Storage Manager

Setup and User's Guide

for Digidesign® DigiDrive® and Avid® Hard Drives

make manage move | media™ Avid®

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Storage Manager Setup and User's Guide • Part 0130-05454-01 Rev. C• May 2004.

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Using This Guide

Storage Manager is a general-purpose, administrative utility for updating, testing, and troubleshooting storage media (Avid® drives and Digidesign® DigiDrive® drives only) connected to Avid or Digidesign systems. Storage Manager is available for the following operating systems:

- Windows NT® operating system running on an Avid Unity™ MediaNetwork File Manager
- Windows® 2000 and Windows XP operating systems running on an Avid Unity MediaNetwork client or as a standalone system
- Mac OS® X operating system running on a standalone system

Who Should Use This Guide

This guide is intended for administrators responsible for installing, testing, and troubleshooting Avid and DigiDrive hard drives.

About This Guide

This guide provides instructions for the installation and use of Storage Manager. The Contents lists all topics included in the book, presented with the following overall structure:

- Chapter 1, "Installing Storage Manager," describes how to install Storage Manager.
- Chapter 2, "Storage Manager Overview," provides basic concepts that you should understand before using Storage Manager.

- Chapter 3, “Using Storage Manager,” provides step-by-step instructions for using all of Storage Manager’s features, except hard drive tuning and testing. Hard drive tuning (Digidesign drives only) is described in Chapter 4, and hard drive testing is described in Chapter 5.
- Chapter 4, “Tuning Digidesign Drives,” describes how to run the Digidesign Drive Tuner for DigiDrive drives.
- Chapter 5, “Testing Hard Drives,” describes the various hard drive tests that you can perform with Storage Manager and provides step-by-step instructions on how to use them.
- Appendix A, “Interpreting Error Messages,” includes information on Storage Manager test results and the actions you should take if you discover a hard drive problem.
- Finally, a detailed Index helps you quickly locate specific topics.

Symbols and Conventions

Unless noted otherwise, the name “Storage Manager” applies to both Avid Storage Manager and Digidesign Storage Manager.

Unless noted otherwise, the material in this document applies to the Windows and Macintosh® operating systems. When the text applies to a specific operating system, it is marked as follows:

- (Windows) or (Windows only) means the information applies to the Windows NT, Windows 2000, and Windows XP operating systems.
- (Macintosh) or (Macintosh only) means the information applies to the Mac OS X operating system.

The majority of screen shots in this document were captured on a Windows XP system, but the information applies to both Windows and Macintosh systems. Where differences exist, both Windows and Macintosh screen shots are shown.

Avid documentation uses the following symbols and conventions.

Symbol or Convention	Meaning or Action
	A note provides important related information, reminders, recommendations, and strong suggestions.
	A caution means that a specific action you take could cause harm to your computer or cause you to lose data.
	A warning describes an action that could cause you physical harm. Follow the guidelines in this document or on the unit itself when handling electrical equipment.
>	This symbol indicates menu commands (and subcommands) in the order you select them. For example, File > Import means to open the File menu and then select the Import command.
▶	This symbol indicates a single-step procedure. Multiple arrows in a list indicate that you perform one of the actions listed.
⌘	This symbol represents the Apple or Command key. Press and hold the Command key and another key to perform a keyboard shortcut.
Margin tips	In the margin, you will find tips that help you perform tasks more easily and efficiently.
Italic font	Italic font is used to emphasize certain words and to indicate variables.
`Courier Bold font`	Courier Bold font identifies text that you type.
Click	Quickly press and release the left mouse button (Windows) or the mouse button (Macintosh).
Double-click	Click the left mouse button (Windows) or the mouse button (Macintosh) twice rapidly.
Right-click	Quickly press and release the right mouse button (Windows only).
Drag	Press and hold the left mouse button (Windows) or the mouse button (Macintosh) while you move the mouse.
Ctrl+*key* ⌘+*key*	Press and hold the first key while you press the second key.

Unless noted otherwise, the name “Avid drive” refers to the internal hard drive of the Avid or Digidesign system. Depending on your system’s setup, the internal hard drive might have a different name. Also, the material in this document applies to the Avid and Digidesign DigiDrive external hard drives.

If You Need Help

If you are having trouble using Storage Manager:

1. Retry the action, carefully following the instructions given for that task in this guide. It is especially important to check each step of your workflow.
2. Check for the latest information that might have become available *after* the documentation was published in one of two locations:
   - If release notes are available, they ship with your application.
   - If ReadMe files are available, they are supplied in your Avid application folder. ReadMe files are also available from Help.

Release notes and ReadMe files are also available on the Avid Knowledge Center.

3. Check the documentation that came with your Avid application or your hardware for maintenance or hardware-related issues.
4. Visit the online Knowledge Center at www.avid.com/support. Online services are available 24 hours per day, 7 days per week. Search this online Knowledge Center to find answers, to view error messages, to access troubleshooting tips, to download updates, and to read/join online message-board discussions.
5. For Technical Support, please call 800-800-AVID (800-800-2843).

   For Broadcast On-Air Sites and Call Letter Stations, call 800-NEWSDNG (800-639-7364).

How to Order Documentation

To order additional copies of this documentation from within the United States, call Avid Sales at 800-949-AVID (800-949-2843). If you are placing an order from outside the United States, contact your local Avid representative.

Avid Educational Services

For information on courses/schedules, training centers, certifications, courseware, and books, please visit www.avid.com/training or call Avid Sales at 800-949-AVID (800-949-2843).

Chapter 1
Installing Storage Manager

This chapter explains how to install the Storage Manager utility on Avid systems that you use to test and update hard drives. Storage Manager is preinstalled on some Windows and Macintosh Avid systems. If it is preinstalled on your system, go to Chapter 2. If it is not preinstalled, check either the installation CD-ROM that came with your Avid or DigiDrive hard drive or the Avid Web site (www.avid.com) for a standalone installer.

This chapter includes the following topics:

- Determining If Storage Manager Is Installed
- Installing Storage Manager (Windows)
- Installing Storage Manager (Macintosh)

Determining If Storage Manager Is Installed

To determine if Storage Manager is already installed:

- (Windows) Click the Start button, and select Programs > Avid > Utilities > Avid Storage Manager.
- (Macintosh) Navigate to Macintosh HD/Applications/Utilities/Avid Storage Manager.

If it is properly installed, Storage Manager should open. If Storage Manager does not appear on the Start menu (Windows) or on the Macintosh HD (Macintosh), you need to install it.

Installing Storage Manager (Windows)

If Storage Manager is not installed on your Avid system, you can install it from the Avid or Digidesign CD-ROM that came with your Avid or DigiDrive hard drive. If your CD-ROM does not contain a copy of Storage Manager, you can download the utility from the Avid Knowledge Center at www.avid.com. Once you have located the utility, perform the following procedure to install it on your Avid system.

Storage Manager runs on systems that use the Windows 2000 or Windows XP operating system. Functionality is reduced when you test Avid Unity LANshare or Avid Unity LANshare EX drives from a client.

To install Storage Manager on a Windows system:

1. Do one of the following:
   - Navigate to the *CD-ROM drive*:\disk1 folder.
   - Navigate to the location where you saved the Storage Manager download file.

The downloaded file is in a compressed format. You must uncompress the file before installing Storage Manager.

2. Double-click the Setup or Setup.exe icon.

   The Storage Manager Setup window opens.
3. Click Next to proceed with the installation.
4. Select the country in which you purchased Storage Manager, and then click Next.
5. Click Yes to accept the license agreement.
6. Click Next to install Storage Manager to its default location, C:\Program Files\Avid\Utilities\Avid Storage Manager.
7. Click Next to perform a default Storage Manager installation.
8. Click Finish to close the Storage Manager Setup window.

Installing Storage Manager (Macintosh)

Storage Manager installs when you install your Avid application on a Macintosh system. If it is not installed, check either the installation CD-ROM that came with your Avid or DigiDrive hard drive or the Avid Web site (www.avid.com) for a standalone installer.

Chapter 2
Storage Manager Overview

This chapter provides an overview of Storage Manager's features and user interface.

This chapter includes the following topics:

- Introduction
- Understanding IDs
- The Main Window
- Toolbars and Menus
- Using Storage Manager with Other Utilities

Introduction

Storage Manager is a utility that you can use to work with Avid hard drives in your storage subsystem. Using Storage Manager, you can do the following:

- Identify Avid hard drives. For more information, see "Identifying Hard Drives" on page 43.
- Spin down Avid hard drives (SCSI and Fibre Channel only). For more information, see "Spinning Down Hard Drives" on page 44.
- Report and share test results by generating log files and sending them by e-mail to recipients that you specify. For more information, see "Sending Error Log and Configuration Files" on page 46.
- Update Avid hard drive firmware. For more information, see "Updating Hard Drive Firmware" on page 48.

- Tune DigiDrive drives for optimal performance using the Storage Manager Drive Tuner. This feature replaces the DigiDrive Tuner. For more information, see “Using the Storage Manager Drive Tuner” on page 52.
- Exercise Avid hard drives using a variety of standardized or customized tests. For more information, see “Testing Your Hard Drives” on page 54.
- Obtain test status information useful for troubleshooting. For more information, see “Viewing Test Information” on page 57.

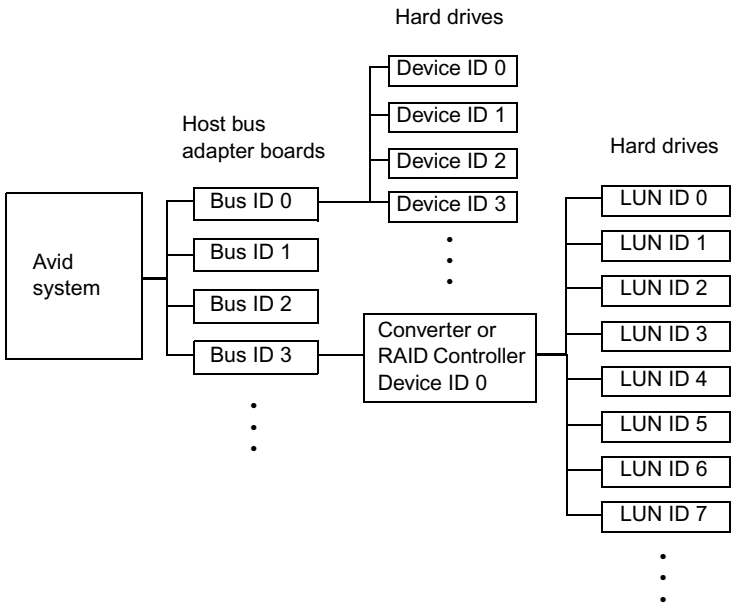
In addition to these features, the Storage Manager user interface provides a main window with two views, Physical view and Volume view, that provide information about your storage subsystem.

