

Pro Tools Storage Guide

Version 1.0 for TDM or LE Systems on Windows or Macintosh

Digidesign

2001 Junipero Serra Boulevard
Daly City, CA 94014-3886 USA
tel: 650-731-6300
fax: 650-731-6399

Technical Support (USA)

tel: 650-731-6100
fax: 650-731-6384

Product Information (USA)

tel: 650-731-6102
tel: 800-333-2137

International Offices

Visit the Digidesign Web site
for contact information

Web Site

www.digidesign.com



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AVID PART NUMBER 0130-05772-01 05/03

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chapter 1

Quick Start

This guide covers three types of storage for Pro Tools systems: stand-alone SCSI drives, SCSI-based MediaDock systems, and FireWire drives.

This chapter includes quick start instructions for installing each type of storage. Complete installation and operation instructions are provided in the remainder of this guide.

SCSI Drives and MediaDock Systems

Installing a SCSI Drive

If you are installing a standalone Avid SCSI drive, start by connecting the SCSI drive to your computer:

To connect a SCSI drive:

- 1 Shut down your computer.
- 2 Connect the AC power cord to the drive.
- 3 Connect a SCSI cable between the SCSI host bus adapter (HBA) in the computer and either of the connectors on the SCSI drive.
- 4 Make sure the SCSI chain is properly terminated. If the SCSI drive is last in the SCSI chain, connect a SCSI terminator to the second connector on the SCSI drive.

- 5 Set the SCSI ID on the drive to a unique number. Do not use ID 7, which is reserved for the SCSI HBA.

- 6 Turn on your SCSI drive, then turn on your computer.

- 7 Continue with “Initializing a SCSI Drive” on page 2.

Installing a MediaDock Chassis

If you are installing an Avid MediaDock chassis, start by connecting the chassis to your computer, then inserting a MediaDock shuttle drive in the chassis.

To connect a MediaDock chassis:

- 1 Shut down your computer.
- 2 Connect the AC power cord to the chassis.
- 3 Connect a SCSI cable between your system and the appropriate SCSI connector on the chassis.
- 4 Make sure the SCSI chain is properly terminated. If the MediaDock chassis is last in the SCSI chain, connect a SCSI terminator to the appropriate SCSI connector on the chassis.
- 5 Insert a MediaDock shuttle in the chassis by opening the top handle on the shuttle, inserting the drive into an available drive bay, and closing the top handle.

6 Set the SCSI ID on the MediaDock shuttle to a unique number. Do not use ID 7, which is reserved for the SCSI HBA.

7 Turn on the MediaDock chassis, then turn on your computer.

8 Continue with “Initializing a SCSI Drive” on page 2.

Initializing a SCSI Drive

Before you can use a SCSI drive for recording, you need to initialize the drive for your computer’s operating system.

Windows

Initialize the SCSI drive with the Windows XP Disk Management Tool. Choose NTFS as the File System.

Mac OS X

Initialize the SCSI drive with the Mac OS X Disk Utility. Choose Mac OS Extended (HFS+) as the File System.

Mac OS 9

Initialize the SCSI drive with the ATTO ExpressPro-Tools application (included on the Pro Tools Installer CD-ROM). Choose Mac OS Extended (HFS+) as the File System.

If you are running Mac OS 9, do not use the Digital Audio mode page settings in ATTO ExpressPro-Tools. In the next step, you will use DigiDriveTuner to set the optimal mode pages for use with Pro Tools on Mac OS 9.



When formatting SCSI drives larger than 60 GB for use on a Macintosh, use the HFS+ file system. If you must use regular HFS, you should partition the drive so that each partition is 69,695 MB or less. Otherwise, you will not be able to transfer files over 2 GB in size.

Tuning a SCSI Drive

After initializing a SCSI drive, you should tune the drive using the supplied utility software for your operating system.

Windows XP and Mac OS X

Install the DigiDrive Storage Manager application from the CD-ROM included with the drive.

Launch the DigiDrive Storage Manager application and click Tune. This optimizes the mode pages of all connected Avid and Digidesign SCSI drives for use with Pro Tools.



DigiDrive Storage Manager only works on Avid and DigiDrive SCSI drives. It does not affect FireWire drives, or drives from other manufacturers.

Mac OS 9

Locate the DigiDriveTuner application on the CD-ROM included with the drive, and drag it to the Pro Tools Utilities folder on your system drive.

Launch the DigiDriveTuner application. When DigiDriveTuner detects a SCSI drive, it will automatically optimize the drive's mode pages for use with Pro Tools.



DigiDriveTuner only works on Avid and DigiDrive SCSI drives. It does not affect FireWire drives, or drives from other manufacturers.

FireWire Drives

To set up your FireWire drive for use with Pro Tools, you must connect it to your computer, then format it for your computer's operating system.

Installing a FireWire Drive

First, connect the FireWire drive to your computer.

To connect a FireWire drive:

- 1 Connect the AC power cord to the drive.
- 2 Connect the 6-pin FireWire cable between your system and either of the FireWire connectors on the FireWire drive.



Be sure to insert the FireWire cable connector in the correct direction. Inserting the connector upside down can damage the FireWire bus on the computer.

Intializing a FireWire Drive

Before you can use a FireWire drive for recording, you need to initialize the drive for your computer's operating system.

Windows

To initialize a FireWire drive for Windows:

- 1 Open the Windows Disk Management Utility.
- 2 Select Basic disk type.
- 3 Select Primary as the partition.
- 4 Select NTFS as the File System.
- 5 Select Perform Quick Format.
- 6 Type a name for the drive partition and click Next.

Macintosh

To initialize a FireWire drive for Mac OS X:

- 1 Turn on the FireWire drive.
- 2 Launch the Disk Utility application, located in the Utilities folder inside the Applications folder.
- 3 Click the Erase tab.
- 4 Select the drive you want to initialize in the column on the left side of the window.
- 5 Choose the format for the drive, and type a name for the volume.
- 6 Click Erase.

To initialize a FireWire drive for Mac OS 9:

- 1 Turn on the FireWire drive. An initialization dialog appears in the Finder.
- 2 Select HFS+ from the Format menu.
- 3 Type a name for the FireWire drive and click Initialize.
- 4 Click Continue.

chapter 2


SCSI Drive Installation

Connecting SCSI Drives

This section covers connection of SCSI drives to Pro Tools systems. For information on initializing SCSI drives, refer to Chapter 5, “Drive Management for Windows XP” or Chapter 6, “Drive Management for Macintosh.”

SCSI Cable Requirements

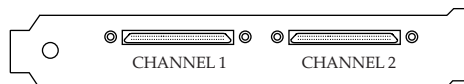
Use only high-quality LVD SCSI cables when you are attaching a SCSI drive to the SCSI bus on your system.

 For more information on SCSI cables, see Appendix A.

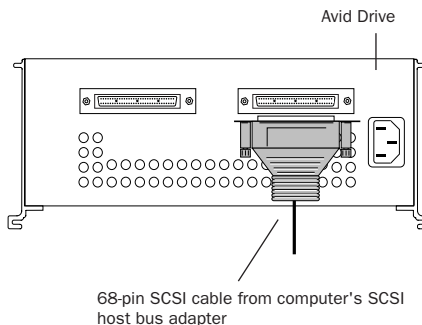
The following instructions are for connecting SCSI drives to any supported dual-channel SCSI host bus adapter (HBA) card installed in the computer.

To connect SCSI drives:

- 1 Turn off power to both the computer and the SCSI drive.
- 2 Attach a SCSI cable from either connector on the SCSI drive to a SCSI port on the SCSI HBA card in the computer. If you are only using one cable, connect it to the port labeled Channel 1.



