Apple
Workgroup
Server 95

Reference Guide

July 1993

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Introduction to the Apple Workgroup Server 95

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This guide helps you become more familiar with the features, configurations, and theory of operation of the Apple® Workgroup Server (AWS) 95. It assists you with several service tasks, such as hardware upgrades and running diagnostics, and includes some troubleshooting tips.

This guide *does not* cover

- Software installation or in-depth software troubleshooting
- File/print and database server setup, configuration, and administration

For information on these topics, refer to the manuals listed in the next section.

What You Need To Know

To upgrade and repair an Apple Workgroup Server 95, you should be an Apple-certified Service Technician and should have completed

- Macintosh® Service & Tools Course (or Macintosh Service Course)
- Apple LAN Primer (or Apple LAN Literacy)
- AppleTalk Technologies and Products Course (or Networking Service Course)

To provide A/UX® support for the Apple Workgroup Server 95, you should have a background in UNIX and a knowledge of the following network technologies and products:

- AppleShare®, AppleTalk®, LocalTalk®, and EtherTalk®
- Ethernet, TCP/IP, and Internet networks

To become more familiar with the Apple Workgroup Server 95, read the manuals that accompany the system:

- *Basic Skills*
- *Setting Up and Administering Your Server*
- *Server Administration with A/UX 3.0.1*
- *AppleShare Pro Administrator's Guide*
- *Retrospect® Remote® User's Guide*
- *Retrospect User's Guide*
- *Retrospect A/UX*

Refer to the Service Price Pages for a listing of available product and A/UX manuals and documentation. Refer to the Apple Service/Training icon on AppleLink® for A/UX and networking course descriptions and schedules.

Apple recommends that an Apple Authorized Service Provider install the processor direct slot card and the 4 mm tape drive in order to guarantee the continued coverage of the hardware under the Apple Limited Warranty. Unless other arrangements have been made, Service Providers should install the hardware and run the *MacTest*™ *Pro* diagnostic to confirm that the hardware is operational. Apple suggests that the technician ensure a successful launch of the Installer program for the customer. The customer/network administrator should then install the Apple Workgroup Server 95 software according to their specific applications. Software installation takes approximately 45 to 60 minutes.

On-Site Service Tools and Parts

To upgrade and repair an Apple Workgroup Server 95, you need service tools and parts from the following lists:

Tools
- ESD-safe workstation
- Take-apart tools
- *Service Guide for Macintosh Computers, Vol. II* (March 1993)
- *MacTest Pro* diagnostic disk (Workgroup Server specific tests reside on the May 1993 *MacTest Pro CPU and Peripherals Nonbootable Disk v5.0*
- *Macintosh CPU Tests Vol 2 v4.0* (March 15, 1993)
- *SONY CD-ROM Test Disc Type 2.0* (provided in the Apple diagnostic starter kit subscription, Apple P/N 678-5064)
- CD-ROM caddy
- Blank DDS-DC tape
- External CD-ROM drive
- System software:
  - *Installation Boot Disk for Apple Workgroup Server 95*
  - *Apple Workgroup Server 95 Software Installer for File/Print Environment* CD-ROM
  - *Apple Workgroup Server 95 Software Installer for Database Environment* CD-ROM

Parts (refer to *Service Source* for the most up-to-date parts list)
Side Cover Assembly
    076-0436 • Cover, Side
    815-6262 • Latch, Side Cover
Main Housing Assembly
    076-0434 • Assembly, Main Housing
    076-0432 • Vent, Fan Exhaust
    076-0431 • Bezel, Blank
    922-0854 • Bezel, Tape Drive

076-0437 • Bezel, Floppy
815-6251 • Light Pipe, Power On
076-0435 • Misc. Screw Kit (P/S, Fan, Light Pipe, Speaker, FD Spacer)
815-6249 • Actuator, Reset
815-6250 • Actuator, Interrupt
705-0175 • Keyswitch with two keys
Speaker Assembly
630-6011 • Assembly, Speaker
076-0433 • Bezel, Speaker
076-0438 • Bezel, Speaker, Quadra 950
922-0856 • Bezel, Speaker, Workgroup Server 95
076-0435 • Misc. Screw Kit (P/S, Fan, Light Pipe, Speaker, FD Spacer)
Power Supply & Fan Assembly
661-0664 • Power Supply, Quadra 900/950 & WGS 95
720-0518 • Fan, Power Supply
076-0435 • Misc. Screw Kit (P/S, Fan, Light Pipe, Speaker, FD Spacer)
462-4100 • Screw, M 3.5 x 6 x .8 PNCR Rec
Microphone Assembly
699-5073 • Assembly, Microphone, Quadra 900/950
Hard Drive & Drive Shelf Assembly
661-0780 • HDA, 1 GB, 3.5" SCSI
661-1647 • HDA, 160 MB, 3.5" SCSI
661-1641 • HDA, 160 MB, 3.5" SCSI
661-1649 • HDA, 160 MB, 3.5" SCSI
661-1637 • HDA, 230 MB, 3.5" SCSI
661-1636 • HDA, 400 MB, 3.5" SCSI
661-0781 • HDA, 500 MB, 3.5" SCSI
805-5106 • Carrier, Hard Drive 3.5/5.25/DDS-DC Drive
444-6104 • Screw, 6-32x.250
705-0045 • Switch, SCSI Select
590-0518 • Cable, SCSI Select
590-0790 • Cable, SCSI Select (400 MB HDA)
590-0528 • Cable, SCSI with terminator
590-0517 • Cable, HDA Power
630-6097 • Assembly, Drive Shelf (includes velcro cable straps)
462-4100 • Screw, M 3.5 x 6 x .8 PNCR Rec
Floppy Drive Assembly
661-0474 • Drive, Apple SuperDrive
805-5050 • Drive Carrier, 800K/Apple SuperDrive
844-0018 • Screw, Apple SuperDrive
810-5113 • Spacer, Apple SuperDrive
462-4100 • Screw, M 3.5 x 6 x .8 PNCR Rec
590-0515 • Cable, Floppy

Symptom/Cure Charts

Cannot double-click to open a disk, application, or server
1. Remove extra system files on hard drive.
2. Clear parameter RAM. Hold down (Command-Option-P-R) keys during startup but before "Welcome to Macintosh" message appears.
3. If mouse was connected to keyboard, connect mouse to rear ADB port. If mouse now works, replace keyboard. If mouse doesn't work in any ADB port, replace mouse.
4. Replace logic board. Move customer's DRAM SIMMs to new logic board.

Known-good serial printer does not print
1. Make sure system software is 7.0.1 or later.
2. Make sure Chooser settings are correct.
3. Replace printer interface cables.
4. Replace logic board. Move customer's DRAM SIMMs to new logic board.

Known-good printer on AppleTalk network doesn't print
1. Make sure system software is 7.0.1 or later.
2. Make sure Chooser settings are correct.
3. Refer to the Network and Communications manual in *Service Source*.

Miscellaneous Problems   **Solutions**

No sound from speaker
1. Make sure speaker volume setting in the Sound control panel is one or above.
2. Replace speaker.
3. Replace logic board. Move customer's DRAM SIMMs to new logic board.

Apple Workgroup Server 95 Setup

The setup process includes installing system software from the CD-ROM, preparing the hard drives, and configuring the network connections. For detailed instructions, refer to the procedures in the *Setting Up and Administering Your Server* manual.

To connect a printer to a network, refer to *Setting Up and Administering Your Server*. If the server provides AppleShare services, spooling is available with AppleShare Pro software. Refer to the *AppleShare Pro Administrator's Guide*. To connect a printer to a serial port on the computer, see *Server Administration with A/UX 3.0.1*.

After the hardware is set up, start up the system as follows:

1. Turn on the monitor only if it hasn't been on before.

   The monitor only needs to be turned on once, after which it automatically turns on and off when you start up or shut down the system.

2. Turn on all external devices. Turn the key on the computer to the On position (straight up).

   The icons above the keyswitch mean the following: the open circle is Off, the straight line is On, and the padlock symbol is the Secure position. The secure position starts up the server in remote access mode and locks the keyboard and floppy drive for increased security.

3. Press the Power On key (the key with a left-facing triangle icon) on the keyboard, usually located in the upper-right or upper-center area of the keyboard.

The Apple Workgroup Server 95, as shown in Figure 1, provides file, print, and database server functionality for large work groups. The system is based on the Macintosh Quadra™ 950. It has a 33-megahertz Motorola 68040 microprocessor; has high performance I/O (input/output) subsystems; and is the most powerful and expandable member of Apple's server family.
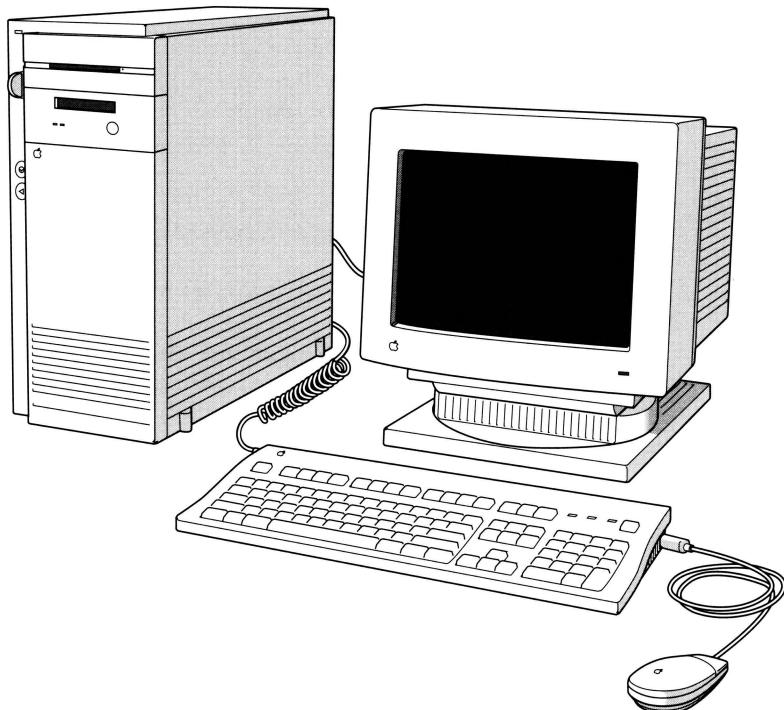
Figure 1 The Apple Workgroup Server 95

The Apple Workgroup Server 95 consists of a Macintosh Quadra 950 with an I/O card in the processor direct slot (PDS) that accelerates I/O processing and adds

• Two SCSI channels (small computer systems interface) with direct memory access (DMA)
• Large secondary-level cache memory

The Apple Workgroup Server 95 comes preloaded with System 7™ and a special version of the A/UX operating system, version 3.0.1. A/UX 3.0.1 is the native operating system and is an I/O-optimized version of Apple's UNIX® implementation. The interface is virtually identical to that of a Macintosh

running System 7. By using A/UX—a time-tested, extremely robust, and stable operating system—and by supporting asynchronous I/O, the server increases disk performance and speed over a network.

The Apple Workgroup Server 95 also benefits from enhancements to other software available with the different server configurations. Retrospect Remote backup software from Dantz Development Corporation makes it easy to back up server data. AppleShare Pro, an AppleShare product designed for servers, supports asynchronous I/O and faster AppleTalk and file system performance. Finally, the Oracle 7 database program from Oracle Corporation, also optimizes the performance enhancements of the AWS 95.

The AWS 95 also takes advantage of circuitry on the logic board to support parity checking for dynamic random access memory (DRAM). Parity checking allows the operating system to detect possible RAM hardware errors and to ensure that data integrity is maintained between the CPU and system memory.

The Apple Workgroup Server 95 comes with a built-in floppy drive and supports up to three additional internal devices, including a tape drive or CD-ROM drive and a 5.25 or 3.5-inch Apple SCSI hard drive. The four SCSI channels (two SCSI DMA channels provided on the PDS card and two on the main logic board) allow a theoretical limit of 20 SCSI devices to be connected when running A/UX. The system supports all Apple monochrome and color monitors.

PDS Card

The PDS card provides from 128K to 512K of fast secondary cache memory to reduce the amount of time the processor spends getting information from system memory (random access memory, or RAM). The card accelerates disk I/O using new high-performance SCSI controllers with full support for SCSI direct memory access (DMA). DMA supports asynchronous I/O by off-loading memory control from the main processor to a special DMA controller that allows the operating system to move data to and from the disk subsystem without constant attention from the main central processing unit (CPU).

SCSI DMA and SCSI Busses

The AWS 95 PDS card has two NCR 53C96A SCSI controller chips running at 33 MHz along with supporting circuitry for SCSI DMA. DMA allows data transfer from the SCSI bus to main memory by the SCSI controllers without constant attention from the CPU. The main CPU continues performing other tasks in parallel. Server performance is enhanced by the resulting increase in disk I/O throughput.

