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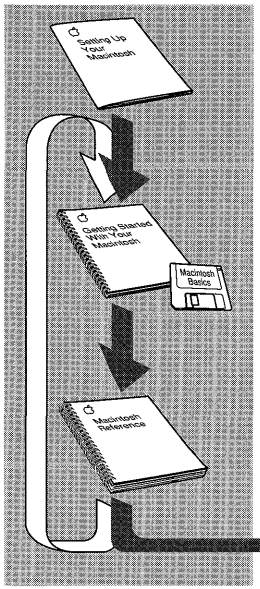
"Extension of the Macintosh to UNIX®"

The learning path through A/UX documentation



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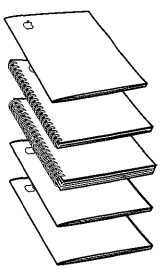
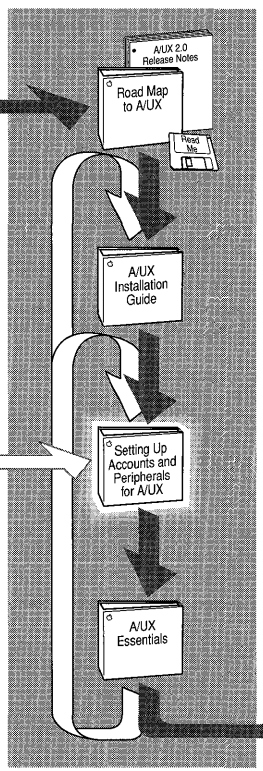
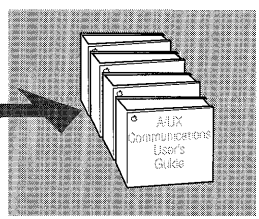


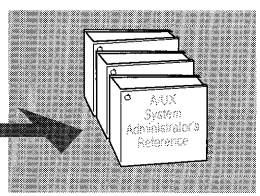
Apple guides for various peripheral devices



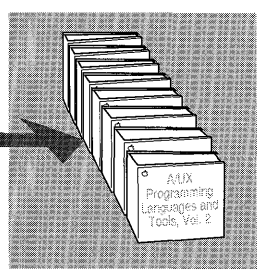
In the Accessory Kit with A/UX



In the User Kit for A/UX



In the Administrator Kit for A/UX



In the Programmer Kit for A/UX

Contents

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Preface

Once you have your Apple® Macintosh® set up and the A/UX® operating system installed, you are likely to add peripheral devices such as printers and modems. Though the owner's guides accompanying your Apple peripheral devices describe how to physically connect the cables and power cords for the devices, they do not explain how to add the peripheral devices for use with A/UX. That's where this guide comes into play. It describes how to configure A/UX for the various peripheral devices you might want to add.

Another task you will probably undertake is setting up user accounts for yourself and possibly others. This guide describes how to do this.

This guide describes how to set up A/UX for the following:

- a user account
- Apple printers
- Apple Hard Disk SCs
- the AppleCD SC®
- the Apple Tape Backup 40SC
- an Apple Personal or Hayes-compatible modem
- a Macintosh Plus or Macintosh SE as a terminal

This guide also describes how to configure A/UX when connecting to an existing AppleTalk network.

How to use this guide

A/UX users commonly add a printer or other peripheral device when they first set up their Macintosh to run A/UX. Then they add other devices as they need them. This guide is helpful in both instances. You can use it along with *A/UX Installation Guide* as you finish setting up your Macintosh with A/UX by adding a peripheral device. You can also refer to this guide later when you've aquired another peripheral device to add.

Read the first chapter for an overview of system configuration. Then use the guide chapter by chapter as you need it.

What you should already know

You need to know the basic skills of using a Macintosh, such as double-clicking the mouse to open a file and how to press and drag down with the mouse to choose a menu command. This information is covered in *Macintosh Essentials*. You also need to be familiar with the information in *A/UX Essentials* on navigating through the A/UX system.

Conventions used in this guide

A/UX guides follow specific conventions. Words that require special emphasis appear in specific fonts or font styles. The following sections describe the conventions used in all A/UX guides.

Keys and key combinations

Certain keys on the keyboard have special names. These modifier and character keys, often used in combination with other keys, perform various functions. In this guide, the names of these keys are in Initial Capital Letters followed by SMALL CAPITAL letters.

The key names are

CAPS LOCK	ESCAPE	SHIFT
COMMAND	LEFT ARROW	TAB
CONTROL	RETURN	UP ARROW
DOWN ARROW	RIGHT ARROW	

For example, suppose you enter

```
Applee
```

instead of

```
Apple
```

To erase the additional *e*, you would position the cursor (or insertion point) to the right of the word and press the DELETE key once.

Sometimes you will see two or more names joined by hyphens. The hyphens indicate that you use two or more keys together to perform a specific function. For example,

Press COMMAND-K

means "Hold down the COMMAND key and press the K key."

Terminology

In A/UX guides, a certain term can represent a specific set of actions. For example, the word *enter* indicates that you type an entry and press the RETURN key. The instruction

Enter `ls`

means "Type `ls` and press the RETURN key."

Here is a list of common terms and the corresponding actions you take.

Term	Action
Choose	Activate a command in a menu. To choose a command from a pull-down menu, click once on the menu title while holding down the mouse button, and drag down until the command is highlighted. Then release the mouse button.
Click	Press and then immediately release the mouse button.
Drag	Position the pointer on an object, then press and hold down the mouse button while moving the mouse. Release the mouse button when the object reaches the desired position on the screen.
Enter	Type the letter or letters and press the RETURN key.
Press	Type a *single* key *without* pressing the RETURN key. Or position the pointer on an object and hold down the mouse button.
Select	Position the pointer on a selectable object and click the mouse button.
Type	Type an entry *without* pressing the RETURN key.

The `Courier` font

Throughout A/UX guides, words that you see on the screen or that you must type exactly as shown are in the `Courier` font.

For example, suppose you see the instruction

Type `date` on the command line and press RETURN.

The word `date` is in the `Courier` font to indicate that you must type it.

Suppose you then read this explanation:

Once you type `date` and press RETURN, you'll see something like this:

```
Tues Oct 17 17:04:00 PDT 1989
```

In this case, `Courier` is used to represent exactly what appears on the screen.

All A/UX manual page names are also shown in the `Courier` font. For example, the entry `ls`(1) indicates that `ls` is the name of a manual page.

Font styles

Words that you must replace with a value appropriate to a particular set of circumstances appear in *italics*. For example, if you see
`cat` *filename*

replace the italicized word with the name of the file you wish to view. If you want to view the contents of a file named `Elvis`, type the word `Elvis` in place of *filename*. In other words, enter

```
cat Elvis
```

New terms appear in **boldface** where they are defined.

A/UX command syntax

A/UX commands follow a specific command syntax. A typical A/UX command has this form:
`command` [*flag-option*] [*argument*]...

The following table outlines the elements of an A/UX command.

Element	Description
`command`	The command name.
flag-option	One or more optional arguments that modify the command. Most flag options have the form [-*opt*...], where *opt* is a letter representing an option. Most commands have one or more flag options.
argument	A modification or specification of a command, usually a filename or symbols representing one or more filenames.
[]	Brackets used to enclose an optional item—that is, an item that is not essential for execution of the command.
...	Ellipses used to indicate an argument that can be repeated any number of times.

For example, the `wc` command is used to count lines, words, and characters in a file. Here is the full syntax for that command, including all possible flag options and the optional argument *name*.

`wc` [`-c`] [`-l`] [`-w`] [*name...*]

Thus, you can enter

```
wc -w /Priscilla
```

to count all of the words in the file `/Priscilla`, where `wc` is the name of the command, `-w` is the flag option that instructs the command to count all of the words in the file, and the optional argument `/Priscilla` is the file to be searched.

Command reference notation

A/UX Command Reference, A/UX Programmer's Reference, and *A/UX System Administrator's Reference* contain references for commands, programs, and other related information. Material is organized within these references by section numbers. The standard A/UX cross-reference notation is

cmd (sect)

where *cmd* is the name of the command, file, or other facility; *sect* is the section number where the entry resides.

- Items followed by section numbers (1M), (7), or (8) are listed in *A/UX System Administrator's Reference.*
- Items followed by section numbers (1), (1C), (1G), (1N), and (6) are listed in *A/UX Command Reference.*
- Items followed by section numbers (2), (3), (4), and (5) are listed in *A/UX Programmer's Reference.*

For example,

`cat`(1)

refers to the command `cat`, which is described in Section 1 of *A/UX Command Reference.*

References can be also called up on the screen. Use the `man` command to display pages from reference manuals, known as manual pages, directly on the screen. For example, enter the command

```
man cat
```

to display the manual page for the `cat` command, including its description, syntax, options, and other pertinent information. To exit, press the Space bar until you see a shell prompt, or type `q` at any time to return immediately to your shell prompt.

Cross-referencing

An A/UX guide often refers to information discussed in another guide in the suite. The format for this type of cross-reference is "Chapter Title," *Name of Guide.*

For a complete description of A/UX guides, see *Road Map to A/UX.* This guide contains descriptions of each A/UX guide, part numbers, and ordering information for all the guides in the A/UX documentation suite.

Chapter 1 **About System Configuration**

A/UX® users frequently need more peripheral devices than their keyboards and monitors. There's usually a printer to connect, an extra hard disk to attach, and a modem or perhaps a terminal to add. This guide provides instructions on connecting the Apple® devices that can be used with a Macintosh® computer running the A/UX operating system and suggests ways to use those devices.

If you are a novice A/UX user who is setting up a new A/UX system or adding Apple peripheral devices to an existing A/UX system, this guide and the owner's manual for the device you are adding are the only setup books you'll need (unless you are setting up or managing a computer network, in which case you'll need *A/UX Network System Administration*). This guide is also for the professional system administrator who oversees dozens of Macintosh computers and who desires quick instructions on how to attach peripheral devices to a single A/UX computer.

In this guide you'll find instructions on adding the following to an A/UX system:

- user accounts
- LaserWriter® and ImageWriter® printers
- Macintosh Plus and Macintosh SE computers as terminals
- AppleCD SC®
- Apple Tape Backup 40SC
- additional Hard Disk SCs
- Apple Personal Modem and Hayes-compatible modems
- connection to an AppleTalk® network that is already set up

This guide discusses Apple devices only. For information on connecting third-party products to a Macintosh computer running A/UX, refer to the documentation for those products.

Adding equipment and creating user accounts are just two of the tasks required of the system administrator. These tasks are simplified by several scripts in A/UX. A script is like a program but written in a small programming language called a command-line interpreter, and its purpose is to automate a repeated task.

A/UX Local System Administration describes the many system administration tasks other than system configuration, such as making a plan for backing up files on a regular basis and checking the health of the A/UX file systems, all of which are beyond the scope of this guide. For complete documentation of system administration concerns, see *A/UX Local System Administration.*

For information on designing, setting up, and administering a computer network, see *A/UX Network System Administration.*

What is system configuration?

Whenever you add or remove users or devices to and from a Macintosh system running A/UX you are configuring the system. When you configure a system, you are the system administrator for the system. Configuring the system involves not only physically connecting the peripheral devices you want to use but also altering A/UX system files so that A/UX recognizes the devices.

A/UX scripts ease the job

System administrators often write scripts to reduce tedium in their job. This book shows how to use the A/UX scripts that simplify the tasks of adding user accounts and devices.

A/UX Essentials describes the three user interfaces available in A/UX: the A/UX Finder, the CommandShell window with Commando dialog boxes, and the CommandShell window with the command-line interface. In this guide you'll use the configuration scripts with the Commando dialog boxes. *A/UX Local System Administration* describes how to use the scripts with the command-line interface.

The scripts described in this book were written primarily with the Bourne Shell. The Bourne shell is a command-line interpreter and a simple programming language. For further information about the Bourne Shell and how to use it to write your own scripts, see *A/UX User Interface Guide.*

The superuser and setting the `root` password

Just as your bank account identifies you as a bank customer with certain privileges, all A/UX users have accounts that identify them and specify their privileges.

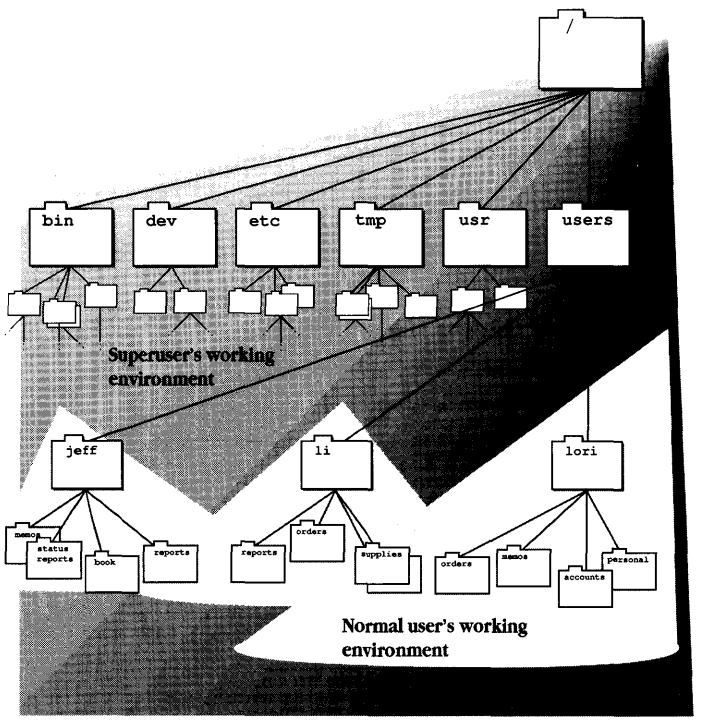
There are two kinds of A/UX users: normal users and the superuser. Normal users have user accounts and the superuser has the root account. The superuser can work with *all* A/UX files, including all the system files, whereas normal users can only work with three kinds of files:

- files in their own user account
- files that are accessible to them through a group they belong to
- files that are explicitly made available to anyone using the computer

Figure 1-1 illustrates how the normal user and superuser differ.

See Chapter 2 of *A/UX Essentials* for more information on file permissions for normal user accounts.

- **Figure 1-1** The superuser's working environment and the normal user's working environment



△ **Important** You need to assign a password to the root account to protect your system from illegitimate use. If you haven't yet assigned a password to the root account, follow the next steps to do so. △

Assigning a password to the `root` account

Follow these steps to assign a password to the `root` account only if you haven't already given a password to the `root` account (or if you want to change the `root` password).

1. **Start up A/UX.**

   After the startup screens are displayed and A/UX is running, the login dialog box appears.

2. **Choose Change Password from the Options menu.**

   The Change Password dialog box appears.

   Restrictions apply to the characters of a password. (For more information, see `passwd`(1) in *A/UX Command Reference* or see the same information displayed on screen by using the `man` command.) The requirements for a password are shown in the dialog box.

3. **Type `root` in the Name text box.**
4. **Click the Old Password text box and type the old password if you are changing the password.**
5. **Click the New Password text box and type a new password.**
6. **Click OK.**

   If your password is not accepted, modify it to meet the requirements and type it again.

   A dialog box asks you to confirm your new password.

7. **Type the new password again.**
8. **Click OK.**

The login dialog box appears again, with the login name and password boxes filled in. This gives you the opportunity to use the Options menu again, if you wish, before logging in.

9. **Click Login.**

   You are logged in to A/UX. The root account now has a password, or a new password. You will have to enter it the next time you log in.

   The Finder appears so you can begin working.

Becoming the superuser

Any system administration task, such as adding a new user account, requires you to be the superuser. How you become the superuser depends on the state your computer is in.

If A/UX is not running

If A/UX is not running (if the computer is turned off or the Macintosh OS is running), follow these steps:

1. **Start up A/UX by turning on the computer. If you're using the Macintosh OS, double-click the A/UX icon.**

   After the startup screens appear, the login dialog box appears.

2. **Click Registered User, unless it is already selected.**

3. **Enter `root` in the Name text box.**

   The computer prompts you for the password. If you haven't assigned one to the account, follow the steps in "Assigning a Password to the Root Account," in the previous section.

4. **Type the password.**

   A grey rectangle expands through the Password box as you enter each character.

5. **Click Login or press RETURN.**

If the password is correct, you are logged in to the `root` account and thus have the status of the superuser.

If A/UX is running and you're already logged in

If A/UX is running, and you are logged in to a user account, follow these steps to become the superuser:

1. **In the Finder, choose Logout from the Special menu.**

   The system reminds you to save all unsaved work.

   The Login dialog box appears, indicating you have logged out successfully.

2. **Follow the procedure in the previous section, "If A/UX is Not Running," beginning with step 2, to log in to the `root` account.**

Connecting devices

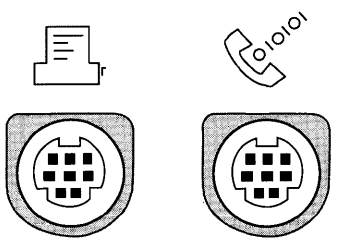
Adding peripheral devices to A/UX usually requires two main steps: connecting the hardware, and adding the software that informs A/UX about that piece of hardware.

There are limits to the number of peripheral devices you can connect to an A/UX system. The limits are imposed by the capacity of the ports, as described in the next two sections.

Printers, modems, and terminals

You connect printers, modems, and terminals through the two serial ports on the back of the Macintosh computer, as shown in Figure 1-2.

■ **Figure 1-2** The serial ports

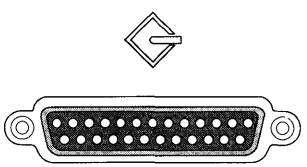


The two ports allow you to connect any two serial devices (printers, modems, and terminals) at one time. For information on adding devices through the serial port, see Chapter 3, "Adding and Managing Printers," Chapter 7, "Adding and Managing Modems," and Chapter 8, "Adding and Removing Terminals."

Hard Disk SCs, AppleCD SC, and Tape Backup 40SC

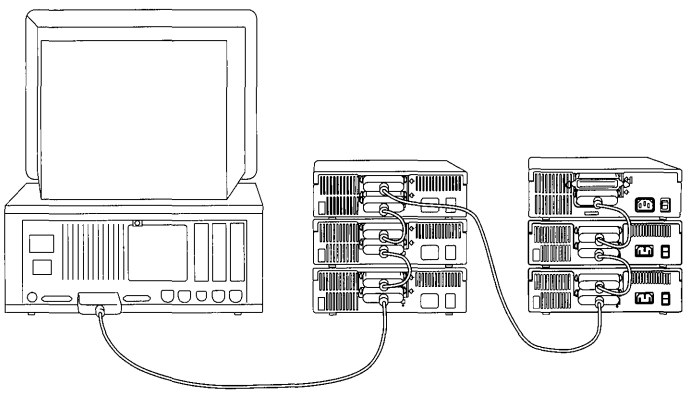
You connect Apple Hard Disk SCs, the Tape Backup 40SC, and the AppleCD SC through the SCSI port (Small Computer Systems Interface) port, shown in Figure 1-3.

■ **Figure 1-3** SCSI port



The Macintosh computer has just one SCSI port, but you can connect up to six external SCSI devices through it at one time by linking them together. (If you don't have an internal hard disk, you can connect seven external devices.) For example, you could have one Tape Backup 40SC, one AppleCD SC, and five Hard Disk SCs connected simultaneously, as shown in Figure 1-4.

- **Figure 1-4** A SCSI port used to the maximum



For instructions on adding SCSI devices, see Chapter 4, "Adding and Managing Hard Disk SCs," Chapter 5, "Adding and Managing the AppleCD SC," and Chapter 7, "Adding and Managing the Apple Tape Backup 40SC."

Chapter 2 **Adding and Managing User Accounts**

Because each user has his or her own account, A/UX allows several users to work on the same computer, with security and privacy.

A/UX is shipped with two user accounts: Guest and start. These accounts serve specific needs: the start account contains files for use with the A/UX tutorials in *A/UX Essentials*, and the Guest account allows a guest (that is, someone without a user account) to log in to the system. These two accounts are explained in more detail in *A/UX Essentials*. If you require more system security than this, you can either assign the Guest account a password, as explained in *A/UX Essentials*, or remove the account, as explained in the last section of this chapter.

You need to add a user account for each individual who wants to use A/UX on a regular basis.

This chapter describes how to

- add user accounts
- modify user accounts, for example, to share membership in a group with other user accounts
- remove user accounts that are no longer necessary

Why create user accounts?

A user account provides a secure and customized work environment. Security is provided by a password; only the person who knows the account's password can log in and use the account. This protects the files from outside tampering. (In contrast, the current Macintosh Operating System allows anyone who turns on the computer to work with all the files stored on that computer.) A customized work environment is provided through the choice between three login shells, group memberships with other accounts, and file-permission settings that determine who can do what with the files in the account. Users can change the file permissions on the files in their accounts and change their login shells, but they cannot change group memberships, as doing so requires superuser status.

The system administrator is responsible for initially determining the characteristics for all user accounts. When you create an account with the `adduser` script, as described in this chapter, the account acquires the following characteristics, unless you make other choices:

- the C shell as the login shell (the program used "behind the scenes" in CommandShell windows)
- membership in a new group, of which the new user is the only member
- the following access permissions on its files:

  ```
  user=rwx    group=r-x    others=---
  ```

  `r`= read permission `w`=write permission `x`=execute permission

  The owner of the account can look at and make changes to all files and run all programs. Users who share group membership with this account can look at but not make changes to the files and can run all programs, while all other accounts cannot even look at the files.

- a home directory in the `/users` directory

  Each user account has a home directory within `/users`. Don't confuse the `/users` directory with the `/usr` directory which contains the on-line manual pages, games, and other files. For more information on the importance of the distinction between these two directories, see Chapter 4, "Adding and Managing Hard Disk SCs."

- a connection to the global System Folder

The global System Folder determines the fonts and desk accessories available to all users. A user can have a different set of fonts and desk accessories by adding a personal System Folder to his or her account. Because adding a personal System Folder is performed by the user, it is described in *A/UX Essentials.*

In addition, you have the option to give an account a folder called Useful Commands. This folder contains commands deemed especially useful and is readily accessible because it resides in each user's account. A sample of the commands it contains are `chmod` (to change the permissions on a file) and `man` (to see information on the screen about an A/UX command rather than referencing a manual).

Adding a new account

With the following procedure, you add an account by using the Commando utility and the `adduser` script, which make the procedure simple and visual. For complete information on Commando, see Chapter 4, "Using Commando," in *A/UX Essentials.*

Follow these steps to add a new user account:

1. **Log in to the root account.**

   See Chapter 1 if you need instructions.

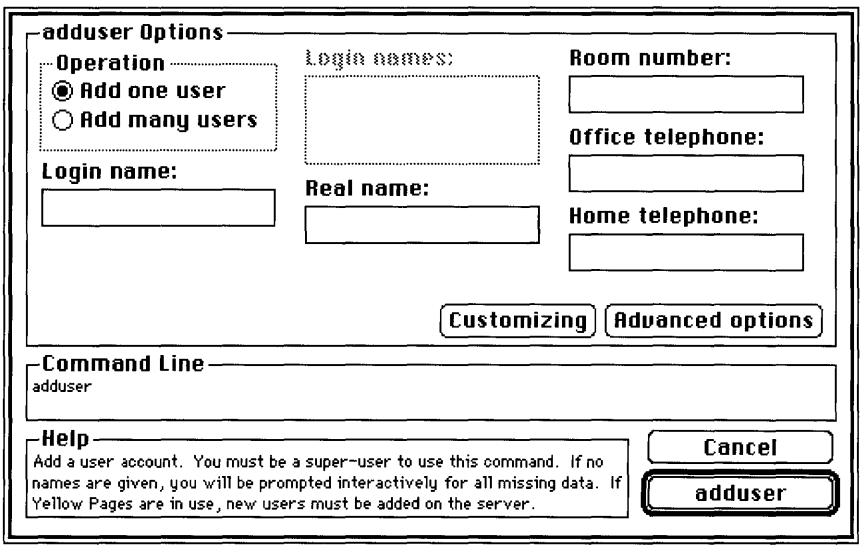
2. **Choose CommandShell from the Apple menu.**

   A CommandShell window appears.

3. **Type `adduser` and press COMMAND-K.**

   The `adduser` Commando dialog box appears, as shown in Figure 2-1.

