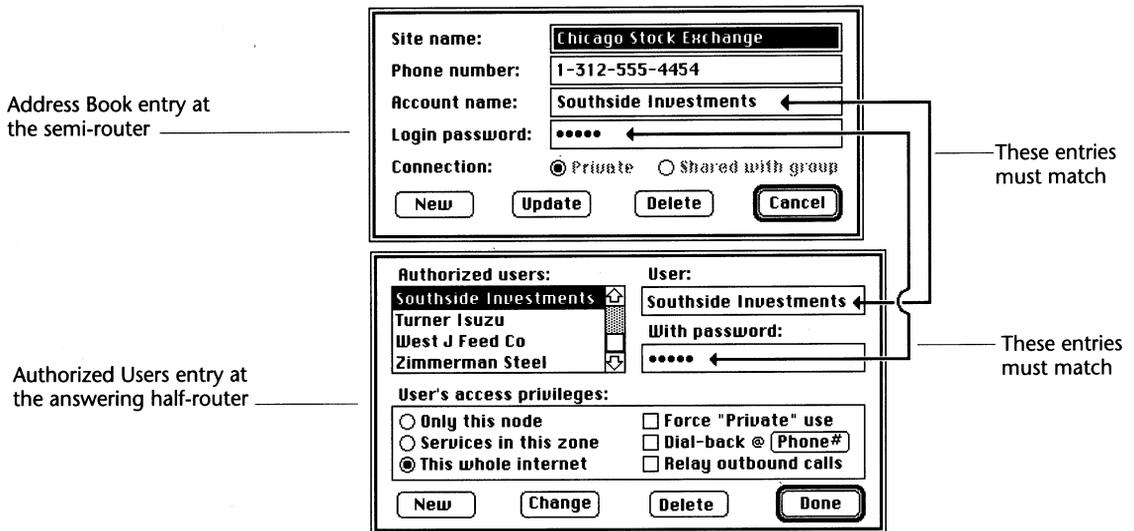
Address Book entry at
the semi-router

Site name: Chicago Stock Exchange
Phone number: 1-312-555-4454
Account name: Southside Investments
Login password: •••••
Connection: ⦿ Private   ○ Shared with group

[New]   [Update]   [Delete]   [Cancel]

These entries
must match

Authorized Users entry at
the answering half-router

Authorized users: User:
Southside Investments   Southside Investments
Turner Isuzu   With password:
West J Feed Co   •••••
Zimmerman Steel

User's access privileges:
○ Only this node   ☐ Force "Private" use
○ Services in this zone   ☐ Dial-back @ [Phone#]
⦿ This whole internet   ☐ Relay outbound calls

[New]   [Change]   [Delete]   [Done]

These entries
must match

To dial the other network:

1. Open the Chooser and select Liaisonet.

2. Select the site you wish to dial from the scrolling list under Establish a Liaison With.

3. Click Dial:
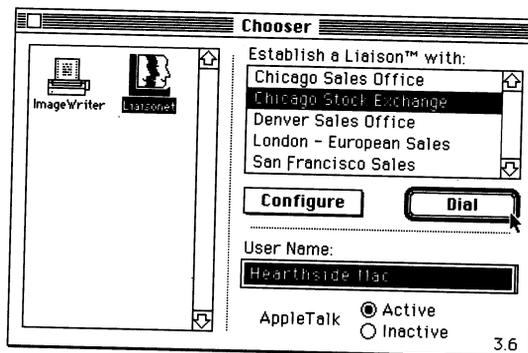
If your Address Book does not contain a password for a particular site, the answering half-router asks for one before proceeding with your call. Liaisonet then dials the selected site and attempts to make a connection.

When the connection is made, the final message reports that the connection is private. The Dial button changes to a Hang-up button to confirm that you are connected.

Using a semi-router connection

When your Macintosh is connected to the distant network across a semi-router, you may see zones of the distant network—if it has more than one zone—added to your Chooser window and other network interfaces, such as electronic mail and Timbuktu:

```
┌─────────────────────────────────────────────────────┐
│ ▤□▤▤▤▤▤▤▤▤▤▤▤▤▤ Chooser ▤▤▤▤▤▤▤▤▤▤▤▤▤▤▤▤▤        │
│ ┌──────────────────────────┐  Establish a Liaison™ with: │
│ │    🖨       👤        ⬆ │  ┌────────────────────────┐│
│ │                          │  │ Chicago Sales Office  ⬆││
│ │ ImageWriter  Liaisonet   │  │ Chicago Stock Exchange ││
│ │                          │  │ Denver Sales Office    ││
│ │                          │  │ London – European Sales││
│ │                       ⬇ │  │ San Francisco Sales   ⬇││
│ └──────────────────────────┘  └────────────────────────┘│
│ AppleTalk Zones:               ┌──────────┐ ┌──────────┐ │
│ ┌──────────────────────┐       │ Configure│ │ Hang Up  │ │
│ │ GatorZone         ⬆ │       └──────────┘ └──────────┘ │
│ │ Kansas               │       User Name:                │
│ │ KS EtherTalk         │       ┌────────────────────────┐│
│ │ Warehouse            │       │ Hearthside Mac         ││
│ │ Yellow Brick Road ⬇ │                  ● Active      │
│ └──────────────────────┘       AppleTalk  ○ Inactive    │
│                                                    3.6  │
└─────────────────────────────────────────────────────┘
```
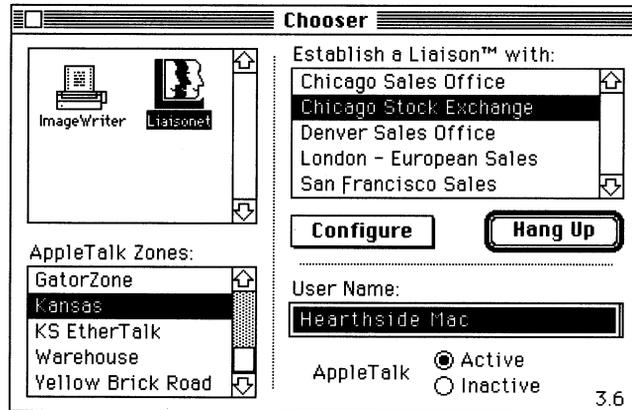
Depending on the scope of your connection (see Chapter 10), one or more users on the distant network will see your Macintosh in a unique zone or added to one of the local zones; however, because the Liaisonet can only make private connections, the distant network will not see other devices on your local network.

Here are some of the uses of the semi-router connection:

■ You can use electronic mail to exchange memos with users on the distant network.

■ By choosing a printer from a zone on the distant network, you can print a document.

■ By choosing a file server from a zone on the distant network, you can obtain files from the distant network.

■ By choosing a Timbuktu host list from a zone on the distant network, you conduct both screen-sharing and file transfer sessions with a Macintosh on the distant network.

Dial-up connections perform more slowly than LocalTalk connections. Dial-up transfer rates are 1–20 kilobits per second, whereas local networks run in excess of 200 kilobits per second.

Terminating a dial-up link

Once you have finished using the services of the distant network, either side of the link can end the connection.

1. **Important:** Bring to a normal close all current activity you have initiated involving network services across the dial-up link. Some examples are:

   ■ Unmount all file server volumes from the distant network by dragging their icons to the Trash. Network services such as AppleShare, MacServe, and TOPS can be disrupted if you disconnect from a wide area network without first releasing their resources.

   ■ If you are printing a document over the dial-up link, allow the printing to finish or cancel the print job manually.

   ■ If you are conducting a screen-sharing or file transfer session using Timbuktu, cancel these through the appropriate Timbuktu procedures.

2. Open the Chooser and select Liaisonet.

3. Click the Hang-Up button or press the Return key. A dialog box asks you to confirm that you want to break the connection.

4. Click OK to terminate the connection.

Note: Your call will be terminated automatically after 3 minutes of no activity if either the personal bridge or the answering half-router has been configured to do this. However, this will not happen if the remote user has mounted an AppleShare volume on the network.

Chapter 10

Defining the Scope of a Dial-Up Connection

A Liaison dial-up link lets one or more users on each network see one or more devices or services—printers, file servers, electronic mail servers—on the other network. Printers and file servers appear in the Chooser window. Mailing addresses and Timbuktu host lists appear in the interfaces of their respective products.

Just which users can see which devices is known as the *scope* of the connection. You can configure Liaison and Liaisonet to permit six levels of access between networks.

This chapter explains where to find the scope options in the Liaison user interface and then illustrates how these options can be combined to set up the level of access that is appropriate for your needs.

Where to find the scope options

Two of the scope options are handled in the Address Book of the calling half-router, which can be chosen from the Preferences menu. Each address must be specified to be either Private or Shared With Group.

Scope options ——————

Site name:	Atlanta Dial-In #1
Phone number:	1-404-555-6101
Account name:	Houston Liaison
Login password:	•••••
Connection:	○ Private ● Shared with group

[New] [Update] [Delete] [Cancel]

- In a Private connection, only the user of the calling Macintosh can see, and be seen by, the distant network.

- In a Shared With Group connection, all the users on the calling network can see, and be seen by, the distant network. This option is not available for personal bridges and semi-routers.

The other three scope options are handled in the Authorized Users list of the answering half-router, also chosen from the Preferences menu. Each Authorized User account (which may be used by a single user or an entire network) must be granted access to Only This Node, Services in This Zone, or This Whole Internet.

Authorized users:　　　　**User:**

Boston Blackie	Houston Liaison
Denver Bridge	
Houston Liaison	**With password:**
Santa Rosa Connection	•••••

User's access privileges:

Scope options ——————

○ Only this node　　　　☐ Force "Private" use
○ Services in this zone　☐ Dial-back @ [Phone#]
● This whole internet　　☐ Relay outbound calls

[New]　[Change]　　[Delete]　[Done]

■ Only This Node limits the information that users on the calling network can see to one device, the answering half-router—more specifically, calling users can see the network services installed on that computer, such as Timbuktu or a public AppleShare folder.

■ Services in This Zone limits the information that users on the calling network can see to the devices in the home zone of the answering half-router.

■ This Whole Internet allows users on the calling network to see all devices on the answering network.

Examples of scope combinations

Each combination of scope options is illustrated on the following pages using hypothetical networks and zones:

Houston network

Oilers zone
  two computers and a LaserWriter
Astros zone
  a file server and two computers, including the calling half-router

Atlanta network

Falcons zone
  a file server and two computers, including the answering half-router
Braves zone
  two computers and a LaserWriter

For the sake of simplicity each network has only two zones although a real network might contain dozens of zones. Each of the zones contains only three nodes—a printer or file server and individual Macintosh computers—although a real zone might include hundreds of nodes.
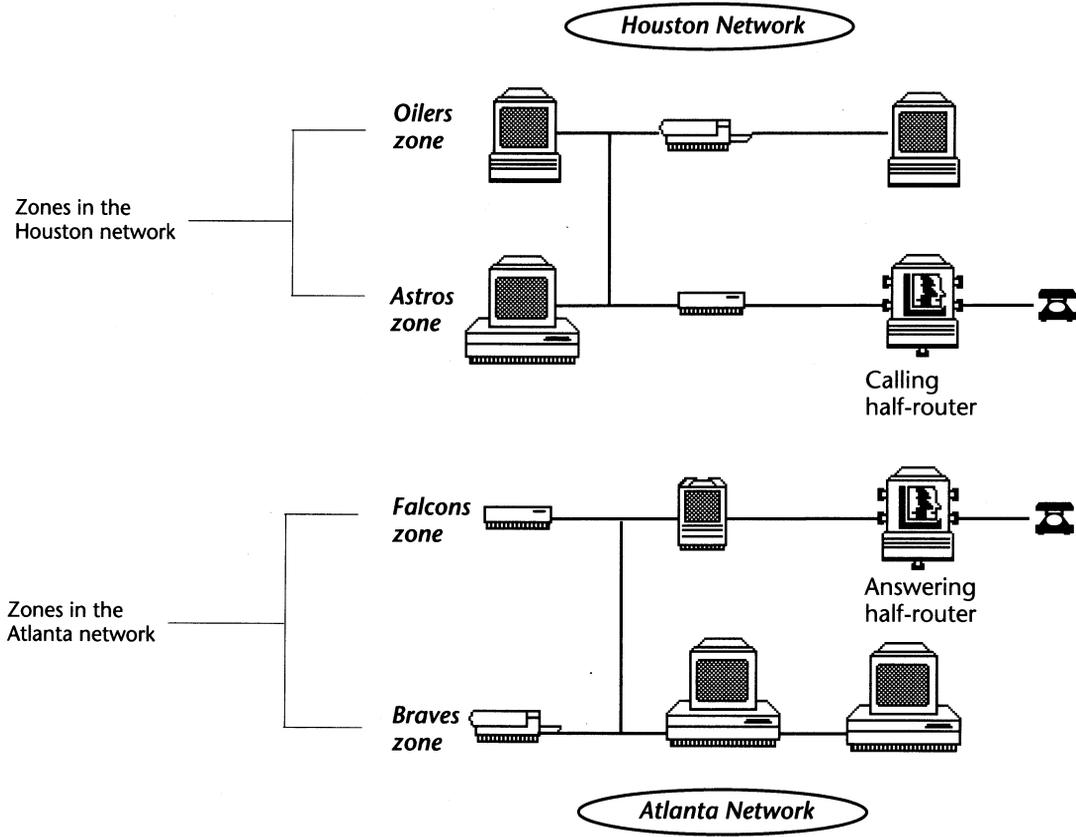
In this illustration the Houston and Atlanta networks are shown
before a dial-up link is established. At this point no network
services, such as electronic mail, Timbuktu, or AppleShare, are
available between the distant networks.

In the following illustrations, Houston has established a dial-up link
with Atlanta. The bold rectangle with rounded corners in each
illustration shows the effect of a specific combination of scoping
options.

Shown in the margin are the Address Book and Authorized User
options selected on each side of the dial-up link.

Private/Only This Node

◉ **Private**   ○ **Shared with group**

Houston Address Book entry

◉ **Only this node**
○ **Services in this zone**
○ **This whole internet**

Atlanta Authorized User entry

Houston Network

Oilers
zone

Astros
zone

Calling
half-router

Falcons
zone

Answering
half-router

Braves
zone
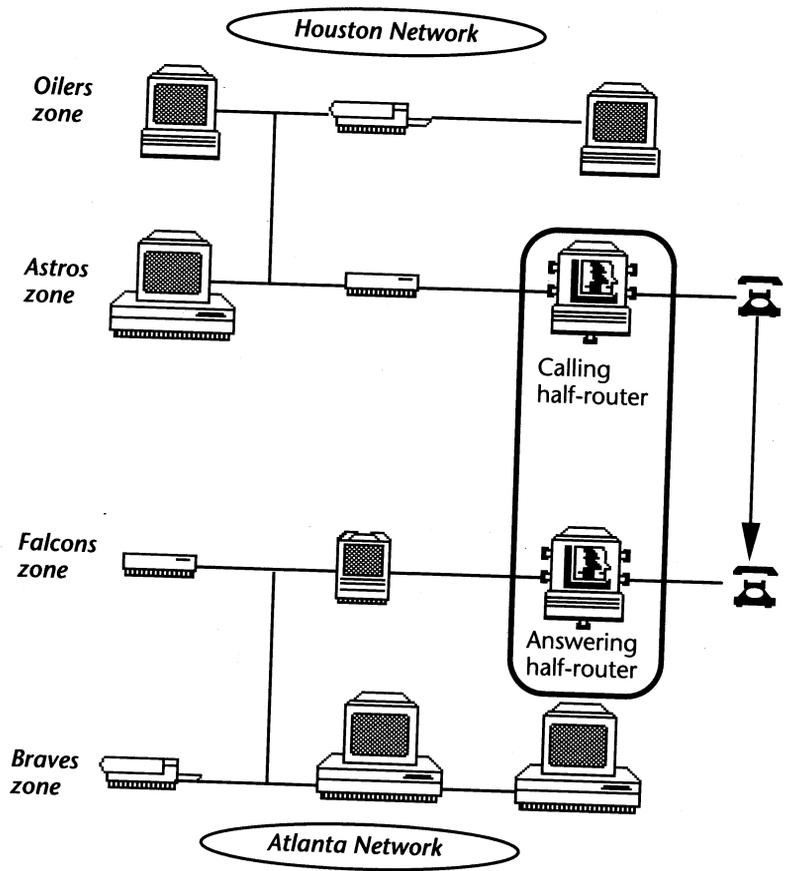
Atlanta Network

Houston calling Atlanta: Minimum scope connection

The calling half-router in the Houston network can see the answering half-router on the Atlanta network.

The answering half-router on the Atlanta network can see the calling half-router in the Houston network.

No other users in Houston can see users in Atlanta, and vice versa.

