A/UX® Installation Guide

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"Extension of the Macintosh to UNIX® "

The learning path through A/UX documentation

Setting Up Your Macintosh

Getting Started With Your Macintosh

Macintosh Basics

Macintosh Reference
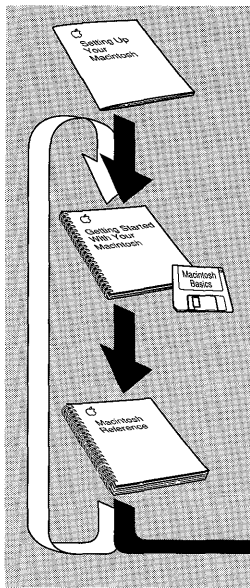
In the box with the Macintosh computer
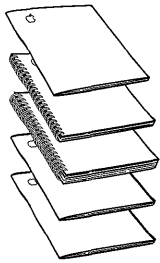
Apple guides for various peripheral devices

A/UX 2.0 Release Notes

Road Map to A/UX

Read Me

A/UX Installation Guide

Setting Up Accounts and Peripherals for A/UX

A/UX Essentials
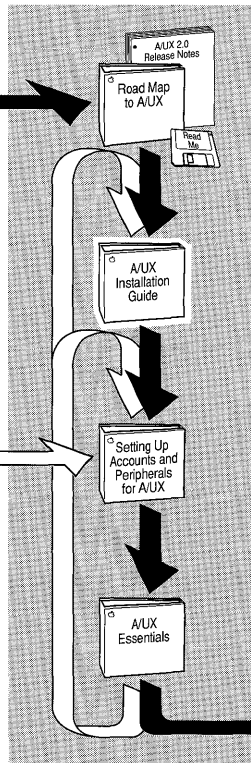
In the Accessory Kit with A/UX

In the User Kit for A/UX

A/UX Communications User's Guide

In the Administrator Kit for A/UX

A/UX System Administrator's Reference

In the Programmer Kit for A/UX

A/UX Programming Languages and Tools, Vol. 2

Contents

Figures

Preface

This guide provides information for installing A/UX® 2.0, either as a new A/UX system or as an update to an existing A/UX 1.0, 1.0.1, 1.1, or 1.1.1 system. This guide contains all the instructions necessary to complete the A/UX installation procedure required for the system you have. Even if you are not a programmer or an experienced system administrator, you can use this guide to set up A/UX on your computer.

This guide contains the following chapters:

- Chapter 1, "Starting Up the System"
- Chapter 2, "Updating A/UX 1.x to A/UX 2.0"
- Chapter 3, "Preparing the Hard Disk"
- Chapter 4, "Installing from CD-ROM, Tape, or Floppy"
- Chapter 5, "Running A/UX 2.0 for the First Time"
- Appendix A, "Troubleshooting"
- Appendix B, "Nonstandard Procedures"
- Appendix C, "Reusing the Installation Media"

Who should read this guide

This guide is intended for the person responsible for the hardware setup and initial software startup of A/UX. In the past, a site running the UNIX operating system usually had an expert system administrator to install and maintain the system for all other users. The power of the UNIX operating system is now available to single users through A/UX for the Macintosh. If you're the sole user of your system, you're also the system administrator.

How to use this guide

The most effective way to use this guide is straightforward: start at the beginning and continue until the end. There can be a few twists, however. Because A/UX comes supplied on a variety of media and can be installed on different hard disk configurations, be alert for pointers to particular sections specific to your installation. For example, when there are differences in the installation procedures for CD-ROM, tape, and floppy disk, the instructions direct you to go to the section that applies to your installation media. If A/UX has been factory installed, you'll find that you skip over large sections of the procedures.

Regardless of your experience with A/UX or the installation you are performing, start with Chapter 1 to check that you have all the necessary ingredients: hardware and software. Next, if you are updating an existing A/UX system, go through the procedures in Chapter 2. If you're not updating, skip to Chapter 3 to prepare the hard disk. From there, go through the rest of the chapters in order, unless the instructions send you elsewhere to handle special circumstances. Certain specialized installations may require you to follow the instructions in Appendix B, "Nonstandard Procedures." We'll let you know when this is necessary. If you encounter problems during the installation, Appendix A, "Troubleshooting," is the place to get information on how to remedy them.

What you should already know

This guide assumes that you've completed the procedures in the *Setting Up Your Macintosh* guide that came with your Macintosh, and that the machine is installed and you've learned the basics of Macintosh operation. These basics are covered in the tour disk, labeled *Macintosh Basics* or *Your Apple Tour of the Macintosh*, and the *Setting Up Your Macintosh* guide that came with your system.

Before installing A/UX, you also should have read *Road Map to A/UX* so that you have a general background on A/UX and know something about what this powerful operating system offers. You don't need any UNIX experience to install A/UX; even if you are unfamiliar with the UNIX operating system you can find the information you need in this guide to install A/UX 2.0 or update a previous A/UX release to A/UX 2.0.

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.

Term	Action
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 **Starting Up the System**

This chapter describes how to make sure that you have all the components you need to install A/UX 2.0. Next it explains how to turn on the power to your Macintosh and check the Read Me file for additional A/UX information. This chapter includes these sections:

- Before you start
- How A/UX is supplied
- What you need
- Checking the Read Me disk
- A/UX factory installed on a hard disk
- Updating an existing A/UX system to A/UX 2.0
- Installing A/UX 2.0 on a new hard disk
- Reading the Read Me file

Before you start

Before you power on your Macintosh, use the information in the following sections, "How A/UX Is Supplied" and "What You Need," to check that you have the appropriate hardware and software components to install A/UX 2.0. Figure 1-1 shows the basic hardware configurations and the various installation media available for A/UX 2.0.

■ **Figure 1-1** Hardware configurations and installation media

Factory-installed

Installation to new or existing hard disk

A/UX Floppy Product

A/UX Tape Product

A/UX CD-ROM Product
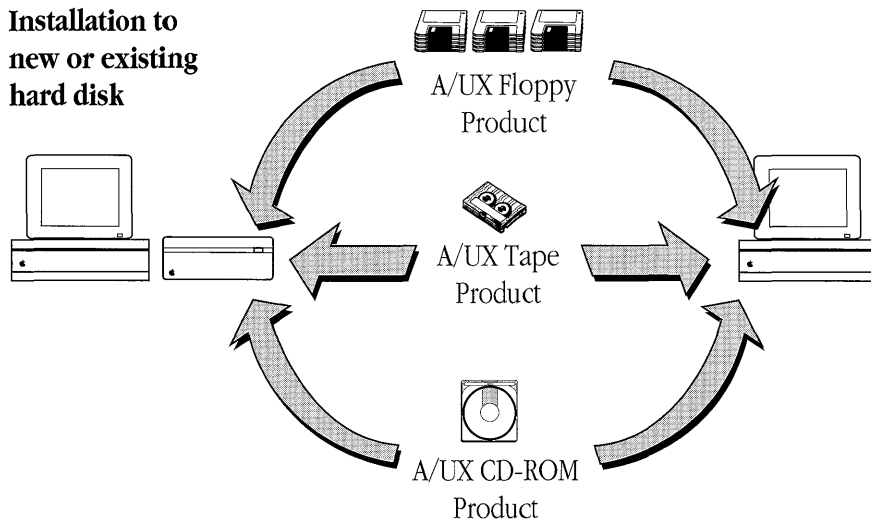
How A/UX is supplied

A/UX is distributed in one of several ways, as shown in Figure 1-2. It may be

■ Factory installed on the internal hard disk of your Macintosh IIcx, Macintosh IIfx, or Macintosh IIci.

If you're new to UNIX, set aside about a half hour to start and complete the standard installation with A/UX factory installed on an internal hard disk.

■ Factory installed on an external Apple HD 80 SC.

If you're new to UNIX, set aside about 1 hour to start and complete the standard installation with A/UX factory installed on an external hard disk.

■ Supplied on a compact disc as the A/UX 2.0 CD-ROM Product.

If you purchased A/UX on CD-ROM, allow about 2 hours to complete the standard installation. Once begun, the compact disc installation can proceed unattended.

■ Supplied on a tape cartridge as the A/UX 2.0 Tape Product.

If you purchased A/UX on a tape cartridge, allow about 2 hours to complete the standard installation. Once begun, the tape installation can proceed unattended.

■ Supplied on a set of floppy disks as the A/UX 2.0 Floppy Disk Product.

If you purchased A/UX on a set of floppy disks, allow yourself about 3 hours to start and complete the standard installation. This disk installation requires someone to insert disks throughout the process.

■ **Figure 1-2** A/UX distribution options

Macintosh IIfx, IIci, or IIcx with internal hard disk

External hard drive

A/UX 2.0

CD-ROM

Tape cartridge
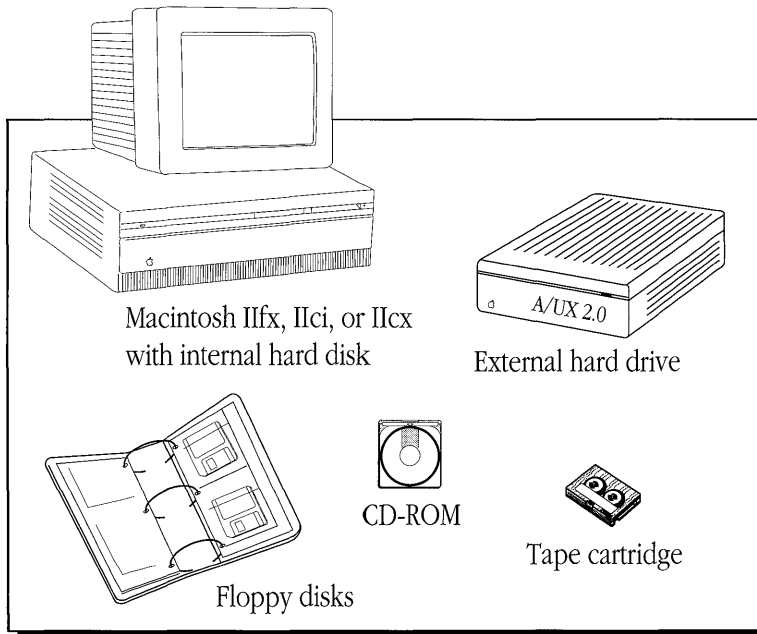
Floppy disks

What you need

In order to install A/UX 2.0, you need

■ hardware that meets A/UX requirements

■ the A/UX operating system and its utilities, provided factory installed on a hard disk, or on the CD-ROM, Tape, or Floppy Disk Product.

■ the A/UX Accessory Kit, which contains this guide and other documentation. If you purchased the CD-ROM, Tape, or Floppy Disk Product, the Accessory Kit contains additional disks for installation and setup.

A/UX Accessory Kit

The A/UX Accessory Kit contains these items:

- Packing List
- *A/UX 2.0 Release Notes*
- *Road Map to A/UX*
- *A/UX Installation Guide*
- *Setting Up Accounts and Peripherals for A/UX*
- *A/UX Essentials*
- *Read Me* disk

   This Macintosh disk contains a Read Me file that provides any information that may have changed or been added since the manuals in the A/UX library were published. The section "Reading the Read Me File" later in this chapter explains how to examine the file on this disk for late-breaking technical information about A/UX 2.0.

- *6.0.5 System Tools, Utilities 1, Utilities 2, Printing Tools,* and *Network Installation* disks

   These five Macintosh disks contain the Macintosh Operating System software and the utilities that enable the system to install A/UX 2.0. For the initial installation you don't use *Printing Tools* or the *Network Installation* disks.

- *Startup* and *Startup Utilities* disks

   These two disks contain utilities that enable the system to start A/UX 2.0. They also can serve as backups for starting and troubleshooting A/UX if there are problems with your hard disk.

- *System Checker* disk

   This UNIX system disk contains a utility for checking the A/UX files on your system and reporting which ones have changed. You use this information when you update A/UX 1.0 or later to A/UX 2.0.

Figure 1-3 shows the A/UX Accessory Kit.

■ **Figure 1-3** A/UX Accessory Kit

6.0.5 System
    System Tools
    Printing Tools
    Utilities 1
    Utilities 2
    Network Installation

Read Me
System Checker
Startup
Startup Utilities

Release Notes

Setting Up Accounts and Peripherals for A/UX

Road Map to A/UX

A/UX Installation Guide

A/UX Essentials
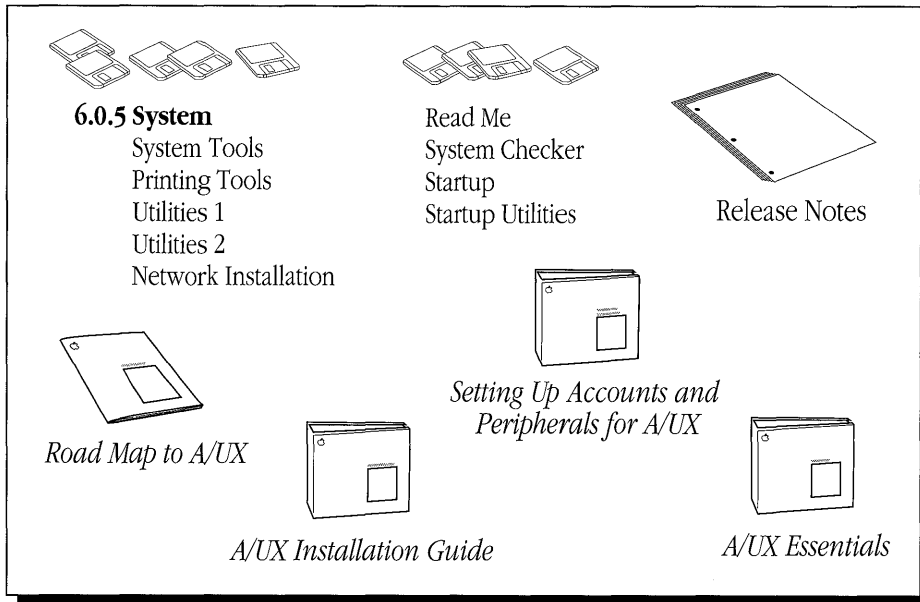
A/UX CD-ROM Product

The A/UX CD-ROM Product contains this software:

■ *Floppy Launch* disk

This disk contains a stand-alone A/UX shell, a kernel, and a few utilities for installing A/UX from a compact disc.

■ *Floppy Root* disk

This disk contains a minimal A/UX file system to be used for installing A/UX from a compact disc.

■ *Kernel Archive* disk

This disk contains an A/UX kernel in `cpio` archive form.

- *A/UX Release 2.0 Installation* compact disc

  This disc contains the complete A/UX operating system and utilities as an A/UX file system.

Figure 1-4 shows the A/UX CD-ROM Product.

- **Figure 1-4** A/UX CD-ROM Product

A/UX Release 2.0

Floppy Launch
Floppy Root
Kernel Archive

Installation CD-ROM
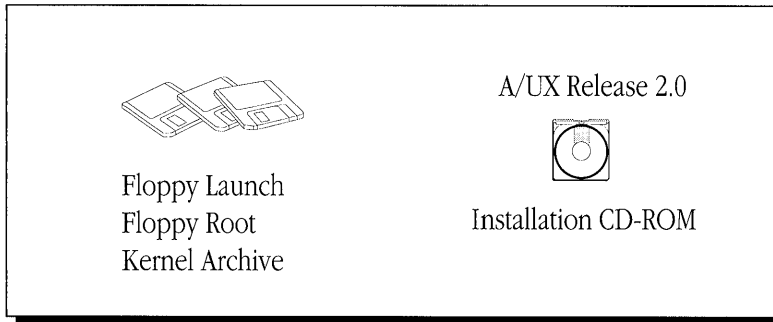
A/UX Tape Product

The A/UX Tape Product contains this software:

- *Floppy Launch* disk

  This disk contains a stand-alone A/UX shell, a kernel, and a few utilities for installing A/UX from a tape cartridge.

- *Floppy Root* disk

  This disk contains a minimal A/UX file system to be used for installing A/UX from a tape cartridge.

- *Kernel Archive* disk

  This disk contains an A/UX kernel in `cpio` archive form.

■ *Release 2.0 Installation* tape cartridge

This tape cartridge contains the complete A/UX operating system and utilities in compressed `cpio` format.

Figure 1-5 shows the A/UX Tape Product.

■ **Figure 1-5** A/UX Tape Product
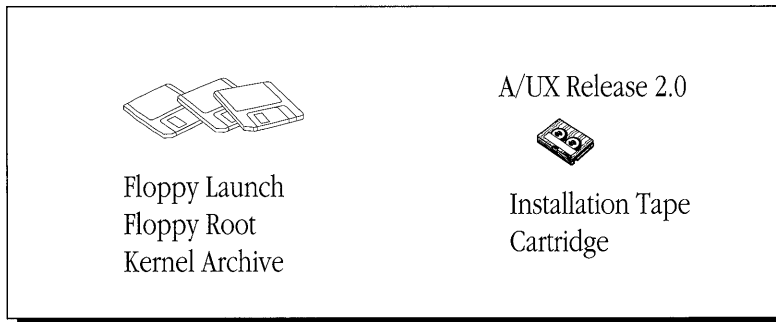
A/UX Floppy Disk Product

The A/UX Floppy Disk Product contains this software:

■ *Floppy Launch* disk

This disk contains a stand-alone A/UX shell, a kernel, and a few utilities for installing A/UX from floppy disks.

■ *Floppy Root* disk

This disk contains a minimal A/UX file system to be used for installing A/UX from floppy disks.

■ *Kernel Archive* disk

This disk contains an A/UX kernel in `cpio` archive form.

- *A/UX Release 2.0 Installation* floppy disks 1-32

  These sequentially-numbered disks, of which there are 32, contain the complete A/UX operating system and utilities in compressed `cpio` format.

Figure 1-6 shows the A/UX Floppy Disk Product.

- **Figure 1-6** A/UX Floppy Disk Product
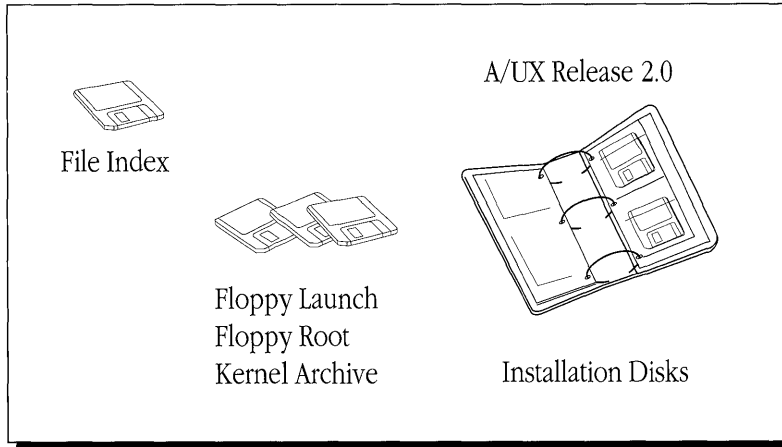
Hardware requirements

To run A/UX, you need one of the hardware configurations listed here. If you have any questions about these requirements, ask your Apple representative for more information. Figure 1-7 shows the required hardware.

■ **Figure 1-7** A/UX Required Hardware
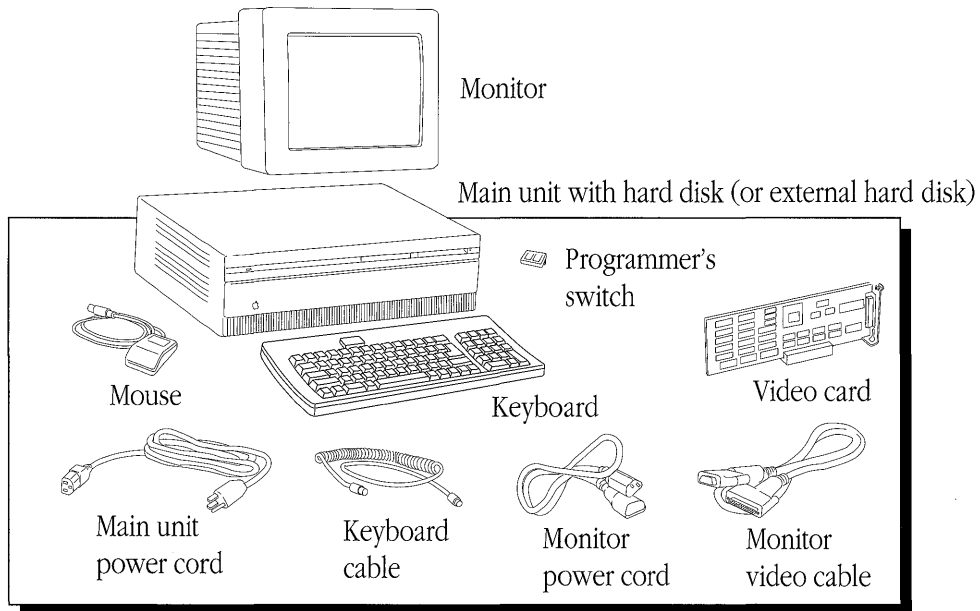
■ The Macintosh SE/30 or any of the Macintosh II family of computers, with at least one floppy disk drive. These are among the computers on which A/UX runs:

  □ Macintosh II

  □ Macintosh IIx

  □ Macintosh IIcx

  □ Macintosh IIci

  □ Macintosh IIfx

  □ Macintosh SE/30

■ An 80 MB Apple Hard Disk 80SC or 160 MB Apple Hard Disk 160SC. If you are also installing X11, one of Apple's X Window System products, you may need a second 80 MB hard disk or the 160 MB hard disk; see *Getting Started with X Window System for A/UX* for details.