■ **Figure 2-1** The `adduser` Commando dialog box



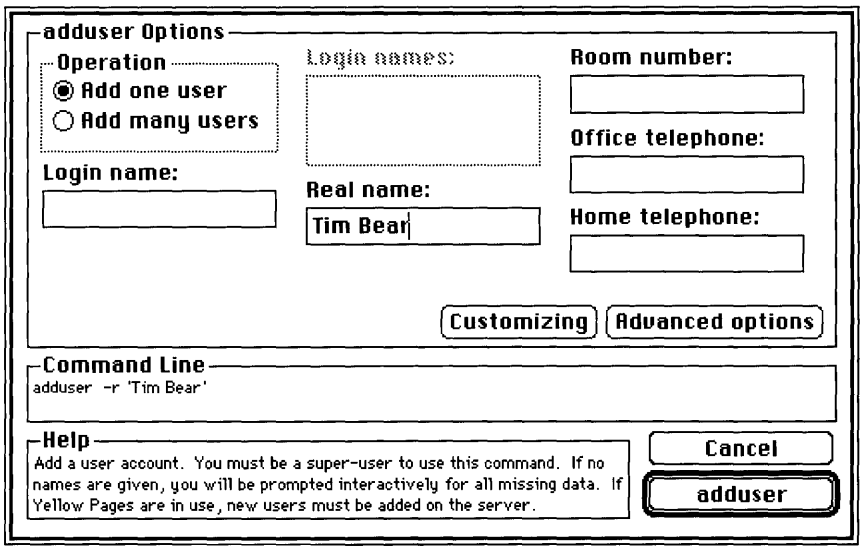
4. Type the account owner's full name in the "Real name" text box.

The insertion point (blinking vertical bar) is already in this box.

Do not press RETURN after typing the name or you'll run the `adduser` command prematurely. If you inadvertently run the command, press CONTROL-C to get back to the CommandShell window where you can start again with step 1.

See Figure 2-2 for an example of a typed user's name. Note that the name appears as part of the adduser command in the Command Line box.

■ **Figure 2-2** Entering the person's real name



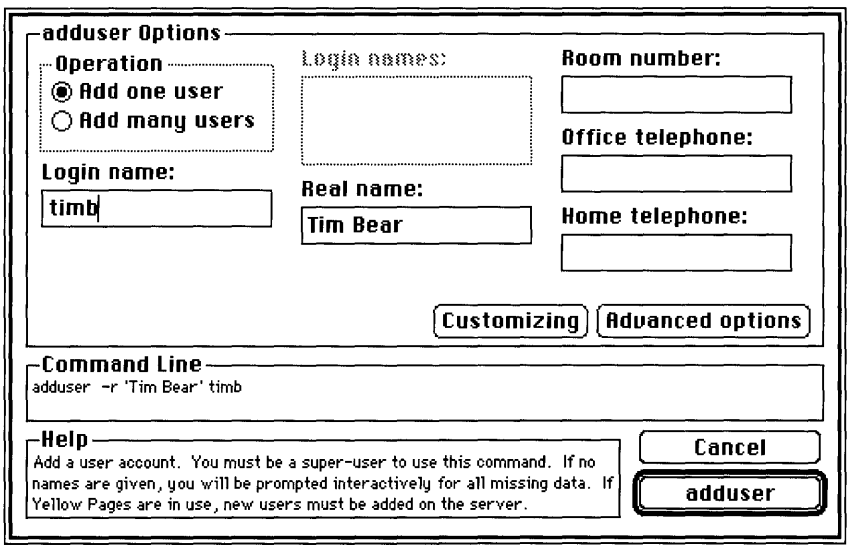
5. Click in the "Login name" text box and then type the login name for the account.

You can also press the TAB key a few times to move to this text box.

It is best to name the account with some part of the owner's name. For example, `timb` is used for Tim Bear's account, as shown in Figure 2-3. This makes it easier to relate login names to the people who use them when you're doing such things as sending mail or using the `who` command to see who's logged in. Of course, if there are only two or three people with accounts on your system, you would not have trouble matching fanciful names to a person's proper name.

Make an account name unique among the login names on your network. For example, if five people named Tim are on your network, you could distinguish their account names by forming them with some part of their first and last names. This makes it easier for users and for the system administrator to navigate the various computers and accounts on the network.

■ **Figure 2-3** Entering the login name



6. **Optionally, type the account owner's office address, and office and home phone numbers in the provided text boxes.**

   To move from box to box, press the TAB key and not the RETURN key. The RETURN key has the effect of closing this dialog box and running the command.

   Typing information in these fields is optional. You can leave them blank without affecting the user account. This information is recorded in the `/etc/passwd` file for future reference.

   The account is given the C shell as its login shell. The account also is assigned membership in a new group with an identification number but not a name, and in which this account is the sole member. If these are acceptable to you, continue with the following step to create the account. However, if you want to change the login shell or assign the account to a group by name, skip the next step and turn to "Modifying the Group Membership or Login Shell" later in this chapter.

7. **Click `adduser`.**

You return to the CommandShell window and see the `adduser` command line that you built with Commando.

8. **Press RETURN.**

   When the command finishes running, the screen displays information about the new account, which is ready for use. You can see an entry for the new account by entering `ls /users`. The home directory folder for the account will appear in the Finder when the user logs into the account, and the folder will bear the user's login name

To assign a password to the new account rather than waiting for the account owner to assign it one, see "Adding a Password to an Account" later in this chapter.

You're ready to create another user account if you wish.

Modifying the group membership or login shell

Selecting another login shell or adding the account to a group are common, easily effected changes to make while creating the account. The following procedures show you how.

However, if you need to change file permissions on the account or change the directory in which the account is stored, see Chapter 3, "User and Group Administration" in *A/UX Local System Administration*. Also see that guide for instructions on changing an account once you've created it. That guide contains a complete reference on the `adduser` script.

About groups

Group membership allows users to look at and make changes to files in another group member's account. This capability requires that the permissions on the file and its containing directory allow read and write access to group members. If you want the owner of this user account to share such privileges with another user, you need to add it to a group.

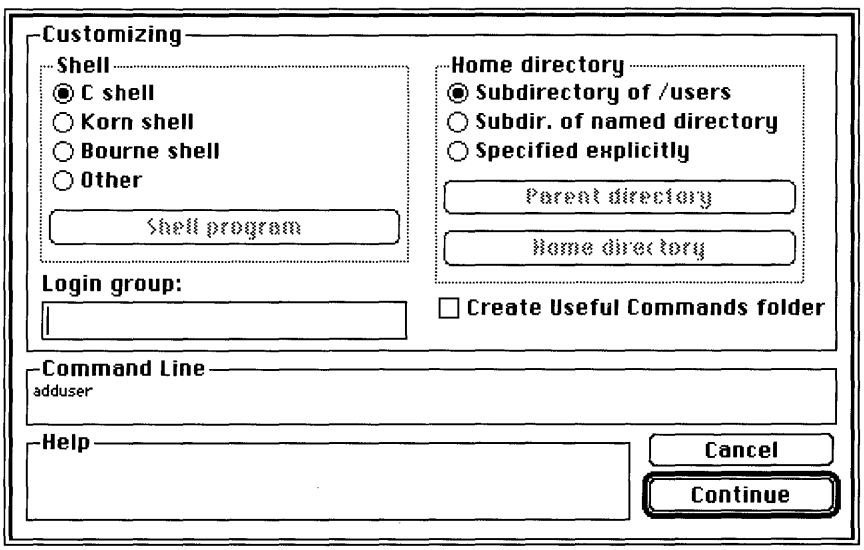
A group is identified by its group name or group ID number. Because a name is easier to remember than a number, this procedure refers to groups by name.

A/UX is shipped without groups. If you're creating the first group for your A/UX system, follow this procedure. Also follow this procedure if you're adding the account to an existing group for which you know the name. However, if you don't know the name of the group, you need to look at the `/etc/group` file to find the name of the group before proceeding with these steps.

1. **Click Customizing.**

   The Customizing dialog box appears, as shown in Figure 2-4.

■ **Figure 2-4** The `adduser` Customizing dialog box



2. **From the Shell options select the login shell of your choice.**
3. **Type the group name to which you want to add this account.**

   If the group does not exist, create a name for the group by typing in this box.

4. **Click Continue.**
5. **Click adduser.**

You return to the CommandShell window.

6. **Press RETURN.**

   When the command finishes running, the screen displays information about the new account, which is ready for use. You can see an entry for the new account by entering `ls /users`. The home directory folder for the account will appear in the Finder when the user logs into the account, and the folder will bear the user's login name.

Adding a password to an account

A user account has no password until someone logs in to the account for the first time. At first log in, the account requires the person to assign it a password. Until the account has a password, anyone can log in to the account. If you require more system security, immediately log in to the account and assign it a password. Tell the account owner the password, and he or she can change it.

If you need instructions on how to add a password, see *A/UX Essentials.*

Removing a user account

If a user account is no longer needed, you can remove its files from the disk to create space for other files. Of course, if the account contains valuable files, copy them to a floppy disk or tape cartridge, or in some way copy them before removing the account. When in doubt as to the value of the files in an account, make a backup of the files before removing the account.

The simplest way to copy a directory is to drag the directory folder icon to the icon of an empty floppy disk you inserted into a disk drive. Of course, if the directory is larger than the capacity of one floppy disk, you must select files in the directory and copy them to a floppy disk, and copy other files to additional disks until you have copied all the files in the directory. You have several other ways to make backup copies of A/UX files. For a complete description of the choices and for specific instructions on how to back up a directory, see Chapter 2, "Getting Around in A/UX," in *A/UX Essentials.*

After the account is backed up, you can remove it. You remove a user account the same way you remove any directory. Follow these steps:

1. **Log in to the root account.**
2. **In the Finder, open the / icon, then open the `users` folder.**

   The contents of the `users` folder are displayed.
3. **Drag the user account folder to the Trash.**
4. **Choose Empty Trash from the Special menu.**

The account's home directory is deleted.

Chapter 3 **Adding and Managing Printers**

To print from A/UX you can either connect a printer directly to your Macintosh computer for exclusive use by yourself and others who may use your computer, or you can connect your computer to a network and use the printers available on the network.

This chapter describes how to connect any Apple LaserWriter (except for the LaserWriter IISC) or ImageWriter printer directly to your Macintosh running A/UX. If you want to connect to a printer on an existing LocalTalk or TCP/IP network, skip this chapter and instead see Chapter 9, "Connecting Your Computer to a Network."

To add printers not made by Apple, see "Setting Up Other Printers" in Chapter 7 of *A/UX Local System Administration.*

Adding a LaserWriter

To connect a LaserWriter to a Macintosh running A/UX, you need two LocalTalk™ system connector kits—one kit to connect to the LaserWriter and one to connect to the Macintosh computer. LocalTalk system connector kits are available from your authorized Apple dealer.

This section describes how to

- add a LaserWriter to a Macintosh running A/UX
- use the Chooser to select the printer you're going to use

△ **Important** A/UX does not support the LaserWriter IISC. △

When you are finished with the procedures in this section, you will have set up a small LocalTalk network between your Macintosh and your printer. Should you later wish to expand this network to include other computers or printers, refer to the *LocalTalk Cable System Owner's Guide,* which comes with each LocalTalk system connector kit, for further instructions.

Connecting a LaserWriter

To connect a LaserWriter to a Macintosh running A/UX, follow these steps:

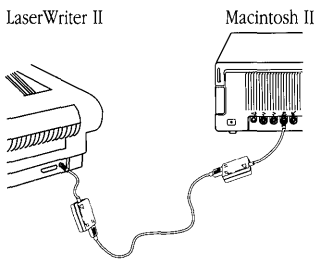
1. **Unpack the LaserWriter and set it up with paper and a power source by following the instructions in the owner's guide, but don't connect it to your computer.**
2. **Shut down A/UX.**

   Choose the Shut Down command from the Special menu.
3. **Switch off the LaserWriter.**
4. **Follow the instructions in "Installing a Network Using LocalTalk Cables" in *LocalTalk Cable System Owner's Guide* to connect your LaserWriter to your Macintosh computer.**

These instructions describe how to connect the boxes and cables together, and then connect one of the connector box cables to the LaserWriter and one to the Macintosh. The result is shown in Figure 3-1.

- *Note:* If you have a LaserWriter IINT or NTX, your LaserWriter owner's guide has instructions on connecting the printer by using AppleTalk cables and connectors. You can follow the instructions in your owner's guide instead of in the *LocalTalk Cable System Owner's Guide.*

■ **Figure 3-1** LocalTalk cables and connector boxes connecting a LaserWriter to a Macintosh



- *Note:* The SCSI port on the LaserWriter II NTX lets you connect a hard disk directly to this printer to provide a place to store large numbers of fonts that are quickly accessible to the printer. Your LaserWriter owner's guide contains complete information on connecting a hard disk to the printer SCSI port.

5. Switch on the printer and make sure the green Select light flashes.

When you turn on the LaserWriter, it prints a test page if it's running correctly. Your LaserWriter owner's guide contains more information about this self-test. If the printer does not produce a test page, see the guide for help in correcting the problem.

6. Switch on the Macintosh and start A/UX.

7. Log in to the root account.

- *Note:* If any users on your system have already created personal System Folders (as described in *A/UX Essentials*), they must also log in and go through the next four steps to update their personal System Folders with a printer selection.

8. **In the A/UX Finder, choose the Chooser from the Apple menu.**
9. **Make sure the AppleTalk Active button is selected.**

   Click the button if it isn't.

10. **Select the LaserWriter icon from the upper-left box.**

    The name LaserWriter, or another name previously assigned to this printer, appears in the box to the right.

11. **Close the Chooser.**

    You can close the Chooser by clicking its close box. Proceed to "Testing the Printer in A/UX" later in this chapter.

Adding an ImageWriter

You can use any of the ImageWriter printers with A/UX. You can connect an ImageWriter either with two LocalTalk system connector kits or with a serial cable. You gain no advantage using one method over the other, with one exception: if you connect an ImageWriter LQ with a serial cable you will not be able to use `lpr`, the A/UX print utility.

△ **Important** If you are connecting an ImageWriter I, you must use a serial cable. △

This section describes how to

- connect an ImageWriter to a Macintosh running A/UX by using either LocalTalk system cables or a serial cable
- use the Chooser to select the printer you're going to use, if you connected the printer with LocalTalk system cables

Connecting an ImageWriter with LocalTalk cables

You need to install a LocalTalk Card in your ImageWriter printer if you wish to connect it to your Macintosh with LocalTalk system cables. This card is available from your authorized Apple dealer.

△ **Important** If you have an ImageWriter I, you must connect it with a serial cable. Turn to "Connecting an ImageWriter With a Serial Cable" later in this chapter. △

When you are finished with the procedures in this section, you will have set up a small AppleTalk network between your Macintosh and your printer. Should you later wish to expand this network to include other computers or printers, refer to *LocalTalk Cable System Owner's Guide,* which comes with each LocalTalk system connector kit, for further instructions.

To use LocalTalk system cables to connect an ImageWriter to a Macintosh running A/UX, follow these steps:

1. **Shut down A/UX.**

   Choose the Shut Down command from the Special menu.

2. **Unpack the ImageWriter, but don't turn the power on.**

   Follow the instructions in your ImageWriter II or ImageWriter LQ owner's guide.

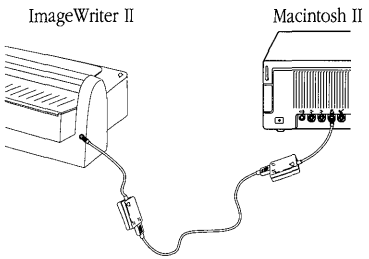
3. **Install a LocalTalk Card in the ImageWriter.**

   To install the LocalTalk Card in your ImageWriter, follow the instructions in the *ImageWriter II/LQ LocalTalk Option User's Guide* that comes with the LocalTalk Card.

4. **Follow the instructions in "Installing a Network Using LocalTalk Cables" in *LocalTalk Cable System Owner's Guide* to connect your ImageWriter to your Macintosh computer.**

   These instructions describe how to connect the boxes and cables together, and then connect one of the connector box cables to the ImageWriter and one to the Macintosh. The result is shown in Figure 3-2.

■ **Figure 3-2** LocalTalk cables and connector boxes connecting an ImageWriter to a Macintosh



5. **Switch on the printer and make sure the green Select light is on.**
6. **Switch on the Macintosh and start A/UX.**
7. **Log in to the root account.**

   ◆ *Note:* If any users on your system have already created personal System Folders (as described in *A/UX Essentials*), they must also log in and go through the next four steps to update their personal System Folders with a printer selection.

8. **In the A/UX Finder, choose the Chooser from the Apple menu.**
9. **Make sure the AppleTalk Active radio button is selected.**

   Click the button if it isn't.

10. **Select the AppleTalk ImageWriter icon or the LQ AppleTalk ImageWriter icon from the upper-left box.**

    The name of your model of ImageWriter appears in the box to the right.

11. **Close the Chooser.**

    You can close the Chooser by clicking its close box. Proceed to "Testing the Printer in A/UX" later in this chapter.

Connecting an ImageWriter with a serial cable

You can connect any ImageWriter with a serial cable to a Macintosh computer running A/UX. However, if you connect an ImageWriter LQ with a serial cable, you will be able to print using Macintosh applications such as TextEditor, but you won't be able to print using `lpr`, the A/UX print utility. See "Printing a File" later in this chapter for more information.

To add an ImageWriter by using a serial cable, follow these steps:

1. **Unpack the ImageWriter, but don't turn the power on.**

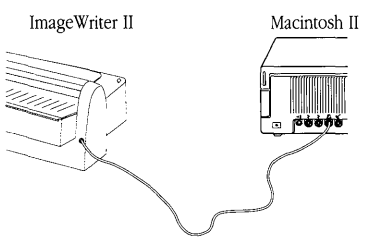
   Follow the instructions in your ImageWriter owner's guide.

2. **Use the serial cable(s) appropriate for your printer, as described here.**

   - For the ImageWriter II and ImageWriter LQ

     Use a Macintosh Plus-to-ImageWriter II cable, as explained in your owner's guide. Figure 3-3 shows the result.

■ **Figure 3-3** A serial cable connecting an ImageWriter II to a Macintosh II



   - For the ImageWriter I

     Connect a Macintosh Plus adapter cable to an ImageWriter cable. Attach the DB-9 connector of the ImageWriter cable to the DB-9 connector of the Macintosh Plus adapter cable. Then plug the DB-25 connector of the ImageWriter cable into the printer port on the ImageWriter. Finally, plug the mini-8 connector of the Macintosh Plus adapter cable into the printer port on the Macintosh computer.

3. **Follow the instructions in your ImageWriter owner's guide to connect the serial cable between the printer port on the back of the computer and the serial port on your printer.**
4. **Switch on the printer and make sure the green Select light is on.**
5. **Switch on the Macintosh and start A/UX.**

Testing the printer in A/UX

To be sure the printer is working in A/UX, follow these steps:

1. **Choose CommandShell from the Apple menu.**

   If a CommandShell window does not appear, choose New from the File menu.

2. **Open a letter stored in the start account by entering**
   `TextEditor /users/start/letter1`

   This starts the TextEditor application and automatically opens the file `letter1`, which contains a bland business letter.

3. **Choose Print Window from the File menu.**
4. **Click OK in the Print dialog box.**

   This sends the letter to the printer.

   If the letter isn't printed, there could be a problem with the printer. See the troubleshooting section in your printer owner's guide for help locating the problem. If the problem isn't solved with help from the owner's guide, the problem might be with A/UX. See "Managing Other Peripheral Devices" in *A/UX Local System Administration* for information on checking that the printer spooler and printing scheduler are running.

   You are finished connecting and testing the printer. You can quit the TextEditor application by choosing Quit from the File menu. The next section provides instructions on two ways to print a file in A/UX.

Printing a file

This section describes the two main ways to print files in A/UX. First it describes how to print the Macintosh way by selecting Print from the File menu. Then it describes how to print using `lpr`, the A/UX print utility. (A/UX also supplies several standard UNIX text processors, such as `troff` and `tbl`. See *A/UX Text Processing Tools* for information on creating and printing files with these utilities.)

The files that you can print the Macintosh way include those created with Macintosh applications as well as ordinary text files. Macintosh applications make use of the Macintosh graphic user interface. An example of this kind of application is TextEditor, which is distributed with A/UX as its default text editor. TextEditor gives you the capability to create, edit, and print text files with the help of a mouse and pull down menus.

The files you can print with the A/UX print utility, `lpr`, are files created with A/UX text editors, such as TextEditor and the `vi` editor, and text files that are part of the A/UX distribution; for example, `/etc/passwd`.

Printing a file the Macintosh way

Follow these steps to use the Macintosh way to print a text file or a file created with a Macintosh application:

1. **Select the file you want to print from the A/UX Finder.**
2. **Choose Print from the File menu.**

   This automatically starts the application that created the file and opens the file on your screen. A Print dialog box will also appear. With TextEditor as the default editor under A/UX, you can select text files such as `/etc/passwd` and send them to the printer in this way.
3. **Click OK in the Print dialog box.**

   This sends the file to your printer.

Alternatively, if you have your application already running, you can open the file from your application and then choose Print from the application's File menu. Again, click OK when the Print dialog box appears.

Printing a text file by using the A/UX `lpr` print utility

Follow one of these steps to print a file by using the `lpr` utility:

- **If you have a LaserWriter or a LocalTalk-connected ImageWriter printer, enter the following command from a CommandShell window:**
  `lpr` *filename*

  For *filename,* type the name of the text file you want to print.

- **If you have a serially connected ImageWriter printer, enter the following command from a CommandShell window:**
  `lpr -Piw` *filename*

  For *filename,* type the name of the text file you want to print.

Chapter 4 **Adding and Managing Hard Disk SCs**

You can expand your A/UX system by adding one or more external hard disks. Multiple hard disks provide not only more storage, but also more ways to divide up disk space. For example, some people will use A/UX exclusively, while others might distribute their time or their co-worker's time between A/UX and the Macintosh Operating System (OS). Perhaps they will want half of their added disk space allocated for A/UX and half for the Macintosh OS.

Since A/UX can access files in the portion of the disk storing the Macintosh OS as easily as it can access files in its own file system, consider storing all your Macintosh applications and documents in a Macintosh file system so that you can access them from either operating system.

This chapter describes how to

- devise a plan to allocate disk space for A/UX and the Macintosh OS
- prepare a disk to store only A/UX user files
- prepare a disk to store both A/UX and the Macintosh OS
- prepare a disk with a separate `/usr` partition to store large application programs such as X Window System
- create a file system on an A/UX partition and mount it into A/UX

Planning the use of your disk space

There's no substitute for a good plan when it comes to making efficient use of hard disks. Before partitioning your disk, you need to answer several questions:

- What's your total disk capacity? Of course, the larger the available disk space, the more flexibility you have in designing your system.
- How much disk space do you require for user accounts? This will help you decide how much disk space you need to add and which distribution files you'll choose not to install, such as the on-line man (manual) pages.
- How much space do you require for large application programs you might add, such as X Window System? If you are planning to add X Window System, keep in mind that X11 requires 13 megabytes (MB) of disk space and MacX™ requires 4 MB of disk space. When calculating the required partition size for X11 or MacX, increase your figure by 10% to allow space for the file system to juggle its overhead work.
- Do you need to use the Macintosh OS? If so, you'll probably want to increase the size of the MacPartition because, as shipped, it is 1 MB in size and likely to be inadequate.
- Are there distribution files that you didn't install due to limited disk space, such as the on-line man pages? If so, you might want to install them now that you are adding disk space.

When calculating the required partition size for any partition, increase your figure by at least 10% to allow space for the file system to juggle its overhead work.

Understanding a few facts

Novice A/UX administrators are often confused by the difference between a partition and a file system. Understanding the difference between these two entities helps when performing the steps to create them.

- A partition is hardware oriented. It is a sectioned-off area of a disk. You create disk partitions by using the Apple HD SC Setup software. (You can also create partitions by using the `dp` (1M) utility provided with A/UX. But be forewarned: using this utility requires a solid understanding of UNIX file systems and slice numbers.)

- A file system is software oriented and goes into a partition. A file system provides the overhead or "bookkeeping" system on a disk to manage the location of files. A/UX 2.0 uses the Berkeley type of file system. When you add a file system to A/UX, you have a choice between using two types: Berkeley and System V. Unless you have a reason to do otherwise, we recommend you stay with the Berkeley file system, as it offers better performance and allows longer filenames.
- A/UX and the Macintosh OS use entirely different types of file systems. One of the major differences between the two operating systems is that the Macintosh OS and related files always reside in one partition, whereas A/UX can reside in several partitions, each one with a special use.
- With Apple HD SC Setup you can choose from several predefined partitioning schemes. These schemes provide various combinations of partitions for A/UX system files, A/UX user files, and the Macintosh OS. With Apple HD SC Setup you can customize any of these predefined partitioning schemes to further match your needs.
- Some of the predefined partitioning schemes are applicable only to disks of a certain size. The Apple HD SC Setup software displays a help box on the screen to give you this type of information when selecting partitioning schemes.

