Avid® Storage Manager

Setup and User's Guide

make manage move | media™

Avid®

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Avid Storage Manager Setup and User's Guide • Part 0130-04874-01 Rev. B• June 2002

Contents

Figures

Tables

Using This Guide

This guide contains information about installing and using Avid® Storage Manager. Avid Storage Manager is a general-purpose, administrative tool for updating, testing, and troubleshooting Avid storage media connected to Avid systems. Avid Storage Manager is available for the Windows 2000 operating system and the Mac OS X operating system.

Who Should Use This Guide

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

About This Guide

This guide describes how to install and use Avid Storage Manager. The Contents lists all topics included in the book. They are presented with the following overall structure:

- Chapter 1, “Installing Avid Storage Manager” describes how to install Avid Storage Manager.
- Chapter 2, “Avid Storage Manager Overview” provides basic concepts that you should understand before using Avid Storage Manager.
- Chapter 3, “Using Avid Storage Manager” provides step-by-step procedures for using all of Avid Storage Manager’s features, with the exception of testing, which is described in Chapter 4.
- Chapter 4, “Testing Hard Drives” describes the various hard drive tests that you can perform with Avid Storage Manager and provides step-by-step information on how to use them.
- Appendix A, “Interpreting Error Messages” includes information on Avid Storage Manager test results and the actions you should take when a hard drive problem is discovered.
- A detailed Index helps you quickly locate specific topics.

Symbols and Conventions

Unless noted otherwise, the material in this document applies to the Windows 2000 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 2000 operating system.
- (Macintosh) or (Macintosh only) means the information applies to the Macintosh OS X operating system.

The majority of screen shots in this document were captured on a Windows 2000 system, but the information applies to both Windows 2000 and Macintosh systems. Where differences exist, both Windows 2000 and Macintosh screen shots are shown.

The Avid Storage Manager documentation uses the following special symbols and conventions:

1. Numbered lists, when the order of the items is important.
    a. Alphabetical lists, when the order of secondary items is important.

- Bulleted lists, when the order of the items is unimportant.
    - Indented dashed lists, when the order of secondary items is unimportant.

▶ One arrow indicates a single-step procedure. Multiple arrows in a list indicate that you perform one of the actions listed.

The ⌘ symbol refers to the Apple or Command key. Press and hold the Command key and another key to perform a keyboard shortcut.

In this document, Avid drive refers to the Avid system's internal hard drive. Apple Computer, Inc. names the internal hard drive Macintosh HD. Microsoft names the internal hard drive My Computer. Depending on your system's setup, the internal hard drive might have a different name.

Look here in the margin for tips.

In the margin, you will find tips that help you perform tasks more easily and efficiently.

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.

If You Need Help

If you are having trouble using Avid Storage Manager, you should:

1. Retry the action, carefully following the instructions given for that task. It is especially important to check each step of your workflow.
2. Check the release notes for the latest information that might have become available *after* the hardcopy documentation was printed.
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.
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CHAPTER 1

Installing Avid Storage Manager

This chapter explains how to install Avid Storage Manager on Windows-based Avid systems that will be used to test and update hard drives. Avid Storage Manager is preinstalled on some Windows 2000 and Mac OS X Avid systems. If it is preinstalled on your system, go to Chapter 2.

A stand-alone installer for the Windows version of Avid Storage Manager is available from the Avid web site (www.avid.com). There is currently no stand-alone installer for the Mac OS X release of Avid Storage Manager.

This chapter includes the following topics:

- Determining if Avid Storage Manager is Installed on Windows 2000
- Installing Avid Storage Manager on Windows 2000 Systems

Determining if Avid Storage Manager is Installed on Windows 2000

To determine if Avid Storage Manager is already installed:

- Click the Start button, point to Programs, point to Avid, point to Utilities, and then click Avid Storage Manager.

  If it is properly installed, Avid Storage Manager should start. If Avid Storage Manager does not appear on the Start menu, you need to install it.

Installing Avid Storage Manager on Windows 2000 Systems

If you do not have Avid Storage Manager installed on your Avid system, you can download the application from the Avid Web site Knowledge Center at www.avid.com. Once you have the application, perform the following procedure to install it on your Avid system.

Avid Storage Manager runs only on systems that use the Windows® 2000 operating system. It does not run on Avid systems that use the Windows NT® operating system.

To install Avid Storage Manager on a Windows 2000 system:

1. Navigate to the location where you saved the Avid Storage Manager download file. The file is in a compressed format.
2. Uncompress the file.
3. Double-click the Setup or Setup.exe icon. A welcome screen appears.
4. Click Next to proceed with the installation.
5. Select the country in which you purchased Avid Storage Manager, and click Next.

6. Click Yes to accept the license agreement.
7. Click Next to install Avid Storage Manager to its default location, C:\Program Files\Avid\Utilities\Avid Storage Manager.
8. Click Next to perform a default Avid Storage Manager installation.

When you are notified that the installation is complete, click Finish.

CHAPTER 2

Avid Storage Manager Overview

This chapter provides an overview of Avid Storage Manager's features and user interface. It contains the following sections:

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

Introduction

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

- Identify Avid hard drives.
- Exercise Avid hard drives using a variety of standardized tests or tests you customize yourself.
- Obtain test status information useful for troubleshooting.
- Report and share test results by generating log files and sending them by e-mail to recipients that you specify.
- Spin down Avid hard drives (SCSI and Fibre Channel only).
- Update Avid hard drive firmware (Windows only).

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

Avid Storage Manager can only test Avid hard drives. It cannot test non-Avid hard drives.

Understanding IDs

All the devices connected to an Avid system — for example, hard drives and CD-ROM drives — must have unique IDs. The Avid system uses these IDs to distinguish the devices from each other and to properly direct traffic between itself and the devices. There are a number of different types of IDs. This section provides a brief overview of each type. You will see these IDs used throughout the Avid Storage Manager user interface. Figure 2-1 shows how IDs are assigned to devices attached to an Avid system.