Dual-Channel SCSI host bus adapter connectors

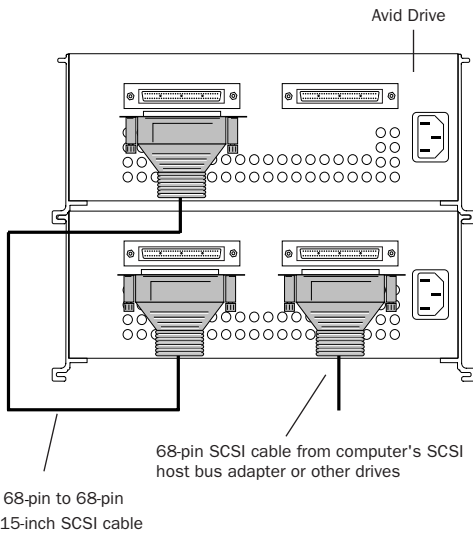


SCSI cable to SCSI drive connection

3 Connect additional drives according to the type of media they will be storing:

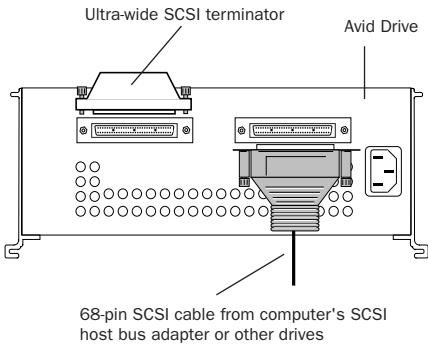
- If you will be working with audio only, connect an equal number of audio drives to each of the two channels on the SCSI HBA card.
- If you are working with both audio and video files, connect all audio drives to one channel on the SCSI HBA card, and all video drives to the other channel.

4 To daisy-chain SCSI drives, use a SCSI cable to attach the remaining connector on the first SCSI drive to a connector on the second SCSI drive.



Additional SCSI drive connection

5 Attach a SCSI terminator to the remaining connector on the last SCSI drive in each drive chain.



Ultra, Wide SCSI terminator connection

6 Attach an AC power cord to the AC power connector on the back of each drive.

Connecting Different SCSI Drive Types

You can mix Avid drives along with other wide drives, as well as with narrow drives, on the same SCSI bus. This allows you to continue using your narrow drives as you expand your system's storage capability.

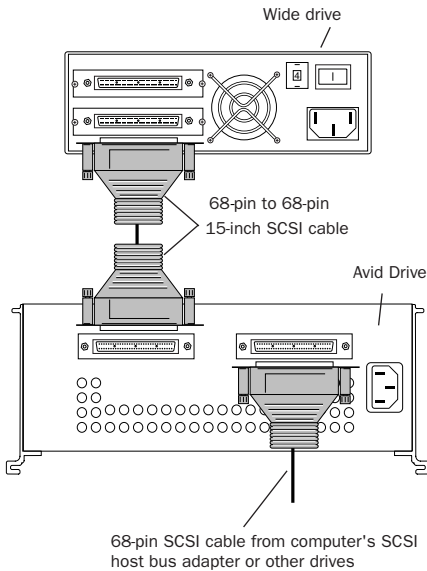
When mixing wide drives and narrow drives on the same SCSI bus, the following conditions apply:

- ◆ Mixing an ultra-wide LVD drive with either a single-ended wide or a narrow drive on an LVD bus causes the bus to default to single-ended mode. When you mix drive types, cable length restrictions for single-ended SCSI chains apply.
- ◆ Place the wide (68-pin) drives physically on the SCSI bus before the narrow (50-pin) drives.
- ◆ PCI-based SCSI buses that contain a mixture of wide and narrow drives can have up to eight drives on the SCSI bus.
- ◆ To connect a 50-pin narrow SCSI drive to a 68-pin SCSI port or cable, use a wide-to-narrow terminating adapter (68-pin to 50-pin) for the connection between the last wide drive and the first narrow drive. The adapter terminates unused data lines in the cable to ensure data integrity on the SCSI bus.

The following instructions are for connecting a mix of wide and narrow SCSI drives to a system that also includes Avid SCSI drives.

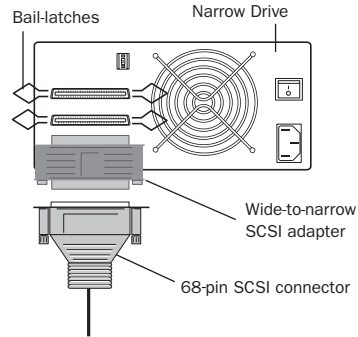
To connect wide and narrow drives:

- 1 Connect any Avid SCSI drives to your system first.
- 2 Connect other wide drives second. Use a 68-pin to 68-pin SCSI cable to attach the remaining SCSI connector on the last Avid drive in the drive chain to a SCSI connector on the wide drive.



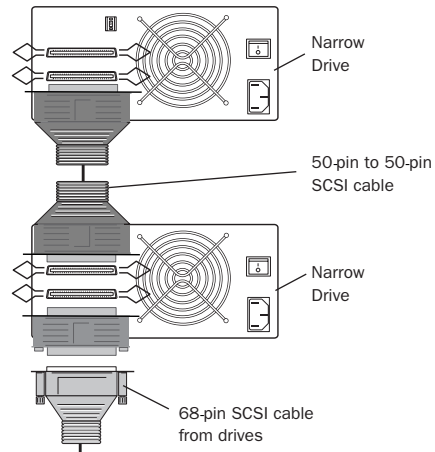
Additional wide drive connection

- 3 Daisy-chain any additional wide drives to the first wide drive.
- 4 Connect narrow drives last. Locate an ultra wide-to-narrow SCSI adapter. The adapter has a 68-pin female connector on one end and a 50-pin Centronics® connector on the other end.
- 5 Attach the wide-to-narrow SCSI adapter to the first narrow drive.



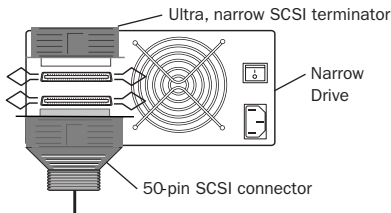
SCSI cable to narrow drive connection

- 6 Use a 68-pin to 68-pin SCSI cable to attach the remaining SCSI connector on the last wide drive in the drive chain to the wide-to-narrow SCSI adapter.
- 7 Daisy-chain any additional narrow drives to the first narrow drive using cables with 50-pin Centronics connectors on both ends.



Additional narrow drive connection

8 Attach a 50-pin SCSI terminator to the remaining SCSI connector on the *last* narrow drive in each drive chain.



Ultra-,narrow SCSI terminator connection

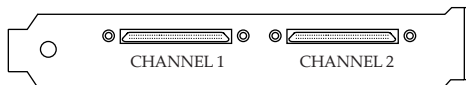
9 Attach an AC power cord to the AC power connector on the back of each drive.

Connecting a MediaDock Chassis

The following instructions are for connecting a MediaDock II chassis to any supported dual-channel SCSI host bus adapter (HBA) card installed in the computer.

To connect a MediaDock chassis:

- 1** Turn off power to both the computer and the chassis.
- 2** Attach a SCSI cable to a SCSI port on the SCSI HBA card in the computer. If you are only using one channel, connect it to the port labeled Channel 1.



Dual-Channel SCSI HBA connectors

3 Connect the other end of the SCSI cable to the SCSI port on the first bay of the MediaDock chassis.

4 If you have two MediaDock shuttle drives installed in the MediaDock, and are using a single SCSI channel, connect the other SCSI port on the first bay and to a port on the second bay (see Figure 1 on page 9).

– OR –

If you have two MediaDock shuttle drives installed in the MediaDock, and are using both SCSI channels, repeat steps 2–3 to connect the second SCSI bus to channel 2 of the SCSI HBA (see Figure 2 on page 9).

5 Connect additional MediaDock chassis and shuttle drives according to the type of media they will be storing:

- If you will be working with audio only, connect an equal number of shuttle drives to each of the two channels on the SCSI HBA card.
- If you are working with both audio and video files, connect all audio drives to one channel on the SCSI HBA card, and all video drives to the other channel.

You can daisy-chain up to four MediaDock chassis (containing eight MediaDock shuttles) on a single SCSI bus.

Figure 3 illustrates four MediaDock chassis on a single SCSI channel, and Figure 4 illustrates four MediaDock chassis on two SCSI channels.