■ A video card (not required for the Macintosh IIci).

■ A monochrome or color monitor with cables.

- A keyboard, mouse, and Apple Desktop Bus™ (ADB) cables. Apple offers a choice of keyboards.

◆ *Note for Macintosh II users only:* If you have a Macintosh II, your dealer installed a 68851 PMMU (Paged Memory Management Unit) in place of the AMU (Address Mapping Unit) normally shipped with the Macintosh II. You also need 4 MB of memory; 1MB is standard.

- At least 4 MB of main memory, which comes standard with all except the Macintosh II. If you also intend to run X11, one of Apple's X Window System products, 5 MB of main memory is required. Additional memory may be required for multiple users.

- If you purchased A/UX on an external Hard Disk 80SC, the Apple SCSI Cable System, including cables and cable terminators.

- If you purchased A/UX on a compact disc, an AppleCD SC drive, the Apple SCSI Cable System, including cables and cable terminators.

- If you purchased A/UX on a tape cartridge, the Apple Tape Backup 40SC and the Apple SCSI Cable System, including cables and cable terminators.

Checking the Read Me disk

After you or your system administrator has set up your Macintosh according to directions that came with the computer, you are ready to check the A/UX Read Me file. Before you continue, find the disk labeled *A/UX Read Me.* This disk contains a file that provides the latest information on the installation process, including information that may have been added or changed since this manual was printed. The *A/UX Read Me* disk also contains the TeachText application so that the file can be opened and read.

If you have a printer attached to your Macintosh and you have the appropriate printer software installed, you can print the Read Me file. It's not necessary to print it now; wait and print the file when you have all your peripheral devices attached and your system is set up for printing. See the owner's guide that came with your computer for more information on printing from the Macintosh Operating System.

From the following sections, choose the one that describes your A/UX system and continue.

A/UX 2.0 factory installed on a hard disk

Follow these steps to start up your computer:

1. **Turn on all external SCSI devices.**

    SCSI (Small Computer System Interface) devices include the Apple Hard Disk SC, the AppleCD SC drive, and the Apple Tape Backup 40SC. A power light on each device indicates that it is on. After turning on the last SCSI device, wait 10 seconds before turning on the Macintosh.

2. Set your monitor's power switch to On.

Be sure to press the switch on the monitor (shown in Figure 1-8) even though system power is not yet on. If your monitor is connected to the power source on the Macintosh, the monitor turns on when you turn on your computer.

■ **Figure 1-8** The POWER ON switch on the Apple monitor
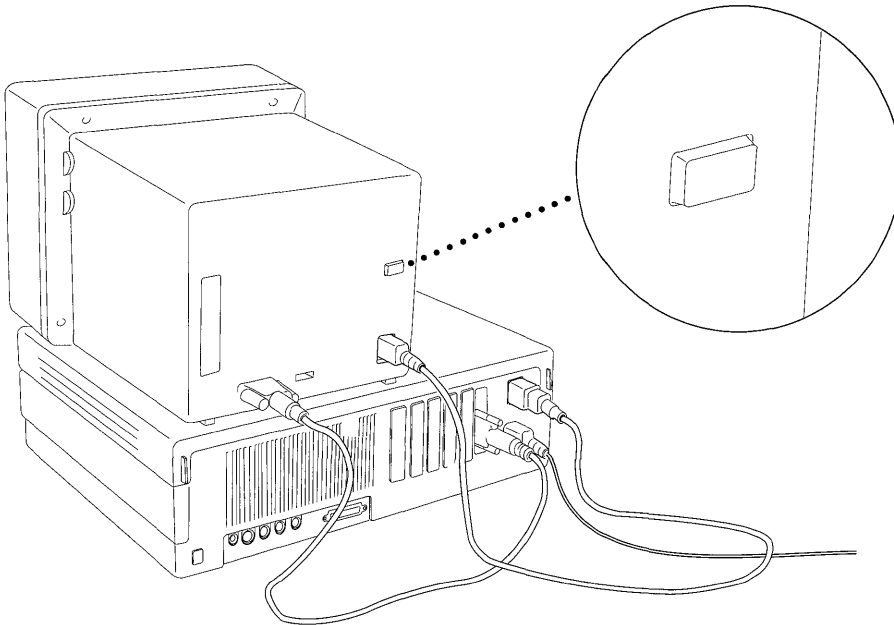
3. Press the POWER ON key to turn on your computer.

The POWER ON key, identified by a triangle, is located at the top middle of the standard keyboard and on the top right of the extended keyboard as shown in Figure 1-9. The Finder appears, as shown in Figure 1-10.

■ **Figure 1-9** POWER ON key on Apple keyboards
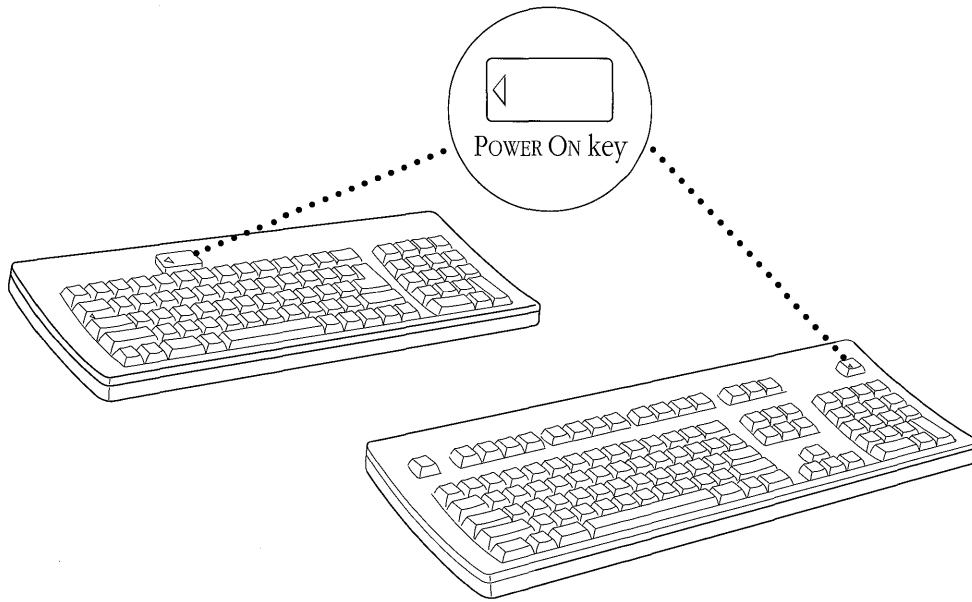
■ **Figure 1-10** The Finder
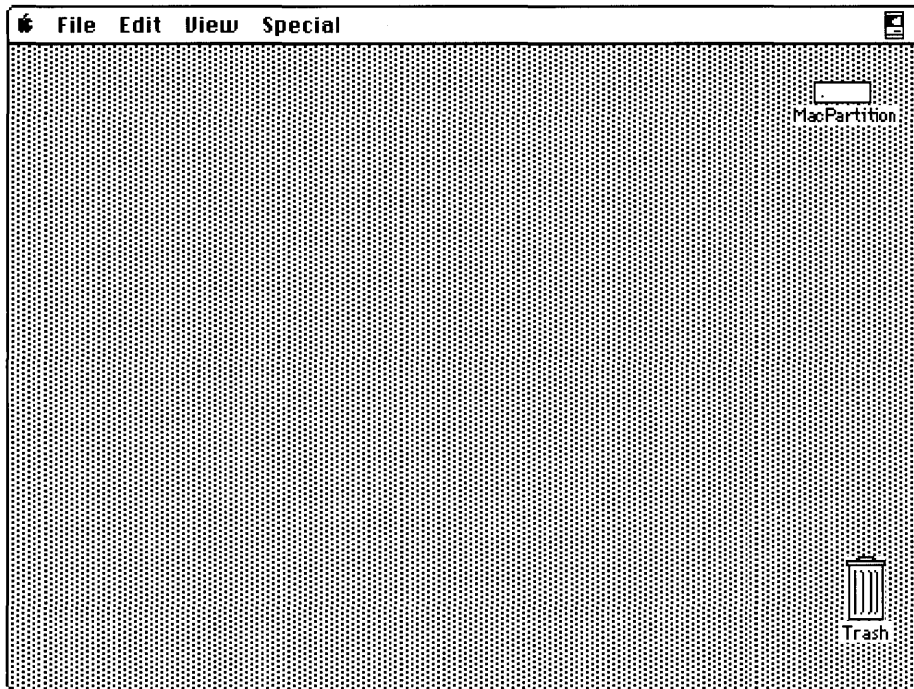
4. **Go to the section, "Reading the Read Me File," later in this chapter.**

Updating an existing A/UX system to A/UX 2.0

If you are updating an existing A/UX 1.0, 1.0.1, 1.1, or 1.1.1 system, be sure that you have a current backup of your entire system, then follow these steps to start up your computer in preparation for A/UX installation:

1. **Remove all unnecessary SCSI devices from your system.**

    Leave connected only the CD-ROM drive or tape drive, if you are installing from compact disc or tape, and the hard disk onto which you are installing A/UX.

2. **Turn on all remaining external SCSI devices.**

    You see a power light on each device indicating that it is on. After you power on the last SCSI device, wait ten seconds before turning on the Macintosh.

3. **Set your monitor's power switch to On.**

    Be sure to press the switch on the monitor (shown in Figure 1-8) even though system power is not yet on. If your monitor is connected to the power source on the Macintosh, the monitor turns on when you turn on your computer.

4. **Press the POWER ON key to turn on your computer.**

    The POWER ON key, which is identified by a triangle (shown in Figure 1-9), is located at the top middle of the standard keyboard and at the top right of the extended keyboard.

5. **If the Stand-Alone Shell window appears, click Cancel to cancel the automatic startup sequence of `sash`.**

6. **Choose Quit from the File menu.**

    You return to the Finder, as shown in Figure 1-11.

■ **Figure 1-11**   The Finder
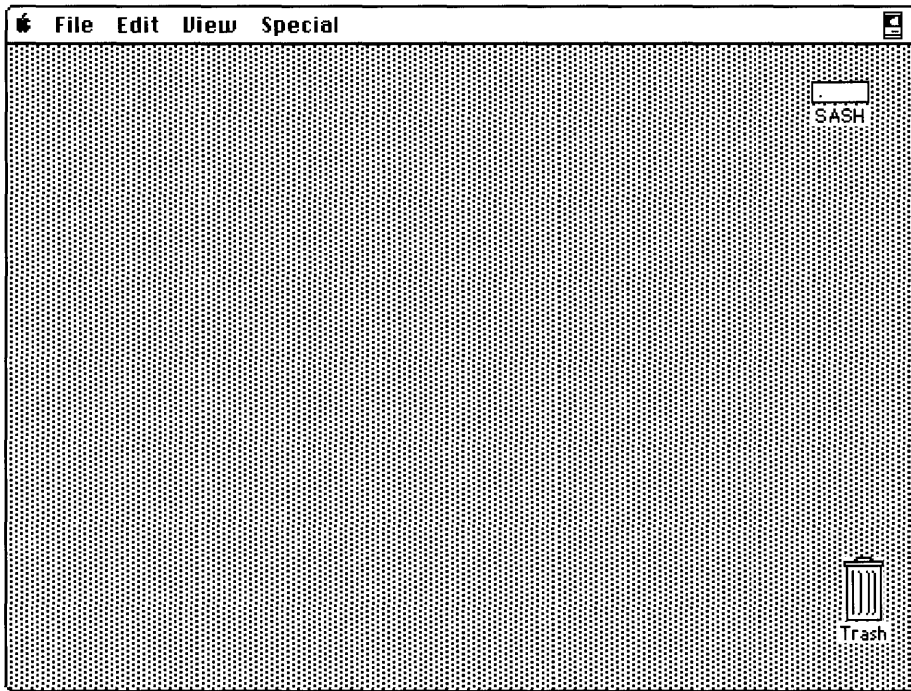
7. **Go to the section, "Reading the Read Me File," later in this chapter.**

Installing A/UX 2.0 on a new hard disk

Follow these steps to start up your computer:

1. **Remove all unnecessary SCSI devices from your system.**

    Leave connected only the CD-ROM drive or tape drive, if you are installing from compact disc or tape, and the hard disk onto which you are installing A/UX.

2. **Turn on all external SCSI devices.**

    You see a power light on each device indicating that it is on. After you turn on the last SCSI device, wait ten seconds before turning on the Macintosh.

3. **Set your monitor's power switch to On.**

    Be sure to press the switch on the monitor (shown in Figure 1-8) even though system power is not yet on. If your monitor is connected to the power source on the Macintosh, the monitor comes on when you turn on your computer.

4. **Press the POWER ON key to turn on your computer.**

    The POWER ON key, which is identified by a triangle, is located at the top middle of the standard keyboard and at the top right of the extended keyboard, as shown in Figure 1-9.

    If you have an existing Macintosh operating system, you see the Finder. If you haven't installed a System Folder on the hard disk yet, you see a blinking question mark.

5. **If there are existing files you'd like to save, back them up.**

    A/UX installation includes initializing and repartitioning the disk, completely erasing existing information in the process. If you have previously used the hard disk for Macintosh applications and there are files you would like to save, use either HD Backup or the tape backup.

6. **Go to the next section, "Reading the Read Me File."**

Reading the Read Me file

This section provides a test to make sure that your system is functioning properly. If your system started up and you are able to read the Read Me file, you can proceed with the installation.

(If you can't read the file or open the TeachText application, make sure your cables are connected and all devices are turned on. Then check Appendix A, "Troubleshooting," for some suggestions about what to do.)

Follow these steps to read the Read Me file:

1. **Insert the disk labeled *A/UX Read Me* into the disk drive, with the metal end first and the label side up.**

   If you have two floppy disk drives, insert the *Read Me* disk into the drive on the right.

2. **Click the Read Me icon to select it.**

   The Read Me icon is highlighted.

3. **Choose Open from the File menu.**

   A shortcut for opening files or applications is to *double-click* the icon. To double-click, position the pointer on the icon of the file or application that you'd like to open and press the mouse button twice quickly. This action automatically opens the item and you don't need to choose the menu command Open.

   The contents of the Read Me file appear on the screen. Any additions or changes to the *A/UX Installation Guide* appear at the beginning of the file.

4. **Read all the information pertaining to the installation process.**

   Be sure to read the information carefully and note any items that apply to your installation.

   You can read the rest of the file later when you've finished installing A/UX. For now go on to the next step after you read about *A/UX Installation Guide*.

You can scroll through the text by using the scroll direction arrows on the screen. These arrows are located at the right edge of the screen. Move the I-beam (the cursor becomes an I-beam when it's on text) to the arrow pointing down on the lower right side. The cursor changes to a pointer. When you press the mouse button, the text scrolls past. You can reverse the direction of the text movement by placing the cursor on the arrow pointing up and pressing the mouse button.

5. **Choose Quit from the File menu.**

   This command closes the file and the TeachText application. You return to the Macintosh Finder. Now it's time to work in the A/UX installation environment.

If you have A/UX 2.0 *factory installed* on a hard disk, go to Chapter 5, "Running A/UX 2.0 for the First Time."

If you are *updating an existing A/UX 1.0 or higher* system to A/UX 2.0, go to Chapter 2, "Updating A/UX 1.x to A/UX 2.0."

If you are *installing A/UX 2.0 on a new hard disk* by using the CD-ROM, Tape, or Floppy Disk Product, go to Chapter 3, "Preparing the Hard Disk."

Chapter 2 **Updating A/UX 1.x to A/UX 2.0**

This chapter presents the instructions for preserving files from an existing A/UX 1.0, 1.0.1, 1.1, or 1.1.1 system, for later restoration on A/UX 2.0. If you don't have an existing version of A/UX, or if you have A/UX but aren't interested in saving any existing A/UX files, go directly to Chapter 3 to continue with A/UX 2.0 installation.

If you are installing A/UX onto a new hard disk, skip this chapter and go on to Chapter 3.

The programs described in this chapter, `syschk` and `bakchk`, are provided to assist you in the update process. You run these programs from your current A/UX operating system. You also back up your files from A/UX, with floppy disks formatted in the Macintosh Operating System.

This chapter includes the following sections:

- What you need now
- The update process
- Your current system and the new release
- Using `syschk`
- Examining the `/syschk.report` file
- Using `bakchk` to back up files

What you need now

Have the following items available:

- *System Checker,* a disk that contains a mountable A/UX file system. This disk contains programs that you will use when preparing to update.

- At least two floppy disks that have been formatted in the Macintosh Operating System. You will use these disks to back up your current A/UX files.

The update process

As shown in Figure 2-1, updating your current A/UX system to A/UX 2.0 consists of three parts:

1. Renaming any user files that have the same name as new A/UX distribution files, then backing up these renamed files and any essential A/UX files that exist on your current system. You can run the System Checker to help you with this process.

2. Preparing the hard disk as described in Chapter 3 and then installing A/UX 2.0 as described in Chapter 4.

3. Restoring user files and certain system setup files that you backed up. Instead of restoring the system setup files, you can edit the new A/UX setup files to restore your original system setups. By editing the new A/UX setup files, you ensure that your system retains all your original setups while getting the benefits of the new A/UX settings. "Restoring Saved Files" in Chapter 5 describes how to restore the files you saved.

■ **Figure 2-1** Updating your system to A/UX 2.0

Hard disk

① **Backup**　Current A/UX files

② **Install**　New A/UX files

③ **Restore**

A/UX Installation disks　　or　　A/UX Installation Tape Cartridge

or

A/UX Installation CD-ROM

Saved files
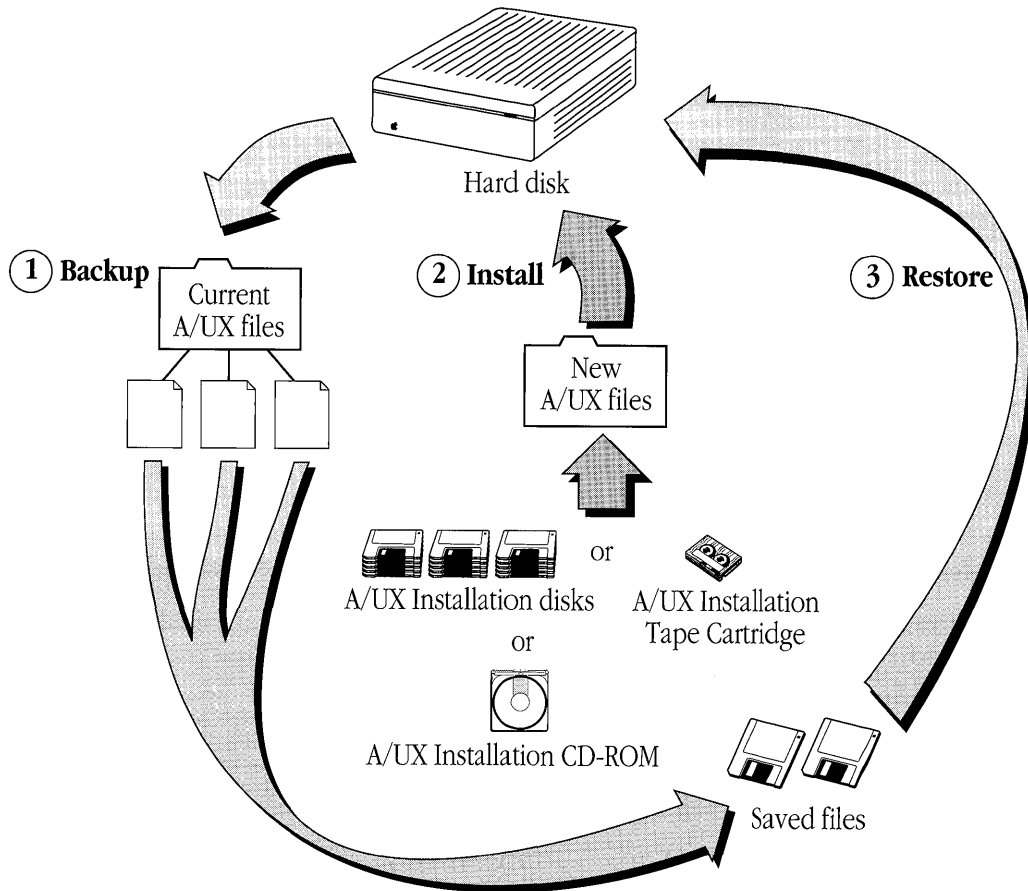
The *System Checker* disk is included with the A/UX Accessory Kit. This disk contains two programs to help you in the update process: syschk (the system checker) and bakchk (the backup checker). You will run syschk to discover which of your current A/UX distribution files differ from the new A/UX release.

The syschk program returns information to you in the report file `syschk.report` in the root directory. The `/syschk.report` file lists system files in your current A/UX system that will be replaced in the new release, system files in your current A/UX system that do not exist in the new release, and any user files that have the same name as new A/UX distribution files.

After running `syschk`, you can use `bakchk` to make a backup copy of files reported by `syschk`. This is where you use the two floppy disks that have been formatted in the Macintosh Operating System. Figure 2-2 illustrates how `syschk` and `bakchk` are used in the update process.