The AWS 95 has four separate SCSI busses, two on the main logic board and two on the PDS card. The four SCSI busses are numbered as follows:

Bus 1—Main logic board internal
Bus 2—Main logic board external
Bus 3—PDS card internal
Bus 4—PDS card external

The Macintosh OS sees all four busses as a single bus. A/UX 3.0.1 sees all busses because its SCSI disk drivers are written for separate SCSI busses. I/O acceleration is only provided to Busses 3 and 4 where SCSI devices attach to the PDS card, not to the main logic board Busses 1 and 2. Therefore, it is recommended that devices only be connected to Busses 3 and 4.

Memory Cache

The high-speed static RAM (SRAM) L2 (level 2) cache supports server applications that read the same data from main memory or disk for different users. The SRAM cache decreases data access time by getting data from the RAM cache. With a large secondary cache ranging from between 128K to 512K, frequently used data resides in high-speed SRAM instead of DRAM or main memory or the much slower disk drive. The PDS card L2 cache caches both program instructions and data.

The 8K on-chip cache in the 68040 on the main logic board is considered level 1 (L1) or primary cache. The larger L2 cache increases memory subsystem performance, is direct-mapped cache, and is most effective for reads. Read performance is significantly enhanced because the processor doesn't go all the way to main memory for instructions or data that are in the cache. All cache management is accomplished through hardware, so applications do not need to be rewritten to be cache-aware.

Parity Checking

Parity checking enables the operating system to detect errors in the RAM hardware and to flag them immediately to prevent data loss between the CPU and the system memory. By default, parity checking is turned off in the AWS 95 software. A check box within the A/UX Startup application allows the administrator to turn parity checking on or off. Parity checking can slightly slow overall server performance. AWS 95 systems are shipped from Apple with 9-bit parity DRAM installed. Parity checking does not work with systems that have non-parity DRAM.

Specifications

For detailed system specifications, see the specifications in *Setting Up and Administering Your Server*. The general Apple Workgroup Server 95 technical specifications are as follows:

Power/Speed
- MC68040 microprocessor, 32-bit architecture, 33 MHz clock speed
- Paged Memory Management Unit (PMMU), Floating Point Unit (FPU), and 8K-cache architecture

Memory
- 16 MB, 32 MB, or 48 MB parity RAM standard, expandable to 256 MB
- 128K second-level memory cache on PDS card, expandable to 512K
- 1 MB ROM (two 150 ns, 256K by 16-bit chips)
- 256 bytes parameter memory (PRAM)
- 1 MB VRAM, expandable to 2 MB
- ASIC clock chip with PRAM and DFAC support and lithium battery

Operating System and Software
- A/UX, Apple's implementation of the UNIX operating system with Macintosh System 7 features and interface

Mass Storage
- Built-in Apple SuperDrive™ 1.4 MB floppy drive
- Choice of one or two Apple SCSI hard drives (230 MB, 500 MB, or 1 GB)
- Choice of one (or none) of the following removeable mass storage devices
    - 2 GB Digital Data Storage-Data Compression drive for 4 mm tape backup. DDS tapes must use the media recognition system (MRS) standard.
    - AppleCD 300i (internal) CD-ROM drive
- Support for additional non-Apple drives

Expansion Interfaces
- One 68040 processor-direct slot (PDS); 140-pin connector
- One Apple Desktop Bus™ (ADB) port
- Two serial (RS-232/RS-422) ports
- Four SCSI busses (two internal and two external)
- Video port (RGB and monochrome monitor support)
- Up to four internal storage devices, 20 SCSI devices total
- Five internal NuBus expansion slots (one used by PDS card)
- Sound-input port for monaural sound input
- Dual mono line input ports
- AAUI Ethernet connector

Video Display
- Built-in support for all Apple monitors, including
  - Macintosh 12-inch RGB Display
  - Macintosh 12-inch Monochrome Display
  - Apple Color High-Resolution RGB Monitor
  - Macintosh Portrait Display
  - Macintosh 16-inch Color Display
  - Macintosh Two-Page Monochrome Monitor
  - Macintosh 21-inch Color Display
- Support for other non-Apple monitors, including some VGA, SVGA, NTSC, and PAL monitors

Configurations

The Apple Workgroup Server 95 ships in the configurations listed in the chart below.

AWS 95 Configurations	RAM	Floppy Drive	Hard Disk(s)	Cache	Backup Device	Software
16/SD/230/128: File/Print Platform	16 MB	SuperDrive	230 MB	128K		A/UX 3.0.1, Retrospect Remote
16/SD/500/256/ DDS-DC: File/Print Platform w/DDS	16 MB	SuperDrive	500 MB	256K	DDS tape drive	A/UX 3.0.1, Retrospect Remote
32/SD/1000/512/ DDS-DC/ AppleShare Pro: File/Print Server	32 MB	SuperDrive	1000 MB	512K	DDS tape drive	A/UX 3.0.1, AppleShare Pro, Retrospect Remote
32/SD/230/500/ 256/DDS-DC: Database Server	32 MB	SuperDrive	230/500 MB drives	256K	DDS tape drive	A/UX 3.0.1, Retrospect Remote
48/SD/230/1000/ 512/DDS-DC: Database Server	48 MB	SuperDrive	230/1000 MB drives	512K	DDS tape drive	A/UX 3.0.1, Retrospect Remote

Note: The Apple Workgroup Server 95 does not support a configuration with an internal tape drive and internal CD-ROM drive.

The Apple Workgroup Server 95 uses the A/UX 3.0.1 operating system. A/UX is a synthesis of the UNIX operating system and the Macintosh Finder. With A/UX, you use the UNIX operating system through the Macintosh user interface. You use the Macintosh icons and mouse operations to manipulate UNIX commands and utilities, and to manipulate files and folders whether they are stored in a UNIX file system or in a Macintosh file system.

When you turn on the server, the Macintosh Operating System (OS) starts up the computer and starts the A/UX Startup program (a Macintosh program), which loads and launches the A/UX 3.0.1 operating system. You'll see a "Welcome to Macintosh" screen, followed by the A/UX copyright screen, and then a "Welcome to the Apple Workgroup Server 95" alert box, which contains a Cancel button. The A/UX Startup program checks the condition of the file systems each time A/UX starts and fixes problems identified during the check. The check lasts several minutes and the screen might flicker or even become blank. The Cancel button is replaced by a Messages button when A/UX Startup passes control of the system to A/UX 3.0.1.

Startup may take several minutes, depending on the system configuration. When the startup process is complete, you are automatically logged into the root account (the user with unlimited system privileges) and placed in the Finder environment with A/UX 3.0.1 running. You'll see the Finder desktop with two hard disk icons in the upper-right corner, as shown in Figure 2.

Figure 2 The A/UX 3.0.1 Desktop

Note: If an Apple Workgroup Server is configured to present the Log In dialog box each time the system starts up, you must obtain the login name and password from the system administrator.

One hard disk icon is labeled with a slash (/) character, and the other is named MacPartition. These are the two partitions of the startup disk. The / icon represents the root directory of the UNIX file. The MacPartition contains the Macintosh files needed to start up the computer.

Hard disks can be divided into sections called partitions that act like separate hard disks. You can create Macintosh partitions (called volumes), UNIX partitions (preferred for use with the server), or database partitions (for database storage only). The desktop displays one hard disk icon for the contents of all UNIX partitions, and one icon for each Macintosh volume connected to the system. Each UNIX partition that is added to the system appears as a folder on the root directory, not as a separate icon on the desktop. No icons appear on the desktop for a database partition, which can only be accessed from within a database application.

MacPartition contains a Macintosh System Folder plus the files needed to start up the computer and A/UX. Figure 3 shows the contents of the MacPartition.
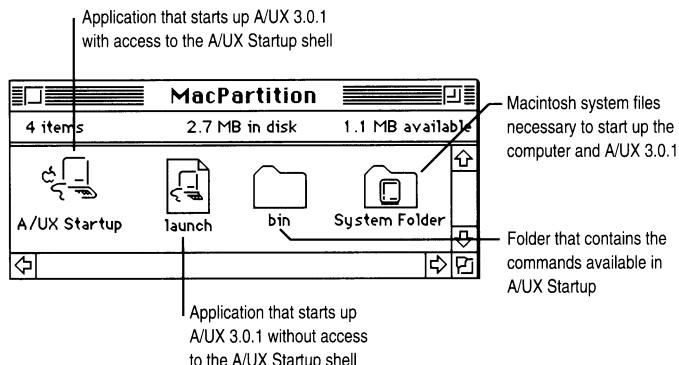
Figure 3 The Contents of MacPartition

The root directory contains all the system files and folders, even those residing on separate hard disks or CD-ROM drives that are formatted as UNIX partitions. Figure 4 shows four folders in the root directory: a System Folder alias, Applications, Shared Data, and Documentation. If AppleShare Pro is installed on the server, an AppleShare Workstation folder also appears.

System Folder alias where you add
fonts and extensions to the system
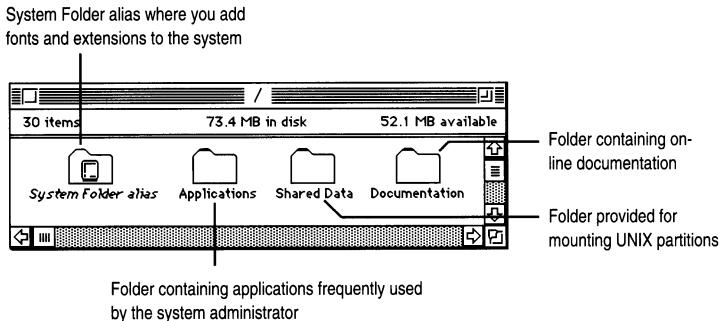
Figure 4 Four Folders in the Root Directory

While the standard Macintosh environment has only one System Folder, the more complex environment of A/UX 3.0.1 uses multiple Macintosh System Folders, which the operating system accesses at different times. The System Folder in the MacPartition controls the system during startup. The System Folder in the root directory becomes active as soon as A/UX 3.0.1 starts up and maintains the desktops while A/UX runs.

The System Folder alias makes the System Folder available without having to open other folders, so extensions or fonts can be added to the system by placing them in the System Folder alias at the top of the root directory.

To see the entire contents of the root directory as shown in Figure 5, click the zoom box in the upper-right corner of window. The icons you see provide access to UNIX capabilities from the Finder.

| 30 items | 75.2 MB in disk | 50.3 MB available |

System Folder alias   Applications   Shared Data   Documentation

●aux_prefs   ●cshrc   ●kshrc   ●login   ●logout   ●mac

●mailrc   ●profile   FILES   mac   bin   dev

etc   lib   lost+found   mnt   newunix   nextunix

root   sa   screenshots   shlib   tmp   unix

users   usr

A "dot" file that contains preferences, startup settings, or shell data

List of all system files

The UNIX kernel that schedules and performs all system tasks

An A/UX file that contains binary data (cannot be edited)

Figure 5 Contents of the Root Directory

The folders and files contain data and commands available to the system administrator and to the operating system. You do not need these commands to run the server.

Warning: Do not rename, move, or delete any contents of the root directory. The operating system and certain utilities depend on locating specific file names in specific locations.

The following upgrade kits and accessories are available from Apple for upgrading Workgroup Server 95 memory and for upgrading a Quadra 900 or 950 to a Workgroup Server 95. See the corresponding upgrade procedures sections later in this chapter.

Apple Workgroup Server 95 PDS Card Upgrade Kit
(Order No. M6940Z/A)
This kit upgrades a Macintosh Quadra 900 or 950 to an Apple Workgroup Server 95 and contains:
- Processor direct slot (PDS) card for the Macintosh Quadra 900 or 950 (128K level 2 cache SRAM on-board)
- System software installer CD-ROM and Retrospect Remote backup software
- Complete documentation
- Limited warranty statement
- CPU labels

Apple Workgroup Server 95 PDS Card/DDS-DC Drive Upgrade Kit
(Order No. M6945Z/A)
This kit upgrades a Macintosh Quadra 900 or 950 to an Apple Workgroup Server 95 and contains:
- Internal digital data storage-data compression (DDS-DC) 4 mm tape backup drive
- All items included in the Apple Workgroup Server PDS Card Upgrade Kit above

Blank DDS Tape 5 Pack
(Order No. M2092Z/A)
This pack contains 5 blank DDS/MRS tapes for use with the DDS-DC tape drive.

Apple Workgroup Server 95—128K/Tag Second-Level Memory Cache Upgrade Kit
(Order No. M6810Z/A)
This kit adds an additional 128K and Tag second-level 68040 memory cache to the PDS card for a total of 256K second-level memory cache. It contains two SRAM SIMMs.

Apple Workgroup Server 95—256K/Second-Level Memory Cache Upgrade Kit
(Order No. M6815Z/A)
This upgrade requires the installation of the 128K/Tag Kit, Order No. M6810Z/A. The 256K upgrade kit adds an additional 256K of second-level 68040 memory cache to the PDS card for a total of 512K second-level memory cache. It contains one 256K SRAM SIMM.