6 Attach a SCSI terminator to the remaining connector on the last SCSI drive in each drive chain.

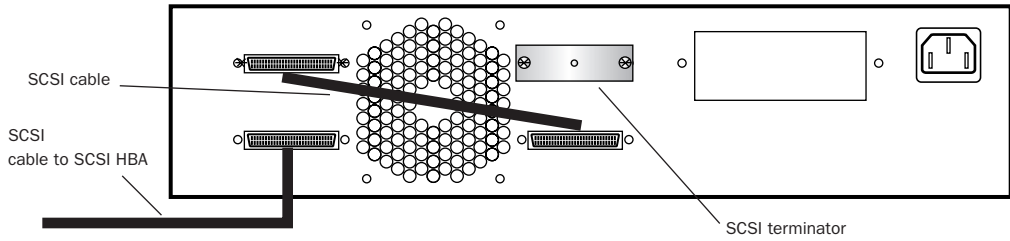


Figure 1. Single MediaDock chassis, single-channel SCSI with termination

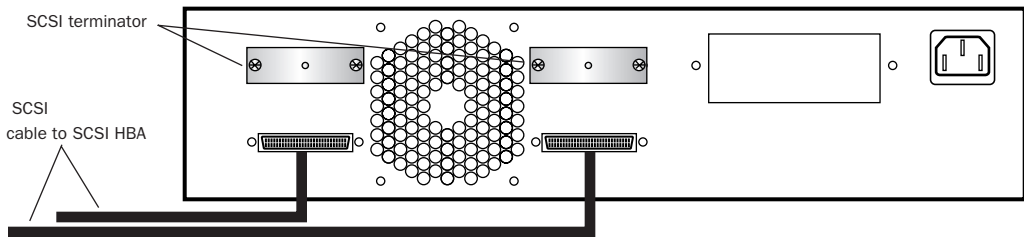


Figure 2. Single MediaDock chassis, dual-channel SCSI connections with termination

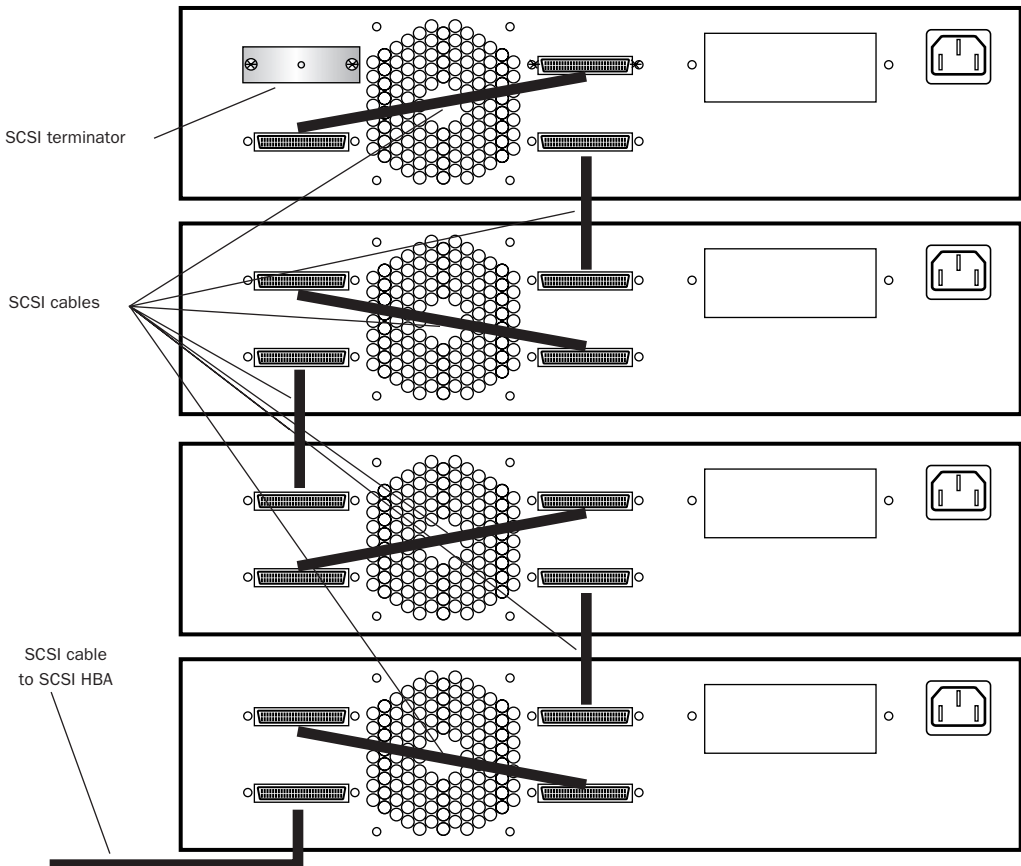


Figure 3. Configuration using four MediaDock chassis, single channel SCSI connections with termination

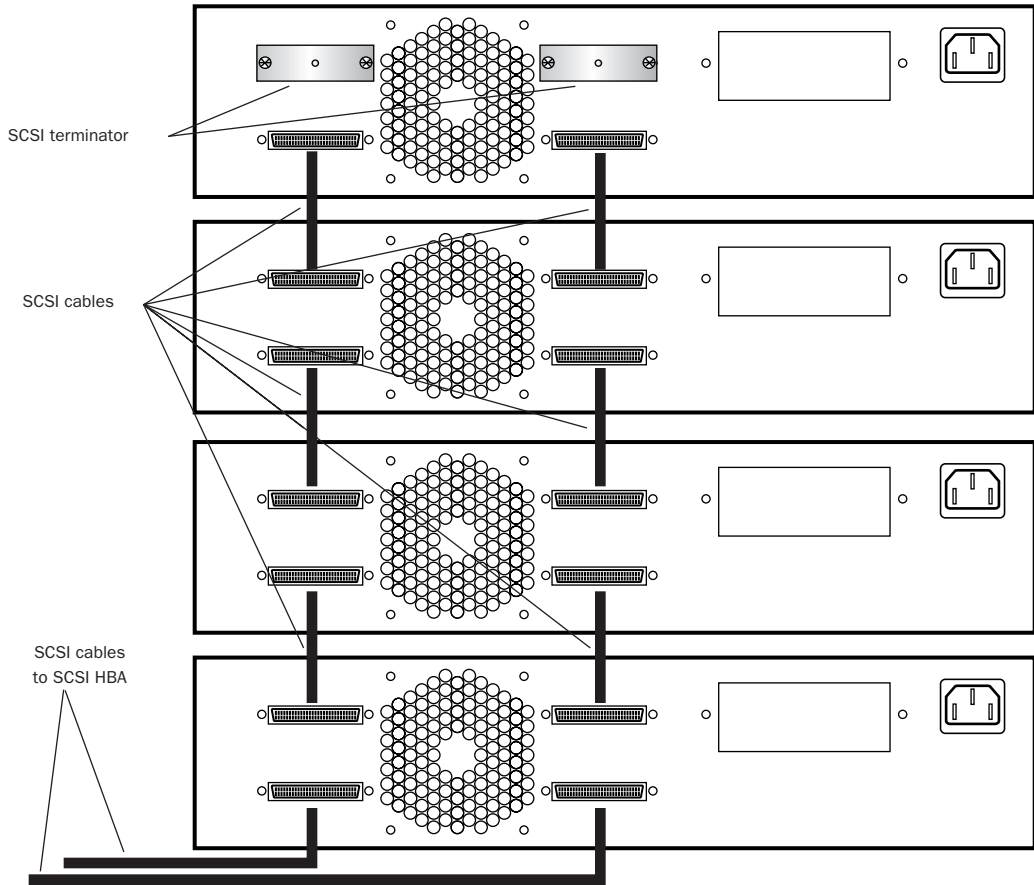


Figure 4. Configuration using four MediaDock chassis, dual-channel SCSI connections with termination

Assigning SCSI IDs

SCSI ID Requirements

Your system identifies the SCSI drives connected to the SCSI bus by the drive's assigned SCSI ID. When you are assigning SCSI IDs to the drives, the following conditions apply:

- ◆ Each device on each SCSI bus, including the system SCSI accelerator board, must have a unique SCSI ID.
- ◆ SCSI ID 7 is reserved for each SCSI accelerator board in your system. Do not assign SCSI ID 7 to a SCSI drive.
- ◆ Narrow (50-pin) SCSI drives can only use SCSI IDs 0 through 6.
- ◆ Wide (68-pin) SCSI drives, including Avid drives, can use SCSI IDs 0 through 6 and 8 through 15.

Avoiding SCSI ID Conflicts

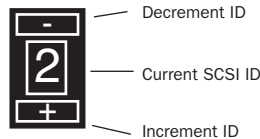
When you add a new drive to your system, check which SCSI IDs are currently in use. Assigning duplicate SCSI IDs can cause problems such as system errors, the drive not appearing on the desktop, multiple copies of the same drive appearing on the desktop, possible data corruption, or system startup failures.