Private/Services in This Zone

Houston Network

Oilers zone

◉ Private   ○ Shared with group

Houston Address Book entry

Astros zone

Calling half-router

○ Only this node
◉ Services in this zone
○ This whole internet

Atlanta Authorized User entry

Falcons zone

Answering half-router

Braves zone
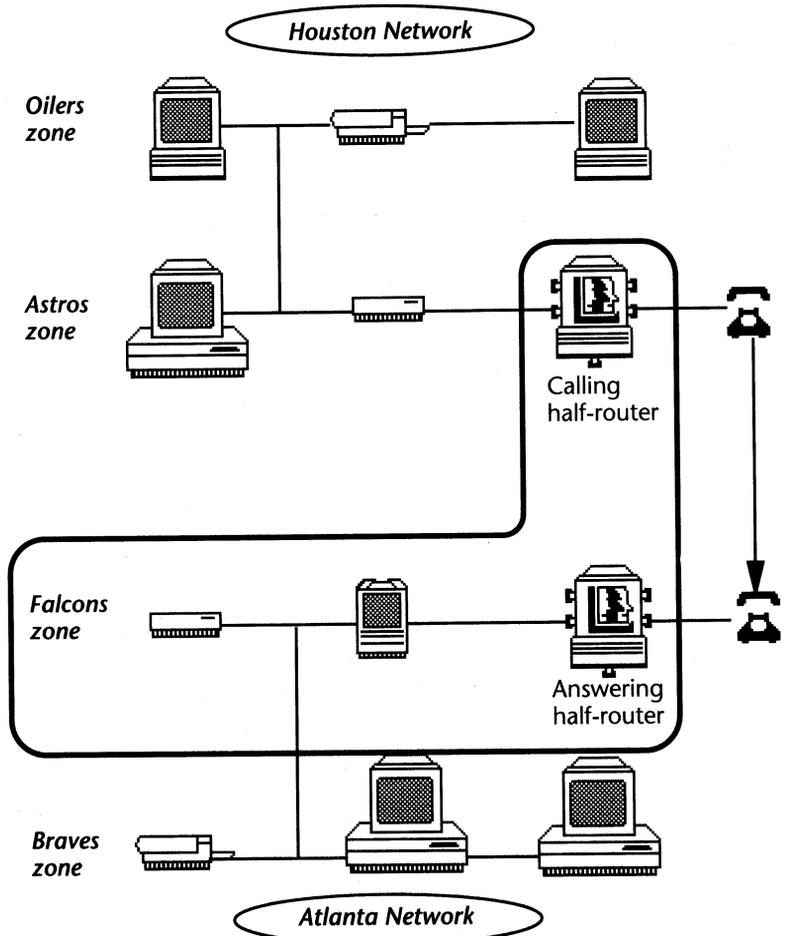
Atlanta Network

Houston calling Atlanta: Moderate scope connection 1

The calling half-router in the Houston network can see all devices in the Falcons zone (the zone of the answering half-router). No other users on the Houston network can see any services in Atlanta.

All users in the Falcons zone can see the calling half-router on the Houston network. No other users can see across the dial-up link.

Private/This Whole Internet

Houston Network

Oilers zone

Astros zone

⦿ Private   ◯ Shared with group

Houston Address Book entry

Calling half-router

◯ Only this node
◯ Services in this zone
⦿ This whole internet

Atlanta Authorized User entry

Falcons zone

Answering half-router

Braves zone
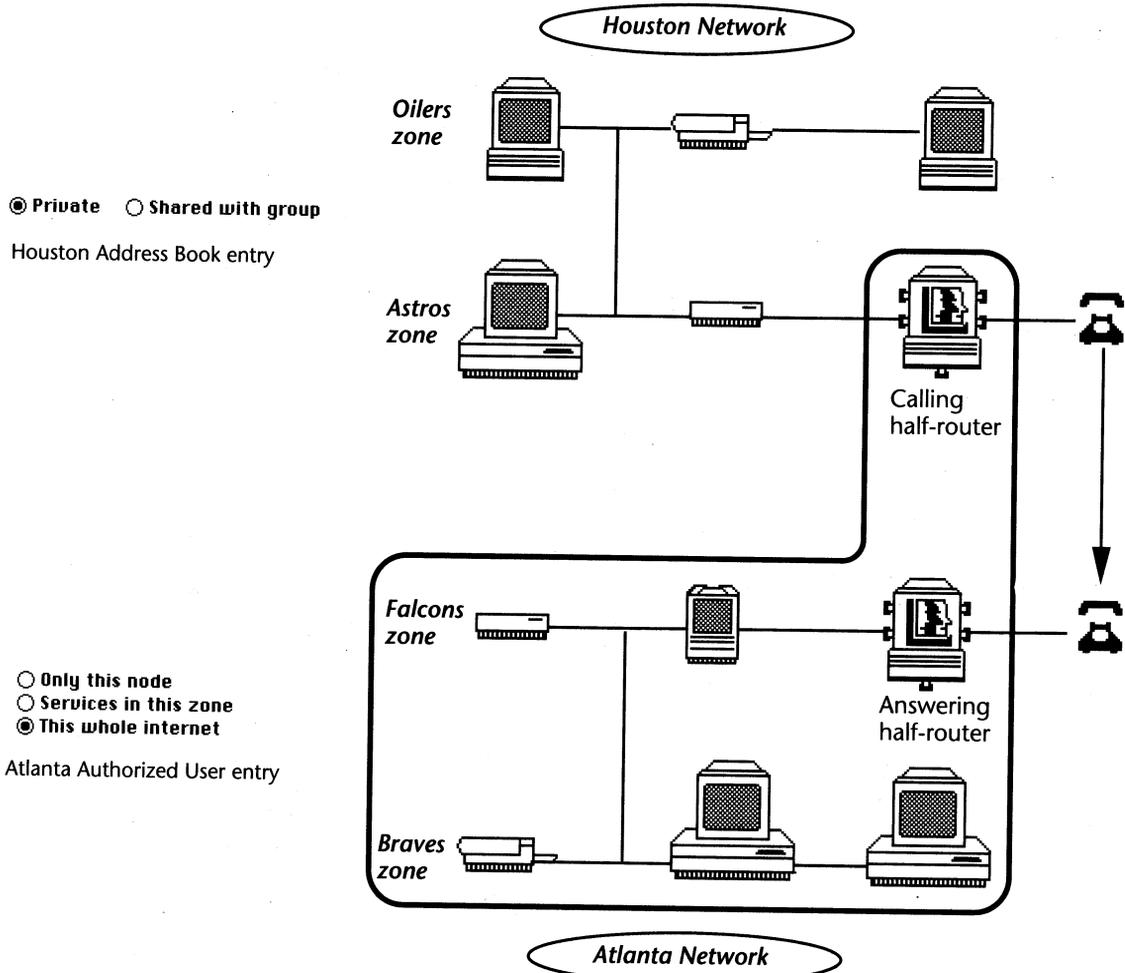
Atlanta Network

Houston calling Atlanta: Moderate scope connection 2

The calling half-router in the Houston network can see all devices in the Atlanta network. No other users on the Houston network can see any services in Atlanta.

All users in the Atlanta network can see the calling half-router on the Houston network.

Shared With Group/Only This Node

○ **Private**   ◉ **Shared with group**

Houston Address Book entry

◉ **Only this node**
○ **Services in this zone**
○ **This whole internet**

Atlanta Authorized User entry
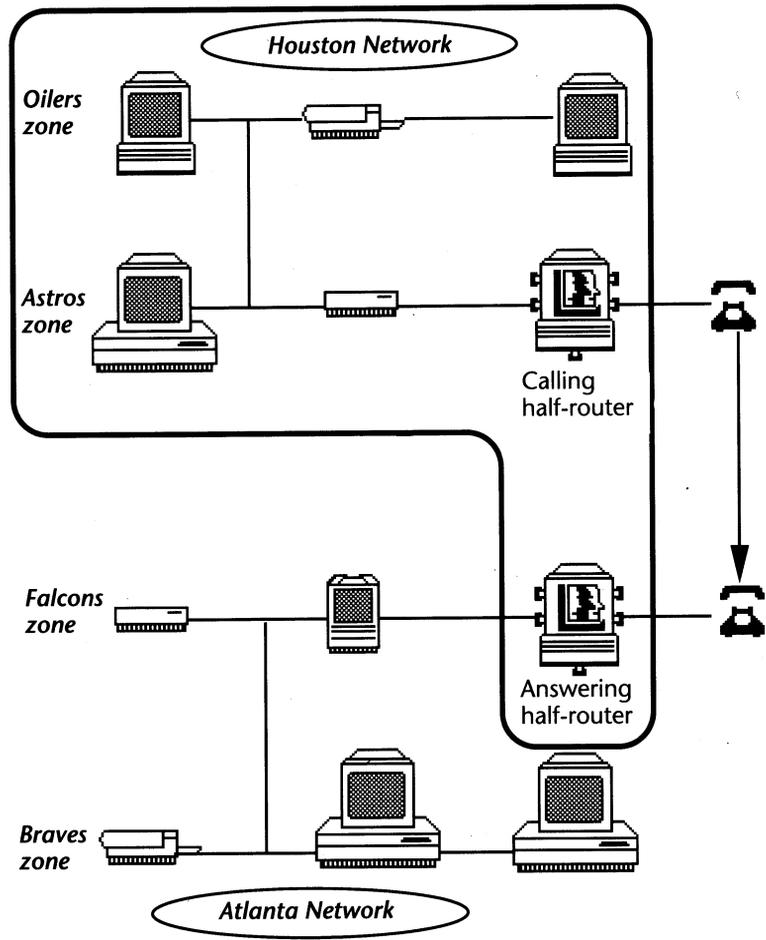
Houston calling Atlanta: Moderate scope connection 3

All users on the Houston network can see the answering half-router in the Atlanta network.

The answering half-router can see all devices on the Houston network. No other users on the Atlanta network can see devices in Houston.

Shared With Group/Services in This Zone

○ **Private**   ◉ **Shared with group**

Houston Address Book entry

○ **Only this node**
◉ **Services in this zone**
○ **This whole internet**

Atlanta Authorized User entry
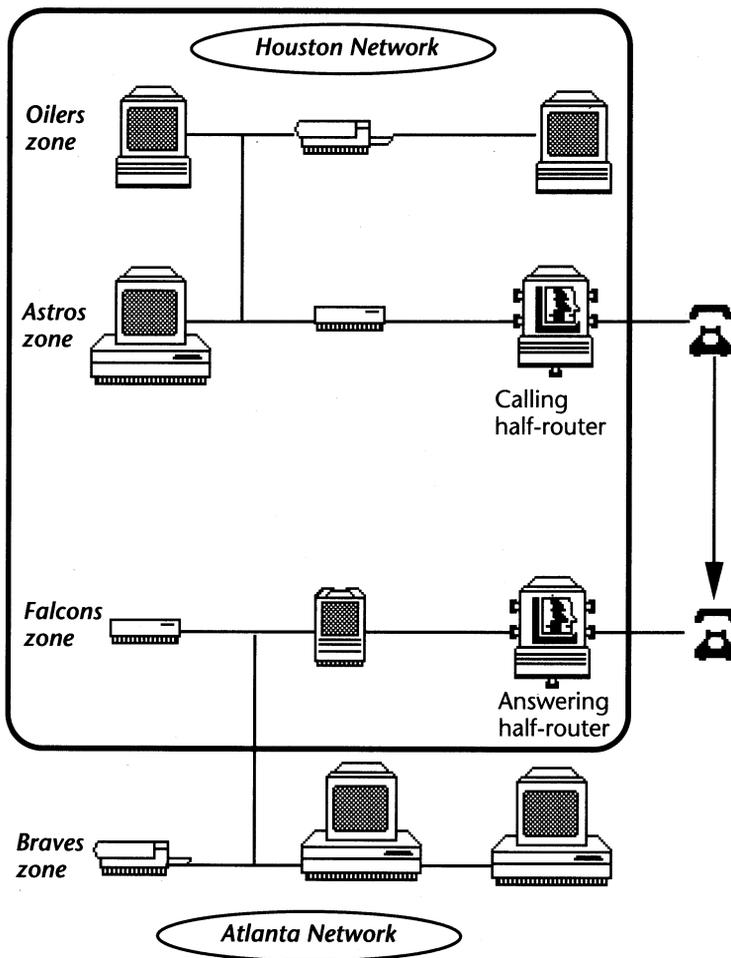
Houston calling Atlanta: Moderate scope connection 4

All users on the Houston network can see all devices in the Falcons zone.

All users in the Falcons zone can see all devices on the Houston network.

Shared With Group/This Whole Internet

○ Private   ◉ Shared with group

Houston Address Book entry

○ Only this node
○ Services in this zone
◉ This whole internet

Atlanta Authorized User entry
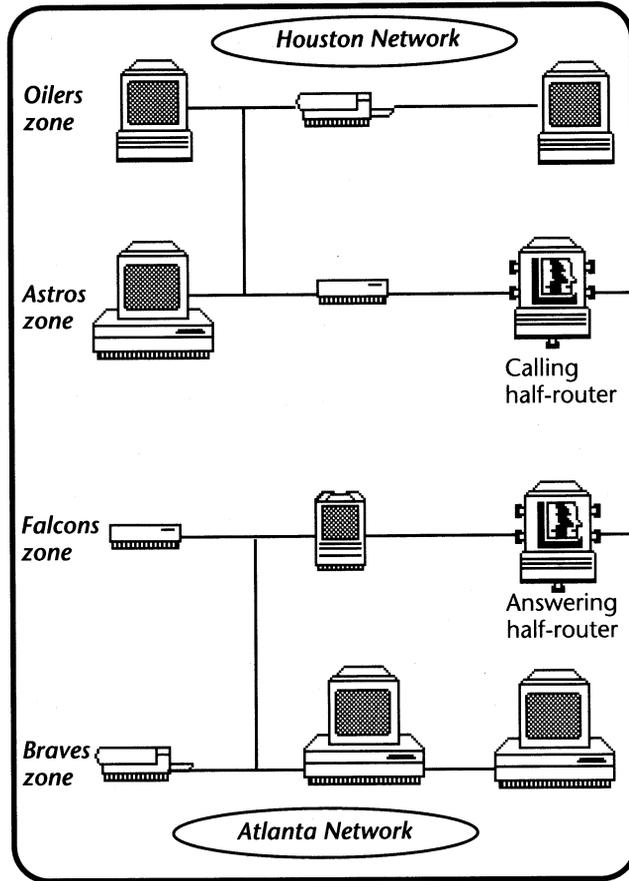
Houston calling Atlanta: Maximum scope connection

All users on the Houston network can see all devices on the Atlanta network.

All users on the Atlanta network can see all devices on the Houston network.

Seeing devices across a dial-up link

What does it mean to "see" the distant network that is connected to yours by Liaison half-routers? It means seeing the network services—printers, Timbuktu hosts, file servers—available on that network. The easiest example is printing a document on a distant LaserWriter.

LaserWriter example

Michella, in the Oilers zone of the Houston network, wants to print a sales forecast on the Marketing LaserWriter in the Braves zone of the Atlanta network. For her to select that printer, the dial-up link must be of maximum scope: Shared With Group/This Whole Internet, as shown in the final illustration of the previous section. This is because Michella's computer and the calling half-router are in different zones of the Houston network, and the Marketing LaserWriter and the answering half-router are in different zones of the Atlanta network.

Michella opens the Chooser and selects the LaserWriter icon:
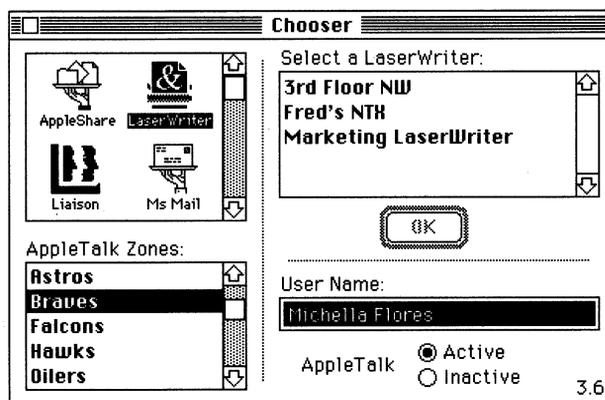
She then goes to the AppleTalk Zones list and selects the Braves zone. The Chooser displays the LaserWriters available in the Braves zone, and Michella chooses the Marketing LaserWriter to print her document.

Using other network services

Selecting an AppleShare or electronic mail server follows basically the same procedure as that described for selecting a LaserWriter. Some network services, such as Timbuktu, display zone lists in their own windows and do not require that you open the Chooser.

Chapter 11

Monitoring Liaison Activity

Liaison offers three ways of monitoring the activity of half-routers:

■ Report Remote Connection Changes, an option in the Preferences dialog box

■ Terminate Idle Calls, an option in the Preferences dialog box

■ Log Call Activity, an option in the Network Services dialog box.

In addition, Liaison can monitor the activity of full routers and half-routers with the Statistics window, a table of network statistics accessed by clicking the Statistics button in the Network Services dialog box.

Report Remote Connection Changes

Report Remote Connection Changes, in the lower panel of the
Preferences dialog box, pertains to all configurations of Liaison
involving dial-up links.