Apple Workgroup Server 95—16 MB Parity DRAM Upgrade Kit
(Order No. M6820Z/A)
This kit adds an additional 16 MB of parity DRAM to the Apple Workgroup Server 95 main logic board and contains four 80 ns 4 MB parity SIMMs.

Macintosh VRAM Expansion Kit
(Order No. M5953LL/A)
This kit adds 500K of video RAM and provides greater on-screen colors for the Macintosh Quadra. The kit contains two 256K VRAM SIMMs. Two kits (or a total of four 256K SIMMs) must be purchased and installed to upgrade to a maximum 2 MB of VRAM.

Before performing upgrades or repairs, make sure you follow these precautions:

- Properly turn off the system using the Shut Down command in the Special menu, and turn off all SCSI devices connected to the computer after the computer shuts down.

- Unplug the computer prior to installing or removing any module or part.

   Caution: Failure to unplug the computer could cause damage to the logic board and/or card.

- Set up an ESD safe-work area and wear a grounding wriststrap to prevent ESD damage to components.

To shut down A/UX to perform upgrades, for system maintenance, or to add devices, follow these steps:

1. With either the Login dialog box or Finder™ displayed, choose Shut Down from the Special menu.

   Note: The Login dialog box is displayed if the system administrator configured the system for login by editing the autologin file in the Preferences folder (located in the Login System Folder) in the mac/bin file. See the *Basic Skills* manual for more information.

2. If you are prompted for the root password, type in the password provided by the system administrator.

3. Type a warning message in the text box to warn other AppleShare users the server is shutting down.

4. Type a number specifying the delay, in minutes, between the time the message is transmitted and the time the other users must finish logging out.

5. Choose Shut Down.

SCSI Data Cable

Hard Drive

Side Cover Latches

SCSI Power Cable

Spacer

SCSI Select Switch

Side Cover Assembly

Floppy Drive Cable

Floppy Drive

Power Supply

Drive Carrier

DDS-DC Drive

SCSI Device Select Cable

Fan

Logic Board

Drive Shelf Assembly

PDS Card

Main Housing Assembly

Microphone

ADB Cable

Keyswitch

Speaker Assembly

Interrupt Actuator

Reset Actuator

Floppy Drive Bezel

Blank Bezel

Speaker Bezel Assembly

AC Power Cable
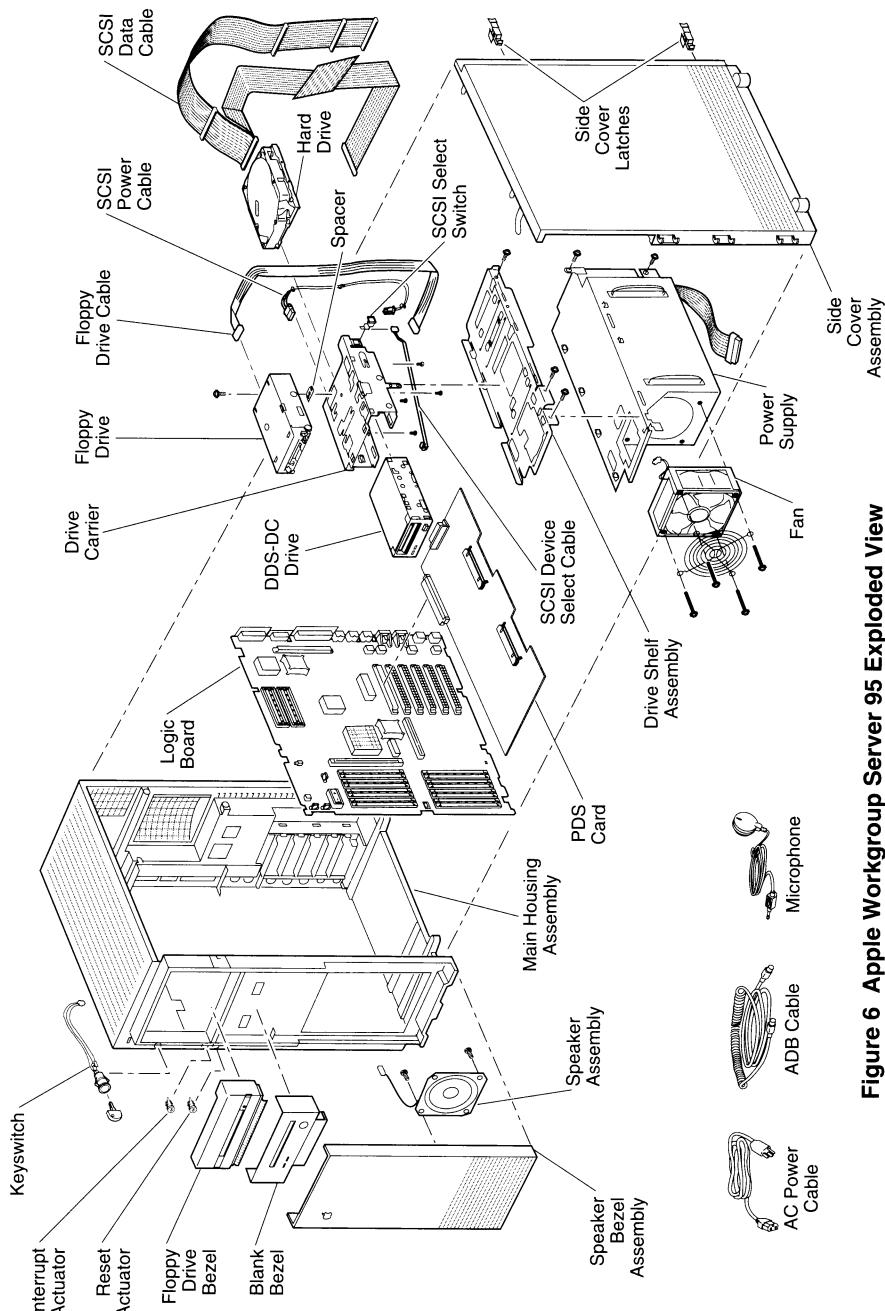
Figure 6 Apple Workgroup Server 95 Exploded View

See Figure 6 for an exploded view of the Apple Workgroup Server 95. The take-apart procedures for performing upgrades are included in the remaining sections of this chapter. Refer to *Service Source* for detailed Macintosh Quadra 900/950 and Workgroup Server 95 take-apart instructions.

PDS Card Upgrade

This procedure requires Apple Workgroup Server PDS Card Upgrade Kit (Order No. M6940Z/A). To upgrade a Macintosh Quadra 900 or 950 to an Apple Workgroup Server 95, install a PDS card by following these directions:

1. Place the system on its side and remove the cover by pressing the two latches on the back side above the ports and connectors.

2. Remove the plastic NuBus card holder from the cover (the holder furthest from the bottom edge of the cover).

3. Remove the plastic cover plate behind the processor-direct slot (NuBus slot 5).

4. Disconnect the SCSI data cable from the logic board.

5. Install the Workgroup Server 95 PDS card in the 140-pin PDS connector next to the power supply in front of NuBus slot 5 (see Figure 7).
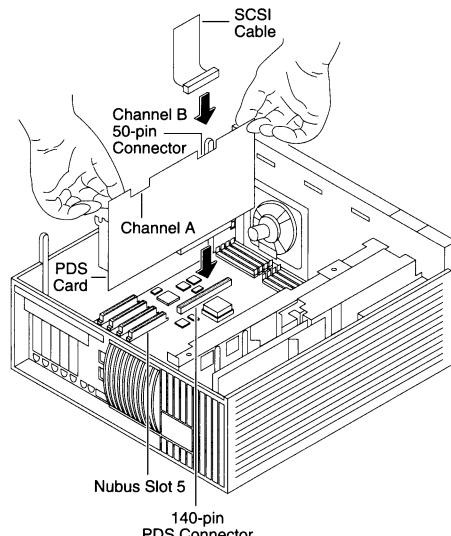
Figure 7 PDS Card Installation

6. Connect the SCSI data cable to the 50-pin connector (labeled Channel B) at the top of the Workgroup Server 95 PDS card (see Figure 7).

7. Attach the product identification and speaker bezel labels.

8. Run *MacTest Pro* diagnostics on the complete system (see "Running *MacTest Pro* Disk-Based Diagnostics" in the "Troubleshooting" chapter).

9. Prepare the system for software installation (see "Preparing the System for Software Installation" later in this chapter).

PDS Card/DDS-DC Drive Upgrade

This procedure adds a PDS card and a DDS-DC drive to a Macintosh Quadra 900 or 950. It requires the Apple Workgroup Server 95 PDS Card/DDS-DC Drive Upgrade Kit (Order No. M6945Z/A). Follow these steps to install the tape drive, and then refer to the preceding "PDS Card Upgrade" section to install the card.

1. Place the system on its side and remove the cover by pressing the two latches on the back side above the ports and connectors.

2. Remove the drive shelf assembly:
    – Disconnect the floppy drive cable and SCSI data cable from the logic board (see Figure 8).
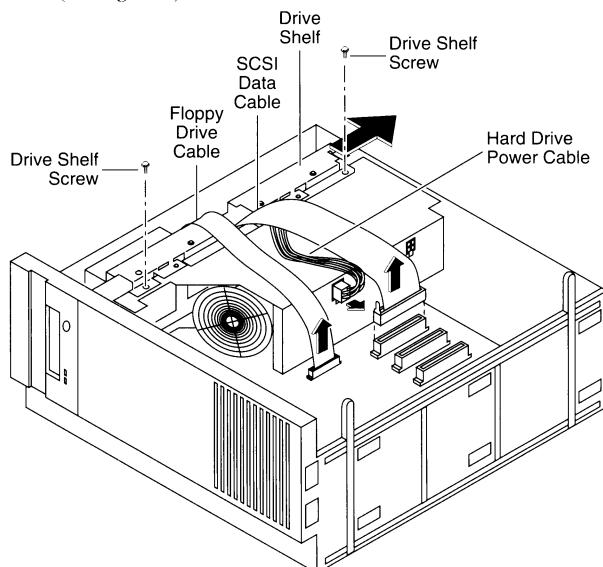
Figure 8 Drive Shelf Assembly

– Disconnect any SCSI power cable(s) from the power supply (see Figure 8).
– Remove the two drive shelf screws (see Figure 8).
– Slide the drive shelf toward the rear of the computer (see Figure 8).
– Grasp the front and rear metal tabs, and lift the drive shelf out of the computer.

3. Remove the floppy drive:
– Disconnect the floppy drive cable from the floppy drive (see Figure 9).

Screw

Floppy Drive
Cable
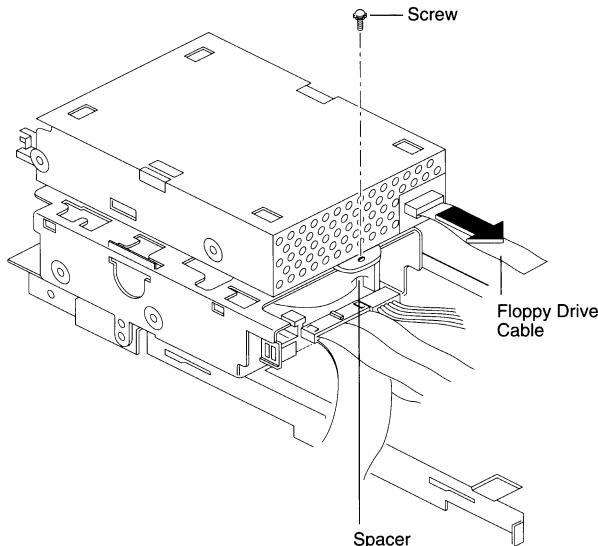
Spacer

Figure 9 Floppy Drive

– Remove the floppy drive mounting screw and spacer (see Figure 9).
– Lift the rear of the floppy drive and slide it off the drive shelf.

Replacement Note: Apple recommends using dust shields on 1.4 MB SuperDrives in Macintosh Quadra 900/950 computers. If you install a dust shield on the current drive, first clean the drive heads with a disk drive cleaning kit available at most computer stores.

4. Remove any SCSI device installed beneath the floppy drive.

5. Remove the speaker bezel:
   – Disconnect the speaker cable from the logic board (see Figure 10).
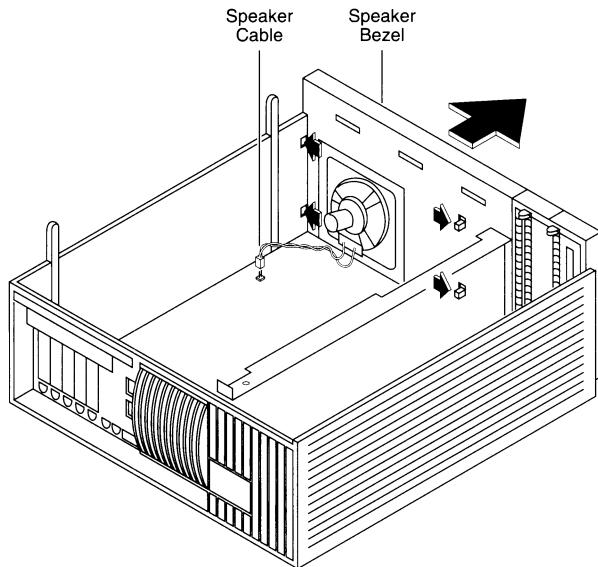
Figure 10 Speaker Bezel and Speaker

– Release the four plastic latches on the inside of the speaker bezel (see Figure 10).
– Remove the speaker bezel and speaker from the computer.