Digidesign recommends that you set the SCSI IDs for the devices on each SCSI bus in sequential order, that is, starting with the device attached closest to the Digidesign system as ID 0.

- ⚠ *Do not set the SCSI ID for any drive on any SCSI bus to SCSI ID 7. This can prevent the drive from mounting on the desktop, or prevent your Digidesign system from starting up correctly.*

To set a SCSI ID:

- 1 Turn off the computer, and make sure the SCSI drive or MediaDock power is off.
- 2 Locate the SCSI ID switch on the front of the SCSI drive or MediaDock chassis.
- 3 Set the SCSI ID to an available SCSI ID on the SCSI bus by pressing the buttons on the SCSI ID switch.



SCSI ID Switch

There are two versions of SCSI ID switch used with Avid drives. One version uses the numbers 0 through 15, and the other version uses the numbers 0 through 9 and the letters A through F. Use the table below to associate the letters A through F with a SCSI ID number.


Numbers Associated with SCSI Switch Letters

| Switch Letter | SCSI ID Number |
|---------------|----------------|
| A | 10 |
| B | 11 |
| C | 12 |
| D | 13 |
| E | 14 |
| F | 15 |


- 4 Turn on the SCSI drives or MediaDock and start the computer. The drive will appear on the system with the new SCSI ID.

SCSI Termination

Your computer's SCSI chain must be properly terminated or your system will not function correctly. Connect an LVD SCSI terminator to the last drive on each SCSI bus.

 *For more information on SCSI terminators, see Appendix A.*

The drive should use either an external terminator plug or have its internal terminator enabled. (Avid drives do not use internal termination.) If you are using an external terminator, Digidesign recommends that you use only the highest quality active SCSI terminator to ensure data integrity.

 *Do not enable internal termination and install an external terminator plug on the same drive. This will cause SCSI errors. See your hard drive's documentation for information on the type of termination it uses.*

Disconnecting SCSI Drives

When you disconnect a SCSI drive, you first need to turn off the computer and all SCSI drives.

To disconnect a SCSI drive:

- 1 Quit Pro Tools.
- 2 Turn off the computer.
- 3 Turn off all the SCSI drives connected to the system.
- 4 Disconnect the SCSI drive.
- 5 Reconnect any remaining SCSI drives and make sure the SCSI chain is properly terminated.

Inserting a MediaDock Shuttle

Each MediaDock chassis provides shuttle bays for two MediaDock shuttles. This section explains how to install a MediaDock shuttle in the MediaDock chassis.

Each MediaDock shuttle has two handles. The bottom handle is stationary, while the top handle can be pulled outward from the left of the MediaDock shuttle by pressing a latch on the inside of the handle (see Figure 5). When you close the top handle with the MediaDock shuttle partially in the MediaDock chassis, the lever catches the chassis and gently connects the MediaDock shuttle into the MediaDock backplane.

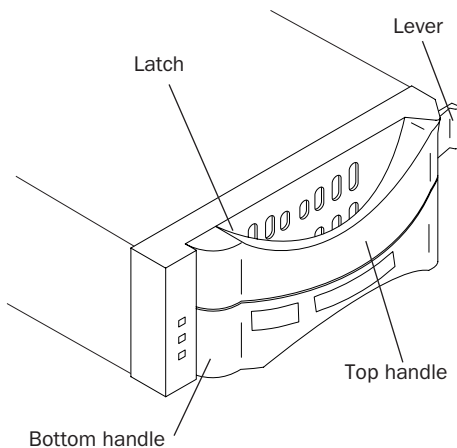
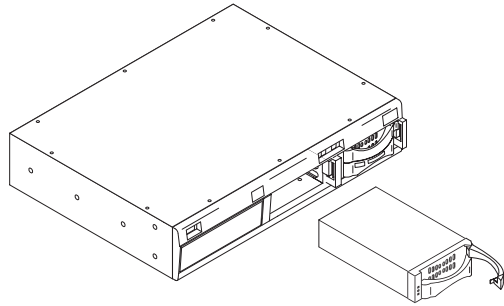


Figure 5. MediaDock Shuttle latch and handles

To install a MediaDock shuttle:

1 Carefully align the MediaDock shuttle in front of the empty bay.



Inserting the MediaDock shuttle

2 Pull the top handle outward to the open position.

3 Insert the MediaDock shuttle into the bay and gently push until you feel the contact with the inside of the MediaDock chassis.

4 Gently but firmly close the top handle.

The MediaDock shuttle will automatically spin up when power is applied to the MediaDock chassis. If the MediaDock chassis is already powered up and you insert a MediaDock shuttle, the shuttle will spin up as soon as it is fully latched into the MediaDock chassis.

Replacing a MediaDock Shuttle

You can remove the shuttle in several different ways, depending on your operating system, the utilities available to you, and whether the computer is on.

To make sure the operating system can see the replacement MediaDock shuttle in the system, use this *general procedure*:

To remove a MediaDock shuttle on any system:

1 Identify the MediaDock shuttle you want to remove.

This can be done by accessing the MediaDock shuttle and watching the activity LED on the shuttles.

2 Make sure you are not accessing the MediaDock shuttle.

3 Shut down your computer. (It is not necessary that you turn off the MediaDock chassis.)

4 Release the latch and open the handle on the shuttle to disengage the shuttle from the back-plane.

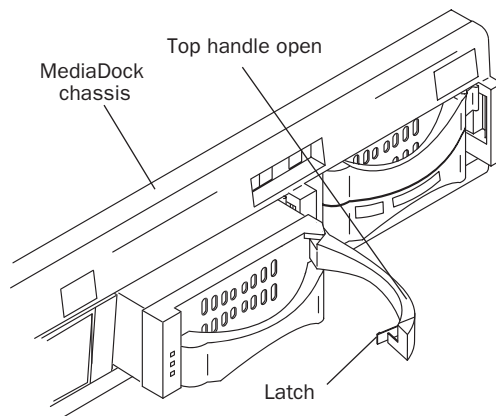


Figure 6. Letting the MediaDock Shuttle spin down

5 Allow the drive to spin down. Wait 30 seconds before fully removing the shuttle to ensure that heads are parked.

6 Insert the new MediaDock shuttle as explained in “Inserting a MediaDock Shuttle” on page 14.

7 Allow the MediaDock shuttle to spin up. This typically takes less than 30 seconds.

8 Turn on (or reboot) your computer. The new MediaDock shuttle can be seen by the operating system.

WarmSwapping a MediaDock Shuttle

You can also *WarmSwap* MediaDock shuttles in and out of a MediaDock chassis. WarmSwapping refers to the process of unmounting a drive, replacing it, and mounting the new drive without shutting down your computer and while the MediaDock power is still on.

⚠ *Before you change any MediaDock shuttle, be sure to unmount the drive. Failure to unmount the drive can cause damage or data loss.*

Windows

To WarmSwap a MediaDock shuttle in Pro Tools 6 and higher:

- 1 Choose Windows > Show Workspace.
- 2 Select a drive (volume) in the Workspace browser.
- 3 Choose Unmount from the Browser menu.
- 4 Release the latch and open the handle on the shuttle to disengage the shuttle from the back-plane (see Figure 6 on page 15).
- 5 Allow the drive to spin down. Wait 30 seconds before fully removing the shuttle to ensure that the heads are parked.
- 6 Remove the MediaDock shuttle.
- 7 Insert the new MediaDock shuttle and allow it to spin up. This can take up to one minute.
- 8 Assign a drive letter to the new MediaDock shuttle.

The new drive automatically appears in the Workspace browser.

To WarmSwap a MediaDock shuttle in Pro Tools 5.x and lower:

- 1 Quit Pro Tools.
- 2 Right-click the My Computer icon and choose Manage from the pop-up menu.
- 3 Select Disk Management.
- 4 In the Disk Management tool window, choose Action > All Tasks > Change Drive Letter and Paths.
- 5 Click Remove. The disk is unmounted.
- 6 Release the latch and open the handle on the shuttle to disengage the shuttle from the back-plane (see Figure 6 on page 15).
- 7 Allow the drive to spin down. Wait 30 seconds before fully removing the shuttle to ensure that the heads are parked.
- 8 Remove the MediaDock shuttle.
- 9 Insert the new MediaDock shuttle and allow it to spin up. This can take up to one minute.
- 10 In the Disk Management tool, choose Action > Rescan Disks.
- 11 Assign a drive letter to the new MediaDock shuttle.

