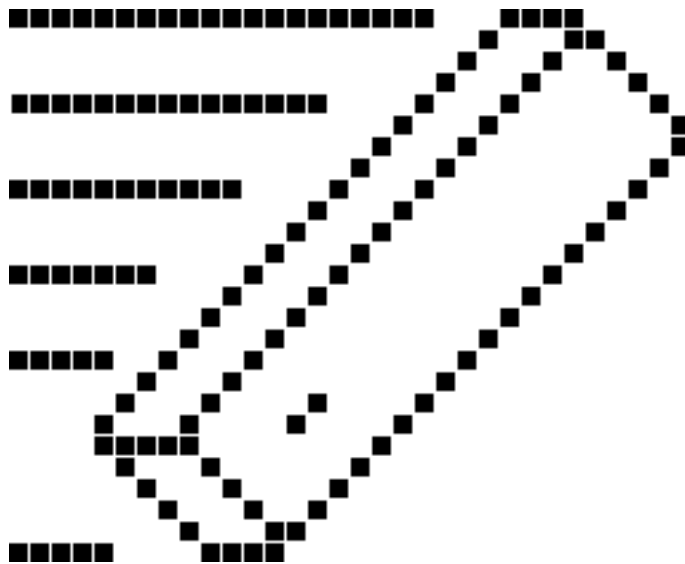


# DiskExpress® II

The Power Optimizer with DiskCheck



from

**ALSoft, Inc.**

Fifth Printing

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**DiskExpress II Credits:**

DiskExpress II written by  
Manual written by

Al Whipple, Mark Audas, Sean Neely  
Al Whipple, Mark Audas, Russ Ferrill

# **Chapter 1**

## **Introduction**

# A Look At The Powerful ALSoft DiskExpress II

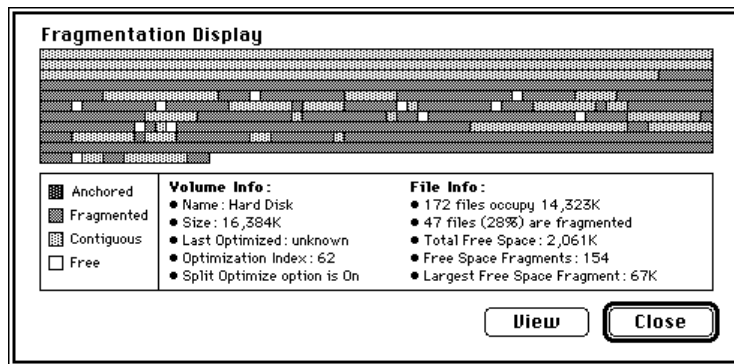
## The Power Of ALSoft DiskExpress II Is In Your Hands

DiskExpress II, developed by ALSoft, is the first truly personalized disk optimization System software.

## How Fragmentation Affects You And Your Macintosh

Each time you copy or save a file to your hard disk, the potential exists for the file to be broken into two or more fragments. A file is said to be fragmented when it is stored in noncontiguous blocks (blocks not located next to each other – see Figure A). Large amounts of contiguous free space cannot prevent file fragmentation.

Adding, deleting, copying, duplicating and modifying files are common tasks that will increase fragmentation and decrease the efficiency of your hard disk. To read an entire fragmented file, your hard drive must move its head from one part of a volume to another. The more fragmented a file becomes, the longer it takes to retrieve its information.

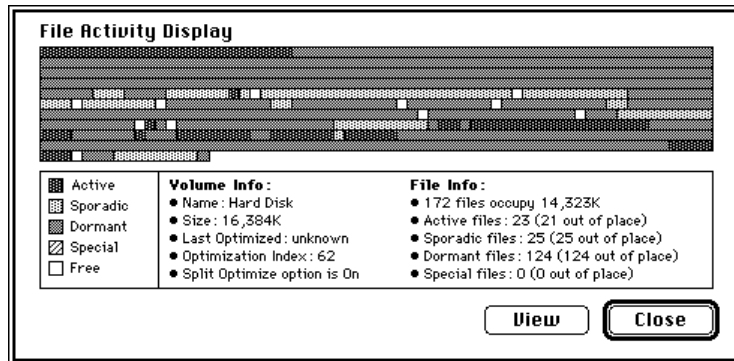


**Figure A**  
A Typical Fragmented Hard Disk

## How File Location Affects You And Your Macintosh

Figure B displays the files on a typical disk according to their frequency of use. Under normal operation, seldom-used files (most of any user's files), free space and

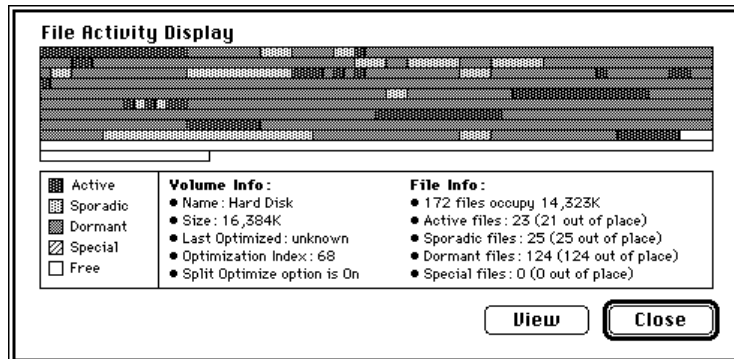
frequently used files are stored randomly throughout the disk. This places progressively higher demands on the disk head as it accesses your frequently used files, resulting in longer file access times and decreasing individual productivity.



**Figure B**  
View of File Locations by Activity

## Why Simple Defragmentation Isn't The Answer

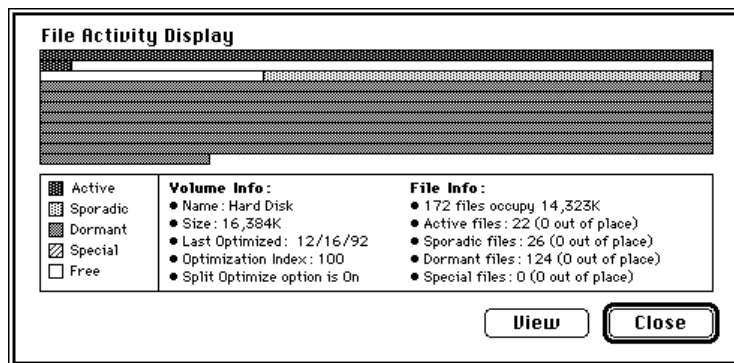
Other defragmentation programs move pieces of individual files to adjacent locations on the disk. They make no provision for a file's frequency of use and how its location will effect the performance of your hard disk.



**Figure C**  
A Typical Hard Disk Defragmented By Other Products

## Why ALSoft DiskExpress II Is The Only Answer

DiskExpress II adapts to the way you work on your Macintosh in your particular environment. DiskExpress II monitors your daily file usage to determine the absolute optimum file placement on your hard disk. DiskExpress II intelligently groups your files (see Figure D) – frequently used files are placed at the front of the hard disk, next to the directory, for optimum access. Free space is positioned next to the frequently used files to minimize the effects of any fragmentation that may occur between optimizations. Finally, seldom-used and dormant files are placed out-of-the-way at the back of the disk.



**Figure D**  
A Typical Disk Optimized By DiskExpress II

## How DiskExpress II Personalizes Disk Optimization

Unprecedented ALSoft advancements in optimization technology have made DiskExpress II even more powerful and personalized than ever before.

### 1. Choose Manual or Automatic Optimization

With DiskExpress II, you are always in complete control over the optimization of your hard disk. Depending upon your needs, choose either manual or automatic optimization. If you choose automatic, DiskExpress II will optimize automatically whenever necessary – while you continue to work on your Macintosh.

For network administrators in charge of busy file servers, DiskExpress II offers a way to optimize without taking file servers off-line. Your company's productivity is never compromised in order to optimize.

## **2. Customized Optimization**

DiskExpress II uses patent-pending technology to adapt to the way you work on your Macintosh in your particular environment. DiskExpress II monitors your daily file usage to determine the optimum placement for files on your hard disk. DiskExpress II intelligently groups your files – frequently used files are placed at the front of the hard disk, next to the directory, for optimum access. Free space is positioned next to the frequently used files to minimize the effects of any fragmentation that may occur between optimizations. Finally, seldom-used and dormant files are placed out-of-the-way at the back of the disk.

## **3. Choose Split, Packed or Quick Optimization**

With DiskExpress II, you can choose one of two methods for optimizing your entire hard disk or you can select quick optimization. The Split and Packed optimization methods optimize all your files and your entire hard disk, while quick optimization optimizes only your most frequently used files. By skipping all the sporadically used and dormant files (which account for the majority of most users' files), Quick optimization takes much less time.

## **4. Optimize Only When Necessary**

With DiskExpress II you never have to wonder if it is time to optimize. Using the "Optimization Index", an exclusive development of ALSoft, you can tell DiskExpress II how often you want to optimize. The higher the Optimization Index (a number which you select from 1 to 100), the less fragmentation and the less file misplacement you are willing to accept before automatic optimization should be scheduled.

## **5. Advanced Time Control**

DiskExpress II lets you control the times of day and days of the week for automatic optimization. Optimize during lunch or late at night, or only on Tuesdays. You set the times, in half-hour increments, and select the days of the week during which scheduled optimization will take place.

## **6. Choose The Buffer Size That Works Best For You**

The buffer is the memory used during file optimization. With DiskExpress II, you can easily change the buffer size. By setting a large memory buffer, DiskExpress II will optimize volumes faster. The buffer size you choose, however, should depend upon both your needs and your Macintosh configuration.

## **7. Additional Speed From Efficient Memory Management**

DiskExpress II can use temporary memory to store data required during optimization. Taking advantage of this option reduces optimization times by as much as 50%.

## **8. Responsiveness To User Activity**

DiskExpress II has built-in “extra-sensitivity” to all kinds of computer activity in a work situation. This includes sensitivity to all file (disk I/O), printer (serial) and communications activity as well as any user intervention. A click of the mouse or a press of a key will instantly signal DiskExpress II to stop and yield to the application which is running. Once all activity stops, DiskExpress II will pause 30 seconds before proceeding. DiskExpress II optimizes your files one file at a time. As a result, DiskExpress II can be interrupted at any time without scrambling all of the information on your hard disk.

## **DiskExpress II Is The State-Of-The-Art Optimizer**

ALSoft is the leader in state-of-the-art disk optimization technology. That is why so many leading-edge advancements can only be found in DiskExpress II.

DiskExpress II fully supports all major bad block sparing software. Not only can it detect spared bad blocks without reporting them as bad again, DiskExpress II is able to optimize around them. And more importantly, you don’t have to reformat your entire hard disk to optimize.

Using advanced “Verify Reads and Writes” technology, DiskExpress II maintains the integrity of your files as they are optimized. DiskExpress II verifies your data by double-checking all of its read and write activity to your hard disk – including the directory. DiskExpress II’s data verification is “hardware independent” enabling it to work reliably on any hard disk.

DiskExpress II can optimize files of any size – including huge graphics and database files. Instead of skipping over big files or your entire disk, DiskExpress II can optimize even when there is virtually no free space left on your hard disk.