Report Remote
Connection Changes

```
┌─────────────────────────────────────────────────────┐
│  Network interfaces:        Modem setup:              │
│  ☐ LocalTalk           ⬆   ┌─────────────────────────┐│
│  ☐ LocalTalk (modem)       │  Farallon Remote U.32   ││
│  ☒ Modem, dial-up          │ ┌──────┐                ││
│  ☒ Null Network            │ │ 9600 │ Baud (max)     ││
│                            │ ☐ Auto-dial at startup  ││
│                        ⬇   │ ☒ Terminate idle calls  ││
│  ┌────────────────────────────────────────────────┐  │
│  │ ☒ Report remote connection changes.            │  │
│  │ ☐ Support an optional printer port serial printer.│
│  └────────────────────────────────────────────────┘  │
│        ┌──────────┐           ┌──────────┐            │
│        │   Save   │           │  Cancel  │            │
│        └──────────┘           └──────────┘            │
└─────────────────────────────────────────────────────┘
```
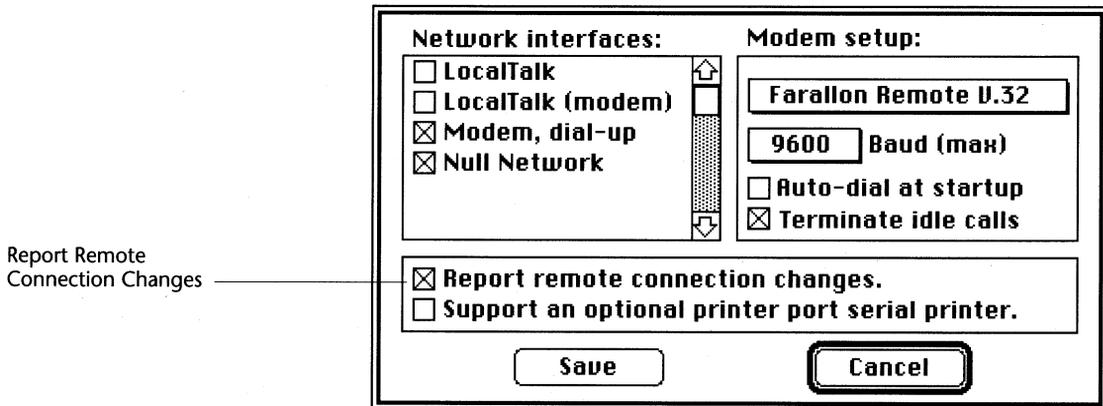
If the option is selected, Liaison displays a message, titled News
From Liaison, that tells you when:

■   Another computer is making a connection to yours.

■   Another computer is terminating a connection with yours.

■   Another computer is dialing a distant network using your
    computer as a relay router.

Terminate Idle Calls

Users of dial-up links may be concerned about the risk of running up a telephone bill by neglecting to terminate a Liaison or Liaisonet connection that is no longer being used.

Terminate
Idle Calls

```
┌─────────────────────────────────────────────────────────┐
│  Network interfaces:        Modem setup:                 │
│  ┌──────────────────────┐⬆  ┌──────────────────────────┐ │
│  │ ☐ LocalTalk          │   │ Farallon Remote U.32     │ │
│  │ ☐ LocalTalk (modem)  │   └──────────────────────────┘ │
│  │ ☒ Modem, dial-up     │   ┌──────┐                     │
│  │ ☒ Null Network       │   │ 9600 │ Baud (max)          │
│  │                      │   └──────┘                     │
│  │                      │   ☐ Auto-dial at startup       │
│  │                      │⬇  ☒ Terminate idle calls       │
│  └──────────────────────┘                                │
│  ┌─────────────────────────────────────────────────────┐│
│  │ ☒ Report remote connection changes.                 ││
│  │ ☐ Support an optional printer port serial printer.  ││
│  └─────────────────────────────────────────────────────┘│
│        ┌──────────┐              ┌──────────┐            │
│        │   Save   │              │  Cancel  │            │
│        └──────────┘              └──────────┘            │
└─────────────────────────────────────────────────────────┘
```
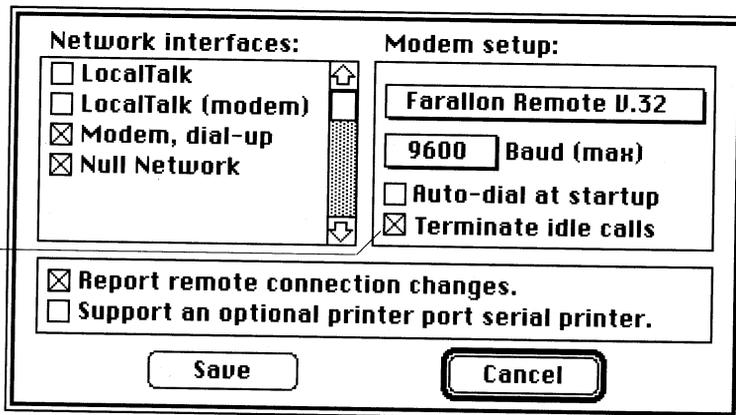
You can configure Liaison to automatically disconnect by choosing Preferences from the Configure menu and selecting Terminate Idle Calls.

When Terminate Idle Calls is selected, Liaison displays the following message after a dial-up connection has been inactive for 3 minutes:

```
┌─────────────────────────────────────────────────────────┐
│ ▤☐ ══════════ News from Liaison™ ══════════             │
├─────────────────────────────────────────────────────────┤
│  ┌───┐   Your connection has been idle for some time.   │
│  │ ▌▐│   I will hang-up if you don't respond.           │
│  └───┘                                                   │
│ ┌────────────────┐        ┌──────────────────┐          │
│ │ Disconnect Now │        │  Stay Connected  │          │
│ └────────────────┘        └──────────────────┘          │
└─────────────────────────────────────────────────────────┘
```
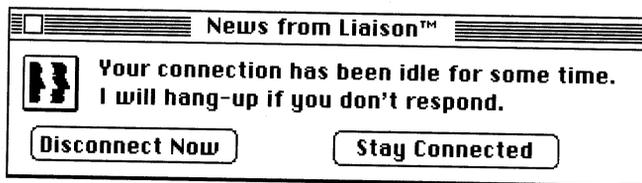
■   To remain connected, click the Stay Connected button. The message reappears after another 3 minutes of inactivity.

■   To terminate the connection, click the Disconnect Now button.

If you don't respond to the message within 30 seconds after it is displayed, Liaison hangs up automatically.

Exception: Liaison does not hang up if a remote AppleShare volume is mounted.

Log Call Activity

This option is displayed in the Network Services dialog box.

Port name	Hm	Net	-Range	Zone	Hide
LocalTalk	○	101		Marketing	☐
LocalTalk, (modem)	○	106		Publications	☐
EtherTalk 2.0	◉	230	250	Greener Pastures	☐
TokenTalk	○	45	45	Plasma Physics	☒

☐ Answer in-bound calls   ☐ Forward user calls
☒ Defer to foreground   ☒ Log call activity

[Statistics]   (Save)   (**Cancel**)

Log Call
Activity

Log Call Activity can be used to record all call activity to a text file named Liaison Log. This document is automatically created and stored in the System Folder of the answering half-router. You can use call logging for accounting purposes or detecting intruders.

The contents of the log define all calls placed, answered, refused, relayed, and terminated, along with the caller's User Name and the Account Name entered in the caller's Address Book entry for your Liaison site, as shown on the following page.

Caller's User or Owner Name	Liaison function	Remote guest's Account Name or Local Caller's Destination	Time	Date
Ronnie	Failed as	Guest User	9:01:24 PM	11/29/90
George W.	Relayed to	LA Office	9:02:05 PM	11/29/90
George W.	Disconnected	LA Office	9:05:02 PM	11/29/90
Steve B.	Called to	NY Office	9:06:04 PM	11/29/90
Steve B.	Disconnected	NY Office	9:09:48 PM	11/29/90
Sue Z.	Dialed back as	Field Sales	9:15:14 PM	11/29/90
Sue Z.	Disconnected	Field Sales	5:57:26 PM	12/2/90
George W.	Relayed to	LA Office	6:04:23 PM	12/2/90
George W.	Disconnected	LA Office	6:05:00 PM	12/2/90
Steve B.	Called to	Denver R&D	6:16:57 PM	12/2/90
Steve B.	Disconnected	Denver R&D	6:26:28 PM	12/2/90
Mark S.	Called to	NY Office	6:34:40 PM	12/2/90
Mark S.	Disconnected	NY Office	9:38:07 PM	12/3/90
Lisa M.	Logged in as	Tokyo Mkt	1:45:59 PM	12/5/90
Lisa M.	Disconnected	Tokyo Mkt	1:53:12 PM	12/5/90
Steve B.	Called to	NY Office	9:37:16 AM	12/9/90
Steve B.	Disconnected	NY Office	12:25:48 PM	12/11/90

A Liaison log covering 12 days of activity

You can review a Liaison Log document at any time. To create a copy of the log at a specific time, drag the Liaison Log file out of your System Folder, and then use a word processor to open the file. Liaison automatically creates a new log in the System Folder when one is next needed.

Liaison log on an AppleShare server

If Liaison or Liaisonet is running on a Macintosh with an active AppleShare server, you should use the following procedure to read the log:

1. Leave the Liaison log file in the Server Folder.

2. Copy Foreground Edit to the Server Folder of the file server.

3. Open Foreground Edit from the File menu of the server.

▲ Do not use the Foreground Edit utility to examine files outside the Server Folder.

Statistics dialog box

The Liaison router offers a range of run-time statistics that help you to understand and troubleshoot a full router or internet problem. To display these statistics, choose Network Services from the Configure menu and click the Statistics button.

```
┌─────────────────────────────────────────────────────────────┐
│  Port name        Hm  Net  -Range  Zone           Hide       │
│                                                              │
│  EtherTalk 2.0    ◉  │230│ │250│  │Marketing      │ □        │
│  LocalTalk        ○  │101│         │Publications   │ □        │
│  LocalTalk, (modem)○ │106│         │Greener Pastures│ □       │
│  TokenTalk        ○  │45 │ │45 │  │Plasma Physics │ ☒        │
│                                                              │
│  ┌──────────────────────────────────────────────────────┐   │
│  □ Answer in-bound calls    □ Forward user calls            │
│  ☒ Defer to foreground      ☒ Log call activity            │
│  ┌────────────┐   ┌──────────┐      ┌──────────┐            │
│  │ Statistics │   │   Save   │      │  Cancel  │            │
│  └────────────┘   └──────────┘      └──────────┘            │
└─────────────────────────────────────────────────────────────┘
```

Statistics button ────────

Liaison displays the Statistics dialog box:

Net	-Range	Hop	Prt	St	Via	Pkts_Sent	Zone
2120		1	0	2	231	112	Astros
2201	2202	0	1	D	171	2880	...Rockets
2210		1	1	3	116	0	Rockets
2220		1	1	4	45	0	Rockets
3100		3	2	2	45	321	Braves
3110		4	2	4	45	6011	Braves
3120		-	2	0	45	0	Braves
3201	3202	3	2	3	45	453	...Falcons

```
┌──────────────────────────────────────────────┐  ┌────────┐
│ BrRqs In  = 179      LkUps Out = 371          │  │  Save  │
│ Rtmp/Zips = 8807     Pkts Frwd = 6586         │  └────────┘
│ Rx Errors = 5        Tx Errors = 0            │  ┌────────┐
│ No Buffer = 0        Inval Prt = 0            │  │ Reset  │
│ HopOvrFlo = 0        Inval Net = 94           │  └────────┘
│ Bad CkSum = 0        Filtered  = 35           │  ┌────────┐
└──────────────────────────────────────────────┘  │   OK   │
                                                   └────────┘
```

The dialog box is organized into upper and lower panels, the contents of which are described on the following pages. The upper panel is the routing table for this router. The Save, Reset, and OK buttons are described in the final section.

Upper panel

The upper panel of the Network Statistics window is a table of information pertaining to the internet as a whole:

Net	−Range	Hop	Prt	St	Via	Pkts_Sent	Zone
2120		1	0	2	231	112	Astros
2201	2202	0	1	D	171	2880	...Rockets
2210		1	1	3	116	0	Rockets
2220		1	1	4	45	U	Rockets
3100		6	2	2	45	321	Braves
3110		7	2	4	45	6011	Braves
3120		−	2	0	45	0	Braves
3201	3202	6	2	3	45	453	...Falcons

Following is a key to the abbreviations.

Net is the network number; if the net is an extended (Phase 2) cable, Net specifies the lower bound of the range.

−Range specifies the upper bound of extended (Phase 2) cable ranges.

Hop is the distance from this router to the network. Each intermediary local router increments Hop, normally by one. Liaison adds a larger factor, derived from the baud rate, when crossing a dial-up link:

Baud	Hops	Baud	Hops
1,200	12	9,600	6
2,400	10	19,200	5
4,800	8	38,400	4

Prt is the port through which the network is reached. The digit is the index in the Network Services port table, starting with 0, 1, 2, etc.

St is the status of the network entry; D for networks that are directly connected to the Liaison router. The status of others networks is reset to 4 each time the network is reaffirmed by its intermediary router and is then lowered by one every ten seconds. Networks that have decayed to a bad (zero) state linger in the display with a Hop count of "−" for 30 seconds while adjacent routers are notified.

Via is the node address of the router through which the network can be reached with the fewest hops. If the network is a single hop away, the Via field shows the node address of the connecting router.

Pkts_Sent is the number of total number of packets sent to the network by or through this router.

Zone is the name of the zone to which the network belongs. A leading ellipsis ("…") indicates the network has more than one zone.

Lower panel

The lower portion of the window displays information about the routing history from the time the router was started up or the statistics box was reset:

```
BrRqs In   = 179        LkUps Out = 371
Rtmp/Zips = 8807        Pkts Frwd = 6586
Rx Errors = 5           Tx Errors = 0
No Buffer = 0           Inval Prt = 0
HopOvrFlo = 0           Inval Net = 94
Bad CkSum = 0           Filtered  = 35
```

Following is a key to the abbreviations:

BrRqs In is the number of NBP Broadcast Requests the router has been asked to resolve.

Rtmp/Zips is the number of router maintenance (Rtmp, Zip, etc) packets received. It is incremented when another router sends an Rtmp or a workstation asks for a zone list.

Rx Errors is the number of packets that encountered an error while being received by the Liaison elements of the AppleTalk protocol stack. This statistic does not include packets aborted by higher level services.

No Buffer is the number of times the router could not accept a packet (usually for forwarding) because all its buffers were allocated.

HopOvrFlo is the number of packets whose hop counts, or distance factors, exceeded the maximum limit of 15, as defined by the AppleTalk protocols.

Bad CkSum is the number of packets containing invalid DdpLong checksums, caused by corruption while in transit through an intermediary router or due to an incorrect query response formulation.

LkUps Out is the number of NBP Lookups sent from the router, including the derivatives of BrRqsIn.

Pkts Frwd is the number of Packets Forwarded by the router from the source network to another network.

Tx Errors is the number of packets the router failed to transmit due to a transmission error.

Inval Prt is the number of packets destined for a disabled or otherwise Invalid Port.

Inval Net is the number of packets destined for an unknown network.

Filtered is either the number of packets that could not be forwarded because they were destined for a "hidden" network or the number of duplicated packets already queued for transmission.

Save, Reset, and OK buttons

- Clicking the Save button saves the information displayed in the Statistics dialog box as a text file called "Networks" in your System Folder. You can normally open this document with a word processor.

  However, if Liaison is installed on a Macintosh that is also running an AppleShare file server, you should use the Foreground Edit utility on your Liaison disk to read the Networks file. To do this, first copy Foreground Edit to the Server Folder of the file server.

  Important: Do not use the editor to examine files outside the Server Folder of an AppleShare server.

- Clicking the Reset button sets the counters to zero. The only other time that the counters are set to zero is when Liaison is loaded during startup of your computer.

- Clicking the OK button closes the dialog box without resetting the counters.

Chapter 12

Troubleshooting

The following problem descriptions, solutions, and compatibility notes were compiled during field tests of Liaison. If you are still unable to resolve a problem after consulting this section or if Liaison displays a message you do not understand, contact your dealer or Farallon Technical Support representative.

You may also wish to create the following Liaison (or Liaisonet) Address Book entry for testing purposes:

Site Name:	Farallon Network Testing
Account Name:	First Time User
Telephone:	1–510–596–9078
Password:	[no password needed]

By connecting directly to your router, our technical support representatives are often able to detect the cause of your difficulties.

General tips

If you experience problems using a Liaison router, try some of the following procedures to help isolate the source of the problem:

- Make sure your network cables and taps are securely connected. They can work loose when a network is reorganized to add a router. Farallon CheckNET and NetAtlas software is useful for isolating cabling problems.

- As a test, try starting up your computer from the Liaison distribution disk and running Liaison or Liaisonet from that disk. This eliminates the possibility of conflicts with third-party INITs. If it works, there is a problem in your Macintosh startup disk. If it fails, the problem lies elsewhere.

- Try moving the Liaison router to another Macintosh. Remember to disable any copies that are not in use.

- If you suspect that the problem lies with the modem, see if the modem works with another telecommunications application, or try using a different make of modem with Liaison.

- If you suspect that the problem lies with the cable, replace the cable and see if your problem persists.

- Remember that some network services may not be visible or even usable across cabling systems in a mixed AppleTalk Phase 1 and Phase 2 environment or if a network has been hidden by the router. See Chapter 10.

Problems and solutions

General malfunction

Sometimes your system's memory can become corrupted. If you suspect this is the case, try restarting. If that fails, one or more files may be corrupted. Try reinstalling Liaison.

The modem doesn't respond.

Make sure that your modem is attached to the modem port with a reliable cable and that the modem is turned on.

Create an Address Book entry with no phone number and place a call to it. Then click the Stop button. This will reset the modem.

A high-speed modem connects only at slower speeds.

There is no standardization of the protocols used by high-speed modems. Frequently, a modem of a specific make will only connect at high speed to another of the same make and model. However, most high-speed modems will connect to dissimilar types at 2400 baud.

High-speed modem connections fail intermittently.

You may be experiencing poor signal conditions. If the problem persists, lower the baud rate and try again.

The Chooser shows an erratic list of device names in remote zones.

Make sure that Network Tuner is installed on all computers not running Liaison or Liaisonet on your network and on the distant network.

The Chooser shows fewer remote zones or services than expected.

Check with the administrator of the answering half-router and make sure that your connection provides the desired scope of remote access. See Chapter 10.