Macintosh

To WarmSwap a MediaDock shuttle in Pro Tools 6 and higher:

- 1 Choose Windows > Show Workspace.
- 2 Select a drive (volume) in the Workspace browser.
- 3 Choose Unmount from the Browser menu.
- 4 Release the latch and open the handle on the shuttle to disengage the shuttle from the back-plane (see Figure 6 on page 15).
- 5 Allow the drive to spin down. Wait 30 seconds before fully removing the shuttle to ensure that the heads are parked.
- 6 Remove the MediaDock shuttle.
- 7 Insert the new MediaDock shuttle and allow it to spin up. This can take up to one minute.
- 8 Scan the SCSI bus using ATTO ExpressStripe or any other SCSI utility to identify and mount the new drive.

The new drive automatically appears in the Workspace browser.

To WarmSwap a MediaDock shuttle in Pro Tools 5 and lower:

- 1 Quit Pro Tools.
- 2 Unmount the drive by dragging its icon on the Desktop to the trash.
- 3 Release the latch and open the handle on the shuttle to disengage the shuttle from the back-plane (see Figure 6 on page 15).
- 4 Allow the drive to spin down. Wait 30 seconds before fully removing the shuttle to ensure that the heads are parked.
- 5 Remove the MediaDock shuttle.
- 6 Insert the new MediaDock shuttle and allow it to spin up. This can take up to one minute.
- 7 Scan the SCSI bus using ATTO Express-Pro Tools, ATTO ExpressStripe, or any other SCSI utility to identify and mount the new drive.

chapter 3

FireWire Drive Installation

Connecting FireWire Drives

This section covers connection of FireWire drives. For information on initializing FireWire drives, refer to Chapter 5, “Drive Management for Windows XP” or Chapter 6, “Drive Management for Macintosh.”

FireWire Cable Requirements

The FireWire cable between the computer and the first drive (or between any two ports) cannot exceed 14.76 feet (4.5 meters).

The total FireWire cable length from the system to the last drive cannot exceed 236 feet (72 meters).

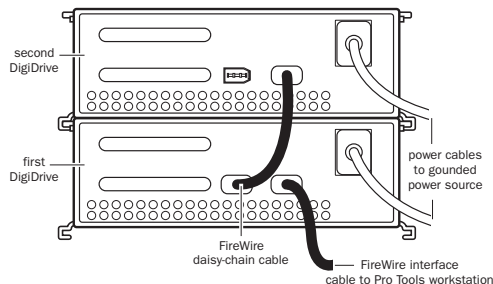
Number of FireWire Drives

Digidesign has qualified configurations containing a maximum of four FireWire drives daisy-chained to a Pro Tools workstation.

Either FireWire connector on the drive can be used to connect to the system and other drives.

To connect FireWire drives:

- 1 Attach a FireWire cable from either connector on the FireWire drive to a FireWire port on the computer.
- 2 Daisy-chain any additional FireWire drives to the first FireWire drive.




Connecting FireWire drives

FireWire Termination

FireWire drives do not require termination.


Connecting Other FireWire Devices

If you need to connect other FireWire devices (such as a camera or video deck) in addition to your FireWire drives, you can ensure maximum performance by daisy-chaining all drives to one FireWire bus and any other devices to a second FireWire bus.

 *Computers with 2 FireWire ports do not necessarily have 2 FireWire busses. The 2 ports may be on a single bus. (Refer to your computer manufacturer's documentation for details.) Depending on your needs, you may want to add an additional FireWire bus card to your computer.*

Hot-Swapping FireWire Drives

You can connect or disconnect a FireWire drive without shutting down your computer. This is referred to as “hot-swapping” a drive.

 *Before you hot-swap a FireWire drive, be sure to unmount the drive and turn off power to the drive before disconnecting it from the computer. Failure to unmount and turn off the drive can cause damage or data loss.*

Connecting a FireWire Drive

To connect a FireWire drive while the computer is running:

- 1 Do one of the following:
 - With Pro Tools 6 and higher, you can leave Pro Tools running.
 - With Pro Tools 5.x and lower, quit Pro Tools.


- 2 Connect the FireWire cable to the system and turn on the FireWire drive.

The FireWire drive appears in the task bar as a HotPlug/Eject icon (Windows) or on the Desktop (Mac OS).

Disconnecting a FireWire Drive

To disconnect a FireWire drive with Pro Tools 6 and higher:

- 1 Choose Windows > Show Workspace.
- 2 Select a drive (volume) in the Workspace browser.
- 3 Choose Unmount from the Browser menu.
- 4 Turn off the FireWire drive and disconnect it from the computer.

 *Always use the Unmount command in the Workspace browser menu to unmount volumes, or quit Pro Tools and then unmount the volume from the computer operating system. Do not use any other method to unmount a volume while Pro Tools is launched.*

To disconnect a FireWire drive with Pro Tools 5.x and lower:

- 1 Quit Pro Tools and make sure that all open applications are idle.
- 2 Do one of the following:
 - In Windows, click the HotPlug/Eject icon on the right side of the taskbar and choose the FireWire drive you want to unmount from the pop-up menu.
 - On Macintosh, drag the FireWire drive icon from the Desktop to the Trash.
- 3 Turn off the FireWire drive and disconnect it from the computer.

chapter 4

System Performance Guidelines

Pro Tools systems have strict hard drive requirements. The recording and playback performance of your system depends on several factors.

For the latest information on Pro Tools drive requirements and performance, refer to the *Hard Drive Minimum Requirements* in the Digidesign Compatibility documents at www.digidesign.com/compto.

Factors Affecting System Performance

Hard Drive Performance The faster the drive's seek time and data transfer rate, the better. The data transfer rate required for 32-track, 24-bit performance (at a sample rate of 44.1 kHz) is 4.04 MB per second of sustained throughput. This rate must be reflected in the performance of one or more of the drives (and for SCSI drives, in the SCSI subsystems in your computer) to achieve this level of performance.

Processor Speed The faster the computer's processor speed, the better. Overall system performance can affect track count.

DAE Playback Buffer Size Refer to the *Getting Started Guide* that came with your system for information on DAE Playback Buffer size and its effect on system performance.

Edit Density The number of edits per second affects the number of times that a drive must seek to play audio. Sessions with higher edit density are more demanding on hard drives than sessions with lower edit density. While most Pro Tools sessions have a low to moderate number of edits, extensive use of crossfades or processes such as Beat Detective can create high edit density in a session.


Hard Drive Performance Tips

Use at least two drives You can improve performance by allocating audio files between two or more hard drives. It is best to use drives that have similar performance characteristics.

Minimize cable length Do not exceed the maximum cable length for your drive type. Note that cable length includes the cabling inside the drive enclosures themselves—which can be up to 12 inches.

- With SCSI Drives, the maximum cable length that can be used on a wide single-ended SCSI bus is 3 meters if you are using fewer than four devices, or 1.5 meters if you are using four or more devices. If you are running the drive in LVD mode, the maximum SCSI cable length is 12 meters.
- With FireWire drives, each drive in the system must be within 14.76 feet (4.5 meters) of the next bus connector. The maximum total bus length cannot exceed 236 feet (72 meters).

Keep audio files on one partition per drive Avoid distributing a session's audio files over different partitions on the same drive, as this will slow drive performance.

 *Round Robin Disk Allocation in Pro Tools is not supported on systems with partitioned hard drives.*

Consolidate audio regions If you suspect that you are receiving poor drive performance due to high edit density, consider using the Consolidate Selection command in Pro Tools for heavily edited tracks. This will reduce the number of seeks required.

Keep sessions on the same drive type Do not spread sessions across different types of drives. For example, if your session has audio on a FireWire drive, you cannot also have audio for that session on a SCSI drive or an internal drive.


For details on consolidating audio and allocation of tracks to drives, refer to the *Pro Tools Reference Guide*.

Drive Management for Windows XP

Initializing Drives

To prepare an audio drive for use with Pro Tools, you need to initialize it. In addition, you may want to periodically re-initialize the drives on your Digidesign system to improve overall drive performance.

When you initialize a drive, all data on the drive is permanently erased, and the partition map and directory structure are re-created. It is best to initialize drives when you are between projects, or when you are certain the media files and other data on the drives are no longer needed.