■ **Figure 2-2** Using `syschk` and `bakchk`
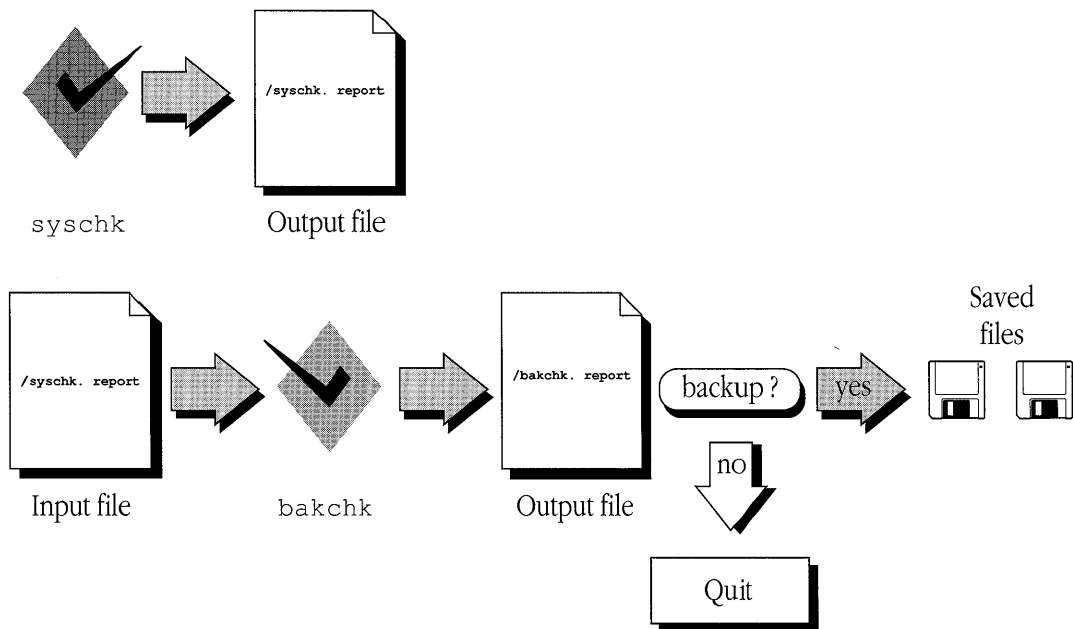
Your current system and the new release

By running `syschk`, you can identify these categories of files:

- Current A/UX distribution files that are replaced with new files of the same name. For example, `/etc/inittab` on your current system will be replaced by the `/etc/inittab` file in the new release.

  Certain files that will be replaced have essential information that you may wish to preserve; for instance, your password file and parts of your `/etc/inittab` file. You can use `syschk` to identify A/UX distribution files that have been modified since their installation. The `syschk` program lists these files in a report file called `/syschk.report`. You can modify that list and use `bakchk` to copy listed files onto floppy disks.

- User-named files that happen to have the same name as one of the new A/UX distribution files and thus are overwritten. You should rename these user files to avoid conflicts with the new files. As a general rule you should not create new files in directories that contain the A/UX distribution, such as `/etc` and `/bin`.

  The `syschk` program lists in `/syschk.report` any existing user files that have the same name as A/UX distribution files in the new installation. You can use this information to rename those files or make backups of them while you are backing up the essential A/UX distribution files. You can later restore your own files from these copies, renaming them or placing them in an appropriate directory to avoid collision with A/UX distribution file names.

Using `syschk`

The `syschk` program helps you identify the files on your current A/UX system that differ from A/UX 2.0. The `syschk` program also checks to make sure you have enough space on your hard disk to install the new release. If the available space is insufficient, `syschk` warns you to increase the free space on your hard disk before beginning installation of the new release. Because you will be initializing and partitioning the disk to make at least 80 MB available for the new A/UX release, you can ignore any messages about insufficient space.

Note that the files listed in `/syschk.report` include all the files that have had their modification date changed, not just those that have actually changed. In other words, if you used the command `touch /users/start/animals`, this file would appear in the list even though you did not actually change the contents of the file.

When you are ready to update your system, follow these steps to run `syschk`:

1. **Boot A/UX in single-user mode.**

   From the Finder open the SASH Partition disk icon. Double-click the `sash` icon.

   When you see the prompt

   ```
   Do you want to check the root file system? (y or n)
   [default: n]
   ```

   enter `y`.

   If `fsck` prompts you to check other file systems, also enter `y`.

   The `syschk` program must be run from single-user mode. If you are not already in single-user mode, enter `shutdown` to enter single-user mode and unmount all extra file systems. If either `/usr` or `/tmp` are separate file systems and local to your system, remount these from single-user mode and run `fsck` on the file systems.

2. **Insert the *System Checker* disk in drive 0.**

   Once your system is in single-user mode, insert the *System Checker* disk into drive 0 (usually the one on your right, if your system has more than one).

3. **Mount the disk.**

   Use the `mount` command to mount the *System Checker* disk on the `/mnt` directory. Enter

   ```
   mount -r /dev/floppy0 /mnt
   ```

4. **Use the `syschk` program to check your system.**

   Run `syschk` by entering

   ```
   /mnt/syschk
   ```

   The `syschk` program asks a question about your current release and then begins checking certain attributes of current A/UX distribution files. You see a message like

   ```
   Welcome to the A/UX System Checker.
   ```

```
This program examines the current attributes of files being
replaced or added in this release.  You will be notified of
files needing attention.
Your current release appears to be A/UX Release <1.1>.  If
this is correct, press RETURN.  Otherwise, enter the correct
release number:
```

5. Confirm your current release number.

Press RETURN if the release number is correct. Otherwise, type the release number of
your current system and press RETURN.

You see a message like

```
Examining the system files on your current release,
comparing their current attributes with their original
attributes, as shipped. This will take a minute or so ...
```

The syschk program examines A/UX distribution files that appear to have been
modified since your original system was shipped and lists them in the
/syschk.report file. You then see the message

```
Checking for conflicts with files added since A/UX Release
1.1 ...
```

At this time syschk searches for any user files that have the same name as a file on
the new release and records them in the /syschk.report file. The syschk
program also searches for any files on the current system that are no longer part of
the A/UX release and records them in /syschk.report.

6. Ignore any messages about insufficient room on your hard disk.

While the syschk program verifies whether you have enough room on your hard disk
to install the new release, it displays the message

```
Checking to see if there is enough room to install 2.0...
```

If you do not have enough free space on your hard disk to install the required files,
one of these messages appears

```
Error - insufficient room on / partition. At least xxxx more
free blocks needed to install required files. Optional files
(catman, games) disregarded.

Warning - limited room on / partition. At least xxxx more
free blocks needed to install optional files. Actual size
(blocks): catman yyyy, games zzzz
```

If you see either of the above messages, ignore them. In the next chapter you will be initializing and partitioning the hard disk, a process that will automatically create sufficient space.

When the `syschk` program has finished checking your system, you see a short message directing you to examine the `/syschk.report` file. The `syschk` program also produces `/bakchk`, the backup checker program, `/syschk.cfloppy`, an executable file used by `bakchk`, and `/syschk.readme`, a file containing information about `syschk` and `bakchk`. The next section describes the `/syschk.report` file.

Examining the `/syschk.report` file

The `/syschk.report` file produced by `syschk` can easily be used as a control file for a backup utility such as `cpio`. You can edit this file and then use `bakchk` to make backup copies. Or you can edit the file and use it as input on a `cpio` command line. See "Using `bakchk` to Back Up Files" for information on the `bakchk` program.

The `/syschk.report` file is divided into three parts:

■ Part 1 shows A/UX distribution files that appear to have been modified since your original system was shipped. These files will be replaced by the corresponding A/UX distribution files in the new release.

■ Part 2 shows user files whose names conflict with those of files contained in the new release.

■ Part 3 shows files that are no longer part of the A/UX release.

Use a text editor to examine your `/syschk.report` file. The following sections explain each part of the `/syschk.report` file and discuss how you can use the contents of this file to preserve essential A/UX files and back up user files.

Preserving essential A/UX distribution files

Part 1 of the `/syschk.report` file shows the A/UX distribution files that appear to have been modified since your original system was shipped. Part 1 of a sample `/syschk.report` file is listed here:

```
# These files have been modified, and may need backup:
# ====================================================
.cshrc
.login
etc/cshrc
etc/fstab
etc/group
etc/hosts
etc/hosts.equiv
etc/inittab
etc/motd
etc/passwd
etc/rc
etc/startup
etc/startup.d/ae6
# unix
usr/games/lib/alienslog
usr/include/sys/buf.h
usr/include/sys/gdkernel.h
usr/include/sys/ssioctl.h
usr/lib/sendmail.st
usr/lib/spell/spellhist
usr/lib/uucp/L-devices
usr/lib/uucp/SEQF
usr/spool/cron/crontabs/root
usr/spool/lp/SCHEDLOCK
usr/spool/lp/log
usr/spool/lp/oldlog
usr/spool/lp/outputq
usr/spool/uucp/LOGFILE
```

These files will be replaced by the corresponding A/UX distribution file in the new release. You can use `bakchk` to back up these files as explained in "Using `bakchk` to Back Up Files."

When you install A/UX 2.0, your system will contain the new A/UX distribution files. You can then restore your old A/UX files or modify the new A/UX distribution files to include your customized information. (For example, you can back up `/etc/inittab`, and after installing the new release, incorporate the changes from your old `/etc/inittab` file into the new `/etc/inittab` file.) "Restoring Saved Files" in Chapter 5 helps you customize your new A/UX system.

Follow these steps to decide which files to back up:

1. **Carefully read the list of modified files in the `/syschk.report` file.**

   A general rule is to back up filenames that you recognize and files that you may have modified. Most files in `/etc` should be backed up. You probably do not need to back up such files as old log files.

2. **Edit `/syschk.report`.**

   Edit the `/syschk.report` file by putting a number sign (#) in the first column of each line containing a filename that you do not want to back up (or by deleting the line from the file). For example, you will notice that `unix` has a # in the first column, because this kernel will be obsolete once you install the new release. Files such as old log files (for example `/usr/spool/lp/oldlog`) and binary files probably do not require backup.

Preserving user files

Part 2 of the `/syschk.report` file lists the user files that happen to have the same name as one of the A/UX distribution files contained in the new release. You can rename these files so that when you restore them on the A/UX system they don't overwrite the new A/UX files. Or when you restore these files, you can put them in a directory where they won't conflict with the A/UX file of the same name.

Part 2 of a sample `/syschk.report` file is listed here:

```
# These files conflict with files added in the new release:
# =========================================================
```

```
nextunix
usr/lib/cron/log
```

Follow these steps to decide which user files to back up:

1. Read the list of conflicting filenames in the `/syschk.report` file.

You do not need to back up or restore the `nextunix` file because a new one will be created in the new release.

2. Edit `/syschk.report`.

Edit the `/syschk.report` file by putting a number sign (#) in the first column of each line containing a filename that you do not want to back up (or by deleting the line from the file).

If you later restore any other files listed here, be sure to restore them to a new directory to avoid overwriting the new A/UX distribution files with the same name.

If you want to add any user data files to this list, add them after the list of modified files (Part 1) but before the list of filename conflicts (Part 2). The installation process will not overwrite any user data files that have names unlike the names of A/UX distribution files. (However, you should always make a full backup of your system before reconfiguring your system.)

Note that relative pathnames of files are listed in `/syschk.report`, so restoring these files is easier. You should also use relative pathnames without a leading slash (`/`) if you add any files to this list.

3. Save a copy of `/syschk.report`.

If you run `syschk` again, the `/syschk.report` file will be overwritten. If you have made any changes to `/syschk.report`, for example, deleting or adding file names to Part 1 or Part 2, save your `/syschk.report` file by entering

```
mv /syschk.report /orig.report
```

4. Restore your original copy of `/syschk.report`.

Restore your original copy of `/syschk.report` by entering

```
mv /orig.report /syschk.report
```

5. Unmount the *System Checker* disk.

Enter `umount /mnt`.

6. Eject the *System Checker* disk.

Enter `eject` and remove the *System Checker* disk and store it in a safe place.

Files to be removed

Part 3 of the `/syschk.report` file contains a list of all A/UX distribution files on your current A/UX system that are no longer part of the A/UX release. These files will automatically be erased when you initialize and partition the hard disk according to the instructions in Chapter 3.

Part 3 of a sample `/syschk.report` file is listed here:

```
# These files are no longer in A/UX, and should be removed:
# ==========================================================
README
bin/crypt
bin/diffmk
etc/bind/master/named.ca
etc/bind/master/named.db
etc/delivermail
etc/eschatology/descriptors
etc/eschatology/init2files
etc/eschatology/otherfiles
etc/setmactime
lib/libg/libPW.a
lib/libg/libc.a
lib/libg/libg.a
lib/libg/libm.a
lib/libg/librmt.a
lib/libg/libtermcap.a
lib/libp/libg.a
usr/bin/module_data
usr/catman/a_man/man1/dual.1m.z
usr/catman/a_man/man7/afm.7.z
.
.
```

```
# Old autoconfiguration files (pre-2.0) WILL NOT work with
# A/UX release 2.0. These files must be removed. Following
# installation of A/UX, re-install third-party drivers ONLY
# after consulting your vendor regarding usability with 2.0.
# ============================================================
/etc/boot.d
/etc/boot.d/BNET
/etc/boot.d/ae6
/etc/boot.d/at_sig
/etc/boot.d/debugger
/etc/boot.d/nfs
/etc/boot.d/slots
etc/boot.d/toolbox
/etc/init.d
/etc/master.d
/etc/master.d/BNET
/etc/master.d/ae6
/etc/master.d/at_sig
/etc/master.d/debugger
/etc/master.d/nfs
/etc/master.d/slots
/etc/master.d/toolbox
/etc/startup.d
/etc/startup.d/BNET
/etc/startup.d/ae6
```

◆ *Note:* In order to gain the full benefits of A/UX 2.0, you are instructed in Chapter 3 to initialize and partition your hard disk. Because all existing files on the hard disk are erased in this process, you only need to remove files in Part 3 of /syschk.rpt if you are performing a nonstandard installation and not initializing or partitioning.

Using `bakchk` to back up files

The `bakchk` program is designed to help you back up your files. The `bakchk` program uses the list of files in `/syschk.report` to produce a file called `bakchk.report` in the root directory. The `/bakchk.report` file can be used as an input file to `cpio`.

If you save files yourself, without using the `bakchk` program, use relative pathnames without a leading slash (`/`). Always label the disks to identify the files on them and store them in a safe place.

Follow these steps to back up your files:

1. **Edit the `/syschk.report` file.**

   Edit the contents of the `/syschk.report` file to contain the filenames you want to back up as described in "Preserving Essential A/UX Distribution Files" and "Preserving User Files."

2. **Enter `/bakchk` to check files in `/syschk.report`.**

   The `bakchk` program is in your root directory and must be run from the root directory. Do not move `bakchk` to any other directory. Enter

   ```
   /bakchk
   ```

   The `bakchk` program checks the `/syschk.report` file for inconsistencies and displays this message

   ```
   Preliminary checks satisfied, trying dummy cpio...
   ```

   The `bakchk` program inspects the `/syschk.report` file to determine whether it contains acceptable input for a `cpio` command. If `bakchk` finds problems with the `/syschk.report` file (for example, if `bakchk` could not locate a file), you see a message like

   ```
   could not locate the following files:
           < reports >
           < documents >
   ```

   and `bakchk` quits. If you see this message, examine the contents of the `/syschk.report` file and correct any errors reported by `bakchk`. Then run `bakchk` again to make sure you have corrected any problems.

3. **When prompted, enter** `y` **to back up files listed in** `/syschk.report` **to a floppy disk.**

If the `/syschk.report` file contains filename entries that are acceptable as input to `cpio`, `bakchk` asks if you want to back up the files at this time. Then `bakchk` informs you of the number of floppy disks required to make the backup. Note that you must have previously formatted in the Macintosh Operating System the floppy disks you will use for backup.

You see a message like

```
The cpio archive will require 1153536 bytes.  Do you wish to
make a cpio archive at this time?  (You must have 2 pre-
formatted disks available to proceed.)  [y/n, default n]:
```

Write down the number of bytes that the `cpio` archive will require. You will need this number later when you are restoring files.

Enter `n` if you do not want to make a backup at this time or if you do not have the required number of formatted floppy disks. This quits the `bakchk` program. You can examine the `/bakchk.report` file and use it later as an input file to `cpio` if you wish.

Enter `y` if you want to make a backup at this time and if you have the required number of formatted floppy disks.

4. **Insert a formatted floppy disk into drive 0 when prompted.**

The `bakchk` program displays the message

```
Waiting for floppy
```

and waits for you to insert a floppy disk into drive 0. Label and number each disk sequentially, starting with 1. *It is very important that you correctly label each disk.*

Continue removing and inserting disks as prompted by `bakchk`.

5. **Reinsert the backup disks for verification.**

After the backup has been made, you see the messages

```
xxxx blocks
The archive has been written.  Please re-insert the disk(s)
for verification of readability.
```

Reinsert the floppy disks one by one, starting with disk 1. Ignore the message

```
can't read input - errno=25: Not a typewriter
```

if it appears.

The `bakchk` program concludes when you see the message

```
xxxx blocks
```

Remove the last floppy disk and store your backup disks in a safe place.

6. **Print a copy of the `/bakchk.report` file.**

   Print a copy of the `/bakchk.report` file for future reference. Enter multi-user mode by entering `init 2`, log in as `root`, print your file by using the `lp` command, and then enter `shutdown` to return to single-user mode. Store the printed copy of `/bakchk.report` with the floppy disks that you have just saved your files on. This list will help you when you restore files.

7. **Power down your A/UX system.**

   From single-user mode, use this sequence to turn off your computer:

   ```
   sync
   sync
   powerdown
   ```

   The next steps you take are performed in the Macintosh Operating System.

Go to Chapter 3, "Preparing the Hard Disk," to continue the software setup.

Chapter 3 **Preparing the Hard Disk**

This chapter presents the instructions for preparing your hard disk for A/UX 2.0. The steps given in this chapter are necessary only if you are installing A/UX from CD-ROM, a tape cartridge, or floppy disks. If you have A/UX *factory installed* on an internal or external hard disk, go to Chapter 5, "Running A/UX 2.0 for the First Time."

This chapter includes the following sections:

- Before you begin
- Initializing and partitioning the hard disk
- Preparing the Macintosh Partition
- Copying *A/UX Startup* and *A/UX Startup Utilities* to the MacPartition

Before you begin

Procedures for initializing and partitioning take about 15 minutes to complete for an 80 MB hard disk, and about 20 minutes for a 160 MB hard disk.

▲ **Warning**   Initializing the hard disk or installing A/UX on a disk that already contains other data destroys everything previously installed on the disk. If you have existing files on the system, be sure to back them up before completing the procedures in this chapter. ▲

Before you use an Apple Hard Disk SC, you must initialize it—that is, prepare it to receive information by organizing its surface into tracks and sectors. Initializing a hard disk erases any existing information on it. Even if you are installing onto a hard disk that has been previously used, it's important to go through the initialization procedure in order to ensure that it is initialized with the current software.

After initializing, you partition the disk—that is, divide it into separate areas for use by different parts of A/UX and the Macintosh Operating System. The following sections describe standard A/UX partitioning, which applies to most installations and which works for both the Apple hard disk 80SC and the 160SC. These standard partitions are illustrated in Figure 3-1.

■ **Figure 3-1** Standard A/UX System partitions

```
┌─────────────────────────────────────────────────────────────────┐
│  Approx.            Partitions                                    │
│  16 K        ┌─────────────────────┐ ········································ │
│  16 K        │ Mac Driver          │  Click on a partition to       │
│              │ ▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓ │  select it.  Click & drag      │
│              │                     │  in gray area to create a      │
│              │                     │  new partition.                │
│                                                                     │
│  54567 K     │ A/UX Root&Usr slice 0│         ┌──────────────┐      │
│              │                     │          │   Remove     │      │
│              │                     │          └──────────────┘      │
│              │                     │          ┌──────────────┐      │
│              │                     │          │    Lock      │      │
│              │                     │          └──────────────┘      │
│              │                     │          ┌──────────────┐      │
│  18432 K     │ A/UX Swap slice 1   │          │    Group     │      │
│              │                     │          └──────────────┘      │
│                                                ┌──────────────┐      │
│  3072 K      │ A/UX Autorecovery   │          │   Details    │      │
│  2048 K   🔓 │ MacPartition        │          └──────────────┘      │
│  1 K         │ Free A/UX slice 3   │          ┌──────────────┐      │
│  1 K         │ ▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓ │          │    Done      │      │
│              └─────────────────────┘          └──────────────┘      │
└─────────────────────────────────────────────────────────────────┘
```
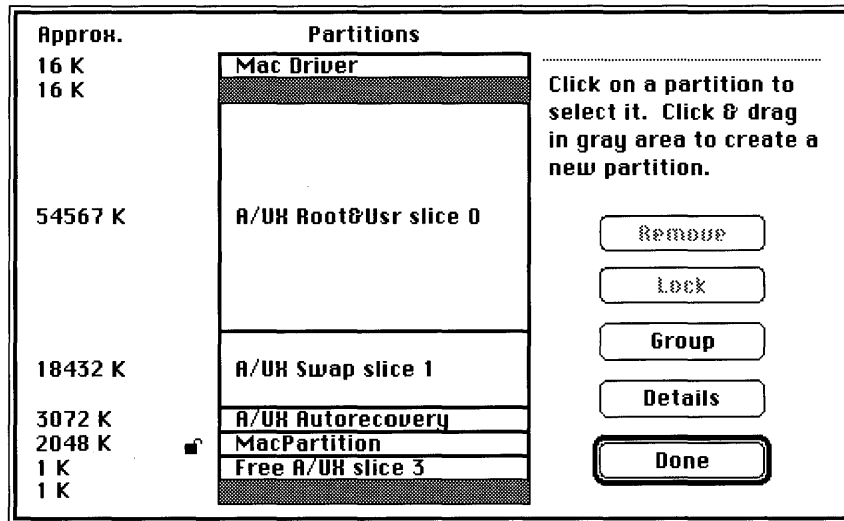
You also have the option of using one of the specialized partitioning options or customizing your disk partitions for nonstandard use. These nonstandard partitioning options are described in Appendix B of this manual:

■ Partitioning for A/UX plus 40MB Macintosh.