The Chooser shows a duplicate list of device types after Liaison hangs up.

This is a known bug in some older versions of the Chooser. Close and reopen the Chooser to update the device list.

The modem doesn't answer any calls.

Make sure:

- Your modem is turned on before you start your Macintosh.

- You are using Liaison, not Liaisonet, and have at least one local network port selected in the Preferences dialog box. If there is no network connected to your Macintosh, select Null Network.

- You selected Answer In-Bound Calls in the Network Services dialog box on the answering half-router.

- Your caller is using the correct telephone number.

You can also reset your modem by creating an Address Book entry with no phone number and placing a call to it; then click the Stop button.

There is no relay router to place a call through.

Make sure you have selected the correct zone. The relay router requires an Authorized User entry for your Chooser User Name (System 6) or Owner Name (System 7), and Relay Outbound Calls must be selected. Forward User Calls must also be selected in the Network Services dialog box of the relay router.

The network seems slower since the router was added.

A router delays the packets it forwards to other networks. To minimize forwarding delays, try structuring your internet so that most of the traffic is contained within networks and does not have to be forwarded across routers.

Some screen savers may interfere with Liaison.

If the screen saver you are using seems to interfere with Liaison's background routing functions, see if the screen saver has an option that supports background processing. You should switch that option on. If the screen saver does not support background processing, you cannot use it while Liaison is running.

Liaison stops routing when the System clock is set back.

If you reset the System clock on a Macintosh running Liaison to an earlier time—typically for Daylight Savings Time in the fall—you will need to restart that computer before Liaison can continue its routing functions. Liaison should reappear quickly enough that no one will notice that the router was inactive.

Personal bridge users switching to a home LocalTalk network cannot regain access to LocalTalk even though they have removed Liaisonet from the Extensions folder.

Remove Liaisonet Prep from Extensions folder or use the Network Control Panel to reselect LocalTalk. Consider using the semi-router configuration of Liaisonet, which allows you to remain connected to your home network during a dial-up session. See Chapter 9.

Phase 2 devices do not appear in the Chooser.

Extended cable (Phase 2) devices that have not been assigned a network ID number adopt an arbitrary net address in the default startup range when started up in the absence of a router. When a router starts up on the network, the Phase 2 device must reestablish its AppleTalk connections using the network numbers the router is broadcasting. On a Macintosh, you can do this by opening the Network Control Panel and double-clicking the EtherTalk2 icon. Other Phase 2 devices, such as VAXes running AFP server software have to be restarted.

If you install any router, including Liaison full routers or half-routers, on an extended cable (EtherTalk 2.0 or TokenTalk) that does not have a router currently on it, the working AppleTalk addresses of all Phase 2 devices, including all Macintosh computers, on that network will need to be updated. To do this:

1.   Install and activate the router.

2.   Restart the Phase 2 devices on that network.

In addition to Macintosh computers, Phase 2 devices include:

- VAXes running LanWorks, AlisaShare, or PacerShare

- Novell servers running AFP services.

The calling Liaison or Liaisonet ceases to function after displaying the 'Connecting at...' message.

The problem may pertain to a recently edited Liaison Script. Choose Preferences from the Configure menu, select a script other than Liaison Script, e.g., Farallon Remote V.32, and click Save. Then go back to Preferences, select Liaison Script, and click Save again. The modified script is now compiled, and you should be able to connect.

Only one network port can be selected in the Preferences dialog.

You are using Liaisonet instead of Liaison. This may be because:

- You installed Liaisonet directly.

- You started to install Liaison but did not enter a serial number.

- You entered a serial number during installation but clicked the Personal button instead of the Network button.

Remove the Liaison Prep file from your System Folder and reinstall Liaison following the instructions in Chapter 3.

Liaison does not use the network number(s) and zone name(s) designated by the user.

Your router has one or more nonseed ports. For such ports Liaison adopts network numbers and zone names defined by seed ports on adjacent routers.

If you need to enter new network numbers and zone names:

1. Shut down all other routers, including router-like devices such as the Dayna EtherPrint and some versions of the Shiva NetModem.

2. Make sure the desired network numbers and zone names have been entered on your Liaison router.

3. Restart the Liaison router.

4. Restart the other routers. They will adopt the new values.

For more information see "Assigning Network Numbers and Zone Names" in Chapter 4.

A Liaison half-router causes some network software, including some versions of QuickMail, DataClub and FileMaker Pro, to perform unreliably or to be isolated from the network.

Some AppleTalk software is disrupted when it detects a network number without an accompanying zone name. An inactive Liaison half router broadcasts a network number continuously, but it broadcasts the zone name only when a dial-up connection has been established. This does not occur on a network that includes a full router because the full router broadcasts the zone name continuously.

You can work around this situation by causing Liaison to simulate a full router:

1. Select Liaison from the Chooser of the half-router Macintosh.

2. Choose Preferences from the Configure menu.

3. Under Network Interfaces, select Null Network. This creates a dummy network, causing Liaison to broadcast a zone name.

4. Click Save, then choose Network Services from the Configure menu.

5. In the Zone box for the null network, enter a zone name that is identical to the LocalTalk or EtherTalk zone name already defined. This prevents an extraneous zone name from appearing in everyone's Chooser.

Liaison is not communicating with its own modem.

■   Make sure the modem is functional. It should be able to make a call for a telecommunications application.

■   Make sure there is a reliable cable running from the modem port of the Macintosh to the modem.

■   Check for the presence of other startup documents (INITs) that seek to control the modem port. During startup Liaison takes control of the modem port to insure that it can communicate with it. If some application is launched that requests the modem port, Liaison will pass control to it and then regain control when the application is exited. A problem can occur when some other INIT software, including fax software and Shiva dial-up software, seeks to control the modem port.

AppleTalk services seem sluggish or intermittent over a dial-up link.

Remember that some sluggish response is to be expected over any slow link. However, if you are experiencing abnormally slow performance, make sure that Network Tuner is copied to the System Folder of every Macintosh (not already running Liaison or Liaisonet) that will be involved in the remote connection.

To take full advantage of Net Tuner on more powerful computers, install the latest version of AppleTalk, included in the Liaison package.

Starting up a Macintosh with Liaisonet interrupts access to the local network (typically a home network with a LaserWriter).

Choose Preferences from the Liaisonet Configure menu, select LocalTalk under Network Interfaces, and then click Save.

A relay-client Macintosh tries to dial out through its modem port instead of displaying the list of relay routers.

Choose Preferences from the Liaisonet Configure menu on the relay client, deselect Modem, Dial-Up under Network Interfaces, and then click Save. Only the LocalTalk or EtherTalk port should be selected.

Liaison fails to establish a connection with a remote site.

- If the cable does not support DTR, it is necessary to insure the script does not issue an &D2 (support DTR). Instead, the script should send &D0 (don't support DTR). Change it if necessary. For more information see Appendix C, "Liaison Scripting Guide."

- Some users attempt reset the modem by switching its power off and on. Unfortunately, this simply aggravates the problem. Liaison sends out its configuration strings at startup, or when a Liaison call has been terminated, or when a telecommunication application has been exited. If the modem is switched off, those configuration strings are lost.

  To cause Liaison to re-send the configuration strings, select any entry in your Address Book—even a dummy address with no phone number will do—click Dial, and then immediately click the Stop button.

Compatibility notes

This section contains suggestions for improving the performance of Liaison in combination with specific hardware and software products.

Apple Macintosh Portable

Liaisonet personal bridges are temporarily switched off on the portable if you:

■ Choose Sleep from the Special menu

■ Click the Sleep button in the Battery DA window

■ Switch off AppleTalk in the Chooser.

Personal Bridges will then remain dormant until you switch on AppleTalk again in the Chooser.

AppleTalk version 53 (or later)

Non-Liaison nodes using AppleTalk version 53 or later sometimes do not display recent zone list changes in the Chooser unless you install the Network Tuner on them. Please note that AppleTalk version 53 or later must be installed with the Installer application; it cannot be installed by dragging the icon to your System Folder.

Farallon Remote/V.32 modem

If you have a Farallon Remote/V.32 modem with firmware older than version 2.0.8, please contact contact your dealer or Farallon Technical Support representative to arrange for a firmware upgrade. Unless previously upgraded, this includes Remote/V.32 modems with serial numbers lower than 2030834.

FlashTalk

A Liaison router with FlashTalk on its printer port should be started before you start any FlashTalk workstations on the same network.

In addition, you will need to disable Liaison or Liaisonet to use TOPS FlashCheck because FlashCheck requires special features of the TOPS FlashTalk file.

AppleTalk Internet Router (AIR)

There are a number of problems associated with the AppleTalk Internet Router (AIR) when it is used in conjunction with Liaison half-routers (that is, when Liaison is used across a dial-up link):

- The AIR does not respond quickly to or propagate network additions or removals. This causes incorrect zone list information to appear temporarily in the Chooser windows of computers on the local network when remote users dial in.

- The Network Tuner does not activate on an AppleTalk Internet Router since the router's design does not lend itself to network tuning. This causes an AIR running AppleShare to be less reliable as a network server in a wide-area context.

Since Liaison is a full superset of the AppleTalk Internet Router feature set, we recommend replacing the AIR with a Liaison full router if you have half-routers installed on your network. In addition, AIR does not stop routing when it is shut down on a Macintosh Plus or Macintosh SE. This can lead to confusing network management problems.

InBox version 2

InBox version 2 must be manually tuned for dial-up applications; it does not benefit from Liaison's Network Tuner. In addition, it may not work correctly with hidden networks. For information about network hiding, see Chapter 10.

Kinetics/Excelan/Novell EtherPort

Kinetics/Excelan/Novell EtherPort network interfaces are sometimes problematic on Liaison routers, especially when a router shares a Macintosh with an AppleShare server. We recommend using only version 3.25 or later of Kinetics EtherTalk drivers.

Kinetics/Shiva FastPath

The Kinetics/Shiva FastPath, running as a router between Phase 1 and Phase 2 networks, will likely have problems upon detecting an extended network with more than one zone or network in its range on the internet. This situation is more likely to occur in a wide-area (dial-up) context. In addition, the FastPath does not report correct zone information in the Chooser immediately after a wide-area connection is terminated.

Accelerated Macintosh Plus computers

If you are setting up Liaison on an accelerated Macintosh Plus computer, you can connect only one LocalTalk cable, and it must be designated as the home port.

Macintosh IIfx computers

A Macintosh IIfx must be in Compatibility Mode to use Liaison dial-up services. Save the IIfx Serial Switch file (on the Liaison disk) in the System Folder. Choose the IIfx Serial Switch Control Panel to select Compatibility Mode.

h-three Systems MacRing TokenTalk

The h-three Systems MacRing TokenTalk products require at least 2MB of memory when used with Liaison. MacRing version 1.2 and its predecessors must be designated as the home port.

Network modems

Liaison and Liaisonet do not support dial-up connections through a network modem (e.g., Shiva NetModem). You can, however, use a network modem from a Liaison workstation, but not with Liaisonet. Y

MultiFinder

A 1MB Macintosh with several AppleTalk services may not have enough free memory to work correctly with MultiFinder.

Make sure you close the Chooser before restarting or shutting down. You will lose any pending changes to your Liaison or Liaisonet configuration if you restart or shut down under MultiFinder while the Liaison is selected in the Chooser.

AppleTalk changes

While Liaison is resident, it prevents changes to AppleTalk, including selecting alternate cabling systems in the Network control panel. However, if no dial-up session is active, you can use Network control panel 2.0 to select the home zone of an extended network while Liaison is active.

Shiva EtherGate routers

Shiva EtherGate routers should download firmware version 1.46 or later.

Suitcase II

Suitcase II sometimes prevents Liaison and Liaisonet from automatically updating the Chooser zone list. To update the zone list in this situation, open the Chooser and select Liaison or Liaisonet.

Sun Tops for the Sun 386

Sun Tops for the Sun 386 may require that you configure your EtherTalk network number to have the same values in both bytes of the 16-bit word. For example, you can use 257 ($0101), 514 ($0202), or 771 ($0303). (The binary representation of 257 is 0000 0001 0000 0001.)

NCSA Telnet application

We recommend the public-domain NCSA Telnet application revision 2.3 or later.

Remote network software from other vendors

To use other vendors' remote network software, restart your Macintosh with Liaison or Liaisonet disabled.

Miscellaneous

Use the Null Network selection to extend a half-router to a full router for installations that require that routers do not disappear from and reappear on the network. For example, some AppleTalk for IBM PC products are unable to function when a network number exists but no router can be located.

Appendix A

Networks and Network Planning

The first section of this appendix is an overview of the terms and concepts used throughout this manual to describe the services Liaison provides. The second section contains practical suggestions for organizations that are designing new internetworks or expanding existing ones.

Terminology

A **network** is a communication system that connects computers together to share information using **network services**, such as electronic mail, print spoolers, and file servers. Information is transferred over a cabling system using a common set of **protocols.** You can think of the cabling system as an organization of cities, streets, and buildings and the protocols as the method of sending letters or packages, as illustrated on the following pages. A **cable** is the physical medium (for example, twisted pair, coaxial, fiber optic) over which information travels from one device to another.

AppleTalk is a protocol set for local area networks developed by Apple Computer. While initially applied to the **LocalTalk** cabling system for connecting Macintosh computers and LaserWriters, it has been expanded to use other cabling systems, such as Ethernet and fiber optics, as well as the dial-up telephone network and packet switching systems. LocalTalk was originally known as the AppleTalk Personal Network system.

Each computer or peripheral device (printer, fax, file server) connected to a network is called a **node** and has a unique **node address,** which can be any number from 1 to 254. Whenever you open the Chooser or any application that communicates with other computers on your network, your application compiles a list of all node names and addresses. All you see are the names—for example, "Molly's SE," "GanjaWriter," or "4th Floor AppleShare"— but your application also knows the node addresses of all these devices.

When you send information, commands, or requests to a printer, server, or another workstation, your application formats the information into units known as **packets**. It then attaches the correct address to the packets and sends them to the AppleTalk software on your computer, which forwards the packets across the network. Packets also include a return address, so the receiver will know where to reply.

If the cabling of your network were a street system, then a node address would correspond to a building's street address. Sending information from a Macintosh at Node 50 to a printer at Node 116 would look like this:

Node 116
Printer

Node 48

Node 8

Node 39

Node 133
File Server

Node 50

Node 64
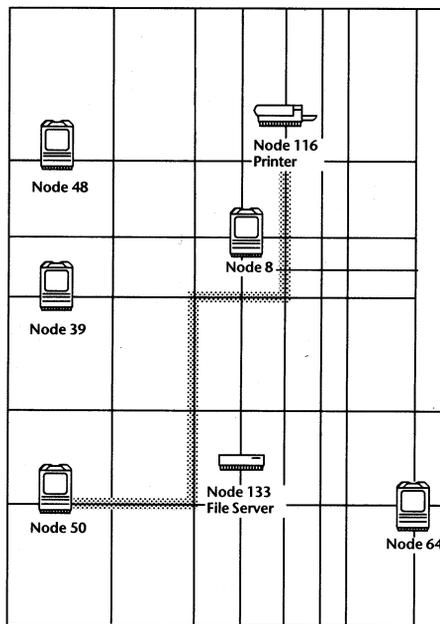
Network layout as a street map

Node addresses are not permanent. Each AppleTalk device determines its node address at startup. Although a Macintosh that is starting up will try to use its previous address, the address will often be different every time you restart. This **dynamic node addressing** scheme prevents conflicts when devices are moved between networks and simplifies the administrative tasks of a network. If you have only one network, the node address alone is all the information AppleTalk needs to send a packet from one computer to another.

However, networks can be connected together through **routers**, such as Liaison, into an **internetwork** (often shortened to **internet**). Because devices on different networks can have duplicate node numbers, AppleTalk tells them apart according to an additional part of their addresses: the **network number**.

The router assigns a unique network number to each member network. In terms of the city street metaphor, the network number is like the name of a city. Putting a network number together with a node number fully specifies the address of a node on an internet.

In the illustration below, the computer at Node 50 in Network 201 (represented here as 201/50) is obtaining a file from the AppleShare server at Node 71 in Network 301 (address 301/71):

Network 201   Network 301
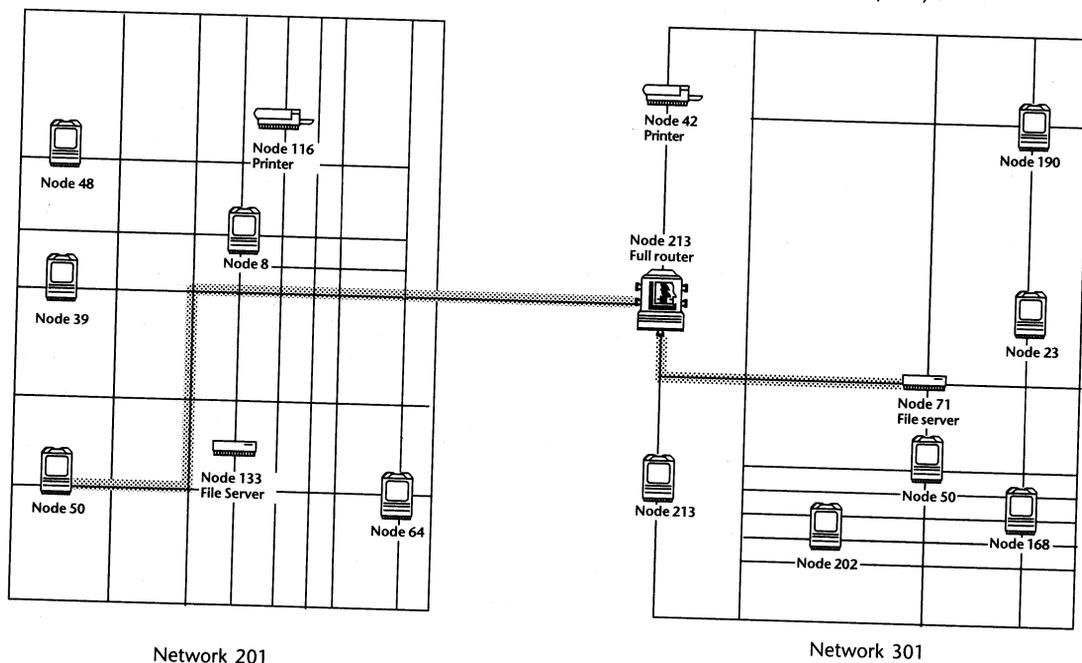
When the AppleShare software at 201/50 sends a data packet to that address, the AppleTalk software at that node determines that 301/71 is not on the immediate network (201) and, therefore, sends it to the full router at Node 213 on Network 301. In this simple internet there is only one router, so the decision is straightforward.