Storage Manager tests or tunes DigiDrive and Avid hard drives on Digidesign systems only. It cannot test or tune other hard drives. For Avid hard drives on other Avid systems, use the Avid Startup utility to tune drives.

Understanding IDs

All of the devices connected to an Avid system — for example, hard drives and CD-ROM drives — must have unique IDs (identification numbers). The Avid system uses these IDs to distinguish the devices from each other and to direct traffic between itself and the devices. There are different types of IDs, and this section provides a brief overview of each type. These IDs are used throughout the Storage Manager user interface.

The following figure shows how IDs are assigned to devices attached to an Avid system.



IDs in a Storage Subsystem

Each ID contains three parts — the bus ID, the device ID, and the LUN ID:

- **Bus ID:** Indicates the storage bus in the Avid system to which the drives are connected. Storage Manager can identify and use storage buses that are on host bus adapter boards or the system board. Host bus adapter boards can have multiple storage buses.
- **Device ID:** Indicates an individual device connected to a storage bus. Each device must have a unique ID. You can attach many types of devices to a storage bus; however, Storage Manager uses only the device IDs for the hard drives in your storage subsystem.

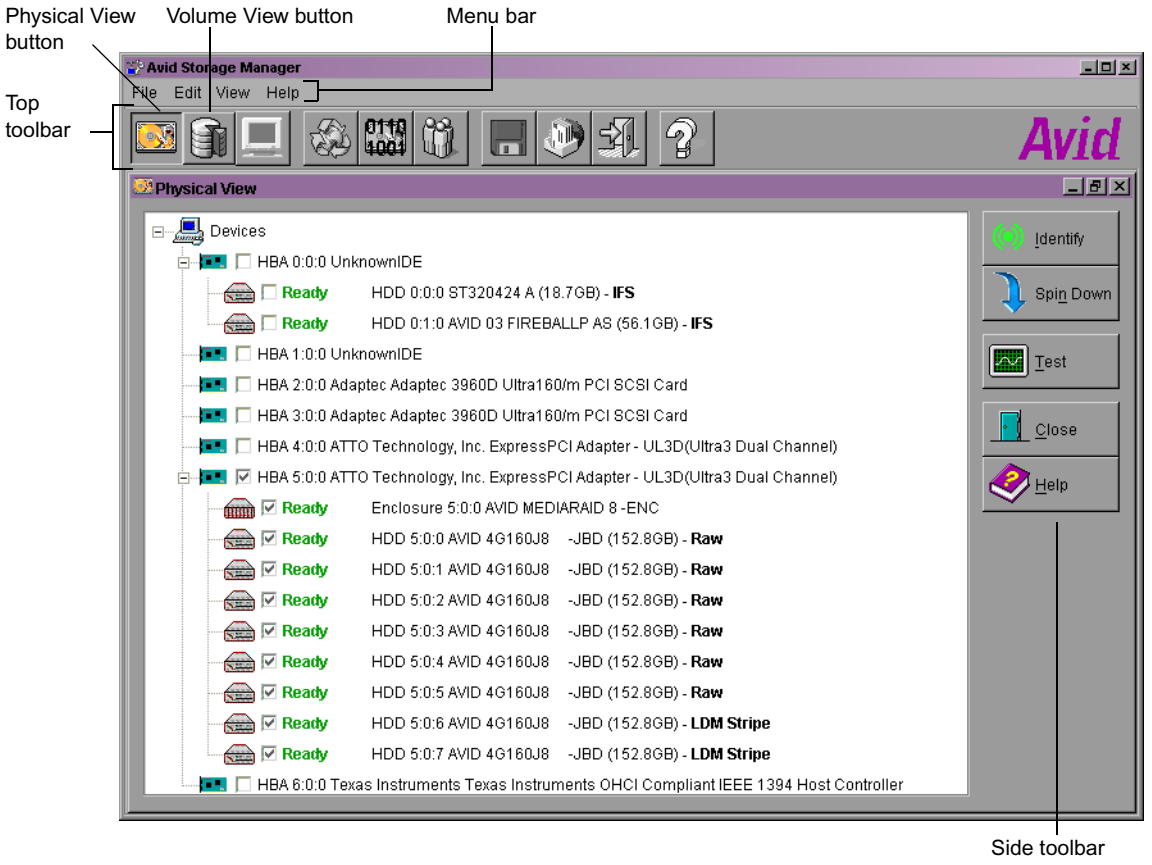
  Device IDs are limited. A SCSI adapter board can accommodate 16 IDs. One ID is used for the SCSI bus adapter itself (typically ID 7), leaving 15 IDs for any hard drives connected to it. A Fibre Channel adapter board using a Fibre Channel arbitrated loop can accommodate 126 IDs.

- **LUN ID:** LUN ID stands for logical unit number ID. Storage Manager uses LUN IDs when you add a converter or RAID controller to your storage subsystem. Converters convert a bus's drive interface from one type to another (for example, a SCSI bus to an IDE bus). Every hard drive attached to a converter has a unique LUN ID, and the converter has a device ID. RAID controllers map the storage connected to them into one or more storage groups identified by LUN IDs.

The Main Window

Storage Manager's main window provides a visual display of your storage subsystem along with several status indicators. The main window has two views, Physical view and Volume view, which allow you to look at your storage from a physical perspective or a logical perspective. The following figure shows Storage Manager's main window with Physical view active.

You cannot see Physical view and Volume view concurrently.



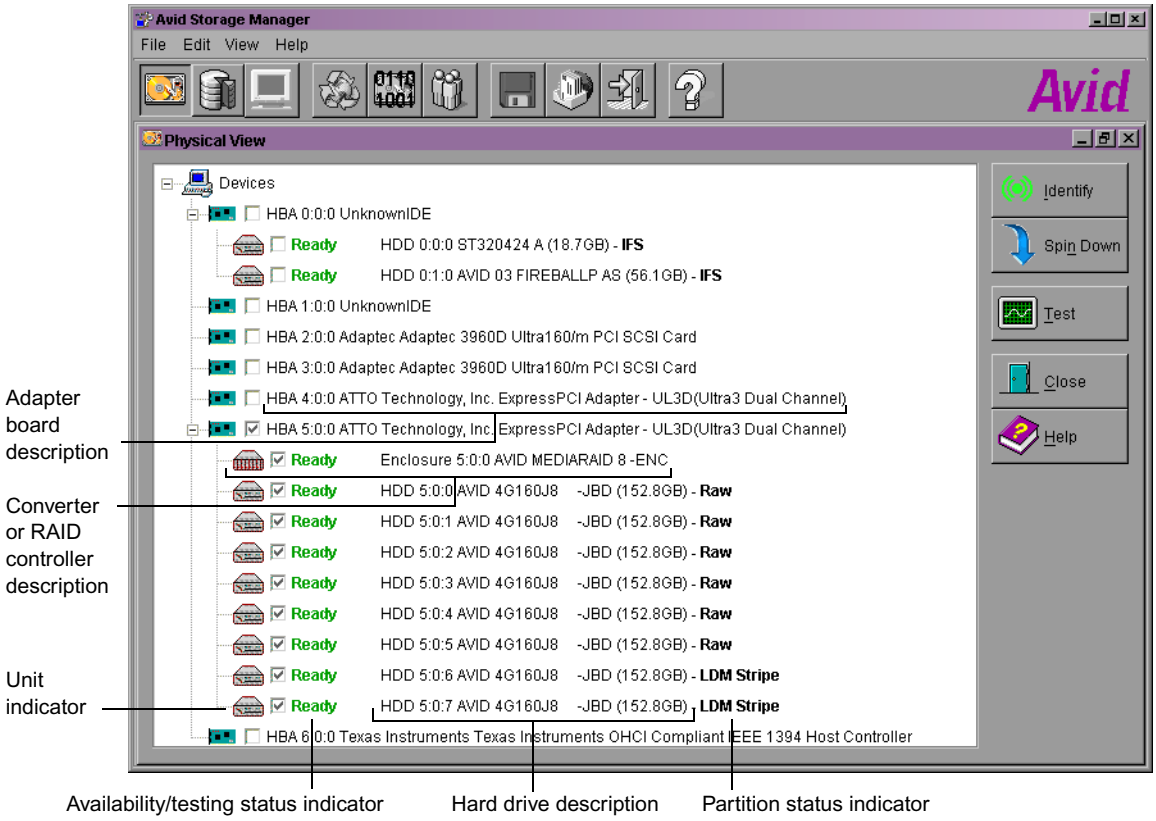
The remainder of this chapter describes the features in Physical view and Volume view. It also describes the toolbar buttons and their functions.

Physical View

Physical view is the default view when you open Storage Manager (unless you reset the user preferences to Volume view). Physical view presents, in an expandable tree structure, the physical characteristics of your storage subsystem: all of the storage adapter boards in your Avid system, any converters or RAID controllers, and the hard drives attached to them.

Physical view shows your internal and external hard drives. Do not select the internal system drive when you are working with Storage Manager's features. Drives that contain mounted volumes (visible in Volume view) can be selected but not tested.

The following figure shows the main window with Physical view active and highlights the view's most important features. These features are described in the following sections.

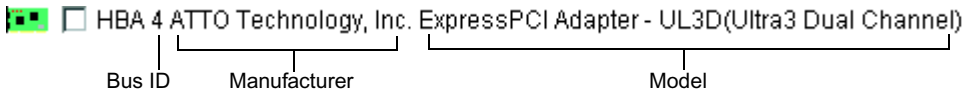


Adapter Board Description

An adapter board description includes:

- Bus ID (a bus on the Avid system where the hard drive is connected)
- Manufacturer's name
- Model number

The following illustration shows the description for an adapter board.