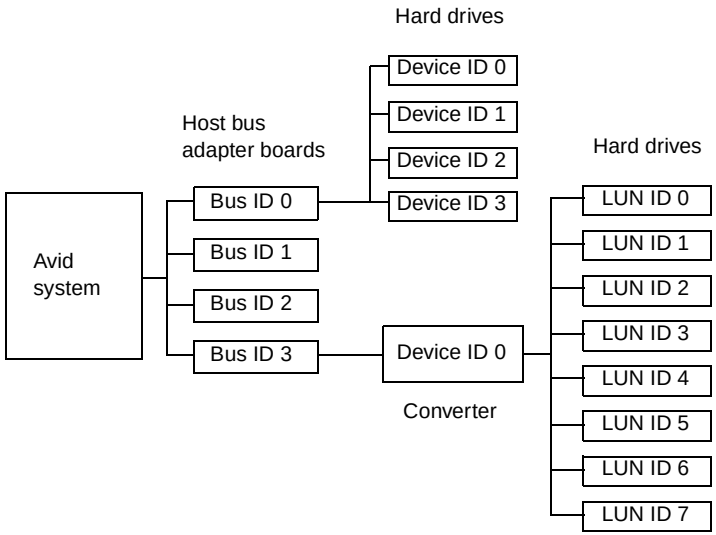


Figure 2-1 IDs in an Avid Storage Subsystem

Each ID contains three parts, the bus ID, the device ID, and the LUN ID, defined as follows:

- **Bus ID:** Indicates the storage bus in the Avid system to which the drives are connected. Avid Storage Manager can identify and work with 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. While there are many types of devices that can be attached to a storage bus, Avid Storage Manager is concerned only with 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 can handle up to 126 IDs (using a Fibre Channel arbitrated loop). This limitation, along with the use of converters, gives rise to the LUN ID.

- **LUN ID:** LUN ID stands for logical unit number ID. LUN IDs are used when you introduce a converter or RAID controller into your storage subsystem. Converters convert a bus' disk interface from one type to another (for example, converting a SCSI bus to an IDE bus). Every hard drive attached to a converter has a unique LUN ID to identify it, 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

Avid Storage Manager's main window provides a visual display of your storage subsystem along with a variety of status indicators. The main window has two views, Physical view and Volume view, that allow you to look at your storage from a physical perspective or a logical perspective. Figure 2-2 shows Avid Storage Manager's main window with Physical view active.

Physical view and Volume view cannot be viewed concurrently.

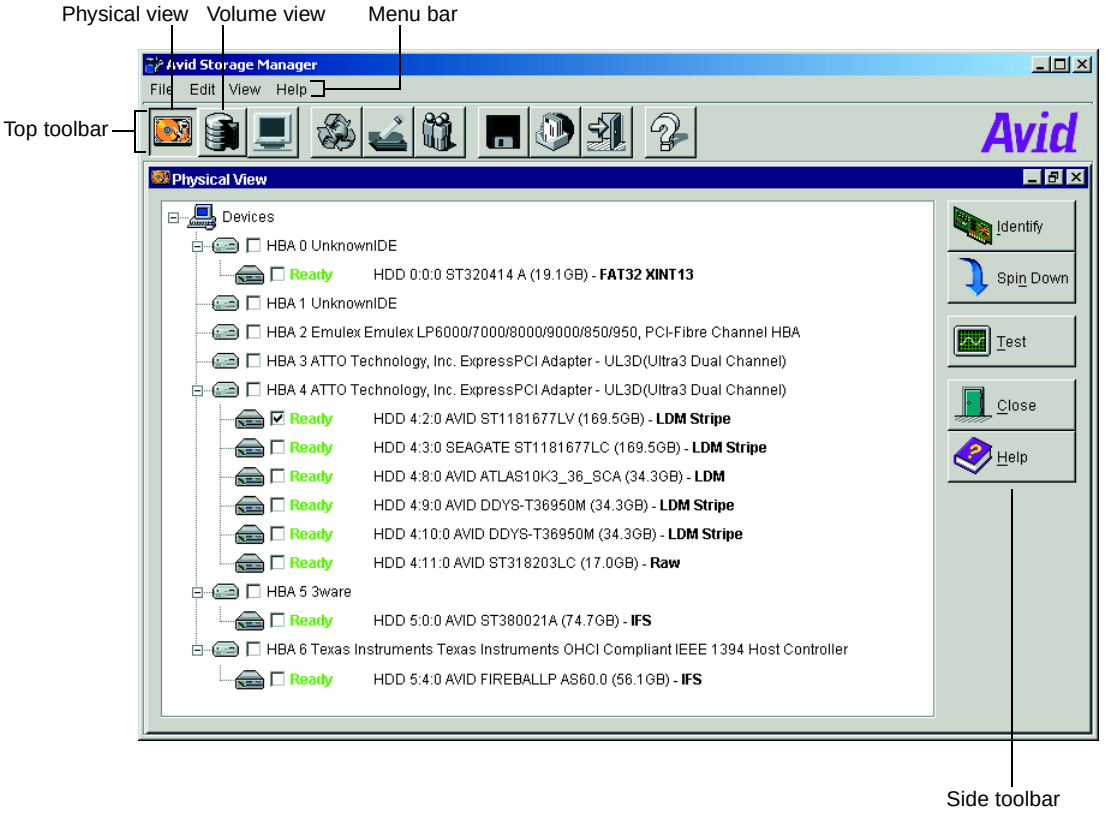


Figure 2-2 Main Window with Physical View Displayed

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 start Avid Storage Manager (unless changed by resetting the user preferences). Physical view presents, in an expandable tree structure, a view of all the storage

adapter boards in your Avid system and the hard drives attached to them. Physical view shows the physical characteristics of your storage subsystem.

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

Figure 2-3 shows the main window with Physical view active and points out the view's most important features. The features themselves are described in the following sections.