 *Initializing a drive destroys all the data on the drive. Make sure you back up all critical data on a drive before you initialize it.*


Partitions on Audio Drives

Windows drives require at least one partition. You can format your entire audio drive to consist of one partition, or you can create multiple partitions on a single drive as a way to manage files and projects.

Pro Tools does not require specific partition sizes, so a range of partitioning schemes are possible. However, while creating multiple partitions can improve drive performance with complex sessions (when the session is contained in a single partition), small partitions can limit the size of audio files and sessions.

Choosing a File System

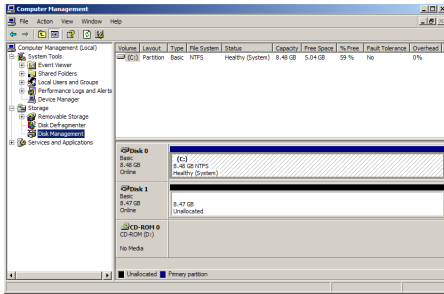
Pro Tools on Windows XP supports the NTFS and FAT32 file systems. In most cases, NTFS is recommended.

 *If you plan to connect your drive to a Mac OS X system, you may want to use FAT32. Mac OS X will mount a FAT32 drive, allowing you to transfer your files to a Mac OS drive (HFS or HFS+) for playback.*

The Windows XP Disk Management utility limits FAT32 partitions to a size of 32 GB. If your drive is larger than 32 GB, either create multiple FAT32 partitions smaller than 32GB, use the NTFS file system, or use a partitioning application such as PartitionMagic® to create partitions larger than 32 GB.

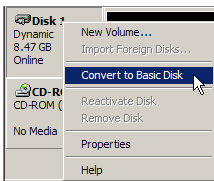
To initialize a drive in Windows XP:

- 1 Right-click My Computer and choose Manage from the pop-up menu.
- 2 Under Storage, click Disk Management.
- 3 Select the drive you want to initialize by clicking its disk number at the bottom of the Disk Management window.



Disk Management window

- 4 Make sure the disk appears as a Basic Disk. If the description of the drive under the drive number appears as “Dynamic,” right-click the disk number and choose Convert to Basic Disk.



Converting to Basic disk

- 5 Choose Action > All Tasks > Initialize Disk.
- 6 Click in the disk partition map for the drive you just initialized.



Clicking in the partition map

- 7 Choose Action > All Tasks > New Partition.

8 In the Partition Wizard, select Primary partition and click Next. Do not create an Extended partition for use with Pro Tools.

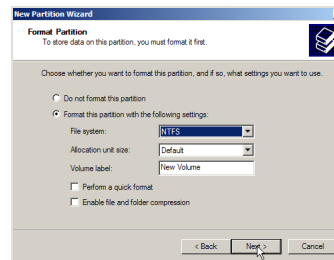
9 Enter the size of the partition you want to create and click Next.

10 Assign a drive letter to the partition, and click Next.

11 Choose a format for the partition (NTFS is recommended).

12 Set the Allocation Unit Size to 32K.

13 Enter a name for the new volume, and click Next.



Choosing a format

14 Click Finish to create the partition. The progress of the formatting is shown in the partition map for the drive.

15 If you are creating more than one partition, click the unallocated portion of the partition map for the drive and repeat steps 7–14 for each partition.

After formatting is complete, each partition on the drive appears in the My Computer window with its associated drive letter and volume name.

Tuning SCSI Drives

DigiDrive Storage Manager is a utility for tuning and testing Avid SCSI drives. DigiDrive Storage Manager will only work with Avid and DigiDesign brand SCSI drives. It will not tune FireWire or IDE/ATA drives.

To tune a drive for Windows XP:

- 1 Launch the DigiDrive Storage Manager Setup application, located in the DigiDrive Utilities folder on the Avid Storage Utilities CD-ROM.
- 2 Follow the on-screen instructions to install the DigiDrive Storage Manager application in the Pro Tools Utilities folder on your system drive.
- 3 Double-click the file named DSM to launch the DigiDrive Storage Manager application.
- 4 In the Storage Manager main window, click the Tune button in the side toolbar. This optimizes the mode pages of all connected Avid and DigiDesign SCSI drives for use with Pro Tools.
- 5 Quit the Storage Manager application.

Checking Drives

To keep your hard drive in peak operating condition, you should perform maintenance checks on a regular basis.

Checking and Repairing Drives

Windows XP includes a utility for checking and repairing drive directory structure.

To check a drive on Windows XP:

- 1 In the My Computer window, right-click the drive and choose Properties from the pop-up menu.

- 2 Click the Tools tab, and click Check Now.
- 3 Select the “Automatically Fix File System Errors” and the “Scan for and Attempt Recovery of Bad Sectors” options, and click Start.
- 4 When the Check Disk process is finished, click OK.

If you are getting disk errors that cannot be resolved through the use of the disk repair utilities, it may be necessary to back up your data (to tape or another hard drive), re-initialize the drive, and restore the data.

Defragmenting Drives

In multitrack recording, audio tracks are written in discrete files, spaced evenly across the disk. If the space required to write a discrete file is not available in a single contiguous block, the file is broken up into several file fragments. The decrease in performance due to fragmentation is continuous and progressive. As you add new sound files and edit existing files, the hard drive becomes increasingly fragmented.

To correct fragmentation, use the Windows XP defragmentation utility or a third-party disk maintenance utility (such as Norton Speed Disk® or Executive Software Diskeeper®). These utilities reassemble file fragments and reorganizes discrete files so they are contiguous. You should check and repair a drive before you defragment it.



While defragmentation utilities usually do not endanger the integrity of hard drive data, you should back up any critical data before defragmenting or reorganizing files and directories on your hard drive.

Troubleshooting

Drive Does Not Appear in My Computer

When a drive does not appear:

1 Make sure the drive is properly connected to a power source and turned on.

⚠ *With SCSI drives, before making any changes to cable connections or termination, shut down the Digidesign system and turn off all of the drives on the SCSI bus.*

2 Make sure all the drive cables are properly connected and secured in place.

3 With SCSI drives, make sure each SCSI bus is properly terminated. See Chapter 2 and Appendix A for information on the correct terminator to use with the drive configurations on your system.

4 With SCSI drives, make sure each drive on a SCSI bus has a unique SCSI ID. If you have drives with duplicate IDs on the same SCSI bus, one or both of the drives might not appear on the desktop. See “Assigning SCSI IDs” on page 12.

5 Restart the Digidesign system for the changes to take effect.

Drive Produces Errors

When a drive is producing errors or is acting unpredictably during playback or recording:

1 Run the Windows Disk Check Utility to repair any directory problems.

2 If you still experience problems, run a disk utility application (such as Norton Disk Doctor) to fix any bad block, folder, and file problems.

3 If possible, copy all the data on the drive to another location, initialize the drive, and restore the data.

System Fails to Start

On systems with SCSI drives, a SCSI bus error may cause the system to freeze on startup.

If the computer fails to start, do the following:

1 Turn off the computer and make sure all Digidesign cards and the SCSI host bus adapter card are properly seated.

2 Check that all SCSI devices on the bus have a unique SCSI ID. Duplicate SCSI IDs cause system problems.

3 Make sure all SCSI cables are properly connected.

4 Check that the SCSI bus is properly terminated, as described in Chapter 2.

5 Turn on the computer.

6 If the system still does not start, disconnect all SCSI drives and restart the system. If the system starts without any drives connected, a drive, a cable, or a SCSI terminator might be defective.

7 Refer to the installation instructions that came with your Digidesign system for additional troubleshooting information.

chapter 6

Drive Management for Macintosh

Initializing Drives

To prepare an audio drive for use with Pro Tools, you first need to initialize it for your version of Mac OS. In addition, you may want to periodically re-initialize the drives on your Digidesign system to improve overall drive performance.

When you initialize a drive, all data on the drive is permanently erased, and the partition map and directory structure are re-created. It is best to initialize drives when you are between projects, or when you are certain the media files and other data on the drives are no longer needed.