Keeping user files in a separate partition

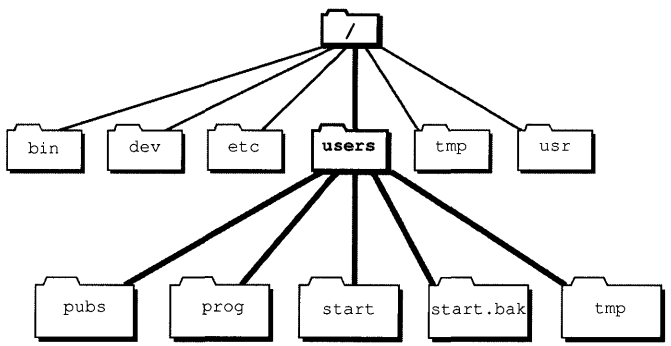
User files are any files on an A/UX system other than those distributed with A/UX. Typical user files are programs you've written, files created with text editors, and application programs you run in A/UX. These are normally stored in the directories associated with user accounts.

Over time, the number of user files increases, while the number of distribution files remains constant. Therefore, when you add disk space to your A/UX system, you're adding it to hold user files. (The exception to this is adding disk space to hold distribution files that you never installed because of limited disk space.)

As distributed, A/UX stores user accounts in a partition with system files. When you disperse A/UX over multiple disks, put the user files in a separate partition from the distribution files. This will let you manage the process of backups with less time and necessary disk space. It will let you concentrate on backing up the partition that contains the user files, which change frequently and thus need backing up frequently, and not the partition containing the system files, which seldom change and thus seldom need backing up.

Keeping the user files separate from the distribution files means putting user files in their own partition so you can mount their file system in their own directory, or limb, off of `root`, as shown in Figure 4-1.

- **Figure 4-1** User files on a major limb off of `root`



The predefined partitioning schemes in HD SC Setup are designed to place user files in a separate partition from distribution files.

Novice administrators often make the mistake of creating user accounts on the `/usr` branch. This is not a good idea because `/usr` is one of the largest branches in the A/UX file system and contains on-line man (manual) pages, utilities, games, and many other files. Putting user accounts here would make backing up the user account files very difficult. Instead, use the `/usr` branch to store large application programs you may add to A/UX, such as X Window System. And to store user accounts, use the `/users` directory, as described in this chapter, or another directory that you create.

Only you, the administrator, will know that user files are actually stored on a separate disk, in a separate file system off of `root`. No disk icon for the users file system will appear on the desktop to give it away as something special. Users will see their user accounts as residing in a directory under `/`, like any other directory.

Connecting the Hard Disk SC

Your *Apple Hard Disk SC* owner's guide describes how to attach a second SCSI disk to your computer, or a third or fourth. It also describes the intricacies of attaching an additional hard disk to a system for which a Tape Backup 40SC or an AppleCD SC drive is already connected. See the *Apple Hard Disk SC* owner's guide for instructions on physically connecting an additional Hard Disk SC, then return to "Starting Apple HD SC Setup," the next section in this chapter.

Starting Apple HD SC Setup

Here are the steps to prepare a disk. They apply to both new and used disks.

1. **Turn on the power to all external disks, including the one you want to partition.**
2. **Start the computer from the *Utilities 1* floppy disk included with the A/UX product.**

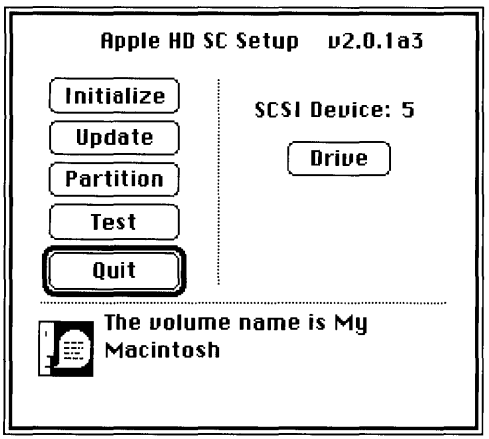
   With the computer turned off, insert the *Utilities 1* disk into the drive and press the POWER ON key.

   Apple HD SC Setup runs on the Macintosh OS and not on A/UX. The floppy disk contains a Macintosh System Folder with all the necessary system files to start up the Macintosh OS.
3. **Double-click the Apple HD SC Setup icon to start this program.**

   The main dialog box of Apple HD SC Setup appears, as shown in Figure 4-2.

▲ **Warning** Apple HD SC Setup is preset to initialize the disk with the lowest SCSI ID number. Do not initialize your system disk because initializing erases the disk. ▲

■ **Figure 4-2** The main dialog box of Apple HD SC Setup



Do I need to initialize?

You only need to initialize a Hard Disk SC if

- the disk is blank and has not been used.
- the disk has been previously used with an operating system other than A/UX.
- you've been trying to use the disk with A/UX, but it's been giving you trouble.

  To use the disk for A/UX, start the disk preparation procedure from scratch so that by the end of this procedure either the disk will function properly or you'll know that the problem lies with the disk and not with the software.

◆ *Note:* If your disk contains files, make a backup of the important files on the disk before reinitializing, as reinitializing erases the disk.

If you need to initialize the disk, follow these steps. Otherwise, turn to the next section, "Partitioning the Disk."

1. **Click Drive until you see the SCSI number of the disk you want to initialize.**

   The SCSI ID number is located on the back panel of the hard disk, in a small opening below the SCSI ports.

2. **Click Initialize.**

   An alert box tells you that initializing erases all information from the disk.

3. **Click Init.**

   If the disk has not been previously partitioned with a Macintosh partition, you are prompted to name the Macintosh volume. The initialization procedure automatically partitions the disk with one large Macintosh volume.

4. **If you are prompted to name the Macintosh volume, type a name and click OK.**

   Volume is another word for file system. If you create a Macintosh partition on the disk, the name you supply will appear in the Finder to identify the Macintosh file system.

   Disk initialization takes several minutes, depending on the size of the disk.

You're ready to partition the disk.

Partitioning the disk

Use this list to decide which of the next three subsections describes the partitioning scheme you want, then follow the procedure provided in that subsection.

- To partition for A/UX user files exclusively, see "Creating a Partition for A/UX User Files Only." You must have a 20 MB disk or larger.
- To partition for A/UX user files and the Macintosh OS, see "Creating Partitions for A/UX User Files and the Macintosh OS." You must have a 40 MB disk or larger.
- To partition for A/UX user files and a `/usr` partition to store large application programs such as X Window System, see "Creating Partitions for A/UX User Files and `/usr`." You must have an 80 MB disk or larger.

Other partitioning schemes are possible, as well as variations on the ones listed here. For help in carrying out variations, see the complete reference for A/UX and Apple HD SC Setup in *A/UX Local System Administration.*

The partitioning schemes described here assume that the A/UX system is already on a hard disk. If you need instructions to install the A/UX system from tape, floppy disks, or a CD-ROM, whether it be a repeat installation or your first installation of A/UX, see *A/UX Installation Guide* for instructions.

Creating a partition for A/UX user files only

Follow these steps if you want to prepare a disk to hold A/UX user files, to the exclusion of A/UX system files and the Macintosh OS.

1. **Start the Apple HD SC Setup program.**

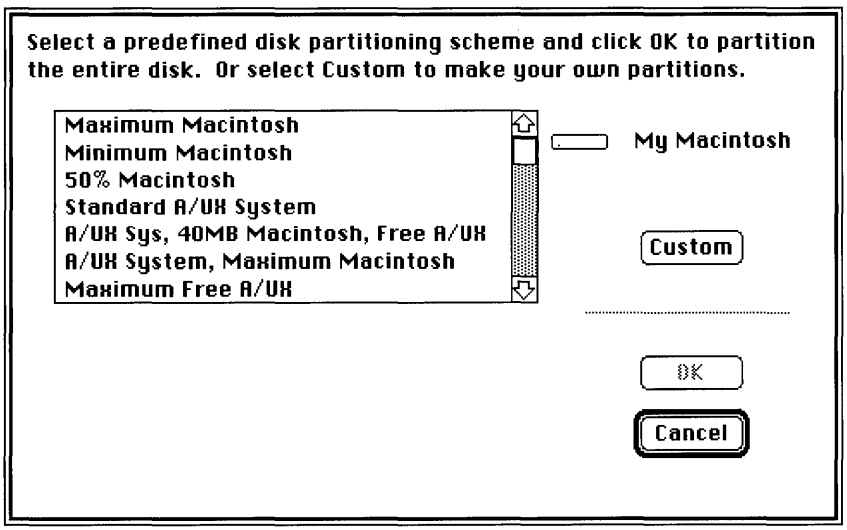
   Follow the instructions in "Starting Apple HD SC Setup," earlier in this chapter.

   △ **Important** Make sure you are partitioning the correct disk. Does the SCSI device number displayed on screen match the SCSI ID number of the hard disk you want to partition? If not, click Drive until they match. △

2. **Click Partition.**

   The Partition dialog box appears, as shown in Figure 4-3.

■ **Figure 4-3** The Partition dialog box



3. **Select Maximum Free A/UX.**

   A brief description of this partitioning scheme appears in the dialog box.

4. **Click OK to confirm your selection.**

   You can also double-click the partition to select and confirm it.

   An alert box warns you that partitioning erases any information on your hard disk. If you click Cancel, you return to the main dialog box, and no partitioning takes place.

5. **Click OK to continue.**

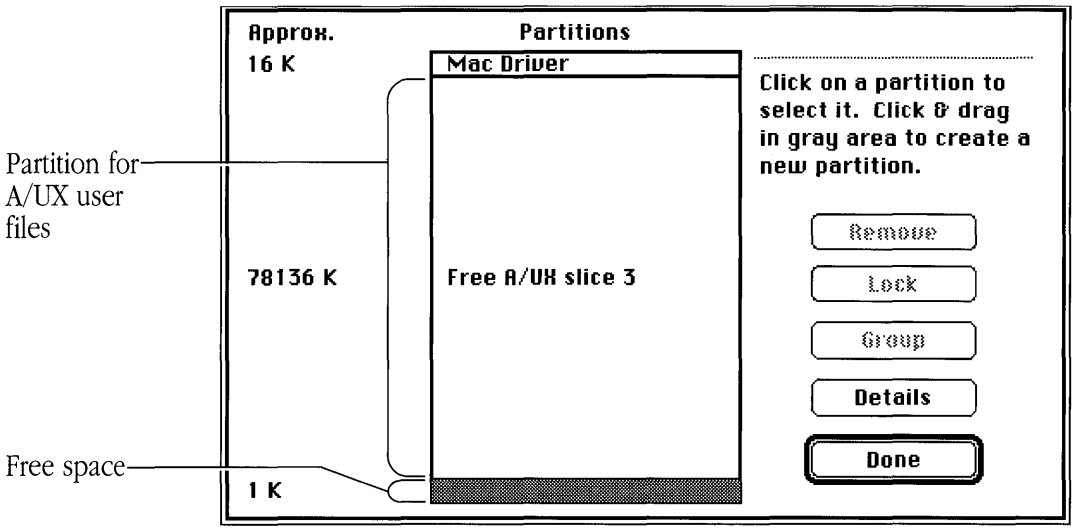
   Partitioning usually takes less than a minute.

   You return to the main dialog box.

6. **To see a graphic representation of your newly partitioned disk, click Partition, and then click Custom.**

   The Custom Partition dialog box appears, as shown in Figure 4-4.

■ **Figure 4-4** The Custom Partition dialog box for Maximum Free A/UX



The disk is divided into three partitions, with the largest partition for A/UX user files. The MacDriver partition contains disk-management software. The grey rectangle is free space at the end of the disk. The size of each partition, in kilobytes, is shown to the left of the rectangle that represents the partition.

▲ **Warning** The MacDriver partition and the free space at the end of the disk are necessary for proper use of the disk. Do not remove them. ▲

7. Click Done.

You return to the main dialog box.

8. Click Quit.

An icon for your newly partitioned A/UX disk will not appear in the Macintosh Finder or in the A/UX Finder.

You are ready for the last two procedures in preparing a disk for A/UX: making a file system and mounting it onto your existing A/UX system. Turn to "Making and Mounting a File System," later in this chapter.

Creating partitions for A/UX user files and the Macintosh OS

You can partition an additional hard disk to store A/UX user files and the Macintosh OS. The predefined partitioning scheme automatically divides the disk 50/50 between these two uses, but you can easily change the size of these two partitions.

1. **Start the Apple HD SC Setup program.**

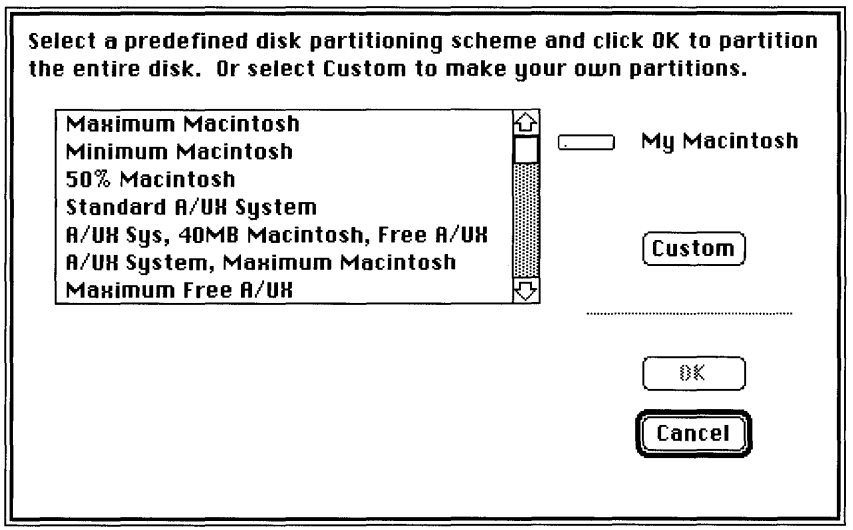
   Follow the instructions in "Starting Apple HD SC Setup," earlier in this chapter.

   △ **Important** Make sure you are partitioning the correct disk. Does the SCSI device number displayed on screen match the SCSI ID number of the hard disk you want to partition? If not, click Drive until they match. △

2. **Click Partition.**

   The Partition dialog box appears, as shown in Figure 4-5.

■ **Figure 4-5** The Partition dialog box



3. **Press the down scroll arrow until you see 50% Macintosh, 50% A/UX, and then select it.**

   A brief description of this partitioning scheme appears in the dialog box.

4. **Click OK to confirm your selection.**

   You can also double-click the name of the partitioning scheme to select and confirm it.

   An alert box warns you that partitioning erases any information on your hard disk. If you click Cancel, you return to the main dialog box, and no partitioning takes place.

5. **Click OK to continue.**

   If the disk has not been partitioned with a Macintosh partition before, you are prompted to name the volume.

6. **If a message prompts you to name the Macintosh volume, type a name and click OK.**

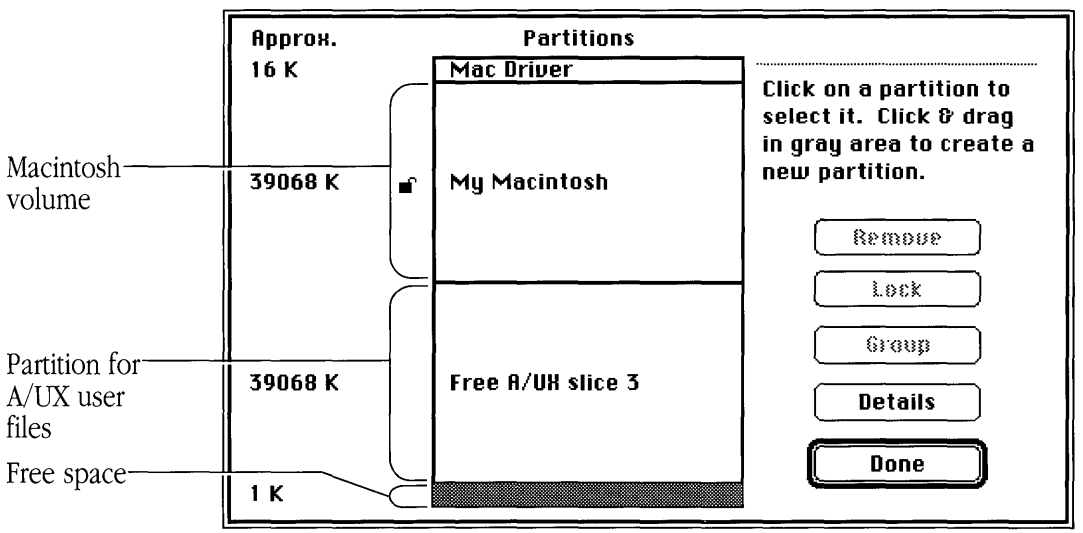
   Volume is another word for file system. The name you supply will appear in the Finder to identify the Macintosh file system.

   Partitioning usually takes less than a minute, depending on the size of the Macintosh partition. Then you return to the main dialog box.

7. **Click Partition, and then click Custom.**

   The Custom Partition dialog box appears, as shown in Figure 4-6.

■ **Figure 4-6** The Custom Partition dialog box for 50/50



The disk is divided into two main partitions of equal size: one for A/UX user files and one for the Macintosh OS. The Macintosh partition has the name you gave it. The size of each partition, in kilobytes, is shown to its left.

▲ **Warning** The MacDriver partition and the free space at the end of the disk are necessary for proper use of the disk. Do not remove them. ▲

If the 50% Macintosh, 50% A/UX partitioning scheme fits your needs, you are finished partitioning and ready to turn to "Making and Mounting a File System," later in this chapter.

However, if you want to change the sizes of these two partitions, turn to "Adjusting the Size of Partitions," later in this chapter.

Creating partitions for user files and `/usr`

As shipped, the A/UX `root` partition contains a large directory called `/usr`. This directory traditionally stores large application programs that you might want to add to the system. The X11 product is an example of a large application program that you would store in `/usr`.

To allow room for a large application program, such as the X11 product, partition your disk with a separate `/usr` partition by following this procedure.

◆ *Note:* If you are planning to add X Window System to the `/usr` partition, keep in mind that X11 requires 13 MB of disk space and MacX requires 4 MB of disk space. When calculating the required partition size for X11 or MacX, (or for any partition), increase your figure by 10% to allow space for the file system to juggle its overhead work.

1. Start the Apple HD SC Setup program.

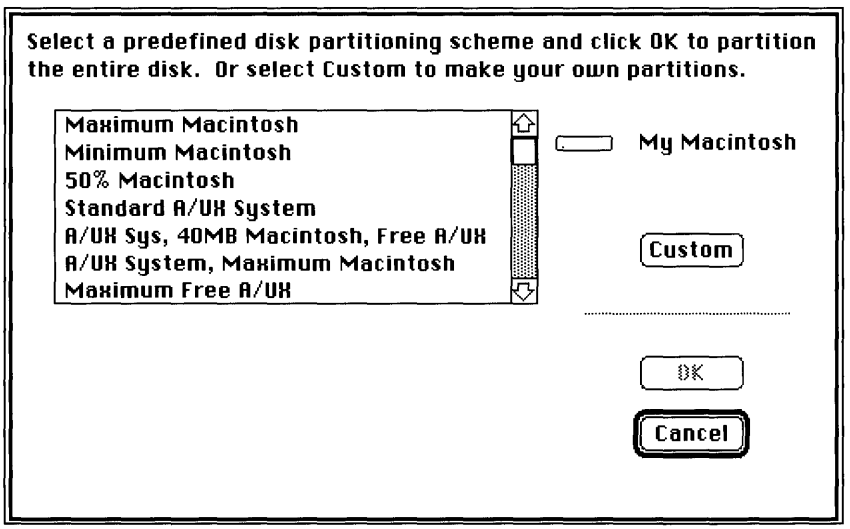
Follow the instructions in "Starting Apple HD SC Setup," earlier in this chapter.

△ **Important** Make sure you are partitioning the correct disk. Does the SCSI device number displayed on screen match the SCSI ID number of the hard disk you want to partition? If not, click Drive until they match. △

2. **Click Partition.**

The Partition dialog box appears, as shown in Figure 4-7.

■ **Figure 4-7** The Partition dialog box



3. **Press the down scroll arrow until you see 50% Macintosh, 50% Free A/UX, and then select it.**

The dialog box displays some information about this partitioning scheme.

4. **Click OK.**

You can also double-click the partition to select and confirm it.

An alert box warns you that partitioning erases any information on your hard disk. If you click Cancel, you return to the main dialog box, and no partitioning takes place.

5. **Click OK to continue.**

If the disk has not been partitioned with a Macintosh partition before, you are prompted to name the Macintosh volume.

6. **If you are prompted to name the Macintosh volume, type a name and click OK.**

   Volume is another word for file system. The name you supply will appear in the Finder to identify the Macintosh file system.

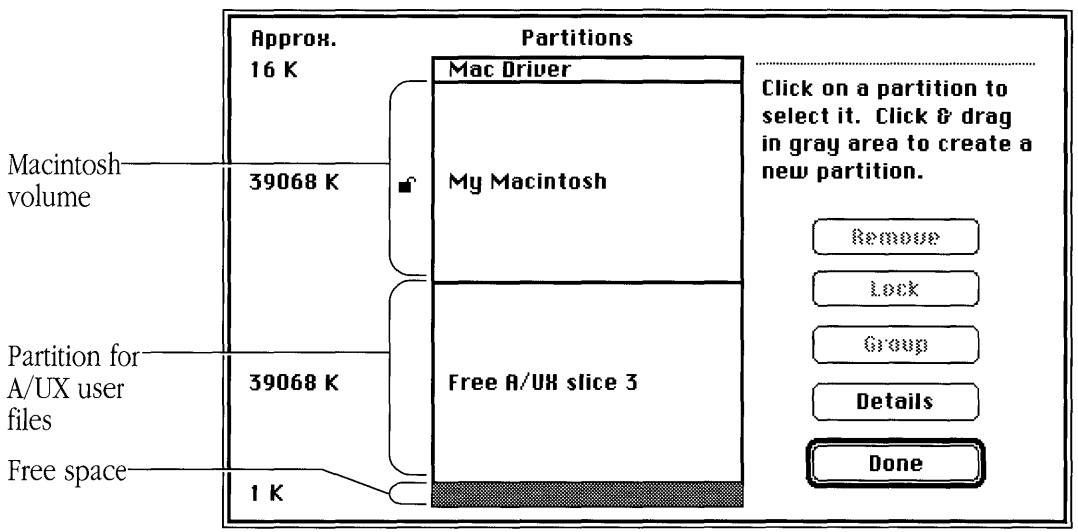
   Partitioning usually takes less than a minute, depending on the size of the Macintosh partition. Then you return to the main dialog box.

7. **Click Partition, and then click Custom.**

   The Custom Partition dialog box appears, as shown in Figure 4-8.

   Each partition is represented by a rectangle, and its size, in kilobytes, is shown to the left of the rectangle. Now you must remove the Macintosh partition and replace it with a partition for `/usr`.

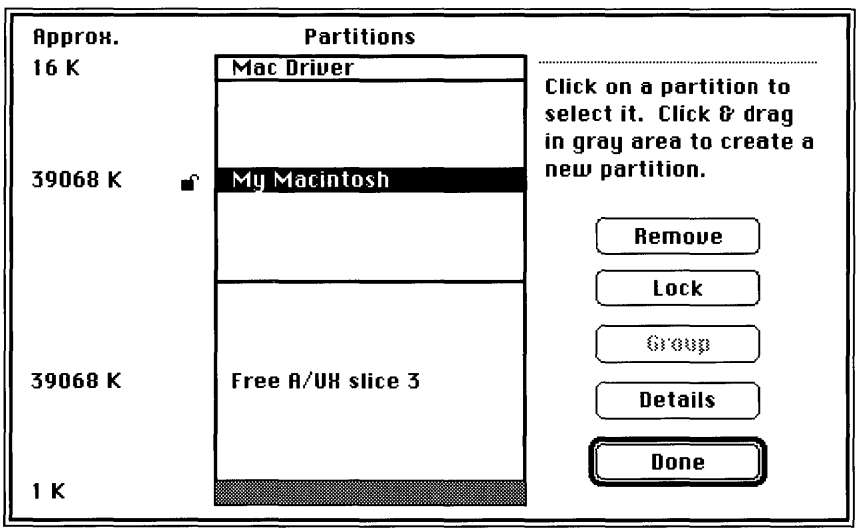
■ **Figure 4-8** The Custom Partition dialog box for 50/50



8. **Click the Macintosh partition to select it.**

   Figure 4-9 shows the partition after you've selected it.