Converter or RAID Controller Description

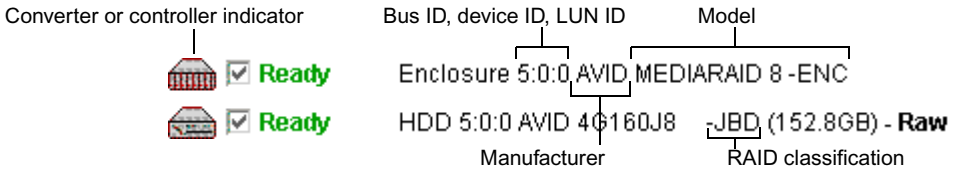
A converter or RAID controller description appears in the branch beneath the adapter board to which it is connected. Converter and RAID controller descriptions branch again to display descriptions of all the hard drives connected to them. You can recognize a converter's hard drives because their descriptions begin with LUN instead of HDD (hard disk drive). You can recognize a RAID controller's hard drives because their descriptions include their RAID classification (RAID 0, RAID 5, or JBOD).

JBOD (Just a Bunch of Disks) mode is also available but only for diagnostic purposes. User data storage is not supported in JBOD mode.

A converter or RAID controller description includes:

- Converter or controller indicator
- Bus ID, device ID, and LUN ID for the converter or controller
- Manufacturer's name
- Model number
- RAID classification

The following illustration shows the descriptions for a RAID controller and a JBOD enclosure.

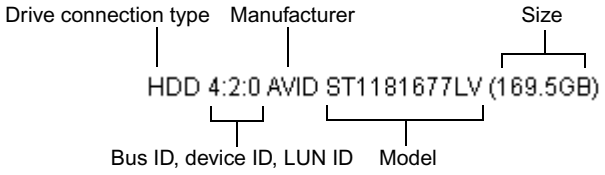


Hard Drive Description

A hard drive description includes:

- Drive connection type. The drive connection type is either HDD or LUN. HDD indicates that the hard drive is connected directly to the adapter board. LUN indicates that the hard drive is connected to the adapter board by way of a converter.
- Bus ID, device ID, and LUN ID for the hard drive. For information on ID types, see "Understanding IDs" on page 16.
- Manufacturer's name.
- Model number.
- Drive size, where 1 GB equals 1024 bytes x 1024 bytes x 1024 bytes. Drive sizes typically appear smaller than the manufacturer's stated size because drive manufacturers state drive size in decimal billions of bytes.

The following illustration shows the description for a hard drive.



Unit Indicator

Each unit in the storage subsystem (hard drive, adapter board, converter, or RAID controller) has a drive icon. If FC appears on a drive's icon, the drive is a Fibre Channel drive. If FC does not appear on a drive's icon, the drive is a SCSI or IDE drive.

Availability/Testing Status Indicator

To the left of the hard drive description is the availability/testing status indicator. The following table describes the various availability/testing status indications.

Availability/Testing Status Indications

Status	Description
Ready	The hard drive is ready to read and write data.
Unavailable	The device is not accessible. The drive might be turned off, spinning up, having a problem, or not supported (for example, it is a non-Avid drive). The device might be an enclosure or a CD-ROM drive that is not testable.
Testing	The hard drive is currently being tested.
Passed	The hard drive has passed its most recent test. *If the test aborts before the hard drive has failed, the status indication is Passed.*
Failed	The hard drive has failed its most recent test.
Updating	Updated firmware is currently being downloaded to the hard drive (Windows only).
Updated	Firmware has been downloaded to the hard drive (Windows only).
Broken	The hard drive is having a problem.

Hard drives with an availability/testing status of Passed, Failed, or Updated change their status back to Ready when you rescan the storage subsystem. For more information on rescanning, see "Rescanning the Storage Subsystem" on page 45.

Partition Status Indicator

To the right of the hard drive description is the partition status indicator. The following table describes the various partition status indications.

Partition Status Indications

Status	Description
Striped	The hard drive has partition and file system information on it and is part of a stripe set of drives.
Unstriped	The hard drive has partition and file system information on it but is not part of a stripe set.
Raw	The hard drive has no partition or file system information on it.
Unsupported	The hard drive has an unsupported file system.
Mixed	The hard drive has several partitions with different format types.
Remus	The hard drive's partition information indicates it was used for local Fibre Channel storage (Mac OS 9.*x* or earlier; drive format is not compatible with Mac OS X).
Remus Stripe	The hard drive's partition information indicates it was used for striped local Fibre Channel storage (Mac OS 9.*x* or earlier; drive format is not compatible with Mac OS X).
Apple	The hard drive's partition information indicates it was used as a boot drive for a Macintosh system (Mac OS 9.*x* or earlier).
ATTO	The hard drive's partition information indicates it was connected to a Macintosh system by an ATTO™ adapter board (Mac OS X).
ATTO Stripe	The hard drive's partition information indicates it was part of a stripe set connected to a Macintosh system by an ATTO adapter board (Mac OS X).
MediaNet Stripe	The hard drive's partition information indicates it was part of a MediaNetwork Fibre Channel shared storage environment.

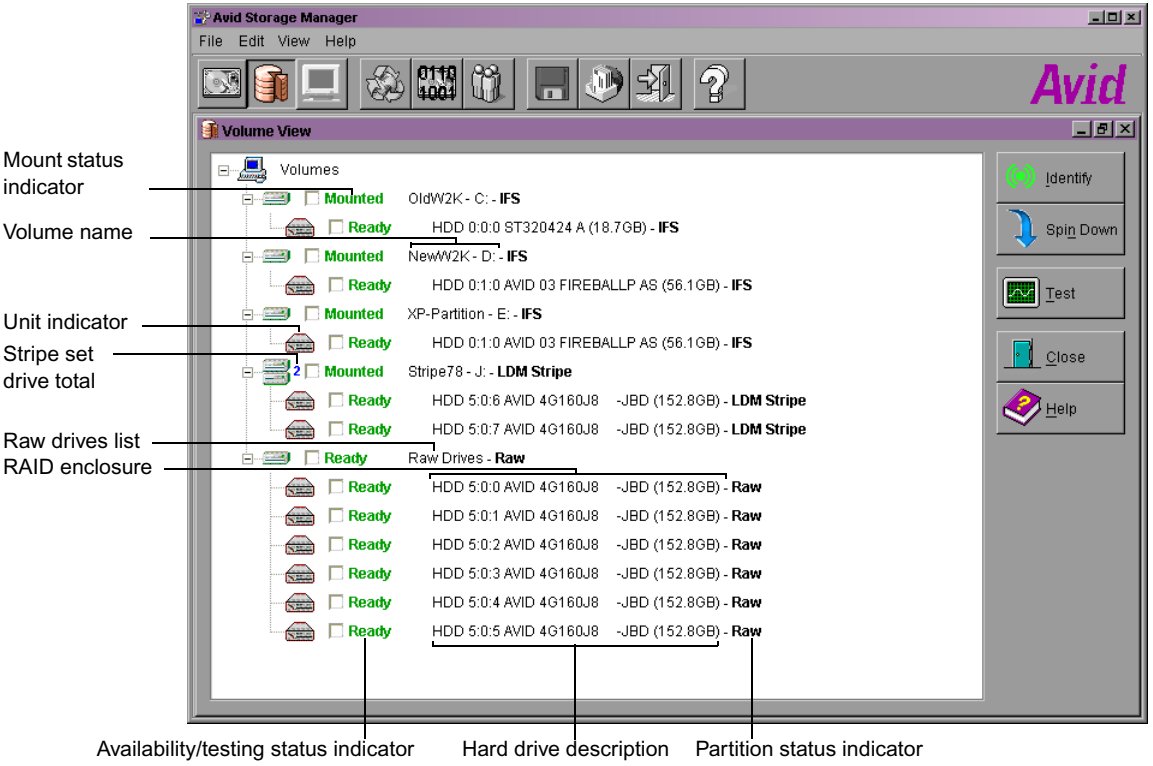
Partition Status Indications (Continued)

Status	Description
FAT 16, FAT 32, FAT 32 XINT13	The hard drive's partition information indicates it has been formatted for use in an MS-DOS® environment (Windows).
LDM	The hard drive's partition information indicates it is a dynamic drive (Windows 2000 and Windows XP).
LDM Stripe	The hard drive's partition information indicates it is a stripe dynamic drive (Windows 2000 and Windows XP).
NTFT	The hard drive's partition information indicates it is part of a fault-tolerant partition (Windows 2000 and Windows XP).
NTFS Stripe	The hard drive's partition information indicates it is a stripe dynamic drive (Windows 2000 and Windows XP).
IFS	The hard drive's partition information indicates the drive has an older MS-DOS partition.
RD0, RD5, JBD	For drives in a MediaRAID enclosure, the partition information indicates if the drive is part of a RAID 0 or RAID 5 enclosure, or if it is a JBOD set.

Volume View

Volume view presents, in an expandable tree structure, a logical view of the volumes you have created for your storage subsystem and the hard drives that make up those volumes.

The following figure shows the main window with Volume view active and highlights the view's most important features. These features are described in the following sections.



Volume view has many of the same features as Physical view, such as:

- Hard drive description
- Availability/testing status indicator
- Partition status indicator
- Unit indicator

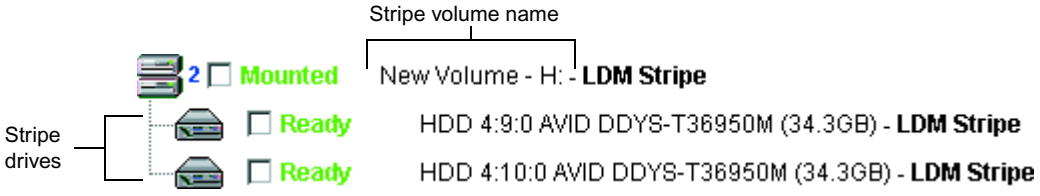
For a description of these features, see "Physical View" on page 19. The following sections describe features that are specific to Volume view.

Raw Drives List

Volume view lists all of the unformatted drives in a Raw drives list. To view your raw drives, expand the Raw drives list.

Volume Name

Each volume has a specific name. A volume is a logical storage unit that either uses one physical drive or spans multiple drives. Volumes that span multiple drives are called stripe volumes. You can expand each volume name to show the drives that make up that volume.



Mount Status Indicator

To the left of the volume name is the mount status indicator. The following table describes the various mount status indications.

Mount Status Indications

Status	Description
Mounted	The hard drive is currently mounted on your Avid system.
Unmounted	The hard drive is not currently mounted on your Avid system.
Broken	The volume is made up of multiple hard drives that are part of a stripe set, and one or more drives in the set are unavailable. If this status is shown for a raw drive, then the drive is having a problem.

RAID Enclosures

RAID enclosures are displayed as separate volumes. Each volume expands to show the hard drives that comprise the RAID enclosure.