If Network 201 were connected to two more routers, the AppleTalk software at 201/50 would have to decide which router would forward the packets most efficiently to their destination. To learn more about how AppleTalk makes this decision, see the section "Comparing Phase 1 to Phase 2."

To make the services on an internet manageable, groups of devices on a network can be grouped into **zones**. When this is done, selecting a network service (printer, etc.) includes choosing a zone from which the service can be selected. Like network numbers, **zone names** are assigned by routers.

If you are using Phase 1 AppleTalk, each network can have only one zone, although you can give the same zone name to more than one network:
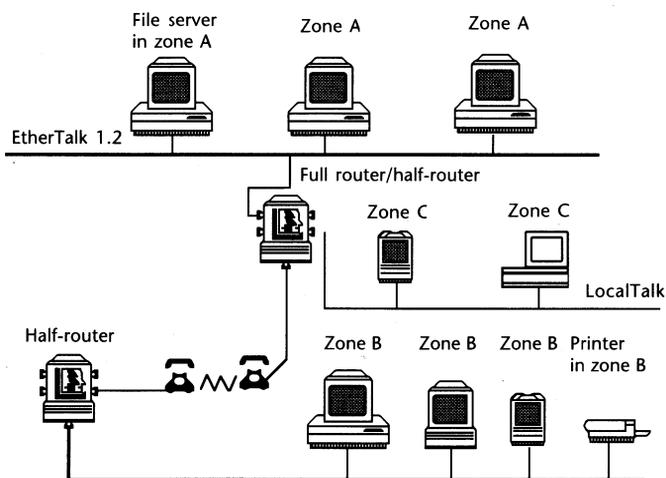
Zones on a nonextended (Phase 1) network

If you are using AppleTalk Phase 2, you can create many zones for one network, so that users can be grouped according to departments whether they are all on one network or spread out over many networks:

Zones on an extended (Phase 2) network

A **routing table** is maintained by each AppleTalk router. The table serves as a map of the internet, specifying the path and distance, in hops, between its router and other networks. The routing table is used to determine whether a router will forward a data packet and, if so, to which network. You can see the routing table for a Liaison router by displaying the Network Services dialog box and clicking the Statistics button, as explained in Chapter 11. The upper panel of the display contains the routing table:

Net	−Range	Hop	Prt	St	Via	Pkts_Sent	Zone
2120		0	0	D	231	112	Astros
2201	2203	0	1	D	171	2880	...Rockets
2210		1	1	3	116	0	Rockets
2220		1	1	4	45	0	Rockets
3100		6	2	2	45	321	Braves
3110		7	2	4	45	6011	Braves
3120		−	2	0	45	0	Braves
3201	3203	6	2	3	45	453	...Falcons

Routing table for router at Node 171 in the illustration below

All statistics in the routing table refer to this router.

Internetwork with 2 extended cables and 10 nonextended cables, including a dial-up link between the routers at nodes 171 and 45

The illustration assumes that the Liaison full router at Node 171 is installed on your Macintosh and that you are looking at its routing table (Network Statistics dialog box). Only 8 of the 12 networks can be seen in the display.

Network 2110 is one hop away, across the router at Node 202. It is indirectly connected to Port 0. (Liaison's five ports are numbered 0, 1, 2, 3, 4.)

Network numbers 2201–2203 are part of an extended (Phase 2) network. Because their cable is directly attached to your Macintosh, they are zero hops away. They are directly connected to Port 0.

Network 2210 is one hop away, across the router at Node 116. It is indirectly connected to Port 1.

Network 2220 is also one hop away, across the router at Node 45. It is indirectly connected to Port 1.

All the networks on the right side of the diagram are connected to your internet through a dial-up link. Dial-up links are also known as **slow links** because even the fastest modems are slow compared to network cable speeds. In this illustrative example Liaison adds six hops to indicate the extra delay introduced by a 9600-baud link. This insures that the router will not route traffic across the slow link simply because there are fewer routers in that direction.

Your network as a class discussion

Computers must take turns sending information across the network, much as students must hold up their hands and wait to be recognized in a classroom discussion. After a packet is transmitted, there is a small gap of inactivity on the network during which other computers have a chance to transmit their information. Whichever computer finds the network available first gets to go next.

Busy signals and collisions

Every time your computer attempts to send information across the network and finds it busy, it has to wait and try again. When two computers attempt to send information at the same time, the result is a **collision**, which means that both must try again. AppleTalk uses a special technique to prevent the computers from trying again at precisely the same time; otherwise there would be an endless series of collisions.

The more users who attempt to send mail or print documents at the same time, the longer they have to wait for the network to become available to them, just as students have to keep their hands up longer if more people are involved in the discussion. Even though network service requests are processed in thousandths of second, the cumulative effect of too many busy signals and collisions is a sluggish network.

What generates network traffic?

Anything you do that requires your computer to exchange information with other nodes on the network generates a certain amount of traffic. Following are some common examples:

- **The Chooser**. It may surprise you to learn that selecting a service in the Chooser can generate a wave of network traffic. At that time, your computer broadcasts a message to every other computer on the network, and some of those computers must then transmit a reply. For example, if 20 users select AppleShare in a network containing 50 computers with File Sharing switched on, 1000 messages are generated. While AppleShare remains selected, this interchange of information continues to flow although at a much lower volume.

■ **File servers.** All during the time you have an AppleShare volume mounted and whether or not you are accessing the volume, a small number of packets is being exchanged periodically between your computer and the file server so that each side can be alerted to a change on the other.

When you run an application from a file server, code segments are read in from the application file and executed on your computer. They may be swapped across the network several times, generating considerable traffic and slowing performance of the application as a result.

■ **Printing.** When you print a complex document, such as a desktop publishing file with linked graphics files, your computer is sending enormous numbers of packets to the printer. In addition, the printer periodically replies when its memory buffer is full or it is ready to receive more data.

The rapid-fire nature of printing activity narrows the gaps of network availability. During this time other computers have a far slimmer chance of using the network. Thus, printing across the network has the effect of the proverbial windbag, who talks and talks and talks. Everybody wishes the windbags could be put in a room to themselves.

That is just what a router can do for your beleaguered network. By dividing a large network into two or more smaller ones with routers between them, you can prevent the heavy traffic generated by the network-intensive users—the windbags—from jamming the network for the rest of your organization.
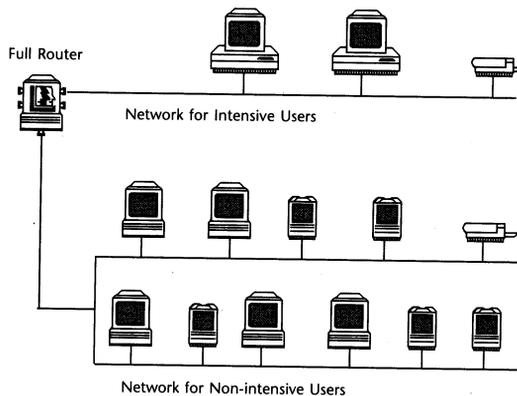
Dividing an overloaded network into heavy- and light-use networks

Comparing Phase 1 to Phase 2

AppleTalk protocols in use previous to 1989 are now referred to as **Phase 1**. Phase 1 LocalTalk networks, without routers, could contain up to 254 nodes, but in practice network performance often deteriorated with more than 15 nodes per cable. With EtherTalk 1.2 cards installed on each computer, a network could easily expand to 254 nodes without a router, but this was the "legal" limit because Phase 1 could not handle addressing for more than 254 nodes. In addition, it was not possible to assign more than one zone to a single cable.

In 1989 Apple Computing introduced a new protocol, AppleTalk **Phase 2**, which provides extensions that make possible significantly larger networks. Phase 2 makes possible an **extended network** interface, such as EtherTalk 2.0 and TokenTalk. The cable that carries an extended network is called an **extended cable**. Extended networks offer four prominent advantages over nonextended networks.

Thousands of nodes on a single network

The expanded addressing scheme of Phase 2 supports more nodes per network. You can assign a **range** of network numbers to an extended network. Each number within that range can be associated with up to 253 nodes. For example, a network having a range of 21–40 could contain up to 20 x 253 nodes, or 5060 nodes. (A router is required to define multiple network numbers even though it may only be serving a single cable.)

Smarter router selection

Phase 2 ensures more efficient direction of data packets on networks containing multiple routers. Under Phase 1, if your computer needed to send a packet to a computer on a different network, it would simply send the packet to the last router it heard from, which might be across a slow dial-up link! That router would then have to send the packet back in the other direction to the correct router, thus generating two wasted transmissions.

Under Phase 2 the AppleTalk software in your computer:

1.   Checks the network number of a packet.

2.   If the packet is not destined for the immediate network, AppleTalk determines whether packets have been received from the destination node.

3.   If the destination node has previously sent packets to your computer, AppleTalk remembers which adjacent router last forwarded packets from that node and sends the outgoing packets to that router.

Many zones per network

Phase 1 permitted only one zone per network, but Phase 2 permits up to 255 zone names per network. Both Phase 1 and Phase 2 allow you to assign a single zone name to multiple networks.

Reduced updating between routers

Routers communicate with computers and other devices on the network. They also communicate with each other to modify their routing tables automatically as the network is changed by adding or deleting paths, routers, and dial-up links.

Under Phase 1 protocols, a great deal of redundant information is exchanged in this way: essentially, Router A tells Router B much information that Router B already knows. This wasted exchange poses significant delays in internets connected by backbones and/or dial-up links.

Phase 2 protocols reduces the amount of traffic generated by routing table exchange to a fraction of the previous volume.

Routers, bridges, and gateways

A router has multiple communications ports and is capable of forwarding information to other routers and devices on the internet. The router performs packet forwarding, network and device address maintenance, and other administrative functions required by the AppleTalk protocols.   The distinction between routers and bridges is an important one:

■   A true bridge, like a router, is used to join two cable segments and filter traffic between them. The result is still one expanded network rather than an internet. Bridges do not assign network numbers or zone names, nor do they maintain network maps.

■   A router maintains the separate identities of the networks it connects; the result is an internet.

Although one configuration of Liaisonet is called a *personal bridge*, it is still technically a router (or half-router, to be precise).

By contrast, a **gateway** performs protocol translation when the connected networks use different protocols, such as AppleTalk and TCP/IP. Liaison does not provide gateway services. It does translate different "dialects" of AppleTalk, namely, LocalTalk, EtherTalk, and TokenTalk.

Network planning

The following principles will prove helpful to your planning, whether you are setting up a completely new network or expanding an existing one.

Maintain a long-term outlook

Whether planning a new network or modifying an exiting one, always take the long-term view. Assume more computers will be added. Do you have cabling in place for them? Does each floor have its own wiring closet? Will you need to add repeaters or hubs to strengthen the signal on long cables?

Avoid uncontrolled growth

Do not add new devices willy-nilly to your network. Consider how much additional traffic they will generate. If you have a new department, consider putting it on a separate network or at least in a separate zone.

Work towards a balanced network

Network services should be uniformly distributed. You should have a printer on every network whose computers generate printed materials on a regular basis. Place file servers in a central location—for example, directly connected to a backbone network—if they will be accessed from all nodes on the internet.

Avoid routing unnecessary traffic through secondary networks

If certain users routinely print to a certain printer, they should be on the same network as the printer. Printing across secondary networks not only slows printing but imposes unnecessary traffic on the secondary networks.

Keep the cabling simple

When you move to a different building, how easy will it be to reestablish the network relationships? If you are trying to solve a network problem, how easy is it to thread your way through a network map to isolate the source of the trouble?

Use consistent zone and device names

If you will be connecting to distant networks, are you likely to encounter duplicate zone names? These will not obstruct your connection, but they can lead to confusing AppleTalk zone lists.

Device names should convey the function of the service their devices provide. In the case of printers it is often helpful to include the model name so that users will be able to make any needed changes to the Page Setup dialog box.

Analyze user traffic needs

While there are no absolute cutoff levels for the number of nodes on a network, understanding how your network is used can help balance loads. It is good policy to underload networks in the initial internet design.

Consider more efficient topologies

In a backbone topology a central network connects outlying networks, reducing all routed message transmission to a maximum of two hops. Backbone networks also increase the independence of the outlying networks.

In a star topology, which is normally built in to the telephone wiring system of most office buildings, three or more branch cables are connected together at a central location. These can be connected as a *passive star*, with no signal boosting or reclocking, or as an *active star*, in which a hub such as a Farallon StarController, strengthens the signal and provides remote sophisticated troubleshooting capabilities to the network manager.

Add a higher speed cabling system

Installing Ethernet for your backbone network speeds cross-network traffic. You can provide high-speed service to your most active users with a hybrid LocalTalk/EtherTalk internet that is reliable, cost-effective, and easy to manage.

Appendix B

Modem Specifications

Modem scripts are small programs that tell Liaison how to communicate with specific modems. Certain standard scripts are built in to Liaison. When a new version of Liaison is shipped, additional scripts may be included in a Scripts folder. Unlike the standard modem scripts, these scripts do not automatically appear in the pop-up menu in the Liaison Preferences dialog box.

When you click the pop-up menu under Modem Setup in the Preferences dialog box, Liaison displays a list of standard modems:

Network interfaces:
- ☒ LocalTalk
- ☐ LocalTalk (modem)
- ☒ Modem, dial-up
- ☐ Null Network

Liaison Script
- Courier 2400e – HST
- Direct Connect
- Farallon Remote U.32
- ✓ Hayes Compatible
- Hayes 2400 – U9600
- Leased Line 2400+
- Microcom AX series
- Telebit TrailBlazer
- U.32 with MNP

Liaison Script

You can designate a custom script to use with your modem and install it in the Modem Setup pop-up menu as the top item, Liaison Script. Determine which script meets your needs and then use the following procedure to install the script in the pop-up menu.

To make a custom script accessible to Liaison:

1. Copy the custom script from the Liaison disk to your System Folder.

2. Rename the script file "Liaison Script."

3. Select Liaison in the Chooser.

4. Choose Preferences from the Configure menu.

5. Pull down the Modem Setup menu and choose Liaison Script.

6. Click Save.

Note: If you have just modified the current Liaison Script, you will need to select a different script, e.g., Farallon Remote V.32, in the Preferences dialog box, and click Save. Then go back to Preferences, select Liaison Script, and click Save again. The modified script is now compiled, and you should be able to connect.

Standard scripts

The following notes explain the options in the Modem Setup menu. To learn of additional options contact your dealer or Farallon Technical Support representative.

Note: Because Liaison directly controls the Macintosh serial ports, it is unable to utilize a modem that connects directly to an AppleTalk network, such as Shiva or Solana dial-up devices.

■ **Courier 2400 HST:** The U.S. Robotics 2400e and HST modems uses MNP error correction when available. Connection rates up to 19,200 bps are possible.

■ **Direct Connect:** Used for connections requiring only a serial cable or with modems where a carrier is manually established. The baud rate must be preset to be the same at both ends. Direct Connect is also used any time a "permanent virtual circuit" exists, such as over a T1 link or with some X.25 PADs.

- **Farallon Remote V.32:** Supports Class 5 MNP data compression and error correction.

- **Hayes compatible:** For modems that understand a minimal Hayes Smartmodem 1200 command set. Most modems can operate at this setting although they may not use all their capabilities. Included are:

  Apple Personal Modem
  Case Rixon Executive 212
  Concord 224/V.22bis
  Getronics GTM2
  Hayes Smartmodem 1200
  Paradyne FDX 2400 Plus
  U.S. Robotics Courier 2400

- **Hayes 2400 - V9600:** For higher performance modems that understand the Hayes Smartmodem 2400 command set extensions, specifically, commands that begin with an ampersand ("&"). Included are:

  Codex 2250/2260
  Getronics Personal Modem
  Hayes Smartmodem 2400
  Hayes Smartmodem 9600
  Hayes Ultra (assume DTR signaling)
  Microcom AX/9600 Plus
  Microcom AX/1200 and AX/2400
  Practical Peripherals PM2400SA
  Telebit T-1000

- **Leased Line 2400+:** For modems that understand the Smartmodem 2400 "&L" command on dedicated rather than dial-up lines. Either end can auto-answer. Use an Address Book entry with a blank phone number. Included are:

  Codex 2250/2260
  Hayes Smartmodem 2400
  Hayes Smartmodem 9600
  Microcom AX/1200 and AX/2400
  Microcom AX/9600 Plus
  Practical Peripherals PM2400SA

- **Microcom AX series:** Supports most modems manufactured by Microcom Corporation.