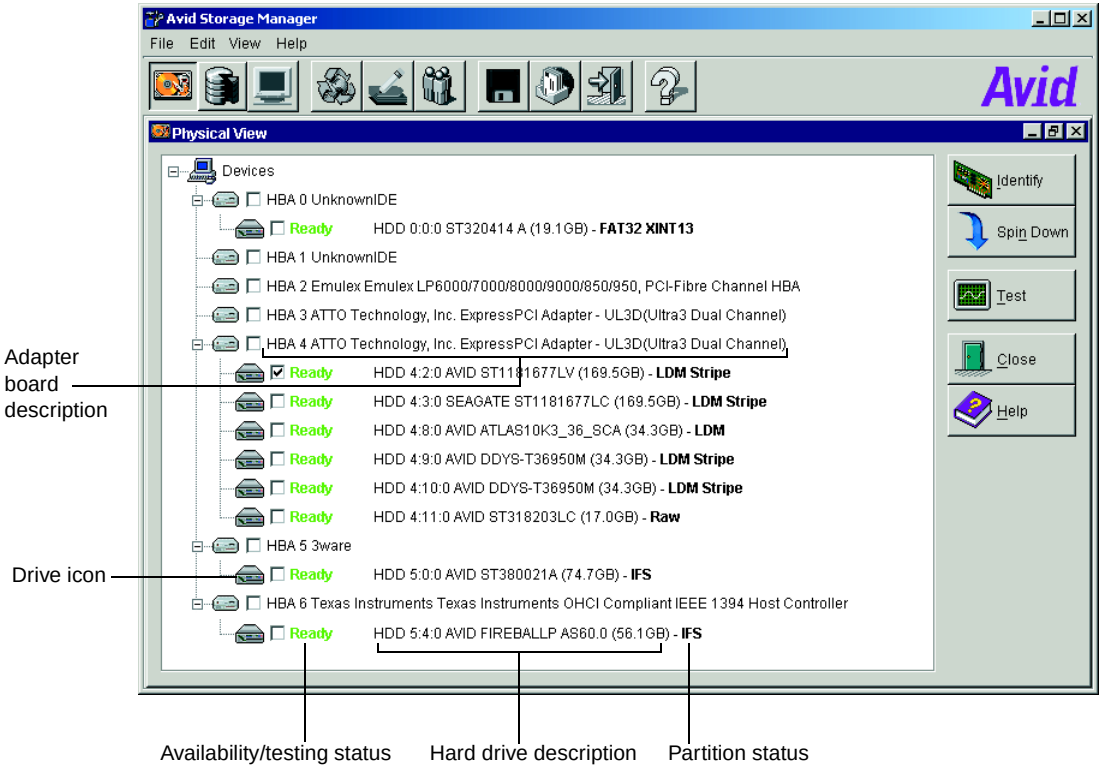


Figure 2-3 Physical View Features

Adapter Board Description

An adapter board description (see Figure 2-4) includes:

- Bus ID (a bus on the Avid system where hard drives are connected)
- Manufacturer's name
- Model

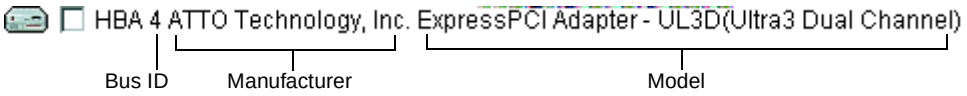


Figure 2-4 Adapter Board Description

Hard Drive Description

A hard drive description (see Figure 2-5) 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 via a converter.
- Bus ID, device ID, LUN ID for the hard drive (For more information on ID types, see "Understanding IDs" on page 2-3.)
- Manufacturer's name
- Model
- 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.

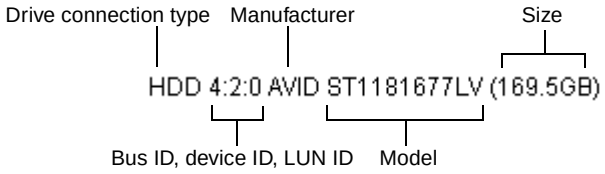


Figure 2-5 Hard Drive Description

Converter Description

A converter description appears in the branch beneath the adapter board to which it is connected. Converter descriptions branch again to display descriptions of all the hard drives connected to the converter; you can recognize a converter's hard drives because their description begins with LUN instead of HDD.

A converter description includes:

- Converter indicator
- Bus ID, device ID, and LUN ID for the converter
- Manufacturer's name
- Model

Availability/Testing Status

To the left of the hard drive description is the availability/testing status indicator. Table 2-1 describes the availability/testing status indications you might see.

Table 2-1 Availability/Testing Status Indications

Status	Description
Ready	The hard drive is ready to read and write data.
Unavailable	The hard drive is not accessible. The drive might be turned off, spinning up, having a problem, or not supported (a non-Avid drive). Or, the device might be an enclosure, such as 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.
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 the storage subsystem is rescanned.

Partition Status

To the right of the hard drive description is the partition status. Table 2-2 describes the partition statuses you might see.

Table 2-2 Partition Status Indications

Status	Description
Striped	The hard drive has partition and file system information on it and is part of a striped set of drives.
Unstriped	The hard drive has partition and file system information on it but is not part of a striped 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 or earlier, drive format is not be usable 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 or earlier, drive format is not be usable 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 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).

Table 2-2 Partition Status Indications (Continued)

Status	Description
ATTO Stripe	The hard drive's partition information indicates it was part of a striped 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 MediaNet Fibre Channel shared storage environment.
FAT 16, FAT 32, FAT 32 XINT13	The hard drive's partition information indicates it has been formatted for use in a DOS environment (Windows).
LDM	The hard drive's partition information indicates it is a dynamic drive (Windows 2000).
LDM Stripe	The hard drive's partition information indicates it is a striped dynamic drive (Windows 2000).
NTFT	The hard drive's partition information indicates it is part of a Windows 2000 fault-tolerant partition.
NTFS Stripe	The hard drive's partition information indicates it is a striped dynamic drive used with Windows 2000.
IFS	The hard drive's partition information indicates the drive has an older DOS partition.

Drive Type Indicator

Each drive in the storage subsystem has a drive icon. If "FC" appears on a drive's icon, the drive is a Fibre Channel drive. If FC does not appear, the drive is a SCSI or IDE drive.

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.

Figure 2-6 shows the main window with Volume view active.