Stripe Set Drive Total

If a volume is comprised of a stripe set of drives, the number of drives in the set is shown to the left of the volume's mount status indicator.

Toolbars and Menus

Storage Manager has two toolbars, one on the top and one on the side, which allow you to access features quickly and easily. All of the buttons in the top toolbar have menu equivalents that you can access from the menu bar.

Top Toolbar and Menu Equivalents

The following table describes the buttons in the top toolbar and provides their equivalent menu commands.

Top Toolbar Buttons

Button	Button Name	Description	Menu Equivalent
	Physical View	Displays Physical view in the main window.	Select View > Physical.
	Volume View	Displays Volume view in the main window.	Select View > Volume.
	Console	Opens the Console window, which allows you to view test results and firmware updating results.	Select View > Console.
	Rescan System Configuration	Initiates a rescan of the entire storage subsystem, and updates Physical view and Volume view with the results.	Select Edit > Rescan Configuration.

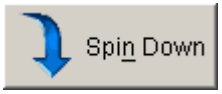
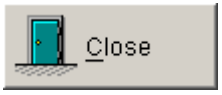
Top Toolbar Buttons (Continued)

Button	Button Name	Description	Menu Equivalent
	Update Firmware	Initiates a firmware download to an Avid hard drive.	Select Edit > Update Firmware.
	User Preferences	Opens the User Preferences dialog box, which allows you to set the default behavior for a variety of features.	Select Edit > User Preferences.
	Save Configuration	Saves the current configuration of your storage subsystem. Avid Customer Support uses this configuration file for diagnostic purposes.	Select File > Save Configuration.
	Send File	Opens the Send File dialog box, which allows you to send a log file by e-mail to a recipient you specify.	Select File > Send File.
	Exit	Closes Storage Manager.	Select File > Exit.
	Help	Displays Storage Manager Help contents.	Select Help > Contents.

Side Toolbar

The following table describes the buttons in the side toolbar. These buttons do not have equivalent menu commands.

Side Toolbar Buttons

Button	Button Name	Description
	Identify	Identifies the hard drives currently selected in the main window by causing the drives' activity LED to blink. *The Identify feature is not supported when you test Avid Unity LANshare or Avid Unity LANshare EX drives from a client.*
	Spin Down	Spins down the shuttles currently selected in the main window in preparation for swapping the shuttles. This feature parks the heads, stops the disk rotation, and puts the drives in Idle mode. For more information on the Spin Down feature, see "Spinning Down Hard Drives" on page 44. *The Spin Down feature is not supported for IDE, IEEE 1394-compliant (FireWire®), or MediaRAID drives.*
	Test	Opens the Test window that you use to set up and run tests on your Avid hard drives.
	Tune	Tunes hard drives for optimal performance in Avid systems (Digidesign drives only).
	Close	Closes Physical view or Volume view, depending on which view is active.
	Help	Opens a context-sensitive Help window that contains information about the main window's current view (Physical or Volume).

Using Storage Manager with Other Utilities

You can use Storage Manager with other Avid configuration and diagnostic utilities designed to set up and troubleshoot your Avid components. These utilities include:

- **Avid System Test Pro:** This utility tests the Avid editing system to make sure the Avid components and peripheral boards are functioning properly.
- **AvidStartup:** This utility ensures that the storage media performance parameters are set correctly for your Avid software.

Chapter 3
Using Storage Manager

This chapter provides information on using Storage Manager's features, except hard drive tuning and hard drive testing. For information on these topics, see the following chapters:

- Chapter 4, "Tuning Digidesign Drives"
- Chapter 5, "Testing Hard Drives"

This chapter includes the following topics:

- Opening and Closing Storage Manager
- Setting User Preferences
- Selecting Hard Drives
- Viewing Hard Drive Information
- Identifying Hard Drives
- Spinning Down Hard Drives
- Rescanning the Storage Subsystem
- Saving the Storage Subsystem Configuration
- Sending Error Log and Configuration Files
- Updating Hard Drive Firmware

Opening and Closing Storage Manager

To open Storage Manager on a Windows system:

- Click the Start button, and select Programs > Avid > Utilities > Avid Storage Manager.

To open Storage Manager on a Macintosh system:

- Navigate to Macintosh HD/Applications/Utilities/Avid Storage Manager, and then double-click the Storage Manager icon.

To close Storage Manager:

- Click the Exit button in the top toolbar, or select File > Exit.

Setting User Preferences

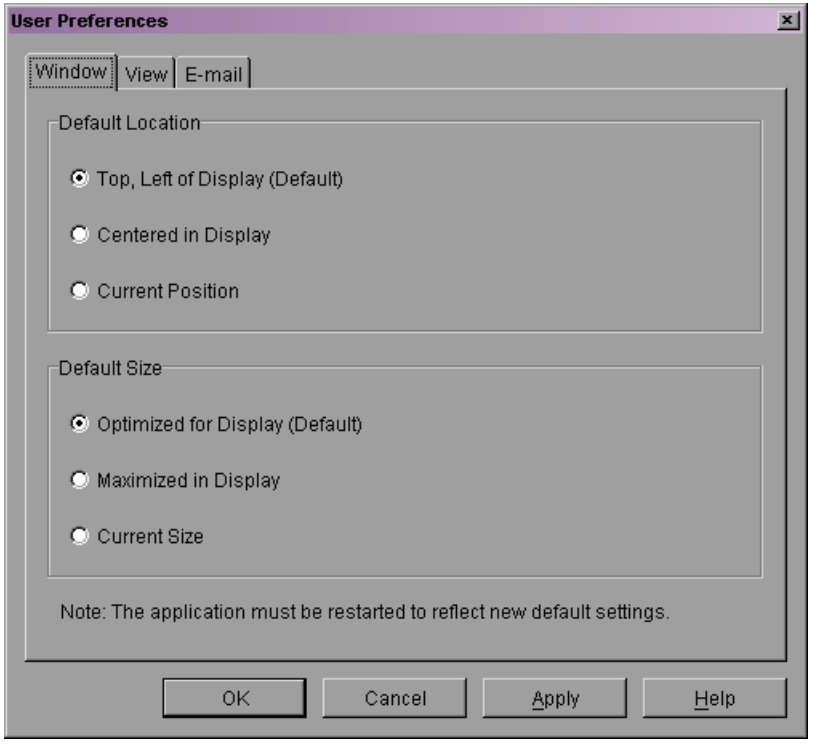
You can set user preferences that determine the default behavior of Storage Manager as follows:

- The initial view for the main window (Physical view or Volume view)
- The default window's location, size, and "look and feel"
- The default e-mail addresses for sending and receiving log and configuration files

To set user preferences:

1. Click the User Preferences button in the top toolbar, or select Edit > User Preferences.

   The User Preferences dialog box opens.



2. Click the tab for the preferences you want to set. See "Window User Preferences" on page 36, "View User Preferences" on page 36, and "E-mail User Preferences" on page 37 for descriptions of the options on each tab.
3. Make your changes, and then click Apply.
4. Repeat steps 2 and 3 to set the options on the other tabs.
5. When you have finished setting user preferences, click OK to close the User Preferences dialog box.
6. Close Storage Manager, and then reopen it to make your new user preferences active.

Window User Preferences

Option Type	Option	Description
Default Location	Top, Left of Display (Default)	The Storage Manager window opens in the upper left corner of your display.
	Centered in Display	The Storage Manager window opens in the center of your display.
	Current Position	The Storage Manager window opens in the same location where it was last closed.
Default Size	Optimized for Display (Default)	The Storage Manager window is sized as large as possible, up to 800 x 600 pixels.
	Maximized in Display	The Storage Manager window is sized to fill the entire display.
	Current Size	The Storage Manager window opens with the same dimensions as when it was last closed.

View User Preferences

Option Type	Option	Description
Default Window	Physical View Window (default)	When it opens, Storage Manager displays Physical view.
	Volume View Window	When it opens, Storage Manager displays Volume view.
	Main Window Only	When it opens, Storage Manager displays the main window with neither Physical view nor Volume view showing.

View User Preferences (Continued)

Option Type	Option	Description
Default Look & Feel	CDE/Motif	Storage Manager uses CDE (Windows and Macintosh) or Motif® style windows (Macintosh only).
	MacOS Adaptive	Storage Manager uses Mac OS X style windows (Macintosh only).
	Metal	Storage Manager uses Metal style windows.
	Windows	Storage Manager uses Windows style windows (Windows only).

E-mail User Preferences

Option	Description
Recipient E-mail Addresses	The default e-mail addresses for the recipients of log and configuration files.
Sender E-mail Address	The default e-mail address for the sender of log and configuration files.
Outgoing Mail (SMTP) Server	The name of the SMTP server used to deliver the e-mail. To use this feature, the system running Storage Manager must have a network connection to an SMTP server.
E-mail Subject	The default subject line for the log and the configuration file e-mail messages.

Selecting Hard Drives

Selecting the correct hard drives in both Physical view and Volume view is important before you use any of the features in Storage Manager, especially if you are running a destructive test.

Running a destructive test destroys the data on a hard drive. Do not run a destructive test on your internal boot drive or on any drive that has data you want to keep.

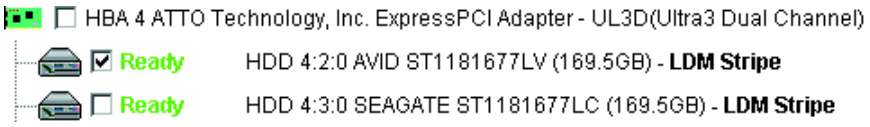
Selecting a Single Drive

The procedure for selecting a single drive in Physical view and in Volume view is identical.

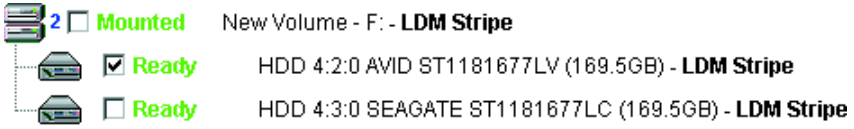
To select a single drive in Physical view or Volume view:

- Click the check box next to the hard drive description to enable it. If you select a drive that is part of a stripe set, Storage Manager will ask you if you want to select all the drives in the set or just the one you clicked.