6. Install the DDS-DC drive on the drive shelf in the front position and verify that the SCSI ID number is set to 2 (see Figure 11).
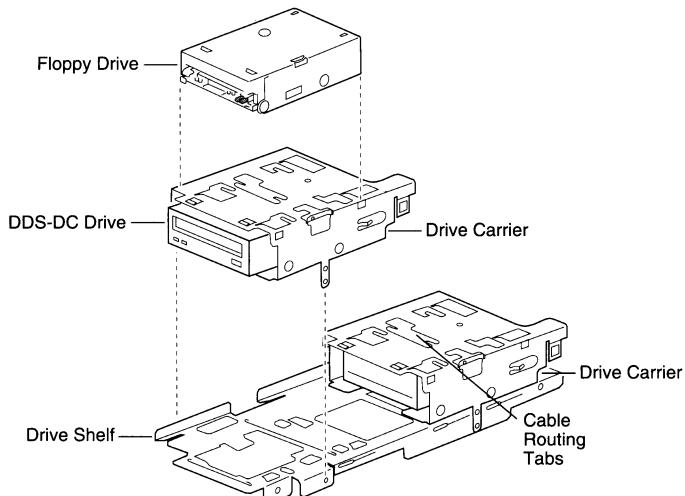
Figure 11 DDS-DC Tape Drive Installation

7. Attach the floppy drive to the DDS-DC drive carrier.

8. If applicable, reinstall the SCSI device that was removed from beneath the floppy drive above the rear SCSI device.

9. Connect the power cable and SCSI data cable to the tape drive and to any other internal hard drives, and route the cable between the two tabs on the top of the rear drive carrier.

10. At the front of the main housing assembly, squeeze the two plastic latches on the inside of the blank bezel and remove the bezel from the computer.

11. Install the DDS-DC drive bezel and replace the speaker bezel.

12. Reinstall the drive shelf and drives into the computer.

13. Connect the SCSI power cables to the power supply and the floppy drive cable to the logic board.

14. Install the PDS card (refer to the previous section, "PDS Card Upgrade") and connect the SCSI data cable to channel B of the PDS card.

15. Attach the product identification and speaker bezel labels.

16. Run *MacTest Pro* diagnostics on the complete system (see "Running *MacTest Pro* Disk-Based Diagnostics" in the "Troubleshooting" chapter).

17. Prepare the system for software installation (see "Preparing the System for Software Installation" later in this chapter).

Second-Level Memory Cache Upgrades

The AWS 95 PDS card has 128K of built-in SRAM which can be optionally upgraded to 256K or 512K through three SIMM sockets. For an upgrade to 256K, this procedure requires the Apple Workgroup Server 95 128K/Tag Second-level Memory Cache Upgrade Kit (Order No. M6810Z/A). For an upgrade to 512K, the procedure requires that kit and the 256K/Second-level Memory Cache Upgrade Kit (Order No. M6815Z/A). A tag RAM SIMM—the memory the cache uses to track the line of memory that is loaded into the cache—must be installed for each upgrade in the TAG SIMM slot. To install a memory cache upgrade, follow these steps:

1. Place the system on its side and remove the cover by pressing the two latches on the back side above the ports and connectors.

2. Disconnect the SCSI data cable from the Workgroup Server PDS card.

3. Carefully grasp each end of the PDS card and pull up to remove it.

4. Install SIMMs on the PDS card according to this list and by referring to Figure 12:

    • Upgrade from 128K to 256K:
      – One 128K SRAM SIMM
      – One TAG SIMM

    • Upgrade from 128K to 512K:
      – One 128K SRAM SIMM
      – One 256K SRAM SIMM
      – One TAG SIMM
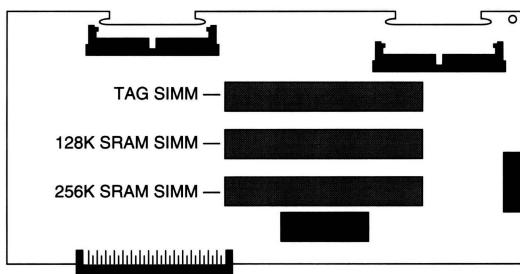
Figure 12 AWS Cache Card SIMM Slots on the PDS Card

To install a SIMM, follow these steps:

1. Hold the SIMM by the edges with the contacts pointing down.

2. Insert the SIMM at an angle (bottom forward) into the SIMM slot.

3. Push back on the top corners of the SIMM until you hear a click and the SIMM snaps into place.

16 MB Parity DRAM Upgrade and Parity Checking

This upgrade adds an additional 16 MB of parity RAM to the Apple Workgroup Server 95. This procedure requires the Apple Workgroup Server 95 16MB Parity DRAM Upgrade Kit (Order No. M6820Z/A). To install the upgrade, refer to SIMM installation procedures in the previous section, "Second-Level Memory Cache Upgrades;" see Figure 13 for bank locations; and follow these guidelines:

- DRAM SIMMs must be 80 ns or faster (slower SIMMs cause serious timing problems and system crashes).
- Fill each bank with DRAM SIMMs.
- A filled bank must have four DRAM SIMMs of the same size (four 1 MB SIMMs or four 4 MB SIMMs).

DRAM SIMM Banks
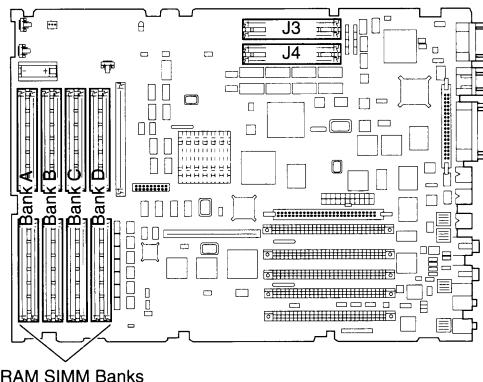
Figure 13 DRAM SIMM Slots on the Main Logic Board

The Apple Workgroup Server 95 supports any combination of 8-bit and 9-bit DRAM SIMMs. However, to enable parity checking, a system *must* have 9-bit DRAM SIMMs only. The 9-bit SIMMs have nine integrated circuits (ICs) on the SIMM module, and 8-bit SIMMs have eight ICs.

Caution: Enabling parity on a system with 8-bit SIMMs causes the system to crash.

After you install 9-bit parity SIMMs into an Apple Workgroup Server 95, you can enable parity checking by entering A/UX Startup as the system boots. Parity checking allows the system to check for memory corruption in RAM.

To turn on parity checking, follow these steps:

1. Start up/restart the system.

2. Click Cancel in the "Welcome to A/UX" alert box or press Command-Period to enter the A/UX Startup application.

    Note: If password checking has been turned on under Preferences in the A/UX startup application, a Login dialog box appears before the startup shell opens. In this case, type root and enter the root password supplied by the system administrator. If no password has been set for the root account, press Return in the Password text box to proceed.

3. Choose General from the Preferences menu.

4. Click "Memory parity checking" and then click OK. You'll see a warning stating that enabling parity with 8-bit SIMMs installed may crash the system.

VRAM Upgrade

The Macintosh Quadra 900 and 950 video RAM (VRAM) can be upgraded from 1 MB to 2 MB by installing additional VRAM SIMMs on the logic board. This procedure requires two Macintosh VRAM Expansion Kits (Order No. M5953LL/A). The two VRAM SIMM slots—J3 and J4 (see Figure 14)—can hold up to two 256K VRAM SIMMs each. To install additional VRAM, refer to the SIMM installation procedure at the end of the "Second Level Memory Cache Upgrades" section; see Figure 14; and follow these guidelines:

- VRAM SIMMs for the Macintosh Quadra 950 or AWS 95 must be 80 ns or faster (slower SIMMs cause video timing problems).
- VRAM SIMMs for the Macintosh Quadra 900 must be 100 ns or faster.
- Fill both VRAM SIMM sockets or leave both slots empty.
- Filled SIMMs slots must contain four 256K VRAM SIMMs.
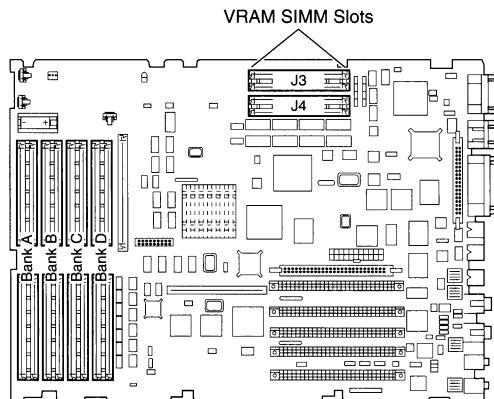
Figure 14 VRAM SIMM Slots on the Main Logic Board

Preparing the System for Software Installation

Apple recommends that you verify system operation after an upgrade to a Macintosh Quadra 900 or 950. To do this, turn on the system, run *MacTest Pro* diagnostics if appropriate, and prepare the system for software installation by loading the A/UX Installer application. For complete software installation instructions, refer to Appendix B in *Setting Up and Administering Your Server.*

To load the A/UX Installer application, you need these items:

- An external CD-ROM drive and a CD-ROM caddy
- *Apple Workgroup Server 95 Software Installer for File/Print Environment* CD-ROM or *Apple Workgroup Server 95 Software Installer for Database Environment* CD-ROM.
- *Installation Boot Disk for Apple Workgroup Server 95*

To bring up the A/UX Installer, use the *Installation Boot Disk* and one of the software installer CD-ROMs, and follow these steps:

1. Shut down the computer.

2. Connect the CD-ROM drive and any hard disks on which the system administrator plans to install system software.

3. Turn on the CD-ROM drive and other external devices.

4. Insert the floppy disk labeled *Installation Boot Disk* into the disk drive.

5. Turn on the computer.

6. Insert the software installer CD-ROM into the CD-ROM drive (label side up).

   A dialog box appears, displaying the status of the A/UX Installer's startup procedure. This process takes three to five minutes to complete. The screen may go black momentarily, and then gray with no pointer. A few minutes after the Installer ejects the floppy disk, the Installer's Easy Install dialog box appears.

7. If you plan to install software for the System Administrator, be familiar with the installation procedures in Appendix B of *Setting Up and Administering Your Server*, and consult with the administrator about their installation requirements as appropriate.

Small Computer System Interface (SCSI) is a standard for connecting small computers to peripheral devices. To add SCSI devices to an Apple Workgroup Server 95, you need to be familiar with SCSI device guidelines and the recommended configuration for connecting them to the PDS card so that:

- The startup hard drive is not hidden by another device
- You obtain maximum performance from devices
- You can see all SCSI devices when in the Macintosh OS (such as when you are running diagnostics—see the "Troubleshooting" chapter for more detailed information)

SCSI Identification Numbers

A Macintosh desktop computer, internal and external hard drives, CD-ROM drives, some printers, and scanners are all SCSI devices. An Apple SCSI chain (the total number of accessible SCSI devices) can have up to eight devices. Each SCSI device, whether internal or external, must have its own unique ID or priority number.

The desktop Macintosh CPU is always assigned SCSI ID 7 and the internal hard drive is assigned SCSI ID 0. You can use SCSI ID numbers 1-6 for other devices. Macintosh Quadra computers can have multiple internal SCSI devices, so the internal devices must have ID numbers that do not duplicate the external SCSI devices. If a Macintosh Quadra has an internal CD-ROM drive, the CD-ROM drive is set to SCSI ID 3 at the factory. If the Macintosh Quadra has been upgraded with a DDS-DC tape drive, the SCSI ID is preset at the factory to 2.

SCSI ID numbers on both internal and external devices are set by pressing the buttons on the SCSI ID switch (refer to the manual that came with the device for the exact location of the switch) to raise or lower the ID number. The devices with SCSI IDs numbers 1-6 can be changed at any time; however, users can only modify ID numbers on external devices. Apple recommends establishing a numbering scheme for the internal and external devices that can be easily communicated, so a user can add additional external devices without introducing SCSI ID number conflicts. For example, internal devices can be numbered from 0-3, and external devices from 4-6. SCSI ID 7 is reserved for the CPU.

SCSI Termination

Terminators ensure signal integrity along a SCSI bus. Proper termination prevents signal distortion which could cause data corruption or unpredictable system behavior. Improper termination, or no termination at all, causes many system problems, such as the inability to boot or to recognize SCSI devices, or unexpected system halts.