- **Telebit TrailBlazer:** May require initial configuration at 9600 baud.

- **V.32 Full Duplex MNP:** Supports many brands of 9600 and 19.2K full-duplex modems with MNP. If your modem does not respond correctly, contact your dealer or Farallon Technical Support representative.

Appendix C

Liaison Scripting Guide

This appendix explains how you can customize the way Liaison communicates with your modem or other dial-up service.

Overview

The Liaison dial-up logic can be viewed as three integrated managers that are responsible for establishing and maintaining AppleTalk connections between remote sites. These managers are used in different stages of a call and perform the following functions:

- The **Interface Manager** establishes and terminates a physical, point-to-point connection, such as a data link, between Liaison half-routers. It isolates the rest of Liaison from the specific characteristics of the data communications equipment (or "DCE," usually a modem) attached to an asynchronous serial interface (currently the Macintosh modem port).

- The **Dial-up Lap Manager** implements a reliable AppleTalk packet transport between Liaison half-routers. It manages the data link established by the Interface Manager.

- The **Remote Session Manager** implements the core of Liaison's dial-up security system. It uses the Dial-up Lap Manager to arbitrate call acceptance once a data link exists.

Pre-3.0 versions of Liaison contain a simple Interface Manager which supports data links using Hayes-compatible async modems or links established outside of Liaison that emulate a direct connect serial cable. Using ResEdit, a user can modify the Hayes commands issued by the Interface Manager to the modem. However, the list of events (or result codes) that the Interface Manager understands (and their effects) is fixed and buried in the Interface Manager code.

Liaison contains an enhanced Interface Manager which uses a custom programming language capable of supporting virtually any asynchronous DCE. The user creates **scripts** using this programming language that tailor the behavior of the Liaison Interface Manager for use with:

- All previously supported Hayes-style modems

- DCEs that do not conform to the pre-defined Hayes-style modem options

- Modem pools connected to PBX systems

- Access control systems requiring user interaction during call establishment.

A Liaison script contains **sequences** of instructions that define the protocol used to:

- Set (or reset) the DCE and async interface into an operational state

- Prepare the DCE and interface to answer calls (for half-routers and dial-back)

- Place a call to the user-designated site

- Determine that a data link has been established or broken.

Liaison contains a number of predefined scripts for commonly used (and previously supported) modems. You can also create a new script or revise an existing one with any text editor or word processor.

To create a new script or revise an existing one:

1. Use any of the scripts in the Script folder on the Liaison disk as a template.

2. Modify the script using a word processor.

3. Save your new script as a TEXT (ASCII) file.

4. Rename the script file "Liaison Script."

5. Save the script in your System Folder.

6. Select Liaison in the Chooser.

7. Choose Preferences from the Configure menu.

8. Pull down the pop-up menu under Modem Setup and choose Liaison Script.

9. Click Save.

Note: If you have just modified the current Liaison Script, you will need to select a different script (such as Farallon Remote V.32) in the Preferences dialog box, and click Save. Then go back to Preferences, select Liaison Script, and click Save again. The modified script is now compiled, and you should be able to connect.

Liaison will recognize and translate a new custom script into internal format at startup or whenever a custom script is selected in the Preferences dialog. The translated script is stored in the user's Liaison Prep file, allowing the script source file to be subsequently removed from the System folder.

▲   The script compiler does not offer any diagnostics or error messages about incorrect scripts.

To display a script from Liaison:

If you want to inspect the script that Liaison is using to call another half-router:

1. Select the desired entry in your Address book.

2. Hold down the Option key.

3. Click Dial. Liaison displays the CCL commands as they are executed:

```
  ┌──────────────────────────────────────────────┐
  │  ┃┃   Placing your call to:                   │
  │  ┃┃   Huntsville Research Lab      ( Stop )    │
  │  ──────────────────────────────────────────   │
  │          ┌──────────────────────┐             │
  │  Script  │ OK                   │  ( Break )   │
  │          │ AT $BA0 &BS1 #L1 $R1 │             │
  │          │ OK                   │  ( DTR )     │
  │          │ AT                   │             │
  │          └──────────────────────┘             │
  └──────────────────────────────────────────────┘
```

- To cancel dialing, click Stop.

- To issue a 1.3 millisecond break, click Break.

- To switch the DTR circuit off for 0.10 second, click DTR.

The Break and DTR commands free the modem from control of the script, which can useful if the wrong script was selected for a modem or if there is a problem with a custom script. You may need to experiment to determine whether to use the Break button, which works better with certain modems and cables, or the DTR button, which works better with others.

Script structure

A script is a text file that contains a series of commands, labels, and optional comments. The file is comprised of a series of lines, each ending in a carriage return. In turn, each line contains one or more symbols (commands, labels, and other command arguments), and is comprised of up to 127 characters total line length. Symbols are case insensitive (unless otherwise noted) and are separated by one or more space or tab characters. You may create or revise a script with any text editor (or word processor, saving in TEXT format).

▲ Out of range arguments cause the command to be ignored.

Script **commands**, defined below, are instructions to the Liaison Interface Manager; use no more than one command per line. Some commands take strings as arguments. A **string** is a case-sensitive sequence of characters that begins and ends with double quote (") characters. Everything between is considered part of the string. In addition, a string may contain numeric literals, typically representing non-printing characters. **Literals** are decimal numbers immediately preceded by a back-slash (\) character. (For example, "\13" is a string containing the ASCII carriage return character.)

Labels are place markers. Typically, they are arguments to script commands and indicate where to begin or resume script execution when some event occurs. A label is a unique number between 0 and 99. (Label "0" is reserved and implies the next command line.) A label may begin anywhere on a line prior to a command and may be declared prior to or after its reference.

▲   Liaison labels can also be declared in the form `-Label nn` for AppleLink script compatibility.

Comments guide the reader of a script in understanding the intent of the script. They begin with an exclamation mark (!). Liaison ignores the remainder of the source line when it encounters a comment delineator.

In summary, a script consists of a series of lines in the following format:

```
label    command    arguments    ! comment.
```

Script events

The lines of a script construct sequences of instructions. Each sequence executes in response to an **event** without interruption until it reaches an end point. These events originate both internally and externally.

A script's main entry point dispatches the four classes of internal events, defined below, and performs whichever of the following three actions are required:

■   An **Answer** sequence prepares the interface to answer calls. It is executed in preparation for a dial-back call or if a half-router is configured to auto-answer.

■   A **Dial** sequence initiates outbound calls.

■   A **Reset** sequence is used to configure the interface for Liaison use. It is executed at call termination or as a prelude to either of the above sequences.

The Interface Manager recognizes external events presented in the form of **response** strings and declared with the Match command. Declared events are significant and require some action by the script. Examples include Connect, No Answer, or No Carrier responses. Other responses are advisory only and may not even be declared—they require no additional action.

In `STR# -4073` the Liaison user interface predefines a number of external events and states that may be of interest to the user. A script includes instructions that map the responses received from the interface to messages the user sees in the Chooser call progress dialog. External events 1–12 correspond to the following, predefined call progress messages:

ID	Hayes result	Hops	User interface call progress message
1	No Carrier		Sorry, there was no response at:
2	Connect		Connected at selected speed to:
3	Connect 1200	12	Connected at 1200 baud to:
4	Connect 2400	10	Connected at 2400 baud to:
5	Connect 4800	8	Connected at 4800 baud to:
6	Connect 9600	6	Connected at 9600 baud to:
7	Connect 19200	5	Connected at 19,200 baud to:
8	Connect 38400	4	Connected at 38,400 baud to:
9	Ringing		The phone line is ringing at:
10	No Dial Tone		Sorry, there is no dial tone for:
11	Busy		Sorry, there is a busy signal at:
12	No Answer		Sorry, there was no answer at:

Events 13–15 may also be declared with the Match command for internal use by the script.

Script variables

The Liaison scripting system supports four **variables** (numeric quantities), identified as 0 to 3, to assist programming and maintain sequencer state information. Variable 0 is associated with external events, such as the incoming responses from the interface and the call progress messages the user sees when placing a call through the Chooser—its value is normally set with Match commands. Variable 1 indicates which internal event, defined below, initiated script execution. Variables 2 and 3 are available for unrestricted use by the script programmer and are not interpreted by the scripting system.

Script commands

The following commands and their arguments are used to define the script control sequences:

`AddVar     variable   value`

Adjusts the value of `variable` by adding value to it, where variable is in the range 1-3 and value is an unsigned, modulo 16-bit quantity (i.e. range 0-65535). Variable 0 cannot be adjusted through this command.

`Bell`

Signals the user by sounding the system beep or blinking the menu bar, as defined in the Control Panel.

`Carrier    rate`

Declares to Liaison that a data link has been established with the other end, that is, the interface is "off-hook" and must be subsequently reset. It also specifies the baud rate that will be used by the interface, where 0 means to use the value derived from the last response. (See Events, above, for a list of standard responses.) Rates 3–8 allow a specific carrier rate to be declared, with resulting hop count adjustment. A "Connected" message is subsequently displayed advising the baud rate.

▲   Typically, a `Match` declaration includes baud rate information and triggers a sequence that executes `Carrier`.

`ChrDelay   delay`

Defines the inter-character delay when sending strings to the interface. `Delay` is a number of clock ticks (60ths of a second), ranging from 0–60. A non-zero `delay` is used to slow down the transmission speed when the interface cannot interpret commands at the baud rate. Reset to a 1/60th second delay between characters when the main script entry point executes.

`Connect`

Declares to Liaison that a data link has been established and that user authentication should commence. Must be the last instruction of a sequence since it performs an implicit script `Exit`.

▲   Connection sequences that do not declare `Carrier` and `Connect` eventually abort.

`Dial`

Instructs Liaison to send the Phone Number string from the user's Address Book entry. Note that the string is not terminated with a carriage return—if needed by the interface, it must be appended using the Xmit command.

`DialChr    variable   index`

Sets the value of variable (range 1–3) to the `index`'th (ordinal) byte of the current Phone Number string. An `index` of zero returns the string length, while an `index` greater than the string length returns zero. The first DialChr can be extracted to detect a long distance prefix, etc.

`DtrOff`

Deasserts the DTR signal lead to the interface. Most modems (when programmed with "AT &D2" and connected via a cable that passes the DTR signal) disconnect and return to command mode upon a brief DTR deassertion.

▲   This command is incompatible with hardware flow control since hardware flow control cables redirect the DTR of the Macintosh signal to the DCE's RTS pin.

`DtrOn`

Asserts the DTR signal lead to the interface (asserted by default at the script entry point).

`Escape     char`

Instructs Liaison that char is interpreted by the interface and therefore must be "hidden" when contained in an AppleTalk data packet. (See the comments at the end of this document.)

▲   The effects of an Escape command are not undone until Liaison restarts.

`Exit`

Terminates a script sequence. The script will resume when a new event occurs.

`Flush`

Discards any accumulated input from the interface. An implicit `Flush` is performed by the `Pause` and `Xmit` commands, as well as any time a `Match` occurs.

`Hangup     event`

Instructs Liaison that the data link is terminated or could not be established. `Event` indicates which call progress message (range 0–12) should be displayed, where 0 means to use the value derived from the last successful `Match`. Liaison responds (if the interface is off-hook from initiating a call or a `Carrier` command, or if set to auto-answer and event is non-zero) by resetting the dial-up logic and re-executing the script. This command is equivalent to clicking the Chooser Hang-up button.

▲   Receipt of a No Carrier, Busy, or similar response normally triggers a sequence that issues Hangup. The `Match` definition of the response usually indicates why the link was terminated.

`Hops      value`

Instructs Liaison that the interface throughput should have the weighting factor defined by `value` (range 1–15). Liaison adjusts the hop count for all AppleTalk packets sent over the interface to "tune" AppleTalk requests so that applications do not prematurely time out a request. Used when the expected performance of the interface differs from that associated with its baud rate.

▲   The standard hop values for predefined carrier events are listed above and under `SetBaud`.

`IfVar      variable   value   label`

Redirects the script sequence to the commands that begin at `label` if the `variable` (range 0–3) matches `value` (a modulo 16-bit unsigned number, i.e. range 0–65535). As noted above, `label` may have a value of 0–99, and may not yet be declared. If the label is never declared, the `IfVar` will have no effect.

`IfnVar      variable   value   label`

Redirects the script sequence to the commands that begin at `label` if the `variable` (range 0–3) does not match `value` (a modulo 16–bit unsigned number, i.e. range 0–65535). As noted above, `label` may have a value of 0–99, and may not yet be declared. If never declared, the `IfnVar` will have no effect.

```
Jump        label
```

Redirects the script sequence to the commands that begin at `label`. As noted above, label may have a value of 0–99, and may not have been declared yet. If the label is never declared, the `Jump` will have no effect.

```
LBreak
```

Issues a long (3.5-second) break signal to the interface, typically to gain the interface's attention.

```
Match        event   label   string
```

Associates an external event with an incoming response `string` (case sensitive) from the interface. Detection of the string in the incoming interface data stream will begin script execution at `label` if no sequence is in progress. If a sequence is in progress, the event will be recognized at the next `Wait` command, with appropriate script redirection. `Label` 0 indicates that no script invocation or redirection should occur.

Strings are ordered 1–15, by `event`—other values are ignored. As a result, defining (or redefining) an event undefines all events with higher IDs. All events are undefined prior to executing the script entry point. Variable 0 stores the last detected `event`, and if within the range 1–12 the event is also presented to the Liaison user interface. `Events` 13 to 15 are reserved for special, internal script needs (such as the `Prompt` command).

The incoming interface data stream is continually scanned when an AppleTalk frame is not being received. Accumulated characters are sequentially matched against defined response strings in increasing event order—therefore, a given `string` need only be long enough to be unique and should not be a subset of a string with a higher ID. In addition, a string can `match` a subset of the accumulated characters.

If DCD carrier sensing is enabled (see `Options` below), DCD assertion executes the label defined with `Match 2 nn "xx"`; DCD deassertion executes the label of `Match 1 nn "xx"`.

▲   Detecting an event results in an implicit `Flush`—as a result, concatenated events can be lost. We recommend programming the interface to not issue insignificant messages.

`Name        string`

Defines the interface description presented to users in the Relay Select dialog. This command is mandatory and must precede all other commands in the script file.

`Options     value`

Defines special features of the interface. Calculate value by adding together the following predefined constants, as needed (multiple `Options` commands OR together their `values`):

128 Use bidirectional hardware flow control instead of software flow control. Note that this option requires appropriate cabling and DCE configuration.

64 Sense DCD transitions per Match "No Carrier" and "Connect" commands above. Note that DCD monitoring occurs on the Mac's GPi pin, which is not available on all Macs.

32 Do not send tickle packets or terminate a call if the line goes idle—for permanent, virtual circuits. With this option, idle detection causes a router table resynchronization.

16 Do not time out call placement (nominally 90 seconds)— requires manual quitting a Dial command. Used for debugging and when the script includes `Prompt` commands.

8 The interface is a direct connect and uses shorter arbitration timeouts.

4 Reserved

2 The interface experiences unusually slow line turnarounds— for AppleFax modems.

1 The interface runs at a fixed baud rate (i.e. does not change after a Carrier response).

`Pause       delay`

Instructs Liaison to temporarily suspend the script execution for the number of ticks specified by `delay` (range 0–255). Liaison ignores all incoming information from the interface while paused and performs an implicit `Flush` before resuming script execution. `Wait` is an active `Pause`.

```
Prompt      string
```

Instructs Liaison to solicit some intermediary input from the user via a modal dialog and send it to the interface. `String` is the prompt displayed to the user. If the user enters a null response the script terminates. Otherwise the sequence resumes at the instruction following the prompt after sending the user response (which does not end with a carriage return). Typically used when the connection path includes (modem pool) port selection or supplemental access control equipment.

```
SBreak
```

Issues a 250-millisecond break signal to the interface, typically to gain the interface's attention.

```
SerReset    baudRate
```

Sets the baud rate for communication with the interface and adjusts the hop count to match. `BaudRate` must be a value 0 or below, that is, the value in the Chooser Preferences.

Rate	Hop Count
1,200	12
2,400	10
4,800	8
9,600	6
19,200	5
38,400	4

```
SetVar      variable   value
```

Sets the specified variable (range 0–3) to the new `value` (range 0–65,535).

```
Wait        seconds
```

Instructs Liaison to actively pause the specified number of `seconds` looking for an external event defined by prior `Match` commands. Script execution resumes when either an event occurs or the wait times out. Unless otherwise defined with `Match`, event 15 is interpreted by `Wait` as a match-all string of <cr><lf> for generic ("OK" and "ERROR") responses with a NIL destination label.

```
Xmit        string
```

Instructs Liaison to send the string to the interface, using the inter-character delay specified by `ChrDelay`. An initial Pause of 1/10th second occurs before sending the string, with an implicit ending `Flush`.

Interface configuration

Interfaces present a wide range of configuration options. As a result, there are many levels of "Hayes compatibility" among modem vendors who claim to use the Hayes AT command set. The following list includes preferred interface options typically used with Liaison modem scripts (the command may vary—the effect is significant):

B0   Use CCITT carrier arbitration—needed for some V.32 modems.

E0   Don't echo commands.

F1   Operate in full duplex mode.

M0   Turn off speaker (for leased lines).

Q0   Return modem result codes.

V1   Return textual result codes (numeric results may not be the same between vendors).

Xn   Report all result codes that are meaningful to the Liaison user interface.