Selecting a single drive in Physical view



Selecting a single drive in Volume view



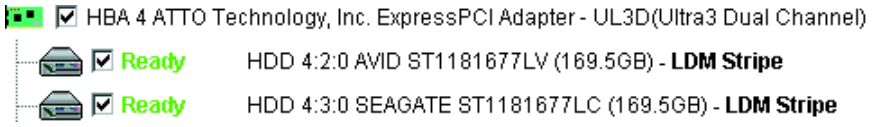
Selecting Multiple Drives

The procedures for selecting multiple drives differ slightly in Physical view and in Volume view.

To select multiple hard drives in Physical view:

- Click the check box next to the adapter board description to select all of the drives that are connected by that adapter board.

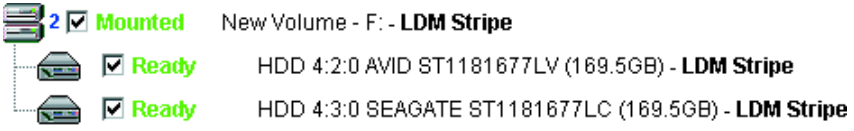
Selecting multiple drives in Physical view



To select multiple hard drives in Volume view:

- Click the check box next to the volume name to select all of the drives that make up that volume.

Selecting multiple drives in Volume view



You can also use the Shift and Ctrl keys to select multiple drives.

Viewing Hard Drive Information

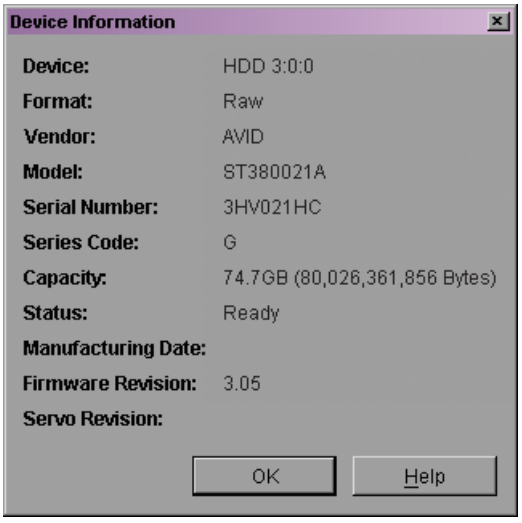
Storage Manager has two features for viewing hard drive information. One feature provides details on the physical hardware for a drive. The other feature provides information on the volumes that use all or a portion of the hard drive's storage space.

Viewing Hardware Information

To view the hardware information for hard drives:

1. In either Physical view or Volume view, click the check boxes for the hard drives for which you want information. If you select a drive that is part of a stripe set, Storage Manager asks you if you want to select all drives in the set or just the drive you selected.
2. Right-click (Windows) or Control+click (Macintosh) a selected hard drive description, and select Device Information.

   The Device Information dialog box opens. If you have selected multiple hard drives, then several dialog boxes open, one on top of the other.



   For detailed descriptions of the information contained in the Device Information dialog box, see "Device Information Dialog Box" on page 41.
3. Click OK to close the Device Information dialog box.

To view the Device Information dialog boxes that are hidden, click OK to close the topmost dialog box, or click the topmost dialog box and drag it away from the dialog box behind it.

Device Information Dialog Box

Label	Description or Comment
Device	A description of the selected hard drive. This information includes the drive type, its bus ID, its device ID, and its LUN ID. For example, HDD 1:1:0 indicates a hard drive on bus 1 with a device ID of 1 and a LUN ID of 0. *Bus numbers for SCSI drives start at 0. Bus numbers for FireWire drives start at 64.*
Format	The type of partition that currently exists on the hard drive. For complete information, see "Partition Status Indications" on page 24.
Vendor	The manufacturer of the hard drive.
Model	The model number of the hard drive.
Serial Number	The serial number of the hard drive.
Series Code	Each Avid hard drive is assigned a series code that indicates its drive type (for example, 7,200 RPM, second generation 10,000 RPM, and so forth). You use the series code when striping drives. Drives should have the same series code (that is, they are the same type) in order to be striped together. If you stripe drives of different types together, the performance of the stripe set is limited to the speed of the slowest drive in the set. Drives with dissimilar series codes generally should not be striped together.
Capacity	The storage capacity of the hard drive. The first number is based on the industry standard—1024 bytes equals one kilobyte (KB) — and the second number is the actual physical byte count on the drive.

Device Information Dialog Box (Continued)

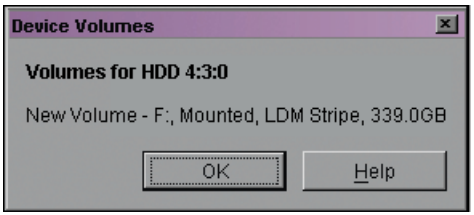
Label	Description or Comment
Status	The status of the hard drive. Possible values are: • **Ready:** The drive is available and ready for testing. • **Not Ready:** The drive is not ready for testing • **Unavailable:** The device is not a hard drive (for example, it is a CD-ROM drive). • **Testing:** The drive is in the process of being tested. • **Passed:** The drive has passed its most recent test. • **Failed:** The drive has failed its most recent test. *A drive's label changes from Passed to Ready only after you have rescanned the storage subsystem by using the Rescan feature or by reopening Storage Manager.*
Manufacturing Date	The date the hard drive was manufactured, in Julian notation. For example, 01/360 indicates the drive was manufactured on the 360th day of the year 2001. *The manufacturing date is not available for all drives.*
Firmware Revision	The firmware revision of the hard drive.
Servo Revision	The servo code revision of the hard drive. Servo code is responsible for keeping the drive heads on track. *The servo revision is not available for all drives.*

Viewing Volume Information

To view the volume information for hard drives:

1. In either Physical view or Volume view, click the check boxes for the hard drives on which you want information.
2. Right-click (Windows) or Control+click (Macintosh) a selected hard drive description, and select Device Volumes.

The Device Volumes dialog box opens. If you have selected multiple hard drives, then several dialog boxes open, one on top of the other.



The Device Volumes dialog box contains the following information:

- The hard drive description includes the drive type, its bus ID, its device ID, and its LUN ID (for example, HDD 1:10:0).
- The names of any volumes that use all or a portion of the hard drive's storage capacity.

  In addition to the volume name, the dialog box provides the volume's mount status (Mounted, Unmounted, or Broken), its stripe status (Striped or Unstriped), and its size.

3. Click OK to close the Device Volumes dialog box.

Identifying Hard Drives

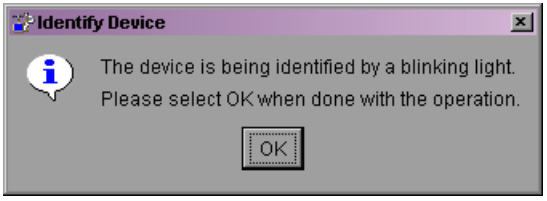
The Identify button in the side toolbar provides a visual aid that allows you to match the hard drive descriptions in the main window with the physical hard drives in your storage subsystem.

To identify hard drives:

1. In either Physical view or Volume view, click the check boxes for the hard drives you want to identify.

2. Click the Identify button in the side toolbar.

The Identify Device dialog box opens, and the drive activity LEDs for the drives you selected start to blink.



The drive activity LEDs blink for approximately 1 second on and 1 second off.

3. Click OK to close the Identify Device dialog box and stop the blinking LEDs.

Spinning Down Hard Drives

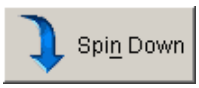
You can use Storage Manager to spin down your Avid shuttles. The Spin Down feature parks the drive heads, stops the drive from rotating, and ensures that you can safely swap the drive without loss of data or damage to the drive.

You should use the Identify feature to identify drives before spinning them down (see "Identifying Hard Drives" on page 43). Only removable drives that you plan to remove should be spun down. If you spin down a fixed drive or an internal system drive, you must turn it off and then turn it on for the drive to spin up again.

The Spin Down feature is not supported for IDE, IEEE 1394-compliant (FireWire), or MediaRAID drives.

To spin down hard drives:

1. Make sure the hard drives you want to spin down do not have any volumes that are mounted. If they do, then unmount the volumes before spinning down the drives.
2. In Physical view or Volume view, click the check boxes for the hard drives you want to spin down.



3. Click the Spin Down button in the side toolbar.

4. The hourglass pointer appears, and Storage Manager waits 30 seconds to ensure that all of the drives are spun down. When the hourglass pointer disappears, the spin down is complete.

For information about spinning up a shuttle, see your shuttle enclosure documentation. In most cases, the shuttle spins up when you insert it in the shuttle enclosure. If you inadvertently spin down a fixed drive, you must turn the drive power switch off and then on to spin the drive back up for use.

Rescanning the Storage Subsystem

You can manually initiate the Rescan feature by clicking the Rescan System Configuration button in the top toolbar, or by selecting Edit > Rescan Configuration. When the Rescan feature is active, Storage Manager scans all of the hard drives in your storage subsystem and updates the information in the main window.

Hard drives with an availability/testing status of Passed, Failed, or Updated change their status back to Ready when you rescan the storage subsystem.

Rescanning might not find hard drives or shuttles that you added to the Avid system since the last system boot. If you have added hard drives since the last system boot, you might need to restart your system.

To rescan for new drives:

- (Windows) Run Disk Manager to rescan the buses, and then click the Rescan System Configuration button to locate the new hard drives. If the new hard drives still do not appear, then reboot the system.
- (Macintosh) Restart the Macintosh system and run Storage Manager to locate the new hard drives.

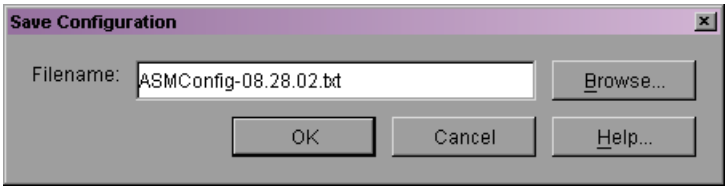
Saving the Storage Subsystem Configuration

In Storage Manager, you can save your storage subsystem's configuration to a log file. Avid Customer Support uses the information in this file for diagnostic purposes.

To save the storage subsystem configuration:

1. Click the Save Configuration button in the top toolbar, or select File > Save Configuration.

   The Save Configuration dialog box opens.



2. Click the Browse button, and then navigate to the location where you want to save the configuration file.
3. Type a name for the file. The default file name is:

   ASMConfig-*MM.DD.YY*.txt

   where *MM* is the month, *DD* is the day, and *YY* is the year the file was created.
4. Click OK, and then click OK again to close the Save Configuration dialog box and save the file.