ALSoft designed DiskExpress II to work with many of the features of System Software 7. These include:

- Full compatibility with all Apple File Sharing access privileges, enabling

DiskExpress II to optimize without interfering with File Sharing access privileges

- DiskExpress II will not interfere with System 7 aliases, so it can optimize without changing any alias reference information to your actual files.
- DiskExpress II supports System 7's bad block sparing mechanism. Not only can it detect bad blocks spared by System 7 without reporting them as bad again, DiskExpress II is able to optimize around them. And more importantly, you don't have to reformat your entire hard disk to optimize.
- DiskExpress II gives special treatment to Virtual Memory swap files and startup system extensions during optimization. By placing the Virtual Memory file at the front of the hard drive next to the directory and by grouping extension files together (within their priority group), DiskExpress II offers enhanced virtual memory performance and improved computer startup speeds.
- DiskExpress II supports both 32-bit mode and System 7's balloon help.

With DiskCheck, DiskExpress II's companion Power Diagnostics software, you can also get the help you need to diagnose and pinpoint disk directory damage as well as hardware malfunctions. DiskCheck provides help by listing those files which are anchored (unable to be optimized), explaining why they are anchored, and allowing you to unanchor or anchor files on your hard disk.

## **More Graphical Information You Can Really Use**

A click of the Volume Info button opens a window which graphically displays the file and free space fragmentation on your hard disk. This window also presents important information relating to the hard disk and graphically displays where files of different priorities are located on the hard disk. As a result, you never have to wonder if optimization is really working. DiskExpress II always gives you graphic proof you can see both on your monitor and in improved disk performance.

## **Improve the Speed of Your Network File Server**

Unlike many conventional optimization utilities, DiskExpress II maintains all AppleShare and File Share access privileges and is compatible with TOPS®, enabling it to significantly improve the speed of network file servers. Network licenses are also available for your convenience.



**Note About Memory:** If you plan to install DiskExpress II on your Apple-Share file server, the Macintosh must have at least 2 megabytes of memory.

## Easy Compatibility

DiskExpress II is compatible with System Software Version 6 and System 7. DiskExpress II supports any HFS disk connected to a Macintosh Plus or newer computer. DiskExpress II also maintains all file directory information making it compatible with all hard disk backup programs.



**Notes About Compatibility:** The “Read Before Using DiskExpress!” document contains important information about compatibility issues concerning DiskExpress II. To review this document, simply double-click the “Read Before Using DiskExpress!” icon. You must read this document before installing DiskExpress II.



**Warning** about TurboCharger, TurboCache, and PowerDisk:

If you own TurboCharger, TurboCache, or PowerDisk, you must deinstall them. Do not run DiskExpress II if TurboCharger, TurboCache, or PowerDisk is running.

## Getting Help

DiskExpress II has been designed by ALSoft to be easy-to-use by all Macintosh owners. Virtually all questions asked by DiskExpress II users can be answered by **READING THIS MANUAL**. We believe this manual is complete, but if the answer to your question is not in this manual, please call ALSoft's Customer Support at (713) 353-1510. Our Customer Support Specialists will be ready to help you. When you call, please be sure to have the serial number of your copy of DiskExpress II ready to give the ALSoft Customer Support Specialist. Please note that support may be limited if you have not registered your purchase of DiskExpress II before calling.

## A Quick Look Ahead

This manual will lead you step-by-step through every important aspect of optimizing your hard disk with DiskExpress II. You may be eager to jump ahead and skip a step or two, but remember that each step is important to installing and using DiskExpress II properly. Here's what you'll be doing:

Chapter 1: Introduction

Chapter 2: DiskExpress II

Chapter 3: Quick Reference

Chapter 4: Trouble-Shooting and Error Messages

Chapter 5: DiskCheck

Glossary

Index

## Getting Started

This section will start you off on the right track. You'll learn how to make a backup copy of DiskExpress II and how to register your new purchase.

### First Make A Backup

DiskExpress II is not copy protected, so the Finder can be used to create a backup of the DiskExpress II master disk.



**Figure 1-1**

DiskExpress II Backup Diskette

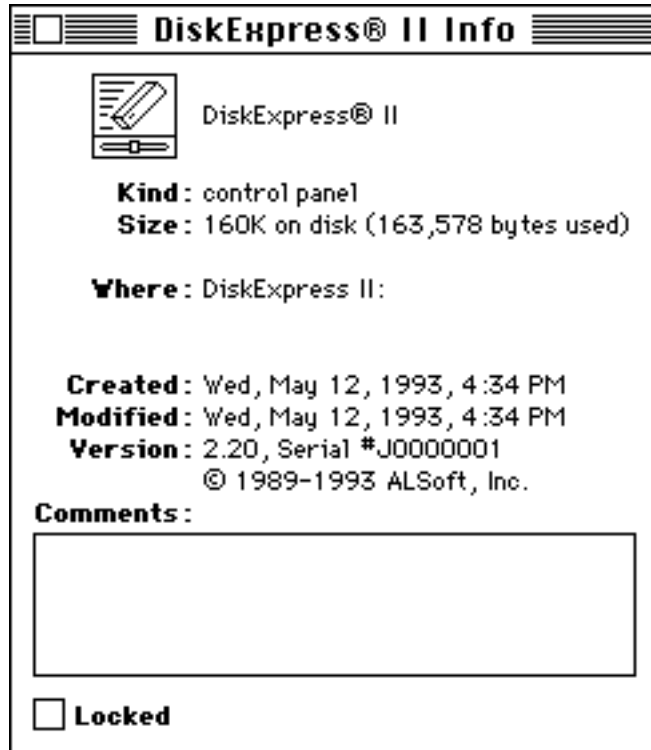
- 1) Set the write protect tab on the DiskExpress II master disk to the write protect position (hole open).
- 2) From the Finder, erase a double-sided disk and name it "DiskExpress II Copy."
- 3) Make a complete copy of the DiskExpress II master disk by dragging the icon of the master disk to the icon of the blank "DiskExpress II Copy" disk. Let the Finder replace the entire contents of the empty disk.

DiskExpress II requires System Software version 6 or greater. Both the Finder AND System versions must be 6 or greater. If you are using System Software version 7, you must use DiskExpress II release 2.07 or greater.

### Be Sure To Register Your Purchase

- 1) In the Finder, click once with the mouse pointer (arrow) on the DiskExpress® II control panel icon (shown to the left) to select it. Do not click the DiskExpress II disk icon.
- 2) Choose the Get Info command from the File menu. The application name, release number, and serial number are in the Info window (shown in Figure 1-2).





**Figure 1-2**

The Info window contains your serial number

- 3) Completely fill out and sign the enclosed product registration card and mail it to ALSoft. Be sure to include the serial number.



**Note About Your Serial Number:** This serial number is required for proper registration of your purchase so that you may receive customer support, updates and future product special offers.



**Note:** Please review the terms and concepts discussed in the next section before proceeding.

## Basic Optimization Terms and Concepts You Need To Know

This section provides helpful background information on each facet of DiskExpress II. These terms and concepts will be important in later chapters that describe how to use DiskExpress II.

### **Anchored File**

An anchored file is a file that DiskExpress II will not move during optimization. Refer to Chapter 3, **DiskCheck** for more information.

### **Application Program**

An application program is a tool your computer uses to manipulate information and perform a useful function for you. Applications include such products as MacWrite and MacPaint.

### **Block**

A block is one of an integral number of areas that composes a volume. Each block holds as little as 1/2K of data. A double-sided floppy disk has 1,600 blocks while a 20 megabyte hard disk can have over 40,000 blocks. The Macintosh stores files by breaking them into block-size pieces and writing them into unused blocks wherever they are available.

### **Directory**

Blocks set aside by the Macintosh to store the number, names, locations (which blocks), and sizes of files for each volume comprise the directory.

### **Disks**

Disks are the magnetic media on which information is stored. There are both floppy disks, such as the 3.5-inch disk which comes with DiskExpress II, and hard disks, like the Apple Hard Disk 20SC. A disk must be initialized before it can be used.

### **Document**

A document is a type of file that you create with an application. Documents include the information you enter, modify, view or save to your disk.



### **Eligible Volume**

To be eligible for automatic optimization by DiskExpress II, a volume must have been created as an HFS volume. In addition, an eligible volume must be located on a hard disk drive (not a diskette) that is locally attached to the Macintosh, it must not be write protected, and it must have some free space available on it.

**Note About Networks:** DiskExpress II will not work with any volume that you must access via a network because it is on a file server. These volumes are only eligible to another copy of DiskExpress II installed on the file server.

### **File**

A file is a collection of information stored in a volume. Files can be system files, application files or document files.

### **File Server**

A file server is an application program designed to allow many Macintosh users to share common files via a network. Examples of AppleTalk network file server applications are AppleShare and File Share.

### **Fragmented File**

A fragmented file is a file that is stored in noncontiguous blocks (blocks not located next to each other). Over time, virtually every file can become fragmented, including the volume directory. To read an entire fragmented file, your hard drive must move its head from one part of a volume to another. The more fragmented files become, the longer it takes to retrieve information from them.

### **Fragmented Volume**

A fragmented volume is a volume that contains fragmented files or fragmented free space. Free space is considered fragmented if the unused blocks are noncontiguous.

### **Free Space**

The free space encompasses all the unused blocks on a volume. As free space, these blocks are available to be allocated to files or to the directory. Once a file is deleted, the blocks previously occupied by the file will be returned to the free space.

### **Partitions**

Many hard disks come with management utilities which allow you to divide a volume into additional volumes called partitions. There is also independent system software, such as MultiDisk™ from ALSoft, SUM, Hard Disk Partition™ and MacServe™ which allows you to partition a hard disk.

**Startup Volume**

The startup volume is the volume which contains a group of special files stored in the System Folder. Your Macintosh cannot operate without the information in these files. The startup volume appears at the top-right corner of the desktop.

**Volume**

An initialized disk is called a volume. Because a disk often contains only one volume, the terms disk and volume are frequently used interchangeably.

## Installation

This section describes how to install and deinstall DiskExpress II and DiskCheck properly.

### Requirements

DiskExpress II requires at least a Macintosh Plus and System Software 6 or greater. System Software is available from any authorized Apple dealer.

### Copyright Notice

As stated in the copyright notice in this manual, each Macintosh that will or could run DiskExpress II simultaneously will require a separately purchased copy of DiskExpress II.

### Installing DiskExpress II

DiskExpress II is installed by following these 5 steps:

- 1) While in the Finder, insert the DiskExpress II disk into your Macintosh.
- 2) Drag the DiskExpress II control panel icon to the System Folder icon of your startup hard disk to have the Finder make a copy of it. If you are running System 7, DiskExpress II will be copied into the Control Panels folder within the System Folder.



**Note About the System Folder:** Finder 6.0 or greater will display the System Folder with the icon shown on the left of Figure 1-3. Earlier versions of the Finder display the System Folder with the normal folder icon as shown on the right of Figure 1-3.



**Figure 1-3**

Icons representing System Folders.  
Newer Finders (6.0 or greater) display the icon on the left.



**Note About the Control Panel:** The DiskExpress II control panel document has two functional parts. The operational portion of DiskExpress II performs all activities with hard disks, and is normally loaded into memory at startup time. The user control portion of DiskExpress II is loaded into memory when its icon is opened.