■ Updating an existing A/UX system without repartitioning

Additional partitioning options are described in *Setting Up Accounts and Peripherals for A/UX*:

■ Partitioning additional disks for A/UX file space.

■ Creating a separate /usr partition

For information on custom partitioning, see *Apple Hard Disk SC Owner's Guide.* For a complete discussion of all the A/UX partitioning options, see *A/UX Local System Administration.*

Initializing and partitioning the hard disk

To initialize and partition your hard disk, use HD SC Setup, Version 2.0.1 or later, which is on the *System Tools* disk. It is important that you use the version of HD SC Setup included on this disk because earlier versions of HD SC Setup do not properly support A/UX 2.0.

◆ *Note:* If you are using a hard disk purchased from a vendor other than Apple, you might not be able to use HD SC Setup to initialize and partition the disk. Contact your hardware vendor for guidelines.

Follow these steps to initialize your hard disk:

1. **Check that the power is on to the hard disk that you intend to use for A/UX.**

   If the power is already on, go to step 2. If the power is off, switch it on.

2. **Restart the system with the *System Tools* disk as the startup disk.**

   Insert the System Tools disk. If you have two floppy disk drives, use the drive on the right. Select Restart from the Special menu. When the disk ejects, *immediately re-insert the disk.*

   Your computer will start up from the *System Tools* disk. After a few moments the System Tools disk icon appears. Ensure that the System Tools disk icon is the startup disk by checking that it is highlighted and that it appears on the top right side of your screen, as shown in Figure 3-2.

■ **Figure 3-2** The System Tools startup screen
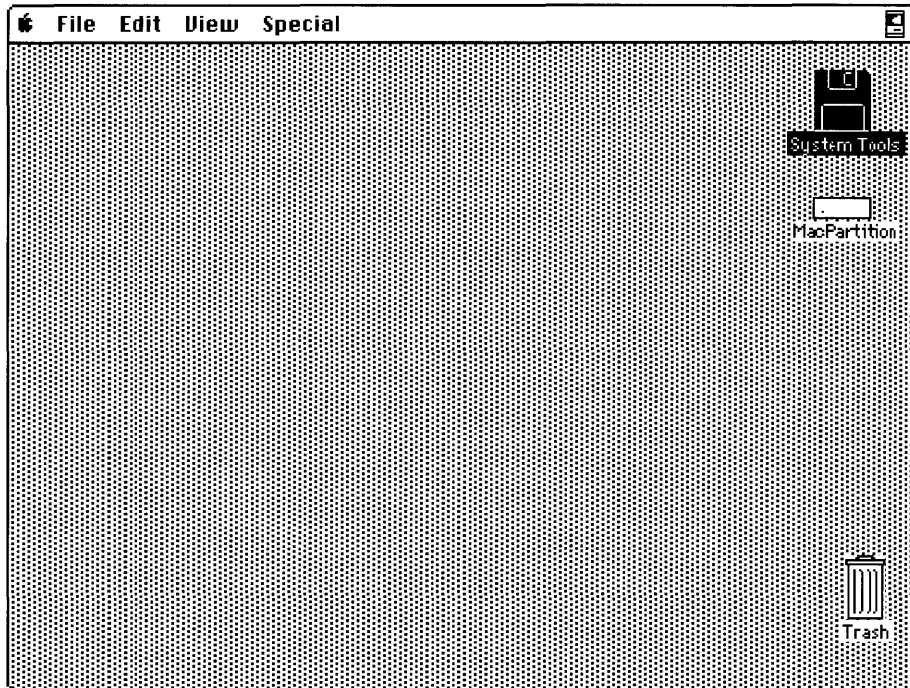
3. **Choose Open from the File menu.**

   As a shortcut you can double-click the disk icon to open it. The System Tools
   window appears, as shown in Figure 3-3.

■ **Figure 3-3** System Tools window
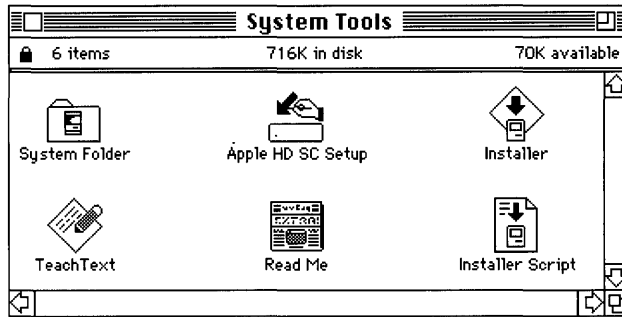
4. **Open the HD SC Setup application.**

Open the HD SC Setup application by double clicking the icon or by selecting the icon and choosing Open from the File menu. The Apple HD SC Setup dialog box appears, as shown in Figure 3-4. Next to the words SCSI Device is a number from 0 to 6. The SCSI ID number of your Apple internal hard disk is always 0. Apple external hard disks come set to 5. If you have a SCSI hard disk from another manufacturer, consult the owner's guide that came with the hard disk.

■ **Figure 3-4** The Apple HD SC Setup dialog box
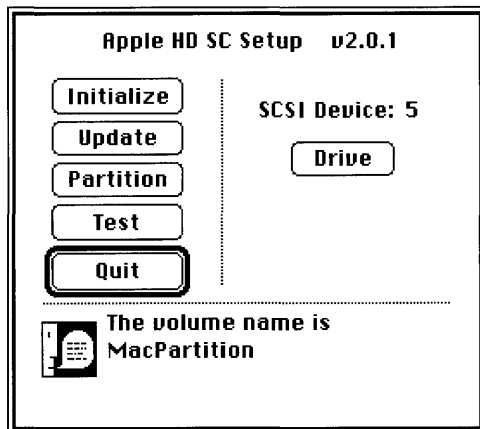
△ **Important**   If you have two or more hard disks, make sure that the SCSI device number matches the SCSI ID indicator number of the hard disk you want to initialize. If they do not match, click Drive until they do. Each time you click Drive, the program searches for a different SCSI device. If the number of the drive does not appear when you click Drive, the disk may be incorrectly connected or switched off. Check your connections and power switch. △

5. Click Initialize.

A dialog box like the one shown in Figure 3-5 appears, reminding you that initializing erases all the information from the hard disk.

■ **Figure 3-5** The initialization alert box


```
┌─────────────────────────────────────────────────┐
│  ┌───────────────────────────────────────────┐  │
│  │      Initializing will erase all of the data │  │
│  │  /!\ on this disk. Do you want to            │  │
│  │      initialize this disk?                    │  │
│  │         ┌──────────┐  ┌──────────┐           │  │
│  │         │  Cancel  │  │   Init   │           │  │
│  │         └──────────┘  └──────────┘           │  │
│  └───────────────────────────────────────────┘  │
└─────────────────────────────────────────────────┘
```
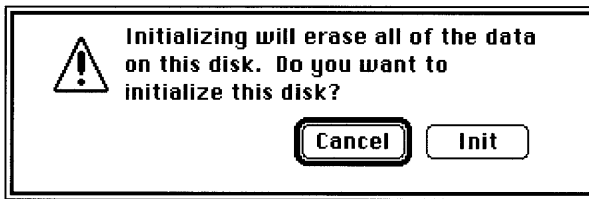
6. Click Init.

If you want to cancel the procedure, click Cancel.

Messages explaining the course of the initialization appear in the Setup dialog box. Initialization takes several minutes. In addition to preparing the hard disk, the Initialize command automatically tests the disk and installs the driver program, which controls the exchanges between the hard disk and your Macintosh.

If you see a message that the hard disk failed to initialize properly, check all cables and terminators to make sure the connections are tight, then try again. If you are still unable to initialize, there may be a hardware problem. See your authorized Apple dealer.

At the end of the initialization process the main setup dialog box appears to tell you that initialization was successful. It may also prompt you for a name for the disk.

7. Name the Macintosh volume MacPartition.

The text entry box in the dialog box is highlighted. Type the name MacPartition, then press RETURN. This accepts the new name and returns you to the main HD SC Setup dialog box.

If the name prompt does not appear, you can edit the disk name later in the Finder. You can assign a name other than MacPartition, but keep in mind that the A/UX manuals refer to the disk name MacPartition throughout.

8. Click Partition.

The Partition dialog box appears. The hard disk icon on the right represents the disk you just initialized and named MacPartition. The predefined partitioning options are listed on the left side of the dialog box.

■ **Figure 3-6** The Partition dialog box

```
Select a predefined disk partitioning scheme and click OK to partition
the entire disk.  Or select Custom to make your own partitions.

  Maximum Macintosh            ⬆        ▭  MacPartition
  Minimum Macintosh
  50% Macintosh
  Standard A/UX System
  A/UX Sys, 40MB Macintosh, Free A/UX
  A/UX System, Maximum Macintosh         [ Custom ]
  Maximum Free A/UX            ⬇

    ▤   Standard A/UX System                [   OK   ]

   The standard A/UX System partitions with a 2MB          [ Cancel ]
   Macintosh partition.  Any remaining space (on disks
   larger than 80MB) is used for Free A/UX (slice 3).
```

9. **Select Standard A/UX System.**

   Figure 3-6 shows Standard A/UX System selected. Verify that the hard disk icon name
   is MacPartition, then click OK.

   In most cases an alert box (shown in Figure 3-7) reappears to remind you that
   partitioning erases all information on a hard disk.

■ **Figure 3-7** The Partition alert box

```
    ✋   The data on SCSI drive number '5' will be
         lost during the repartitioning process.
         Press OK to repartition.

                       [   OK   ]   [ Cancel ]
```
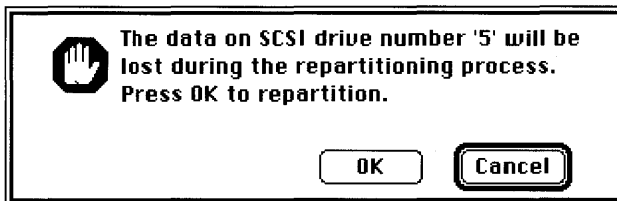
10. **Verify the correct SCSI ID, then click OK.**

As partitioning begins, the main Setup dialog box appears. Status messages appear in the bottom of the dialog box. Partitioning takes only a few moments. The Setup dialog box tells you when partitioning is complete.

11. **Click Quit to return to the Finder.**

The Finder appears. The Macintosh Operating System partition of the newly initialized hard disk is represented on your screen as a hard disk icon with the name MacPartition.

12. **If necessary, rename the disk MacPartition**

If the disk has an old name, you can rename it by double-clicking the icon name and typing MacPartition.

13. **Leave the *System Tools* disk in the drive and go on to the next section to continue with the software setup.**

Preparing the Macintosh Partition

After you've initialized and partitioned the hard disk and before you install A/UX, you need to prepare the Macintosh partition. You need to perform these tasks:

- Install the System Folder on the MacPartition.
- Copy the A/UX Startup application and utilities to the MacPartition.

Installing the System Folder

This section shows you how to set up the System Folder on your A/UX disk by using the Installer found on the *System Tools* disk. The System Folder contains resources, such as those necessary for printing, along with desk accessories and other system resources. The resources in the System Folder on your A/UX disk are accessible from the Macintosh Operating System and when you are running A/UX Startup.

What you need now

You use the Installer to install Macintosh system resources on your hard disk labeled MacPartition. Have ready the 6.0.5 System disks, *Utilities 1* and *Utilities 2*, which are in your A/UX Accessory Kit.

Using the Installer

Follow these steps to install the Macintosh System Folder:

1. **Open the Installer.**

   Double-click to open the Installer icon. The Installer welcome screen appears as shown in Figure 3-8.

■ **Figure 3-8** Installer welcome screen

◇ Welcome to the Apple Installer

Your Macintosh needs certain software to start up.

The Installer places this software on your disk
in the System Folder.

System Folder

"Easy Install" chooses the software Apple recommends and
creates a disk which can be used to start up your Macintosh.

("Customize" if you are sure you want to override those
recommendations.)

[OK]

2. **Click OK to clear the welcome screen.**

The welcome screen disappears and the Installer's primary dialog box
(Figure 3-9) appears.

■ **Figure 3-9** Installer primary dialog box


```
Easy Install

   Click Install to place
      An update to Version 6.0.5 of
      • Macintosh System Software
      • Any existing Printer Software          [ Install ]

   on the hard disk named
      ⊂⊃ MacPartition

                                               [ Eject Disk ]

                                               [ Switch Disk ]

                                               [ Customize ]

              [ Help ]                         [ Quit ]
3.0.1
```
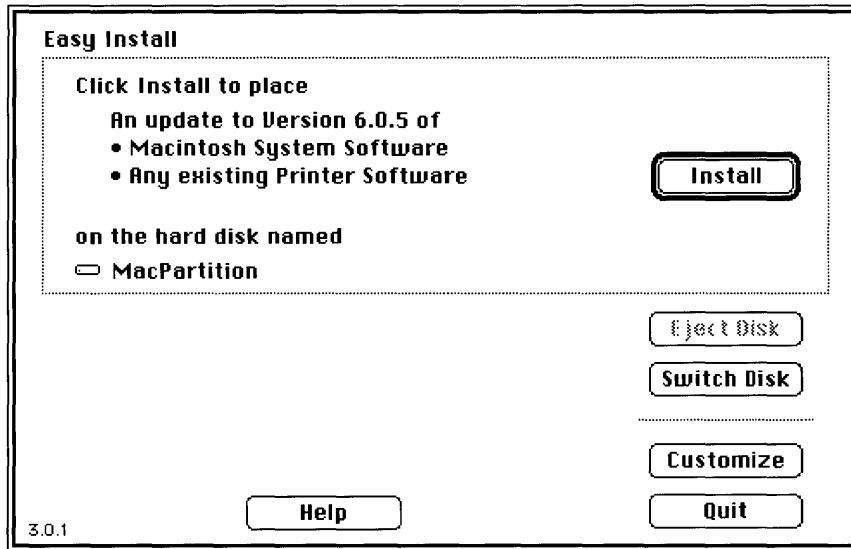
3. **Verify that the disk indicated on the screen is the one for installation.**

   Unless you named the disk something else, the hard disk name should be MacPartition. If the wrong disk is indicated, click the Switch Disk button until the correct drive's name appears.

4. **Click Customize.**

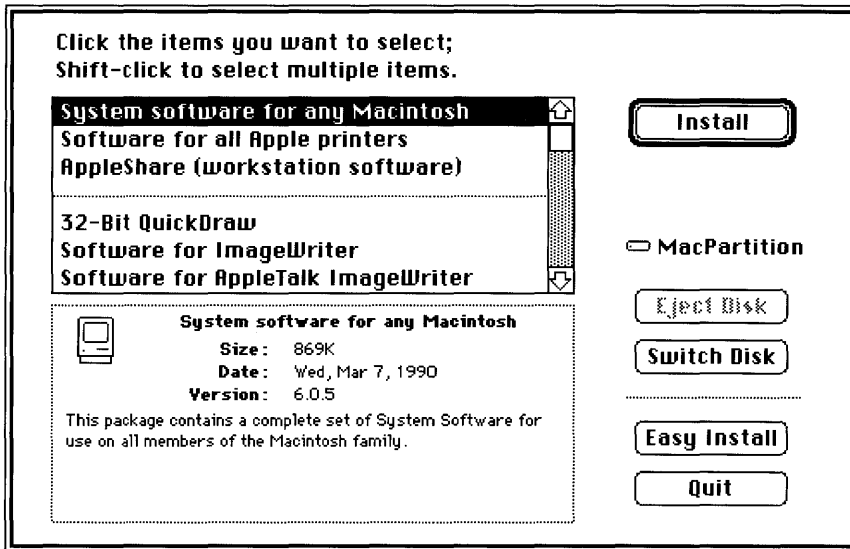   △ **Important**   Be sure to click Customize (*not* Install) at this point. If you click Install, the system will display error messages indicating that there is not enough space. If this occurs, repeat the procedure using the Customize option. △

   The Customize dialog box appears.

5. **Select "System software for any Macintosh."**

   The Customize dialog box appears as shown in Figure 3-10.

■ **Figure 3-10** Customize dialog box selected

Click the items you want to select;
Shift-click to select multiple items.

System software for any Macintosh
Software for all Apple printers
AppleShare (workstation software)

32-Bit QuickDraw
Software for ImageWriter
Software for AppleTalk ImageWriter

System software for any Macintosh
    Size: 869K
    Date: Wed, Mar 7, 1990
    Version: 6.0.5
This package contains a complete set of System Software for
use on all members of the Macintosh family.

Install

◯ MacPartition

Eject Disk

Switch Disk

Easy Install

Quit

6. **Click Install.**

7. **When the System Tools disk is ejected and you see a message to insert a different disk, insert the specified disk. Repeat this process as necessary.**

   Depending on the software needed for your system, you may be asked to switch disks more than once. If the system prompts you to insert the *Printing Tools* disk, Cancel and repeat from step 1 of this procedure.

8. **When you see a message reporting that installation was successful, click Quit.**

   The Installer window closes. (If for some reason the installation was not successful, a message on the screen reports this, and you can begin the installation again.)

9. **Choose Restart from the Special menu.**

   When you choose Restart, the system ejects the floppy disk from the disk drive; you can now remove the disk. Your computer restarts from a hard drive that contains a System Folder. You should now see the Finder.

Go to the next section to continue with the software setup for A/UX.

Copying A/UX Startup Utilities to the MacPartition

Now you need to copy a few programs from the *A/UX Startup* and *A/UX Startup Utilities* disks to the hard disk labeled MacPartition. You need to perform the steps listed in this section only if you are installing or updating A/UX from the A/UX CD-ROM, Tape, or Floppy Product.

What you need now

Have available the floppy disks *A/UX Startup* and *A/UX Startup Utilities.* These disks contain a stand-alone A/UX shell and stand-alone versions of some key A/UX utilities.

Copying *A/UX Startup* to the MacPartition

Follow the steps below to copy `esch`, `launch`, `read_disk`, `A/UX Startup` and `bin` to your MacPartition disk. Always use disk drive 0 (usually the drive on the right if your computer has more than one).

◆ *Note:* If you have an old version of A/UX and did not initialize and partition your hard disk as described earlier in this chapter, be sure to remove the old `sash` and `bin` folders before continuing with this procedure.

1. **Insert the disk labeled *A/UX Startup* into the floppy disk drive.**

   You should see a window showing the contents of the disk as shown in Figure 3-11. If you do not see this window, double-click the disk icon labeled A/UX Startup.

■ **Figure 3-11** The A/UX Startup window
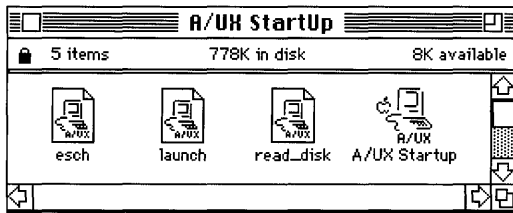
2. **Select everything except the System Folder, which should be out of sight.**

   Move the pointer to any place that does not touch any of the icons. Press and hold down the mouse button while dragging the pointer across the icons you want to copy. Notice that this draws a dotted line box around the icons. When the box encloses all four icons shown in Figure 3-11, release the mouse button and the icons are highlighted.

3. **Drag the selected icons to the MacPartition hard disk icon.**

   Point to any of the three icons. Press and hold down the mouse button while you drag the icons onto the MacPartition hard disk icon. Release the mouse button when the MacPartition icon is highlighted.
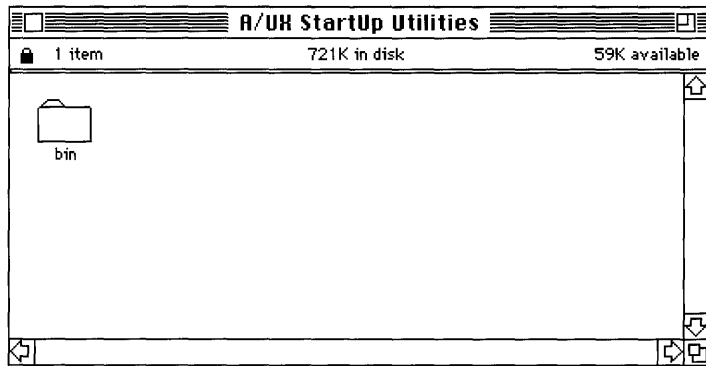
   Status messages report on the progress of the copy.