&C1   DCD tracks data carrier from remote modem.

&D2   Use DTR signalling (faster than guard band "attention" signalling). If the hardware flow control Option is selected, &D0 should be used to ignore DTR signalling.

&M0   Operate in asynchronous data mode.

&N0   Allow interface to synchronize with user-defined baud rate.

&R1   Ignore RTS, which is normally not available from a Macintosh.

When used with PAD (packet assembly/disassembly) equipment, packets should be forwarded when one of the following conditions occurs:

■   A carriage return (hex 0D) is encountered, denoting end-of-frame.

■   Characters have accumulated for one tenth of a second.

By implication, the PAD should be able to accumulate as many characters as can accumulate in one tenth of a second (100 characters at 9,600 baud).

For interfaces that do not generate textual messages, but instead generate DCD transition events, the Options 64 command will detect carrier assertion and loss on the GPi pin.

▲   Not supported on the Macintosh Plus, Classic, or LC.

Recommended modem cable
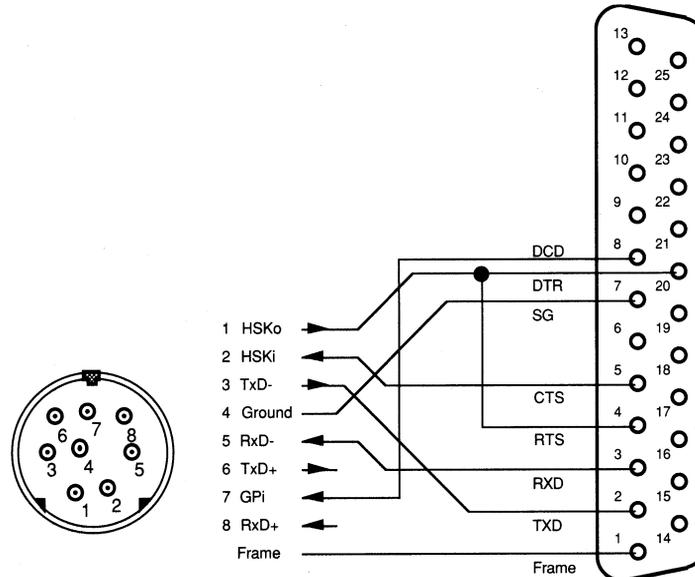
Preferred Macintosh modem cable. It supports DTR signaling or hardware flow control DCD sensing.

Suggested script flow

A script normally includes sequences to handle the four classes of internal events. Additional sequences are usually required to deal with asynchronous responses, such as Connect, No Answer, or No Carrier (or their equivalents). We recommend structuring a script as show in the outline below:

Header	Name, entry point declarations, options
Attention sequence or Liaison	For disconnects/resets initiated by user
Reset sequence	General interface configuration
Answer sequence	Prepares interface to answer calls
Call placement	Initiates user calls
Connect handler	Finishes connection establishment
Disconnect handler	For disconnects initiated by the interface

The diagram on the following page illustrates the structure and flow of a typical script. The numbers match the labels in the example script that follows.

```
         10        ┌─────────────────┐
┌──────────────┐   │ DCE "off hook" ?│
│ Internal Event│──▶│                 │
└──────────────┘   └─────────────────┘
                    no │        │ yes
                       │        ▼
         20            │    ┌──────────────────┐
                       │    │ Get DCE attention.│
                       │    │ Hang up DCE.      │
                       │    └──────────────────┘
                       │        │
         30            ▼        ▼
                   ┌──────────────────────┐
                   │ Restore default baud  │
                   │ rate. Turn off        │
                   │ auto-answer.          │
                   └──────────────────────┘
                            │
         32                 ▼
                   ┌─────────────┐    yes
                   │ Simple reset?│─────────────────────────┐
                   └─────────────┘                          │
                        no │                                │
         34                ▼                                │
                   ┌──────────────────────┐                 │
                   │ Configure basic DCE   │                 │
                   │ options. Define basic,│                 │
                   │ external events.      │                 │
                   └──────────────────────┘                 │
                            │                                │
         36                 ▼                                │
                   ┌─────────────┐                           │
                   │ Initiate call?│                         │
                   └─────────────┘                           │
                  yes │        │ no                          │
                      │        ▼                             │
         40           │    ┌──────────────┐                  │
                      │    │ Configure for │                  │
                      │    │ auto-answer.  │                  │
                      │    └──────────────┘                  │
                      │        │                             │
         60           ▼        │                             ▼
              ┌──────────────────────┐   ┌───────────────────────┐
              │ Define call abort     │──▶│ Exit & wait for event │
              │ events. Issue dialing │   └───────────────────────┘
              │ commands.             │
              └──────────────────────┘

         70
┌──────────────────┐   ┌──────────────────┐   ┌───────────────────┐
│ Termination Event │──▶│ Report event nature.│─▶│ Initiate DCE reset│
└──────────────────┘   └──────────────────┘   └───────────────────┘

         80
┌──────────────────┐   ┌──────────────────────┐   ┌───────────────────┐
│ Carrier Event     │──▶│ Adjust connection     │──▶│ Declare connection│
└──────────────────┘   │ options.              │   └───────────────────┘
                       └──────────────────────┘
```

A modem script example

The following annotated script illustrates how the features of the Liaison scripting system are combined. The script begins by defining the user-visible interface descriptor (Name).

```
!
! Liaison script for Hayes 2400, V-series, and Ultra
modems.
!
    Name      "Hayes 2400+ DTR"       ! what the user sees
```

Following the header is the internal event entry point, which may have an optional label. Variable 1 defines the internal event as a combination of the current and desired future states. The script dispatches to one of three locations on the basis of the event. On entry, all external events are undefined, variables 0, 2 and 3 are zero, and `ChrDelay` has the default value of 1.

```
!
! Entry point - dispatch on the current and future
state.
! Cases are:
!
!   1) Off-hook, ending a connection and releasing the
modem
!   2) On-hook,  preparing to answer (i.e. awaiting a
call)
!   3) Off-Hook, ending a connection and resuming answer
wait
!   4) On-hook,  initiating a call
!
10 SetVar  3    0         ! not always reset on Hangup
   IfVar   1    1    20   ! if off-hook, signal modem
   IfnVar  1    3    25   ! otherwise, skip around
```

When the modem is off-hook and possibly in a data transmission state, the script proceeds to regain the modem's attention and cause it to disconnect from the line. Since the modem responds to DTR signalling (enabled with the `&D2` configuration string, below), the script blips DTR and waits for a response. If the modem issues any

```
!
! We're off-hook, so try to hang up the modem by dropping
! DTR momentarily.
! (This will work if the modem remembers its &D2 setting)
!
20  DtrOff                       ! drop DTR to hang up
    Wait      2                  ! wait up to 2 sec for response
    DtrOn                        ! restore DTR
    IfVar     0     15    30     ! branch if modem responded
                                 !
! If the modem did not respond to DTR, use the dumb
! attention sequence.
!
21  Pause     90                 ! quiet for 1.5 sec
    Xmit      "+++"              ! send the attention command
    Wait      2                  ! wait up to 2 sec for response
    IfnVar    0     0     30     ! branch if modem responded
25  Xmit      "AT\13"            ! make sure the modem is there
    Wait      1                  ! wait for a response
                                 !
! If the modem is not responding, try again to signal it.
!
    IfnVar    0     0     30     ! BR if we got anything
    AddVar    3     1            ! else bump the count
    IfnVar    3     2     21     ! maybe try again
    Hangup    1                  ! else abort with "No Response"
```

At label `30`, the script merges for all four states and has the modem's attention. Since the modem may have changed its baud rate once it connected, the script restores the baud rate to that specified in the user's Preferences. It then issues its initial AT command at the new baud rate, synchronizing the modem. The command includes an "H" to hang-up, in case DTR signalling failed. The script waits in between commands to allow the modem to process the commands—a match-all `<cr><lf>` response terminates the waits early.

Note that the script then issues a command string specific to Hayes V-series commands. Other modems report an error, which still satisfies the final `Wait` with no ill effect.

```
!
! Configure the generic Hayes 2400 modem options, including
! DTR control.
!
30  SerReset  0                                  ! restore user-
                                                 ! defined speed
      Xmit        "AT E0 Q0 S0=0 V1 X4 H\13"     ! generic modem
                                                 ! setup and hang-up
      Wait        3                              ! wait for the
                                                 ! response
      Xmit        "AT &D2 &L0 &M0 &R1\13"        ! DTR Dial-up Async
                                                 ! noRTS
      Wait        2                              ! wait for the
                                                 ! response
                                                 !
! Lastly, configure the Hayes V-series modem features and
! modem responses.

      Xmit        "AT N1 W0 &K4 &Q5\13"          !
                                                 ! anySpeed noProgr
                                                 ! XON
                                                 ! ErrorCtl
      Wait        2                              ! wait for the
                                                 ! response
```

The modem is now configured for Liaison's preferred options. For a simple reset, no further action is needed (the script branches to label 50). Otherwise, the script continues to define each of the responses that indicate a significant external event has occured. Note that only a portion of the high speed Connect messages is needed—enough to uniquely identify them. Also, the catch-all Connect response is defined to include the ending carriage return— that way it will not override the high speed Connects (which have higher event codes).

```
!
! If not just hanging up, define the responses we'll accept.
!
32  IfVar  1  1    50              ! if we're just hanging up
                                   !
34  Match  1  90   "NO CARR"       ! redefine termination event
    Match  2  80   "CONNECT\13"    ! define activation events
    Match  3  80   "T 12"          ! "CONNECT 1200"
    Match  4  80   "T 24"          ! "CONNECT 2400"
    Match  5  80   "T 48"          ! "CONNECT 4800"
    Match  6  80   "T 96"          ! "CONNECT 9600"
    Match  7  80   "T 19"          ! "CONNECT 19.2"
    Match  8  80   "T 38"          ! "CONNECT 38.4"
```

Normally, the modem is not configured to answer calls unless a call-back is in progress (state 3) or a half-router has auto-answer enabled (state 2). The next sequence, executed for those cases, instructs the modem to answer calls on the first ring (the value could be set for a higher ring count). The script Exits at label 50 for all cases except case 4, call initiation.

```
!
! To allow Answering, let the modem go off-hook on the 1st
! ring.
!
36  IfVar  1  4    60              ! if we're initiating a call
                                   !
40  Xmit   "AT S0=1\13"            ! go off-hook on 1st ring
    Wait   1                       ! and wait for the response
50  Exit                          ! then wait for an event
```

When Liaison initiates a call, the script skips the auto-answer configuration, and instead executes the instructions at label 60. This defines the call failure responses (any of which aborts the call). Then the modem is instructed to dial the user's phone number. Note that a trailing carriage return (the Hayes command terminator) is appended to actually begin the dialing. The script terminates and waits for the modem to report call progress.

```
!
! To place a call, issue the phone number and wait for a
! response.
!
60  Match     10    70    "NO DIAL"   ! define modem abort
                                      ! events
    Match     11    70    "BUSY"      !
    Match     12    70    "NO AN"     ! "NO ANSWER"
    Xmit                  "AT DT "    ! touch-tone dial
    Dial                              ! the user phone number
    Xmit                  "\13"       ! with a terminating EOL
    Exit                              ! then wait for a response
!
! On receipt of a dialing abort message, begin a teardown.
!
70  Hangup    0                       ! result is message value
```

If the call fails, the script resumes at label 70 (above) and begins an interface reset via the Hangup command. If, however, the call completes (or the phone is answered in response to a ring signal), the sequence resumes at label 80 (below). With carrier established, the only external event that is meaningful is No Carrier, so the script redefines all the other external events. The script then Pauses a brief period for any additional modem responses to clear. Lastly, it declares that a connection exists, which terminates the script and returns control to Liaison, at which point AppleTalk address arbitration and user authentication proceed. If the session cannot be established, Liaison re-executes the script from the beginning.

Label 80 is executed on auto-answer as well as dial completion. As noted above, variable 1 can differentiate which event actually occured (2 or 3 implies answer, 4 implies dial).

```
!
! On receipt of "Connect", begin arbitration.
!
80  Match     1     90    "NO CARR"   ! drop all the other
                                      ! strings
    Pause     6                       ! let the line settle down
    Carrier   0                       ! we have carrier per msg
    Connect                           ! result is "Connected at
                                      ! xxxx"
```

This script previously declared that a "No Carrier" modem response is a significant external event and indicated that the Hangup command at label 90 should be executed when this response is detected (outside of a script sequence). Liaison responds to the Hangup command by re-executing the script, if necessary, from the beginning.

```
!
! On receipt of "No Carrier", begin a teardown, with auto-
! answer disabled.
!
90  Xmit            "AT S0=0\13" ! turn off auto-answer for now
    Hangup    1                  ! result is "No response"
!   Exit                         ! Hangup does this implicitly
!
!   SCRIPT END
!
```

A sample prompt sequence

The following sequence fragment illustrates a possible use of the prompt command to respond to an intermediary access control system. The fragment assumes a script similar to the Hayes model described above. Note that if the response is always a fixed argument, no user interaction would be needed and a simple Xmit command could be used.

This system allows a single script to handle destinations that use a specific access control system as well as destinations that rely solely upon Liaison's security system.

Note that this script extension performs two additional functions. First, it looks for a prompt from an intermediary access control system *if initiating* a call (which would be incompatible with Liaison's dial-back service). Second, if it finds the access system, once past it, it sends a CONNECT message to the answering Liaison host (since it would not have seen the original modem messages which were intercepted by the access system).

The script might also utilize DCD sensing (`Option 64`) if the access
system does not pass `No Carrier` messages on to the host. DCD
sensing would allow the host to detect disconnects by the caller—
without it, the host would not be available for 2.5 minutes after
disconnect.

```
!
! On receipt of "Connect", synchronize baud rates and, if
! placing a call, look for and respond to a possible
! intermediary security system.
!
80  Match    1    90    "NO CARR"        ! undefine all other
                                         ! events
    Pause    6                           ! let the line settle
                                         ! down
    Carrier  0                           ! we have carrier, per
                                         ! message
    IfnVar   1    4    85                 ! branch if not placing
                                         ! a call
!
! The Security Dynamics system prompts with "Enter
! passcode:" once the modem answers.  Solicit today's code
1 from the user and proceed.
!
    Match    13   0    "code:"           ! define security
                                         ! system prompt
    Xmit     "\13\10"                    ! and get its attention
    Wait     5                           ! give it 5 seconds to
                                         ! respond
    IfnVar   0    13   85                ! system did not
                                         ! intercept call
    Prompt   "Enter SecurID passcode:"   ! solicit code from
                                         ! user and send
    Xmit     "\13\10"                    ! with a terminating
                                         ! EOL
!
```

```
! Wait 2 seconds and then make the host think it got a
! CONNECT message, which was previously intercepted by the
1 security device.
!
   Wait      2                          ! give it 2 seconds to
                                        ! process
   Xmit    · "CONNECT 9600\13"          ! fake out the
                                        ! answering Macintosh
!
! Once past the security system allow Liaison to begin its
! arbitration.
!
85 Pause     6                          ! let the line settle
                                        ! down
   Connect                              ! declare a link exists
!  Exit                                 ! Connect does this
                                        ! implicitly
```

Character and packet formats

The AppleTalk packets that Liaison transmits contain 8-bit binary data. Consequently, the interface must not interpret any part of the data stream, except as noted herein. Liaison "hides" or "escapes" packet data bytes that would otherwise be interpreted by the interface by XORing them with the hex bit pattern $21 and prefixing them with a DLE (hex $10) character.

Byte values automatically escaped by the Dial-up Lap Manager include: $0D (CR), $10 (DLE) to $14 (DC4), $91 and $93 (7 bit XON/XOFF), $95, and $96. This scheme supports transparent 7-bit Xon/Xoff flow control and reserves a number of special characters for packet control.

In addition, all packets end with a single carriage return for interface buffering schemes.

Converting Liaison 2.0 scripts

The Liaison scripting system more closely resembles the commands and syntax of AppleLink and Timbuktu/Remote™. It requires the following changes from pre-release scripts:

- Comments are now denoted with exclamation ("!") rather than hash ("#").

- `ChDelay` has been renamed `ChrDelay`.

- `Goto` has been renamed `Jump`.

- `SetBaud index` has been replaced by `SerReset baudRate`.

- `SetDTR` value has been split into `DtrOff` and `DtrOn` commands.

- Instead of using multiple entry points (`ToAns`, `ToReset`, etc.), variable 1 indicates the current and desired state. This requires some recoding. The easiest way is to modify the most similar modem script shipped with Liaison.

Converting AppleLink or Timbuktu/Remote scripts

The Liaison scripting system has some very special design considerations that make full translation of an AppleLink or Timbuktu script impossible. However, the basic RS–232 interface commands are roughly equivalent. While we recommend adapting a similar Liaison script to your needs, the following points highlight the primary differences between the systems:

- Liaison uses a single entry point for internal events and a state variable that a script can dispatch upon. This is simpler to use and more flexible than using multiple entry points.

- Liaison line labels are limited in range from 0 to 100, where 0 means the next instruction. Labels may be declared as the first non-white text on a line or prefixed with `-Label`.

- Liaison strings are contained within double quotes ("), with only one string per argument. The Liaison user interface only passes equivalents for the strings `~BAUD` and `~FONE`.

- Liaison supports four variables and/or counters, of which two have special uses.

- The Liaison scripting system is designed to run in the background. As a result, its user interface features differ significantly from those of AppleLink and Timbuktu.