- 3) Choose Restart from the Special menu to allow the operational portion of DiskExpress II to load into memory. The first time DiskExpress II is started from a disk, it will display a “Welcome” dialog asking you to confirm that you have read the “Read Before Using DiskExpress!” document and this manual. If you answer the dialog affirmatively, the dialog will not be displayed on subsequent restarts. If you answer negatively, DiskExpress II will not load.

Look for one of the DiskExpress II icons in Figure 1-4 to be displayed momentarily in the lower portion of the Macintosh screen.



**Figure 1-4**  
DiskExpress II icons displayed at startup

- 4) Make a complete backup of your hard disk volumes and use DiskCheck to verify the directories and media of those volumes. Follow the instructions provided by DiskCheck to correct any errors found in the volumes. Refer to Chapter 3, **DiskCheck**.
- 5) Before DiskExpress II will begin monitoring file usage and automatically optimizing, DiskExpress II must be turned on. Under System 6, choose the Control Panel desk accessory from the Apple menu and then click the DiskExpress II icon to display its control panel. (If necessary, use the scroll bar to bring the DiskExpress II icon into view.) Under System 7, choose Control Panels from the Apple menu and double-click the DiskExpress II icon to display its control panel. (If necessary, use the scroll bar to bring the DiskExpress II icon into view.) Click the “On” button to turn DiskExpress II on. Your installation is now complete.



## If The Loaded Icon Appears

As your Macintosh restarts, DiskExpress II should display the Loaded icon, shown to the left. If so, the installation is successful. You can then proceed to the next chapter knowing that DiskExpress II will now (by default) perform the following operations on all eligible volumes.

### DiskExpress II Will Now Perform:

- 1) **Automatic Monitoring and Recording Of File Usage**  
DiskExpress II will automatically monitor and record all file usage in a log file on each eligible volume.
- 2) **Daily Analysis**  
DiskExpress II will compute each volume's optimization index.
- 3) **Automatic Defragmentation and Optimization**  
Using the results of the daily analysis, DiskExpress II will then automatically optimize each volume as needed.



**Note:** Please review the Basic Optimization Terms and Concepts You Need To Know section of this chapter before using DiskExpress II.

Until DiskExpress II becomes familiar with your file usage it may have to work very hard to keep your volumes optimized. Daily optimization should take place very rapidly after a volume has been monitored for five or more days. Other ways to decrease optimization time are to turn off the "Verify Before Optimize" option or turn on the "Use Memory For Temp Data" option in the DiskExpress II control panel. If your hard disk is not moved you may want to leave the "Verify Before Optimize" option off.

## Loading Problems. What Went Wrong?



If the Not Loaded icon is displayed, try the following:

- 1) Restart your Macintosh. Make sure not to press the Shift, Command or Option keys while the Macintosh is starting.
- 2) Make sure that you have not locked the DiskExpress II control panel that is in your System Folder.

- 3) After the Macintosh finishes starting, open the DiskExpress II control panel. An error message may be displayed which states the reason for not loading. Refer to Chapter 4, **Trouble-Shooting and Error Messages**.



If the Error icon is displayed, then verify that the System file on the startup disk is version 6.0 or greater. Repeat steps 1 through 3 of the Installation section.

If none of the icons are displayed at startup, then the installation was not successful and you must repeat steps 1 through 3 of the Installation section. Either the DiskExpress® II icon was not dragged to the active System Folder or the DiskExpress II diskette icon was dragged to the System Folder. The latter action creates a folder within the System Folder which prevents DiskExpress II from starting. The System Folder is the folder that contains the System file and the Finder file. If you have more than one folder containing a System file and Finder file, then use one of these other folders when repeating step 2 of this section.

## Installing DiskCheck

The DiskCheck application requires no special installation procedure. Simply drag the DiskCheck icon from the DiskExpress II disk into the folder of your choice on your hard disk. You must have restarted your Macintosh since installing DiskExpress II in order for DiskCheck to run.

## Deinstalling DiskExpress II

If you ever have a need to deinstall DiskExpress II, follow these 2 easy steps:

- 1) Under System 6, drag the DiskExpress® II control panel icon out of the System Folder of your startup hard disk. Under System 7, drag the DiskExpress® II control panel icon out of the Control Panels folder of your startup disk (located within the System Folder) onto the Desktop. If desired drag the DiskExpress® II control panel icon to the Trash.
- 2) Choose Restart from the Special menu. Deinstallation is now complete.



## Flashing DiskExpress II Icon in the Apple Menu

A blinking DiskExpress II icon displayed in place of the Apple icon in the Apple menu is an indication that DiskExpress II has a message to display. When you see this icon, you should open the DiskExpress II control panel to allow the message to be displayed.

## **How To Get Even More Out Of DiskExpress II**

At this point you could simply let DiskExpress II automatically take excellent care of your disks. But we highly recommend that you learn how to work with all the powerful yet easy-to-use features of DiskExpress II. To learn how to use these advanced features, just continue reading.

Additional options for DiskExpress II are available in the control panel. They are explained in Chapter 2, **DiskExpress II**.



# **Chapter 2**

## **DiskExpress II**

## The DiskExpress II Control Panel

This chapter describes, in detail, the DiskExpress II control panel. The DiskExpress II control panel is the command center for DiskExpress II. From the control panel, you can manage all of the automatic and manual features of DiskExpress II. All settings made in this window are “remembered” between startups.

### Opening the DiskExpress II Control Panel

To open the DiskExpress II control panel follow these 2 simple steps.

- 1) Choose the Control Panel desk accessory from the Apple menu under System 6 or choose Control Panels from the Apple menu under System 7.
- 2) Click the DiskExpress II icon to display its control panel under System 6 or double click the icon under System 7. (If necessary, use the scroll bar to bring the DiskExpress II icon into view.)



**Figure 2-1**

The DiskExpress II Control Panel

## DiskExpress II Control Panel Items

The following items appear in the DiskExpress II control panel:

### Volume List

The Volume List shows a list of all eligible volumes and diskettes currently available to the Macintosh.



#### Rabbit Icon Preceding A Volume Name

If a volume name is preceded by a rabbit icon then it is currently undergoing automatic optimization.

#### Selecting Volumes

Volumes in the volume list can be selected by clicking a volume name. Clicking a volume name highlights it and a copy of the name is displayed over the Monitor check box indicating that DiskExpress II is currently set to work with the volume.

#### Ineligible Volumes

Volumes that are not eligible to be worked with will not be shown in the list. Some examples of volumes that are not eligible are AppleShare and TOPS volumes which you access via a network.

### On/Off buttons

If DiskExpress II has been successfully loaded, these radio buttons can be used to start or stop its operations. This includes all file activity logging and automatic optimization. The installation default setting is “off”. To stop active optimization, open the DiskExpress II control panel, click on the appropriate volume, click the Status button, and click Stop. A shortcut: open the DiskExpress II control panel and turn DiskExpress II off and then on again.

### Volume Info button

When this button is clicked, DiskExpress II will display a Volume Information Window for the selected volume. The Volume Information Window (refer to the Volume Information Window section of this chapter) contains the Fragmentation Display, File Activity Display and Volume Statistics.

### **Status button**

If the selected volume is undergoing automatic optimization (its name is preceded with a rabbit icon), the Volume Info button changes to a Status button. When the Status button is clicked, DiskExpress II will present a dialog that displays a progress indicator, a Stop button, and a Close button.

Clicking the Stop button will close the dialog and stop the current operation. Automatic optimization of the selected volume will not resume until the next day or 5 minutes after the next restart. Clicking the Close button closes the dialog without stopping the current operation.

### **Verify button**

Clicking this button causes DiskExpress II to verify the selected volume's media by performing a sequential "read" of the entire selected volume. DiskExpress II first presents a dialog that displays a progress indicator and a Stop button. The verify operation will continue until it either completes examination of the selected volume or you click the Stop button. This operation does not change any information on the volume. If a portion of the volume is unreadable, an error message will be displayed. Refer to Chapter 4, **Trouble-Shooting and Error Messages**.

### **Optimize button**

When this button is clicked, DiskExpress II analyzes all files and rearranges them based on their fragmentation and optimization priority. DiskExpress II displays a dialog with a progress indicator and a Stop button. This operation is not performed in the background as when DiskExpress II optimizes automatically. The Optimize operation will continue until it either completes optimization of the selected volume or you click the Stop button. When finished, all files, the directory and free space will be arranged in contiguous order on the volume. The physical order of files on the volume is determined by their priority and the type of optimization selected.

To start a background optimization manually, hold down the Option key while clicking the Optimize button. It is not a good idea to start a background optimization on a volume you are currently modifying. Background optimization will stop if the volume being optimized is modified, ejected or removed from the desktop. This includes renaming, copying, deleting or moving files located on the volume.



### **Monitor check box**

If this option is checked, DiskExpress II will automatically monitor and record in a log file all file activity on the selected eligible volume. If the Monitor All Volumes option is on, you will not be able to turn off this option for any selected volume. A volume which is not monitored cannot be optimized automatically. Also, diskettes cannot be monitored nor optimized automatically.

### **Options button**

Clicking this button displays the settings that are available to customize DiskExpress II. Refer to the Options Settings section of this chapter for more information about these settings.

### **About button**

Click this button to open a window which will provide information about DiskExpress II's release number, copyright information, and phone numbers for sales and support.

## Volume Optimization

DiskExpress II will automatically analyze all files on an eligible volume and rearrange them based on their fragmentation and optimization priority. When finished, all files, the directory and free space will be arranged in contiguous order on the volume. The physical order of files on the volume is determined by their priority and the type of optimization selected.

### Two Operating Methods

DiskExpress II has two operating methods of working with a volume:

- 1) **Automatic** - DiskExpress II optimizes each eligible volume whenever it is necessary. Priorities are based on at least five days of activity. To have a volume automatically optimized just do the following:
  - Select the volume in the DiskExpress II Volume List.
  - Check the Monitor check box in the DiskExpress II control panel.
  - Check the Optimize Automatically check box in the DiskExpress II Options dialog.
- 2) **Manual** - DiskExpress II immediately optimizes the selected volume including files, the directory and free space. Diskettes can be optimized using this method. Priorities are also based on at least the last five days of activity. If five days of activity are not recorded, such as when DiskExpress II is first installed or when working with a diskette, files are prioritized according to a fixed default priority setting. To manually optimize a volume, click the Optimize button.



**Note About Networks and Backup Applications:** Both methods of optimization are 100% compatible with files servers, such as AppleShare, File Share and TOPS, as well as with all backup applications.

### Determining File Prioritization

The priority for physical placement of files on each volume is determined by an analysis of its log file which is maintained by DiskExpress II. All files are first classified as either “anchored” or “movable”.

## Two Basic Classifications of Files:

- 1) **Anchored Files**. Anchored files are files such as copy protection files, open virtual memory files, many invisible files, and most partitions. They must remain where they are physically located (anchored) on the disk and will be skipped by DiskExpress II. Certain programs create invisible files to store information they may need to access. DiskExpress II keeps a list of invisible files that are safe to move. This list is updated regularly. For more information on manually anchoring and unanchoring files, see the section entitled, **Anchoring and Unanchoring Files With DiskCheck**, in this chapter.



**Note About Partitions:** DiskExpress II can only move MultiDisk and Multi-Partition partition files that are closed (not visible on the desktop). DiskExpress II assures that their invisible partition files are saved in contiguous space and that they are positioned correctly on the disk according to their priority. All other partition files are classified as anchored and will be skipped.