A SCSI bus should never have more than two terminations. A SCSI chain with more than two terminators may cause intermittent problems or inhibit booting. One of the terminators is always at the beginning of the chain, either inside the computer or between the system cable and the first external SCSI device. The second terminator is always at the end of the chain, either inside the last SCSI device or attached to a SCSI port on the last device. Terminators should never be located in the middle of a SCSI chain.

The AWS 95 has the following built-in termination points that must be considered when determining the number of terminators:

- On the internal SCSI ribbon cable attached to Bus 3 (Channel B) of the PDS card
- On both Channel A & B on the PDS card (implemented through circuitry)
- On the internal main logic board SCSI port

As a general rule, AWS 95 internal SCSI devices should not be internally terminated because termination is provided in the locations listed above. Always use the platinum terminator to terminate the last external device on a SCSI bus.

SCSI Device and Bus Search Order

The Apple Workgroup Server contains four SCSI ports or busses where you can add SCSI devices—the computer's standard internal and external SCSI bus (Busses 1 and 2), plus an internal and external SCSI bus on the PDS card (Busses 3 and 4). When you turn on the computer, the Macintosh OS searches the four busses for each SCSI device in the following order:

    Bus 1—main logic board internal bus
    Bus 2—main logic board external bus
    Bus 3—PDS card internal bus (marked Channel B on the card)
    Bus 4—PDS card external bus (marked Channel A on the card)

Figure 15 shows the location of the four SCSI busses and the way in which they are searched by the Macintosh OS.

Parallel 50-pin connector
to the external SCSI port

External 25-pin SCSI port
on main logic board

Internal 50-pin
SCSI port on the
main logic board

Startup disk

External 25-pin
SCSI port on
the PDS card

Tape drive

② ④

① ③

Internal 50-pin
SCSI port on
the PDS card
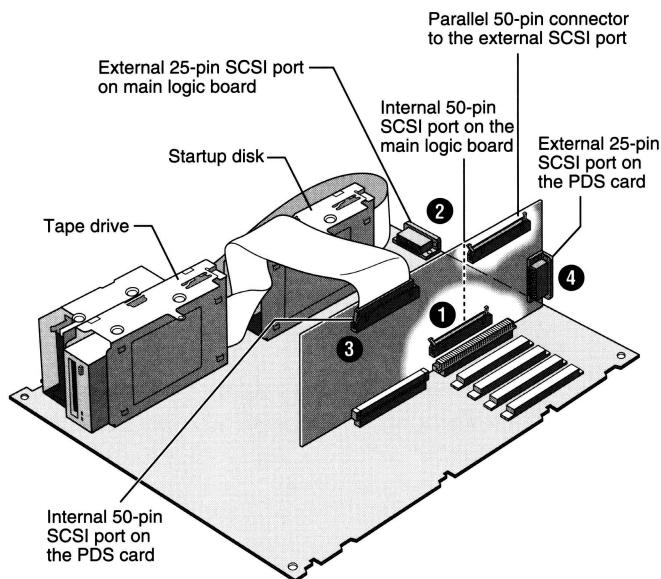
Figure 15 Four SCSI Busses and Their Search Order

In addition to the PDS card external SCSI connector on Bus 4, the card has a parallel, 50-pin internal SCSI connector that is also on Bus 4 and is labeled Channel A. This connector allows internal SCSI devices to be attached to Channel A. Internal access to Channel A is provided for special disk array applications that might require use of both SCSI channels on the PDS card. To avoid violating SCSI bus termination rules, only one of the Channel A connectors should be used at a time.

SCSI Device Installation

To add internal devices to a Workgroup Server 95, such as an additional hard drive, a CD-ROM drive, or a DDS-DC tape drive, follow these general steps:

- Follow ESD precautions.
- Remove the following parts by referring to the exploded view (Figure 6) and to the "PDS Card/DDS-DC Drive Upgrade" procedure in the "Apple Workgroup Server 95 Upgrades" chapter, or use *Service Source*.
  - Cover
  - Drive shelf
  - Floppy drive
- Plan and set SCSI ID numbers as necessary.
- Reassemble the computer.
- Run diagnostics.

To connect internal and external SCSI devices to an AWS 95, follow standard SCSI device numbering rules and the following guidelines to ensure proper system operation and to obtain maximum performance from the Apple Workgroup Server.

To ensure that the system boots and to avoid system problems, follow these guidelines:

• Never assign SCSI ID number 7 to any SCSI device on any bus. ID 7 is reserved for the CPU. If another device has the same ID, the system will not boot or may crash.

• Never attach a SCSI hard disk or CD-ROM drive with SCSI ID 0 to the computer's internal or external SCSI port (Bus 1 or Bus 2). The device will obscure the startup disk, which is SCSI ID 0 on Bus 3, and you will not be able to start up the server.

• Do not connect SCSI devices to Bus 4 (Channel A) via the external connector and to the internal parallel 50-pin connector at the same time. Using both connectors results in a bus with three termination points and causes system problems.

To obtain maximum performance from the Apple Workgroup Server, follow these guidelines:

• Store data in UNIX partitions, which provide faster data access and can be accessed by both Macintosh and UNIX clients on a network.

• Connect SCSI devices to the internal and external PDS card busses. The Direct Memory Access of the PDS card provides faster data transfer than the computer's standard SCSI ports. Connect internal drives to Bus 3 or Channel B and external drives to Bus 4 or Channel A.

• If you connect SCSI devices to Busses 1 or 2 on the main logic board, the data on those devices will not benefit from the increased I/0 processing and memory caching available with the PDS card.

The following charts show two sample AWS 95 configurations and the recommended configuration for attaching external SCSI devices. The charts include the default SCSI ID numbers for the DDS-DC and CD-ROM drives.

SCSI Device Information

This first chart shows an Apple Workgroup Server 95 with one internal hard drive, an internal tape drive, an external CD-ROM drive, and four additional external SCSI devices.

SCSI ID Numbers	0	1	2	3	4	5	6	7
BUS 1 (internal)								Mac CPU
BUS 2 (external)								
BUS 3 (internal PDS card)	Startup internal hard drive		DDS-DC tape drive					
BUS 4 (external PDS card)		External SCSI device		CD-ROM drive	External SCSI device	External SCSI device	External SCSI device	

This chart shows an Apple Workgroup Server 95 with two internal hard drives, an internal tape drive, an external CD-ROM drive, and three additional external SCSI devices.

SCSI ID Numbers	0	1	2	3	4	5	6	7
BUS 1 (internal)								Mac CPU
BUS 2 (external)								
BUS 3 (internal PDS card)	Startup internal hard drive	Internal hard drive	DDS-DC tape drive					
BUS 4 (external PDS card)				CD-ROM drive	External SCSI device	External SCSI device	External SCSI device	

The Apple HD SC Setup application prepares the SCSI hard disks that are added to a server for use with A/UX 3.0.1. Apple HD SC Setup is supplied with the system software and is located in the Applications folder on the startup disk.

Disk preparation consists of two parts: initializing and partitioning. Initializing prepares a hard disk to receive information. Partitioning divides the disk into separate areas for access by either A/UX 3.0.1, the Macintosh OS, or a database application. Your decision to initialize and partition a hard disk depends on the current status of the hard disk. You only need to initialize a hard disk in the following cases:

• The disk is new and uninitialized. Apple hard disks—and most non-Apple hard disks—are initialized at the factory and do not have to be initialized again. Check the owner's manual if the disk is a new, non-Apple hard disk.

• The disk has been formatted for use with a non-Apple operating system.

• Repeated disk errors occur when reading from or writing to the disk.

The decision to partition a hard disk depends on its current partitioning and the type of data you intend to store on the disk. Follow these guidelines for partitioning a disk for use with the server:

• Create database partitions to hold database files. A database partition can only be accessed by a database application.

• Create file server data (UNIX) partitions to store all other types of file server data, including Macintosh applications and files. The data stored in UNIX partitions will be available to all of the A/UX, UNIX, and Macintosh clients on the network.

• Avoid adding Macintosh volumes to the server. Store file server data in UNIX partitions for most efficient access by A/UX 3.0.1.

Be sure to back up data on hard drives prior to initializing or partitioning a drive.

Initializing a Hard Disk

Follow these steps if you need to initialize a disk:

Caution: Initializing erases all data on a disk.

1. Start Apple HD SC Setup by double-clicking its icon in the Applications folder on the startup disk.

    If you are upgrading a system to an AWS 95 or are replacing the startup disk, you need to use the Apple HD SC Setup provided on the software installer CD-ROM. To access HD SC Setup on the CD-ROM, refer to "Preparing the System for Software Installation" in the "Apple Workgroup Server 95 Upgrades" chapter.

2. Click Previous or Next to select the disk you want to initialize.

    Make sure that both the SCSI ID and the bus identify the disk you want to initialize. You can verify a disk's SCSI ID by looking at the ID setting on the back of the device.

3. Click initialize to begin.

4. Click Init to initialize the hard disk.

    You will see messages that report the status of initialization, which takes several minutes. One large Macintosh volume is created on the disk.

5. Type a name for the hard disk and click OK.

    If the Name dialog box does not appear, the disk already has a name. You can edit the name of the disk later in the Finder.

Partitioning a Hard Disk

In general, you use the Apple HD SC Setup automated (default) partitioning schemes to partition a disk into equal file server (UNIX) or database data partitions. If you plan to use the custom partition option, be familiar with creating custom partitions as described in *Setting Up and Administering Your Server*.

To partition a hard disk using automated schemes, follow these steps:

1. Start Apple HD SC Setup by double-clicking its icon in the Applications folder on the startup disk.

2. Click Previous or Next to select the disk you want to initialize.

   Important: Do not select the startup disk which is SCSI Device 0 on Bus 3.

3. Click Partition.

   The Partition dialog box appears, as shown in Figure 16, and lists five partitioning schemes for dividing a disk into UNIX, database, or Macintosh partitions. Two of the schemes—File Server System and Database Server System—are only used for preparing a startup disk for installing system software (see Appendix B in *Setting Up and Administering Your Server*).

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

| File Server System |
| **File Server Data** |
| Database Server System |
| Database Server Data |
| Macintosh Volume |

Hard Disk

[Custom]

File Server Data

Creates up to 12 partitions of equal size and makes a UNIX file system in each. Use this partition scheme to prepare a non-startup disk for sharing files.

[OK]

[**Cancel**]

Figure 16 Partition Dialog Box

4. Select a partition scheme.

   A description of the scheme appears in the lower-left corner of the partition box when you select it. Choose one of the following schemes that corresponds to the function the device will perform:

   • Select File Server Data to create equal-size UNIX partitions to store file server data.
   • Select Database Server Data to divide the disk into equal-sized database partitions for use by a database application.

5. Click OK to partition the disk.

    What you see next depends on the type of partition you created. You may see a warning dialog box if you try to create a Macintosh volume on a disk that has the same SCSI ID as a device on a lower-numbered bus.

6. To create File Server Data or Database Server Data partitions, enter the number of equal partitions you want on the disk, click Create, and go to step 7. If you created a Macintosh volume, enter a name for the volume and click OK. After you name the volume, the HD SC Setup main dialog box appears. Go to step 10.

7. Click OK in the alert box (warning you all data will be lost) to begin partitioning.

8. Create a mount point for each UNIX partition.

    A directory dialog box appears, as shown in Figure 17, with the Shared Data folder selected and a default directory name of "Untitled 1" in the text box.
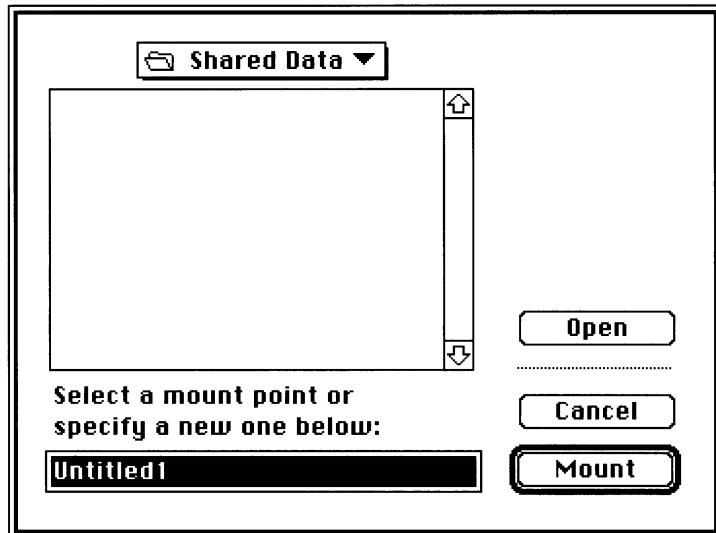
Figure 17 Mount Point Directory Dialog Box

Mounting links a UNIX partition to the root directory or the top directory of the UNIX directory hierarchy. The folder you specify in the dialog box is the mount point. The mount point makes each new partition visible to the operating system and provides access to the partition from the Finder.