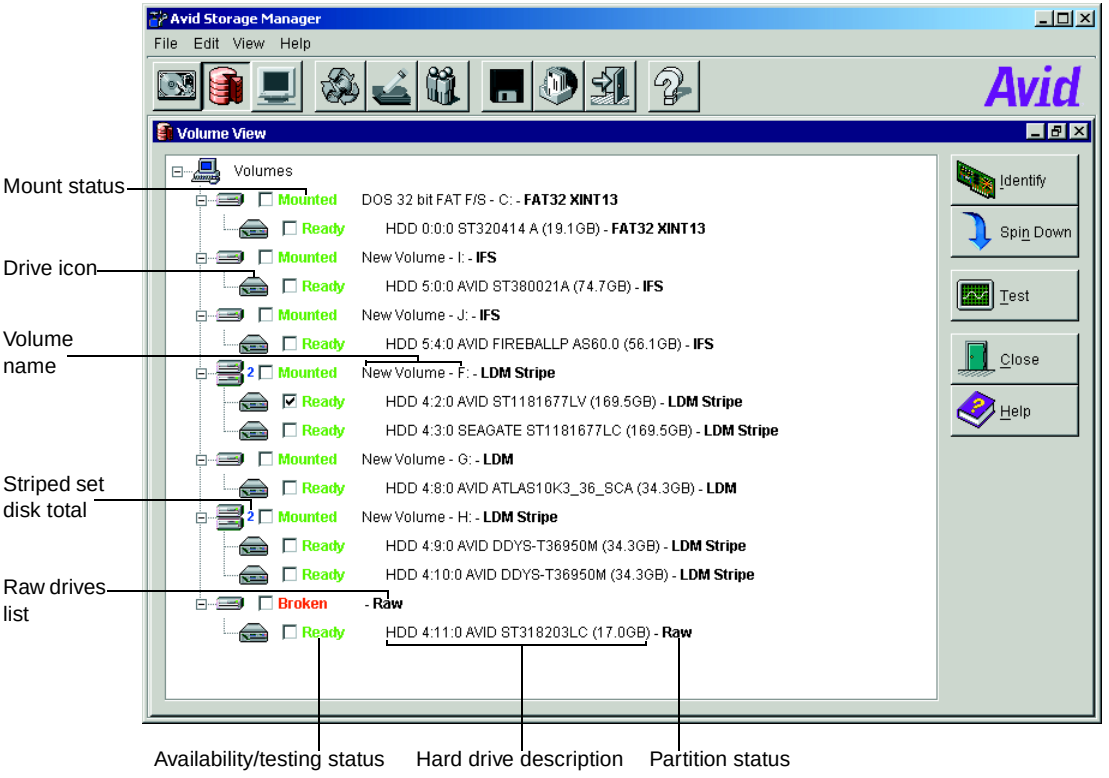


Figure 2-6 Volume View Features

Volume view has many of the same features as Physical view. Features that the two views have in common are:

- Hard drive description
- Availability/testing status
- Partition status
- Drive type indicator

For a description of these features, see “Physical View” on page 2-5. The remainder of this chapter describes features that are specific to Volume view.

Raw Drives List

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

Volume Name

Each volume has a specific name. A volume is a logical storage unit that might use only one physical drive or span across multiple drives. Volumes that span across multiple drives are called striped. Each volume name expands to show the drives that make up that volume.

Mount Status

To the left of the volume name is the mount status. Table 2-3 describes the mount status indications you might see.

Table 2-3 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 striped set, and one or more of the drives in the set are unavailable. If shown for a Raw drive, the drive is having a problem.

Striped Set Drive Total

If a volume is made up of a striped set of drives, the number of drives in the set is listed to the left of the volume's mount status indicator.

Toolbars and Menus

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

Top Toolbar and Menu Equivalents

Table 2-4 describes the buttons in the top toolbar and gives their menu equivalents.

Table 2-4 Top Toolbar Buttons

Button	Button Name	Description	Menu Equivalent
	Physical View	Displays Physical view in the main window.	View > Physical
	Volume View	Displays Volume view in the main window.	View > Volume
	Console	Displays the Console window, which allows you to view test results and firmware updating results.	View > Console
	Rescan System Configuration	Initiates a rescan of the entire storage subsystem and updates Physical view and Volume view with the results.	Edit > Rescan Configuration
	Set User Preferences	Displays the User Preferences dialog box, where you can set the default behavior for a variety of features.	Edit > User Preferences
	Update Firmware on Drives	Initiates a firmware download to an Avid hard drive (Windows only).	Edit > Update Firmware

Table 2-4 Top Toolbar Buttons (Continued)

Button	Button Name	Description	Menu Equivalent
	Save System Configuration	Saves the current configuration of your storage subsystem. This configuration file can be used by Avid Customer Support for diagnostic purposes.	File > Save Configuration
	Send File	Displays the Send File dialog box that allows you to send a log file by e-mail to a recipient you specify.	File > Send File
	Exit Application	Closes Avid Storage Manager.	File > Exit
	Help	Displays the Avid Storage Manager Help contents.	Help > Contents

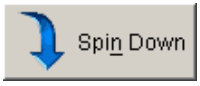
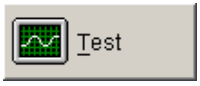
Side Toolbar

Table 2-5 describes the buttons in the side toolbar. These buttons do not have menu equivalents.

Table 2-5 Side Toolbar Buttons

Button	Button Name	Description
	Identify	Identifies the hard drives currently selected in the main window by flashing the drives' disk activity LED.

Table 2-5 Side Toolbar Buttons (Continued)

Button	Button Name	Description
	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 Spin Down, see "Spinning Down Hard Drives" on page 3-13. *This feature is not supported for IDE drives.*
	Test	Displays the Test window that you use to set up and run tests on your Avid hard drives.
	Close	Closes Physical view or Volume view, depending on which view is active.
	Help	Displays a context-sensitive Help window with information about the main window's current view (Physical or Volume).

Using Avid Storage Manager with Other Utilities

You can use Avid Storage Manager in conjunction 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 an Avid editing system to make sure that the Avid components and peripheral boards are functioning properly.
- AvidStartup — This utility ensures that the Avid storage media performance parameters are set correctly for your Avid software.

CHAPTER 3

Using Avid Storage Manager

This chapter provides information on using Avid Storage Manager's features, with the exception of hard drive testing. For information on hard drive testing, see Chapter 4.

This chapter describes the following features:

- Starting and Stopping Avid 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 (Windows Only)

Starting and Stopping Avid Storage Manager

To start Avid Storage Manager on a Windows 2000 system:

- Click the Start button, point to Programs, point to Avid, and then click Avid Storage Manager.

To start Avid Storage Manager on a Macintosh system:

- Navigate to Avid drive:Applications:Utilities:Avid Storage Manager and double-click the AvidStorageManager icon.

To stop Avid Storage Manager:

- Click the Exit button, or choose Exit from the File menu.

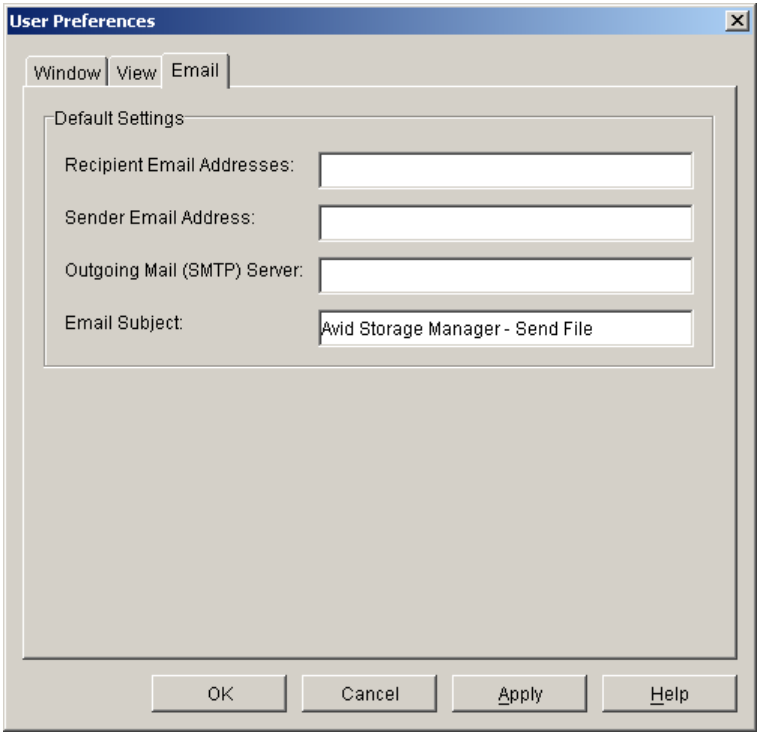
Setting User Preferences

You can set user preferences that determine how Avid Storage Manager behaves by default. You can set:

- The initial view for the main window (Physical view or Volume view)
- The default window location, size, and look and feel
- The default e-mail setup to use when sending log and configuration files

To set user preferences:

1. Click the User Preferences button in the top toolbar, or choose User Preferences from the Edit menu. The User Preferences dialog box appears.