**For Enhanced Virtual Memory Performance:** Virtual memory storage files receive special treatment by DiskExpress II. If a virtual memory storage file is open, DiskExpress II will anchor it during optimization. However, DiskExpress II will optimize a closed virtual memory storage file by defragmenting it and moving it to the first allocation block following the volume directory. To allow DiskExpress II to optimize your virtual memory storage file you should start your computer with virtual memory turned off. Then turn virtual memory on and set the amount of virtual memory you want. Next, without restarting the computer, optimize the volume containing the virtual memory storage file. Finally, restart the computer. The virtual memory storage file created by Connectix' Virtual program is given the same special consideration that is given to the System 7 virtual memory storage file.

- 2) **Movable Files**. Movable files are files which can be analyzed and given one of the following priorities based on their usage for at least the previous five days:
  - a) **Active:** files that were used frequently but did not change size such as system files and applications or files that did change size such as word processing, spreadsheet, and database files;
  - b) **Sporadic:** files that were used occasionally but did not change size. Examples of sporadic files are utility programs, word

- processing and spreadsheet templates;
- c) **Dormant:** files that have not been used recently.

## Arrangement of Files on an Optimized Hard Disk

DiskExpress II will arrange your files according to their priority. Files on the volume will be arranged in the following order:

### **Split Optimization**

Volume Directory  
Active Files  
Free Space  
Sporadic Files  
Dormant Files

### **Packed Optimization**

Volume Directory  
Dormant Files  
Sporadic Files  
Active Files  
Free Space

## Options Settings

Clicking the Options button in the DiskExpress II control panel displays the Options Dialog.

The Options Dialog box is divided into several sections:

- General:** Contains six checkboxes: ☒ Optimize Automatically, ☒ Verify Before Optimize, ☒ Monitor All Volumes, ☒ Verify Reads & Writes, ☐ Use Memory for Temp Data, and ☒ Auto Optimize Only When Charger Is Connected.
- Type of Optimization:** Contains three radio buttons: ☐ Packed (All Files), ☒ Split (All Files), and ☐ Quick (Active Files Only).
- Buffer Size:** A text box showing '32K' with up and down arrow buttons.
- Optimization Index:** A slider control with a value of '100' displayed. The slider ranges from 'Low' to 'High'.
- Optimization Times:** A calendar grid showing days of the week (Mon to Sun) and times (12 AM to 11 PM). A checkbox 'Start Automatic Optimization' is checked, and 'Don't Start' is unchecked.
- Buttons:** 'Use Defaults', 'Cancel', and 'Save' buttons are at the bottom.

**Figure 2-2**

Options Dialog

## General Options

The General options allow you to specify the settings for verification and optimization.

The General Options section contains the following settings:

- ☒ Optimize Automatically
- ☒ Verify Before Optimize
- ☒ Monitor All Volumes
- ☒ Verify Reads & Writes
- ☐ Use Memory for Temp Data
- ☒ Auto Optimize Only When Charger Is Connected

**Figure 2-3**

General Options for Optimization

### **Optimize Automatically check box**

Choosing the Optimize Automatically option signals DiskExpress II to automatically optimize all monitored volumes when necessary. The installation default setting for this check box is checked (on).

### **Verify Before Optimize check box**

Choosing this option will automatically verify a volume prior to optimizing it. This is true whether the volume is being optimized automatically or manually. The installation default setting for this check box is checked (on).

### **Monitor All Volumes check box**

Checking this option tells DiskExpress II to monitor and record in a log file all file activity on all eligible volumes. If DiskExpress II encounters an eligible volume for which no logging has occurred, it will automatically create a log file and commence logging. The installation default setting for this check box is checked (on).

### **Verify Reads & Writes check box**

If this option is selected, every read and write operation will be tested using a proprietary verification process. A proprietary method was chosen because the verification process that is built into the Macintosh Operating System is not supported by any of the hard disks that we have tested (including those from Apple).

DiskExpress II is shipped with the Verify Reads & Writes box checked. Although optimization times will be increased by about 50% and media verification times will increase by about 100%, it is highly recommended that this box remain checked during all optimizations. Failure to leave this box checked will reduce the ability of DiskExpress II to maintain the integrity of your data. DiskExpress II recognizes bad blocks that have been marked by Sector Collector, Norton Utilities, and MacTools, as well as the System 7 bad block sparing mechanism that was mentioned previously. Optimization and media verification will operate around these spared bad blocks.

### **Use Memory For Temp Data check box**

This option is available only under System software 7.0 or greater. It allows DiskExpress II to optimize your hard disk up to two times as fast. When this option is selected, DiskExpress II will build its temporary data file in memory instead of writing it to the hard disk. This file is used throughout the optimization. When the file is kept in memory it can be accessed much more quickly, so the optimization

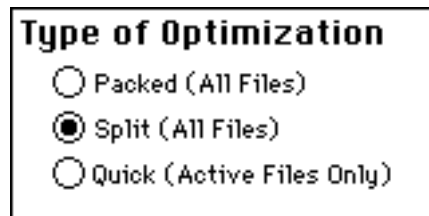
takes less time to perform. This option is most effective if you have some additional memory to spare. The additional memory is used by DiskExpress II only while an optimization is actually in progress. No additional memory is used while DiskExpress II is waiting to optimize nor after DiskExpress II has completed the optimization. The installation default setting for this check box is unchecked (off).

### **Auto Optimize Only When Charger Is Connected**

This option is for Macintosh Portable and PowerBook users only and will not appear on any other type of Macintosh. Checking this box will stop DiskExpress II from automatically optimizing whenever the Macintosh is disconnected from its battery charger, thereby conserving battery power. Automatic optimization will not occur regardless of any other settings if this check box is checked and your Macintosh is not connected to a battery charger.

### **Choose the Type of Optimization You Prefer**

You can specify whether you want DiskExpress II to optimize your entire hard disk or only those files that are active. If you choose to have DiskExpress II optimize your entire hard disk you may choose to use either Packed or Split optimization. Each type of optimization is designed to meet specific needs. Choose the optimization that fits the way you use your Macintosh.



**Figure 2-4**

Type of Optimization Radio Buttons

### **Packed Optimization**

During packed optimization, all files are placed together at the front of the disk. All free space is placed at the end of the disk. Directory files are placed at the very beginning of the disk. To reduce the accumulation of subsequent fragmentation, all other Active files are placed as close to the free space as possible. This configuration is ideal for those who use hard disk partitions and frequently wish to change the size of the partitions. Use this type of optimization on any partition whose size you wish to change.

## Split Optimization

This is the standard DiskExpress II optimization. It is suited to the needs of most Macintosh users. Directory files and other files that you are using the most often are placed right at the front of the hard disk for maximum speed. Seldom used files are placed out of the way at the end of the disk. All the free space is placed in the middle of the disk between the files you use a lot and the files you use infrequently. This minimizes the fragmentation resulting from continued use of your hard disk.

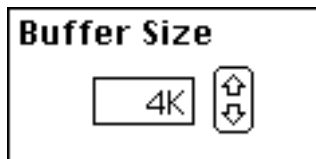
## Quick Optimization

When DiskExpress II performs a quick optimization it optimizes only the most frequently used files. It does not move the files you rarely use, which account for most of the files on your hard disk. This means that you get most of the benefits of split or packed optimization in much less time. For the absolute fastest optimization, try a quick optimization with the Use Memory For Temp Data option selected!

## Changing The Buffer Size

The section of memory DiskExpress II uses to move files from one portion of the volume to another is called the buffer. The buffer size only applies to background optimization (and verification if chosen), i.e., automatic or manual background optimization. For foreground optimization, the buffer size is allocated dynamically based upon available memory up to 1 MB. The amount of memory you set for the buffer is reserved at startup.

You can change the size of the buffer by using the arrow buttons to increase or decrease the number. The larger the buffer is, the faster DiskExpress II will optimize your volumes. However, a large buffer may slow down other activity in the foreground. You may want to experiment to see what buffer size works best for your Macintosh configuration.



**Figure 2-5**  
Buffer Size Setting



**Note:** You must restart your machine after changing the buffer size to guarantee that DiskExpress II can reserve the appropriate amount of memory.

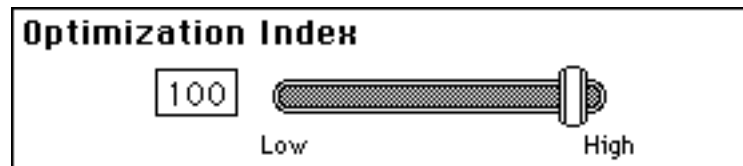
## Optimization Index

The Optimization Index is a measure of the current state of optimization of a volume. Using this control, you can specify the amount of fragmentation and file misplacement you are willing to accept before automatic optimization should be scheduled.

The index ranges from 1 to 100. The higher the value, the higher the degree of optimization enforced. The lower the value, the less often DiskExpress II will automatically optimize. At the highest setting, 100, DiskExpress II will schedule optimization when any fragmentation and file misplacement is found. However, automatic optimization of a volume will never occur more than once per day.

The optimization index is computed for each volume independently. For example, if you have the index set to 80 and your startup volume has a computed index of 95, DiskExpress II will bypass that volume and advance to compute the index of the next volume. If that volume has a computed index of less than 80, it will be scheduled for automatic optimization.

The optimization index is computed periodically, therefore automatic optimization is not scheduled the moment a volume falls below the index. The four factors DiskExpress II takes into account when determining this index are file location, fragmentation, file activity and the type of optimization selected. You may want to experiment with the Optimization Index to see what degree of optimization works best for you.



**Figure 2-6**  
Optimization Index Slide Control



**Note:** The Optimization Index is not valid for a volume unless it has been optimized at least one time by DiskExpress II 2.10 or greater.

## Optimization Times

The Optimization Times controls allow you to set the days of the week and times of day during which automatic optimization for eligible volumes can begin. Days of the week can be selected and the time of day can be set in 30 minute increments by simply clicking on the appropriate boxes. Be sure to allow enough time for all of the eligible volumes to be optimized (and verified if you have selected this option.)

<b>Optimization Times</b>														
		Mon		Tue		Wed		Thu		Fri		Sat		Sun
		12	1	2	3	4	5	6	7	8	9	10	11	
AM														
PM														

**Figure 2-7**

In this example, Automatic Optimization can never be performed on Mondays and Tuesdays. On all other days, Automatic Optimization cannot begin between 2:30 p.m. and 4:30 p.m.

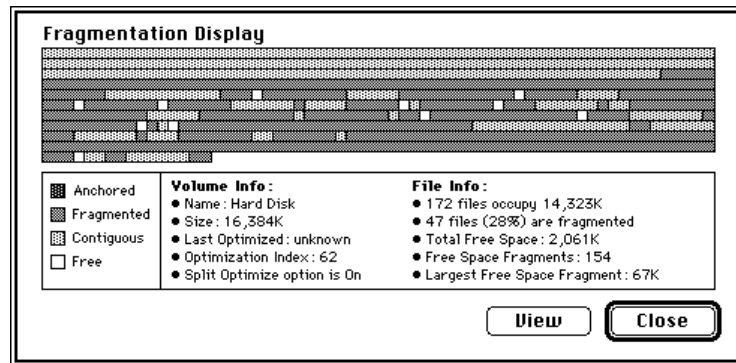
A filled box indicates that automatic optimization may begin during that time or on that day. A white box indicates that automatic optimization may not begin during that time period or at any time during that day. DiskExpress II will begin optimization (and verification) during the time you have set on the days you have selected only when there is no disk activity with which optimization would interfere.