■ **Figure 4-9** Selecting the Macintosh partition for removal



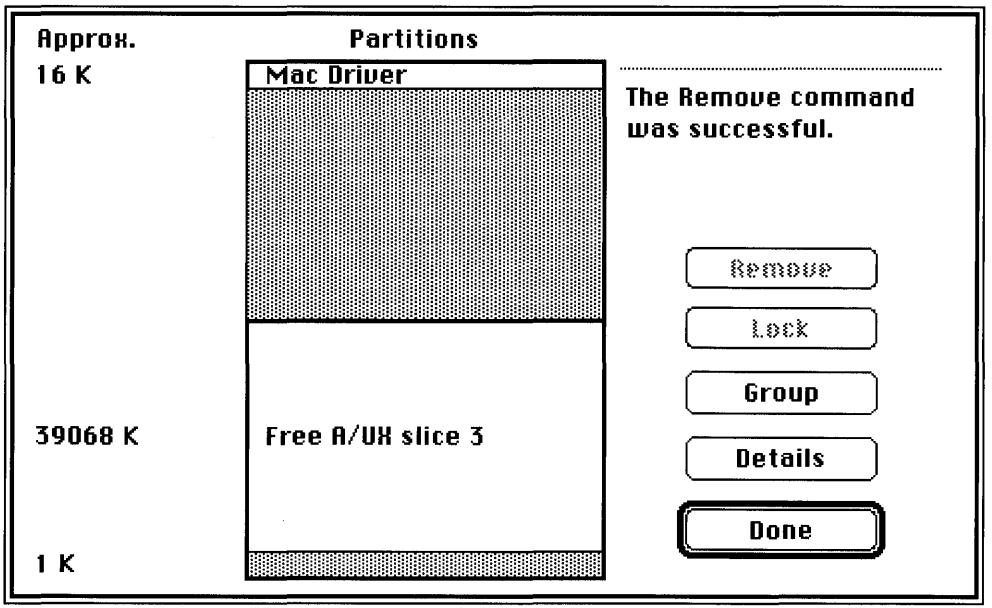
9. **Click Remove.**

   A warning message asks you to confirm that you want to erase the information in the partition.

10. **Click OK to continue.**

    Free space replaces the removed partition, as shown in Figure 4-10.

■ **Figure 4-10** The free space after a Macintosh partition is removed

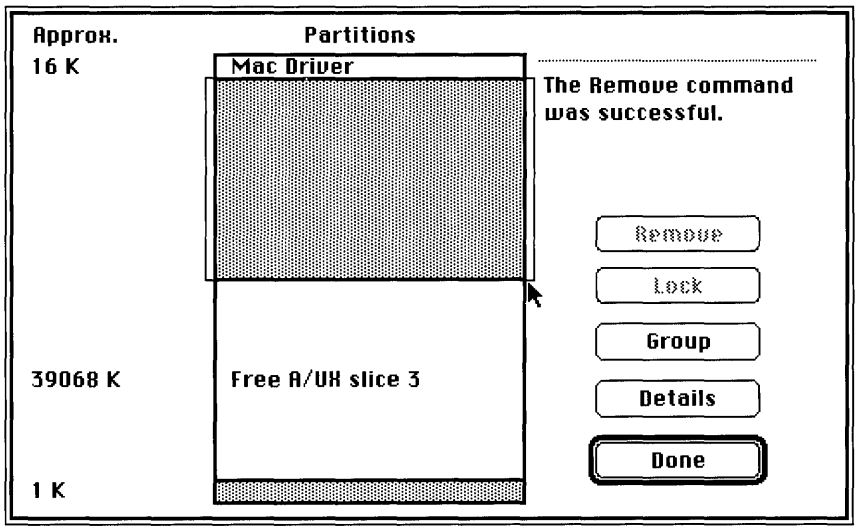


11. Press and drag downwards from the top of the grey area to select all the free space.

As you drag, a rectangle indicates the selection, as shown in Figure 4-11.

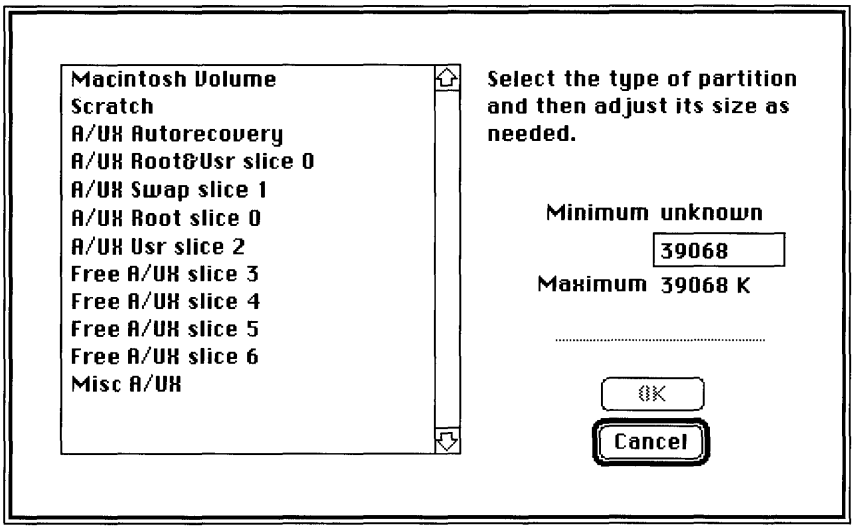
◆ *Note:* Leave 1K of free space at the end of the disk. The system needs this space as a buffer. And don't click the MacDriver partition or you'll move it instead of selecting the free space.

■ **Figure 4-11** Selecting the free space



After selecting the free space, the list of individual partition types appears, as shown in Figure 4-12.

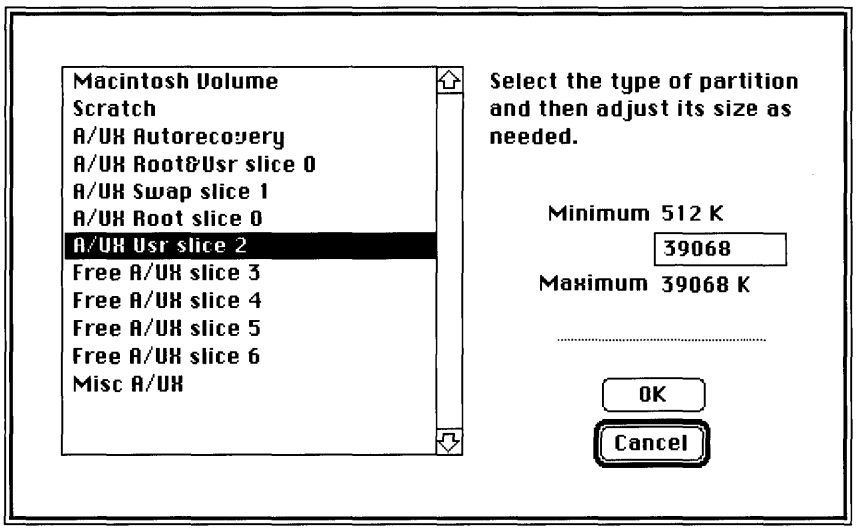
■ **Figure 4-12** The list of individual partition types



12. Click "A/UX Usr slice 2" to select it.

To the right appears the proposed size, in kilobytes, for the new partition. In addition, the minimum and maximum sizes for this type of partition are displayed, as shown in Figure 4-13. In this case, the minimum size is 512K and the maximum size is your proposed size.

■ **Figure 4-13** Selecting the A/UX Usr slice 2 partition type



13. Click OK.

The Custom Partition dialog box shows the new partitioning scheme.

14. Click Done.

You return to the main dialog box.

15. Click Quit.

- *Note:* This software program assigns slice 2 to the `usr` partition. You do not need to use `pname` to make this assignment.

An icon for your newly partitioned A/UX disk will not appear in the Macintosh Finder or in the A/UX Finder. All A/UX partitions are subsumed in the / file system, so the / icon in the A/UX Finder represents all your A/UX partitions.

You are ready to make and mount a file system on the partition. For instructions, turn to "Making and Mounting a File System" later in this chapter. However, if you want to adjust the size of partitions, continue with the next section "Adjusting the Size of Partitions."

Adjusting the size of partitions

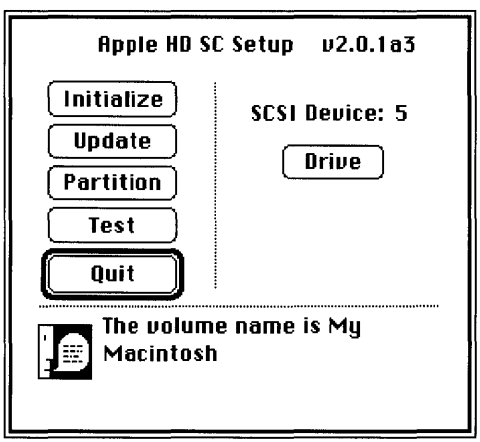
In the following steps, the figures illustrate a particular repartitioning scheme. But you can easily modify these steps to adjust the sizes of other partition types as well.

1. Start the Apple HD SC Setup application.

Follow the instructions in "Starting Apple HD SC Setup," earlier in this chapter. The main dialog box of Apple HD SC Setup appears, as shown in Figure 4-14.

△ **Important** Make sure you are partitioning the correct disk. Does the SCSI device number displayed on screen match the SCSI ID number of the hard disk you want to partition? If not, click Drive until they match. △

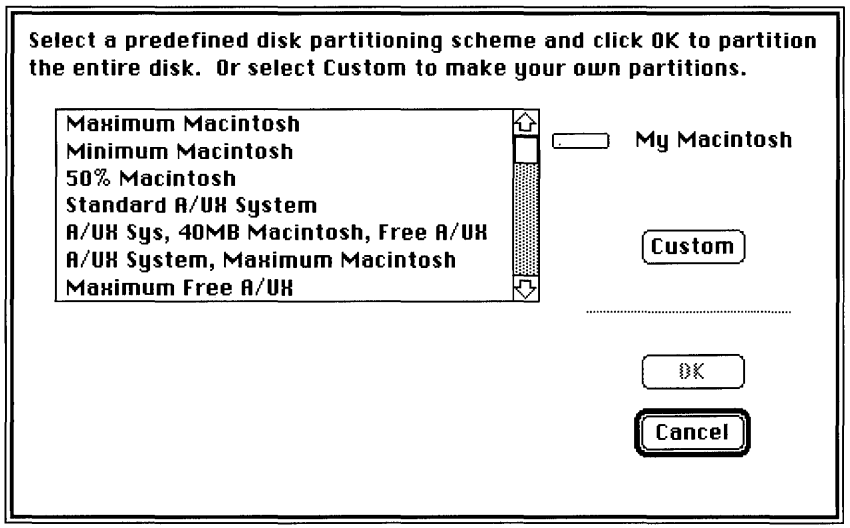
■ **Figure 4-14** The main dialog box of Apple HD SC Setup



2. Click Partition.

The Partition dialog box appears, as shown in Figure 4-15.

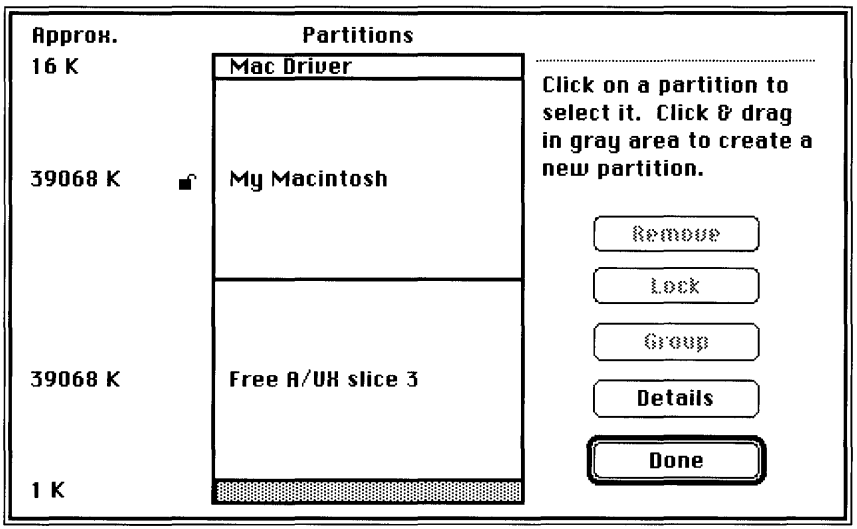
■ **Figure 4-15** The Partition dialog box



3. Click Custom.

The Custom Partition dialog box appears, as shown in Figure 4-16.

■ **Figure 4-16** A Custom Partition dialog box



- *Note:* The contents of the dialog box vary depending on the partitioning scheme of your disk.

4. **Select the partition you want to reduce in size.**
5. **Click Remove.**

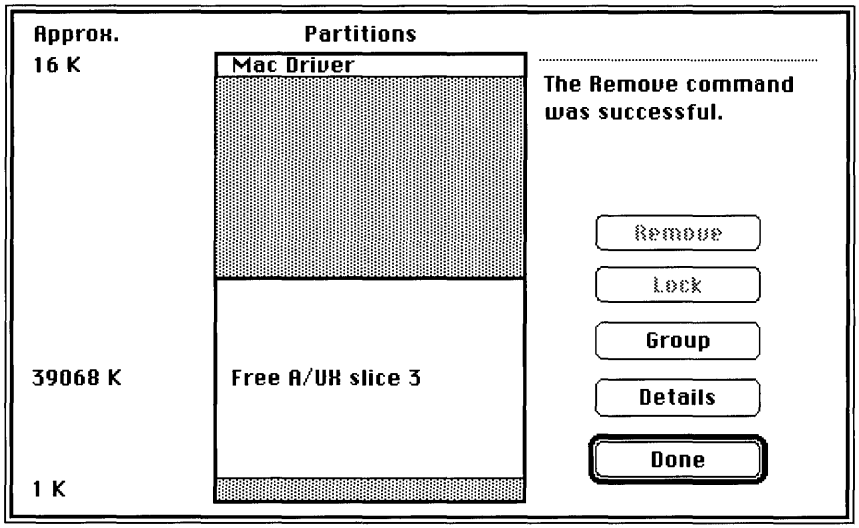
   This is temporary; you'll add the partition back in the next steps.

   An alert message warns that removing causes loss of all data on the partition.

6. **Click OK to continue.**

   Free disk space replaces the removed partition, as shown in Figure 4-17. You need to specify the size of the partition you want to add back.

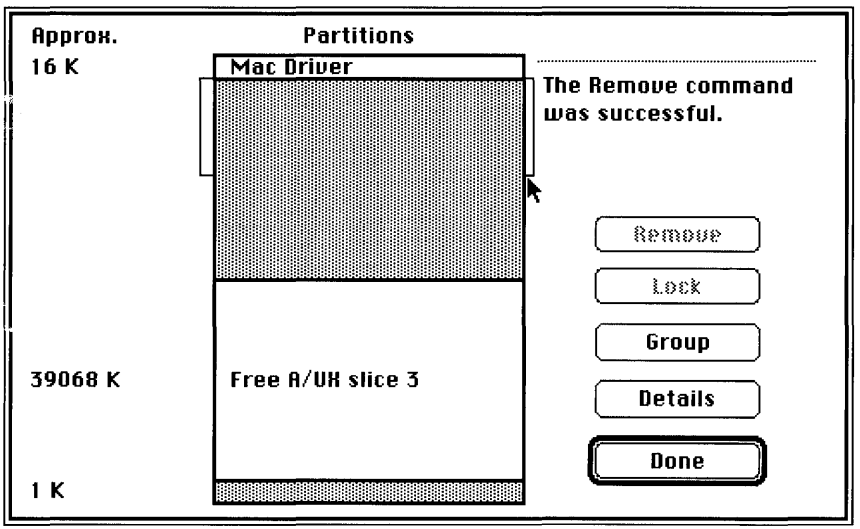
■ **Figure 4-17** Free space replacing the removed partition



7. **Press and drag downwards from the top of the grey area, and release the mouse button when the partition is the approximate size you want.**

   Figure 4-18 shows you part of the free space is selected.

■ **Figure 4-18** Selecting space for the new partition

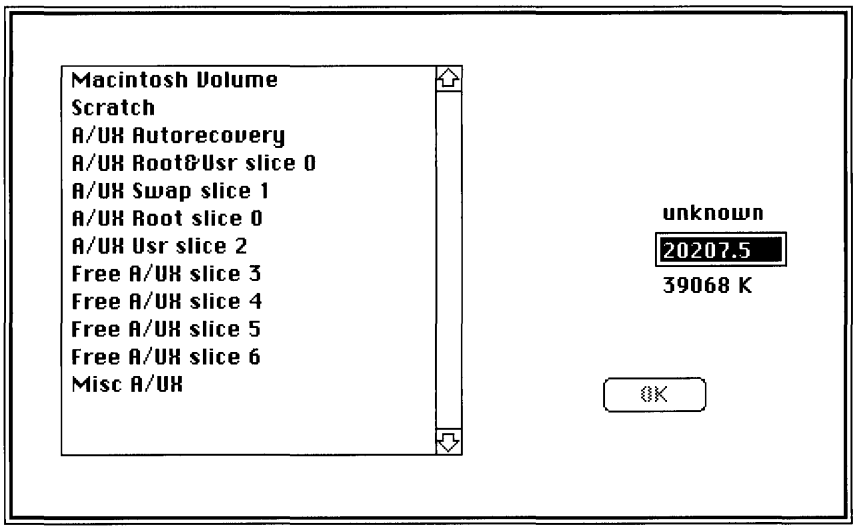


◆ *Note:* Don't click on the MacDriver partition or you'll move this partition instead of selecting the free space.

You don't have to be exact; you can enter the exact size in the next dialog box.

The list of individual partition types appears, as shown in Figure 4-19. The size, in kilobytes, of the partition awaiting a type appears to the right under Minimum. You can type a number to enter an exact size for the partition.

■ **Figure 4-19** The list of individual partition types



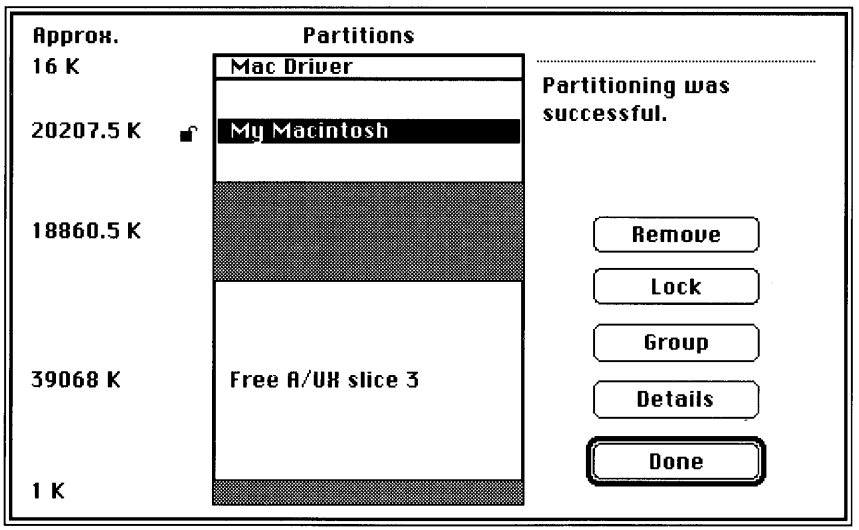
8. Select the partition you want to add back.

For example, if you removed the Macintosh partition, select Macintosh Volume.

9. Click OK.

You return to a graphic representation of your partitioning scheme, as shown in Figure 4-20.

■ **Figure 4-20** A reduced Macintosh partition



In the next step you'll remove the partition that you want to be the largest on the disk, for example Free A/UX slice 3, and then add it back, sized to fit the free space.

10. Select the partition you want to enlarge.

11. Click Remove.

An alert message warns you that removing causing the loss of all data on the partition.

12. Click OK to continue.

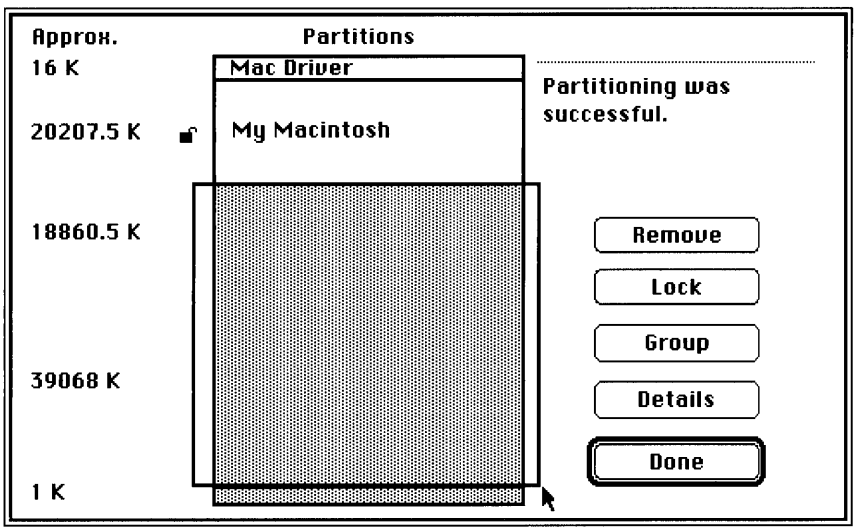
Free space replaces the removed partition. Now you need to select the free space.

13. Press and drag downwards from the top of the grey area to select the free space.

Figure 4-21 shows the selected free space.

△ **Important** Don't select all the free space. Leave 1K of the disk in free space. A file system requires 1K of unallocated free space as a buffer. △

■ **Figure 4-21** Selecting the free space



The list of individual partition types appears.

14. Select the partition type you want to add back.

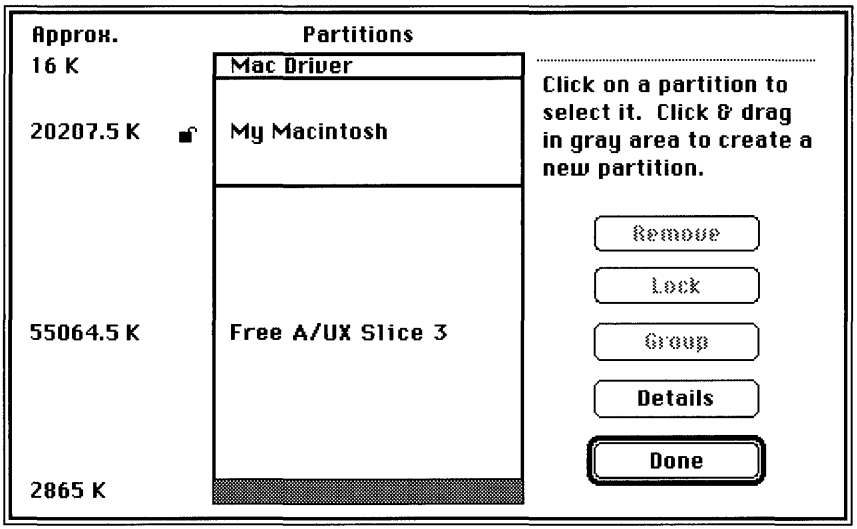
For example, select Free A/UX slice 3.

Notice the size, in kilobytes, is displayed to the right under Minimum.

15. Click OK.

The new partitioning scheme appears, as shown in Figure 4-22.

■ **Figure 4-22** The new partitioning scheme



16. Click Done.

You return to the main dialog box.

17. Click Quit.

You are now ready for the last two procedures in preparing a disk for A/UX: putting a file system on it and mounting it into your existing A/UX system. Turn to "Making and Mounting a File System" to complete these procedures.

Making and mounting a file system

A partitioned disk is physically ready to receive data. It lacks, however, the "bookkeeping system" necessary to manage it. A file system provides the bookkeeping system necessary to manage a disk and to locate files on it.

You create a file system by using the `newfs` command.

- *Note:* `newfs` creates a BSD (Berkeley Software Distribution) file system, which is the type used by A/UX as shipped. A/UX also supports System V file systems. System V file systems are not recommended because they limit filenames to 14 characters. However, if you want to create System V file systems, use the `mkfs` command instead of `newfs`. For details on `mkfs`, see `mkfs`(1M) in *A/UX System Administrator's Reference*, or enter `man mkfs` in a CommandShell window to see the same information on the screen.

Making a file system

If your disk contains more than two A/UX partitions you'll need to run `newfs` for each partition.

1. **Start up A/UX and log in to the root account to become the superuser.**

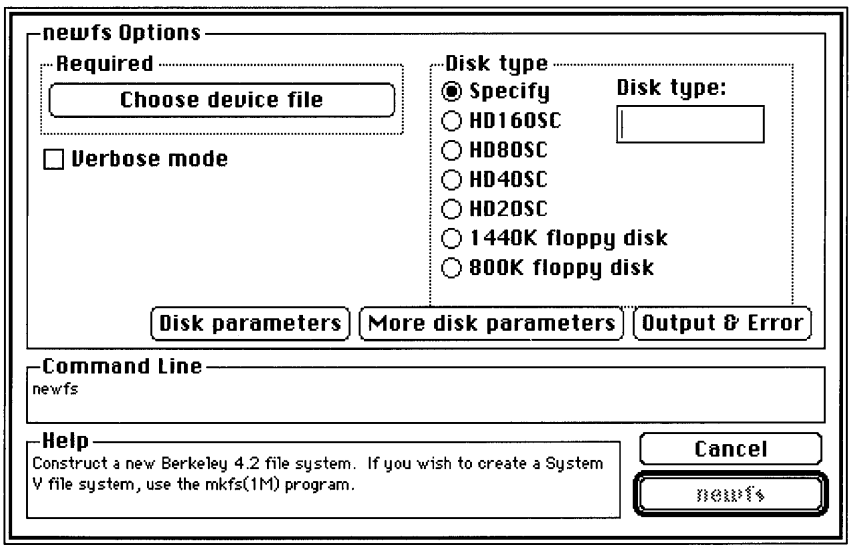
   See "Becoming the Superuser" in Chapter 1 if you need instructions.