2. Click the tab for the preferences you want to set. See Table 3-1 through Table 3-3 for descriptions of the options on each tab.
3. Make your changes, and click Apply.
4. Repeat steps 2 and 3, if necessary, to set the options on the other tabs.

5. When you have finished setting user preferences, click OK to close the dialog box.
6. Exit Avid Storage Manager, and then restart it to make your new user preferences active.

Table 3-1 Window User Preferences

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

Table 3-2 View User Preferences

Option Type	Option	Description
Default Window	Physical View Window (default)	When it starts, Avid Storage Manager displays Physical view.
	Volume View Window	When it starts, Avid Storage Manager displays Volume view.
	Main Window Only	When it starts, Avid Storage Manager displays the main window with neither Physical view nor Volume view showing.
Default Look & Feel	CDE/Motif	Avid Storage Manager uses CDE and Motif® style windows.
	MacOS Adaptive	Avid Storage Manager uses Mac OS X style windows.
	Metal	Avid Storage Manager uses Metal style windows.
	Windows	Avid Storage Manager uses Windows style windows.

Table 3-3 E-mail User Preferences

Option	Description
Recipient E-mail Addresses	The default e-mail address for the recipient 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 Avid Storage Manager must have a network connection to an SMTP server.
E-mail Subject	The default subject for the log and configuration file e-mails.

Selecting Hard Drives

Selecting hard drives in both Physical view and Volume view is important. A solid understanding of hard drive selection will keep you from selecting the wrong drives inadvertently, which could cause a problem 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.

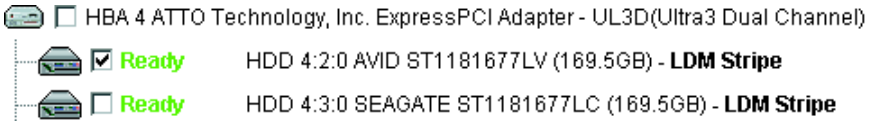
Selecting a Single Drive

Selecting a single drive functions identically in Physical view and Volume view.

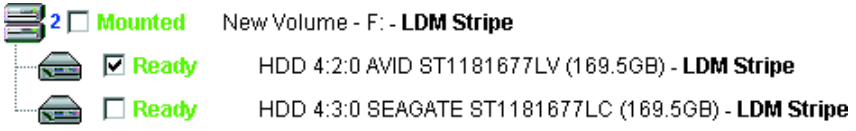
To select a single drive in Physical view or Volume view:

- Click the check box next to the hard drive description to enable it. If you select a drive that is part of a striped set, Avid 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



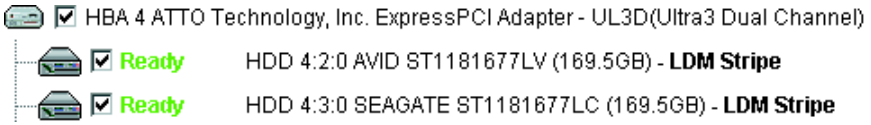
Selecting Multiple Drives

Selecting multiple drives functions slightly differently in Physical view and Volume view.

To select multiple hard drives in Physical view:

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

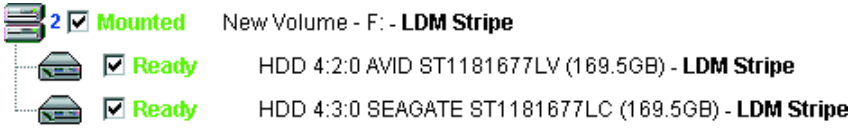
Selecting multiple drives in Physical view



To select multiple hard drives in Volume view:

- Click the check box next to the volume description to select all 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

Avid Storage Manager provides two features for getting 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.

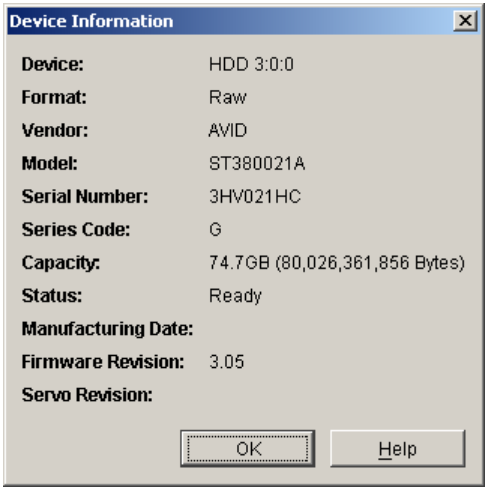
Viewing Hardware Information

To view the hardware information for hard drives:

1. In either Physical view or Volume view, select the hard drives on which you want information by clicking their check boxes.
2. Right-click (Windows) or Control+click (Macintosh) a selected hard drive's description, and choose Device Information from the menu.

   The Device Information dialog box appears. If you have multiple hard drives selected, multiple dialog boxes appear, one on top of the other.

   See Table 3-4 for detailed descriptions of the information contained in the Device Information dialog box.



3. Click OK to close a Device Information dialog box.

To view Device Information dialog boxes that are hidden, click OK to close the topmost dialog box.

Table 3-4 Device Information Dialog Box

Label	Description or Comment
Device	A description of the selected hard drive. Windows) 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 LUN of 0. (Macintosh) This information includes the drive type, its bus ID, its device ID, its LUN ID, and an unused ID. For example, HDD 64:0:0:0 indicates a hard drive on bus 64 with a device ID of 0 and LUN of 0. *Bus numbers for SCSI drives start at 0. Bus numbers for FireWire drives start at 64.*

Table 3-4 Device Information Dialog Box (Continued)

Label	Description or Comment
Format	The type of partition that currently exists on the hard drive. For complete information, see Table 2-2 on page 2-10.
Vendor	The manufacturer of the hard drive.
Model	The hard drive's model number.
Serial Number	The hard drive's serial number.
Series Code	Each Avid hard drive is assigned a series code that indicates the type of drive it is (for example, 7,200 RPM, second generation 10,000 RPM, and so forth). The series code is used when striping drives. Drives should have the same series code (that is, the same type) in order to be striped together. If you stripe drives of different types together, the performance of the striped set is limited by 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 of 1024 bytes/KB, while the second number is the actual physical byte count on the drive. The actual physical byte count (the advertised byte count) is more than the industry-standard byte count.