4. **Eject the *A/UX Startup* disk.**

   Drag the disk icon to the trash can. Remove the *A/UX Startup* disk and put it in a safe place.

5. **Insert the disk labeled *A/UX Startup Utilities* into the floppy disk drive.**

   A window reveals the contents of the disk as shown in Figure 3-12. If you do not see this window, double-click the disk icon labeled A/UX Startup Utilities.

■ **Figure 3-12** The A/UX Startup Utilities window


```
▤▯▤▤▤▤▤▤▤▤ R/UH StartUp Utilities ▤▤▤▤▤▤▤▯▤
🔒  1 item                721K in disk              59K available
                                                              ⇧

        ▱
       bin




                                                              ▱
◁                                                        ▷⊞
```

6. **Drag the** `bin` **folder to the MacPartition icon.**

   Point to the `bin` icon. Press and hold down the mouse button while you drag the icon onto the MacPartition icon. Release the mouse button when the icon is highlighted.

   Status messages report on the progress of the copy.

7. **Eject the** *A/UX Startup Utilities* **disk.**

   Choose Eject from the File menu. Remove the *A/UX Startup Utilities* disk and put it in a safe place.

Now you are ready to install A/UX. Go on to Chapter 4, "Installing from the CD-ROM, Tape, or Floppy Product" to begin the installation process.

Chapter 4 Installing from the CD-ROM, Tape, or Floppy Product

This chapter describes how to install A/UX 2.0 using the A/UX CD-ROM, Tape, or Floppy Product. Before performing the procedures described in this chapter, you should have started up your system as described in Chapter 1 and prepared your hard disk as described in Chapter 3. If you are installing onto an existing A/UX hard disk, you should have also backed up the files you intend to save as described in Chapter 2.

This chapter includes the following sections:

■ An overview of software installation

■ Launching the installation process

■ Installing from CD-ROM

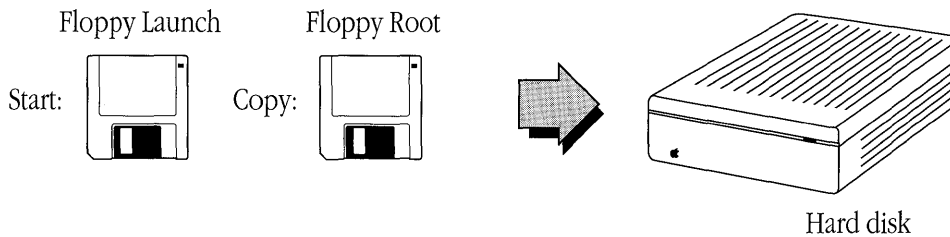■ Installing from tape cartridge

■ Installing from floppy disks

An overview of software installation

The A/UX CD-ROM (Compact Disc Read-Only Memory) Product consists of a set of floppy disks containing the tools necessary to install the A/UX software on a hard disk and a single CD-ROM containing the A/UX software. The A/UX Tape Product consists of a set of floppy disks containing the tools necessary to install the A/UX software on a hard disk and a single streaming tape cartridge containing the A/UX software. The A/UX Floppy Product consists of the same set of tools and A/UX software, entirely on floppy disks.
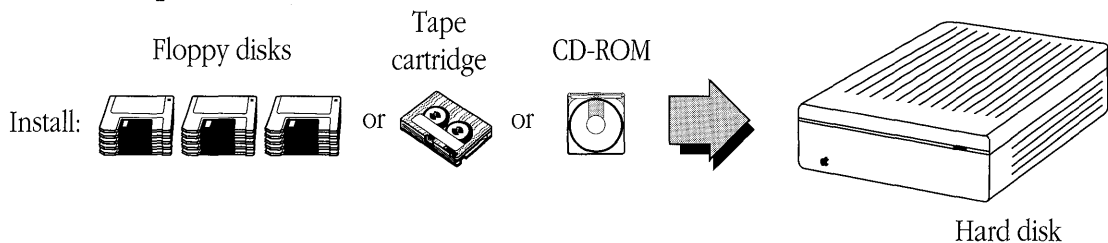
Installing the A/UX software from CD-ROM, tape, or floppy disks is done in two phases: an initial phase and an installation phase. Figure 4-1 illustrates this two-phase installation process.

- **Figure 4-1** The installation process

Initial phase

Installation phase

- In the initial phase, you specify whether you are installing from CD-ROM, tape, or disks and whether you will perform a standard or nonstandard installation. You also provide one or more SCSI identification numbers. You then start the first part of the installation process, which copies root files onto your hard disk. This phase takes about 20 minutes.

- In the installation phase, you copy the rest of the A/UX software onto the hard disk. If you are installing from CD-ROM, this phase requires about 60 minutes for a complete installation, and once begun it can proceed unattended. If you are installing from tape, this phase requires about 75 to 80 minutes for a complete installation, and once begun it can proceed unattended. If you are installing from floppy disks, this phase requires about 2 hours for a complete installation, and it requires someone to insert disks during the process.

What you need now

Before you begin, you must have prepared your hard disk by following the procedures in Chapter 3, "Preparing the Hard Disk." You must know the SCSI ID number of the hard disk on which you will install the system. If you are installing from CD-ROM, you must also have connected your AppleCD SC unit to your system as described in the instructions that came with the disc drive, and you need to know the drive's SCSI ID. If you are installing from tape, you must also have connected your Tape Backup 40SC unit to your system as described in the instructions that came with the tape unit, and you need to know the SCSI ID number for the tape drive.

Have the following items available for the initial phase:

- *Floppy Launch,* a disk that contains a special stand-alone A/UX shell, a kernel, and a few utilities.

- *Floppy Root,* a disk that contains a mountable A/UX file system. This disk is not readable from the Macintosh Operating System.

- *Kernel Archive,* a disk that contains a bootable A/UX kernel in cpio archive format. This disk isn't readable from the Macintosh Operating System.

Have one of the following items available for the appropriate installation phase:

- If you purchased the A/UX CD-ROM Product, use the CD-ROM labeled *A/UX Installation CD-ROM* that contains the complete A/UX file system.

- If you purchased the A/UX Tape Product, use the streaming tape cartridge labeled *A/UX Installation Tape* that contains the complete A/UX file system.

- If you purchased the A/UX Floppy Product, use a set of floppy disks that contain the A/UX software, labeled *A/UX Installation Disk 1* through *A/UX Installation Disk 32,* followed by an index disk labeled *File Index.*

If you are installing from CD-ROM, follow the installation procedures in "Launching the Installation Process" and "Installing from CD-ROM." If you are installing from tape, follow the installation procedures in "Launching the Installation Process" and "Installing from Tape Cartridge." If you are installing from floppy disks, follow the installation procedures in "Launching the Installation Process" and "Installing from Floppy Disks."

Launching the installation process

In this initial phase you use the floppy disks *Floppy Launch* and *Floppy Root* to begin the installation process. If you receive an error message anytime during installation, see Appendix A, "Troubleshooting."

Follow these steps to begin the installation process:

1. Insert *Floppy Launch* into the floppy disk drive.

Always use floppy disk drive 0 (which is usually the drive on the right, if your system has more than one). You should see the Floppy Launch window shown in Figure 4-2. If you do not see this on your screen, double-click the Floppy Launch disk icon.

◆ *Note:* Assuming you followed the directions in Chapter 3, your the hard disk is currently your startup disk. *Do not* restart from the *Floppy Launch* disk.

■ **Figure 4-2** The Floppy Launch window
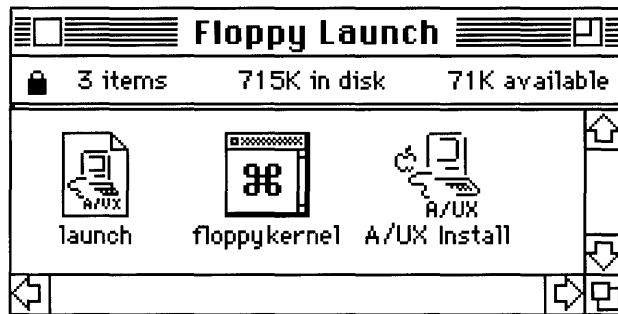
△ **Important**   Use the A/UX Install application on the floppy disk. *Don't* use the A/UX Startup application on the hard disk. △

2. **Double-click the A/UX Install application icon to launch the installation procedure.**

Double-click the A/UX Install application icon in the Floppy Launch window. The system reads information from the floppy disk, the Copyright dialog box appears (you don't need to click OK) then the Welcome to A/UX dialog box appears.

3. **Click OK.**

After a few moments, the system ejects the *Floppy Launch* disk and prompts you to insert a disk with an A/UX filesystem on it.

4. **Remove the *Floppy Launch* disk.**

Remove the *Floppy Launch* disk now and store it in a safe place.

5. **Insert the *Floppy Root* disk into disk drive 0.**

The system boots A/UX from the floppy disk. The screen flashes once and you see the A/UX Console Emulator window.

6. **After reading system messages, press RETURN to continue.**

The screen displays

```
    A/UX Release 2.0 Installation Procedure
Use the DELETE key to erase responses.
Are you ready to begin? [y/n, default=y, ? for help]>>>
```

Remember that now you are in the A/UX environment, where after typing a command you need to press RETURN in order to enter that command into the system. The message Use the DELETE key to erase responses reminds you that during the following installation procedures, you can use the DELETE key to correct your typing as long as you have not pressed RETURN.

◆ *Note:* Most times when the system gives a prompt on the screen, you can enter h or ? for more information.

7. **Press RETURN if you are ready to proceed with the installation.**

This message appears next

```
Do you wish to accept the standard A/UX file configuration?
    [y/n, default=y, ? for help]>>>
```

Enter y or press RETURN to accept the standard configuration. In the standard configuration, the /usr directory is in the root file system, and manual pages and games are installed.

◆ *Note:* Information on nonstandard installation is given in Appendix B, "Nonstandard Procedures." Do not enter n without having read that information.

8. Specify whether you will install from CD-ROM, tape, or floppy disks.

These messages appear

```
At the prompt, please indicate the media from which you will
be installing A/UX.
If you will be installing A/UX Release 2.0 from floppies,
enter F.
If you will be installing from tape, enter T.
If you will be installing from CD (Compact Disc), enter C.
>>>
```

Enter F if you are installing from floppy disks, T if you are installing from tape, or C if you are installing from CD-ROM.

9. Enter the SCSI ID number of the hard disk on which you are installing the A/UX software.

The system prompts you for the hard disk SCSI ID:

```
Enter the SCSI ID number of the disk onto which you will be
installing A/UX [0-6]:
```

Enter the SCSI ID number assigned to the hard disk on which you will install A/UX. The internal drive is set to 0 as shipped. If you are installing on an external hard disk, the number is set to 5 as shipped. If you have more than one SCSI device, make sure that each SCSI device has a unique SCSI ID number. Verify the SCSI ID numbers of all your SCSI devices by checking the SCSI ID indication at the back of the device.

△ **Important** Double-check that you have the correct SCSI ID numbers. Later in this procedure you'll have the opportunity to confirm the SCSI IDs and correct them if necessary. △

10. If you are installing from CD-ROM or tape, enter the SCSI ID number of the CD-ROM drive unit or tape drive.

This appears next:

```
Enter the SCSI ID number of your CD drive [0-6]:
```

◆ *Note:* Your AppleCD SC or Tape Backup 40SC should be on when you answer this prompt. If you have not already powered on your CD drive or tape device, do so now.

Enter the SCSI ID number assigned to your tape or CD-ROM drive. (As shipped, the number is 1 for the tape, 3 for the CD-ROM drive. You can check by looking at the back of the unit.) *It is very important to enter the correct number.*

11. Confirm the SCSI ID number or numbers.

If you specified CD-ROM or tape installation, you see this message:

```
Please verify and confirm the following:
   A/UX will be installed onto hard disk SCSI ID n
   CD drive is SCSI ID n
Are all values correct? [y/n, default=y, ? for help]>>>
```

If you specified floppy disk installation, you are queried only about the hard disk SCSI ID number.

❑ Enter n if the SCSI ID number or numbers are incorrect. You will be prompted to reenter the SCSI ID number or numbers. If you enter n again, the system quits the installation process

❑ Enter y if the SCSI ID number or numbers are correct.

The system now performs initial checks before installation. It performs various preliminary tests to ensure that the hard disk is available, has sufficient space, and has a valid file system. You may be asked to respond during these events if the system has problems or finds unexpected information present.

12. Create a new file system.

If this is the first time you have run the installation procedure, this message appears:

```
Your root partition does not appear to contain an A/UX file
system. Should a new file system be created? [y/n,
default=y, ? for help>>>
```

Enter y to create a new file system. With this new file system, A/UX gives you the full benefits of the 2.0 release, including longer file names.

◆ *Note:* If you are repeating this portion of the A/UX 2.0 installation procedure or are doing a nonstandard installation, the screen displays

```
Your root partition appears to contain an A/UX ufs file
system. OK to use? [y/n, default=y, ? for help>>>
```

If you encountered problems the first time you ran the installation, or if the message indicates svfs instead of ufs file system, enter n to rebuild the file system.

13. Specify the type of disk onto which you are installing A/UX.

When the system displays

```
Choose the disk type that most closely resembles your own
(SCSI ID n)
1   HD 160 SC (CDC Wren V HH)
2   HD 80 SC (Old 5-1/4" 80MB Quantum Q280)
3   HD 20 SC (Seagate ST225N)
4   MicroNet SBX330
5   Generic
Enter the number of the best choice.>>>
```

Enter the number that appears next to the disk description that best fits the hard disk onto which you are installing A/UX. This procedure describes a standard installation,which uses either an 80 MB or 160 MB hard disk. For information on other hard disk installation options, see Appendix B, "Nonstandard Procedures."

After you specify the disk type, these messages indicate the status of the new file system:

```
Creating A/UX file system...Done
Checking space available...Done
Please wait...
```

◆ *Note:* If you doing a nonstandard installation and are not making a new file system, the system also displays a message about copying critical files.

The system now copies the root files from the *Floppy Root* disk. This process usually takes about 3 minutes. After successful transfer of the root file system you see a message similar to this:

```
The system will now be rebooted to continue the installation
of all remaining A/UX 2.0 files onto the hard disk
Be sure to use the read_disk program in the MacPartition to
first install the special kernel from the Kernel Archive
disk. Then choose Autolaunch from the Execute menu to
continue with partII.
<<<Press RETURN to activate reboot>>>
```
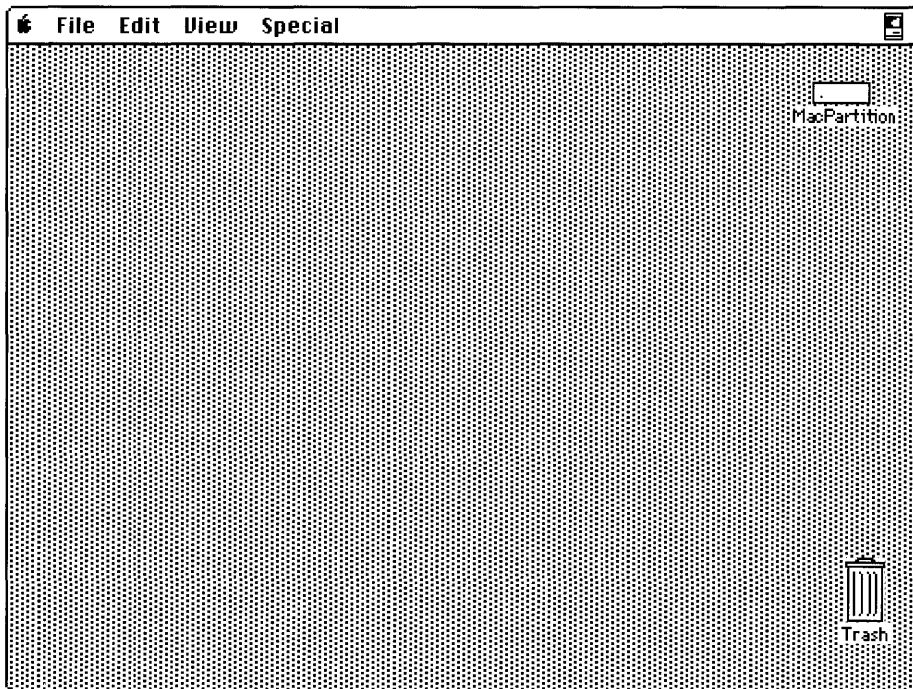
14. Press RETURN.

Your system now reboots. Your screen flashes, the smiling Macintosh icon appears, and the *Floppy Root* disk is ejected.

The Finder, shown in Figure 4-3, appears on the screen.

■ **Figure 4-3** The Finder

♦ *Note:* If the Finder doesn't appear, click Cancel to cancel the automatic startup sequence, then choose Quit from the File menu.

15. Remove the *Floppy Root* disk and put it in a safe place.

16. Double-click the MacPartition disk icon.

The MacPartition window opens.

17. Double-click the read_disk icon.

The system prompts you to insert a disk to read.

18. Insert the *Kernel Archive* disk.

The system takes a few minutes to read the disk, then this prompt appears:

```
startup#
```

19. Select the Boot command from the Special menu to continue the installation.

The "Welcome to A/UX" boot and launching windows appear, then a message about Phase II of the installation appears. The *Kernel Archive* disk ejects.

20. Remove the *Kernel Archive* disk and store it in a safe place.

Proceed to "Installing From CD-ROM," "Installing From Tape Cartridge," or "Installing from Floppy Disks."

Installing from CD-ROM

You are now ready to begin final installation of A/UX. After you respond to a final prompt, the system automatically copies installation files from CD-ROM; you are free to leave the system unattended while copying is in progress.

Make sure your AppleCD SC is powered on before continuing with installation. You should also know how to use your CD-ROM drive before attempting installation. Refer to the *AppleCD SC Owner's Guide* if you have any problems.

1. **Read the messages and press RETURN to proceed.**

   This message appears:

   ```
       A/UX Release 2.0 Installation Procedure
   Use the DELETE key to erase responses
       Welcome to Part II of the A/UX CD installation
       procedure.  The next step will involve bringing all of
       A/UX onto your hard disk from archives stored on the CD.
   Once you begin, you should not interrupt this procedure.

   Do you wish to continue the installation? [y/n, default=y]:
   ```

   You should not interrupt the installation process once you begin. If you do so, you will have to start the installation procedures again beginning with step 1 of "Launching the Installation Process." See "Restarting From CD-ROM After Interruption" at the end of this section if you interrupt the installation process.

   Press RETURN to continue.

2. **Insert the CD-ROM.**

   You see the prompt

   ```
   Waiting for CD
   ```

   After you insert the CD-ROM the yellow light on the drive comes on for a while. If the `Waiting for CD` prompt continues to appear on your screen, the installation software cannot recognize your CD-ROM device. Enter `q` to quit now, and see Appendix A, "Troubleshooting," for information on how to recover.

3. Copy the files from the CD-ROM

All decisions have been made at this point. The complete copy process requires about an hour and is entirely automatic, so you are free to let the system run on its own.

Copying the installation files from CD-ROM begins with the message

```
Installing basic root files.
Please wait, installation in progress.
```

If the process is stopped before completion, you must start again beginning with step 1 of "Launching the Installation Process." Copying the root files takes 12 to 14 minutes.

After the root files are copied, continuing progress is signaled by the message

```
Installing basic /usr files.
Please wait, installation in progress.
```

Copying the /usr files takes about 30 minutes. After these files are copied, continuing progress is signaled by the message

```
Installing manual pages and games.
Please wait, installation in progress.
```

Copying all optional files requires about 20 minutes. When the copy process is complete, you see this message:

```
Finished with installation.
Activating closeout routine.  This routine performs several
important functions necessary to return control to A/UX.
```
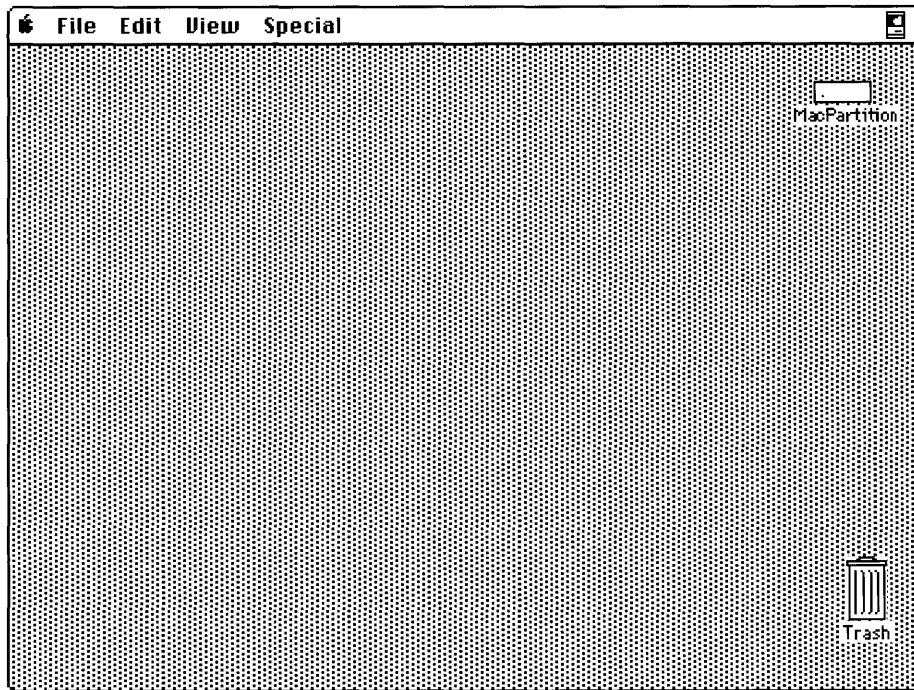
You now see the final messages

```
Closing out.  This takes some time.
Done
Filling autorecovery partitions ... 2:
Done
Done
Doing some cleanup ... Done
Press RETURN to activate reboot
```

4. Press RETURN.

The system now reboots from the MacPartition, and the Finder appears as shown in Figure 4-4.