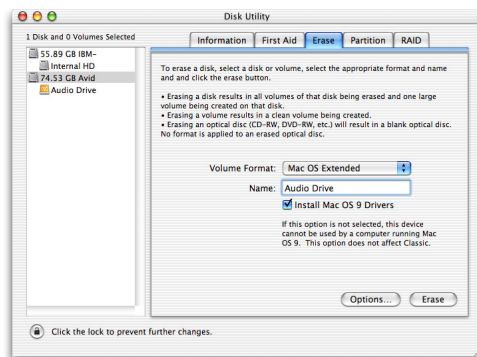
⚠ *Initializing a drive destroys all the data on the drive. Make sure you back up all critical data on a drive before you initialize it.*

Partitions on Audio Drives

Mac OS drives do not need to be partitioned for use with Pro Tools. While creating multiple partitions can improve drive performance with complex sessions (when the session is contained in a single partition), small partitions can limit the size of audio files and sessions.

To initialize a drive on Mac OS X:

1 Launch the Disk Utility application, located in Applications/Utilities.



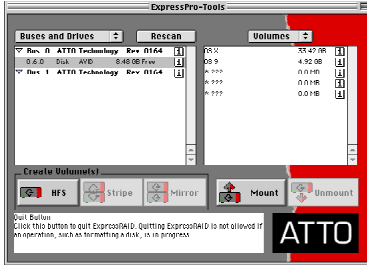
Disk Utility (Mac OS X)

- 2** Click the Erase tab.
- 3** Select the drive you want to initialize in the column on the left side of the window.
- 4** Choose the format for the drive from the Volume format pop-up menu. Mac OS Extended (HFS+) is recommended.
- 5** Type a name for the new volume.
- 6** If you plan to connect the drive to a Mac OS 9 computer, select Install Mac OS 9 Drivers.
- 7** Click Erase.

The drive appears on the Desktop with the new volume name.

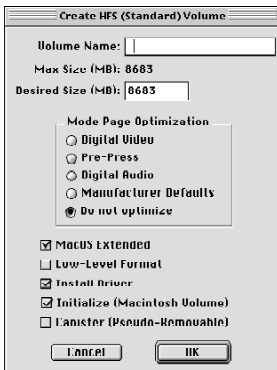
To initialize a drive on Mac OS 9:

- 1 Install the ATTO ExpressPro-Tools application, found on the Pro Tools Installer CD-ROM.
- 2 Launch ATTO ExpressPro-Tools.



ATTO Express-Pro Tools (Mac OS 9)

- 3 Select the drive you want to initialize in the Buses and Drives list on the left of the window.
- 4 Choose Utilities > Create Standard Volume.



Create Standard Volume Options

- 5 Type a new name for the volume.
- 6 Under Mode Page Optimization, select Do Not Optimize.
- 7 If you want the new volume to have HFS+ format, select Mac OS Extended.
- 8 Select the Install Driver and Initialize options.
- 9 Click OK.

The drive appears on the Desktop with the new volume name.

Tuning SCSI Drives

DigiDrive Storage Manager (Mac OS X) and DigiDriveTuner (Mac OS 9) are utilities for tuning Avid SCSI drives. These utilities only work with Avid and Digidesign brand SCSI drives. They do not tune FireWire or IDE/ATA drives.

To tune a drive for Mac OS X:

- 1 Launch the DigiDrive Storage Mgr installer, located in the DigiDrive Utilities folder on the Avid Storage Utilities CD-ROM.
- 2 Follow the on-screen instructions to install the DigiDrive Storage Manager application in the Pro Tools Utilities folder on your system drive.
- 3 Double-click the file named DigiDriveStorage-Manager.
- 4 In the Storage Manager main window, click the Tune button in the side toolbar. This optimizes the mode pages of all connected Avid and Digidesign SCSI drives for use with Pro Tools.
- 5 Quit the Storage Manager application.

To tune a drive for Mac OS 9:

- 1 Locate the DigiDriveTuner application, in the DigiDrive Utilities folder on the Avid Storage Utilities CD-ROM, and drag it to the Pro Tools Utilities folder on your system drive.
- 2 Launch the DigiDriveTuner application.

When DigiDriveTuner detects an Avid or Digidesign SCSI drive, it automatically optimizes the drive's mode pages for use with Pro Tools.


Checking Drives

To keep your hard drive in peak operating condition, you should perform maintenance checks on a regular basis.

Checking and Repairing Drives with Disk First Aid

Disk First Aid is a drive directory structure repair tool that is supplied with the Mac OS operating system. Disk First Aid can find and repair many basic directory structure problems to help keep your drives functioning properly.

Use Disk First Aid when your system is reporting drive errors or when files on the drive cannot be opened and used by Digidesign software.

 *Run Disk First Aid regularly as a proactive method of avoiding drive problems.*

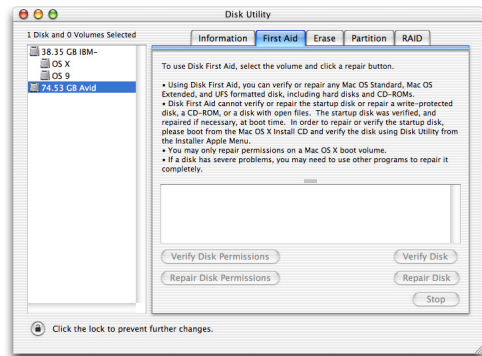
Running Disk First Aid

Follow the instructions that follow for your version of Mac OS.

To run Disk First Aid on Mac OS X:

- 1 Launch the Disk Utility application, located in the Utilities folder inside the Applications folder.
- 2 Click the First Aid tab.

- 3 Select the drive you want to verify or repair in the column on the left side of the window.



Disk First Aid (Mac OS 9)

- 4 Click Repair Disk to verify and repair the drive.
- 5 Quit the Disk Utility application.

To run Disk First Aid for Mac OS 9:

- 1 Launch the Disk First Aid application, located in the Mac OS 9 Utilities folder.




Disk First Aid (Mac OS 9)

- 2 Select the drive you want to verify or repair from the drive icons at the top of the window.
- 3 Click Repair to verify and repair the drive.
- 4 When you are finished, choose File > Quit to quit the application.

Using Norton Disk Doctor

Norton Disk Doctor is a third-party application for diagnosing and repairing drive problems that is available for Mac OS X and Mac OS 9. Norton Disk Doctor provides more comprehensive coverage of drive problems than Disk First Aid, and can repair directory structure and file problems that Disk First Aid cannot repair.


To use Norton Disk Doctor, you can install Norton Utilities® onto one or more of the drives on your system, or you can run it from the Norton Utilities CD-ROM.

 *If you install the Norton Utilities application, perform a custom installation to load only the Repair and Recovery utilities and the Startup Disk Builder. Other Norton Utilities programs can cause conflicts with Digidesign software.*

Repairing Drives with Norton Disk Doctor

To repair a drive:


- 1 Launch the Norton Utilities application.
- 2 Choose Norton Disk Doctor from the Norton Utilities Main menu.
- 3 Follow the Norton Disk Doctor instructions for drive repair and recovery. Try to fix all of the problems noted by Norton Disk Doctor.
- 4 After you are finished, run Norton Disk Doctor a second time to make sure the repairs are complete.
- 5 Quit Norton Utilities.

 *After using Disk First Aid or Norton Disk Doctor to repair a drive or recover data, Digidesign recommends that you back up the data and reinitialize the drive as soon as possible.*

Defragmenting Drives

In multitrack recording, audio tracks are written in discrete files, spaced evenly across the disk. If the space required to write a discrete file is not available in a single contiguous block, the file is broken up into several file fragments. The decrease in performance due to fragmentation is continuous and progressive. As you add new sound files and edit existing files, the hard drive becomes increasingly fragmented.

To correct fragmentation, use a disk maintenance utility (such as Norton Speed Disk), which reassembles file fragments and reorganizes discrete files so they are contiguous. You should check and repair a drive before you defragment it.

 *While defragmentation utilities usually do not endanger the integrity of hard drive data, you should back up any critical data before defragmenting or reorganizing files and directories on your hard drive.*

Troubleshooting

Drive Does Not Appear on the Desktop

When a drive does not appear:

1 Make sure the drive is properly connected to a power source and turned on.

⚠ *With SCSI drives, before making any changes to cable connections or termination, shut down the Digidesign system and turn off all of the drives on the SCSI bus.*

2 Make sure all the drive cables are properly connected and secured in place. See Chapter 2 for cable and setup information.

3 With SCSI drives, make sure each SCSI bus is properly terminated. See Chapter 2 and Appendix A for information on the correct terminator to use with the drive configurations on your system.