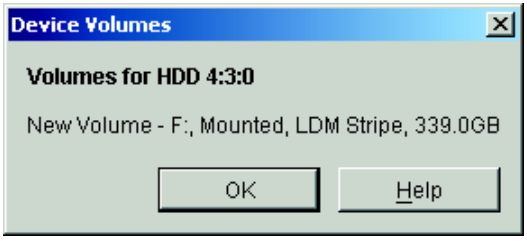
Table 3-4 Device Information Dialog Box (Continued)

Label	Description or Comment
Status	The hard drive's status. 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 something other than a hard drive (for example, 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 the storage subsystem has been rescanned, either by using the Rescan option or by restarting Avid 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 hard drive's firmware revision.
Servo Revision	The hard drive's servo code revision. 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 volume information for hard drives:

1. In either Physical view or Volume view, select the hard drives on which you want information by clicking their check boxes.
2. Right-click (Windows) or Control+click (Macintosh) a selected hard drive's description, and choose Device Volumes from the menu. The Device Volumes dialog box appears. If you have multiple hard drives selected, multiple dialog boxes appear, one on top of the other.



   The Device Volumes dialog box contains the following information:

   - The hard drive's description includes the drive type, its bus ID, its device ID, and its LUN ID (for example, HDD 1:10:0).
   - The name 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 up 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, select the hard drives you want to identify by clicking their check boxes.

2. Click the Identify button in the side toolbar. The Identify Device dialog box appears, indicating that the drive activity LEDs for the drives you selected are blinking.
3. Click OK to close the Identify Device dialog box and stop the blinking LEDs.

Spinning Down Hard Drives

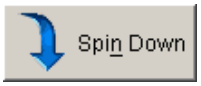
You can use Avid Storage Manager to spin down your Avid shuttles. The spin down operation parks the drive heads, stops the drive from rotating, and ensures that the drive can be safely swapped without loss of data or damage to the drive.

You should use the Identify feature to identify drives before spinning them down (see “Identifying Hard Drives” on page 3-13). Only removable drives that you plan to remove should be spun down. If a fixed drive or an internal system drive is spun down, it must be turned off and then turned on for it to spin up again.

You cannot use this feature to spin down IDE drives because IDE drives do not support a spin down command.

To spin down hard drives:

1. Make sure the hard drive you want to spin down does not have any volumes that are mounted. If it does, unmount the volumes before spinning down the drive.
2. In Physical view or Volume view, select the hard drives you want to spin down by clicking their check boxes.



3. Click the Spin Down button in the side toolbar.
4. Avid Storage Manager waits 30 seconds to ensure that the drives are all spun down. When the hourglass cursor goes away, 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 it is inserted into 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 scan-for-storage operation by using the Rescan button in the top toolbar or choosing Rescan Configuration from the Edit menu. When the Rescan option is activated, Avid Storage Manager scans all 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 the storage subsystem is rescanned. Rescanning might not find hard drives or shuttles that were added to the Avid system since the last system boot.

(Windows) If you have added hard drives since the last system boot, run Disk Manager to rescan the buses and then click the Rescan button to locate the new hard drives. If the new hard drives still do not appear, reboot the system.

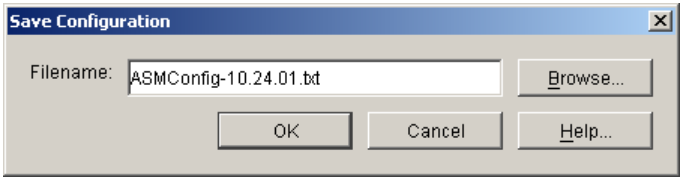
(Macintosh) If you have added hard drives since the last system boot, restart the Macintosh and run Avid Storage Manage to locate the new hard drives.

Saving the Storage Subsystem Configuration

In Avid Storage Manager, you can save your storage subsystem's configuration to a log file. Avid Customer Support can use 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 choose Save Configuration from the File menu. The Save Configuration dialog box appears.



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

   ASMConfig-MM.DD.YY.txt

   where *MM* is the month, *DD* is the day, and *YY* is the year the file is 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 Avid Storage Manager to other locations through e-mail. You can use this feature to send error and configuration information to Avid Customer Support to diagnose storage-related problems.

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

Error logs are generated while testing your hard drives. For more information, see Chapter 4.

To send a log file:

1. Click the e-mail button in the top toolbar, or choose Send File from the File menu. The e-mail Log File dialog box appears.

   The dialog box is partially filled in with information from the e-mail preferences you set (see "Setting User Preferences" on page 3-2).

   You can accept this information, or you can override it by entering new information in the text boxes.

2. Click Browse to locate the error log or configuration file you want to send. The Select File dialog box appears.
3. Select the file you want to send, and click OK to return to the E-mail Log File dialog box.
4. Click OK to send the file.

You can enter the file name manually. If the file does not exist in the directory where Avid Storage Manager is installed (C:\Program Files\Avid\Utilities\Avid Storage Manager, by default), you will have to enter the entire path.

Updating Hard Drive Firmware (Windows Only)

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

You can use Avid 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 pick 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 firmware is older than the updated firmware.

Obtaining an Updated Firmware Package

Updated firmware packages are distributed through:

- The Avid Knowledge Center
- The Avid Storage Utilities CD-ROM

Always exit Avid Storage Manager before retrieving firmware updates.

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

1. Open an Internet browser, and go to www.avid.com.
2. Click Support.
3. Click Knowledge Center. A new browser window opens with the Knowledge Center displayed.
4. Click the Downloads tab, and locate the firmware update (you can use the Search feature to find the update).

5. Download the firmware update to the following location:

   C:\Program Files\Avid\Utilities\Avid Storage Manager\FirmwarePackages

6. Uncompress the update file.

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

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

1. Insert the Avid Storage Utilities CD-ROM into the CD-ROM drive.
2. Open Windows Explorer, and navigate to the Avid Storage Manager directory on the Avid Storage Utilities CD-ROM.
3. Copy the firmware update package from the Avid Storage Manager directory to the following location:

   C:\Program Files\Avid\Utilities\Avid Storage Manager\FirmwarePackages

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

Updating the Hard Drives

After downloading the firmware update package, you are ready to update your Avid hard drives.