2. **To display a CommandShell window, choose CommandShell from the Apple menu.**

3. **Type `newfs` and press COMMAND-K.**

   The `newfs` Commando dialog box appears, as shown in Figure 4-23.

■ **Figure 4-23** The `newfs` Commando dialog box



4. **In the area labeled "Disk type" click the code name that describes the type and size of your disk.**

   Your choices for code names are:

Type of Disk	Code Name
160MB disk	`HD160SC`
80MB disk	`HD80SC`
40MB disk	`HD40SC`
20MB disk	`HD20SC`
1440K floppy disk	`1440K Floppy disk`
800K floppy disk	`800K Floppy disk`

The Specify radio button applies to all disk not listed. If your disk does not match any of these, see the documentation for your hard disk for information on specifying to A/UX the type and size of the disk. A/UX stores these code names in the `/etc/disktab` file. Add the code name for your disk to this file. Then display the `newfs` Commando dialog box again, choose Specify, and enter the code name in the "Disk type" text box.

5. **To specify the device to mount, click "Choose device file."**

   When specifying the device name for a hard disk, you begin with the prefix `/dev/dsk/`. In the next three steps you specify this prefix.

6. **If you need to trace your way back to the /directory, press on the current directory name displayed at the top of the dialog box and drag to select /.**

   The contents of the / directory are displayed.

7. **To open the `dev` folder, double-click it.**

8. **To open the `dsk` folder, double-click it.**

   What you see is a list of the possible extensions to the device name `/dev/dsk`. You need to scroll down and find the one that describes your partition.

9. **Double-click the name that describes your partition.**

   The extension to a device name is given in the form of c*n*d0s*x* , where *n* is the SCSI ID number for the disk and *x* is the slice number for the partition.

   For example, if your disk is SCSI ID 4 and your partition is slice 3 (the Free A/UX slice 3 partition for user files), you need to select `c4d0s3`. If your disk is SCSI ID 5 and your partition is slice 2 (the partition for `/usr`), the device name of your disk is `c5d0s2`.

   After selecting a name, you return to the `newfs` Commando dialog box. The full device name you specified shows in the Command Line box.

10. **Click `newfs`.**

    You return to the CommandShell window.

11. **Press RETURN to run the command.**

    The CommandShell window shows information about the file system (ignore the warning that appears) and then displays the command-line prompt.

You need to create a file system for each A/UX partition on a disk. (Don't create a file system for a Macintosh partition.) Therefore, if your disk contains more than one partition, you need to repeat steps 2 through 11 for each additional partition. When repeating these steps to create a file system for another partition on the same disk, only the slice number changes. The slice numbers is what allows A/UX to distinguish between multiple partitions on a disk.

Once you've created a file system for each partition on the disk, you are ready to mount the file systems. Instructions are provided in "Mounting a File System."

For complete information on the `newfs` command, see `newfs`(1M) in *A/UX System Administrator's Reference*, or enter `man newfs` in a CommandShell window to see the same information on the screen.

Mounting a file system

Mounting a file system "hooks" it into the A/UX tree structure. A/UX cannot recognize a file system until it is mounted.

Mounting can be done in two ways. You can mount a file system permanently, for access to the files on the disk every time you start up A/UX, or you can mount it temporarily, for access until you next shut down A/UX. Mounting a file system permanently is more common than mounting temporarily, so that is what the procedures here show you. For more information on mounting a file system temporarily, see `mount`(1M) in *A/UX System Administrator's Reference* or enter `man mount` in a CommandShell window to see the same information on the screen.

In the final steps of the following procedures you mount the file system with the `fsentry` script. For those users interested, the `fsentry` script makes an entry for a file system in the `/etc/fstab` file. (The filename is short for *file system table.*) An entry in this file is a file system's passport to being mounted each time A/UX starts up. The `/etc/fstab` file is one of the files A/UX reads as it starts up in order to receive instructions on how to configure itself. This file instructs A/UX as to which file systems to mount.

Mounting a file system at an existing directory

Follow these steps if your purpose in mounting the file system is to replace an existing directory. For example, follow these steps if the new file system will replace the existing `/users` or `/usr` directory.

However, don't follow these steps if your purpose with the new file system is to complement an existing directory. For example, don't follow these steps if you are mounting a file system to add space for user files and you want to keep your existing `/users` directory intact. You need to turn to "Mounting a File System at a New Directory," at the end of this chapter.

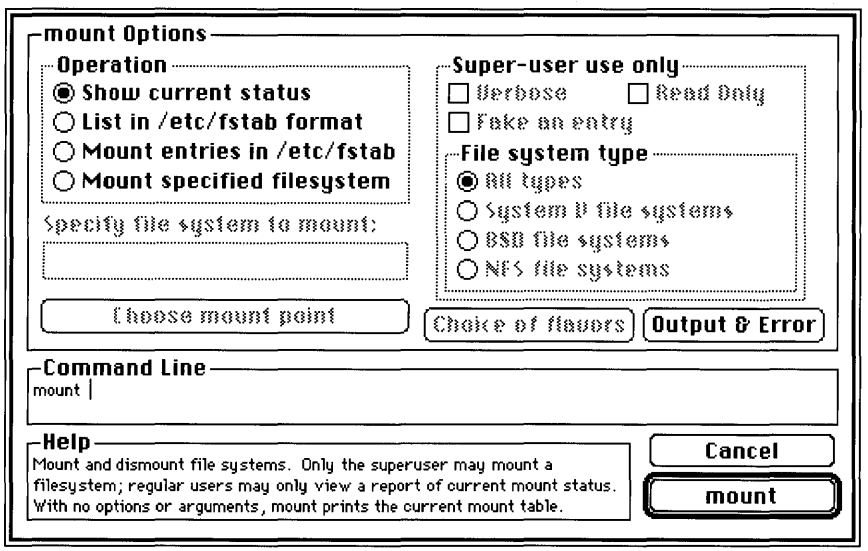
Mount at `/mnt` to copy the files in your existing directory

The `/mnt` directory is shipped with A/UX as a convenient, temporary place to mount a file system. In the following procedure you temporarily mount the new file system at `/mnt`. Then you copy into it the contents of the directory being replaced.

1. **Choose CommandShell from the Apple menu if a CommandShell window isn't already displayed.**
2. **Enter `mount` and press COMMAND-K.**

   The `mount` Commando dialog box appears, as shown in Figure 4-24.

■ **Figure 4-24** The `mount` Commando dialog box



3. **From the Operation options, select "Mount specified filesystem."**
4. **Click in the "Specify file system to mount" text box.**
5. **Type the device name that describes your partition.**

   You must type the name in the form of `/dev/dsk/c`*n*`d0s`*x*, where *n* is the SCSI ID number of the disk, and *x* is the slice number containing the file system you want to mount.

   For example, if the disk is SCSI ID 5 and the partition is slice 3, type

   `/dev/dsk/c5d0s3`
6. **Click "Choose mount point."**
7. **Click `/mnt` to select it. Do not double-click it.**
8. **Click Directory.**

   If you need to trace your way back to the /directory, press on the current directory name displayed at the top of the dialog box and drag to select /. The contents of the / directory are displayed.

9. **Click mount.**

10. **Press RETURN to run the command.**

    You return to the command-line prompt, and the new file system is now mounted.

Copy the directory to be replaced

In this procedure you copy the contents of the directory being replaced before removing it. For example, if you are replacing the `/users` file system, you copy the contents of `/users` into `/mnt`.

1. **Choose CommandShell from the Apple menu if a CommandShell window isn't already displayed.**

2. **Move to the directory that you want to copy by entering**
   `cd` *directoryname*

   For example, to move to the `/users` directory, enter `cd /users`.

3. **To copy the contents of this directory to the `/mnt` directory, enter**
   `find . -depth -print | cpio -pdl /mnt`

   Be sure to enter this command exactly as shown. If you unintentionally run an incorrect command, stop the command from running by pressing CONTROL-C.

Unmount the file system from `/mnt`

In this procedure you disconnect the new file system from its temporary mount point.

1. **Choose CommandShell from the Apple menu if a CommandShell window isn't already displayed.**

   You need to be in the root directory to unmount a device from `/mnt`.

2. **To move to the root directory, enter `cd /`**

3. **Enter `umount /mnt`**

   - *Note:* The command is spelled *umount* and not *unmount* as you might expect.

   The file system is unmounted.

Remove the contents of the old directory

In this procedure you remove the directory being replaced.

1. **Choose CommandShell from the Apple menu if a CommandShell window isn't already displayed.**
2. **To remove the contents of the directory you are replacing, enter** `rm -r` *directoryname*

   where *directoryname* is the name of the directory to be replaced. For example, if you are replacing the `/users` directory, you'd enter `rm -r /users`.

Recreate the directory

When you removed the directory in the previous procedure, the directory was removed along with its contents. In this procedure you recreate the directory so you can mount the new file system on it.

1. **Choose CommandShell from the Apple menu if a CommandShell window isn't already displayed.**
2. **Enter `mkdir` *directoryname***

   where *directoryname* is the directory you removed in the previous procedure, for example, enter `mkdir /users`.

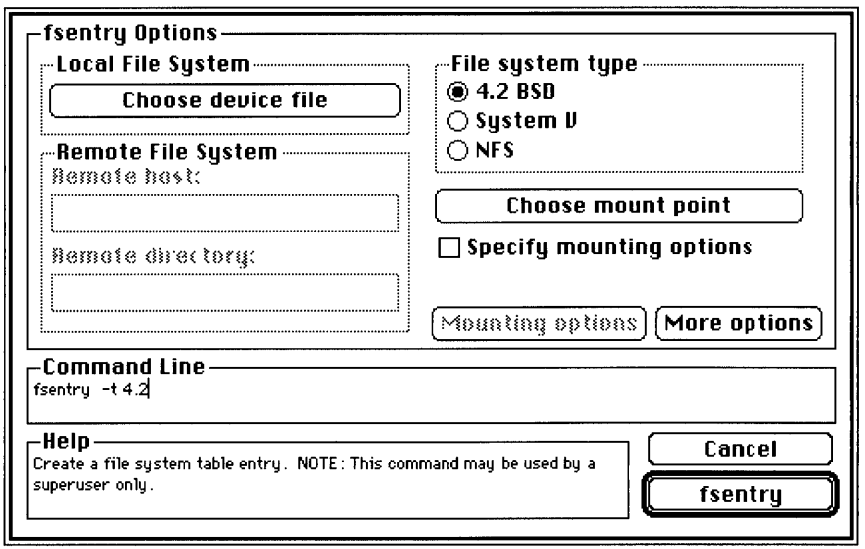
Mount the file system permanently with `fsentry`

In this, the final procedure to make and mount a file system, you mount the new file system permanently by using the `fsentry` script. The `fsentry` script configures A/UX to mount the new file system each time A/UX starts up.

1. **Choose CommandShell from the Apple menu if a CommandShell window isn't already displayed.**
2. **Type `fsentry` and press COMMAND-K.**

   The `fsentry` Commando dialog box appears, as shown in Figure 4-25.

■ **Figure 4-25** The `fsentry` Commando dialog box



3. **To identify the disk you want to mount, click "Choose device file."**

   A dialog box displays the names of the files and folders in /. As when you created the file system, you need to select the filename that describes your file system. The filename is in the form of `/dev/dsk/c`*n*`d0s`*x*, where *n* is the SCSI ID number for the disk and *x* is the slice number for the partition.

4. **Double-click `dev` to open the dev folder.**

5. **Double-click `dsk` to open the dsk folder.**

6. **Scroll to the filename that describes your newly created file system.**

   The filename is in the form of `/dev/dsk/c`*n*`d0s`*x*, where *n* is the SCSI ID number for the disk and *x* is the slice number for the partition.

   For example, if your disk is SCSI ID 5 and slice 3 (a partition for user files), the device name of your disk is `c5d0s3`. And if your disk is SCSI ID 4 and slice 2 (a partition for `/usr`), the device name of your disk is `c4d0s2`.

7. **Double-click the filename that describes your newly created file system.**

   The filename is selected, and you return to the main dialog box of `fsentry`.

8. **To choose the directory to serve as the permanent mount point, click "Choose mount point."**

   A dialog box displays the names of the files and folders in `/dev/dsk`.

   Use the following table to determine the directory at which to mount your file system.

Type of partition	Mount point
Slice 3, 4, 5, or 6 for A/UX User files	`/users` or `/user`
Slice 2 for `/usr`	`/usr`

   - *Note:* Macintosh partitions do not require mounting because they are not part of the A/UX file system.

9. **To move to the mount-point directory, press and drag on `dsk` and select /.**

10. **To select the mount-point directory, press the down scroll arrow and select the directory name.**

    For example, click `/usr`.

    Do not double-click the directory, or it displays its subdirectories rather than becoming selected.

11. **Click Directory.**

    You return to the main dialog box of `fsentry` and are ready to run the command as it appears in the Command Line box.

12. **Click `fsentry`.**

13. **Press RETURN.**

    The command is run. The files on this partition will be accessible from the mount point directory the next time you start up A/UX and for each time after that.

14. **Repeat steps 2 through 13 to run `fsentry` for any other partitions on the disk.**

    A/UX uses slice numbers to distinguish between multiple partitions on a disk; only the slice number will change when you repeat the steps for another partition.

For complete information on the `fsentry` command, see `fsentry`(1M) in *A/UX System Administrator's Reference,* or enter `man fsentry` in a CommandShell window to see the same information on the screen.

Mounting a file system at a new directory

Mounting a file system at a new directory eliminates many of the procedures required when mounting a file system at an existing directory. The following procedures are all that is required.

1. **Choose CommandShell from the Apple menu if a CommandShell window isn't already displayed.**

2. **Enter `mkdir` *directoryname***

   where *directoryname* is the name of the new directory at which to mount the file system. For example, if you are adding a second file system for user files, you might enter the following command to create the directory `/users1`.

   ```
   mkdir /users1
   ```

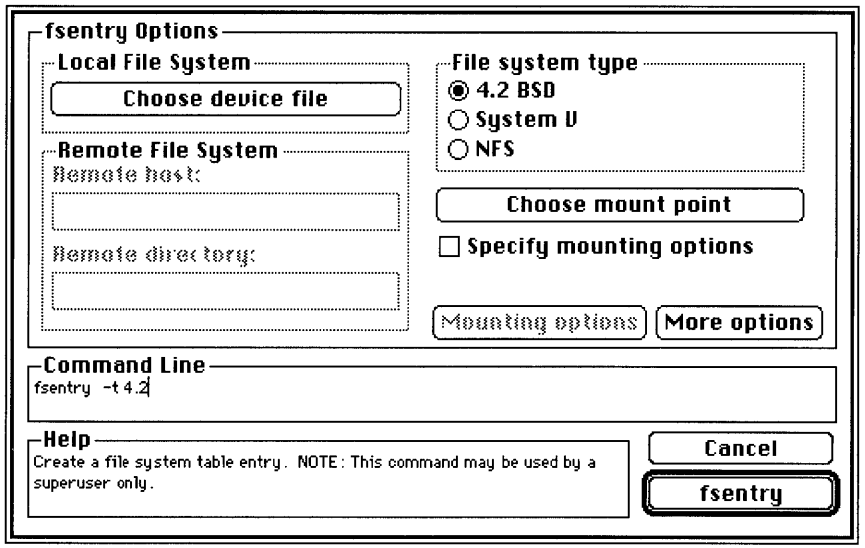
   Your new directory is created. Now you can mount the new file system at this directory.

   You mount a file system permanently by using the `fsentry` script. The `fsentry` script configures A/UX to mount the new file system each time A/UX starts up.

3. **Type `fsentry` and press COMMAND-K.**

   The `fsentry` dialog box appears, as shown in Figure 4-26.

■ **Figure 4-26** The `fsentry` Commando dialog box



4. **To identify the disk you want to mount, click "Choose device file."**

   A dialog box displays the names of the files and folders in /. As when you created the file system, you need to select the filename that describes your file system. The filename is in the form of `/dev/dsk/c`*n*`d0s`*x*, where *n* is the SCSI ID number for the disk and *x* is the slice number for the partition.

5. **Double-click `dev` to open the dev folder.**

6. **Double-click `dsk` to open the dsk folder.**

7. **Scroll to the filename that describes your newly created file system.**

   For example, if your disk is SCSI ID 5 and slice 3 (a partition for user files) the device name of your disk is `c5d0s3`.

8. **Double-click the filename that describes your newly created file system.**

   The filename is selected and you are returned to the main dialog box of `fsentry`.

9. **To choose the directory you created as the permanent mount point, click "Choose mount point."**

   A dialog box displays the names of the files and folders in `/dev/dsk`.

10. **To move to the new directory, press and drag on `dsk` and select /.**

11. **To select your new directory, press the down scroll arrow and select the directory name, for example `/users1`.**

    Do not double-click the directory, or it displays its subdirectories rather than becoming selected.

12. **Click Directory.**

    You return to the main dialog box of `fsentry` and are ready to run the command as it appears in the Command Line box.

13. **Click `fsentry`.**

14. **Press RETURN.**

    The command is run. The files on this partition will be accessible from the mount point directory the next time you start up A/UX and for each time after that.

15. **Repeat steps 2 through 14 to run `fsentry` for any other partitions on the disk.**

    A/UX uses slice numbers to distinguish between multiple partitions on a disk; only the slice number will change when you repeat the steps for another partition.

For complete information on the `fsentry` command, see `fsentry`(1M) in *A/UX System Administrator's Reference,* or enter `man fsentry` in a CommandShell window to see the same information on the screen.

Removing a Hard Disk SC from A/UX

You can remove a Hard Disk SC to free the SCSI ID number for other uses. Removing a disk takes away access to all the files on it.

1. **Log in to the root account.**

   See "Becoming the Superuser" in Chapter 1 if you need instructions.

2. **In the Finder, double-click the / disk icon to open it.**

3. **Double-click `etc` to open it.**

4. **Double-click `fstab` to open it.**

5. **Delete the file system entry for the disk.**

   The entry in `/etc/fstab` for the file system looks similar to the following line:

   ```
   /dev/dsk/c4d0s0        /users        4.2    rw     0      2
   ```

   - *Note:* If you plan to add the disk back to the system, instead of deleting the entry, at the beginning of the entry insert a pound sign (#). The pound sign causes A/UX to ignore the line. When you next connect the disk, mount the file system using the `mount` command, then remove the pound sign from this line. The file system is entered in the file system table and A/UX will automatically mount it each time A/UX starts.

6. **Save the change and close the file.**

7. **Click in the CommandShell window to make it active.**

8. **Shut down A/UX by choosing Shutdown from the Special menu.**

9. **Disconnect the Hard Disk SC from your Macintosh computer.**

   You need to have a SCSI terminator on the last device in your SCSI chain. If the Hard Disk SC was the last device on your SCSI chain, remember to move the terminator to the device that is now last on your SCSI chain.

   The disk is removed from A/UX.

Chapter 5 **Adding and Managing the AppleCD SC**

The AppleCD SC peripheral device is extremely useful for accessing large amounts of information stored on CD-ROM discs. CD-ROM is an acronym for *compact disc read-only memory.* The information on a compact disc can be read but it cannot be added to or changed. A CD-ROM holds 500 megabytes (MB) of data, supplying six times the storage capacity of a commonly used 80 MB hard disk.

Though you cannot make changes to the information on a CD-ROM, you can read it, or you can copy its files to your hard disk and make changes to the information there. Because the CD-ROM is an excellent means for storing reference material or delivering large amounts of information or huge programs, more products and Macintosh related information are likely to be available on CD-ROMs in the near future.

This chapter explains how to

- install the AppleCD SC to use CD-ROM discs as a permanent source of reference information
- install the AppleCD SC to use CD-ROM discs as a temporary source of reference information
- open the files on a CD-ROM
- copy the files from a CD-ROM to a hard disk
- remove the AppleCD SC from an A/UX system

Setting up the AppleCD SC

The following list describes the choices you have when setting up the AppleCD SC with a Macintosh running A/UX. Choose the setup you want and follow the instructions.

- *Note:* A/UX does not support audio on a CD-ROM or support discs that use the High Sierra format.

- **If the AppleCD SC is set up and working with the Macintosh OS**

  You do not need to modify the AppleCD SC resource file (device driver) that you've already installed in the Macintosh OS. Turn to the section in this chapter that describes the set up you wish in A/UX, and follow the instructions.

- **If the AppleCD SC is not connected and set up and you want to use it with the Macintosh OS and A/UX**

  Follow the instructions in *AppleCD SC Owner's Guide* to connect it to your Macintosh and install its resource file (device driver) in the Macintosh OS. Then turn to the section in this chapter that describes the setup you wish and follow the instructions.

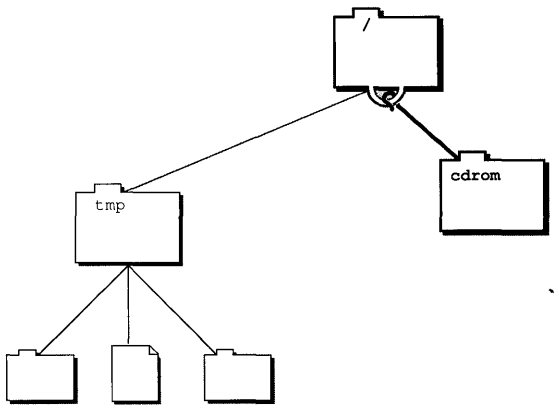
- **If the AppleCD SC is not connected and set up and you want to use it with A/UX only**

  Follow the instructions in *AppleCD SC Owner's Guide* to connect it to your Macintosh by using the cables and power cord, but skip the steps to install the resource file (device driver). Then turn to the section in this chapter that describes the setup you wish to use with A/UX, and follow the instructions.

Installing permanently

You use the `fsentry` script to make the file systems on the CD-ROM accessible whenever A/UX is in use. You can then read the files on the CD-ROM the same way you would read files on a hard disk.

■ **Figure 5-1** A CD-ROM installed permanently



The following procedure describes how to install the AppleCD SC so the files on a CD-ROM are readable whenever A/UX is in use. These steps take you through using the `fsentry` script, which makes an entry for the CD-ROM in the filesystem table `/etc/fstab`. This file contains a list of all the file systems that A/UX automatically mounts each time it starts up.

If you only want to access the CD-ROM temporarily, such as to copy its files to a hard disk, then mount it when you need it rather than mounting it permanently. Turn to the next section, "Installing Temporarily," for instructions.

1. **Log in to the root account.**

   See "Becoming the Superuser" in Chapter 1 if you need instructions.

2. **Choose CommandShell from the Apple menu.**

   If a CommandShell window is not displayed, choose New from the File menu.

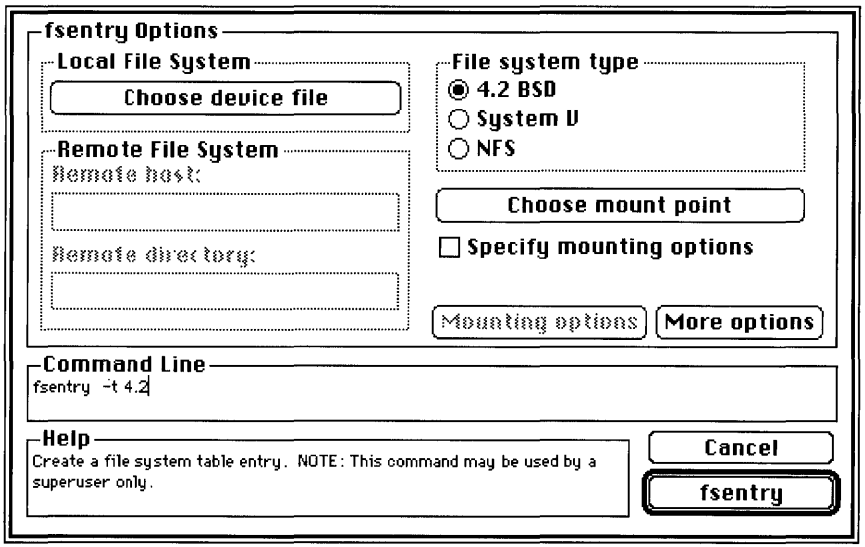
3. **Enter `mkdir /cdrom`**

   This command makes a directory called `cdrom`. In the next steps, you will mount the CD-ROM at this directory.