4 With SCSI drives, make sure each drive on a SCSI bus has a unique SCSI ID. If you have drives with duplicate IDs on the same SCSI bus, one or both of the drives might not appear on the desktop. See “Assigning SCSI IDs” on page 12.

5 Restart the Digidesign system for the changes to take effect.

Drive Produces Errors

When a drive is producing errors or is acting unpredictably during playback or recording:

1 (Mac OS 9 systems only) Rebuild the drive’s Desktop file by restarting the computer and holding down the Option and Command keys during startup, then clicking OK when the system prompts you to rebuild the desktop for each mounted drive.

2 Run Disk First Aid to repair any directory problems.

3 If you still experience problems, use a third-party disk utility application (such as Norton Disk Doctor) to diagnose and fix any bad block, folder, and file problems.

4 If possible, copy all the data on the drive to another location, initialize the drive, and restore the data.

System Fails to Start

On systems with SCSI drives, a SCSI bus error may cause the system to freeze on startup.

If the computer fails to start, do the following:

1 Turn off the computer and make sure all Digidesign cards and the SCSI host bus adapter card are properly seated.

2 Check that all SCSI devices on the bus have a unique SCSI ID. Duplicate SCSI IDs cause system problems.

3 Make sure all SCSI cables are properly connected.

4 Check that the SCSI bus is properly terminated, as described in Chapter 2.

5 Turn on the computer.

6 If the system still does not start, disconnect all SCSI drives and restart the system. If the system starts without any drives connected, a drive, a cable, or a SCSI terminator might be defective.

7 Refer to the installation instructions that came with your Digidesign system for additional troubleshooting information.

appendix a

SCSI Cables and Terminators

SCSI Cables

Use only the highest quality SCSI cables available when connecting a SCSI drive to your Digidesign system. Digidesign recommends the use of SCSI cables manufactured by Avid. These cables are specifically designed for systems that run real-time applications, and their lengths and electrical properties are designed to ensure data integrity on the SCSI bus. These cables are described in Table 1.

Table 1. SCSI Cables

| Cable | Type | Length | Purpose |
|--|------------------|-----------|--|
| Macintosh system built-in SCSI to first narrow drive | 25-pin to 50-pin | 30 inches | To connect the first narrow drive to the Macintosh external SCSI bus. |
| SCSI accelerator board to first drive | 68-pin to 50-pin | 30 inches | To connect the first narrow drive to the Digidesign SCSI bus. <i>Use only on SCSI buses that contain no wide drives.</i> |
| | 68-pin to 68-pin | 30 inches | To connect the first wide drive to the SCSI bus or a single-channel SCSI accelerator board. |
| | 60-pin to 68-pin | 30 inches | To connect the first wide drive to a dual-channel SCSI bus. |
| SCSI cabling between drives | 50-pin to 50-pin | 15 inches | To connect vertically stacked narrow drives. |
| | 50-pin to 50-pin | 30 inches | To connect side-by-side narrow drives. |
| | 68-pin to 68-pin | 15 inches | To connect vertically stacked wide drives. |
| | 68-pin to 68-pin | 30 inches | To connect side-by-side wide drives. |

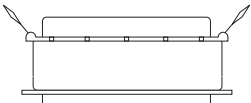
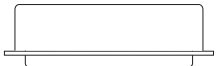

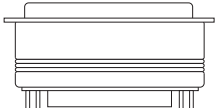
SCSI Terminators and Adaptors

The Pro Tools SCSI chain must be properly terminated or your system will not function properly. Only the last device on the chain should be terminated. Depending on the configuration of your drives, you will need one of several different types of SCSI terminators and adapters to cover the varying style of connectors found. These are illustrated in Table 2.

Digidesign recommends the use of SCSI terminators manufactured by Avid. These color-coded terminators are specifically designed to ensure data integrity on the SCSI bus for systems that run real-time applications. Avid terminators are available through your Digidesign dealer.

You need to connect an ultra, wide-to-narrow SCSI adapter to change from 68-pin cabling to 50-pin cabling. The adapter terminates the unused lines to help prevent any SCSI bus problems.

Table 2. SCSI Terminators and Adaptors

| Type | Style | Description |
|------------------------------|---|--|
| 50-pin terminator |  | Fast, narrow terminator for SCSI buses that have only narrow drives (purple). |
| 50-pin terminator |  | Ultra, narrow terminator for SCSI buses that have a mixture of wide and narrow drives (blue). |
| 68-pin multi-mode terminator |  | Ultra, wide terminator for wide drive SCSI buses which run in LVD or Single-ended mode (blue). |
| 68-pin to 50-pin adapter |  | Ultra, wide-to-narrow terminating adapter for connecting wide and narrow drives (blue). |

Maximum Configurations

Table 3 lists the maximum number of LVD drive enclosures that can be connected in various configurations.

If you increase the length of the cables listed below, you must reduce the number of drives in the chain.

Table 3. LVD Drive Configurations

| Number of LVD Enclosures | Cable Length from Host System to First Drive | Cable Length Between Drives | Comments |
|---|--|-----------------------------|---|
| 15 LVD enclosures | 30-inch | 15-inch | This configuration uses the maximum number of LVD drives but requires that the cable lengths be at a minimum. |
| 10 LVD enclosures | 10-feet | 30-inch | This configuration provides a greater distance between the host system and all the drives. |
| 8 drives (any combination of LVD and single-ended) | 30-inch | 15-inch or 30-inch | This configuration includes LVD and single-ended drives. |

appendix b

Customer Service and Technical Support

Warranty Information

Your Avid Drive has a 5-year warranty, and if it fails in that time period, Digidesign will repair/replace the unit for free. In the event of a failure which requires repair or replacement, Digidesign is not responsible for the recovery or replacement of any data which may be lost as a result of the failure.

For complete warranty information, refer to the Avid documentation included with your Avid drive.

Warranty Product Service

Customers needing warranty service should contact their regional Digidesign support center to troubleshoot, confirm product failure, and obtain a return authorization number. In most cases, repair or replacement will take place within 48 hours of receipt of the product.

Digidesign will return the product, postage prepaid, during the next business day through a suitable carrier to the address specified within the return authorization (directly to the customer or dealer). Rush charges depend on product size and weight.

Non-Warranty Product Service

Customers needing non-warranty service should contact their regional Digidesign support center to troubleshoot, confirm product failure, and obtain a return authorization number. In most cases, repair or replacement will take place within 48 hours of receipt of the product.

Acceptable forms of payment for non-warranty service are Visa, American Express, MasterCard, or approved company purchase order number (North America only). Payment by check is acceptable if drawn on U.S. funds.

Shipping Instructions for Product Repair Service

After obtaining an return authorization number, defective products should be shipped with transportation and insurance charges prepaid to the repair center in your area:

US/Canada:

Digidesign (reference RA #)
Customer Service
3885 Bohannon Drive
Menlo Park, CA 94025 USA

Europe/Japan/Australia/South Pacific:

Please contact your local Digidesign Customer Support office for shipping instructions.

Technical Support

Warranty Support

As an owner of an Avid drive, you are eligible for complimentary technical support from Digidesign for 5 years from the date of original purchase. In the event that you need technical support or if you need to contact a Digidesign office, please refer to or visit the Digidesign Web site (www.digidesign.com).

Non-Warranty Support

Customers in the United States and Canada seeking telephone support for a product that is past warranty should call the Digidesign ProAccess™ Line, a priority support service where customers speak with a senior technical support representative. International customers should call their regional support office. For contact information, please refer to or visit the Digidesign Web site (www.digidesign.com).

How to Contact Digidesign

Digidesign World Offices

| | | |
|--|--|--|
| Digidesign: 2001 Junipero Serra Blvd Daly City, CA 94014-1976 8:30am-5pm PST Mon.-Fri. | France: 33-141-49-40-10 Main 33-147-57-56-28 Fax 10-6 Mon.-Fri. | Mexico/South America: (52)5485-1139 Main (52)5033-8027 Fax latinamerocs@digidesign.com 9-5 Mon.-Fri. |
| North America: 650-731-6300 Main 650-731-6399 Fax 8-5 Mon.-Thur.; 8-3 Fri. | Germany: 49-811-5520-555 Main 49-811-5520-599 Fax 10-6 Mon.-Fri. | United Kingdom: 44-1753-653322 Main 44-1753-658501 Fax 10-6 Mon.-Fri. |
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