## The Volume Information Window

DiskExpress II can display two types of volume information – fragmentation and file activity. This section includes instructions on how to access and understand the Volume Information Window.

### Accessing the Volume Information Window

Select the volume to be displayed from the volume list in the DiskExpress II control panel and click the Volume Info button. DiskExpress II opens the Volume Information Window. The window initially contains the Fragmentation Display for the selected volume.



**Figure 2-8**  
Fragmentation Display and Volume Statistics

The Fragmentation and File Activity Displays each contain a map of the relative locations of files on the selected volume. The displays can be thought of as a series of squares running from left to right and top to bottom with each square representing a section of 50 contiguous blocks on the volume. Each square is assigned a pattern reflecting the state of the files occupying that square's blocks.

A legend of the patterns and relevant volume and file statistics are located below the volume map. The map and statistics combine to give you a complete picture of the efficiency of the volume.

In the lower right corner of the Volume Information Window are two buttons: Close and View. Clicking the Close button closes the Volume Information Window and returns you to the DiskExpress II control panel. Clicking the View button alternates between the Fragmentation Display and the File Activity Display.

## Understanding the Fragmentation Display

The Fragmentation Display maps the locations of files of differing degrees of fragmentation. Optimally, all files and the free space will be contiguous.

The patterns used in the Fragmentation Display are shown in Figure 2-9. Each square of the volume map may represent files with different degrees of fragmentation. The pattern assigned to a square is selected according to the following ranking: 1) Orphaned, 2) Anchored, 3) Fragmented, 4) Contiguous, and 5) Free. For example, if a square represents 5 contiguous files and 1 fragmented file the square will be assigned the pattern for fragmented.



**Figure 2-9**  
Fragmentation Display Pattern Legend

### Orphaned

The areas of the Fragmentation Display drawn with this pattern represent the areas on the volume occupied by an orphaned extent. When the directory of a volume contains a record pointing to a fragment whose parent file can not be found, the fragment is said to be an “orphaned extent”.

An orphaned extent is a common form of directory damage. If DiskExpress II reports encountering an orphaned extent during an optimization, or if the Fragmentation Display shows an area of your volume containing an orphaned extent, you may use DiskCheck, the directory diagnostics program shipped with DiskExpress II, to make repairs. Refer to Chapter 3, **DiskCheck**.

The Orphaned Pattern in the Fragmentation Display Pattern Legend is not present unless an orphaned extent has been found on the volume.

## **Anchored**

The areas of the Fragmentation Display drawn with this pattern represent the areas on the volume occupied by an anchored file. DiskExpress II anchors a file if it should not be moved during optimization. Examples of anchored files include: copy protected programs, active virtual memory files, some types of partition files, and many invisible files. A file is not necessarily considered anchored because it is locked, opened or invisible.

During optimization, DiskExpress II may surround an anchored file with a file prioritized to be placed in the physical area of the anchored file. This is done to eliminate any free space fragments even though it may result in the surrounding file being fragmented around the anchored file.

## **Fragmented**

The areas of the Fragmentation Display drawn with this pattern represent the areas on the volume occupied by a fragmented file. A file is said to be fragmented when it is not stored in contiguous physical space on the volume.

## **Contiguous**

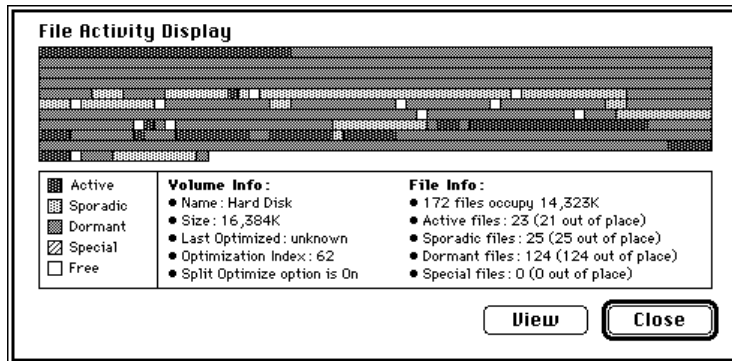
The areas of the Fragmentation Display drawn with this pattern represent the areas on the volume occupied by a contiguous file. A file is said to be contiguous when it is stored in adjacent physical space on the volume.

## **Free**

The areas of the Fragmentation Display drawn with this pattern represent the areas on the volume that are unoccupied.

## **Understanding the File Activity Display**

The File Activity Display maps the locations of files of differing degrees of activity. Optimally, files with the same activity will be grouped together on a volume. Clicking the View button in the Volume Information Window will alternate between the Fragmentation and File Activity Displays.



**Figure 2-10**  
File Activity Display

The patterns used in the File Activity Display are shown in Figure 2-11. Each square of the volume map may represent files with different degrees of activity. The pattern assigned to a square is selected according to the following ranking: 1) Special, 2) Active, 3) Sporadic, 4) Dormant, and 5) Free. For example, if a square represents 5 sporadic files and 1 active file, the square will be assigned the pattern for active.



**Figure 2-11**  
File Activity Pattern Legend

## Orphaned

The areas of the Fragmentation Display drawn with this pattern represent the areas on the volume occupied by an orphaned extent. When the directory of a volume contains a record pointing to a fragment whose parent file can not be found, the fragment is said to be an “orphaned extent”.

An orphaned extent is a common form of directory damage. If DiskExpress II reports encountering an orphaned extent during an optimization, or if the Fragmentation

tation Display shows an area of your volume containing an orphaned extent, you may use DiskCheck, the directory diagnostics program shipped with DiskExpress II, to make repairs. Refer to Chapter 3, **DiskCheck**.

The Orphaned Pattern in the Fragmentation Display Pattern Legend is not present unless an orphaned extent has been found on the volume.

### **Active**

The areas of the File Activity Display drawn with this pattern represent the areas on the volume occupied by an active file. A file is considered active if it is read from or written to on a frequent basis or if it has recently changed size.

### **Sporadic**

The areas of the File Activity Display drawn with this pattern represent the areas on the volume occupied by a sporadic file. A file is said to be sporadic when it has not recently changed size and is only read from or written to occasionally.

### **Dormant**

The areas of the File Activity Display drawn with this pattern represent the areas on the volume occupied by a dormant file. A file is said to be dormant when there has been no recent read or write activity for the file.

### **Special**

The areas of the File Activity Display drawn with this pattern represent the areas on the volume occupied by a special file. A file is said to be special if its prioritized location on the disk is determined by its type rather than its activity. Examples of files considered to be special are open partition files and most anchored files.

### **Free**

The areas of the File Activity Display drawn with this pattern represent the areas on the volume that are unoccupied.

## Volume Statistics

The following statistics are present for both the Fragmentation and File Activity Displays:

- 1) The name of the volume.
- 2) The total size of the volume, in K.
- 3) The date the volume was last optimized. If the volume is not being monitored by DiskExpress II, then the date cannot be shown.
- 4) The current Optimization Index of that volume. The index will vary depending on the type of optimization chosen for that volume (Packed, Split or Quick).
- 5) The type of Optimization to be used on the volume (Packed, Split or Quick).
- 6) The total number of files on the volume (some of which may be invisible) and the total amount of space, in K, they occupy.

The following statistics are shown only in the Fragmentation Display:

- 1) The number of fragmented files and the percentage of the total number of files on the volume they represent.
- 2) The total amount of free space, in K.
- 3) The number of sections into which free space is fragmented.
- 4) The largest single, contiguous section of free space, in K.

The following statistics are shown only in the File Activity Display:

- 1) The number of Active files on the volume.
- 2) The number of Sporadic files on the volume.
- 3) The number of Dormant files on the volume.
- 4) The number of Special files on the volume.

# **Chapter 3**

## **DiskCheck**

## Technical Background

DiskCheck is a powerful automatic disk diagnostics program. When any error is detected, DiskCheck displays a brief description of the error and the appropriate corrective action that you should take. Even though you may not understand one or more of the technical error messages, the instructions to correct the error(s) should be followed.

DiskCheck helps you diagnose and pinpoint disk directory damage as well as hardware malfunctions. This tool can be used to ensure that your disk maintains a stable operating environment in which DiskExpress II can work. DiskExpress II should not be turned on if DiskCheck detects any errors on any of the hard disks or partitions (volumes) that you could use. Any error reported by DiskCheck must be corrected by using the instructions provided to you by DiskCheck.

DiskCheck is capable of detecting most directory damage and disk hardware malfunctions. As a bonus, DiskCheck can list files which are anchored (should not be moved during optimization), explain why they are anchored, and allow you to anchor or unanchor files manually.



**Note:** Having anchored files does not represent an error.

### What Is The Directory?

The directory is the Macintosh Filing System's "map" of all information in a volume. It is the portion of a volume used to store the number, names, locations, and sizes of files and folders saved on that volume. When any software wants information from a volume, the Filing System must go to the directory to find out where the information is located. Also, when any software wants to save information to a volume, the Filing System must go to the directory to find out where the information can be placed. All the necessary information about where the data was saved is then recorded in the directory.

### What Is Directory Damage And How Does It Affect You?

When any of the information about the number, names, locations or sizes of files and folders in a directory is either incorrectly updated or not updated at all, that directory is considered damaged. This damage is normally limited to only a specific area of the directory. So, it's quite common for directory damage to remain undetected until long after the damage actually occurred.



When the Filing System attempts to use the incorrect directory information to read or write information on a volume, an error will occur. This error may be very minor and go unnoticed. It might cause an instantaneous System bomb or crash. Or, worst of all, the entire contents of your volume could become inaccessible!

**Special Note:** Many Macintosh owners mistakenly think that the invisible “desktop file” is a part of the directory. It is not. The truth is that the desktop file is maintained by the Finder. It contains a list of your applications and the folders in which they are located (for quick opening), and the icons and “Get Info” comments of all files. DiskCheck does not “check” the desktop file. Re-building the desktop file will not repair any directory damage.

## How Does Directory Damage Occur?

The continued accuracy of information in the directory depends on the Filing System’s ability to perform ALL of its update and maintenance operations without any unexpected interruptions. Also, to help speed up many Macintosh operations, important pieces of information are temporarily kept in memory instead of being immediately saved to the volume.

Common types of unexpected interruptions are System bombs and crashes, power loss (lights flicker), turning your Macintosh off without using the proper “Shut Down” procedure, and pressing the “RESET” button. Depending upon the exact microsecond the interruption happened, you stand a good chance that your directory was either not updated correctly and/or some information had not been saved to the volume. You now have directory damage and/or information loss.

## What Are Hardware Malfunctions And How Do They Affect You?

If your directory isn’t damaged, yet you are experiencing problems using a disk, you may have some form of hardware malfunction. The malfunction could be due to any combination of mechanical or electronic failures, a portion of the disk’s storage media that can’t be properly read from or written to, or your hard disk’s “driver” software isn’t functioning correctly. Any of these problems could be an intermittent or a consistent failure. Fortunately, most disk drives and their driver software are very reliable.