Create the mount point in one of three ways:

- Click Mount to create a new directory in the Shared Data Folder with the default name as shown.

- Enter a more descriptive name in the text box and then click Mount.

- Use the directory dialog box to specify a directory in a location other than the Shared Data Folder.

9. Click OK to confirm the mount point.

   If you are creating more than one File Server Data partition on the disk, the directory dialog box reappears with a new default directory name in the text box. Repeat the procedure to create a mount point for each partition.

   Important: Do not select the same mount point for more than one partition. Never select the System Folder or other folders that contain system files as a mount point.

10. Click Previous or Next to prepare another hard disk, or click Quit to return to the Finder.

The Apple Workgroup Server 95 tape drive and accompanying software can perform full or partial backup and restore procedures of all the data on a hard disk. The drive automatically performs error correction and data compression of backed up and restored files. The error correction facility ensures data-integrity, and the data compression facility allows more data to fit on a cassette than conventional backup mechanisms.

Apple Workgroup Servers with a tape drive come with Retrospect software from Dantz Development Corporation. See the Retrospect documentation for information on how to use the Retrospect software. You can also use standard UNIX utilities to back up data.

To use the tape drive, simply insert the DDS tape cassette into the tape slot in the front panel. Remove a tape when it is not in use by pressing the eject button, or according to the methods documented in the Retrospect manual.

You can write-protect tapes by sliding the tab on the rear of the cassette so that the hole is visible. Data can be read from, but not written to, write-protected tapes.

To add an Apple Digital-Data-Storage Tape Drive to an AWS 95, refer to "PDS Card/DDS-DC Drive Upgrade" in the "Apple Workgroup Server 95 Upgrades" chapter of this guide.

Compatible Tapes

Use any Apple Digital-Data-Storage (DDS) tape cassette or compatible third-party DDS cassette offered by Apple with a Workgroup Server tape drive. Compatible cassettes must be stamped "Digital Data Storage" and "MRS" (Media Recognition System). Blank tapes can back up between 4-6 GB of data in three hours. Apple tape cartridges come pre-formatted from the factory. To format non-Apple tapes, refer to the A/UX commands in *Server Administration with A/UX*.

Status Lights

Two lights next to the tape drive inform you about the status of the tape operations. The left light is the cassette light, and the right light is the drive light. The following table lists the meaning of all possible combinations of status lights:

States	Cassette light (left side)	Drive light (right side)	Meaning
Read/write states	Flashing green	Flashing green	Cassette loading or unloading
	Green	Green	Cassette loading/on line
	Green	Flashing green	Cassette loaded/activity
	Green	Off	Cassette loaded/off line
Write-protect states	Flashing amber	Green	Cassette loading or unloading
	Amber	Green	Cassette loaded/on line
	Amber	Flashing green	Cassette loaded/activity
	Amber	Off	Cassette loaded/off line
Error states	Green	Green/amber	Media wear (caution)
	Amber	Amber	High humidity/no termination on SCSI bus
	Flashing amber	Flashing amber	Self-test (normal)
	Flashing amber	Amber	Self-test (failure)

If the tape drive detects condensation, both lights display solid amber, any commands in progress are cancelled, and commands to access the tape are rejected. The tape is then unthreaded to prevent tape and tape-head damage. To minimize condensation, ensure that the system and tape drive environmental conditions in *Setting Up and Administering Your Server* are being followed, and that standard use guidelines for tape cassettes are adhered to.

Tape Drive Maintenance

Tape drive cleaning is a crucial part of preventive maintenance. Clean the tape drive heads after a drive has been run for about 25 hours with a DDS cleaning cassette. Simply insert the tape cleaner into the drive to automatically load the cassette and clean the heads. The drive automatically ejects the cassette after cleaning. Track the number of times the cleaning cassette is used by recording the date the on the label provided. Use a new cleaning cassette after 25 uses.

The following list contains guidelines for addressing the most common problems with the AWS 95:

- Replace the 50-pin SCSI cable and check the PDS card SCSI connectors for bent pins or debris inside the connector if the following problems occur:

  - System intermittently hangs or crashes
  - Mac OS boots but A/UX does not
  - SCSI devices are not visible
  - Inability to write to or read data from disks

- Be careful when refolding the cable during the AWS 95 upgrade, because the SCSI cable is especially prone to damage.

- If a system will not boot after an upgrade, check that the PDS card is seated correctly in the main logic board PDS slot.

- If video fails, always reset the PRAM by pressing Command-Option-P-R before replacing the motherboard.

- To avoid violating SCSI termination rules and system problems, never connect devices to both Channel A SCSI connectors at the same time.

- If the DDS-DC drive eject button depresses continuously after installation, does not depress, or you you do not hear a clicking noise after pressing the button, the drive is incorrectly installed. To verify proper installation, press the eject button and listen for a clicking noise.

- Always use DDS/MRS media with the 4 mm DDS-DC tape drive.

Before you begin any repair procedures, refer to "Preparation for an Upgrade or Repair" in the "Apple Workgroup Server 95 Upgrade Procedures" section.

Recovering from a System Crash

A system can freeze or temporarily disable access to applications or commands without the system actually crashing. Before you restart the system, be sure to wait for the system to give you control and write down any error messages from the system console window.

Error messages that begin with the word `panic` mean that the system cannot recover from whatever has happened and you will have to restart. If the system will not restart, use the Messages button in the startup window to

watch the startup process carefully, and document where the restart process fails in order to further troubleshoot the system. Refer to *Server Administration with A/UX 3.0.1* for more detailed troubleshooting information.

Whenever a system crash occurs, Apple recommends that you perform a manual file system check following these steps:

1. Restart the system and click Cancel to enter the A/UX Startup CommandShell window.

2. At the prompt "`startup#`," type `fsck-y/dev/default` and then press Return.

   The five-phase file system check lasts about 1 to 2 minutes and is complete when the "`startup#`" prompt reappears.

3. Press Command-B to launch A/UX.

System crashes also happen when the computer has 8-bit DRAM SIMMs installed and parity checking is enabled in the General window of the Preferences Menu in the A/UX Startup application. If you suspect SIMM/parity incompatibilities, restart the computer and turn off parity checking.

To disable parity checking after a system crash, follow these steps:

1. Press the reset button (the second recessed button below the security key) on the front of the computer to restart the system.

2. Click Cancel in the "Welcome to A/UX" alert box or press Command-Period to enter the A/UX Startup application.

   Parity checking begins when A/UX launches. The system will restart under the Macintosh OS, which doesn't use parity, giving you time to cancel the startup process.

3. Choose General from the Preferences menu.

4. Deselect "Memory parity checking" and then click OK.

5. Return to the Finder and restart the computer.

Logging Into the Root Account

A/UX 3.0.1 assumes the need for an administrator—a user with a special account that provides unlimited privileges for administering the A/UX system. The special account is called root. When you turn on the computer, A/UX 3.0.1 launches automatically and logs you into the root account as the root user. The root user has access to all files, commands, and processes on the A/UX system, including the ability to

- Cancel the startup process
- Enter the A/UX 3.0.1 Startup application to run system utilities
- Edit files that affect system operation

If the system administrator sets a root password to protect the system from unauthorized access, you must obtain the password to log into the root account to see startup errors or system messages.

Viewing System Startup Messages

Systems that experience a power failure or that are shut down improperly may require A/UX file system repair. To view startup errors, you can cancel A/UX Startup—the Macintosh program that automatically launches when the server turns on and checks inconsistencies within the file system. By canceling system startup you can view the A/UX System Console window for potential error messages. Report error messages immediately to the system administrator. To respond to dialog boxes during the automatic file repair process during startup, or to manually run A/UX commands to repair the file system, refer to *Server Administration with A/UX 3.0.1*. To exit A/UX Startup and launch A/UX without restarting the system, press Command-B or choose Boot from the Execute menu.

Viewing A/UX Console Window System Messages

As A/UX runs, the system might generate messages regarding its status. In a traditional UNIX environment, these messages appear on a console terminal. The system administrator monitors the messages and takes action when alerted to avoid or remedy a problem. In A/UX, the system messages appear in the A/UX System Console, a CommandShell window. CommandShell is a utility that establishes an interface between the C shell and the A/UX operating system. You use the CommandShell window to communicate with A/UX by entering commands on a command line.

A/UX alerts you to messages by flashing an icon in the Application menu bar and displaying an alert box. If CommandShell is not the active application, a

diamond-shaped symbol also appears alongside CommandShell in the Applications menu. Choose CommandShell, then choose A/UX System Console from the Windows menu to display the alert box.

To make CommandShell active and view the contents of the A/UX System Console window, follow these steps:

1. Choose CommandShell from the Application menu, at the right side of the menu bar.
2. Choose A/UX System Console from the Windows menu, or press Command-0 (zero).

Document any messages in the window for the system administrator, or consult *Server Administration with A/UX 3.0.1* to learn more about responding to system messages.

To end the A/UX system console session, choose Hide CommandShell from the Application menu to hide the CommandShell window until you reactivate it.

Resolving Print Problems

All A/UX peripheral devices require a device driver that serves as the software interface between A/UX and a peripheral device. A/UX has drivers for commonly used Macintosh peripherals. Drivers for less commonly used or non-Apple devices must be added to the A/UX kernel—the portion of the A/UX operating system that, when running, always resides in memory.

In general, if adding a device involves adding an expansion card, such as an Ethernet NuBus card (but not to the built-in Ethernet port), a device driver needs to be added using A/UX commands. Refer to *Server Administration with A/UX 3.0.1* for detailed instructions. Support for the following devices is already built in to A/UX:

- Terminals
- Printers
- Modems
- Built-in Ethernet port support
- Tape drives (DAT, Nine-track, 1/4", DCAS, QIC, and Apple Tape Backup 40SC)
- CD-ROM drives
- Hard disks
- Apple floppy disk drives

Resolving Network Visibility Problems

Verify that the proper network connection type is selected in the Network Control Panel when users are unable to print documents. AppleTalk network services can run on both LocalTalk or Ethernet networks. Servers that provide AppleShare print and file services must have either LocalTalk or EtherTalk selected in the Network control panel, depending on the type cabling the network uses.

To verify that a server has a network connection, follow these steps:

1. Choose Control Panels from the Apple Menu and open the Network control panel.

2. Verify that the icon for the appropriate network connection is selected.

   If you select or change the connection type, a dialog box warns you that changing the network protocol interrupts the network and abruptly disconnects users logged onto the server.

3. Click OK and close the Network control panel.

For information about and to verify the TCP/IP network configuration parameters, such as host name and Internet address, refer to *Setting Up and Administering your Server*.

Correcting an Improper Shutdown

File system damage and/or loss of data can occur if the system is improperly shut down. If A/UX runs continuously on a machine and you suspect the system was manually turned off or experienced another type of power loss, refer to "Viewing System Startup Messages" in this section of the guide or to the *Server Administration with A/UX 3.0.1.* manual.

Verifying Battery Operation

If the system shuts down intermittently or the system clock displays the incorrect time intermittently after resetting, confirm that the battery voltage on the main logic board is 3.2 volts or higher.

Warning: Lithium batteries are water-reactive and could explode if stored in extreme environmental conditions, or if handled or disposed of improperly.

To check battery voltage:

1. Remove the cover.

2. Set the voltmeter to 10 volts.

3. Hold the positive probe of the voltmeter to the positive end of the battery (marked "+" on the logic board) and the negative probe to the negative end of the battery.

4. If the battery voltage is below 3.2, replace the battery.

To replace a battery:

1. Remove the cover.

2. Remove the drive shelf.

3. Remove the power supply.

4. Using a small flat-blade screwdriver, pry open the latch at the end of the battery holder and lift off the cover.

5. Grasp the battery and remove it from the holder.

6. Return the battery to Apple for proper disposal according to Apple packaging and labeling instructions. Always clip the wires of dead soldered batteries before shipping. Mark the battery DEAD, and return it to Apple in the bag the replacement battery came in.

The May 1993 revision of *MacTest Pro* includes diagnostic software for the Macintosh Workgroup Server products. The software is distributed on the *MacTest Pro CPU and Periphs Disk v5.0*. The server-specific tests include the following:

- Workgroup Server PDS Card Test v1.0, which contains two tests, the "Cache Test" and the "ROM Test." The cache test verifies operation of the level 2 cache and the ROM tests verifies the integrity of PDS card ROM.

  If the test passes, but the cache size reported during the test is not what is installed, the cache memory may be incorrectly installed or is improperly seated. Reseat the SIMMs and replace suspect SIMMs one at a time before replacing the PDS card.

- The SCSI Drive Test v2.0 (previously named Hard Drive, CD ROM Tests v1.0) DDS-DC test contains three test selections: "Unit Self-Test," "Load/Unload Cassette Test," and "Verify MRS Tape Test." The first test verifies the operation of the DDS-DC drive, the second—tape loading and unloading, and the third—tape format compatibility.