■ **Figure** 4-4 The Finder

5. Remove the CD-ROM.

Remove the CD-ROM and store it in a safe place.

You are almost ready to run A/UX. Go now to Chapter 5, "Running A/UX 2.0 for the First Time," for information on how to start A/UX.

Restarting from CD-ROM after interruption

You should not interrupt the installation process once you begin. If you do so, you will have to start the installation procedures again beginning with step 1 of "Launching the Installation Process."

The only situation in which you may be able to restart the installation after interruption is when your system experiences a power failure. When the power comes back on, the installation routines are restarted. If the installation routines can continue you see

```
Use the DELETE key to erase responses.
Welcome back to Part II of the A/UX CD installation procedure.
Continuing installation with the xxxxxx files
Once you begin you may not interrupt this procedure
Press RETURN now to continue [enter q to quit]:
```

To exit from the installation procedure, enter q. To resume the installation, press RETURN.

Restoring files

You can also use the CD-ROM Product to restore original installation files that have been lost or damaged. See Appendix C, "Reusing the Installation Media."

Installing from tape cartridge

You are now ready to begin final installation of A/UX. After you respond to a few prompts, the system automatically copies installation files from tape; you are free to leave the system unattended while the tape copying is in progress.

Make sure your tape device is powered on before continuing with installation. You should also know how to use your tape drive before attempting installation. Refer to *Apple Tape Backup 40SC Owner's Guide* if you have any problems.

1. **Read the messages and press RETURN to proceed.**

   You see this message:

   ```
   A/UX Release 2.0 Installation Procedure
   Use the DELETE key to erase responses
   Welcome to Part II of the A/UX tape installation
   procedure.  The next step will involve bringing all of
   A/UX onto your hard disk from archives stored on the tape.
   Once you begin, you should not interrupt this procedure.

   Do you wish to continue the installation? [y/n, default=y]:
   ```

   You should not interrupt the installation process once you begin. If you do so, you will have to start the installation procedures again beginning with step 1 of "Launching the Installation Process." See "Restarting From Tape After Interruption" at the end of this section if you interrupt the installation process.

   Press RETURN to continue.

2. **Insert the tape cartridge.**

   This prompt appears

   ```
   Waiting for tape
   ```

   Insert the tape cartridge now if you have not already done so. After you insert the tape cartridge, the red light on the tape drive comes on for a while. If the `Waiting for tape` prompt continues to appear on your screen, the installation software cannot recognize your tape device. Enter `q` to quit now, and see Appendix A, "Troubleshooting," for information on how to recover.

3. **Copy the files from the tape.**

   All decisions have been made at this point. The complete copy process requires about 75 to 80 minutes.

   Copying the installation files from tape begins with this message:

   ```
   Installing basic root files.
   Please wait, installation in progress.
   ```

   If you leave the system unattended during the tape copy process, be sure to protect the copy process from interference. If the process is stopped before completion, you must start again beginning with step 1 of "Launching the Installation Process." Copying the root files takes 12 to 14 minutes.

   After the root files are copied, continuing progress is signaled by this message:

   ```
   Installing basic /usr files.
   Please wait, installation in progress.
   ```

   Copying the /usr files takes about 30 minutes. After these files are copied, continuing progress is signaled by this message:

   ```
   Installing manual pages and games
   Please wait, installation in progress.
   ```

   Copying all optional files requires about 20 minutes. When the copy process is complete, you see this message:

   ```
   Finished with installation.
   Activating closeout routine.  This routine performs several
   important functions necessary to return control to A/UX.
   ```

   You will now see the final messages:

   ```
   Closing out.  This takes some time.
   Making links ... Done
   Filling autorecovery partitions ... Done
   Doing some cleanup ... Done
   Press RETURN to activate reboot
   ```

4. **Press RETURN.**

   The system now restarts from the MacPartition, and the Finder appears as shown in Figure 4-5.

■ **Figure 4-5** The Finder
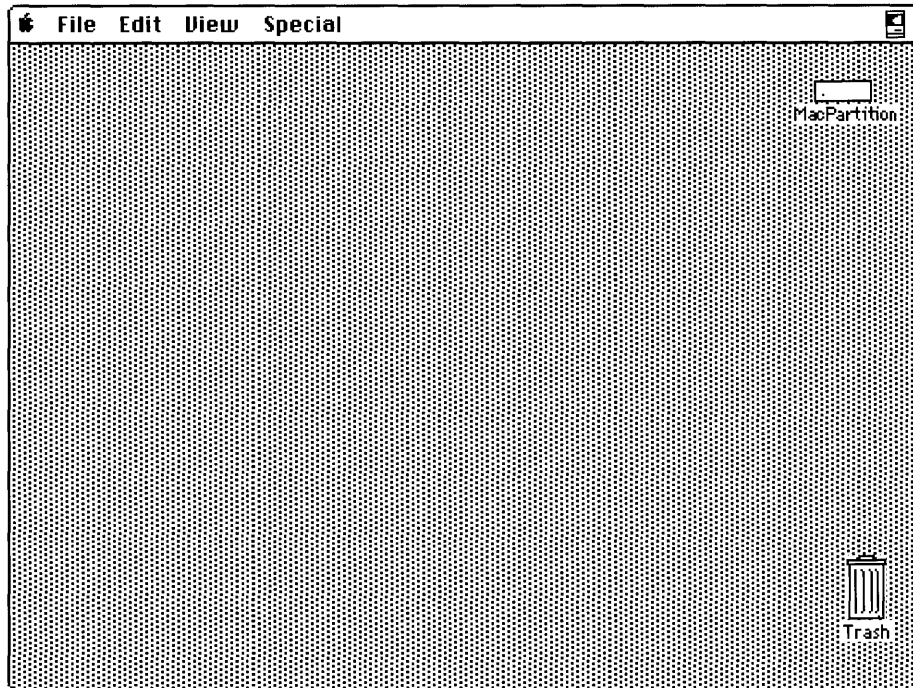
5. Remove the tape cartridge.

Remove the tape cartridge and store it in a safe place.

You are almost ready to run A/UX. Go now to Chapter 5, "Running A/UX 2.0 for the First Time," for information on how to start A/UX.

Restarting from tape after interruption

You should not interrupt the installation process once you begin. If you do so, you will have to start the installation procedures again beginning with step 1 of "Launching the Installation Process."

The only situation in which you may be able to restart the installation after interruption is when your system experiences a power failure. When the power comes back on, the installation routines are restarted. If the installation routines can continue you see the message

```
Use the DELETE key to erase responses
Welcome back to Part II of the A/UX cartridge tape installation
procedure.
Continuing installation with the xxxxxx files
Once you begin you may not interrupt this procedure
Press RETURN now to continue [enter q to quit]:
```

To exit from the installation procedure, enter q. To resume the installation, press RETURN.

Restoring files

You can also use the A/UX Tape Product to restore original installation files that have been lost or damaged. See Appendix C, "Reusing the Installation Media."

Installing from floppy disks

You are now ready to begin final installation of A/UX. After you respond to a few prompts, the system copies installation files from floppy disks. The process of repeatedly inserting and removing disks takes from 1 ½ to 2 hours (estimate a little more than 3 minutes per disk).

1. **Read the messages and press RETURN to proceed with the installation.**

   The system displays this message:

   ```
       A/UX Release 2.0 Installation Procedure
   Use the DELETE key to erase responses
   Welcome to Part II of the A/UX floppy disk installation
   procedure.  The next step will involve bringing all of
   A/UX onto your hard disk from archives stored on floppy
   disks.
   If you have two floppy disk drives, be sure to insert all
   disks in drive 0 when prompted.
   Beginning with disk 1.
   It is not recommended that you interrupt this procedure.
   However if you must do so, you may type q when prompted to
   insert the next floppy disk
   Do you wish to continue the installation? [y/n, default=y]:
   ```

   You should not interrupt the installation process once you begin. Should you interrupt the installation process, see "Restarting From Floppy Disks After Interruption" at the end of this section.

2. **Insert the disks as prompted.**

   ◆ *Note:* Insert all disks into drive 0 (the drive on the right, if you have more than one drive). During the installation process, the system cannot recognize a disk inserted in any other drive. If you insert a required disk in another drive, you may have to remove the disk manually or quit to eject the disk. If you quit, you must restart from step 1 of "Launching the Installation Process."

   Each disk (depending on the total file size) takes a little less than 3 minutes to install. When figuring the time required for the entire process, estimate somewhat more than 3 minutes per disk to allow for disk handling, interruptions, and delays.

For each disk in the set of installation disks, starting with disk 1, you receive messages like

```
Installing basic root files.
Waiting for floppy.  Please insert A/UX Installation Disk n
        [q to quit]
```

The `Waiting for floppy` message blinks until you insert the requested disk. Then the `Waiting for floppy` message is replaced by

```
Processing floppy disk n.
```

When the files on that disk are copied, the disk is ejected from the drive, and you see the `Waiting for floppy` message for the next disk. Remove the ejected disk and insert the required disk. The process continues. Remember that if you quit you must start the installation procedures again beginning with step 1 of "Launching the Installation Process."

When you have finished copying the root file disks, you copy the `/usr` disk set. This message appears:

```
Installing basic /usr files.
Waiting for floppy.  Please insert A/UX Installation Disk n
        [q to quit]
```

Continue as before. When these files have been installed, the optional files are copied onto your hard disk. You see this message:

```
Installing manual pages and games
Please wait, installation in progress.
Waiting for floppy. Please insert A/UX Installation Disk n
        [q to quit]
```

Continue to remove and insert the disks as required.

When all installation disks have been copied successfully, you see this message:

```
Finished with installation.
Activating closeout routine.  This routine performs several
important functions necessary to return control to A/UX.
```

Now the final messages appear:

```
Closing out.  This takes some time.
Making links ... Done
Filling autorecovery partitions ... Done
Doing some cleanup ... Done
```

```
Press RETURN to activate reboot
```

3. **Press RETURN.**

   The system now reboots from the MacPartition, and the Finder appears as shown in Figure 4-6.

■ **Figure 4-6** The Finder
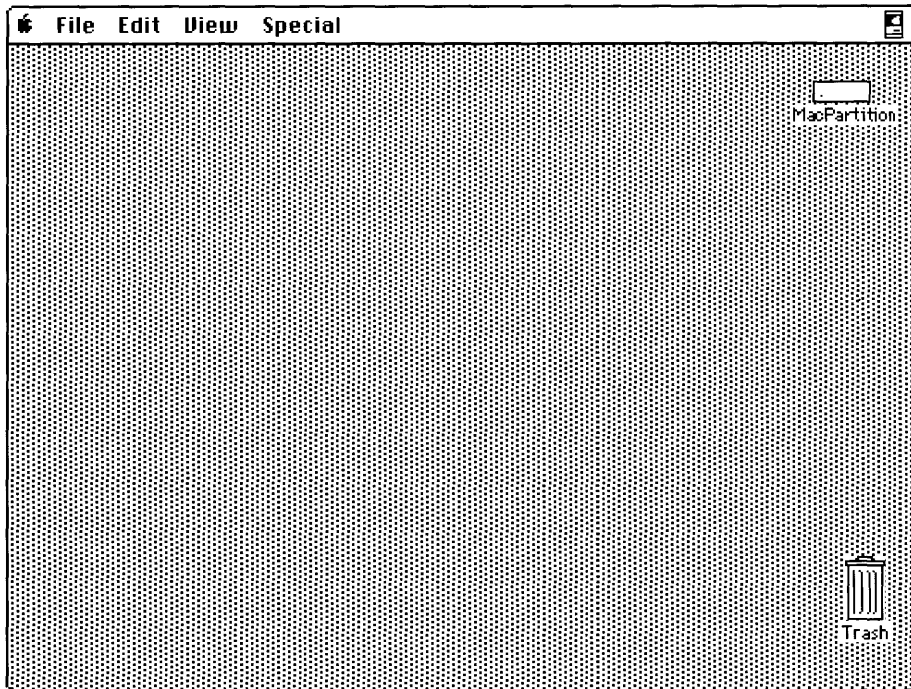
You are almost ready to run A/UX. Go to Chapter 5 "Running A/UX 2.0 for the First Time" for information on how to start A/UX.

Restarting from disks after interruption

You should not interrupt the installation process once you begin. If you do so, you will have to start the installation procedures again beginning with step 1 of "Launching the Installation Process."

The only situation in which you may be able to restart the installation after interruption is when your system experiences a power failure. When the power comes back on, the installation routines are restarted. If the installation routines can continue you will see the message

```
Use the DELETE key to erase responses
Welcome back to Part II of the A/UX floppy disk installation
procedure.
Beginning with disk n
It is not recommended that you interrupt this procedure except at
designated points. However, if you must do so, you may type q when
prompted to insert the next floppy disk
Press RETURN now to continue [enter q to quit]:
```

To exit from the installation procedure, enter q. To resume the installation, press RETURN.

Restoring files

You can also use the A/UX Floppy Product to restore original installation files that have been lost or damaged. See Appendix C, "Reusing the Installation Media."

Chapter 5 **Running A/UX 2.0 for the First Time**

This chapter presents the information necessary to run your A/UX system for the first time. It also describes how to set up your system so that A/UX automatically starts up as soon as you start up your Macintosh. This chapter includes these sections:

- Preparing to run A/UX
- Setting the startup device
- Setting A/UX Startup as the startup application
- Launching A/UX
- Setting the system time
- Setting the root password
- Restoring saved files
- Where to go from here

Preparing to run A/UX

Before you started the installation procedure, you disconnected any SCSI devices that weren't involved in the A/UX installation process. These may have included hard disks, CD-ROM drives, tape drives, and the like. If you intend to use these devices with your A/UX 2.0 system, follow the steps below. If you don't have any additional devices to connect to your system, go directly to the next section, "Setting the startup device."

To connect additional SCSI devices to your system, follow these steps:

1. **Choose Shutdown from the Special menu.**

   The system power goes off.

2. **Connect any additional SCSI devices.**

   Follow the hardware installation instructions that came with the component.

3. **Power the system back on.**

   The Finder appears.

4. **Go on to the next section to set the startup device.**

Setting the startup device

When you switch on the Macintosh, it follows a specified order when it scans for a System file.

1. Internal floppy disk drive(s). If you have two disk drives, it looks first at the drive on the right.

2. SCSI hard disk with the highest ID number.

3. Hard disk with the next highest ID number.

You use the Control Panel desk accessory to override the scanning sequence during startup. You should designate the hard disk with A/UX on it as your startup disk. You can change this order later if you like.

1. Choose Control Panel from the Apple menu.

Place the cursor on the Apple menu and press the mouse button to open it. Drag the pointer down until Control Panel is highlighted, then release the mouse button. The Control Panel dialog box appears.

2. Click the Startup Device icon.

If necessary, use the scroll bar to bring the Startup Device icon into view. Figure 5-1 shows the Control Panel with the Startup Device icon selected.

■ **Figure 5-1** The Control Panel with MacPartition selected as Startup Device


```
███████████████ Control Panel ████████████
┌─────┐ ┌─┐
│ ┌─┐ │ │⇧│
│ │ │ │ ├─┤        ████████    ┌─────┐           │⇧│
│ └─┘ │ │░│      │MacPartition│  │     │          └─┘
 Mouse  │░│       └──────────┘    Kristi
        │░│
 ┌─┐┌─┐ │░│
 └─┘└─┘ │░│
 ┌─┐┌─┐ │░│
 └─┘└─┘ │░│
Network  │░│
        │░│
 ┌─┐    │░│
◁)))   │░│
 Sound  │░│
        │░│
 ┌───┐  │░│
 │ ? │  │░│
 └───┘  │░│
Startup Device│⇩│
┌─────┐ └─┘
│3.3.1│         ┌─┐
└─────┘         │⇩│
                └─┘
```
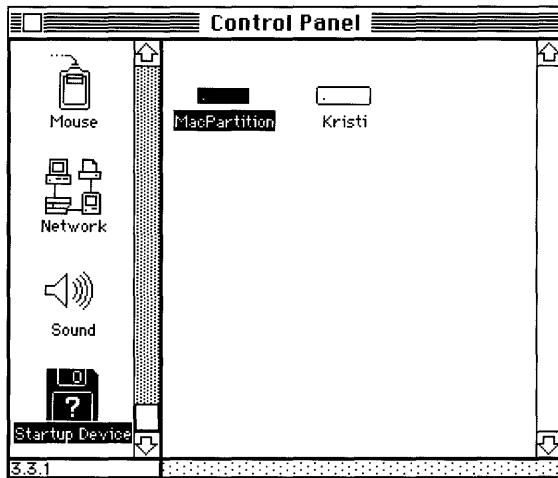
3. **Click the icon that represents the hard disk named MacPartition.**

   The icon is highlighted. (See Figure 5-1.) When you start up your computer, the system uses that hard disk as the startup disk, (unless you first insert a floppy disk that contains a System Folder).

4. **Close the Control Panel.**

   To close the Control Panel, click the close box in the upper left corner.

Launching A/UX

As installed, you start up A/UX by double-clicking the A/UX Startup icon that is found in the MacPartition. You have the option of setting up A/UX Startup as the startup application, so that the system automatically launches A/UX each time you power on. To set up your system so that A/UX launches automatically each time your system comes on, proceed to the next section, "Setting A/UX to Launch Automatically."

If you prefer that A/UX not launch automatically on startup, in other words if you prefer to start up in the Macintosh Finder and manually launch A/UX by double-clicking, skip to the section, "Launching A/UX Manually."

Setting A/UX to launch automatically

To make A/UX the startup application, follow these steps:

1. **If the MacPartition window isn't open, double-click the MacPartition hard disk icon.**

   The disk icon labeled MacPartition (Figure 5-2) is located near the right edge of the screen.

■ **Figure 5-2** The MacPartition icon

MacPartition

2. **Click the A/UX Startup icon to select it.**

   The selected icon is shown in Figure 5-3.

■ **Figure 5-3** A/UX Startup selected

MacPartition

6 items   1,669K in disk   344K available

System Folder   bin   A/UX Startup
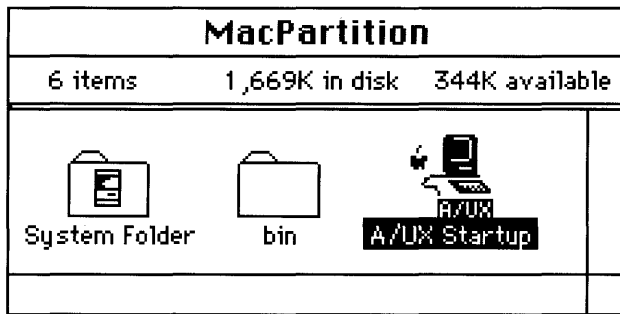
3. Choose Set Startup from the Special menu.

The Set Startup dialog box appears.

4. Select A/UX Startup.

If necessary, click on the radio button next to A/UX Startup to select it, as shown in Figure 5-4.

◆ *Note:* Check that the radio button next to Finder (*not* Multifinder) is selected.

■ **Figure 5-4** The Set Startup dialog box
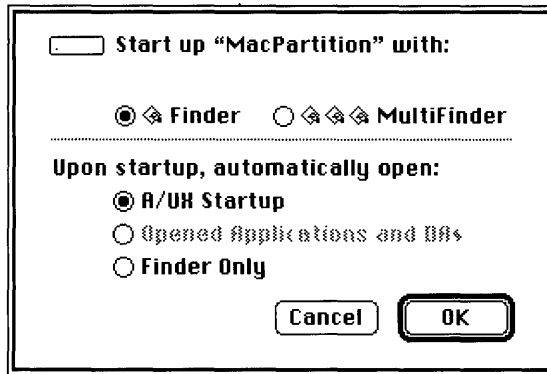
5. **Click OK.**

   This action sets A/UX to start up immediately when you turn on the Macintosh by using the POWER ON key or by running Restart from the Special menu. It also closes the dialog box.

6. **Close the MacPartition window.**

7. **Choose Restart from the Special menu.**

   The A/UX Startup screens appear.

   △ **Important** A/UX may report alert messages during the startup sequence. In some cases, you need to supply information in response to the message. When you click OK in the alert box, a window appears, into which you can enter any information that the program requests. △

   At the end of the startup process, the login dialog box appears. Skip the next section and proceed to the section "Setting the Root Password."

Launching A/UX manually

If you choose not to set A/UX Startup as the startup application, you need to run the A/UX Startup application manually. Follow these steps to start up A/UX:

1. **Locate the disk called MacPartition.**

   A disk icon labeled MacPartition (Figure 5-5) is located near the right edge of the screen.

■ **Figure 5-5** The MacPartition icon

MacPartition

   This icon represents a small part of your disk space that contains Macintosh file system. The A/UX Startup program, which is used to launch the A/UX operating system, is contained here.

2. **Double-click this icon.**

   Figure 5-6 shows the contents of the MacPartition disk.