To update the firmware for your Avid hard drives:

1. Start Avid Storage Manager.
2. 
   Click the Update Firmware button, or choose Update Firmware from the Edit menu.

   Avid Storage Manager checks for drives that require updating, prints the list in the Console window, and checks for available firmware update files. A dialog box appears, telling you the number of drives to be updated and asking if you want to continue.
3. Click Yes to continue. Avid Storage Manager updates any Avid hard drives that are the correct type for the firmware update and that currently have an older version of firmware.

Do not stop Avid 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 Avid Customer Support's discretion.

CHAPTER 4

Testing Hard Drives

This chapter provides detailed information on the tests you can perform with Avid Storage Manager on your Avid hard drives. It includes:

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

Nondestructive and Destructive Tests

There are two types of tests you can perform with Avid Storage Manager: nondestructive and destructive. *Nondestructive* tests only read the data that is 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 data is then compared 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 file system structure that are on the drive.

Running a destructive test destroys all the data currently 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 are not sufficient for a 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 test parameters yourself.
2. Run the test.
3. Review the test results.

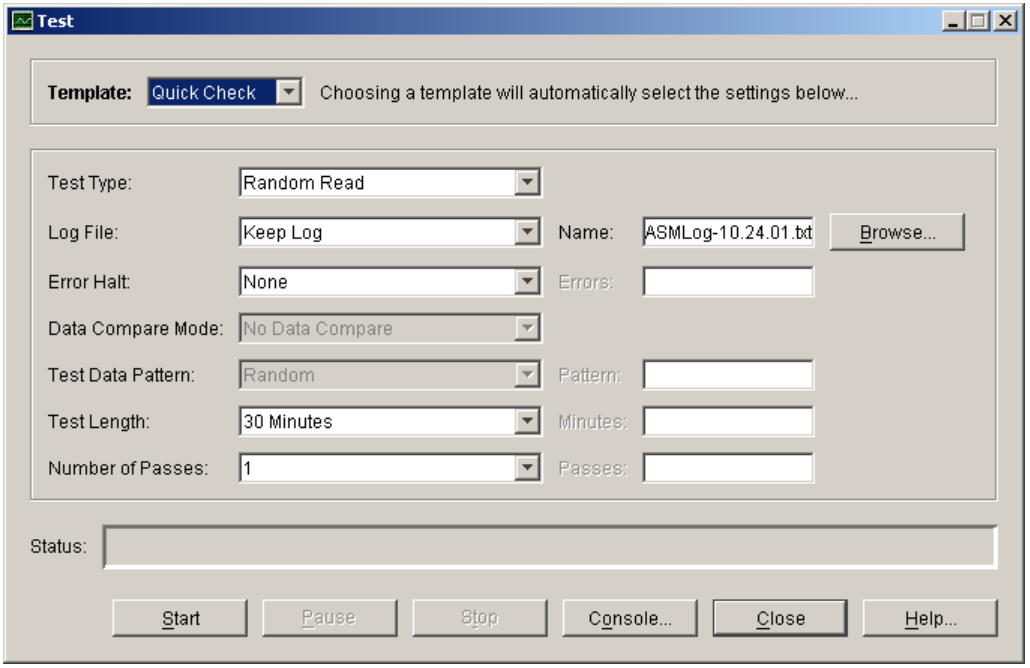
The following sections provide instructions for performing these tasks. For more detailed descriptions of the test templates and the test parameters, see "Test Templates" on page 4-8 and "Test Parameters" on page 4-9.

Using a Test Template

Avid has created three test templates to aid you in testing your hard drives. Each template has its own set of test parameters that are set for you automatically. For detailed descriptions on the templates themselves, see “Test Templates” on page 4-8.

To use a test template:

1. Select one or more drives to test.
2. Click the Test button. The Test window opens.



3. Choose a test template from the Template menu. The test parameters in the remainder of the Test window are set according to the template you chose.
4. To run the test now, using the parameters that are set, follow the instructions in “Running a Test” on page 4-4.

Creating a Custom Test

You can create a custom test by taking an existing template and modifying it to your needs.

To create a custom test:

1. Select one or more drives to test.
2. Click the Test button. The Test window opens.
3. Choose the template you want to modify from the Template menu.
4. Change any test parameters in the remainder of the Test window. The Template menu automatically changes to User Selected to indicate that you have customized the template.
5. To run the test now that the parameters are set, follow the instructions in “Running a Test” on page 4-4.

Running a Test

Once you have set the test parameters, either by a template or by creating a custom test, you are ready to run the 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. Use the Identify feature to verify that you are testing the correct drive (see “Identifying Hard Drives” on page 3-13).

To run a test:

1. After setting the test parameters, click Start in the Test window. If you have chosen a destructive test, Avid Storage Manager asks you to confirm that you want to continue with the test.

   The test begins 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 entire test as a whole.

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

   - To pause the test, click Pause (the button label switches to Resume). Click Resume to restart the test from where it left off.

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

   - To stop the test altogether, click Stop. 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 test results as the test is being run, click Console. The Console window opens. For more information on the Console window, see “Viewing Test Information” on page 4-5.

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 is completed, 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, paused, or after it has finished. A test summary has a line for each drive under test and each pass of the test. Test summaries include:

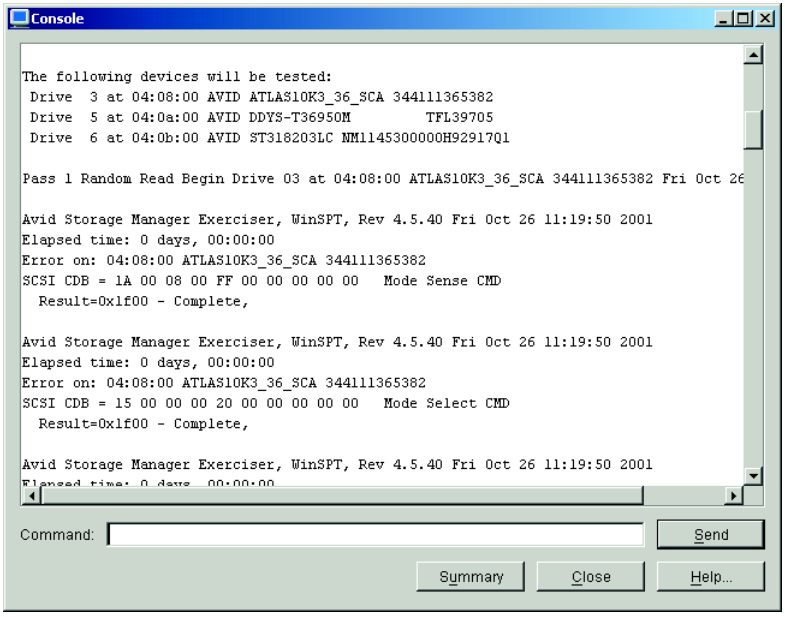
- A drive's bus ID, device ID, and LUN ID
- The test pass number
- The number of read commands
- The number of sectors read
- The number of write commands
- The number of sectors written
- The number of errors
- The number of reallocated blocks
- The maximum, minimum, and average time for the read and 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 the log file.