Sending Error Log and Configuration Files

You can send error logs and configuration files directly from Storage Manager to other locations through e-mail. You can use this feature to send error and configuration information to Avid Customer Support for a diagnosis of storage-related problems.

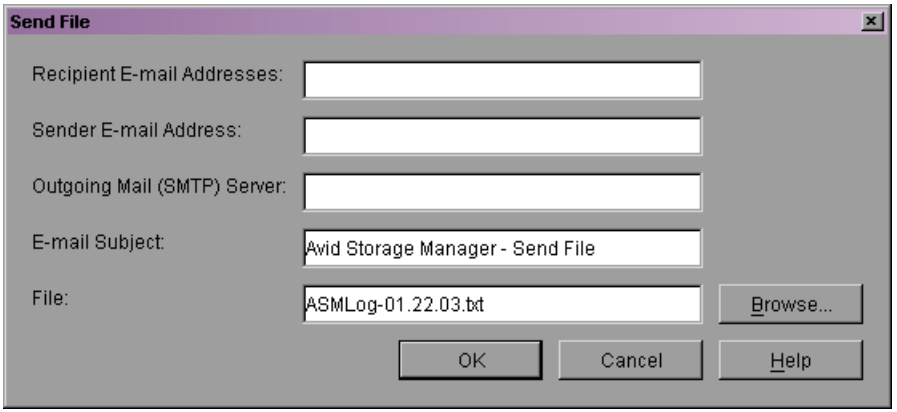
Before using the e-mail feature, make sure the computer running Storage Manager has a network connection to an SMTP server.

Error logs are generated while testing your hard drives. For more information, see Chapter 5.

To send a log file:

1. Click the Send File button in the top toolbar, or select File > Send File.

   The Send File dialog box opens.



   The dialog box is partially filled in with information from the e-mail preferences you set (see "Setting User Preferences" on page 34). You can accept this information, or you can override it by typing new information in the text boxes.

2. Click the Browse button to locate the error log or configuration file you want to send.

   The Select File dialog box opens.

3. Select the file you want to send, and then click OK to close the Select File dialog box.

You can type the file name in the File text box. If the file does not exist in the directory where Storage Manager is installed — by default, C:\Program Files\Avid\Utilities\Avid Storage Manager (Windows) or Macintosh HD/Applications/Utilities/Avid Storage Manager (Macintosh) — you must type the entire path.

4. Click OK to send the file and to close the Send File dialog box.

Updating Hard Drive Firmware

Do not perform this procedure unless directed to do so by Avid Customer Support.

You can use Storage Manager to update the firmware on your Avid hard drives. When you use this feature, all hard drives that are acceptable candidates for the updated firmware package are updated automatically. You cannot select specific hard drives for updating. A drive is an acceptable candidate for updating if it is the correct type of drive for the updated firmware, and its current version of firmware is earlier than the version of the updated firmware.

Obtaining an Updated Firmware Package

Updated firmware packages are distributed through the following:

- Avid Knowledge Center
- Storage Utilities CD-ROM

Always close Storage Manager before retrieving firmware updates.

To retrieve an updated firmware package from the Avid Knowledge Center:

1. Go to www.avid.com.
2. Click the Support tab, and then select Online Support.
3. Under the Knowledge Center heading, click Downloads.

   The Knowledge Center opens in the Downloads tab.
4. Locate the firmware update, and then download the file to the following location:

   (Windows) C:\Program Files\Avid\Utilities\Avid Storage Manager\FirmwarePackages

   (Macintosh) Macintosh HD/Applications/Utilities/Avid Storage Manager/FirmwarePackages

You can use the Search feature to find the update. You can also click Storage Utilities Table at the top of the Downloads tab and select the update from the Storage Utilities Download table.

If you installed Storage Manager in a directory other than the default, download the firmware update to the FirmwarePackages directory in that location instead.

If you do not have a FirmwarePackages folder, you must create one and copy the firmware package files into the folder.

5. Uncompress the update file.

To retrieve an updated firmware package from the Storage Utilities CD-ROM:

1. Insert the Storage Utilities CD-ROM into the CD-ROM drive.
2. Navigate to the Storage Manager directory on the Storage Utilities CD-ROM.
3. Copy the firmware update package from the Storage Manager directory to the following location:

   (Windows) C:\Program Files\Avid\Utilities\Avid Storage Manager\FirmwarePackages

   (Macintosh) Macintosh HD/Applications/Utilities/Avid Storage Manager/FirmwarePackages

If you installed Storage Manager in a directory other than the default, copy the firmware update to the FirmwarePackages directory in that location instead.

If you do not have a FirmwarePackages folder, you must create one and copy the firmware package files into the folder.

Updating Hard Drives

After downloading the firmware update package, you are ready to update your Avid hard drive or MediaRAID enclosure.

To update the firmware for your Avid hard drive:

1. Open Storage Manager.
2. Click the Update Firmware button in the top toolbar, or select Edit > Update Firmware.

Storage Manager checks for drives and enclosures that require updating, prints the list in the Console window, and checks for available firmware update files. A dialog box opens, informing you of the number of drives and enclosures to be updated and asking if you want to continue.

3. Click Yes to continue.

   Storage Manager updates any Avid hard drives that are the correct type for the firmware update and that currently have an earlier version of firmware. The Console window displays the progress of the update for each drive and enclosure.

Do not close Storage Manager or turn off hard drives when performing a firmware update. Doing so might cause the drives to become inoperable, requiring them to be returned to Avid for replacement at the discretion of Avid Customer Support.

When the update is complete, an Updated label displays next to all updated drives listed in the Physical View Window.

Chapter 4
Tuning Digidesign Drives

This chapter has detailed information on tuning Digidesign DigiDrive drives for optimal performance. The Storage Manager Drive Tuner feature provides the ability to set the mode pages on DigiDrive drives for use with Pro Tools®, AVoption™, and AVoption|XL systems.

Drive Tuner is supported on DigiDrive SCSI drives only. You cannot tune DigiDrive FireWire drives.

This chapter includes the following topics:

- Pro Tools System Prerequisites (Windows)
- Pro Tools System Prerequisites (Macintosh)
- Using the Storage Manager Drive Tuner

Before you use Drive Tuner to optimize your DigiDrive drives, first check the following to make sure your system is ready:

- The DigiDrive drives are connected to the SCSI host bus adapter board.
- The Pro Tools, AVoption, or AVoption|XL system is turned on.
- The DigiDrive drives are turned on.
- If you are using a Macintosh system, the DigiDrive drives are visible on the desktop.
- If you are using a Windows system, the DigiDrive drives are visible in the My Computer window or in Windows Explorer.

If the DigiDrive drives are not visible, see the Troubleshooting section of the DigiDrive Guide *included on the DigiDrive CD-ROM.*

Pro Tools System Prerequisites (Windows)

Before you use the Storage Manager Drive Tuner on your DigiDrive drives in a Windows system, format your DigiDrive drives with the Windows Disk Administrator or the Windows Disk Management utility. For more information, see the *DigiDrive Guide* that came with your DigiDrive drives.

Pro Tools System Prerequisites (Macintosh)

Before you use the Storage Manager Drive Tuner on your DigiDrive drives in a Macintosh system, initialize your drives with the ATTO ExpressStripe utility (included with Pro Tools TDM Macintosh systems).

Do not use the Digital Audio mode page settings in the ATTO ExpressStripe utility. Storage Manager Drive Tuner sets the optimal mode pages for Pro Tools systems.

Using the Storage Manager Drive Tuner

You need to run the Storage Manager Drive Tuner once when your Pro Tools system is first set up, and then each time you add a new DigiDrive drive to the system.

To use the Storage Manager Drive Tuner:

1. Open Storage Manager.

   The Storage Manager main window opens showing all of the attached storage devices.

2. Click the Tune button in the side toolbar.

   Storage Manager searches your Pro Tools system for DigiDrive drives, and then sets the drive mode pages.

When Drive Tuner is finished, the message appears, “Mode page check complete. *X* devices checked, *Y* tuned,” where *X* is the number of DigiDrive drives mounted on the system and *Y* is the number of drives tuned.

Chapter 5
Testing Hard Drives

This chapter provides detailed information on the tests you can perform on your Avid hard drives and DigiDrive drives with Storage Manager.

This chapter includes the following topics:

- Nondestructive and Destructive Tests
- Testing Your Hard Drives
- Test Templates
- Test Parameters
- Error Messages

Nondestructive and Destructive Tests

There are two types of tests you can perform with Storage Manager: nondestructive and destructive.

- *Nondestructive tests* only read the data on the hard drive. They do not write any data to the hard drive.
- *Destructive tests* write data to the drive and then read that data. The tests then compare the written data to the original data to verify that the write and read functions of the hard drive are working correctly. These tests destroy any data and the file system structure that are on the drive.

Running a destructive test destroys all the data on a hard drive. Do not run a destructive test on your internal boot drive or on any drive that has data you want to keep.

Destructive tests do not remove data stored on hard drives sufficiently for a full security erase.

Testing Your Hard Drives

To perform a test you must:

1. Set up the test either by using one of Avid's test templates or by specifying the test parameters yourself.
2. Run the test.
3. Review the test results.

The following sections provide instructions for performing these tasks. For more detailed descriptions of the test templates and the test parameters, see "Test Templates" on page 59 and "Test Parameters" on page 61.