■ **Figure 5-6** MacPartition disk contents
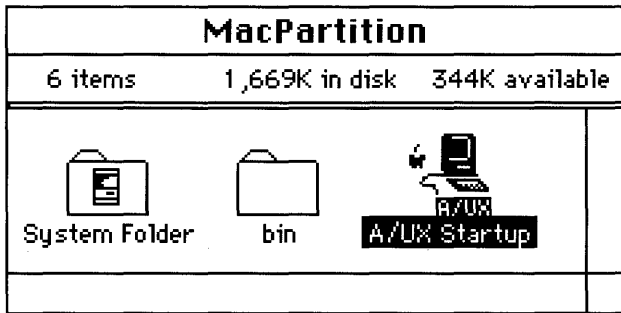
3. Double-click the A/UX Startup icon to launch A/UX.

Position the pointer over the icon and double-click to open the application. The A/UX Startup screens appear as A/UX moves through the loading and launching process.

△ **Important**   A/UX may report alert messages during the startup sequence. In some cases, you need to supply information in response to the message. When you click OK in the alert box, a window appears, into which you can enter any information that the program requests. △

At the end of the startup process, the login dialog box appears. Proceed to the next section, "Setting the Root Password."

Setting the root password

After A/UX has completed loading and launching, the login dialog box appears, as shown in Figure 5-7.

■ **Figure 5-7** The login dialog box
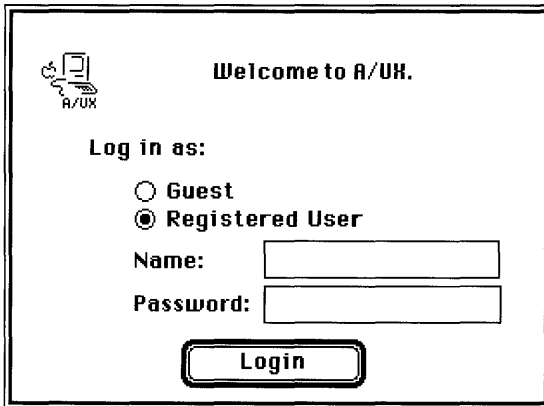
This section explains how to set your root password for the special account that confers unlimited privileges. The user with these privileges is called the superuser and has access to all files, commands, and processes in your system. The special account is called "root."

The first time you log in, there is no root password. Because the superuser has unlimited privileges to all files in the system, it is important that you set the password right away to prevent inexperienced or malicious users from accessing the system as the root user.

Your first step is to decide on a password to use. Choose a password that you can remember easily, but don't make it so easy that others might guess it. For example, don't use your name, initials, or telephone number. One way to derive a fairly secure password is to combine into a single word two or more short words that are meaningful to you and then spell it with a mixture of uppercase and lowercase letters and nonalphabetic characters. For example, `!noSmoking`, `$2toWin`, and `MacII4me` would make acceptable passwords (but since they're printed here, don't use them as passwords on your system).

Passwords for all users other than root must meet certain requirements. Although root doesn't have to adhere to them, you might follow them now anyway because they help create a more secure password, and they make you aware of the rules that regular users must follow. These requirements are as follows:

- A password must consist of at least six characters. The first eight are used for verification. You can include additional characters if they make the password more meaningful.

- A password must contain at least two alphabetic characters. Remember that A/UX and other UNIX operating systems are case sensitive; for example, *s* and *S* are treated as two different characters.

- A password must contain at least one numeric (0 through 9) or one special character (such as a punctuation mark).

- A password must differ from the login name and from any reverse or circular shift of the login name. Also, in determining the uniqueness of the password from the login name, uppercase letters and their corresponding lowercase letters *are* counted as equivalent. For example, some of the prohibited passwords for the login name `cynthia` are: `aihtnyc`, `ynthiac`, and `cynThia`.

Once you've chosen a root password, follow these steps to set it and log in to the root account:

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

    The Change Password dialog box appears.

2. **Type the login name `root`.**

3. **Press RETURN in old password text box.**

4. **Type the root password you've chosen.**

5. **Click OK.**

    Another dialog box directs you to confirm your new password.

6. **Type your new password again.**

7. **Click OK.**

    The login dialog box appears again, with the login name and password fields filled in. You thus have the opportunity to use the Options menu again before logging in, if necessary.

8. Click the Login button.

You are logged in to A/UX, and the Finder appears (Figure 5-8). Your root password takes effect. You will have to enter it the next time you log in to the root account. While you are logged in as the root user, proceed to the next section to set the correct system time.

■ **Figure 5-8** The A/UX Finder
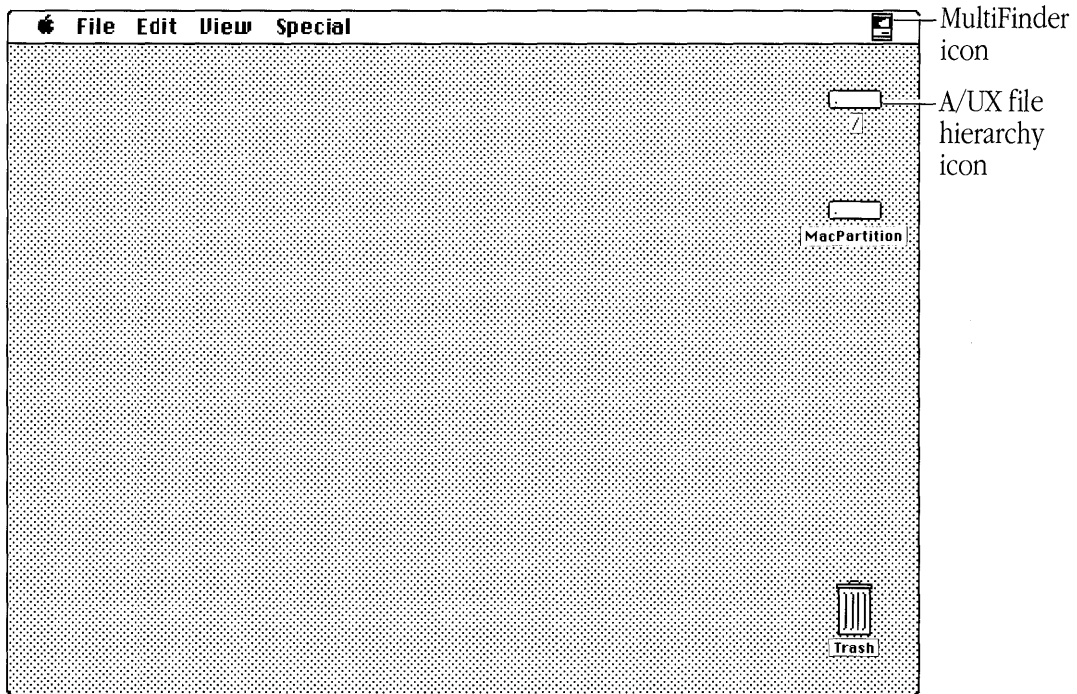
Setting the system time

It's important to ensure that your A/UX system has the correct time and date. The system clock is set to at the factory to Pacific Standard Time. If you live in another time zone, follow these steps to set the correct time:

△ **Important**   Your system automatically sets the Macintosh time to match the A/UX time. Changing the time through the Control Panel does *not* affect A/UX time. You can view the time and date from the clock desk accessory in the A/UX Finder, but to change the time use the A/UX date command only. △

1. **Open the hard disk icon labeled / .**

2. **Open the Useful Commands folder.**

3. **Open the settimezone icon.**

   A list of the major time zones by region is displayed (see Figure 5-9).

■ **Figure 5-9** Time zone menu

```
/Useful Commands/settimezone (set timezone)
Enter the letter corresponding to your region.
        f  Africa
        a  Australia, New Zealand
        c  Canada
        e  Europe
        i  Iceland, Caribbean
        x  Mexico
        m  Middle East
        s  South America
        u  United States
        w  Western Pacific, East Asia
        o  Other

        -  Cancel
Enter letter: w
```

4. Enter the letter that corresponds to your region.

For example, if you live in Japan, enter *w* for Western Pacific. A second menu is displayed that lists time zones with the region. Enter *j* for Japan (see Figure 5-10). If you live in the United States, enter *u* as the region. Then, in the second menu enter the letter that corresponds to your United States time zone. For example, if you live in New York, enter *e* for Eastern Standard Time.

■ **Figure 5-10**　　　Time zone submenu

```
Enter the letter corresponding to your time zone.
        c  Peoples Republic of China
        h  Hong Kong
        j  Japan
        r  Republic of China
        k  Republic of Korea
        m  Samoa
        s  Singapore

        -  Return to previous menu
Enter letter: j

The time zone has been set to Japan
The corresponding date will be Mon Feb 19 23:08:21 JST 1990
This change will take effect the next time you log in.
#
```

Earlier ⇦ ⋮ ⇨ Later

-13 -12 -11 -10 -9 -8 -7 -6 -5 -4 -3 -2 -1hr 0 +1hr +2 +3 +4 +5 +6 +7 +8 +9 +10

Add One Day Monday ←→ Subtract One Day Sunday

International Date Line

Anchorage

Godthab

Greenwich
London ● Berlin
Moscow Gorki
Paris
Rome
Madrid
Taskent

Denver
Chicago
New York City
Washington D.C.
Los Angeles

Mexico City

Honolulu

Cairo
Teheran
Riyadh
New Delhi
Beijing
Seoul
Tokyo
Hong Kong

Prime Meridian

Lagos

Lima La Paz

Singapore

Johannesburg

Buenos Aires

Sydney

These biases reflect Standard Time.
If Daylight Savings Time is in effect,
add one hour.

Figure 5-11 The GMT bias map

If your time zone isn't listed, select the *Other* option, which enables you to select your time zone relative to Greenwich Mean Time. You enter the difference between your time zone and that of the GMT. To determine this offset, see Figure 5-11, which shows a world map divided into time zones one hour later than (east) or one hour earlier than (west) of Greenwich, England.

Locate your region, and enter the letter in the menu associated with the correct number of hours that your time zone is greater or less than GMT time. For example, according to the map, New Delhi is located five time zones east of Greenwich. Regions east of Greenwich are measured in one hour increments greater than the GMT, while those west of Greenwich are measured in one hour increments less than the GMT. Therefore, for a system located in New Delhi, you would enter *f* for five hours later.

If you enter the GMT offset and your time is currently affected by Daylight Saving Time, add one hour. So if New Delhi is currently on Daylight Saving Time, enter *g* for six hours later instead of five.

After you enter the time zone by either method, a message appears to indicate that the time zone has been set to the selected country or region, or for GMT offset—the number plus or minus the GMT—for example, GMT+5. The corresponding date and time also appear. This change takes effect the next time you log on.

5. **Double-click `date` in the Useful Commands folder to check the new system time.**

   This command should display the proper date and time. If it does not, repeat the settimezone procedure, making sure that you chose the correct time zone and gave the correct time and date.

If you updated your system from a previous release of A/UX to A/UX 2.0, proceed to the next section. If this is a new installation, skip to the sections "Shutting Down A/UX" and "Where to Go from Here."

Restoring saved files

If you updated your system from a previous release of A/UX to A/UX 2.0, you can make your system administration tasks for the new release easier by using the information in your old system files to customize your new system files.

In most cases, you will want to combine the information from your old system files with those system files in the new release. For example, some of these files include /etc/passwd, /.profile, /.login, /etc/hosts, and startup scripts. Using the strategy described here you can keep the new general information while adding customized details from your old files.

◆   *Note:* The following steps assume you saved your files by using the bakchk program. The bakchk program uses cpio to save files in a multivolume archive. To find a particular file on the floppy disk, you must insert the floppy disks one at a time in the order that the multivolume archive was made.

Follow these steps to restore files from your backup floppy disks.

1. **Log in as the root user.**

2. **Create a directory for the old system files.**

    Create a new directory or navigate the directory structure until you are in the directory in which you want to restore the files. For example, to create a directory named /oldfiles enter

    mkdir /oldfiles

3. **Change directories to the newly created directory.**

    Change directories to the directory in which you want to restore the files. For example, enter

    cd /oldfiles

4. **Insert the first floppy disk of the multivolume archive into drive 0.**

    Insert the floppy disk you labeled as disk number 1 into drive 0. The labels you placed on the floppy disks when you saved the files will help you identify the correct floppy disk.

5. **Copy the file or files from your backup floppy disks to your working directory.**

   If you backed up your files using `bakchk`, use `cpio` to restore the files. You can read in all files at once, or restore files one at a time.

   If you want to restore many files from your backup, make sure you have enough space to restore the entire archive on your hard disk. When you ran `bakchk`, you were instructed to write down the number of bytes `bakchk` reported were required to archive the files. Use the `df` command to verify that you have this number of free bytes on your system.

   □ To restore all files saved on your backup floppy disks into your current working directory, enter

   ```
   cpio -iBdmuv < /dev/rfloppy0
   ```

   The flag options to `cpio` cause `cpio` to read in (`-i` flag) files from the floppy disk and place the named file or files in the working directory. The `cpio` command blocks the input (B flag), creates any necessary directories (d flag), preserves the file modification date (m flag), and copies the file unconditionally (u flag). (Normally `cpio` will not copy a file older than an existing file with the same pathname.)

   □ To restore a single file saved on your backup floppy disks, enter

   ```
   cpio -iBdmuv filename < /dev/rfloppy0
   ```

   to copy the file specified by *filename* from drive 0 into your current working directory.

   If `cpio` does not find the file on the first floppy disk, you will be prompted to insert the next floppy disk of the archive. Continue inserting floppy disks as prompted.

6. **Save a backup copy of the system file you want to modify.**

   Keep a copy of the new system file as it was originally installed. For example, enter

   ```
   cp /etc/passwd /etc/passwd.orig
   ```

   to save a copy of the `/etc/passwd` file for future reference.

7. **Combine the information from the old system file into the new system file.**

You can combine the information from your old file into your new system file by using any method you choose. Files that you will probably need to customize include

```
.cshrc
.login
etc/fstab
etc/group
etc/hosts
etc/hosts.equiv
etc/inittab
etc/motd
etc/passwd
```

The following steps give you an overview of the steps involved in comparing the information in two different files. Steps to compare two files, one named /etc/passwd and one named /oldfiles/etc/passwd, are listed here.

◆ *Note:* CommandShell must be run from the A/UX Finder. CommandShell is very similar to the `term` utility of previous A/UX releases, but CommandShell has new features. For details on CommandShell, see *A/UX Essentials.*

☐ If you've just logged in, you can select CommandShell from the Apple menu.

☐ Choose New from the File menu so that you see two windows on your screen.

☐ Choose Tile Horizontal from the Window menu.

☐ Use a text editor to edit the new system file in one window while viewing the old system file in another window for comparison. For example, you might use `vi` to edit /etc/passwd in the Terminal 1 window while you display /oldfiles/etc/passwd in the Terminal 2 window.

☐ Use Macintosh copy and paste operations from the Edit menu to customize your new /etc/passwd file.

Shutting down A/UX

Now that you have completed the A/UX installation, if you are through working with your system for the time being, you can shut down your computer by choosing Shut Down from the Special menu. To learn more about working with A/UX, see *A/UX Essentials*.

Where to go from here

You have just finished the basic A/UX setup and installation. You can add user accounts, attach peripheral hardware, or connect to a network by following the procedures in *Setting Up Accounts and Peripherals for A/UX*. For more specifics about working in the A/UX environment, see *A/UX Essentials*. To learn more about where particular information is located in the A/UX library, see *Road Map to A/UX*.

Appendix A **Troubleshooting**

This appendix contains information on support services available for
A/UX. It also presents the most common problems that people may have
during the installation process and some steps that will usually correct each
situation or information on where you can get help.

Before you look at the following sections, check that all cables are
connected and that all devices you're using are turned on. If you can't
continue your installation, see your authorized Apple dealer for assistance.

A/UX Support Services

To enhance the A/UX work environment, Apple Computer provides some optional support services. These services ensure that you get the help you need to keep your system working optimally—now and down the line. The sections that follow describe the available services.

What's available

You can purchase these A/UX support services:

- *A/UX Software Update Service*

  For a single fee you can receive all A/UX software updates released during a one-year period. The updates, which may be cumulative or incremental, provide product enhancements, system revisions, and software fixes. Subscribers also receive documentation containing a description of the enhancements and software fixes and installation instructions.

- *A/UX Technical Answerline*

  You can purchase unlimited toll-free telephone access to A/UX support experts. The A/UX Technical Answerline gives you a sophisticated support service to enhance your already powerful A/UX environment. You'll designate two people at your site to be your A/UX Answerline contacts. These contacts will have 12-hour daily telephone access for answers, information, and advice on issues such as

  □ compatibility

  □ installation

  □ configuration

  □ fundamental usage

  □ administration

  □ troubleshooting

  To subscribe to the technical answerline you don't need to subscribe to the A/UX Software Update Service, however you must be running the latest release of A/UX.

How to order

You may obtain A/UX support services by completing a Support Services order form or by contacting your authorized Apple A/UX reseller or your Apple sales representative. You can also order by contacting

Apple Computer, Inc.
20525 Mariani Avenue
Cupertino, CA 95014
Attn: Customer Relations
(408) 252-2775

Problems and solutions for starting up

This section presents information regarding the starting up process described in Chapter 1.

Blinking question mark

You see a blinking question mark when the Macintosh cannot find a System Folder containing startup files. If no files are yet installed on your hard disk, this is the correct system response. For example, if you are installing A/UX to a new hard disk from either a CD-ROM, tape cartridge, or floppy disks you will see this blinking question mark when you start up the system.

Insert a floppy disk with System files on it, such as *Read Me* or *System Tools*.

If A/UX is factory-installed on your hard disk, however, this prompt indicates that the hard disk has not been properly connected. If you have A/UX installed on an internal hard disk, call your Apple representative for service. If you have A/UX installed on an external hard disk, check the hardware connections to ensure that they are tight.

Macintosh desktop without a MacPartition hard disk icon

If you received A/UX factory-installed on an internal or external hard disk, the desktop should show the MacPartition disk icon. If the MacPartition does not appear, your A/UX disk is not properly connected. Check the cables and cable terminators of the external hard disk to make sure that they are properly connected. Call your Apple representative for service.

Problems and solutions for starting up your system

If your system has not been properly configured, you may receive one of the following messages after starting up your system as described in Chapter 1.

No PMMU

If a dialog box with the message

```
No PMMU
Can NOT launch an A/UX kernel
```

appears on your screen, your system cannot start A/UX until the Macintosh II has a paged memory management unit (PMMU) in place of the address mapping unit (AMU). This must be installed by an authorized Apple dealer. Contact your authorized Apple dealer or representative for assistance.

After the PMMU is properly installed, start again at the beginning of Chapter 1, "Starting up the System."

Not enough memory

If a dialog box appears on your screen with the message

```
Not enough memory
```

the Macintosh does not have 4 MB of memory on the main logic board. Call your authorized Apple dealer or representative to install the required memory.

After the correct amount of memory is installed, start again at the beginning of Chapter 1, "Starting up the System."

Available memory

If you see the message

```
Available memory
```

and you see no further messages on your screen, check the connections on the keyboard to determine that they are tight. If the keyboard cable is loose, A/UX will not complete the startup process.

After the connections have been secured, resume where you stopped when this message appeared.

Program space too small

If a dialog box appears on your screen with the message

```
Stand Alone program space is too small
```

the RAM cache is too high for installing A/UX. If you previously used the Macintosh Operating System for running Macintosh applications, you probably changed the RAM cache in the Control Panel to a higher value to accommodate your Macintosh Operating System programs. Use the Macintosh Control Panel desk accessory to change the RAM cache so that there is at least 1 MB of free memory, which is adequate for running A/UX Startup and starting A/UX. Refer to the owner's guide that came with your computer for instructions on lowering the RAM cache.

Problems and solutions for the update process

This section presents information regarding the update process described in Chapter 2.

Not enough space

When updating, the System Checker may display this message:

```
*** ATTENTION: Not enough space.
*** You need at least nnnn blocks in your A/UX root
    partition
*** You have only nnnn blocks available on disk n
    Quitting ...
```

If you are doing the standard installation, you can ignore messages about insufficient space, because you will be initializing and partitioning to create sufficient hard disk space. If you are doing a nonstandard installation without initializing or partitioning, you can use `cpio` or `tar` to back up unnecessary files on floppy disks and then remove the files from the hard disk to free more space. See Appendix B, "Nonstandard Procedures," for additional information.

FS error, file system full

If the "file system full" message occurs during updating, repeat the installation procedure from the start. If this message occurs during a new installation, contact your dealer.

Problems and solutions for the initial phase of installation

This section lists errors you may encounter during the preparation and initial phase of installation as described in Chapter 4, and gives you instructions on how to correct them.

Finder doesn't appear after rebooting

If the blinking question mark appears after you install the critical root files on the hard disk and restart the computer, press the front of the programmer's switch to reset the computer.

If you see the MacPartition window or icon, open the window and launch A/UX Startup by double-clicking the icon or by selecting the icon and choosing Open from the File menu.

Cannot mount root

If you insert the *A/UX Floppy Root* disk into the wrong disk drive (on the left if you have two disk drives), the system displays a message like

```
panic: rootmount cannot mount root
```

The only recovery is to interrupt (by pressing the programmer's switch) or to turn off the computer by pressing the switch on the back then pressing the POWER ON key. When the disk is ejected, start again, using the floppy drive on the right. If you have only one floppy drive, contact your dealer.