The most common type of hardware malfunction is marginal or bad media. Information can be saved to a part of your disk without error, yet the next time it is read

an error occurs. Again, as with directory damage, this media malfunction may not be detected until long after the malfunction actually occurred.

You may have always had bad blocks on your hard disk. But, unless you filled your disk 100% full (no free space left), or formatted the disk, the bad block might stay undetected. Both DiskCheck and DiskExpress II can read and write to the entire disk's media, including areas that most other programs are not able to. DiskCheck and DiskExpress II cannot create media malfunctions. They only report them to you if they are found.

DiskCheck will report any bad blocks that have been "spared" by the System 7 bad block sparing mechanism or by third party utilities. These spared blocks are bad blocks that have been discovered and locked out of the volume's free space. Sparing a bad block allows you to continue to use your volume without the danger of data loss. The Verify Media check within DiskCheck will not attempt to verify spared blocks.

Remember, just because you haven't observed any problems with your disk doesn't mean that the error(s) reported to you by DiskCheck or DiskExpress II are inaccurate or unimportant. DiskCheck errors should not be ignored. You have an opportunity to correct the problem before you lose any valuable information.

## **What Are Anchored Files?**

Anchored files are files which will not be moved by DiskExpress II. A file may be anchored because some program relies on the file residing at a specific location on the disk. Also anchored are bad allocation blocks that have been "spared" by the System 7 bad block sparing mechanism. These spared allocation blocks are bad blocks that have been discovered and locked out of the volume's free space. When a volume with anchored files or anchored allocation blocks is optimized, there is a possibility that other files or the free space will be fragmented around the anchored areas. Having anchored files or anchored allocation blocks does not represent an error and no repair is necessary. There may be times when DiskExpress II anchors a file that need not be anchored. For more information on manually anchoring and unanchoring files, see the section entitled, **Anchoring and Unanchoring Files With DiskCheck**, in this chapter.

## Using DiskCheck

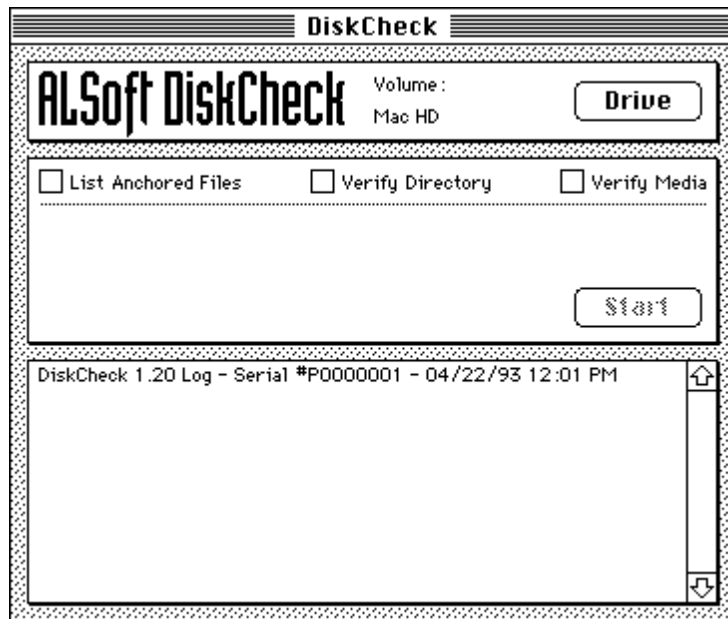
DiskCheck requires that DiskExpress II be loaded at startup. DiskExpress II does not have to be “on.” DiskCheck is compatible with all Macintosh computers.

### Checking A Volume

If you are ready to “check” a volume with DiskCheck, follow these four steps:

- 1) **Select the DiskCheck icon and choose Open from the File menu, or just double-click the icon.**

The DiskCheck window will appear on the screen (Figure 3-1.) The DiskCheck window is divided into two halves. The top half allows you to select the volume to check and to select which checks you want performed. The bottom half is a “log” of the activities performed by DiskCheck since it was opened.



**Figure 3-1**

DiskCheck window with a volume named Hard Disk selected as the current volume.

- 2) **Click the Drive button until the volume you wish to check becomes the current volume.**

The name of the current volume is displayed under the label “Volume:” in the top section of the DiskCheck window.

- 3) **Click the check boxes of the “checks” you wish to have DiskCheck perform.**

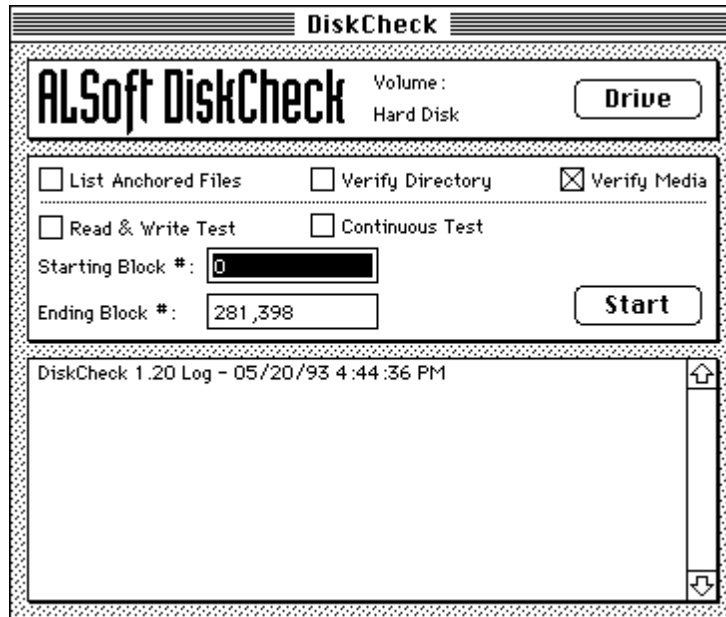
DiskCheck lets you choose any of the following options:

**List Anchored Files** – This option gives you a list of the files that are anchored (cannot be optimized) on the current volume along with an explanation of why they are anchored. Also listed are allocation blocks that have been spared by the System 7 bad block sparing mechanism. The length of time required for this check is dependent upon the number of files on the volume. Times can range from a few seconds to 3 minutes.

**Verify Directory** – This option checks the current volume for directory damage and lists the errors found. A list of the errors found will be appended to the log. Instructions for repairing any damage are also provided. The length of time required for the Verify Directory check is dependent upon the number of files on the volume. Times can range from a few seconds to 9 minutes.

One very common type of directory damage is the presence of records for fragments of a file that no longer exists. These records are referred to as “Orphaned Extents.” DiskCheck will offer to repair this type of directory damage by removing orphaned extent records from the volume’s directory.

**Verify Media** – This option checks the media of the current volume for read/write errors. A list of blocks that could not be verified is appended to the log. Also logged are blocks that have been spared by the System 7 bad block sparing mechanism, Sector Collector, MacTools or Norton Utilities. All blocks are given in terms of “volume” blocks as opposed to allocation blocks. Spared blocks will not be verified. As noted below, Verify Media can be forced to verify spared blocks. This is useful in the case when errors in the directory (where spared blocks are recorded) prevent Verify Media from operating properly. The length of time required for this check is dependent upon the number of blocks verified. Times can range from a few seconds to several hours.



**Figure 3-2**

Additional options are available when verifying media

The following additional options are available to control media verification:

**Continuous** – This option causes the media verification to be repeated until you explicitly cancel it. This is useful for finding sporadic read/write errors.

**Read & Write Test** – This option changes the media verification from a read-only test to a more comprehensive read and write test. While a read and write test is more thorough, there is the risk that data could be lost from one block if the Macintosh is interrupted (such as a power loss) while test data is being written to the block. Also, a read and write test can take up to five times longer than a read only test.

**Starting Block #** – Enter the number of the first block to verify (default: 0.)

**Ending Block #** – Enter the number of the last block to verify (default: last block on volume.)



- 4) Click the Start button to initiate the selected checks. A dialog is presented that displays the percentage of completion and a Cancel button. At the start of each check, the percentage of completion is reset to zero.

**Note:** Hold down the Option key while clicking the Start button to force Verify Media to verify ALL blocks between the starting and ending block - including those that have been spared.



**Figure 3-3**  
The Progress Dialog

The selected checks are performed in the following order:

- 1) List Anchored Files
- 2) Verify Directory
- 3) Verify Media

Clicking the Cancel button terminates the check currently being performed and prevents the remaining checks from starting.

As each check is performed, warnings, errors and summary information are appended to the log.

## Using The Log

The scroll bar in the lower half of the DiskCheck window can be used to review any portions of the log which have scrolled out of view. If you wish to keep a permanent record of the log, you can save the log in a text file (readable by TeachText

or any word processor) using the Save Log menu command or you can print the log using the Page Setup and Print Log menu commands.

## **Anchoring and Unanchoring Files With DiskCheck**

The Anchor menu contains commands for anchoring and unanchoring files. Anchored files are files which will not be moved by DiskExpress II. A file may be anchored because some program relies on the file residing at a specific location on the disk. Also anchored are bad allocation blocks that have been “spared” by the System 7 bad block sparing mechanism. These spared allocation blocks are bad blocks that have been discovered and locked out of the volume’s free space. When a volume with anchored files or anchored allocation blocks is optimized, there is a possibility that other files or the free space will be fragmented around the anchored areas. There may be times when DiskExpress II anchors a file that need not be anchored. Having anchored files or anchored allocation blocks does not represent an error and no repair is necessary.

### **Unanchoring a File**

To unanchor a file, choose Unanchor Files from the Anchor menu. A standard dialog box will be displayed. Select the file you wish to unanchor and click the Unanchor button. Only files which are anchored will be displayed in the file list. If the selected file cannot be unanchored, or if there is special information you should know about the file, this information will be displayed beneath the file list.

### **Anchoring a File**

To anchor a file, choose Anchor Files from the Anchor menu. A standard dialog box will be displayed. Select the file you wish to anchor and click the Anchor button. Only files which are unanchored will be displayed in the file list. If the selected file cannot be anchored, or if there is special information you should know about the file, this information will be displayed beneath the file list.



**Note:** When you anchor or unanchor a file with DiskCheck, you are actually anchoring or unanchoring ALL files of the same type belonging to the same application as the one you select in the dialog box.

## Trouble-Shooting

DiskCheck has one limitation when checking a hard disk. Since DiskCheck performs all read and write operations through the driver software on the hard disk, it is possible for the driver software to fail and leave DiskCheck suspended. Typically this will occur when DiskCheck instructs the driver to read or write a bad block on the hard disk. DiskCheck is suspended when control of the Macintosh is turned over to the driver. The driver will sometimes wait forever for the hard disk to complete the read or write (which it cannot) leaving DiskCheck suspended. If the List Anchored Files or the Verify Directory checks fail to complete (the progress dialog displays the same percentage for 10 minutes or longer) then a bad block was probably encountered. You should restart your Macintosh and perform DiskCheck's Verify Media check. If the progress dialog displays the same current block number for more than a few seconds, then you know that the block with the currently displayed block number is bad.

## Recovering From Directory Damage

If an error is found in a directory then the directory must be repaired or recreated. Disk First Aid is the directory repair utility that was supplied with your Macintosh. Use it to examine and repair any additional directory errors reported by DiskCheck.