4. **Type `fsentry` and press COMMAND-K.**

   The `fsentry` Commando dialog box appears, as shown in Figure 5-2.

■ **Figure 5-2** The `fsentry` Commando dialog box



The file system type is preset to 4.2 BSD, with which A/UX is shipped. Use this file system type unless you know you need to use the NFS or System V type of file system. If you need to use one of these types of file systems, click "System V" or click "NFS" as the option for "File System type."

5. **Click "Specify mounting options."**
6. **Click "Mounting options" and then click Read-only.**

   You must mount the CD-ROM with read-only access because you cannot write to a CD-ROM.

7. **Click Continue.**

   Now you need to specify the device name for the CD-ROM.

8. **Click "Choose device file" to enter the name of the device to mount.**

   The device name for a CD-ROM begins with `dev/dsk`, so this is what you need to specify.

9. **To trace your way back to the /directory, press on the current directory name displayed at the top of the dialog box and drag to select /.**

   The contents of the / folder are displayed.

10. **Double-click `dev` to open it.**

    You see a list of its contents.

11. **Double-click `dsk` to open it.**

    You see a list of its files.

12. **Scroll to the filename that describes the file system on your CD-ROM.**

    For example, if the device is SCSI ID 5 and the file system on the CD-ROM is slice 0, the name you want to select is `c5d0s0`. And if your device is SCSI ID 4 and the file system on the CD-ROM is slice 2, the name you want to select is `c4d0s2`.

    - *Note:* The documentation accompanying your CD-ROM states whether the files on the disc are divided among different slices. Most likely, all the files are contained in one slice. For a disc that keeps all its files in one slice, slice 0 is likely to be the slice used.

13. **Double-click the filename that describes the file system on your CD-ROM.**

    The filename is selected and you return to the `fsentry` dialog box.

14. **To specify the directory at which to mount the CD-ROM, click "Choose mount point."**

15. **To trace your way back to the / directory, press on the current directory name displayed at the top of the dialog box and drag to select /.**

    The contents of the / folder are displayed.

16. **Click `cdrom` to select it. Do not double-click it.**

17. **Click Directory to select `/cdrom` as the mount point.**

    You return to the `fsentry` dialog box and are ready to run the command displayed in the Command Line box.

18. **Click `fsentry`.**

    You return to the CommandShell window.

19. Press RETURN.

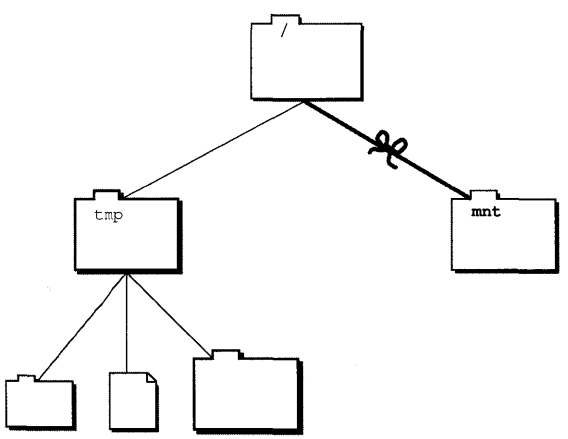
This runs the command. The files on the CD-ROM are now accessible through the `cdrom` folder.

Installing temporarily

If you need to reference the information on the CD-ROM only temporarily, meaning from now until you next shut down A/UX or unmount the CD-ROM, then mount its files using the `mount` command. This procedure is useful if you intend to copy files from the CD-ROM to a hard disk and then disconnect the AppleCD SC.

◆ *Note:* If you mount the CD-ROM with the following steps and then restart the system or if you move the system into single-user mode and back into multi-user mode, you will unmount the CD-ROM.

■ **Figure 5-3** A CD-ROM installed temporarily



1. **Log in to the root account.**

   See "Becoming the Superuser" in Chapter 1 if you need instructions.

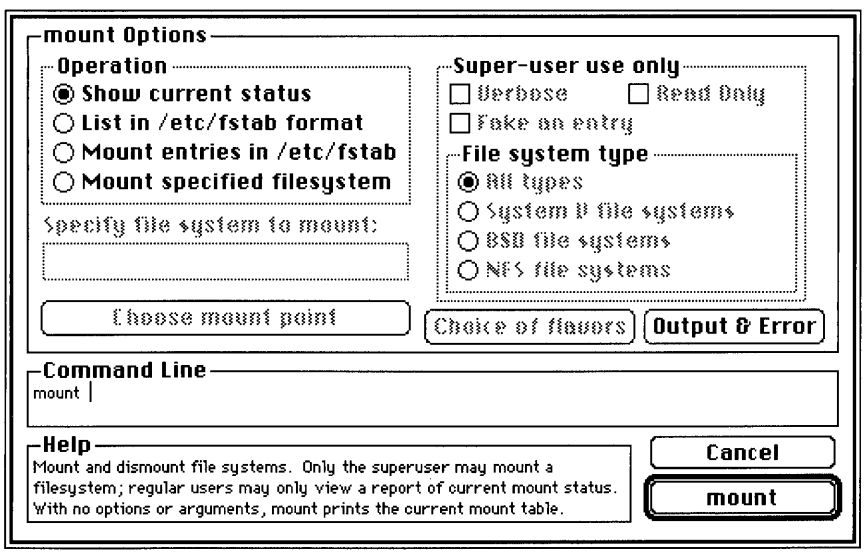
2. **Choose CommandShell from the Apple menu.**

   If a CommandShell window is not displayed, choose New from the File menu.

3. **Type `mount` and press COMMAND-K.**

   The `mount` Commando dialog box appears, as shown in Figure 5-4.

■ **Figure 5-4** The `mount` Commando dialog box



4. **From the Operation options, select "Mount specified filesystem."**

5. **Type the device name that describes your partition.**

   You must type the name in the form of `/dev/dsk/c`*n*`d0s`*x*, where *n* is the SCSI ID number of the device, and *x* is the slice number containing the files you want to copy.

For example, if the device is SCSI ID 5 and the file system is on slice 0, type

```
/dev/dsk/c5d0s0
```

- *Note:* The documentation accompanying your CD-ROM states whether the files on the disc are divided among different slices. Most likely, all the files are contained in one slice. For a disc that keeps all its files in one slice, slice 0 is likely to be the slice used.

6. **Click "Choose mount point."**

   A dialog box displays the available folders in which to place the files.

7. **To trace your way back to the `/` directory, press on the current directory name displayed at the top of the dialog box and drag to select `/`.**

   The contents of the `/` directory are displayed.

8. **Click `mnt` to select it. Do not double-click it.**

9. **Click Directory.**

   Clicking Directory confirms `mnt` as the chosen directory and closes the dialog box.

10. **Click "Choice of flavors" and then click Read-only.**

11. **Click Continue.**

    You return to the `mount` main dialog box and are ready to run the command displayed in the Command Line box.

12. **Click mount.**

    You return to the CommandShell window.

13. **Press RETURN.**

    This runs the command. The CD-ROM is now mounted. To the user, there is no difference between reading the files on the CD-ROM and reading files on a hard disk.

Using the A/UX files on a CD-ROM

You can reference files on a CD-ROM by opening and reading them, or you can copy them to a hard disk where you can change them from read-only files to writeable files.

Opening the files

You can open the files on a CD-ROM from either the Finder or from a CommandShell window.

Opening from the Finder

Follow these steps to open files on a CD-ROM from the Finder:

1. **Display the Finder.**

   Choose Finder from the Apple menu if the Finder isn't already displayed.

2. **Double-click the / disk icon, then double-click the folder that contains the files on the disc.**

   For example, if you mounted the CD-ROM on `/mnt`, double-click the `mnt` folder. And if you mounted the CD-ROM on `/cdrom`, double-click the `cdrom` folder.

   The folder opens and shows the files on the CD-ROM.

3. **Double-click a file to open it.**

If you want to copy files from the CD-ROM to a hard disk, turn to "Copying Files to Disk" later in this chapter.

Opening from a CommandShell window

Follow these steps to open files on a CD-ROM from a CommandShell window.

1. **Choose CommandShell from the Apple menu if a CommandShell window isn't already displayed.**

   If a CommandShell window is not displayed, choose New from the File menu.

2. **Enter `cd` */directoryname***

   where *directoryname* is the name of the directory on which you mounted the CD-ROM.

   For example, if you mounted the CD-ROM on `/mnt`, enter `cd /mnt`. And if you mounted the disc on `/cdrom`, enter `cd /cdrom`.

   You have changed directories.

3. **Enter `ls -C`.**

   The files in the current directory are listed in columns.

4. **Double-click a file to open it.**

   The file is opened. Notice the "read-only" message in the window. This message reminds you that you can read the file but you cannot make changes (write) to the file.

Copying files to disk

By copying files from a CD-ROM to a hard disk, you can then make changes to the files.

Files meant to be copied from a CD-ROM to a hard disk can be in one of several formats. The following three formats are discussed in this guide:

- an A/UX file system
- an archive created with the `tar` utility
- an archive created with the `cpio` utility

To discover the format of the files on a CD-ROM, read the information accompanying the disc. The documentation for the disc explains the format the files are in and how you are to list and copy them. In case the documentation does not describe how to copy the files to a hard disk, the following subsections are provided. Turn to the section that applies to the file format of your CD-ROM and follow the instructions.

Files in an A/UX file system

Follow these steps if the files are in the form of an A/UX file system:

1. **Log in to the root account.**

   See "Becoming the Superuser" in Chapter 1 if you need instructions.

2. **In the Finder, double-click the / disk icon to open it.**

   In the next few steps you create a new folder within the `/usr/local` folder to hold the files from the CD-ROM. If you like, you can put the CD-ROM files in another directory. However, putting them in the `/usr/local` folder makes them easily accessible to all user accounts on the system. The `/usr/local` directory is provided in A/UX to hold programs that you add for use with A/UX, for example a Macintosh application to which you want available to all users.

3. **Double-click `usr` to open it.**

4. **Double-click `local` to open it.**

5. **Choose New Folder from the File menu.**

6. **Type a name for the folder.**

   This folder will hold the files you are copying from the CD-ROM.

7. **Click in the / window to make it active.**

8. **Double-click the folder containing the files on the CD-ROM.**

   For example, if you mounted the CD-ROM at the `/mnt` directory, double-click `mnt`.

9. **Select the file or folder you want to copy.**

10. **Drag the file or folder to the new folder you created in `/usr/local`.**

    The files on the CD-ROM, which you mounted temporarily at the `/mnt` directory, are now in the new folder.

    You are ready to unmount the device. Turn to the section, "Removing the AppleCD SC from A/UX" for instructions.

Files in a `tar` archive

Follow these steps if the files are in the form of a `tar` archive.

1. **Log in to the root account.**

   See "Becoming the Superuser" in Chapter 1 if you need instructions.

2. **Choose CommandShell from the Apple menu.**

   If a CommandShell window does not appear, choose New from the File menu.

3. **Enter `mkdir /usr/local/`*directoryname*.**

   where *directoryname* is the name of the new directory for the files you are copying from the CD-ROM.

4. **Enter `cd /usr/local/`*directoryname*.**

   Your current directory is now `/usr/local/`*directoryname*.

5. **If the CD-ROM contains a `tar` archive but does not contain a file system, enter the following command. Otherwise, skip to step 6.**

   `tar xvf /dev/dsk/c`*n*`d0s`*x*

   where *n* is the SCSI ID number of the CD-ROM and *x* is the slice number containing the `tar` archive you want to copy.

   For example, if your CD-ROM is SCSI ID 5 and the file system is slice 0, the name you want to select is `c5d0s0`. And if your CD-ROM is SCSI ID 4 and the file system is slice 2, the name you want to select is `c4d0s2`.

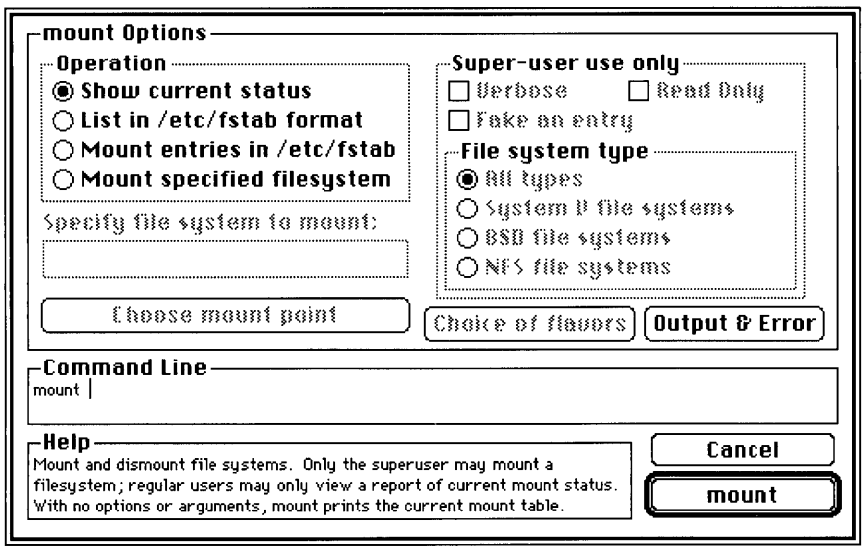
   The files are copied into `/usr/local/`*directoryname* and you are finished with this procedure.

6. **If the CD-ROM contains a `tar` archive and a file system, mount the file system and then copy its files using the following steps.**

7. **Type `mount` and press COMMAND-K.**

   The `mount` Commando dialog box appears, as shown in Figure 5-5.

■ **Figure 5-5** The `mount` Commando dialog box



8. **In the Operation options click "Mount specified file system."**
9. **Click in the "Specify file system to mount" text box.**
10. **Type the device name that describes your CD-ROM.**

    You must type the name in the form of `/dev/dsk/c`*n*`d0s`*x*, where *n* is the SCSI ID number of the device, and *x* is the slice number containing the files you want to copy.

    For example, if the device is SCSI ID 5 and the file system is on slice 0, type `/dev/dsk/c5d0s0`.

    ◆ *Note:* The documentation accompanying your CD-ROM states whether the files on the disc are divided among different slices. Most likely, all the files are contained in one slice. For a disc that keeps all its files in one slice, slice 0 is likely to be the slice used.

11. **Click "Choose mount point."**

    A dialog box displays the available folders in which to place the files.

12. **To trace your way back to the /directory, press on the current directory name displayed at the top of the dialog box and drag to select /.**

    The contents of the / folder are displayed.

13. **Click `mnt` to select it. Do not double-click it.**

14. **Click Directory.**

    Clicking Directory confirms `/mnt` as the chosen directory and closes the dialog box.

15. **Click "Choice of flavors" and then click Read-only.**

16. **Click Continue.**

    You return to the `mount` main dialog box and are ready to run the command displayed in the Command Line text box.

17. **Click mount.**

    You return to the CommandShell window.

18. **Press RETURN.**

    This runs the command. The CD-ROM is now mounted.

19. **To copy the files from the CD-ROM, enter `tar xvf /mnt/`*archivename*.**

    where *archivename* is the name of the directory on the CD-ROM containing the files you want to copy.

    The files are copied to `/usr/local/`*directoryname*.

    You are ready to unmount the device. Turn to the section, "Removing the AppleCD SC from A/UX" for instructions.

Files in a `cpio` archive

Follow these steps if the files are in the form of a `cpio` archive.

1. **Log in to the root account.**

   See "Becoming the Superuser" in Chapter 1 if you need instructions.

2. **Choose CommandShell from the Apple menu.**

   If a CommandShell window does not appear, choose New from the File menu.

3. **Enter `mkdir /usr/local/`*directoryname***

   where *directoryname* is the name of the new directory for the files you are copying from the CD-ROM.

4. **Enter `cd /usr/local/`*directoryname***

   Your current directory is now `/usr/local/`*directoryname*.

5. **Enter `cpio -ivd < /mnt/`*archivename***

   where *archivename* is the name of the directory on the CD-ROM containing the files you want to copy.

   The files on the CD-ROM are now in `/usr/local/`*directoryname*.

   You are ready to unmount the device. Turn to the next section, "Removing the AppleCD SC from A/UX" for instructions.

Removing the AppleCD SC from A/UX

You can remove the AppleCD SC to free the SCSI ID number for other uses. Removing the AppleCD SC takes away access to all the files on an inserted CD-ROM.

If the CD-ROM was mounted permanently

If the CD-ROM was mounted with `fsentry`, you need to follow these steps to remove it from A/UX.

- *Note:* You cannot unmount a file system if any of its files are in use. This means if you are in a directory in the file system that you are trying to unmount, the unmount command will fail. It also means if you share the A/UX system with someone, and while you are attempting to unmount the CD-ROM that person has a file from the disc displayed on screen or in some other way has a file in use, your command to unmount the CD-ROM is blocked.

1. **Log in to the root account.**

   See "Becoming the Superuser" in Chapter 1 if you need instructions.

2. **Choose CommandShell from the Apple menu.**

   If a CommandShell window is not displayed, choose New from the File menu.

3. **Enter `umount /cdrom`**

   - *Note:* The command is `umount` and not `unmount` as you might expect.

   This command unmounts the CD-ROM.

   In the next steps you must open the `/etc/fstab` file.

4. **In the Finder, double-click the / disk icon to open it.**
5. **Double-click `etc` to open it.**
6. **Double-click `fstab` to open it.**
7. **Delete the entry for the CD-ROM.**

   It is probably the last line in the `/etc/fstab` file and looks similar to the following line:

   ```
   /dev/dsk/c5d0s0        /cdrom        4.2    ro     0      2
   ```

8. **Save the change and close the file.**
9. **Click in the CommandShell window to make it active.**
10. **Shut down A/UX by choosing Shutdown from the Special menu.**

11. **Disconnect the AppleCD SC from your Macintosh.**

    You need to have a SCSI terminator on the last device in your SCSI chain. If the AppleCD SC was the last device on your SCSI chain, remember to replace the terminator on the device that is now last on your SCSI chain.

If the CD-ROM was mounted temporarily

Follow these steps to unmount a CD-ROM that is mounted temporarily.

1. **Log in to the root account.**

   See "Becoming the Superuser" in Chapter 1 if you need instructions.

2. **Choose CommandShell from the Apple menu.**

   If a CommandShell window is not displayed, choose New from the File menu.

3. **Enter `umount /mnt`**

   - *Note:* The command is `umount` and not `unmount` as you might expect.

   This command unmounts the CD-ROM.

4. **Shut down A/UX by choosing Shutdown from the Special menu.**

5. **Disconnect the AppleCD SC from your Macintosh.**

   You need to have a SCSI terminator on the last device in your SCSI chain. If the AppleCD SC was the last device in your SCSI chain, remember to replace the terminator on the device that is now last in your SCSI chain.

Chapter 6 **Adding and Managing the Apple Tape Backup 40SC**

You use the Tape Backup 40SC to make backup copies of large amounts of data and to receive and install software. A single cartridge tape holds up to 38.5 megabytes (MB) of data.

In this chapter you'll find instructions to

- add a Tape Backup 40SC to your A/UX system
- back up and restore partitions with the Tape Backup 40SC software
- remove a Tape Backup 40SC from an A/UX system

Backing up a system on a regular basis so that you can reconstruct your system after suffering a problem with the system or with a hard disk is a very important part of system administration. For information on devising a backup plan for your files, as well as procedures to back up data by using the A/UX backup utilities, see "Backing Up Your System" in *A/UX Local System Administration.*

Connecting a Tape Backup 40SC

The Tape Backup 40SC is a SCSI (Small Computer System Interface) device that you connect to the Macintosh through the SCSI port on the back of the computer.

As with other SCSI devices—such as hard disks and the AppleCD SC—the way you connect the cables varies slightly depending on whether or not you have other SCSI devices connected to your Macintosh. Each of the SCSI devices connected to your Macintosh needs a unique SCSI ID number , and you may need to place a SCSI terminator on the last device in your SCSI chain. See your *Apple Tape Backup 40SC Owner's Guide* for complete information on connecting the tape backup device to your Macintosh.

Preparing a tape cartridge for use

Formatting a tape cartridge prepares it to store data. You can format tapes either in the Macintosh OS or in A/UX, whichever is convenient.

- *Note:* If you have Apple tape cartridges, you can skip this section, because Apple tape cartridges are formatted at the factory for you.

It is a good idea to format all unformatted tape cartridges as soon as you receive them. Each tape cartridge stores up to 38.5 MB of data. You'll need two tape cartridges to back up a 40 MB hard disk that is completely full.

You'll need only two tapes to back up a full 80 MB disk. Two tapes can hold the contents of an 80 MB disk because approximately 3 MB of a disk is reserved for the disk bookkeeping system, leaving about 77 MB of disk space for the data.

If you don't have two or more formatted tape cartridges before you start backing up a disk that contains more than 38 MB of data, you'll have to stop the backup procedure, format a tape, and begin the backup procedure again.

Formatting a tape cartridge in the Macintosh OS

To format a tape cartridge in the Macintosh OS, follow these steps. The process lasts about 40 minutes and must not be interrupted.

1. **In the Macintosh OS, open the Apple Tape Backup 40SC application.**

   To open the application, double-click it's icon. If necessary, use Find File on the Apple menu to find the application.

   If you can't find the application on your disk, you need to copy it from the floppy disk that came with the tape backup device.

2. **Insert the tape into the Tape Backup 40SC drive.**

   When you insert the tape cartridge, make sure that the record-lock switch is in the unlocked position (to the left).

   Push firmly until the tape cartridge is inside the Tape Backup 40SC.

   It takes about a minute for the tension on the tape to be adjusted.

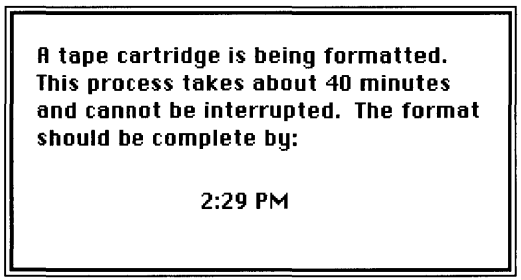
3. **Follow the instructions in the dialog boxes to complete the formatting operation.**

4. **Choose Format Cartridge from the File menu.**

   ▲ **Warning** Never eject the tape cartridge while the red activity light is on or flashing. ▲

   During the formatting process, a status screen, as shown in Figure 6-1, shows you at approximately what time the process will be complete.

■ **Figure 6-1** Format Cartridge status screen



▲ **Warning** Turning off the machine during the formatting operation may permanently damage the tape cartridge. If you interrupt the formatting, you will need to start the process again and complete it before you can use the tape. ▲

When formatting is complete, a dialog box asks you to confirm that you're finished.

5. **Click OK.**
6. **Eject the tape cartridge by pushing the eject button.**

You are now ready to back up information onto the tape cartridge.

Formatting a tape cartridge in A/UX

To format a tape cartridge in A/UX, follow these steps. The process lasts about a minute and must not be interrupted.

1. **Insert the tape into the Tape Backup 40SC drive.**

When you insert the tape cartridge, make sure that the record-lock switch is in the unlocked position (to the left).

Push firmly until the tape cartridge is inside the Tape Backup 40SC.

It takes about a minute for the tension on the tape to be adjusted.

2. **Display a CommandShell window by choosing CommandShell from the Apple menu.**

   If a CommandShell window does not appear, choose New from the File menu.

3. **Enter `mt -f /dev/rmt/tc`*n* `format`**

   where *n* is the SCSI ID number of the tape unit.

   Formatting requires about 30 minutes. After formatting is complete, the CommandShell window reappears. You can copy data onto the tape.

Using the Apple Tape Backup 40SC software

Though you can use any of the A/UX backup utilities—`tar`, `cpio`, and `dump.bsd`—to make backup tapes on the Apple Tape Backup 40SC, you can also use the Apple Tape Backup 40SC software. The Apple Tape Backup 40SC device and software are explained in detail in *Apple Tape Backup 40SC Owner's Guide.* For your convenience, the information from that book on backing up A/UX partitions is provided here.

You can use the commands in the Backup/Restore menu of the Apple Tape Backup 40SC application to make a full or "image" backup. Everything in the partition that you select is copied, even blank spaces on the disk. You cannot use this utility to back up anything smaller than a partition; the Backup Files and Restore Files commands on the menu are available to back up only Macintosh files, not A/UX files.

Each of the Backup/Restore menu commands displays a dialog box. An alert box warns you if you are about to do something that could cause you to lose information on the tape and gives you a chance either to cancel what you were about to do or to switch cartridges.

Backing up partitions

The Backup Volumes and Partitions command in the Backup/Restore menu lets you copy partitions to a tape cartridge or to several cartridges if the partition exceeds 38.5 MB. Partitions are divisions of a disk for use with different operating systems or file systems. A disk can have one or more partitions. You can select any combination of partitions to back up. The application copies all information from each selected partition onto a tape cartridge. You can use the copy on the tape cartridge to restore one or more of the partitions at any time.