Error checking hard disk

When the system checks the hard disk and you see an error message like

```
SCSI ID n is either not connected or does not contain a root
partition. Please verify the SCSI ID of your hard disk. Ensure that
the hard disk is attached
```

you need to check three things:

- If the disk is an external hard disk, make sure you switched it on at least 10 seconds before you switched on the computer.

- Check that you have given the correct SCSI ID number for the hard disk in step 10 of the section, "Launching the Installation Process," in Chapter 4.

  Turn off an external disk before turning it around to see the SCSI ID number in the SCSI ID number indicator on the back of the device.

- Check for correct cable connections. Before doing this, power down the whole system.

When you have corrected the condition that led to this message, you can restart from step 1 of the section, "Launching the Installation Process" in Chapter 4.

Could not make a file system

A new root file system needs to be created and mounted. If a file system could not be created, the system displays a message like this:

```
*** ATTENTION: Could not make a file system.
*** Please recheck all connections.
*** Be sure your disk has SCSI ID number n.
```

The installation procedure quits. Check the cables and verify the SCSI number. You can then restart the installation from step 1 of the section, "Launching the Installation Process."

Error mounting hard disk

If a new file system was created but the mount operation fails, the system displays a message like this:

```
*** ATTENTION: Error mounting hard disk.
*** Your disk may be improperly connected. Please recheck
*** all cables and be sure your hard disk has SCSI ID
*** number n.
```

The installation procedure quits. Check the cables and verify the SCSI ID number. You can then restart the installation from step 1 of the section, "Launching the Installation Process."

Floppy disk inserted into incorrect drive

If you attempt to use disk drive 1 (the drive on the left) rather than disk drive 0 (the drive on the right) during the installation process, the system displays the message

```
Do NOT insert floppies into drive 1. This will be your only
warning. If you have only one drive, quit now and see your dealer
immediately.
```

You can check this situation one time. If you have only one drive, that drive is not identified correctly to the system. See your dealer immediately.

Not enough room to install MacPartition

There should be enough room to install A/UX Startup, `read_disk`, `launch`, `esch` and the `bin` folder, along with a minimal System Folder. Check that you followed the instructions in the section "Preparing the Macintosh Partition" in Chapter 3.

If you are updating a previous release, you may have extra desk accessories, inits and CDEVS that don't fit in A/UX 2.0. Make a `bin` folder and place in this folder the `cpio` and `fsck` files, and the `svfs` and `ufs` folders. If you have decided not to run autorecovery, you can remove `esch`.

`read_disk` fails

If you see the message

```
read_disk couldn't exec cpio (Bad file number).
```

check that you installed the `bin` folder for the *A/UX Startup Utilities* disk, and check the `bin` folder for the `cpio` document.

There isn't enough room on the disk

If you install the printing tools, this message results when you attempt to drag the `bin` folder onto the MacPartition:

```
There isn't enough room on the disk to duplicate or copy the
selected items (additional 186,880 bytes needed)
```

Repeat the procedure in the section "Preparing the Macintosh Partition" in Chapter 3, being sure to click Customize instead of Install. You should only be installing the Utilities 1 and Utilities 2 disks during this procedure; there isn't enough room for the Printing Tools disk. (A/UX handles the printing, so no printing tools are necessary in the MacPartition.)

Problems and solutions for installation from tape

This section lists errors you may encounter during installation from tape as described in Chapter 4, and gives you instructions on how to correct them.

Tape device not recognized

During the installation from tape procedure, if you continue to see the message

```
Waiting for tape.
```

after inserting the tape cartridge, then the installation software cannot recognize your tape device.

Enter `q` to quit the installation process. Check the following:

- You switched on the tape device at least 10 seconds before you switched on the computer.
- You connected all the cables securely.
- You are using the correct SCSI ID number for the tape backup device.
- You booted appropriately from the latest copy of A/UX Startup on the correct hard disk.

After you correct any problems, restart the installation process beginning with step 1 of "Launching the Installation Process."

Problems and solutions for installation from floppy disks

This section lists errors you may encounter during installation from floppy disks as described in Chapter 4 and gives you instructions on how to correct them.

Floppy disk reading error

If the system or the installation procedures do not recognize the disk, one of these two messages appears:

```
ERROR: Cannot read floppy.  Please verify that this is an A/UX
Installation Disk.  If trouble persists, contact your dealer.
ERROR: Incorrect format.  Please verify that this is an A/UX
Installation Disk.  If trouble persists, contact your dealer.
```

The system ejects the floppy disk. Verify that the disk is labeled as one of the current installation disks. If it is not, insert the correct disk. If it is the correct disk, and you insert it again and still get the message, you need a replacement disk. See your authorized Apple dealer.

Error in installation

When the installation procedures could not copy valid information from a disk that appears to be a valid installation disk, the system displays the message

```
     *      *      *      *      *      *
            ATTENTION
Error in installation.  Please insert disk nn again. If problem
persists, press q to quit and contact your dealer.
```

If you insert the disk again and continue to get the message, you need a replacement disk. See your authorized Apple dealer.

Incorrect or bad floppy disk inserted

When you have inserted a disk out of sequence or have inserted a bad disk, the system ejects the floppy disk and displays this message

```
ATTENTION:  Insert disk number nn.  This is disk number nn.
ATTENTION:  Disk sequence number (nn) is incorrect.  Please verify
that this is an A/UX Installation Disk.  If trouble persists,
contact your dealer.
WARNING:  Total number of disks inconsistent.  Assuming nn disks.
```

The message might result from inserting an installation disk of a prior release or a damaged. Verify that the disk inserted is labeled as one of the current installation disks. If it is not, insert the correct disk. If it is the correct disk and you insert it again and still get the message, you need a replacement disk. See your authorized Apple dealer.

Appendix B **Nonstandard Procedures**

This appendix gives background information and instructions for performing these types of nonstandard A/UX installations:

- Partitioning for A/UX plus 40MB Macintosh
- Updating a previous A/UX release to A/UX 2.0 without full repartitioning
- Leaving out manual pages and games

Other types of nonstandard installations relate to particular hardware configurations and are covered in the book *Setting Up Accounts and Peripherals for A/UX.*

- Creating a separate /usr partition
- Customizing partitions

You must have either the A/UX CD-ROM Product, A/UX Tape Product or A/UX Floppy Product to perform a nonstandard installation. When you complete the installation procedures in this appendix, you need to prepare to run A/UX as described in Chapter 5, "Running A/UX 2.0 for the First Time."

If you are updating your current system to A/UX 2.0, read Chapter 2, "Updating A/UX 1.x to A/UX 2.0" before performing a nonstandard installation.

You should choose to do a nonstandard installation only if you are an experienced A/UX user, have good reasons, and know what the ramifications are.

Partitioning for A/UX plus 40 MB Macintosh

Because most Macintosh applications run on A/UX exactly the same way as they do on the Macintosh Operating System, the standard A/UX partitioning suits most users. However, if you intend to run one of few Macintosh applications that don't work under A/UX, or if you prefer to spend significant amounts of time running exclusively under the Macintosh Operating System, you may choose to create a larger partition for the Macintosh Operating System. To do this, select the partitioning option listed as "A/UX Sys, 40Mb Macintosh, Free A/UX." This option appears in the Partition dialog box as described in the section "Initializing and Partitioning the Hard Disk," in Chapter 3. The rest of the installation procedure is exactly the same as for standard installation.

When choosing this partitioning option, keep in mind that pure UNIX applications can only access the A/UX partitions, so you may want to keep the Macintosh partition at a minimum in order to get maximum space for UNIX applications and files.

Updating without full repartitioning

We strongly recommend that you reinitialize and repartition your hard disk as described the Chapter 3. By initializing and partitioning with the latest version of HD SC Setup, you gain the full advantages of the A/UX 2.0 software, including the latest file systems.

If you're updating your current version of A/UX to A/UX 2.0 and decide not to repartition and reinitialize, you need to be familiar with the procedures for creating custom hard disk partitions, as described in *Setting Up Accounts and Peripherals for A/UX*, and in the *Apple Hard Disk SC Owner's Guide*. Follow these guidelines to customize your 1.0 or higher hard disk partitions:

1. **Back up any personal files from the SASH partition, including the kermit folder, if desired.**

2. **Remove the existing Swap, SASH, and Eschatology 2 partitions.**

3. **Create a new 17048K (17 MB) Swap partition at the bottom of the Root&Usr partition.**

4. **Create a new 2048K (2 MB) MacPartition at the bottom of the Root&Usr partition.**

5. **Remove the kermit folder.**

The remainder of the A/UX installation is the same as the standard installation.

Leaving out manual pages and games

You can decide to leave out certain optional files when installing A/UX. The two groups of files are the online reference manual pages (stored in the directory /usr/catman), which provide online help for the A/UX system, and a collection of games (in /usr/games).

If you choose to install these files, keep in mind that you can easily remove them from the system later if you decide that you don't need them. If you choose to omit installing these files and later decide that you need files you did not install, you can bring them in, but at the cost of additional work, by using the procedures described in Appendix C, "Reusing the Installation Media."

If you are updating to A/UX 2.0 and the syschk program reported that you did not have sufficient space to install the optional files, you can choose to omit them.

During the second phase of installation you are given the choice of leaving out /usr/catman and /usr/games. The rest of the installation steps are exactly the same as the standard installation.

The online reference manual files

Online manual pages (also referred to as "man pages") are considered part of A/UX and there are only a couple of reasons you might leave these out. Here are two possibilities:

■ You are building a turnkey system based on A/UX, in which the user always interacts with the front end and never gets into the A/UX system. Therefore, the user does not and will not need online help for A/UX commands.

■ You are installing a system that will tie into a network that has a "man pages" file server. These files are a little over 4 MB in the current release.

The games files

The complete games require just under 1 MB. Remember that you can install them all, and then remove the ones you do not care to have. The games are described in volume 2 of *A/UX Command Reference.*

Appendix C **Reusing the Installation Media**

This appendix describes how to restore lost or damaged files to your hard disk from your installation media (the A/UX CD-ROM, Tape, or Floppy Product). You can restore only the installed system software from this media; you must keep separate backups of your own work.

Overview

Two sets of procedures describe how to copy one or more files from the A/UX CD-ROM, Tape or Floppy Product. You can use these procedures to replace a damaged or lost file by copying the original file from the installation media.

Another procedure is used in special circumstances, such as when the very file you need to restore is required in the restore procedure (such as `cpio`). Certain of these files may be restored from the floppy disk titled *A/UX Floppy Root,* by using procedures described in "Restoring Essential Files."

These procedures require some experience with the A/UX system. If you don't have this experience, see "Reference Information" at the end of this appendix.

Copying a file from CD-ROM

In order to copy a file from the A/UX Installation CD-ROM disc, follow this procedure:

1. **Mount the CD as read-only.**

   For example, to mount the CD on `/mnt`:

   ```
   mount -r /dev/dsk/cxd0s0 /mnt
   ```

   In the above command example, x is the SCSI ID of the CD-ROM drive.

2. **Use `cpio` or `tar` to retrieve the desired files and directories from the CD.**

   For example, to copy the `/etc.passwd` file:

   ```
   cp /mnt/etc/passwd /etc/passwd
   ```

   This series of commands copies the entire `/bin` directory:

   ```
   cd /mnt/bin
   find . | cpio -pdmu . /bin
   ```

3. **Unmount the disk.**

   ```
   /umount /mnt
   ```

Copying a file from cartridge tape

The installation files are stored on the cartridge tape in three major categories: `root` header and `root` files, `usr` header and `usr` files, and `opt` header and optional files. Optional files include manual pages and games. Figure C-1 shows the order.

■ **Figure C-1** Tape cartridge file layout
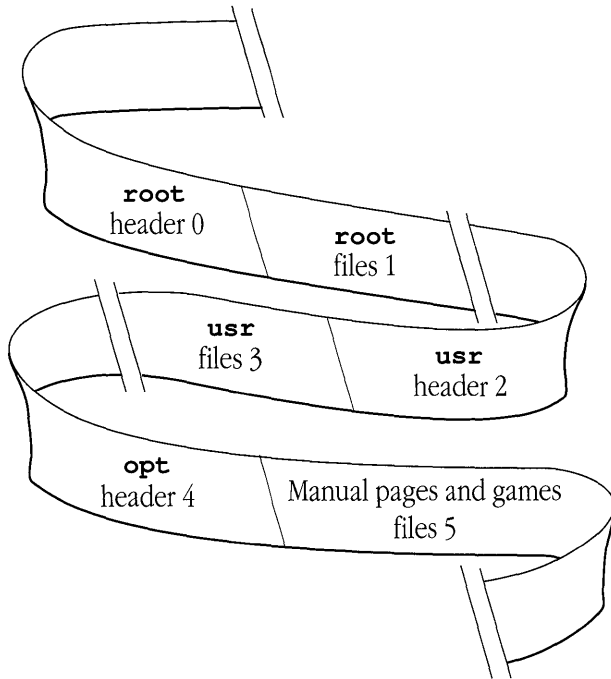
You can ignore the header files. They are quite short and contain (in uncompressed form) identification and positioning information used by the installation procedures. The file groups are quite large, are in compressed form, and contain the entire A/UX system as installed (except for the few files on the *A/UX Floppy Root* disk).

1. **Rewind the tape cartridge.**

   The tape cartridge must be at the beginning of the tape to begin the process of finding the desired file location. To rewind the cartridge, use the `mt` command:

   ```
   mt -f /dev/rmt/tcxn rew
   ```

2. **Position the tape to the desired file location on the tape.**

   In terms of displacement from the start of the tape, the header files are at 0, 2, and 4; the file groups are displaced at 1, 3, and 5. These commands, which assume that the tape is at the beginning (or has been rewound), skip to the desired file location. The x in `tcx` stands for the SCSI ID number of your tape drive.

   ```
   mt -f /dev/rmt/tcxn fsf 1   root files
   mt -f /dev/rmt/tcxn fsf 3   usr files
   mt -f /dev/rmt/tcxn fsf 5   optional files
   ```

   The `n` following `tcx` specifies a no-rewind tape device, which ensures that after the skip command (`fsf` = forward space *count* files) the tape will remain at the correct location.

3. **Retrieve the desired file from the tape.**

   When the tape has been properly positioned, extract the desired file(s) by using the command

   ```
   dd if=/dev/rmt/tcx bs=8k | zcat | cpio\ -idmu filename[s]
   ```

   (This is one command line, broken with the backslash (\) only to fit when printed here.) The input file (`if`) is the tape device represented by the device file, `/dev/rmt/tcx`. Using this device file causes the tape to rewind after the command completes. Note that you could use the nonrewindable tape device (`/dev/rmt/tcxn`) in this command. The output file is standard output.

   The argument `bs=8k` specifies that a block size of 8K will be used when reading and writing data. The output of the `dd` command is sent through `zcat`, which will uncompress it "on the fly."

The uncompressed data is sent to `cpio`, which reads it (`-i` flag, for input) and places the named file or files in the working directory. The `cpio` command creates any necessary directories (`d` flag), preserves the file modification date (`m` flag), and copies the file unconditionally (`u` flag). (Normally `cpio` will not copy a file older than an existing file with the same pathname.)

`cpio` extracts the named files. See `cpio`(1) for information on using wildcard file designations to copy a group of files. Note that a filename should be specified without a leading slash (`/`); installation files are not archived with a full pathname.

If you are going to extract a file or files from two separate file groups, such as the root files and the optional files, you can use the given procedure twice; that is, do two sets of position and extract commands (the `mt ... fsf` command, followed by the `dd` command), with an automatic rewind occurring after each `dd` command. You can avoid the automatic rewind by using the no-rewind form of the `dd` command. For instance, using SCSI ID number 1 (`tc1`):

```
dd if=/dev/rmt/tc1n
```

The tape is now at the end of the file group specified by the original `mt ... fsf` command. Position to the next desired group of files with another `mt ... fsf` command (or even an `mt ... bsf` command, to back space files). The following example below extracts a file or files from the root file group and then from the optional file group.

First, the root files are extracted:

```
mt -f /dev/rmt/tc1n fsf 1
dd if=/dev/rmt/tc1n bs=8k | zcat | cpio\ -idmu etc/passwd
```

At this point the tape is positioned at the `usr` header. Now skip to and extract from the optional files:

```
mt -f /dev/rmt/tc1n fsf 3
dd if=/dev/rmt/tc1 bs=8k | zcat | cpio -idmu\ usr/games/rain
```

The `mt ... fsf 3` command skips the `usr` header, the `usr` files, and the `opt` header. The `dd` command extracts the desired file. The tape then rewinds because `n` was not specified.

Copying a file from a floppy disk

The installation files are stored, in compressed format, on floppy disks labeled *A/UX Installation Disk 1* through *A/UX Installation Disk 26*. Files are complete on a disk; that is, no file is split between installation disks. The last floppy disk in the set contains the index (in ordinary `cpio` format, not compressed) and is labeled *A/UX Floppy Disk Index*; its title (as seen by the system) is `Index`. The index lists all files in the A/UX Floppy Product and the floppy disk on which the file can be found.

Follow these steps to read the index from *A/UX Floppy Disk Index* into an appropriate directory on your hard disk:

1. **Change to the directory into which you will copy the index.**

   Change to an appropriate directory with the command

   `cd dirname`

2. **Insert *A/UX Floppy Disk Index* to floppy drive 0.**

   Insert the floppy disk into drive 0.

3. **Copy the index from *A/UX Floppy Disk Index* into your directory.**

   Enter

   `cpio -iv < /dev/floppy0`

   The `-i` flag tells `cpio` to read (input) the index and the `v` flag causes the index to appear on the screen.

4. **Find the desired file from the index.**

   Consult the index to find the desired file or files. For example, to locate `/usr/bin/calendar`, enter

   `grep 'usr/bin/calendar' Index`

   Note that the installation files are not archived by full pathnames. Do not use the leading slash (`/`). (Do not use `'/usr/bin/calendar'`.)

   In response to the `grep` command, you should see something like

   `08    usr/bin/calendar`

The number 08 indicates that usr/bin/calendar is found on *A/UX Installation Disk 8* in this example.

5. **Eject the floppy disk.**

Eject the *A/UX Floppy Disk Index* floppy disk.

6. **Copy the desired file from the appropriate floppy disk.**

Insert the correct floppy disk into the drive (in this example, *A/UX Installation Disk 8*).

To copy the desired file into your working directory, enter

```
dd if=/dev/floppy0 skip=1 | zcat | cpio\ -idmu usr/bin/calendar
```

The input file (if) is the floppy disk, /dev/floppy0. The output file is standard output.

The argument skip=1 indicates to skip the first block of data (header information) before copying to output.

The output of the dd command is sent through zcat, which will uncompress it "on the fly." The uncompressed data is sent to cpio, which reads it (-i flag, for input) and places the named file or files in the working directory. The cpio command creates any necessary directories (d flag), preserves the file modification date (m flag), and copies the file unconditionally (u flag). (Normally cpio will not copy a file older than an existing file with the same pathname.)

The file usr/bin/calendar is extracted from the floppy disk. See cpio(1) for information on using wildcard file designations to copy a group of files.

Restoring essential files

A small group of files essential to the installation process are not stored on the installation media (the compact disc, cartridge tape or the floppy disks labeled with the word *Installation*). They reside on the floppy disk labeled *A/UX Floppy Root.* The files are

```
bin/rsh
bin/sh
dev/*
etc/init
etc/sysinitrc
```

Note that some of these files are so important that you cannot boot the A/UX system without them (for example, `etc/init` and `/bin/sh`). You can use autorecovery to restore `sh`, `init` and `bin` device files. The file `/bin/rsh` is a special case. This file is the same as `/bin/sh`, so to restore `/bin/rsh`, use the link command:

```
ln /bin/sh /bin/rsh
```

Certain files are special cases requiring special procedures. These files are

```
dev/*
etc/sysinitrc
nextunix
```

The standard A/UX device files (all the files in `/dev`) are stored in compressed form as a `cpio` archive. Note that this archive uses the `-c` option to `cpio`. To restore the file for a given *device-name,* mount the floppy root disk and then enter the commands

```
cd /dev
zcat /mnt/devices.cpio.Z | cpio -icumd device-name
```

You may first wish to use `cpio -ict` to view the "Table of Contents."

The system initialization script, `/etc/sysinitrc`, is stored (for purposes of installation) under the name `etcsysinitrc`. To retrieve the installation version of it, enter the command

```
cd /etc
mv sysinitrc sysinitrc.old
zcat /mnt/etcsysinitrc.z | cpio -imu
```

It is not necessary to use *A/UX Floppy Root* to recreate `/nextunix`. Bring your system up under A/UX Startup and enter the command

```
echo '/unix' > /nextunix
```

Reference information

If you do not have some experience with using the A/UX system, you should work through *A/UX Essentials* before using these procedures. This material will help you become familiar with the cd, ls, and pwd commands, which are useful for navigating the directory structure.

Read (at least) some of the introductory material in *A/UX Essentials*. This material describes the major directories in your A/UX system and will help you locate the directory into which you will copy the desired file or files.

The commands used in these procedures are documented in Section 1 of the two-volume set *A/UX Command Reference*. See especially

cpio(1)
dd(1)
grep(1)
mt(1)
zcat(1)

The "see also" references and the permuted index can be used to find additional information on each command and associated functions.

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