Unfortunately, Disk First Aid cannot repair or even detect every error reported by DiskCheck. It may report that there is "No Repair Necessary" despite the presence of errors. If Disk First Aid reports that it is "Finished, Repair Completed" then check the directory again using DiskCheck to ensure that all errors have been corrected.

If Disk First Aid fails to repair the directory, then the directory must be recreated. The first step in recreating a directory is to make a complete backup of the volume. Do not make a "mirror" or "image" backup of the volume, as this will backup the damaged directory along with the files. Perform a "file" backup instead.

Backup utilities which back up to tape usually offer both "mirror" and "file" backup options. Most other backup utilities perform "file" backups exclusively. Of course, if you backup your volume by dragging groups of files and folders to a backup disk, then you are performing a "file" backup.

The next step in recreating a directory is to erase the volume. Use the Finder's Erase Disk menu command. Dragging all of a volume's files to the Trash does not erase a volume.

The last step in recreating a directory is to restore all of your files from the backup to your volume.

## **Recovering From Media Damage**

The method of recovering from media errors is dependent upon the nature of the error. If DiskCheck repeatedly reports that the same blocks are damaged, you can probably correct the error yourself by formatting the disk that contains the volume.

Before formatting the disk, make a complete backup of all volumes on the disk. Formatting the disk will completely erase the disk including all partitions.

To format a diskette, use the Finder's Erase Disk menu command. To format a hard disk, use the formatting or initialization application that came with the hard disk. For example, an Apple Computer hard disk should be formatted by using the Initialize command in the Apple HD SC Setup utility.

After formatting the disk, verify the media with DiskCheck to ensure that all errors have been removed. If errors are still present then the disk requires service by a qualified technician. If no errors are found then restore all of your files from the backup.

If DiskCheck reports different blocks as damaged every time the media is verified, you probably have some other type of hardware problem. If the volume with the media errors is on an SCSI hard disk, detach all other SCSI devices connected to your Macintosh and try verifying the media again. It could be that one of the other devices is interfering with your SCSI hard disk. Also, try changing the SCSI cable to the hard disk and ensure that your SCSI devices are properly terminated.



# **Chapter 4**

## **Trouble-Shooting and Error Messages**

## Trouble-Shooting

If after DiskExpress II is installed, your Macintosh begins behaving abnormally, you may be experiencing an “extension conflict”. Extension conflicts are incompatibilities between software that extends your System, such as System extensions, Control Panels and Chooser extensions.

Typical conflict symptoms of a newly installed extension are:

- 1) Any extension startup icon is not displayed normally (indicating it could not load properly).
- 2) Computer “stalls” during startup.
- 3) Screen freezing and/or mouse becomes inactive.
- 4) System errors.

Common sense rules for installing any extension into your System Folder:

- 1) Only add one (1) extension at a time.
- 2) Test the new extension.
- 3) Test your previously installed extensions.
- 4) Test your applications.
- 5) If no problems, install your next extension.

If none of the three (3) startup icons for DiskExpress II are displayed at startup and you have some type of extension management utility program (Aask, INIT Picker, INIT CDEV, Startup Manager, INIT Manager, etc.), verify that your utility has **ENABLED** DiskExpress II.

If you encounter any **NEW** difficulties after installing DiskExpress II, the following steps can be used to quickly identify the conflict or, in some cases, even eliminate it. Try each, one at a time, in order shown:

- 1) **Verify that you are running System Software 6 or later.**
  - This can be done by choosing “About this Macintosh ...”(System 7) or “About the Finder...” (System 6) from the Apple menu while in the Finder. Both the Finder **AND** System versions must be 6 or greater. If you are running System Software 7 or greater you must use DiskExpress II release 2.07 or greater.

**2) Reinstall DiskExpress II.**

- Follow the instructions in the Installation section of Chapter 1, **Introduction**, using the ORIGINAL DiskExpress II diskette.
- Restart your Macintosh and test to see if the difficulty remains.

**3) Adjust the loading order of extensions and control panels.**

- Change the name of the DiskExpress II control panel, installed in your System Folder from “DiskExpress® II” to “aDiskExpress® II”. This will let it start before most other control panels. Restart your Macintosh and test.
- If you are using a startup management utility, configure it to have DiskExpress II load first or last. Restart your Macintosh and test.
- Experiment with the loading order. Many conflicts among extensions and control panels can be resolved by adjusting the loading order.

**4) Try running DiskExpress II in isolation.**

- Except for DiskExpress II, move ALL non-Apple Computer extensions and control panels out of the System Folder, Control Panels folder, and Extensions folder. (They do not have to be thrown away, just moved outside of the System Folder.) Restart your Macintosh and test. If the conflict continues, go immediately to step 5. If this cures the conflict, start putting the moved items back into their proper folders one at a time. Restart your Macintosh and test after each one is moved back.

**5) Reinstall your system files**

- The only reliable way to do this is by restarting your Macintosh from the Apple Computer installer diskette (6.0 or later).
- Open the System Folder on your hard disk and put the System file into the Trash. Empty the Trash.
- Start the “Installer” program on the installer disk and perform the appropriate system software installation.
- Restart your Macintosh and test.
- If this cures the conflict, start putting the moved extensions back into their proper folders one at a time. Restart your Macintosh and test after each one is moved back.



**Note:** Be sure to read the document “Read Before Using DiskExpress II.” Last minute changes are detailed there.

## Error Messages

Error messages are most likely to appear while performing a volume operation. A dialog box is displayed describing the nature of the error and, in some cases, a solution is suggested. The following are error messages that you might encounter.

- o **DISKEXPRESS II SIMULTANEOUS USERS ERROR**

**The number of simultaneous users of this copy of DiskExpress II has exceeded your network license. The network license for this copy of DiskExpress II allows (number of users) simultaneous user(s). Click the Users button to display a list of the current users of this copy of DiskExpress II.**

DiskExpress II detected more copies of itself simultaneously running on the network than have been licensed. Clicking the Users button of this dialog will display available information about the current users of this copy of DiskExpress II. This information should help you locate the excessive user(s) so DiskExpress II can be removed from their startup disk.

This error condition is visually indicated by displaying the Not loaded icon at startup time and/or by alternately flashing a small DiskExpress II icon over top of the Apple in the menu bar.

You can easily verify that the Not Loaded error is caused by excessive copies of DiskExpress II running simultaneously on the network. Unplug the AppleTalk connector from the back of your Macintosh and then choose restart from the Finder's Special menu. DiskExpress II should now display the Loaded icon on startup. If it does not, and you have tried steps 1 and 2 of the section titled "Loading Problems. What Went Wrong?" in Chapter 1, **Introduction**, call the ALSoft support line at (713) 353-1510.

If one copy of DiskExpress II is insufficient to meet your needs, a network license is available for any number of users. A network package comes with one diskette licensed for a specific number of users. For more information, call the ALSoft sales line at 1-800-ALSOFT-1.

- o **DISKEXPRESS INTERRUPTED ERROR**

**DiskExpress II may have been interrupted while optimizing this volume. The file “file name” was the last file moved by DiskExpress II.**

This error message appears after startup when DiskExpress II is interrupted during optimization. This occurs when you restart your Macintosh following a system crash or any other abnormal restart.

- o **DIRECTORY DAMAGE ERROR**

**DiskExpress II found errors in the directory of this volume. You can use the DiskCheck utility, included with DiskExpress, to determine the nature of the errors and the steps required to correct them.**

This error message appears when DiskExpress II encounters an error while analyzing the directory before optimizing a volume. No data will have been moved by DiskExpress II at this point. To verify the directory of the named volume, use the DiskCheck utility that came on your DiskExpress II diskette. Refer to Chapter 3, **DiskCheck**. If DiskCheck finds no damage to the directory of the named volume, the DiskExpress II activity log for the volume may have been damaged. Open the DiskExpress II control panel. Select the volume name in the DiskExpress II volume list then uncheck and recheck the Monitor check box. This will reinitialize the activity log for the selected volume.

- o **DIRECTORY DAMAGE ERROR**

**DiskExpress II found errors in the directory entry of the file “file name” on this volume. You can use the DiskCheck utility, included with DiskExpress, to determine the nature of the errors and the steps required to correct them.**

This error message appears when DiskExpress II encounters an error while optimizing a volume. DiskExpress II will identify the name of the file which it was attempting to move when it encountered the error. To verify the directory of the named volume, use the DiskCheck utility that came on your DiskExpress II diskette. Refer to Chapter 3, **DiskCheck**.

- o **UNABLE TO VERIFY MEDIA ERROR**

**DiskExpress II was unable to read or write one or more blocks on this volume. You can use the DiskCheck utility included with DiskExpress to perform a complete media verification.**

This error message appears when DiskExpress II is unable to read or write to a block during optimization. This could be indicative of a bad block on the hard disk, a hardware defect or problems with termination or cabling. You can use the DiskCheck utility included with DiskExpress to perform a complete media verification. Refer to Chapter 3, **DiskCheck**.

- o **UNABLE TO VERIFY BLOCK ERROR**

**DiskExpress II was unable to verify (quantity) block(s) on this volume. You can use the DiskCheck utility included with DiskExpress to perform a complete media verification.**

This error message appears when DiskExpress II is unable to read or write to a block during verification. This could be evidence of a bad block on the hard disk, a hardware defect or problems with termination or cabling. You can use the DiskCheck utility included with DiskExpress to perform a complete media verification. When performing this operation select the volume and check the verify media check box and the continuous test check box. Click the start button and allow DiskCheck to go through at least three passes of the volume (this may take a few minutes to a few hours). If DiskCheck reports bad blocks make a note of the block number. If DiskCheck reports the same bad block number through multiple passes, this is evidence of a bad block on the volume. If different numbers appear to be bad on multiple passes, this could be evidence of a hardware defect, or SCSI termination or cable problems.

- o **BLOCK VERIFICATION ERROR**

**During verification, one or more blocks on this volume required a total of (number) additional attempts to verify. Use the DiskCheck utility included with DiskExpress to perform a complete media verification.**

This error message appears when DiskExpress II is unable to read or write to a block during verification. This could be evidence of a bad block on the hard disk, a hardware defect or problems with termination or cabling. You can use the

DiskCheck utility included with DiskExpress to perform a complete media verification. When performing this operation select the volume and check the verify media check box and the continuous test check box. Click the start button and allow DiskCheck to go through at least three passes of the volume (this may take a few minutes to a few hours). If DiskCheck reports bad blocks make a note of the block number. If DiskCheck reports the same bad block number through multiple passes, this is evidence of a bad block on the volume. If different numbers appear to be bad on multiple passes, this could be evidence of a hardware defect, or SCSI termination or cable problems.

- o **BLOCK VERIFICATION ERROR**

**During verification, one or more blocks on this volume failed to verify after a total of (number) additional attempts. Use the DiskCheck utility included with DiskExpress to perform a complete media verification.**

This error message appears when DiskExpress II is unable to read or write to a block during verification. This could be evidence of a bad block on the hard disk, a hardware defect or problems with termination or cabling. You can use the DiskCheck utility included with DiskExpress to perform a complete media verification. When performing this operation select the volume and check the verify media check box and the continuous test check box. Click the start button and allow DiskCheck to go through at least three passes of the volume (this may take a few minutes to a few hours). If DiskCheck reports bad blocks make a note of the block number. If DiskCheck reports the same bad block number through multiple passes, this is evidence of a bad block on the volume. If different numbers appear to be bad on multiple passes, this could be evidence of a hardware defect, or SCSI termination or cable problems.