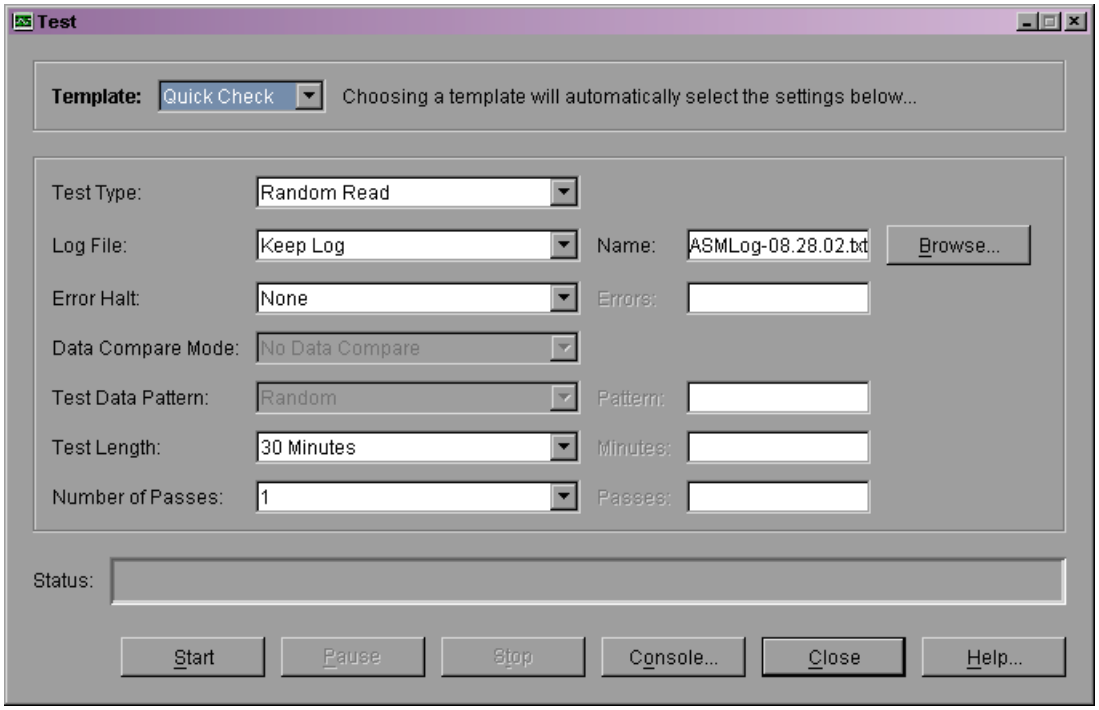
Using a Test Template

Avid has created four test templates to aid you in testing your hard drives. Each template has its own test parameters that are set automatically. For detailed descriptions of the templates, see "Test Templates" on page 59.

To use a test template:

1. Select one or more drives to test.
2. Click the Test button in the side toolbar.

The Test window opens.



3. Click the Template pop-up menu, and select a test template. The test parameters in the remainder of the Test window are set according to the template you selected.
4. To run the test using the template parameters, follow the instructions in "Running a Test" on page 56.

Creating a Custom Test

You can create a custom test by modifying an existing template to fit your needs.

To create a custom test:

1. Select one or more drives to test.
2. Click the Test button in the side toolbar.

   The Test window opens.

3. Click the Template pop-up menu, and select a test template.
4. Change any test parameters in the remainder of the Test window. The Template pop-up menu automatically changes to User Selected to indicate that you have customized the template.
5. To run the test using the custom parameters, follow the instructions in "Running a Test" on page 56.

Running a Test

Once you have set the test parameters by using an existing template or by creating a custom test, you are ready to run the test.

Running a destructive test destroys all data on a hard drive. Do not run a destructive test on your internal boot drive or on any drive that has data you want to keep. Use the Identify feature to verify that you are testing the correct drive (see "Identifying Hard Drives" on page 43).

If you run a test from a client in a LANshare environment, test coverage is limited as follows:

- SCSI or Fibre Channel drives do not allow for soft error reporting and data reallocation.
- IDE drive serial numbers are not available.
- Reallocated block count is not available.

To run a test:

1. After setting the test parameters, click the Start button in the Test window.

   If you select a destructive test, a message box opens, warning you that the test will permanently delete data on your drive. Click Yes to continue.

   The test starts running, and the Status indicator at the bottom of the Test window begins tracking the test. This indicator tracks each pass of the test, not the test as a whole.

2. Use the following options to control the test while it is running:

   - *To pause the test,* click the Pause button (the button label then changes to Resume). Click the Resume button to restart the test at the point it paused.

     Storage Manager retains the present state of the test and all test parameters during a pause.

- *To stop the test,* click the Stop button. The test parameters are saved for a future restart, but all other testing information (elapsed time, error counts, and so forth) are reset.
- *To view the test results as the test is being run,* click the Console button.

  The Console window opens. For more information on the Console window, see "Viewing Test Information" on page 57.

Viewing Test Information

You can view test information in two ways: by using the Console window or by looking at the error log file (if you opted to create one during the test).

- To view test status while the test is running, use the Console window.
- To view test status after the test has finished, look at the error log file.

Test status information includes:

- A list of all the drives connected to the Avid system, including the drive type, bus ID, device ID, and LUN ID
- The type of test being run
- The set of test parameters used to perform the test
- A list of the drives being tested
- The status of each drive that is being tested
- Error messages
- The total number of blocks transferred for each drive (read and write blocks)

You can also view a summary of the test while it is running, while it is paused, or after it has finished. A test summary has a line for each drive under test and a line for each pass of the test. Test summaries include:

- The drive's bus ID, device ID, and LUN ID
- The test pass number
- The number of read commands
- The number of sectors read
- The number of write commands
- The number of sectors written

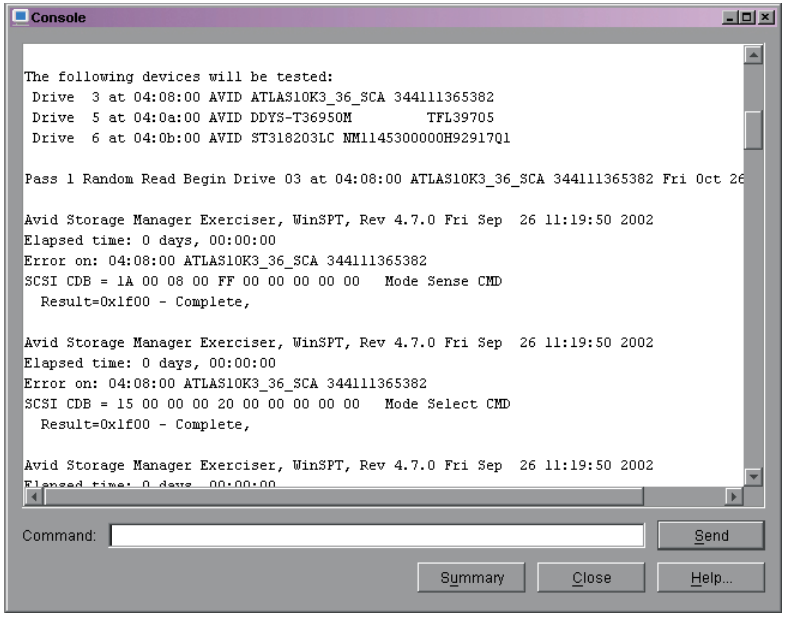
- The number of errors
- The number of reallocated blocks
- The maximum, minimum, and average times for the read and write commands, in milliseconds
- The total number of I/Os per second for the entire storage subsystem

A test's status information is always followed by a summary at the end of the test in both the Console window and in the log file.

To view test information using the Console window:

1. Open the Console window using one of the following methods:
   - In the Test window, click the Console button.
   - Click the Console button in the top toolbar.
   - Select View > Console.

   The Console window opens, displaying test information.



2. To view a summary of the test, click the Summary button.
3. When you are finished looking at the information in the Console window, click the Close button.

To view test information in a log file:

- (Windows) The log file is an ASCII text file. Open the file in Notepad. If it is too large for Notepad, open the file in WordPad.
- (Macintosh) The log file is an ASCII text file. Open the file in TextEdit. If it is too large for TextEdit, open the file in a word processing application.

You can also send your log files to a recipient that you specify. For more information, see "Sending Error Log and Configuration Files" on page 46.

Test Templates

The following table describes Storage Manager's test templates. Each template uses a specific set of test parameters that are described in "Test Parameters" on page 61.

Test Templates

Test	Description	Test Parameters
Extended Test (nondestructive)	This test provides an overall check of the storage subsystem. It nondestructively reads random blocks on the disk. Each pass reads the entire surface and then runs a random read test for approximately 60 minutes. You set the number of passes and the test length for the random read test, in minutes.	**Test Type:** Sequential Read/Random Read **Log File:** Keep Log **Name:** ASMLog-*MM.DD.YY*.txt **Error Halt:** None **Test Data Pattern:** Random **Test Length:** Full Surface + 60 Minutes **Number of Passes:** 1 *All other options are disabled.*
Quick Check (nondestructive)	This test provides a quick indication of any serious problems in the storage subsystem. It nondestructively reads random blocks on each drive, and it runs for 30 minutes.	**Test Type:** Random Read **Log File:** Keep Log **Name:** ASMLog-*MM.DD.YY*.txt **Error Halt:** None **Test Length:** 30 Minutes **Number of Passes:** 1 *All other options are disabled.*

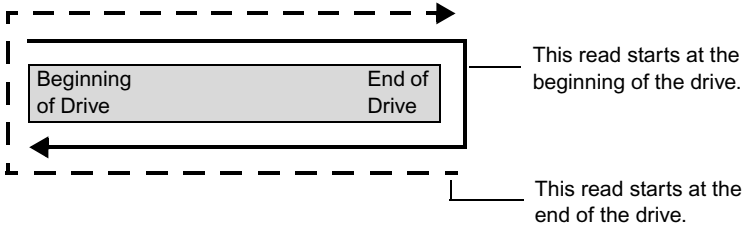
Test Templates (Continued)

Test	Description	Test Parameters
Surface Scan (nondestructive)	This test reads the entire surface area of a selected Avid drive. You run it primarily to detect media errors on selected drives. When you use this test, you are prompted to choose whether or not to automatically reallocate any blocks that have media errors. Reallocating bad blocks scrubs the disk surface clean of media defects. If you choose to reallocate bad blocks, Storage Manager reallocates a bad block's address to a good block and, if possible, copies the data from the bad block to the good block. If the original block contains unreadable data, the block is considered damaged and Storage Manager marks it as bad. Writing data to the reallocated block erases Storage Manager's bad mark and writes good data into the reallocated block.	**Test Type:** Surface Scan **Log File:** Keep Log **Name:** ASMLog-*MM.DD.YY*.txt **Error Halt:** None **Number of Passes:** 1 *All other options are disabled.*
Verify (nondestructive)	This test sequentially reads the entire surface area of a selected Avid drive. The test verifies errors on the drive, but it does not reallocate data for hard (nonrecoverable) media error bad blocks. The test does reallocate data for soft (recoverable) media error bad blocks. This test usually is faster than a Surface Scan because it does not transfer data to memory. *This test is not available for IDE or FireWire drives.*	**Test Type:** Verify **Log File:** Keep Log **Name:** ASMLog-*MM.DD.YY*.txt **Error Halt:** None **Test Length:** Full Surface **Number of Passes:** 1
User Selected	This test is automatically selected when you modify a test template.	User Selected, by its definition, indicates that you have set your own custom parameters.