◆ *Note: Volumes* and *partitions* are very similar, though *partition* is used in A/UX and *volume* is used in the Macintosh OS.

Plan to start the backup operation when you won't need the computer for at least 30 minutes. You can set up the computer to carry out the backup operation while you eat lunch, or at night after you go home (as long as you don't need to insert more tape cartridges).

Follow these steps to back up partitions:

1. **Be sure to have enough formatted tape cartridges on hand to complete the backup.**

   For information on formatting a tape, see "Preparing a Tape Cartridge for Use," earlier in this chapter.

2. **Shut down A/UX and restart the system from the *Tape Backup 40SC* floppy disk.**

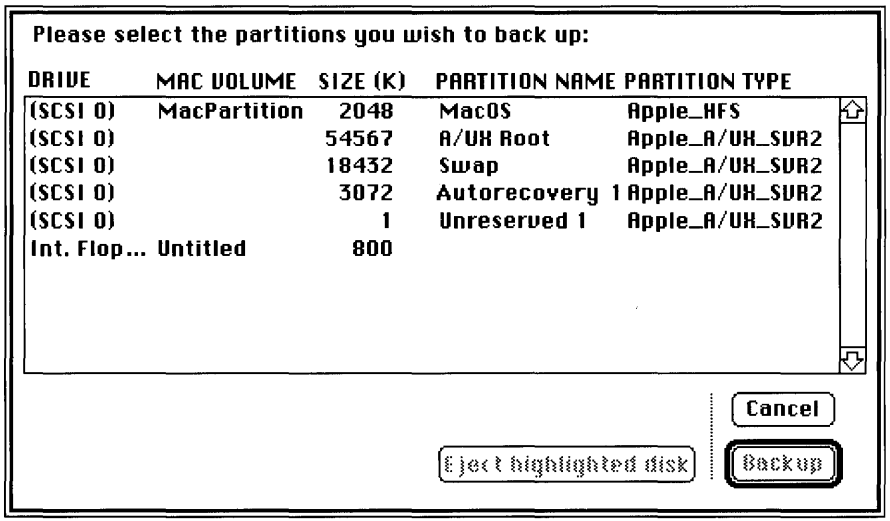
   With the Finder displayed, choose Shutdown from the Special menu, insert the floppy disk into the drive, and press the POWER ON key.

3. **Double-click the Apple Tape Backup 40SC application to open it.**

4. **Choose Backup Volumes and Partitions from the Backup/Restore menu.**

   A dialog box like the one in Figure 6-2 appears, showing you the volumes and partitions available for backup. Each partition is identified by the SCSI ID number of its disk drive and its size, name, and type.

■ **Figure 6-2** The Backup Volumes and Partitions dialog box

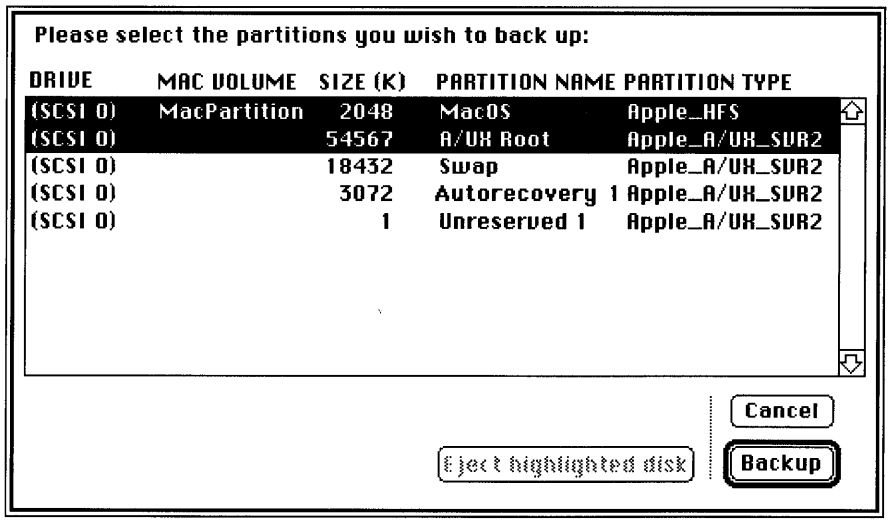


5. Select the partitions you want to back up.

- ◆ *Note:* There is no need to back up the Swap partition.
- □ To select an individual partition, click its name.
- □ To select a contiguous group of partitions, drag down the list of names, until all of the partitions that you want to back up are selected.
- □ To select noncontiguous partitions, hold down the SHIFT key and click the names of the partitions you want to back up.

Figure 6-3 presents an example of selecting partitions.

■ **Figure 6-3** Selecting partitions for backup



6. Click Backup to begin the backup operation.

Follow the instructions in the dialog boxes to complete the backup process.

The application tells you about how many tape cartridges are required for the operation.

During the backup, you see a status screen that reports the progress of the backup operation for each partition and the percentage completed for the total operation.

If your backup session requires more than one tape cartridge, the application requests that you reinsert the first tape cartridge at the end of the backup operation. The application may also request that you reinsert one of the other tapes, such as tape 2 of 4, if the partition you are copying starts on any tape other than the first or the last tape cartridge. The application then writes on the first tape cartridge a catalog that describes which partitions were copied on which cartridge. This process ensures that the backup tapes contain all the information the backup utility needs to restore partitions.

When the backup is complete, a dialog box asks you to confirm that you are finished.

7. **Click OK.**
8. **Eject the tape cartridge by pushing the eject button.**

   - *Note:* Any time that you insert a tape cartridge during the backup operation, the application checks whether or not the tape cartridge contains data. If the tape cartridge contains information, the application displays a warning and allows you either to switch the tape cartridge or to cancel the operation.

   You can cancel the backup operation in midstream, if necessary. All the volumes and partitions copied before you canceled the operation remain copied onto the tape cartridge and can be restored on the hard disk.

△ **Important** After you copy information onto a tape cartridge, slide the record-lock switch to the locked position to guard against copying over information by accident. △

Restoring partitions

You can restore your hard disk if you have a catastrophe that ruins the data on your hard disk (and ruins your day). The Restore Volumes and Partitions command in the Backup/Restore menu copies the contents of a tape cartridge back onto your hard disk. The contents of the hard disk must have previously been backed up on that tape cartridge.

If your hard disk crashes, you may need to reinitialize the hard disk and then start up from the *Tape Backup 40SC* floppy disk to perform the restore operation. See "Do I Need to Initialize?" in Chapter 4, "Adding and Managing Hard Disk SCs," for more information on initializing disks.

Each partition you are restoring from tape should be the same size as the disk partition into which you are restoring. If the partition you are restoring from tape is smaller than the disk partition into which you are restoring, you stand to lose disk space because the disk partition becomes the size of the partition on tape. The maximum disk space you can lose in such a situation is 4 MB. The application warns you of any loss of disk space and gives you a chance to cancel the operation. You can then repartition the disk before restoring it from tape. To create a partition of the correct size, use the Apple HD SC Setup program. See Chapter 4, "Adding and Managing a Hard Disk SC," for further instructions on creating partitions.

Follow these steps to restore a volume:

1. **Shut down A/UX and restart the system from the Tape Backup 40SC floppy disk.**

   In the Finder, choose Shutdown from the Special menu, insert the floppy disk into the drive, and press the POWER ON key.

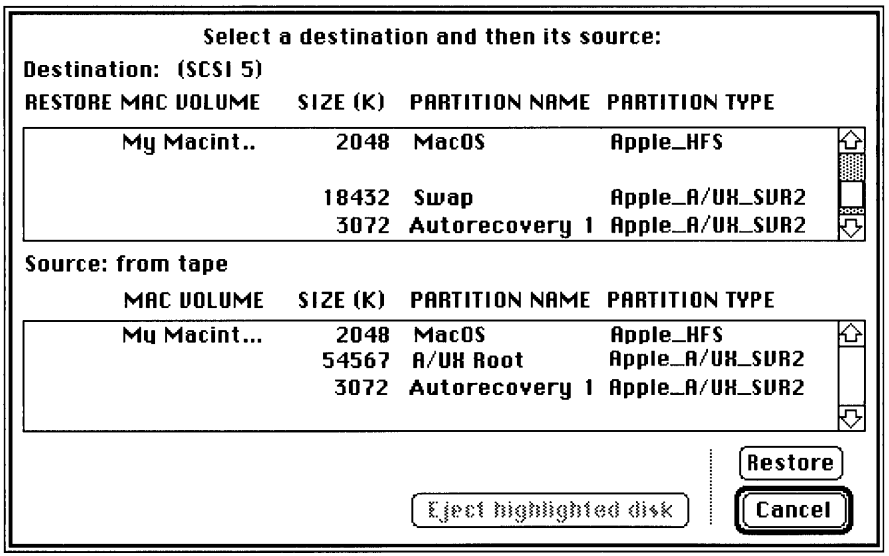
2. **Double-click the Apple Tape Backup 40SC application to open it.**

3. **Insert the first tape cartridge of your backup into the tape drive.**

4. **Choose Restore Volumes and Partitions from the Backup/Restore menu.**

   A dialog box like the one in Figure 6-4 appears, showing you the volumes and partitions available for the restore operation. You see a list of destinations to which the copied information can be restored. For a disk with multiple partitions, the dialog box displays each partition as a separate choice. Each "source" partition (the copy you made on the tape cartridge) is identified by displaying its partition size, name, and type.

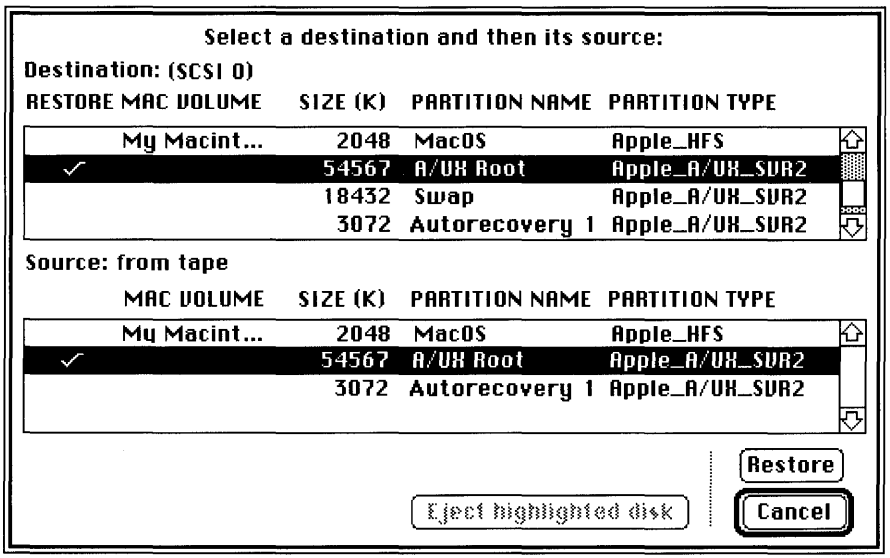
■ **Figure 6-4** Restore Volumes and Partitions dialog box



5. Select a destination for the partition you want to restore.

As shown in Figure 6-5, the dialog box then displays a device name or SCSI ID number after the selected destination. The SCSI ID number identifies the selected drive.

■ **Figure 6-5** Selecting a destination for a partition restore



A destination partition with files that are currently active cannot be selected.

6. **Select a source partition to restore on the selected destination device.**

   Only the partitions on the tape that can fit into the selected destination are available for selection; partitions on tape that do not fit into the selected destination are dimmed. Any source item that is too large, too small, or an operating-system type other than A/UX or Macintosh OS is dimmed and cannot be selected.

   Each destination can receive only one source item. You can review the selections of sources you make by clicking the destination. To undo a selection, first click the destination and then click the source.

   You can select several partitions to restore during the same restore operation. As you select each source partition, a check mark appears next to its name and the name of the selected destination.

You can restore each source partition to an individual destination partition or to several partitions connected to the same SCSI chain.

7. **Click Restore to begin the restore operation.**

   - *Note:* During the restore operation, the Tape Backup 40SC software reads from the tape cartridge and then writes data onto the hard disk. The restore operation writes over any data that is currently on the hard disk. Dialog boxes warn you of the potential data loss and give you a chance to cancel the operation.

8. **Follow the instructions in the dialog boxes to complete the volume restore operation.**

   When the restore operation is complete, click OK in response to the completion message.

9. **Click OK.**

10. **Eject the tape cartridge by pushing the eject button.**

11. **Restart A/UX.**

You can cancel the restore operation in midstream, if necessary, but the partition being restored on the hard disk becomes useless. (Partitions already restored are unaffected.) Canceling the restore operation does not alter the copy on the tape cartridge. You can still use it to restore your hard disk. However, you may have to reinitialize the hard disk and try the Restore Volumes and Partitions command again.

Removing a Tape Backup 40SC from A/UX

Use the following procedure to remove the tape device.

1. **Turn off power to the tape device.**

   The power switch is on the back panel.

2. **Shut down A/UX.**

   In the Finder, choose Shutdown from the Special menu.

3. **Disconnect the tape device from the SCSI port.**
4. **If the tape device was the last device on a SCSI chain, replace the terminator on the device that is now the last device on the chain.**

A/UX is again ready for use.

Chapter 7 **Adding and Managing Modems**

A modem connects your computer through a telephone line to computers beyond the reach of network cables. This chapter describes how to set up the Apple Personal Modem and Hayes-compatible modems for use with an A/UX system. To set up other types of modems, see the manual accompanying your modem. This chapter describes how to

- set up a modem only to make calls
- set up a modem to make *and* receive calls
- reset a modem only to make calls again
- remove a modem from an A/UX system

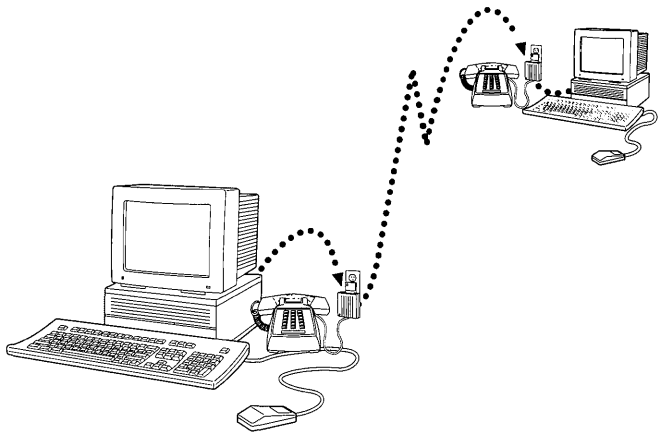
What will you use the modem for?

How you plan to use the modem determines how you need to set it up with A/UX.

You can easily set up a modem to make calls so that, for instance, you can send reports to your home office or read and post articles on an electronic bulletin board (Figure 7-1). If you plan to use the modem solely to dial other computers in this way, then it's a good idea not to allow any incoming calls. You then have the security of knowing that people cannot read information stored on your computer by getting it through the telephone line. This chapter has sections on both setting and resetting your system to only make calls.

Some people require a modem to receive calls; for instance, to receive reports from satellite offices. When you receive calls over the modem, the caller has access to your computer as if that person were connected directly to your computer via a terminal. If you plan to use your modem to receive as well as to make calls, see "Setting Up a Modem to Make and Receive Calls." Even if you plan to use your modem only to receive calls, follow the procedures in "Setting Up a Modem to Make and Receive Calls," because a modem cannot be easily configured to allow incoming but deny outgoing calls.

■ **Figure 7-1** A modem set up only to make calls



Modem setup only to make calls

Knowing your communications software options

Once you set up the modem, you have a choice of software for communicating over it. Many Macintosh applications are available for this purpose, but none are included in the A/UX distribution, so you'll need to purchase them separately. However, several UNIX communications packages are distributed with A/UX, and these are described below.

- UUCP (UNIX to UNIX Copy) is a good choice if you want to share information with other A/UX systems or with other operating systems derived from the UNIX operating system. By performing error checking and correction on the data it transmits, UUCP reliably stores and forwards information such as mail and files.

  UUCP also lets you execute commands on the distant machine. For example, you can send a file on your computer to a printer connected to the system at the other end of the telephone line. However, UUCP doesn't let you communicate interactively with the remote computer.

The drawback with UUCP is the difficulty in setting it up. Allow about a day and a half to set up UUCP if it's your first time, and 15 minutes to set it up thereafter.

UUCP is included with A/UX. See *A/UX Network System Administration* for information on setting up the UUCP system.

- The `cu` (call UNIX) program is easier to set up and use than UUCP, and it allows you to access non-UNIX systems. The `cu` program also lets you work interactively on the remote computer. Unlike UUCP, however, `cu` cannot detect errors in transmission and can only send ASCII text files. The inability to detect errors also makes `cu` inadequate for transmission over long distances or noisy phone lines.

  When you use `cu` to log in to another computer over the telephone line, you are treated like any other user on that computer. You can also use `cu` to log in as a terminal to another computer that is connected by serial line to your system.

  The `cu` program is included with A/UX. See *A/UX Communications User's Guide* for information.

- The `slip` program is useful for dialing into a network that uses the TCP/IP protocols. The `slip` program lets you run network programs such as `rlogin`, `telnet`, and `rcp` without requiring Ethernet hardware.

  The `slip` program is included with A/UX. See *A/UX Communications User's Guide* and *A/UX Network System Administration* for information.

- The `kermit` program is useful for sending information to any computer that's also running a `kermit` program. It performs error checking for increased reliability.

  The `kermit` program is included with A/UX. See `kermit`(1C) in *A/UX Command Reference* or the on-line man page for information.

Connecting and testing your modem

How you connect a modem varies according to the brand of modem and type of phone line and power source. The *Apple Personal Modem User's Manual* describes how to connect the Apple Personal Modem. It also describes how to test the modem. See the manual that accompanies your modem for instructions on connecting the phone line to the modem and the modem to your Macintosh computer.

△ **Important** Follow the steps in your modem owner's manual to test the modem before you configure A/UX for it. Testing the modem at this point lets you identify potential problems with your phone line or modem before you complicate the setup by attaching your modem to the computer. △

The following sections describe how to set up a modem. Once you've set up a modem, you can easily remove or alter its setup. For example, you can inactivate it, or you can change it from making and receiving calls to only making calls. Follow the procedures that match your needs.

Setting up a modem only to make calls

If you only need to dial into other computers and you don't wish to allow anyone to dial into your A/UX system, connect your modem to your Macintosh as described in the modem owner's manual. Then you're set up; your modem's already prepared to dial out. Refer to the user's guide for your communication software for instructions on dialing other computers and transmitting information.

If you later decide to allow incoming calls, follow the instructions in the next section, "Setting Up a Modem to Make and Receive Calls." Should you later decide to disallow incoming calls again, follow the instructions in "Resetting a Modem Only to Make Calls."

Setting up a modem to make and receive calls

Follow this procedure if you want the modem to make calls to and receive calls from other computers. If you are using an Apple Personal Modem you need to perform some additional steps provided at the end of this procedure.

Follow this procedure as well if you need only to receive calls, though you'll also be able to use the modem to make outgoing calls.

1. **Log in to the root account.**

   See "Becoming the Superuser" in Chapter 1 if you need instructions.

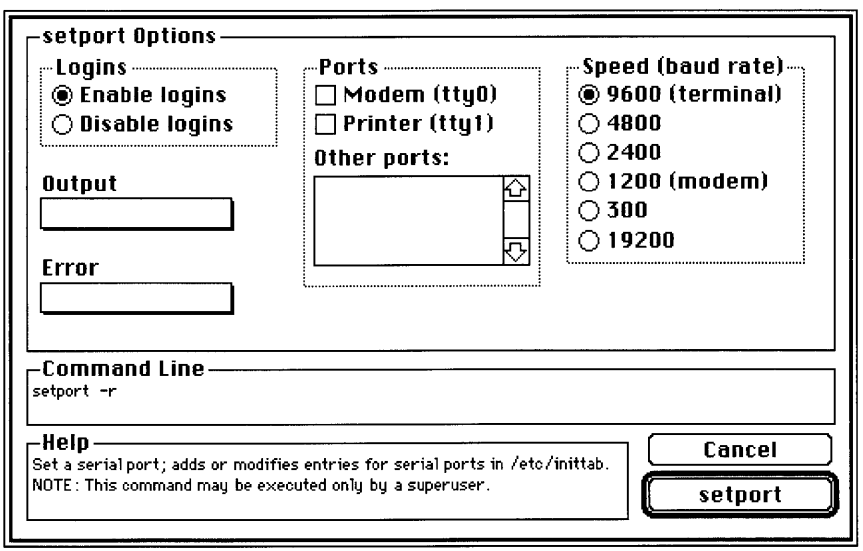
2. **Choose CommandShell from the Apple menu.**

   If a CommandShell window is not displayed, choose New from the File menu.

3. **Type `setport` and press COMMAND-K.**

   The `setport` Commando dialog box appears, as shown in Figure 7-2.

■ **Figure 7-2** The `setport` Commando dialog box



4. **Select "Enable logins" from the Logins options.**

   This setting allows A/UX to accept incoming calls.

5. **Select "Modem (tty0)" from the Ports options.**

   This setting tells A/UX which port the modem is connected to.

   If you connected the modem to the printer port, select "Printer (tty1)" instead.

6. **Select 1200 from the Speed options.**

   The speed of transmission (baud rate) is normally 1200 bits per second.

7. **Click setport.**

   You return to the CommandShell window.

8. **Press RETURN to run the command.**

   A/UX is now ready to send and receive calls through the modem, unless you have an Apple Personal Modem. If you have an Apple Personal Modem, you need to continue with the next steps.

△ **Important** If you are installing an Apple Personal Modem, you need to follow steps 9-13 to edit an A/UX system file after running the `setport` command. △

9. **From CommandShell, begin editing the `inittab` file by entering**
   `TextEditor /etc/inittab`

10. **Find the line defining the settings for the modem port.**

    It looks like the following line and is probably the second-to-last line in the file:
    `00:2:respawn:/etc/getty  tty0  at_1200  #Port 0 (modem)`

11. **Change `getty` to `apm_getty` so that the line looks like this:**
    `00:2:respawn:/etc/apm_getty  tty0  at_1200  #Port 0 (modem)`

    If you need instructions on using TextEditor, see *A/UX Essentials*.

12. **Choose Save then Quit from the File menu to make the change and close the file.**

    Now the Apple Personal Modem is ready to make and receive calls. Refer to the user's guide for your communication software for instructions on dialing other computers and transmitting information.

Resetting a modem only to make calls

This procedure resets a modem that was previously set to both make and receive calls to now only make calls. For example, you might want to follow this procedure if you're going on vacation and you don't want people logging into your computer via telephone while you are away.

1. **Log in to the root account.**

   See "Becoming the Superuser" in Chapter 1 if you need instructions.

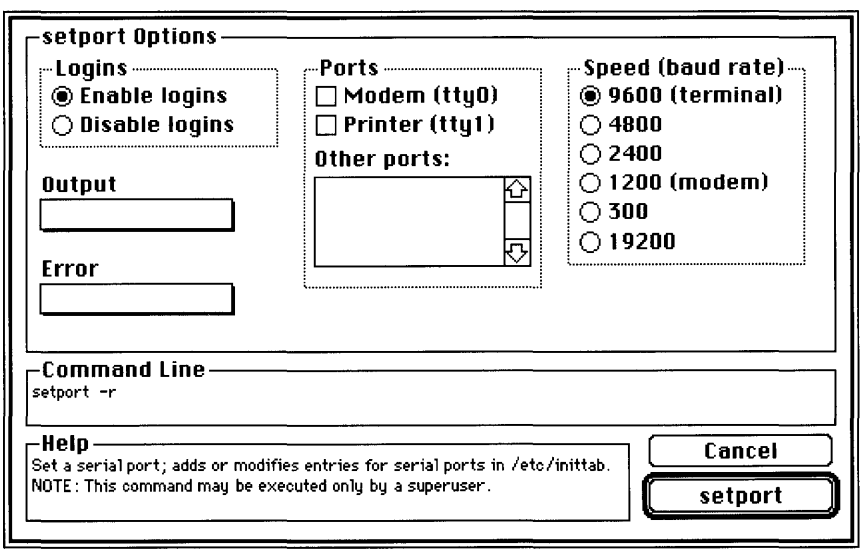
2. **Choose CommandShell from the Apple menu.**

   If a CommandShell window is not displayed, choose New from the File menu.

3. **Type `setport` and press COMMAND-K.**

   The `setport` Commando dialog box appears, as shown in Figure 7-3.

■ **Figure 7-3** The `setport` Commando dialog box



4. **Select "Disable logins" from the Logins options.**

   This setting prevents calls from coming in but allows you to call out over the modem.

5. **Select "Modem (tty0)" from the Ports options.**

   This setting tells A/UX which port the modem is connected to.

   If you connected the modem to the printer port, select "Printer (tty1)" instead.

6. **Click setport.**

   You return to the CommandShell window.