- A Liaison script includes special router-related commands, including `Carrier, Connect, Escape, Hangup, Hops, Name,` and `Options.` Liaison's `Exit` behaves quite differently.

- Liaison does not support script subroutines, invoked with `JSR` and `Return` commands. However, in most cases, the script state variable eliminates the need for subroutines.

Glossary

active star topology: A star topology in which a controller device, such as Farallon's StarController®, located at the center of the star interconnects multiple branch cables and repeats network signals.

answering half-router: Liaison and a modem installed on a Macintosh to answer calls from other half-routers, personal bridges, and semi-routers, thereby establishing a dial-up network.

AppleTalk protocol: Apple Computer's network standard that defines how devices communicate with each other on a network; there are now two generations of AppleTalk protocols: Phase 1 and Phase 2. *See* **Phase 1** *and* **Phase 2**.

backbone topology: (Also called a trunk topology) a topology in which outlying networks are connected to a single, continuous cable; the backbone minimizes the number of routers between any two nodes on the internetwork. *See the illustrations in* "Connecting Two LocalTalk Networks" *in Chapter 4.*

bridge: A device that joins two cable segments into a single, larger network; bridges operate at a lower level of the AppleTalk protocols than routers and do not create zones or form internetworks.

cable: The physical conductor of network transmissions, for example, twisted pair, coaxial, and fiber optic cable.

calling half-router: Liaison and a modem installed on a Macintosh to dial in to an answering half-router and establish a wide area network.

daisy chain topology: A topology in which each device on the network is directly connected to the next with modular extension cable and a connecting device such as a PhoneNET Connector.

dynamic addressing: The method used by AppleTalk to assign node addresses to network devices as they are started up; a device can have a different node address each time it is started up.

electronic mail: A network service that enables users to send and receive messages between computers.

Ethernet backbone: A backbone network running on a single, continuous Ethernet cable.

extended cable: A cable on which an extended network is operating.

extended network: A network using AppleTalk Phase 2 protocols; EtherTalk 2.0 and TokenTalk are extended networks. LocalTalk networks are compatible with Phase 2 but are not extended because a single LocalTalk network cannot have multiple network numbers or multiple zone names.

file server: A network device, usually consisting of a computer and one or more large capacity disks, on which network users can store files and applications in order to share them.

full router: A router that connects two or more networks at the same site into an internet.

gateway: A device that connects networks that use different protocols: it translates between the protocols so that devices on the connected networks can exchange data.

half-router: A router that, in combination with a modem, connects a user or network to a remote site; two half-routers can create a wide area network; the Liaison relay router, Liaisonet personal bridge, and Liaisonet semi-router are all half-routers.

hop: A unit traveled by data packets on an internetwork; every router the packets travel through adds a hop.

internet or internetwork: A network made up of two or more local area or wide area networks connected by routers and half-routers.

LAN (Local Area Network): Computers and shared devices connected to the same network medium in a limited area, usually a single building.

Liaison: Software that allows your Macintosh to be a full-router, half-router, or both simultaneously, and still support user or server applications in the foreground.

Liaison Macintosh: A Macintosh computer on which Liaison has been installed and configured.

Liaisonet: A subset of Liaison that lets you dial a remote site directly (if you have a modem) or by accessing a Liaison Macintosh elsewhere on the network.

Liaison log: A record of the User Names, Account Names, destinations, dates, and times of each session on your Liaison half-router; it is saved in the System Folder.

modem: A device used to convert computer data into a form that can travel over telephone lines.

naming protocol: A protocol used by AppleTalk to associate a name with the physical address of a service.

network: (1) The frequently used, loose definition of *network* is "a communication system that connects computers together to share information via services, such as electronic mail or files servers, and common resources, such as storage devices and printers."
(2) A strict definition of *network*, as it applies to an AppleTalk communication system, is "one continuous cable, possibly containing repeaters or bridges but not containing a router."

network device: A computer, printer, modem, or terminal connected to a network.

network manager: The person responsible for monitoring the network and troubleshooting problems when they arise.

network map: A drawing of the network that shows where network wireis routed and where the connections are located; it shows the topology of the internet.

network number: A unique number for each network in an internet; network numbers are assigned by a seed router, to which the network is directly connected; an isolated network does not need a network number.

network range: A unique set of contiguous numbers associated with an extended network; each number in a network range can be associated with up to 253 node addresses.

network system: A family of network components, such as the Farallon PhoneNET System, that work together using compatible methods of communication.

node: Any network device that has an address on the network; some network devices, such as modems, may be connected to a network but not be nodes themselves.

node number: A number that distinguishes one node from all others on a single network; in AppleTalk, node numbers are assigned by dynamic addressing.

nonseed port: A port on a router that obtains network numbers and zone names from the seed port of an adjacent router; a nonseed port can become a seed port if the seeding router is switched off.

packet: A unit of information that has been formatted according to a specific protocol for transmission on a network.

passive star topology: A network in which branches are connected at one central location; a passive star network does not include a central controlling device, such as a repeater or hub.

personal bridge: (Technically a half-router) a configuration of Liaisonet used to call an answering half-router from a distant location.

Phase 1: An AppleTalk protocol that can be used for nonextended networks.

Phase 2: An AppleTalk protocol that makes extended networks possible.

PhoneNET Connector: A Farallon network component used to connect AppleTalk devices to twisted-pair cabling.

PhoneNET System: A cabling system that includes the components necessary to construct AppleTalk networks using ordinary telephone wiring as cable.

port: The connection point between a router and a network or modem cable; Liaison has five ports.

protocols: Rules that govern interaction on a network; protocols determine where, when, how, and in what format information is transmitted.

relay client: A Liaisonet user who accesses a Liaison relay router on the network to dial a remote site.

relay router: A Liaison calling half-router that can forward outgoing calls from relay clients on the same network.

remote site: A computer or network that you access through a long distance communications medium, such as telephone lines or a satellite.

repeater: A hardware device that extends the maximum length of cable in a single network by amplifying and reclocking the signal.

ring topology: A topology in which network devices are connected by the physical medium in a closed loop; token ring is a ring topology in which an electronic token moves from one device to the next, enabling each device to access the network in turn.

router: A device that intelligently connects networks to each other. A router can connect identical network types, such as LocalTalk to LocalTalk, or dissimilar network types, such as LocalTalk to Ethernet. However, a common protocol, such as AppleTalk, must be used over both networks. A router forwards only the traffic that has a destination outside of the sender's immediate network. The forwarding route may include several routers, each forwarding the data to the next.

routing table: A list of networks maintained by each router on an internetwork; information in the routing table helps the router determine the next router to forward packets to.

seed port: A port on a router from which a network obtains its network number or range and zone names; every network in an internet must have a seed port.

semi-router: A configuration of Liaisonet that connects a home AppleTalk network to an answering half-router.

star topology: A layout scheme in which network devices are arranged so that all are connected at a central location; see **passive star** and **active star** topologies.

Timbuktu: Farallon communications software that permits real-time screen sharing and file transfer among users on a local or wide area AppleTalk network.

Timbuktu/Remote: Farallon communications software that permits real-time screen sharing and file transfer between two Macintosh computers equipped with modems; Timbuktu/Remote does not use AppleTalk.

topology: The physical layout of a network.

traffic: Transmissions traveling across a network.

trunk topology: See **backbone topology**.

twisted-pair cable: A common, relatively low-cost network cable that consists of two insulated wires twisted about each other. Telephone wiring used in a PhoneNET network is twisted-pair cable.

WAN (Wide Area Network): Computers and/or networks connected to each other using long-distance communication methods such as telephone lines and satellites.

zones: Grouping of networks or parts of networks designated by a router that simplifies the task of choosing network services in a large internetwork.

Index

Software License Agreement and Limited Warranty

This is a legal agreement between you, the end user, and Farallon Computing, Inc. ("Farallon"). The enclosed Farallon software program or programs (the "Software") are licensed by Farallon to the original customer and any subsequent transferee of the Software for use only on the terms described in this License Agreement (this "License"). Please read this License. Opening the enclosed diskette envelope indicates that you accept and agree to comply with these terms. If you do not agree to these terms, (a) you may return the unopened diskette envelope, along with the full product and proof of purchase to your dealer within 30 days for a full refund, or (b) you may write to Farallon with a request to modify any term of this License. Please allow 6 weeks for a response.

- **GRANT OF LICENSE.** Farallon grants to you a nonexclusive, personal license to use the Software as provided in this License. Except as otherwise expressly provided in this License, you may use the Software only on a single computer owned, leased or otherwise controlled by you. This means that you may not use the Software, and the Software may not reside, on more than one computer at any one time. Immediately following this paragraph are specific license terms which may or may not apply to you, depending upon the Software licensed by you.

- **MULTIPACK LICENSES.** If the Software has been delivered with more than one serial number, you have the right to use the Software on as many computers as you have been given serial numbers, provided that any copies made for this purpose shall contain all copyright and other proprietary notices that are on the original copy of the Software provided to you. You may make back-up or archival copies for each computer as provided elsewhere in this License.

- **LIAISON™ INTERNET ROUTER.** If the Software is Liaison, you have a royalty-free right to noncommercially distribute the Liaisonet™ chooser document included with Liaison.

- **COPYRIGHT.** The Software is owned by Farallon or its suppliers and is protected by United States copyright laws and international treaty provisions. You may either (a) make two copies of the Software solely for backup or archival purposes, provided that you reproduce all copyright and other proprietary notices that are on the original copy of the Software provided to you, or (b) transfer the Software to a single hard disk, provided you keep the original solely for backup or archival purposes. You may not copy the written materials accompanying the Software (called the "Documentation").

- **OTHER RESTRICTIONS.** You may not rent or lease the Software, but you may permanently transfer the Software and Documentation provided you retain no copies and the recipient agrees to the terms of this Agreement. You may not modify, reverse engineer, decompile, disassemble, or create derivative works from the Software or Documentation.

- **GOVERNMENT LICENSEE.** If you are acquiring the Software on behalf of any unit or agency of the United States Government (the "Government"), the following provisions apply:

    The Government acknowledges Farallon's representation that the Software and Documentation were developed at private expense and no part of them is in the public domain. The Government further acknowledges Farallon's representation that the Software is "Restricted Computer Software" as that term is defined in Clause 52.227-19 of the Federal Acquisition Regulations (FAR) and is "Commercial Computer Software" as that term is defined in Subpart 227.471 of the Department of Defense Federal Acquisition Regulation Supplement (DFARS). The Government agrees that: (i) if the Software is supplied to the Department of Defense (DoD), the Software is classified as "Commercial Computer Software" and the Government is acquiring only "restricted rights" in the

Software and its documentation as that term is defined in Clause 252.227-7013 (c) (1) of the DFARS, and (ii) if the Software is supplied to any unit or agency of the United States Government other than DoD, the Government's rights in the Software and its documentation will be as defined in Clause 52.227-19 (c) (2) of the FAR.

Use, duplication, or disclosure by the Government is subject to restrictions as set forth in subparagraph (c) (1) (ii) of the Rights in Technical Data and Computer Software clause at DFARS 252.227-7013 or in subparagraphs (c) (1) and (2) of the Commercial Computer Software – Restricted Rights at 48 CFR 52.227-19, as applicable. Farallon Computing, Inc. 2000 Powell Street, Suite 600 Emeryville, California 94608.

- **EXPORT LAW ASSURANCES.** You acknowledge and agree that the Software is subject to restrictions and controls imposed by the United States Export Administration Act ("the Act") and the regulations thereunder. You agree and certify that neither the Software nor any direct product thereof is being or will be acquired, shipped, transferred, or reexported, directly or indirectly, into any country prohibited by the Act and the regulations thereunder or will be used for any purpose prohibited by the same.

- **SEVERABILITY.** If for any reason, any provision or partial provision of this License is held invalid, such invalidity shall not affect the remainder of such provision or this License, and this License shall, to the full extent consistent with law, continue in full force and effect.

- **THIRD PARTY BENEFICIARIES.** If any portion of the Software has been licensed to Farallon by a third party for redistribution, Licensee is hereby notified that such third party is an intended third party beneficiary of this License with full rights of enforcement.

- **GENERAL.** The validity and performance of this License shall be governed by California law, except for that body of law dealing with conflict of laws and except as to copyrights, which are governed by United States laws and international treaties. This License constitutes the entire agreement between the parties concerning the subject matter hereof. Any waiver or amendment of any provision of this License shall be effective only if in writing and signed by you and an officer of Farallon. No distributor, dealer, or employee (other than an officer) of Farallon is authorized to change or amend any terms of this License. In the event of any conflict between the terms of this License and the terms of any license bound into any manual packaged with the Software, this License shall govern.

Limited Warranty
Farallon warrants that for ninety (90) days following delivery of the Software to you, as shown by a copy of your receipt: (1) the Software, unless modified by you, will perform substantially the functions described in the Documentation provided by Farallon; and (2) the media on which the Software is furnished will be free from defects in materials and workmanship under normal use. Farallon does not warrant that the Software will meet your requirements or that operation of the Software will be uninterrupted or error-free. Farallon is not responsible for any problem, including any problem which would otherwise be a breach of warranty, caused by (i) changes in the operating characteristics of computer hardware or computer operating systems which are made after the release of the Software, (ii) interaction of the Software with non-Farallon software or (iii) accident, abuse, or misapplication.

THE ABOVE WARRANTIES ARE EXCLUSIVE AND NO OTHER WARRANTIES ARE MADE BY FARALLON OR ITS LICENSORS, WHETHER EXPRESSED OR IMPLIED, INCLUDING THE IMPLIED WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, OR NONINFRINGEMENT. SOME STATES DO NOT ALLOW THE EXCLUSION OF IMPLIED WARRANTIES, SO THE ABOVE EXCLUSION MAY NOT APPLY TO YOU. IN THAT EVENT, ANY IMPLIED WARRANTIES ARE LIMITED IN DURATION TO NINETY (90) DAYS FROM THE DATE OF DELIVERY OF THE SOFTWARE. THIS WARRANTY GIVES YOU SPECIFIC LEGAL RIGHTS. YOU MAY HAVE OTHER RIGHTS, WHICH VARY FROM STATE TO STATE.

Limitation of Remedies

Farallon's entire liability and your sole remedy under the warranty during the ninety (90) day warranty period is that Farallon shall, at its sole and exclusive option, either replace the Software with a functionally equivalent program at no charge to you or refund the license fee of the Software. Any replacement Software will be warranted for the remainder of the original warranty period or thirty (30) days, whichever is longer. These are your sole and exclusive remedies for any breach of warranty during this ninety (90) day period.

In order to make a claim under this warranty you must return the defective item with your receipt within ten (10) days following the end of the warranty period. Farallon will have no responsibility to replace or refund the license fee of Software damaged by accident, abuse, or misapplication.

REGARDLESS OF WHETHER ANY REMEDY SET FORTH HEREIN FAILS OF ITS ESSENTIAL PURPOSE, IN NO EVENT WILL FARALLON OR ITS LICENSORS, OR THE DIRECTORS, OFFICERS, EMPLOYEES, OR AGENTS OF ANY OF THEM BE LIABLE TO YOU FOR ANY SPECIAL, CONSEQUENTIAL, INDIRECT OR SIMILAR DAMAGES, INCLUDING ANY LOST PROFITS OR LOST DATA ARISING OUT OF THE USE OR INABILITY TO USE THE SOFTWARE OR ANY DATA SUPPLIED WITH IT EVEN IF FARALLON OR ANYONE ELSE HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES, OR FOR ANY CLAIM BY ANY OTHER PARTY. SOME STATES DO NOT ALLOW THE LIMITATION OR EXCLUSION OF LIABILITY FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES SO THE ABOVE LIMITATION OR EXCLUSION MAY NOT APPLY TO YOU. IN NO CASE SHALL FARALLON'S OR ITS LICENSOR'S LIABILITY UNDER THIS LICENSE EXCEED THE LICENSE FEE PAID FOR THE SOFTWARE.

Should you have any questions concerning this License, please write or call:

Farallon Computing, Inc.
Licensing Department
2000 Powell Street, Suite 600
Emeryville, California 94608 USA

Voice: (510) 596-9100
Fax: (510) 596-9020

v.792

Apple Warranty and Disclaimer

The Last Word

Farallon Computing welcomes your comments and suggestions for this manual. Your input will help us improve the quality of future documentation. On the attached card, address any documentation issues of concern:

- Did you find any errors? Was the information clearly presented?

- Were the illustrations useful? Did you need more examples?

- If there was online help, did you use it?

- Did you need more information about any particular feature?

- What did you like most about this manual?

Feel free to send photocopied pages from this manual with your comments marked on them, or simply detach and mail this postage-paid card.

Important: This is not the registration card for this product. You must send in the separate registration card to receive information on upgrades to this product.

Liaison Internet Router User's Guide v. 692

Comments _____
_____
_____
_____
_____
_____
_____
_____
_____
_____
_____
_____
_____

Thank you for using our documentation and products.

Name _____

Title _____

Company _____

Street _____

City, State, ZIP _____

_____

*Attention: User Documentation Manager*
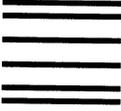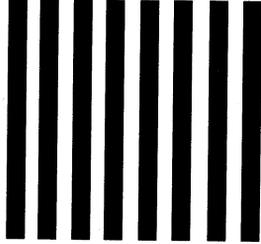
BUSINESS REPLY MAIL

FIRST CLASS MAIL   PERMIT NO. 323   ALAMEDA, CA

Postage will be paid by addressee

FARALLON COMPUTING INC
2470 MARINER SQUARE LOOP
ALAMEDA CA 94501-9707