  - If the "Unit Self-Test" fails, the drive may need to be replaced. The test can fail if the tape cassette jams in the loading mechanism. To eject a jammed tape, switch off power to the system, hold down the eject button, and switch on the power. Then run the test again.

  - If the "Load/Unload Cassette Test" fails, the drive may need to be replaced.

  - If the "Verify MRS Tape Test" fails, the tape does not have a valid Media Recognition System header and the AWS 95 will not be able to write to the tape.

For information on the additional test modules included in the May 1993 *MacTest Pro* Update, refer to the *Macintosh Family Diagnostics Reference Guide* (073-0301-E) on AppleLink (Path: Apple Service/Training icon, Service & Support bulletin board, Service and Support folder, Diagnostics folder).

Handling Workarounds and Known Bugs

The following list contains server-specific workarounds and known bugs that are either new with the May '93 *MacTest Pro* release, or that represent issues that all *MacTest Pro* users must be aware of.

- NEVER run *MacTest Pro* from a remote file server over a network.

- If you are testing a Macintosh Quadra 950 with a RAM disk, DO NOT run "Macintosh CPU Tests Vol. 2" from a bootable floppy, or the system will hang while running the SCC test.

- If a Macintosh Quadra or Centris—including any system sold as an Apple Workgroup Server—is connected to a network, the diagnostic tests will slow network performance. Disconnect the Macintosh Quadra or Centris from the network before running diagnostic tests.

If you have problems testing an internal CD-ROM drive, check to see if the SCSI ID settings displayed in the MacTest Pro window are set to the following factory defaults:

- Internal boot drive=SCSI ID 0
- CD-ROM=SCSI ID 3

If the IDs are not set to the factory default, then *MacTest Pro* may hang on launch.

For additional workaround and bug information published with the May 1993 release, refer to the *Macintosh Family Diagnostics Reference Guide*.

For more information about each *MacTest Pro* test, see the Test Info button next to each test on the MacTest Pro Main Menu, or refer to the *MacTest Pro User's Guide* and the *Macintosh Family Diagnostics Reference Guide*.

Updating Your Bootable Disks

To run *MacTest Pro* on a workgroup server, you must update your bootable disks with the new test modules. To add the "Workgroup Server PDS Card Test v1.0," "SCSI Drive Tests v2.0," and "File Checker v1.0.1" modules to your bootable disk, copy the modules to the Test Modules folder on the *MacTest Pro* (Macintosh Tests Vol. 2 Disk) version 4.0 disk. You may first have to remove some other test module files from the disk to make space. You will need to decide which files to keep and which to take off the bootable disks.

When updating your *MacTest Pro* bootable disks, you may notice the amount of free disk space available on these disks decreases, even though the sizes of individual files remain the same. To reclaim this and other space, you can "rebuild" the invisible desktop file on your disks by following these steps:

1. From the Finder, drag your unlocked disk to the Trash to eject it.

2. As you re-insert the disk, hold down the Option-Command keys (simultaneously) until the Finder asks you if you wish to rebuild the desktop files on that disk.

3. Click OK.

Note: The Finder Comments will be one of the items removed to make space. For further information, see your *Macintosh User's Guide*.

Setting the Application Memory Partition

The application memory partition for *MacTest Pro* is set at 800K, so that *MacTest Pro* will run from a bootable disk on a machine that has only 2 MB of RAM. All *MacTest Pro* tests (except the Macintosh Tests Vol. 2 and the SCSI Drive Tests) will run with the application memory set at 800K. However, Test Info and the Help menu will not be available.

The optimal size for the application memory partition is 1024K. If the machine you are testing has more than 2 MB of RAM, set the application memory partition to 1024K (or higher, depending on the amount of RAM installed on the machine). For example, on a Workgroup Server with 16 MB of DRAM, adjust the Preferred Size in the Get Info box to 2048K in the memory requirements area. See the *Macintosh User's Guide* or the *Macintosh Family Diagnostics Reference Guide* for detailed instructions.

Note: The Macintosh Tests Vol. 2 and the SCSI Drive Tests will not load if the *MacTest Pro* preferred memory partition is not set to 1024K.

Equipment/Materials for Running MacTest Pro

Assemble the following materials and resources before running *MacTest Pro* diagnostics on an Apple Workgroup Server:

- *MacTest Pro* v4.0 (Macintosh Tests Vol. 2 Disk) as the bootable disk with the following test modules from the *MacTest Pro CPU and Peripherals Nonbootable Disk v5.0*:
  - Apple Video Cards Tests
  - Communication Ports Tests
  - File Checker
  - Floppy Drive Tests
  - Hardware Info
  - Macintosh Tests Vol. 2
  - SCSI Drive Tests
  - Workgroup Server PDS Card Tests

- File server or Macintosh set for File Sharing (note the File server name, Server volume name, and file folder name).
- Serial loopback cable
- LocalTalk cable and two LocalTalk connector boxes or EtherTalk cable and two EtherTalk media filters (thin - 10Base2 type)
- Apple DDS-DC 4 mm tape drive
- Blank tape with DDS-MRS header format
- Apple CD-ROM drive to be tested
- *Sony CD-ROM Test Disc Type 2.0* and CD-ROM caddy
- Mini-jack stereo headphones

Running MacTest Pro

To run the Apple Workgroup Server 95 tests provided with *MacTest Pro*, you must run the tests from the Macintosh OS. If you run *MacTest Pro* under A/UX, you will not be able to run some of the tests. Several tests require you to set AppleTalk to inactive, and the Network File Transfer test requires that a system be set up to log onto another file server. The following procedures are divided into two parts—one running the *MacTest Pro* test modules that require with AppleTalk to be active, and the other with AppleTalk set to inactive.

Important: The time required to test a complete system can take more than an hour depending on the amount of DRAM on the logic board and the number of SCSI devices. You may want to run the tests that take the least time first, such as the floppy drive, DDS-DC drive, and CD-ROM drive tests, to free your time for other activities.

Follow these steps to run the *MacTest Pro* test modules which require AppleTalk set to inactive:

1. Boot the system from either the internal hard drive or from a minimum System 7 for Macintosh Quadra Products disk (make sure the disk has the Chooser CDEV installed) and halt the A/UX Startup process by clicking the Cancel button.

2. Open the Chooser and set AppleTalk to Inactive.

3. Shut down the system and connect a serial cable between the Modem port and the Printer port (the cable is used for the serial loopback test).

4. Boot the system from the *MacTest Pro* disk.

5. Click the Setup button for each test module and select the following tests:

- Communication Ports Tests
  – SCC Loopback Test (requires serial loopback cable)

- Floppy Drives Tests (requires 1.4 MB disk)

- Hardware-Software Info
  – Select all items in the Comprehensive Hardware Info tests.

- Macintosh Quadra 950
  – Component test: select both Logic Board tests and Destructive Logic
    Board tests.
  – RAM tests
  – Video RAM test

- SCSI Drive Tests
  – Hard Disk Drive tests
    Bad Block Scan (run if drive has errors or is being exchanged)
    Random Seek test
    Write Test (do not run unless a backup exists)
  – CD-ROM Drive
    Self Test
    Seek Test
    Extended Read test
    Left and Right Channel test
    Left Channel test
    Left Channel Volume test
    Right Channel test
    Right Channel Volume test
  – DDS-DC Tape Drive tests
    Unit Self-Test
    Load/Unload Cassette test
    Verify MRS Tape test

- Volume/System File Check

- Workgroup Server PDS Card Tests
  – ROM tests
  – RAM Cache tests

6. Click the Start button to begin the diagnostic tests and to watch the messages at the top of the window.

7. If all tests pass, continue on with the tests that require AppleTalk to be active. If a problem occurred, take the appropriate corrective actions and rerun the tests to verify the repair.

8. Choose Shutdown from the Special menu in *MacTest Pro*.

To run the remaining communication ports tests with AppleTalk active, follow these steps:

1. Make the required physical network connections (LocalTalk or EtherTalk) from the server to the network and verify the availability of another file server (either an AppleShare Server or a System 7 Macintosh with File Sharing turned on).

2. Boot the system from the startup hard drive and stop the A/UX startup process by clicking the Cancel window.

3. Open the Chooser and set AppleTalk to Active.

4. With the assistance of the system administrator, log onto the available AppleShare File Server (identified in step 1) and close the Chooser.

   Note the names of the file server and the volume that you have logged onto.

5. Create a New Folder on the server volume that was just mounted and leave the name of the folder "Untitled."

6. Insert the *MacTest Pro* disk and double-click its icon to start the application.

   Note the dialog box informing you that certain tests cannot run while AppleTalk is active.

7. Click the Setup button on the Communications test module and select the following tests:

    • Minimum Network test which tests the LocalTalk and/or EtherTalk connection
    • Network File Transfer test which tests the LocalTalk and/or EtherTalk data transfer

    To run the Network File Transfer Test, type in the file server name, file server volume name, and folder name from steps 4 and 5 into the designated fields.

8. De-select any test modules that you previously tested while AppleTalk was set to Inactive.

9. Click the Start button to begin the diagnostic tests and to watch the messages at the top of the window.

10. If all tests pass, quit *MacTest Pro* and remove the disk. If a problem occurred, take the appropriate corrective actions and rerun the tests to verify the repair.

Try the possible solutions in the order they are listed. If the first solution doesn't work, proceed to the next, and so forth.

System Problems	Solutions
Four-tone error chord plays at startup	1. If system boots from internal hard drive, disconnect SCSI cable from logic board and restart system. If startup sequence is normal, reinitialize hard drive. If error chord still sounds, replace hard drive. 2. If system boots from internal floppy drive, disconnect floppy drive cable and restart system. If startup sequence is normal, replace floppy drive. 3. If error chord still sounds at startup, replace logic board. Move customer's SIMMs to new logic board.
Eight-tone error chord plays at startup	1. Install four known-good DRAM SIMMs in Bank A and switch on the system. If no error chord sounds, test customer's SIMMs. (Switch system off, replace one known-good SIMM with customer SIMM. Switch system on. If no error chord sounds, customer SIMM is good. Repeat test for each SIMM.)
System doesn't power up—screen black, fan not running, LED not lit	1. Check power cables. 2. Plug monitor directly into wall socket and verify that monitor has power. 3. Replace power cord. 4. Replace power supply. 5. Replace logic board. Move customer's DRAM SIMMs to new logic board.
Clicking, chirping, or thumping sound	1. Replace power supply. 2. Replace logic board. Move customer's DRAM SIMMs to new logic board. 3. Replace floppy drive cable. 4. Replace floppy drive.
System shuts down intermittently	1. Make sure air vents at rear of system and on side cover are clear. 2. Replace power cord. 3. Check lithium battery voltage on logic board. If voltage is below 3.2 volts, replace battery. 4. Replace power supply. 5. Replace logic board. Move customer's DRAM SIMMs to new logic board.

Symptom/Cure Charts

System crashes or hangs intermittently	1. Make sure system software is 7.0.1 or later.
	2. Verify that software (applications, INITs, CDEVs, RDEVs, etc.) is compatible with System 7.
	3. Identify and replace defective DRAM SIMMs.
	4. Replace logic board. Move customer's SIMMs to new logic board.
	5. Replace power supply.

| System doesn't power up when monitor is not attached | 1. Attach monitor to system. (Unless system is configured as a server, it will not power up with monitor attached.) |
| | 2. If system is a server, install Virtual Monitor Switch Control panel to power up system. |

Video Problems	**Solutions**
Partial or whole screen bright and audio present, but no video information visible	1. Replace monitor. If replacing monitor corrects video problem, refer to appropriate *Service Source* manual for monitor troubleshooting information.
	2. Replace video cable.
	3. Reset Parameter RAM (Command-Option-P-R).
	4. Move video interface card (if installed) to a different slot.
	5. Replace video interface card (if installed).
	6. Replace logic board. Move customer's SIMMs to new logic board.
Screen is black, audio and drive operate, fan runs, and LED is lit	1. Adjust monitor brightness.
	2. Replace monitor. If replacing monitor corrects video problem, refer to appropriate *Service Source* manual for monitor troubleshooting information.
	3. Replace video cable.
	4. If video interface card is being used with monitor, move card to a different slot.
	5. If video interface card is being used with monitor, replace card.
	6. Identify and replace defective DRAM SIMMs.
	7. Replace logic board. Move customer's SIMMs to new logic board.
	8. Replace power supply.
	9. Reset Parameter RAM (Command-Option-P-R).
Screen is black, audio and drive don't operate, fan runs, and LED is lit	1. Replace video cable.
	2. Move video interface card (if installed) to a different slot.
	3. Replace video interface card (if installed).
	4. Identify and replace defective DRAM SIMMs.
	5. Replace logic board. Move customer's SIMMs to new logic board.
	6. Replace power supply.