7. **Press RETURN to run the command.**

You can now make calls through the modem; however, the modem cannot accept incoming calls.

Removing a modem

Removing a modem from A/UX frees the serial port for other uses. If you've set up your modem only to make calls, you can simply unconnect the modem from your computer to free the port; skip the rest of this section. However, if you've set up your system to receive calls, disconnect the modem and use the following procedure to stop the A/UX process that has been answering the line at that port.

1. **Log in to the root account.**

   See "Becoming the Superuser" in Chapter 1 if you need instructions.

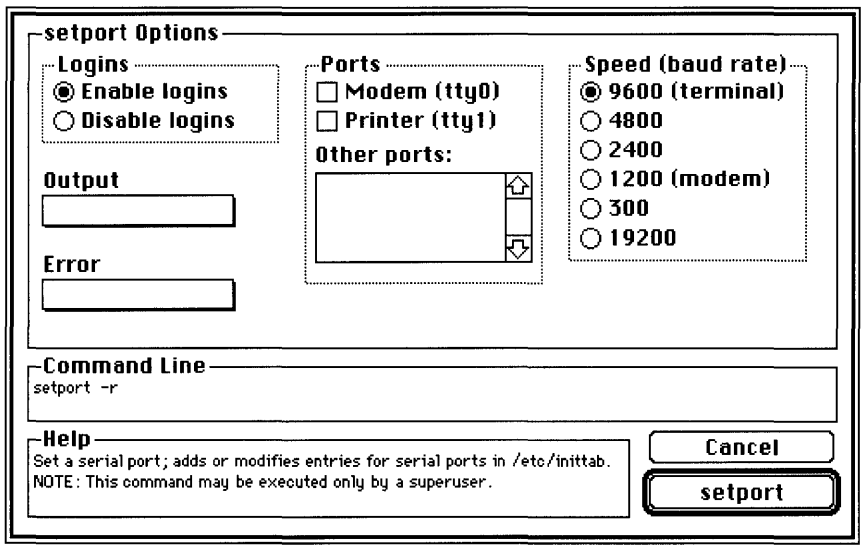
2. **Choose CommandShell from the Apple menu.**

   If a CommandShell window is not displayed, choose New from the File menu.

3. **Type `setport` and press COMMAND-K.**

   The `setport` Commando dialog box appears, as shown in Figure 7-4.

■ **Figure 7-4** The `setport` Commando dialog box



4. **Select "Disable logins" from the Logins options.**

   This setting will stop the process that handled incoming calls.

5. **Select "Modem (tty0)" from the Ports options.**

   Only the modem port is disabled.

   If you connected the modem to the printer port, select "Printer (tty1)" instead.

6. **Click setport.**

7. **Press RETURN.**

   This runs the command.

8. **Disconnect the modem.**

The serial port is free for other uses.

Switching from an Apple Personal Modem to a Hayes-compatible modem

If you set up an Apple Personal Modem to make and receive calls, you entered `apm_getty` into the `/etc/inittab` file to enable automatic call answering. The `apm_getty` setting has the same effect on a Hayes-compatible modem; however, most Hayes-compatible modems don't require this setting because they are preset to auto-answer mode. If you are switching from an Apple Personal Modem to a Hayes-compatible modem, leave `apm_getty` in the `/etc/inittab` file unless the Hayes-compatible modem has settings you want to keep and with which the `apm_getty` setting could interfere.

Chapter 8 **Adding and Removing Terminals**

If you want to let a second person use your A/UX system simultaneously with you, a terminal allows you to do this. A terminal is a device through which you interact with the computer, usually by sending input to the computer through a keyboard and displaying its output on a screen. You can use another computer such as a Macintosh Plus or a Macintosh SE as a terminal, or you can use a third-party's dedicated terminal. Whereas user accounts let several people use an A/UX system sequentially, terminals extend this capability to allow several people to use a system simultaneously.

In this chapter you'll learn how to

- add a Macintosh Plus or Macintosh SE as an A/UX terminal
- remove one of these terminals from A/UX

For information on adding a third-party terminal to A/UX, see *A/UX Local System Administration.*

Limitations of using a terminal

You will encounter the following restrictions if you interact with A/UX through a terminal (such as a Macintosh Plus running a terminal emulator program) instead of through the main console (that is, the keyboard, mouse, and monitor of the Macintosh running A/UX):

- You cannot use the A/UX Finder or the mouse on the terminal; you can use only the command-line interface.
- You cannot run any Macintosh applications on your A/UX system from the terminal. These applications run in the window environment available through the A/UX Toolbox; however, terminals cannot access the A/UX Toolbox.

Usefulness of a terminal

While someone else is running a Macintosh application at the console, you can run any of A/UX's standard UNIX applications, such as the `vi` editor, on a terminal. You can also do any of the A/UX procedures described in this guide, but not with the Commando interface. Instead, you must use the scripts with the command-line interface as described in *A/UX Local System Administration.*

A terminal is also well suited for performing system administration tasks using the traditional command-line interface. A terminal is especially helpful when you have problems with a program you're running on the console. If the program running on the console causes the computer to "freeze" (that is, if the computer won't respond to your commands), then you can enter a command from the terminal to stop that program (in UNIX terms, to "kill" the process running on the console).

Effect on system performance

You can connect multiple terminals to one A/UX computer, but system performance deteriorates with each additional terminal. Constraints on the number of terminals you can have include the amount of RAM in your A/UX system, the demand your applications make on system resources, and the level of system performance you require.

Acceptable system performance is a matter of personal preference. However, you can usually achieve satisfactory performance with one terminal added to an A/UX system configured with a minimum of 5 MB of RAM.

Adding a Macintosh Plus or Macintosh SE as a terminal

You follow the same procedure whether you are adding a Macintosh Plus or a Macintosh SE to a Macintosh computer running A/UX. The procedure requires the following steps:

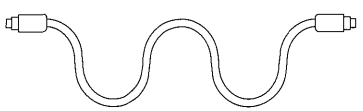
- connecting the Macintosh Plus or Macintosh SE to the Macintosh running A/UX
- running a terminal emulator program, such as MacTerminal®, on the Macintosh Plus or Macintosh SE
- running a script to inform A/UX that a terminal is connected

What you need

To connect a Macintosh Plus or a Macintosh SE as a terminal, you need the following:

- an Apple serial cable (Figure 8-1), such as a Macintosh Plus System to ImageWriter II cable, with mini-8 connectors at both ends.

■ **Figure 8-1** The cable to connect a Macintosh Plus or Macintosh SE



■ a terminal emulator program for the Macintosh Plus or Macintosh SE, such as MacTerminal. (MacTerminal is available from your authorized Apple dealer.)

Making the hardware and software connections

Follow these steps to set up your hardware and configure your software:

1. **Plug one end of the cable into a serial port on the back of the Macintosh computer running A/UX.**

   The serial ports are identified with icons of a modem (represented by a telephone handset) and a printer. You can use either serial port. You can use the modem port if a printer is connected to the computer running A/UX, or use the printer port if a modem is connected.

2. **Plug the other end of the cable into the corresponding serial port on the back of the Macintosh Plus or Macintosh SE computer.**

   The icons used to identify the serial ports are the same as those on the back of the A/UX computer.

3. **Plug the Macintosh Plus or Macintosh SE into a power source.**

   See the Macintosh Plus or Macintosh SE owner's guide if you need instructions.

4. **Turn on the Macintosh Plus or Macintosh SE.**

   The power switch is on the back panel.

5. **Open MacTerminal or another terminal emulator program on the Macintosh Plus or Macintosh SE.**

6. **Select the following settings in the terminal emulator program.**

   For example, if you're using MacTerminal, choose Terminal and Compatibility from the Settings menu and select the following settings:

   - terminal type: VT100
   - line width: 80 columns
   - mode: ANSI
   - baud: 9600
   - bits per character: 8
   - parity: none
   - connection port: modem (Select printer instead if you'll be connecting the terminal through the printer port.)
   - connection: to another computer (that is, instead of to a modem)
   - handshake: XON/XOFF

7. **On the Macintosh running A/UX, log in as root to become the superuser.**

   See "Becoming the Superuser" in Chapter 1 if you need instructions.

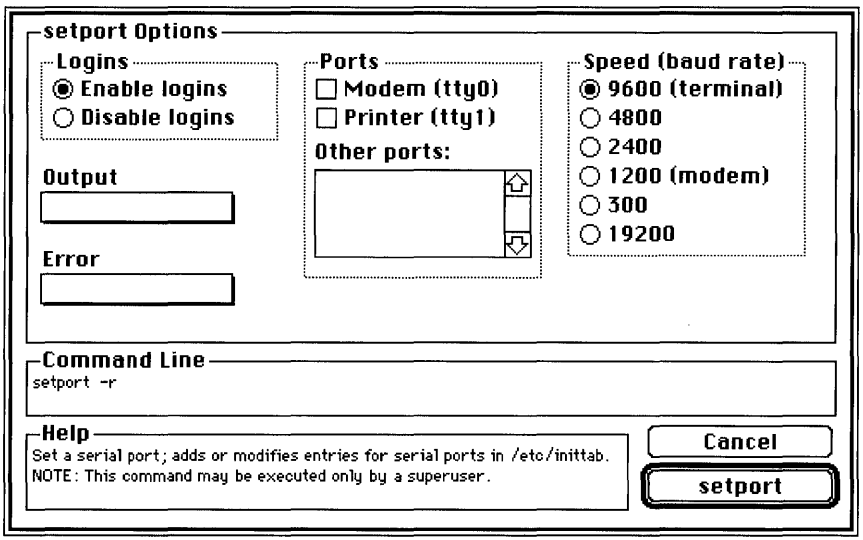
8. **Open a CommandShell window by choosing CommandShell from the Apple menu.**

   If a CommandShell window doesn't appear, choose New from the File menu.

9. **Type `setport` and press COMMAND-K.**

   The `setport` Commando dialog box appears.

■ **Figure 8-2** The `setport` Commando dialog box



In the next step, you tell A/UX through which serial port you connected the terminal.

10. Select "Modem (tty0)" or "Printer (tty1)" from the Ports options.

If your Macintosh running A/UX is connected at its modem port, select "Modem (tty0)." If it's connected at its printer port, select "Printer (tty1)."

11. Select 9600 from the Speed options.

Now you're ready to run the command.

12. Click setport.

You return to the CommandShell window.

13. Press RETURN to run the command.

14. Check the screen of the Macintosh Plus or Macintosh SE computer. You should see a login prompt.

If you see a login prompt in your terminal emulator program, log in as the `root` user or log in to any user account to test the connection. After entering the password, press RETURN to accept VT100 as the type of terminal. Your Macintosh Plus or Macintosh SE is now functioning as a terminal for A/UX.

If you don't see a login prompt, check the cable connections. Check that your settings on the terminal emulator program match those listed in step 6 of this procedure. If those are correct and you still see no login prompt, check that you have configured the software for the terminal to use the port that connects it to the A/UX computer. Then check that the port to which the A/UX computer is connected to the terminal matches the one you selected in the `setport` Commando dialog box.

Removing a Macintosh Plus or Macintosh SE from A/UX

To remove a Macintosh Plus or Macintosh SE serving as terminal to A/UX, follow these steps:

1. **Log in to the root account.**

   See "Becoming the Superuser" in Chapter 1 if you need instructions.

2. **Choose CommandShell from the Apple menu.**

   If a CommandShell window is not displayed, choose New from the File menu.

3. **Type `setport` and press COMMAND-K.**

   The `setport` dialog box appears, as shown in Figure 8-2.

4. **In the area labeled "Logins" click "Disable logins."**

   This stops the process that enables logins at the port you select in the next step.

5. **In the area labeled "Port" click "Modem (tty0)" or "Printer (tty1)."**

   If your Macintosh running A/UX is connected at its modem port, select "Modem (tty0)." If it's connected at its printer port, select "Printer (tty1)."

6. **Click setport.**

7. **Press RETURN.**

8. Disconnect the cable between the two computers.

The serial port is free for other uses.

When you again want to use one of these computers as a terminal, follow the setup procedure in this chapter. You don't need to reenter the terminal emulator program settings if they haven't changed.

Chapter 9 **Connecting Your Computer to a Network**

This chapter describes how to connect your A/UX system to an existing network system. It doesn't describe how to design and set up a network; this job belongs to your network administrator.

This chapter contains the following sections:

- what a network offers
- identifying your network
- networking options
- setting up on Ethernet
- testing the network connection
- using networked printers via Ethernet
- what's available now

You'll need to obtain some information from your network administrator to complete the procedures in this chapter. For an in-depth look at network setup and configuration, see *A/UX Network System Administration.*

For more information on network basics, such as what kinds of networks can be set up and how networks operate, see the Addison-Wesley publication, *Understanding Computer Networks* (Addison Wesley Publishing Company, 1989).

What a network offers

You may want to connect your computer to a network of computers. Over this network you can communicate with other users and share system resources, such as printers, files, and application programs. For example, a single printer on a network can be made available to users throughout an office building. Network software such as AppleShare® allows you to access a library of software tools for a wide range of business tasks. You can also use this network to send electronic mail to other users on the system.

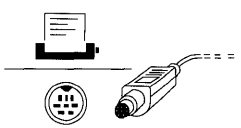
Now that you know something about what's available on a network, continue to the next section to determine which kind of network cabling is available at your site.

Identifying your network

A/UX supports both LocalTalk and EtherTalk®, so the computers on your network may be connected by either LocalTalk or Ethernet cables.

If your cable looks like Figure 9-1, you have LocalTalk. Hardware support for LocalTalk is built into all Macintosh computers.

■ **Figure 9-1** LocalTalk connection

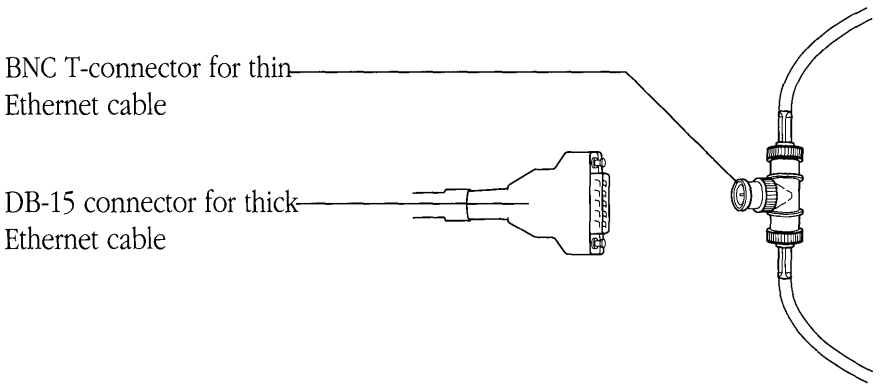


8-pin mini-circular port and plug

8-pin plug Connector box Cable extender 2 meter cable

If your cable looks like Figure 9-2, you have Ethernet. To connect with Ethernet, your system must have an Ethernet card, such as the EtherTalk NB card.

■ **Figure 9-2** Ethernet connection



Now that you've determined the type of network cable you have, continue to the next section for a description of the available networking options.

Networking options

Depending on whether you have Ethernet, LocalTalk, or both, here is an overview of the procedures for connecting to either or both networks:

- *connecting to LocalTalk*
  As an A/UX user, you might wish to use LocalTalk in order to use an AppleTalk printer. If this is the only network you will be using, first connect your system as described in *LocalTalk Cable System Owner's Guide*, which is in the LocalTalk connector kit. Next see Chapter 7 of *A/UX Essentials* for information on how to select an AppleTalk printer.

- *Note:* You can also use a LocalTalk cable to connect a printer directly to your system instead of using a printer on the network. See Chapter 3 for instructions.

LocalTalk also enables you to use a number of additional network services. For information on these additional services available over LocalTalk, refer to the guide that comes with the software (such as an electronic mail program) or with the piece of equipment you'll be using on your network.

- *connecting to Ethernet*
  As an A/UX user, you might wish to connect to the Ethernet-based TCP/IP (B-NET) network. A/UX supports Yellow Pages and the Network File System (NFS) facility, giving you the ability to share network resources with a wide variety of machines. Also, if the Ethernet is connected to another network that has AppleTalk printers, you can set up your system to use printers on that AppleTalk network too.

  In order to connect to the Ethernet, you first need to install an Ethernet card as described in the guide *Macintosh EtherTalk Interface Card,* that came with the EtherTalk NB card. Follow the instructions in that manual to install the card and physically connect your system to the Ethernet network. Or, if you have some other Ethernet card, see the directions that came with that card. After you install the Ethernet card proceed to the section "Setting Up A/UX for Ethernet."

- *connecting to both LocalTalk and Ethernet*
  If you have Ethernet and LocalTalk cables, you may wish to connect to them both in order to get access to both the TCP/IP network over the Ethernet and AppleTalk printers over LocalTalk. If you choose to do this, first install an Ethernet card as described in the guide *Macintosh EtherTalk Interface Card,* that came with the EtherTalk NB card. Follow the instructions in that guide to install the card and physically connect your system to the Ethernet network. Or, if you have some other Ethernet card, see the directions that came with that card. After you install the Ethernet card proceed to the section "Setting Up A/UX for Ethernet."

Setting up A/UX for Ethernet

After you install an Ethernet interface card and connect the Ethernet cables, you can set up A/UX files to communicate with other machines and share resources on the TCP/IP network. Follow these steps:

1. **Collect the necessary network addressing and services information from your network administrator.**

   Check with your network administrator to get the following information about your system:

   - your Internet address (a number such as `192.33.20.1`)

△ **Important** Each Internet address number conveys important information that can affect a large number of network users, so be sure to use legitimate numbers. Do *not* make up numbers.

If you haven't yet received your official Internet address number and your network is not connected to any other networks, you may use the number `192.33.20.`*n*, where *n* is `1` or higher. Your machine must be the only one on the network that has this number. △

   - the Internet address of another machine that is running on the network
     You'll use this address to test that your machine is working on the network.
   - an Internet broadcast address
     Typically this is your Internet address, with `255` in place of the last digits. If you haven't received an official number, use `192.33.20.255`.
   - a netmask
     If you don't have an official netmask, use `none`.

   In a network with multiple subnets, the netmask enables the system to identify local machines, thereby keeping local traffic off the general network. An example netmask is `0xfffffc00` (zero followed by eight hex digits).

- a host name, which is a unique name that identifies your system
- a `yp` domain name if you are using Yellow Pages

2. **Log in to the root account to become the superuser.**

   See "Becoming the Superuser" in Chapter 1 if you need instructions.

3. **Open a CommandShell window if one isn't already on the desktop.**

   In the Finder, choose CommandShell from the Apple menu.

4. **Enter `newconfig nfs`**

   - *Note:* If you know that you don't want NFS, you can save space on your system by entering the `newconfig bnet` command instead, which causes the system to skip the Yellow Pages prompt mentioned later in this step.

   The system prompts you to indicate whether you want to use Yellow Pages:

   ```
   Do you want this machine to be a Yellow Pages client? (y or
   n) [default:n]
   ```

5. **Enter `n` or press RETURN.**

   This procedure assumes that you aren't running Yellow Pages.

   If you haven't already set a host name, the system prompts you for one:

   ```
   Please enter a hostname (it must be unique):
   ```

6. **Enter your host name.**

   You can enter any host name you choose, as long as it meets these conditions:

   - The name must be no longer than 31 characters.
   - The name must be unique on the network.
   - The name must not contain any special characters such as !, \, ? or *.

7. **Enter additional information as prompted.**

   If the information hasn't been previously entered, the system prompts you to enter the information you got from your network administrator: your Internet address, Internet broadcast address, and netmask.

- *Note:* If Internet address and netmask information has been previously entered and you would like to change them to new values, use the `rm` command to remove the existing files:

  ```
  rm /etc/HOSTNAME
  rm /etc/NETADDRS
  ```

  If you use the `rm` command to remove existing files, run the `newconfig nfs` command. In response, the system automatically creates the `/etc/HOSTNAME` and `/etc/NETADDRS` files when you enter the Internet address and host name.

8. To verify that the system is set up to handle the UNIX `mail` utility, check the file `/etc/inittab`.

Use TextEditor, `vi`, or another text editor to open the `/etc/inittab file`. Find this line:

```
net8:2:once:/usr/lib/sendmail -bd -q30m
```

If the line contains `off` instead of `once`, change `off` to `once`, then save and close the file.

9. To use AppleTalk printers over the Ethernet, switch from LocalTalk to EtherTalk.

The remainder of this step describes how to enable printing on AppleTalk printers that are available on the internet via Ethernet. This process disables AppleTalk printing from the LocalTalk port. If you are connected to LocalTalk for AppleTalk printer access, skip to step 9.

To enable AppleTalk printing via Ethernet, enter

```
/etc/appletalk -d
```

Then use TextEditor, `vi`, or another text editor to open the `/etc/appletalkrc` file, and change the line:

```
interface = localtalk0
```

to

```
interface = ethertalk0
```

10. Choose Restart from the Special menu.

The system restarts (reboots), and the changes take effect.

Testing the network connection

Follow these steps to check that your system has a working connection to the network:

1. **Log in to the root account to become the superuser.**

   See "Becoming the Superuser" in Chapter 1 if you need instructions.

2. **Enter `telnet loop`**

   After a short time, the login prompt appears

   ```
   Apple Computer, Inc. A/UX (hostname)
   login:
   ```

3. **Press CONTROL-D to escape from the login prompt.**

   If the login prompt doesn't appear in several seconds, see your network administrator. For details on network tests see Chapter 9, "Tools for Checking System Status," in *A/UX Network System Administration.*

4. **Test communications over the network.**

   To check whether your system can communicate across the network, you need to know the name of another system on the network. Get this information from another user or from your network administrator. Use the command

   `/usr/etc/ping` *address*

   where *address* is the address of another network computer. For example, if `192.33.20.2` is the address of another system already on the network, you would enter

   ```
   /usr/etc/ping 192.33.20.2
   ```

   If the network and both hosts are functional, a display like this appears

   ```
   64 bytes from 192.33.20.2: icmp_seq=0. time=16 ms
   64 bytes from 192.33.20.2: icmp_seq=1. time=16 ms
   64 bytes from 192.33.20.2: icmp_seq=2. time=16 ms
   64 bytes from 192.33.20.2: icmp_seq=3. time=16 ms
   ```

Stop the display by pressing CONTROL-C. Some statistics appear, then the system prompt, as shown here:

```
----hostname1 PING Statistics----
6 packets transmitted, 6 packets received, 0% packet loss
round-trip (ms) min/avg/max = 16/16/16
hostname%
```

Using networked printers via Ethernet

If the network to which you are now connected includes AppleTalk printers, you can select one if these printers as described in Chapter 3, "Adding and Managing Printers," or in Chapter 7 of *A/UX Essentials.*

If your network includes other UNIX hosts that support `lpr`, you can use a printer on the remote host by completing these steps:

1. **Log in to the root account to become the superuser.**

   See "Becoming the Superuser" in Chapter 1 if you need instructions.

2. **Open the file `/etc/printcap`.**

   Use TextEdit, or `vi`, or the text editor of your choice.

3. **Find the `RemoteHost` line.**

   The `RemoteHost` line is in the section that refers to the remote UNIX line printer, as in the last line of this example:

   ```
   #Remote UNIX line printer
   #Change 'RemoteHost' to actual name of remote UNIX host
   remote|remote line printer:\
           :lp=:rm=RemoteHost:sd=usr/spool/lpd/Remote
   ```

4. **Replace `RemoteHost` with the name of the remote UNIX system connected to the printer you intend to use.**

   For example, if the name of the remote host is Thad, edit the line to look like this:

   ```
   :lp=:rm=Thad:sd=usr/spool/lpd/Remote
   ```

Editing the line as shown above causes `lpr` commands sent to the remote host to be automatically printed out on the default printer of the computer named Thad.

5. **If you wish, specify a printer other than the host default printer.**

   For example, to print files on the printer named Bos, insert the name of the printer and the name of the remote host (Thad) on the `RemoteHost` line, as shown here:

   ```
   :lp=:rp=Bos:rm=Thad:sd=usr/spool/lpd/Remote
   ```

6. **Save the `/etc/printcap` file.**

7. **Choose Restart from the Special menu.**

   The changes are put into effect.

Now you can use the remote UNIX printer by entering the `lpr` command in this format:

`lpr -Premote` *filename*

See Chapter 7 in *A/UX Essentials* for additional printing information.

What's available now

Now that you've completed the basic steps for putting your system on the network, you can send and receive mail and use remote printers. Also, A/UX includes AppleShare client software. If an AppleShare file server is on the network, you can use the AppleShare services. See the *AppleShare User's Guide* for information on using AppleShare.

Several other network services are available, for instance, you can make your files available to other network users, and access other network services. To implement these options, see your network administrator for specifics on your network configuration.

See *A/UX Network System Administration* for complete information about network setup and management, as well as information on adding services such as Yellow Pages.

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