Test Parameters

The following table describes the test parameters you see in the Test window. The first parameter, Test Type, is divided into nondestructive and destructive tests.

Test Parameters

Parameter	Options
Test Type (nondestructive)	**Random Read (default):** This test picks a random starting point on the drive and a random number of sectors to test. It then reads the drive's data, beginning at the random starting point and ending after the random number of sectors are read. **Convergence/Divergence Read:** This test picks a random number of sectors to test. It then reads that number of sectors at the beginning of the drive. After the beginning of the drive is read, the test goes to the end of the drive and reads the same random number of sectors. The test then returns to where it left off at the beginning of the drive, picks a new random number of sectors, and repeats the same process. The test continues until it reads the entire drive twice. The Convergence/Divergence test is useful for identifying problems with the drive heads or with the drive's servo system.  **Sequential Read:** This test reads the data on the drive from the beginning sector to the last sector. **Sequential Read/Random Read:** This test starts by reading the data on the drive from the beginning sector to the last sector. It then picks a random starting point on the drive and a random number of drive sectors to test. The test reads the data beginning at the random starting point and ending after the random number of sectors are read. This random read is repeated for the specified test length. **Verify:** This test reads data on the drive from the beginning sector to the last sector. This test identifies errors, but it does not transfer data to memory or reallocate blocks that have errors.

Test Parameters (Continued)

Parameter	Options
Test Type (destructive)	**Random Write/Read:** This test picks a random starting point on the drive and a random number of drive sectors to test. It then writes data to the drive, reads the data back, and compares it to the original data. Writes and reads are done in pairs; that is, the test writes to a group of sectors, reads the data back, writes to another group of sectors, reads the data back, and so on until the test is completed. **Sequential Write/Read:** This test writes data from the beginning of the drive to the end of the drive, reads that data back from beginning to end, and compares it to the original data. **Sequential Write/Random Read:** This test writes data from the beginning of the drive to the end of the drive. It then picks a random starting point on the drive and a random number of drive sectors to test. The test reads the data beginning at the random starting point and ending after the random number of sectors are read. This random read is repeated for the specified test length. **Surface Scan:** This test scans the entire surface area of the drive. It is run primarily to detect media errors. When you select this test, you are prompted to choose whether or not to automatically reallocate any blocks that have media errors, effectively scrubbing the disk surface clean of media defects. If you choose to reallocate blocks, this test will become destructive if any media errors are found and reallocated. If not, the test is nondestructive. **Format Test:** This test performs a low-level format on the drive. You should use this test only when directed to do so by Avid Customer Support. If you stop this test before it is completed, the drive might be rendered inoperable, requiring the drive to be returned to Avid for replacement. This test cannot be used with IDE or FireWire drives. **Random Write:** This test picks a random starting point on the drive and a random number of drive sectors. It then writes data between those two points. This test is useful for diagnostics. **Sequential Write:** This test writes data from the beginning of the drive to the end of the drive. This test is useful for diagnostics.

Test Parameters (Continued)

Parameter	Options
Log File	**Keep Log:** Select this option to keep a log file for the tests you are running. Error logs are cumulative on a daily basis. An error log is appended with information from each test you run during a single day (as indicated by the computer's internal date at the start of the test). When the date changes, a new error log is started. However, if a test runs over the course of several days, only one log file is generated for the entire test. **No Log:** No error log is generated while your tests are run.  *For more information on the naming conventions for error log files, see the Name parameter.*
Name	When you select the Keep Log option, the Name text box is enabled. This box contains the name of the log file to be generated during testing. By default, this file name has the following format: ASMErrorLog-*MM-DD-YY*.txt You can overwrite the default file name with a name you specify by typing it in the Name text box. You must type the entire path if you are saving the file to a directory other than the default directory. You can also use the Browse button to specify a file name and a location for the log file.  *On Macintosh systems, the file name is preceded by the following path notation: ../../../../. This saves the file in a location separate from the Storage Manager utility.*

Test Parameters (Continued)

Parameter	Options
Error Halt	**None (default):** The test continues even when it encounters an error, except when it encounters a catastrophic error. Catastrophic errors stop the test because they are not likely to be corrected and they fill the error log with redundant error information. **Any Error:** The test stops when any drive encounters an error, regardless of the error type. **Media Error:** The test stops when any drive encounters a nonrecoverable media error. A media error is an error in the magnetic drive media, for example, a bad sector on the drive. **Nonrecoverable Error:** The test stops when any drive encounters a nonrecoverable error. Nonrecoverable errors include the following: • A unit attention result that is not the result of a drive power-up or a SCSI Reset command • An illegal request error • An aborted command error • Most driver errors **Catastrophic Error:** The test stops when it encounters a catastrophic error. Catastrophic errors include the following: • A drive seems to have “disappeared” or is nonexistent • A drive not ready error • A hardware error • A data protection error • Any error not recognized by Storage Manager **User Defined:** The test stops when an error count that you specified is reached. The error count applies to any error type.
Errors	If you select User Defined as your Error Halt parameter option, type the number of errors required before the test stops in the Errors text box. The number you type must be greater than 5, representing the maximum number of errors for each drive in the test.

Test Parameters (Continued)

Parameter	Options
Data Compare Mode	**Compare All Data (default)**: For write/read tests, the data written to a hard drive and then read back is compared to the original data for discrepancies. **No Data Compare:** No data comparison is made between the data written to a hard drive during a write/read test and the original data. **Compare First Sector:** For write/read tests, the first 512 bytes of data written to a hard drive and then read back are compared to the original data for discrepancies.
Test Data Pattern	**Random (default):** Random data is written to the drive. **Alternating:** The data written to the drive uses alternating words comprised of all 0s (zeros) or all 1s (ones). **Incrementing Byte:** The data is written using an incrementing byte pattern where the 00 byte is never used. Skipping the 00 byte ensures that as the data repeats itself, it never falls on sector boundaries. This prevents the repetition of the pattern from masking possible data corruption problems. **Incrementing Word:** The data is written using an incrementing word pattern. **User Defined:** This option allows you to specify a number greater than 5 to be used as the repeating pattern.
Pattern	If you select User Defined as your Test Data Pattern parameter option, type a number greater than 5 in the Pattern text box.
Test Length	**30 Minutes (default):** The test runs for 30 minutes and then stops. **60 Minutes:** The test runs for 60 minutes and then stops. **120 Minutes:** The test runs for 120 minutes and then stops. **User Defined:** The test runs for the amount of time you specify in the Minutes text box. It is applicable to random tests only.
Minutes	If you select User Defined as your Test Length parameter option, type the number of minutes that the test is to run before it stops in the Minutes text box.
Number of Passes	**1 (default):** The test runs once and then stops. **Infinite:** The test runs until you manually stop it by clicking the Stop button in the Test window. **User Defined:** The test runs for the number of passes specified in the Passes text box. A pass is completed for a sequential test either when the whole drive has been tested or when the time period for the test ends.

Test Parameters (Continued)

Parameter	Options
Passes	If you select User Defined as your Number of Passes parameter option, type the number of passes required before the test stops in the Passes text box.

Error Messages

The error messages in the Console window or in the error log files give you valuable information about the state of your hard drives. For descriptions of the most common errors and how to correct them, see Appendix A.

Appendix A

Interpreting Error Messages

This appendix provides information on the error messages you might see in the Console window and the steps you can take to fix the errors.

Error Messages and Corrective Actions

The following table describes the most common error messages that might be generated while you test Avid hard drives, and includes actions you can take to diagnose and fix problems.

Error messages are referred to as "sense keys" in the Storage Manager Console window.

Some sense keys provide additional information about the error.

Error Messages

Error Message	Description	Comment or Action
00 NO SENSE	The operation completed successfully with no errors.	None required.
01 RECOVERED ERROR	The operation completed successfully with some recovery action performed by the drive.	Recovered errors usually are not a major concern. Run the Surface Scan test, and rerun the test that had the errors.
02 NOT READY	The drive cannot be accessed. User intervention might be required to correct this condition.	Wait 2 minutes, and rerun the test. If the error reoccurs, turn the drive's power off and then on, wait 2 minutes, and rerun the test. If the error persists, replace the drive.

Error Messages (Continued)

Error Message	Description	Comment or Action
03 MEDIUM ERROR	A 03 - 11 error indicates that the test terminated with an unrecoverable error probably caused by a flaw in the media or an error in the recorded data.	Run the Surface Scan test, enabling block reassignments, and rerun the test that failed.
	A 03 - 31 error indicates a format corruption problem. This might occur after a firmware download. It might also occur if a low-level drive format was started and not completed.	Run the Format test, and do not interrupt or turn off the hard drive or the Avid system until the reformatting is complete.
04 HARDWARE ERROR	The hard drive detected an unrecoverable hardware failure while performing the test or during a self-test.	Turn the drive's power off and then on, and rerun the test. If the error reoccurs, replace the drive.
05 ILLEGAL REQUEST	There was an illegal parameter in the test.	This is a software error, not a hardware error, and it should not be seen unless the software contains a bug.
06 UNIT ATTENTION	The removable media has been changed or the hard drive has been reset or power cycled.	This is a normal occurrence after power cycling the drive or after rebooting your Avid system. This error might be reported at the beginning of a test. If the error is reported after the start of a test, check the drive's cabling, termination, and adapter board. If the error continues, turn off the first drive and rerun the test. If the error persists, turn on the first drive and turn off another drive, and rerun the test. Continue to cycle through the drives until the error is no longer reported. The drive that is turned off at this point needs to be replaced.

Error Messages (Continued)

Error Message	Description	Comment or Action
0B ABORTED COMMAND	The hard drive aborted the test.	This usually indicates a bus problem caused by a cable, a terminator, or an adapter board seating problem. Tighten all cable and terminator connectors. Reseat the adapter board and rerun the test. If the error persists and the drives are connected with daisy-chained cables (device to device), proceed as follows: 1. Reconfigure the cables to test half the drives, move the terminator to the last drive still connected in the chain, and rerun the test. 2. If the error is no longer reported, add one drive at a time to the daisy chain and rerun the test. 3. If the error reoccurs, replace the last cable that you added and rerun the test. 4. If the error is still reported, remove the last drive you added and continue with the next drive until all the drives have been successfully added to the bus and the errors are no longer reported. 5. Replace either the cable or the drive that failed.  *If you reconfigure the cables to use half the drives and the error still occurs, reconfigure the cables to use the other half of the drives and perform steps 1 to 5 again.*

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