Symptom/Cure Charts

Floppy Drive
Problems   **Solutions**

Drive doesn't operate   1. Verify that keyswitch is not turned to the Secure position.
                         2. Replace floppy disk.
                         3. Replace floppy drive cable.
                         4. Replace floppy drive.
                         5. Replace logic board. Move customer's DRAM SIMMs to new
                             logic board.
                         6. Replace power supply.

Drive runs continuously 1. Replace floppy disk.
                         2. Replace floppy drive cable.
                         3. Replace floppy drive.
                         4. Replace logic board. Move customer's DRAM SIMMs to new
                             logic board.

During system startup   1. Replace disk with known-good system disk.
disk ejects; display   2. Replace floppy drive cable.
shows icon with   3. Replace floppy drive.
blinking "X"   4. Replace logic board. Move customer's DRAM SIMMs to new
                             logic board.

Drive won't eject disk   1. Verify that keyswitch is not turned to the Secure position.
                         2. Switch power off and hold mouse button down while
                             switching power back on.
                         3. Replace floppy drive cable.
                         4. Replace floppy drive.
                         5. Replace logic board. Move customer's DRAM SIMMs to new
                             logic board.

Drive attempts to eject 1. Reseat floppy drive bezel and/or floppy drive so that slot
disk, but disk doesn't   in bezel aligns correctly with floppy drive.
eject   2. Eject disk manually with paper clip.
                         3. Replace floppy drive.

MS-DOS drive doesn't   1. Format all disks on MS-DOS drive first.
recognize disk
formatted on
SuperDrive

Symptom/Cure Charts

Hard Drive Problems **Solutions**

Single internal SCSI
drive doesn't operate;
drive doesn't spin

1. Replace SCSI cable.
2. Replace SCSI power cable.
3. Replace SCSI drive.

Drive doesn't appear
on desktop

1. Make sure each SCSI device has unique address.
2. Use HD SC Setup to initialize drive.

No internal SCSI
drives operate

1. Make sure each SCSI device has unique address.
2. Verify SCSI device termination.
3. Replace SCSI cable.
4. Replace power supply.
5. Replace logic board. Move customer's DRAM SIMMs to new
   logic board.

System works with
internal or external
SCSI devices, but not
with both

1. Make sure each SCSI device has unique address.
2. Replace external SCSI terminator.
3. Make sure internal SCSI devices are not terminated.
4. Troubleshoot external device using appropriate *Service
   Source* manual.

Peripheral Problems **Solutions**

Cursor doesn't move

1. Verify that the keyswitch is not turned to the Secure position.
2. Check mouse connection.
3. Inspect inside of mouse for buildup or other contaminants.
   Clean mouse.
4. If mouse was connected to keyboard, connect mouse to
   rear ADB port. If mouse now works, replace keyboard. If
   mouse doesn't work in any ADB port, replace mouse.
5. Replace logic board. Move customer's DRAM SIMMs to new
   logic board.

Cursor moves, but
clicking mouse button
has no effect

1. Replace mouse.
2. Replace logic board. Move customer's DRAM SIMMs to new
   logic board.

No response to any
key on keyboard

1. Verify that the keyswitch is not in the Secure position.
2. Verify keyboard connection to ADB port.
3. Replace keyboard cable.
4. Replace keyboard.
5. Replace logic board. Move customer's DRAM SIMMs to new
   logic board.

Release Notes

This document provides important late-breaking information about the Apple Workgroup Server 95. Most of this information is not included with the printed manuals that came with the server.

Do Not Create an A/UX Autorecovery Partition

The Apple HD SC Setup application allows you to create the partition called "A/UX Autorecovery" (also known as Eschatology) that is not supported by the server operating system. Creating this partition causes problems during startup.

Do Not Remove Currently Mounted Partitions

When using HD SC Setup, do not remove currently mounted partitions; doing so will cause system problems.

Use Custom Install When Adding a Hard Disk Larger Than 2 GB

If you expand your server by adding a hard disk larger than two gigabytes (GB), use the Custom Install option so that you can partition and mount the entire disk during the installation process. If you use Easy Install with a disk larger than 2 GB, there may be some unallocated free space left on the drive after installation is complete. If this situation arises, use HD SC Setup to partition and mount the remaining free space.

Do Not Move Files from / (root directory)

In order to start up, your server requires many of the files located in the / icon. This icon contains the files that make up the root directory of the UNIX file system. Many of those files are essential to startup, especially those located in the etc, Ubin, mac, and lib folders. While you can add to the contents of /, it is a good idea not to delete or move any of the pre-installed files; otherwise, your server could have problems starting up.

Formatting the Second Disk on a Database Server

If your server is one of the database configurations that includes two hard disk drives, the first drive is formatted for A/UX, and the second drive is formatted for the Macintosh operating system (HFS format). If you use the second drive for database services, be sure to check the documentation that came with your database application for instructions on hard disk formatting.

Limit of Three Apple CD 150 Drives, Six HFS Drives

You can attach up to six CD-ROM drives to the server, but no more than three of these should be Apple CD 150 drives. If you attach more than three Apple

CD 150 drives to your server, your system could freeze when you are using it. You can have up to six HFS-formatted drives attached to the server, for example, four CD-ROM drives and two HFS-formatted hard disk drives. The limit for A/UX-formatted drives is 20.

Do Not Use the Quadra 950 Color Addition

Some of the early Macintosh Quadra computers were supplied with a Color Addition extension. Do not copy this extension to your Apple Workgroup Server 95; installing the Color Addition extension does not enhance server functions and could cause problems.

Generic Disk Read and Write Failures

When one or more client systems are accessing files from a CD-ROM or hard disk, a message such as "Generic Disk Read c305d0s0 Failure" may appear. This message appears in the A/UX System Console window, accompanied by a system beep. If the failure message is followed by a "Retry successful" message, no further action is needed. If the failure message is followed by "Retry limit exceeded", then you may need to reformat the hard disk (after backing up files) or clean the CD-ROM disc. It is likely that only the system administrator will ever see disk read and write error messages; clients are unaffected by the problem.

Printing with the UNIX Print Utility

The manuals accompanying the server describe how to set up one printer for use with lpr, the UNIX print utility. However, if you need to configure multiple AppleTalk printers on your network for use with lpr, you need to perform additional steps including setting up a spooling directory for each printer to hold its print requests, and to set up filters and link them. The step-by-step procedure for configuring multiple AppleTalk printers for lpr is available to you on the A/UX Update and Information server. For instructions on accessing that server, see the file A/UX Update Server Info on the floppy containing these Release Notes.

Moving Apple Workgroup Server Disks Between Servers

Macintosh desktop information is stored on the server's / (root) volume for all A/UX file systems. If you move any disk other than the / volume to another server, you will need to rebuild the desktop. To rebuild the desktop, restart your Apple Workgroup Server 95 and wait until the "Starting Background Processes" startup screen has completed. Then, when the watch cursor appears, hold down the Command and Option keys until a dialog box displays "Do you want to rebuild the desktop?" Rebuilding the desktop may take several minutes.

This section details updated documentation information.

Command Changes

These commands are new or have information that was updated since the A/UX reference manuals were last printed. Use the "man" command to review the updated manual pages on-screen:

appletalk(1M)	esch(8)	mt(1)
appletalk(7)	escher(1M)	mtio(7)
asio(2)	eu(1M)	NETADDRS(4)
asiowait(2)	eupdate(1M)	newconfig(1M)
atp(3N)	fstab(4)	pap(3N)
Autologin(4)	gd(7)	pname(1M)
auxstartuprc(4)	intro(8)	sema_acq(2)
bzb(4)	kconfig(1M)	sema_rel(2)
catsearchd(1M)	loginrc(1M)	soundinput(7)
devnm(1M)	macgetty(1M)	startmac(1M)
dp(1M)	mount(1M)	StartupShell(8)
		tc(7)

Apple DocViewer

Your product includes the Apple *DocViewer* application, which lets you read on-screen versions of the product's manuals. For instructions on using the application, see the Apple DocViewer Quick Reference Card.

To obtain the best *DocViewer* performance and avoid potential problems, run the application on your local system. If you use a client system to run a server-based version of *DocViewer* (in other words, if you run *DocViewer* without installing the application and book files on the computer you are using to view the documentation), some features will not be available.

On-Line Documentation Reinstallation

All of the manuals for the Apple Workgroup Server 95 (except for *Setting Up and Administering Your Server*) are available to read on screen. You can remove and then reinstall these on-line manuals. To reinstall the manuals, follow the instructions in "Copying Individual Files from the CD-ROM" in Appendix A of *Setting Up and Administering Your Server*. Then open "/mnt" and copy the documentation files by selecting and dragging one or more of document icons (not the entire folder) to your hard disk. The full names of the files are as follows:

/Documentation/Basic Skills
/Documentation/Basic Skills.idx
/Documentation/Apple DocViewer Guide
/Documentation/Apple DocViewer Guide.idx
/Applications/Apple DocViewer v1.0
/Documentation/Server Admin for A/UX 3.0.1
/Documentation/Server Admin for A/UX 3.0.1.idx

For instructions on reinstalling the on-line documentation for *AppleShare Pro*, see the *DocViewer* section of these notes.

The total space required by the on-line documentation is approximately 9.5 MB.

The rest of this document pertains to *AppleShare Pro*, which is included with some Apple Workgroup Server 95 configurations.

Before Installing AppleShare Pro

Apple Workgroup Server 95 file and print configurations come with *AppleShare Pro* already installed. Before installing *AppleShare Pro*, pull down the Apple menu and check whether the AppleShare Pro alias appears. If this alias appears, *AppleShare Pro* is already on your server, and you can skip the installation procedure.

Installing New Workstation Software

Important: The new versions of AppleTalk and AppleShare workstation are for the client Macintosh computers only. They should not be installed on the Apple Workgroup Server 95.

Be sure that all client Macintosh systems install the new versions of the AppleTalk and AppleShare workstation software supplied with this product (See Chapter 1, "Getting Started," in the *AppleShare Pro Administrator's Guide* for more information on installing workstation software). Users of System 6 (Version 6.0.5 and later) and System 7 (Versions 7.0, 7.0.1, and 7.1) must upgrade to the new AppleShare workstation software to take full advantage of the features of *AppleShare Pro*. In particular, the new software considerably enhances a workstation's ability to receive server messages. If a workstation does not have the upgraded software installed, some server messages can be confusing—for instance, the messages that appear when a user's password has expired or needs to be changed (See Chapter 6, "Troubleshooting" in the *AppleShare Pro Administrator's Guide* for more information on server messages).

If you install (or reinstall) System 7 on a client Macintosh system, you need to reinstall the AppleTalk and AppleShare software.

Upgrading From Earlier Versions of AppleShare

If you are upgrading to *AppleShare Pro* from either *AppleShare Version 2.0* or *AppleShare 3.0*, be sure to read the upgrade instructions provided with this product (see Chapter 1, "Getting Started" in the *AppleShare Pro Administrator's Guide* for more information on upgrading from earlier versions of AppleShare).

For optimal performance, all Macintosh hard disks connected to the Apple Workgroup Server 95 should be prepared for use by the A/UX 3.0.1 operating system. Back up the data on each hard disk and then refer to the *Setting Up*

· *and Administering Your Server* guide for special instructions on preparing your hard disks for use with the A/UX operating system.

After upgrading your server, use the AppleShare Pro Admin program to provide access to the volumes or folders that you want to share with users. Instructions for converting your current AppleShare Server 3.0 Users and Groups Data File are provided in Chapter 1 of the *AppleShare Pro Administrator's Guide*. You need to perform one extra step in addition to the steps described in the guide. After step 5, restart the Apple Workgroup Server 95. Then, after the server restarts, proceed with step 6 to start the AppleShare Pro Admin program.

Retaining Your Current Server Volumes

Instructions for retaining your current server volumes are provided in Chapter 1 in the *AppleShare Pro Administrator's Guide*.

To restore the data and access priveleges from the existing Macintosh server, you need to create a new folder on the / volume—for example, in the Shared Data folder. Then using the Retrospect program, define the new folder as a subvolume and restore your *AppleShare 2.0* or *3.0* volumes to it. Use the AppleShare Pro Admin program to provide access to the volumes or folders that you want to share with users.

Waiting for System Repair

When the system restarts after a power failure or other crash, the file system is automatically repaired. AppleShare waits until the file system, including all Macintosh information, is completely repaired before it registers itself on the network. If you have a large number of hard disks connected to your server, completing this repair process may take several minutes.

Sharing a Network with an AppleTalk Router

A server running *AppleShare Pro* can share a network with an AppleTalk router; however, if the router is visible to the server (if it is on the same local network segment), you need to quit *AppleShare Pro* or shut down the server before connecting the router.

Reinstalling AppleShare Pro On-Line Documentation

If you need to reinstall the *AppleShare Pro* on-line documentation, you can do so at any time by using the *AppleShare Pro Installer* CD-ROM. Use the Installer program to perform a custom installation. The on-line documentation is listed as an option in the Custom Install window.