To view a test's results using the Console window:

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

2. The Console window opens, displaying test information.



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

To view test information in a log file:

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

You can also choose to send your log files to a recipient that you specify. For more information, see "Sending Error Log and Configuration Files" on page 3-16.

Test Templates

Table 4-1 describes Avid Storage Manager's test templates. Each template uses a specific set of test parameters that are described in "Test Parameters" on page 4-9.

Table 4-1 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 Avid 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.*

Table 4-1 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, Avid 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 data in the original block is unreadable, it is still considered damaged so Avid Storage Manager marks it as bad. Writing data into the reallocated block erases Avid 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.*
User Selected	This option 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

Table 4-2 describes the test parameters you see in the lower portion of the Test window. The first parameter, Test, is broken out into nondestructive and destructive tests.

Table 4-2 Test Parameters

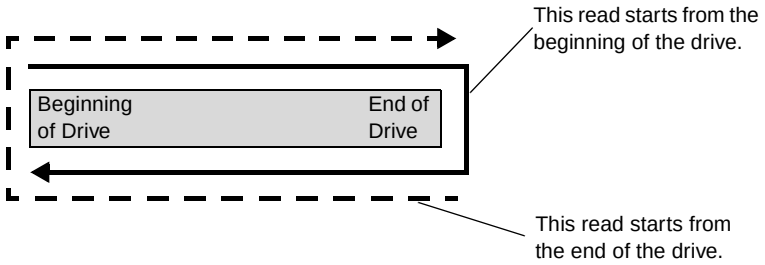
Parameter	Possible Values
Test (nondestructive)	**Random Read (default):** This test picks a random starting point on the drive and a random number of sectors to test. It then reads the drive's data, starting with the random starting point and ending after the random number of sectors has been read. **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 the entire disk has been read 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 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 starting 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.

Table 4-2 Test Parameters (Continued)

Parameter	Possible Values
Test (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, and reads the data back, and so on until the test is complete. **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 starting 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 medium errors. When you select this test, you are prompted to choose whether or not to automatically reallocate any blocks that have medium errors, effectively scrubbing the disk surface clean of media defects. If you choose to reallocate blocks, this test will become destructive if any medium 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 complete, 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.

Table 4-2 Test Parameters (Continued)

Parameter	Possible Values
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 the Keep Log option is selected, the Name box is enabled. This box contains the name of the log file to be generated during testing. By default, this name uses the following format: ASMErrorLog-*MM-DD-YY*.txt You can overwrite the default file name with your own name by typing it in the Name box. You must enter the entire path if you are saving to a directory other than C:\Program Files\Avid\Utilities\Avid Storage Manager. You can also use the Browse button to relocate or name the log file.

Table 4-2 Test Parameters (Continued)

Parameter	Possible Values
Error Halt	**None (default):** The test continues even when an error is encountered. The exception to this rule occurs when a catastrophic error is encountered. Catastrophic errors stop the test because they are not likely to go away and they fill up the error log with redundant error information. **Any Error:** The test is stopped when any drive encounters an error, regardless of the error type. **Media Error:** The test is stopped when any drive encounters a nonrecoverable media error. A media error is an error in the magnetic disk medium, for example, a bad sector on the disk. **Nonrecoverable Error:** The test is stopped when any drive encounters a nonrecoverable error. Nonrecoverable errors include the following: • A unit attention result that is not the result of a disk power on or a SCSI reset command • An illegal request error • An aborted command error • Most driver errors **Catastrophic Error:** The test is stopped when a catastrophic error is encountered. Catastrophic errors include the following: • A drive appears to have gone away • A drive not ready error • A hardware error • A data protection error • Any error that is not otherwise recognized **User Defined:** The test is stopped when an error count that you specify is reached. The error count applies to any error type.
Errors	If you choose User Defined for the Error Halt parameter, type the number of errors required before the test stops into the Errors text box. The number you type must be greater than 5. It is the maximum number of errors for each drive in the test.

Table 4-2 Test Parameters (Continued)

Parameter	Possible Values
Data Compare Mode	**Compare All Data (default)**: For write/read tests, the data that is 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 that is 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 is 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 made up 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 that will be used as the repeating pattern.
Pattern	If you choose User Defined for your Test Data Pattern parameter, 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 only to random tests.
Minutes	If you choose User Defined for your Test Length parameter, type the number of minutes that the test runs before it stops in the Minutes text box.

Table 4-2 Test Parameters (Continued)

Parameter	Possible Values
Number of Passes	**1 (default):** The test runs once and then stops. **Infinite:** The test runs until you stop it manually by clicking Stop in the Test window. **User Defined:** The test runs for the specified number of passes indicated in the Passes text box. A pass is complete for a sequential test either when the whole disk has been accessed or when the time period for the test runs out.
Passes	If you choose User Defined for your Number of Passes parameter, type the number of passes required, in the Passes text box, before the test stops.

Interpreting Error Messages

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

APPENDIX A

Interpreting Error Messages

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

Error Messages

Table A-1 describes the most common error messages that might be generated while testing Avid hard drives and includes possible corrective actions for each error message to aid in diagnosing and fixing problems.

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

Table A-1 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 are usually not a major concern. Run the Surface Scan test, and then rerun the test that had the errors.
02 NOT READY	Indicates that the drive cannot be accessed. User intervention might be required to correct this condition.	Wait 2 minutes, and retry the test. If the error reoccurs, turn the drive's power off and then on, wait 2 minutes, and retry the command. If the error persists, replace the drive.
03 MEDIUM ERROR	An 03 - 11 error indicates that the command terminated with an unrecoverable error condition probably caused by a flaw in the medium or an error in the recorded data.	Run the Surface Scan test, enabling block reassignments, and then rerun the test that failed.
	An 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.

Table A-1 Error Messages

Error Message	Description	Comment or Action
04 HARDWARE ERROR	Indicates that 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	Indicates that there was an illegal parameter in the test command.	This is a software error, not a hardware error, and it should not be seen unless the software contains a bug.
06 UNIT ATTENTION	Indicates that the removable medium might have 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 initial 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 continues to be reported, 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.

Table A-1 Error Messages

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, terminator, or adapter board seating problem. Tighten all cable and terminator connectors. Reseat the adapter board and retest. 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 retry the test. 2. If the error is no longer reported, add one drive at a time to the daisy chain and retry 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 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 through 5 again.*