- o **BLOCK VERIFICATION ERROR**

**During optimization, one or more blocks on this volume required a total of (number) additional attempts to verify. Use the DiskCheck utility, included with DiskExpress, to perform a complete media verification.**

This error message appears when DiskExpress II is unable to read or write to a block during optimization. This could be evidence of a bad block on the hard disk, a hardware defect or problems with termination or cabling. You can use the

DiskCheck utility included with DiskExpress to perform a complete media verification. When performing this operation select the volume and check the verify media check box and the continuous test check box. Click the start button and allow DiskCheck to go through at least three passes of the volume (this may take a few minutes to a few hours). If DiskCheck reports bad blocks make a note of the block number. If DiskCheck reports the same bad block number through multiple passes, this is evidence of a bad block on the volume. If different numbers appear to be bad on multiple passes, this could be evidence of a hardware defect, or SCSI termination or cable problems.

- o **BLOCK VERIFICATION ERROR**

**During optimization, one or more blocks on this volume failed to verify after a total of (number) additional attempts. Use the DiskCheck utility included with DiskExpress to perform a complete media verification.**

This error message appears when DiskExpress II is unable to read or write to a block during optimization. This could be evidence of a bad block on the hard disk, a hardware defect or problems with termination or cabling. You can use the DiskCheck utility included with DiskExpress to perform a complete media verification. When performing this operation select the volume and check the verify media check box and the continuous test check box. Click the start button and allow DiskCheck to go through at least three passes of the volume (this may take a few minutes to a few hours). If DiskCheck reports bad blocks make a note of the block number. If DiskCheck reports the same bad block number through multiple passes, this is evidence of a bad block on the volume. If different numbers appear to be bad on multiple passes, this could be evidence of a hardware defect, or SCSI termination or cable problems.

- o **DIRECTORY CANNOT BE READ**

**During verification, this volume's directory could not be read to determine if any known bad blocks have been "spared." Use the DiskCheck utility, included with DiskExpress, to perform a complete directory and media verification.**

This error message appears when DiskExpress II is unable to read or write to a block during verification. This could be evidence of a bad block on the hard disk, a hardware defect or problems with termination or cabling. You can use the

DiskCheck utility included with DiskExpress to perform a complete media verification. When performing this operation select the volume and check the verify media check box and the continuous test check box. Click the start button and allow DiskCheck to go through at least three passes of the volume (this may take a few minutes to a few hours). If DiskCheck reports bad blocks make a note of the block number. If DiskCheck reports the same bad block number through multiple passes, this is evidence of a bad block on the volume. If different numbers appear to be bad on multiple passes, this could be evidence of a hardware defect, or SCSI termination or cable problems.

- o **UNEXPECTED ERROR**

**DiskExpress II encountered an unexpected error and cannot complete the current operation. If you report this error, mention the number (error number).**

This error message appears when DiskExpress II encounters an unusual error. Make note of the error number (including whether the number was negative or positive) and restart your Macintosh. If DiskExpress II reports this error again, please contact Customer Support at (713) 353-1510.

- o **VOLUME EJECTED/REMOVED ERROR**

**Verification was stopped because the volume was ejected or removed from the desktop.**

This error message appears when DiskExpress II is verifying the named volume and the volume is ejected, removed from the desktop or modified by some other program. This message only appears when the Status window is open.

- o **VOLUME EJECTED/REMOVED/MODIFIED ERROR**

**Optimization was stopped because the volume was ejected, removed from the desktop or modified by another application.**

This error message appears when DiskExpress II is optimizing the named volume and the volume is ejected, removed from the desktop, or modified by some other program. This message only appears when the Status window is open. Examples of other applications that can cause this message are applications which work in the background such as OnLocation, AutoDoubler, or File Share.

- o **OPERATION CANCELED - VOLUME IS LOCKED**

**The operation being performed on this volume was canceled. This volume is locked.**

This error message appears when DiskExpress II attempts to optimize a volume that is locked. Unlock the volume and retry.

- o **OPERATION CANCELED - VOLUME IS FULL**

**The operation being performed on this volume was canceled. This volume is full.**

This error message appears when DiskExpress II attempts to optimize a volume that is full. Remove data to free disk space and retry.

- o **OUT OF MEMORY**

**There is not enough memory to complete the operation on this volume. If appropriate try closing any open desk accessories or turning off (or down) any RAM caches.**

This error message appears when you try to verify or optimize and there is not sufficient memory available to perform the operation. Try closing any open applications or Desk Accessories and retry.

- o **TOO MANY FILES OPEN**

**There are too many files open to optimize this volume. You can use the Set File Count utility included with DiskExpress II to increase the number of files allowed to be open.**

By default, the Macintosh can have a total of forty (40) files open at one time. Forty files may seem like a lot but, in addition to those files that you open, files are opened by applications and by the Macintosh system software. You may exceed the forty file limit when opening files, printing, or opening partitions. Included with DiskExpress II is a utility called Set File Count which allows you to increase the number of files that can be opened.

The maximum number of files allowed to be open is determined by your Macintosh

startup disk. Use Set File Count to modify your startup disk and then restart with that disk.

- o **PORTABLE POWER SUPPLY ERROR**

**The automatic operation being performed on this volume was stopped because the battery charger was disconnected.**

This message can only appear for Macintosh Portable and PowerBook users and only if the “Auto Optimize Only When Battery Charger is Connected” option is checked in the DiskExpress II Options dialog. When checked, DiskExpress II will stop an automatic optimization whenever the Macintosh is disconnected from its battery charger, thereby conserving battery power. Automatic optimization will not occur regardless of any other settings if this check box is checked and if your Macintosh is not connected to a battery charger.

- o **DISKEXPRESS II UNABLE TO SAVE CHANGES**

**DiskExpress II was unable to save changes. Check to see if the startup volume is locked. (error number)**

If your volume is not locked, try throwing the DiskExpress II Preferences file from your System Folder into the trash, empty the trash and then restart your Macintosh.

- o **DISKEXPRESS II UNABLE TO SAVE OPTIONS CHANGES**

**DiskExpress II was unable to open its preference file. Option settings shown may be defaults. Changes to the Option settings cannot be saved.**

Try throwing the DiskExpress II Preferences file from your System Folder into the trash.

- o **SYSTEM INCOMPATIBILITY ERROR**

**Optimization of this volume was canceled due to a conflict with a System Extension or an incompatibility with the current System Software.**

This error message appears when DiskExpress II determines that one or more of its

system software extensions is not functioning properly. Follow the steps at the beginning of this chapter that detail resolving extension conflicts.

- o **TOPS IS INSTALLED**

**Tops is installed on this computer and is preventing DiskExpress II from optimizing automatically. You must make Tops start up before DiskExpress by renaming the file “Tops” to “aTops”.**

TOPS is a system extension located in the System Folder of your Macintosh. An extension conflict with DiskExpress II requires that TOPS be loaded into memory before DiskExpress II. Renaming TOPS to aTOPS will change the loading order. Alternatively you can change the loading order with an extension manager such as INIT Picker, INIT CDEV, Startup Manager or INIT Manager.

- o **DISKEXPRESS II UNABLE TO LOAD AT STARTUP**

**DiskExpress II was unable to load properly at startup time.**

See the Installation section of Chapter 1, **Introduction**, for information about loading problems.

- o **DISKEXPRESS II CORRUPTED ERROR**

**This copy of DiskExpress II is corrupted. Please replace it with a copy from your original disk.**

Portions of the DiskExpress II control panel have been damaged. Deinstall and re-install DiskExpress II as described in the Installation section of Chapter 1, **Introduction**.

- o **COMPATIBILITY ERROR**

**This DiskExpress II control panel is not compatible with the currently loaded version of DiskExpress II. Please make sure you have only one copy of DiskExpress II in your System Folder.**

- o **MEMORY CORRUPTED ERROR**

**Memory in use by DiskExpress II has been corrupted. This computer should be restarted immediately.**

Upon getting this message, restart your computer immediately. If you continue to get this error, you could have an extension conflict. Follow the steps at the beginning of this chapter to resolve your extension conflict.

- o **DATE DISCREPANCY ERROR**

**DiskExpress II found a discrepancy between the last date this volume was monitored and the current date indicated by the clock.**

This error message appears when DiskExpress II detects a manual change in the system date such as when the clock in the control panel is altered by moving the date backward. Indicate the correct date by clicking the appropriate button.



# **Chapter 5**

## **Quick Reference**

# DiskExpress II

## When Is DiskExpress II Active?

DiskExpress II performs an automatic optimization of each volume no more than once per day. When DiskExpress II is performing an optimization it does not interfere with normal computer usage. If your hard disk is being accessed and you think DiskExpress II is optimizing, click the mouse button. If the hard disk activity does not suspend for 30 seconds then something else is accessing your hard disk. When DiskExpress II performs a manual foreground optimization, it continues until stopped or completed. Under several conditions DiskExpress II will wait for a period of time before beginning or continuing a background optimization. The conditions signalling DiskExpress II to pause are:

Initial delay after new calendar day or startup	5 minutes
Delay after mouse click or keyboard operation	30 seconds
Delay after serial port activity (such as a modem or non-AppleTalk printer)	10 seconds
Delay after an optimization is terminated by disk modification	15 minutes
Delay after an optimization is stopped by the user in the status dialog	Remainder of day or 5 minutes after next restart

## Preventing DiskExpress II From Loading Into Memory On Startup

### Permanently

To permanently stop DiskExpress II from loading into memory on startup, follow the same instructions as are given in the Deinstalling DiskExpress II section of Chapter 1, **Introduction**.



## Temporarily

To temporarily stop DiskExpress II from loading into memory on startup, a “Startup Bypass” can be accomplished by holding down any of the Command, Option, or Shift keys while the Macintosh is starting. When any of these keys are detected, DiskExpress II will display the Not Loaded icon, shown to the left, and not load into memory the operational portion of DiskExpress II.

Under these circumstances, even though you can work with the DiskExpress II control panel and turn it “on”, the Macintosh must be restarted to resume DiskExpress II’s logging and optimization operations.

## Flashing DiskExpress II Icon in the Apple Menu

A blinking DiskExpress II icon displayed in place of the Apple icon in the Apple menu is an indication that DiskExpress II has a message to display. When you see this icon, you should open the DiskExpress II control panel to allow the message to be displayed.

## Stopping an Automatic Optimization

Interrupting DiskExpress II while it is automatically optimizing a volume can be accomplished by first opening the DiskExpress II control panel. Next, select the volume name which has the rabbit icon next to it and then click the Status button. This displays a progress indicator and a Stop button. Click the Stop button. Automatic optimization of the volume will resume the next day or 5 minutes after the next restart. Turning off the DiskExpress II control panel causes all operations to cease.

## Selecting Specific Volumes

The Volume List shows the name of all eligible volumes and diskettes currently available to the Macintosh. You may select a volume to work with by clicking its name in the list. When selected, the volume name will highlight and be displayed over the Monitor check box to the right, indicating that DiskExpress II is currently set to work with it. Volumes that are not eligible to be worked with will not be shown in the list.

## Verifying A Volume

To verify that a volume can be read without problems, select the volume you want to work with, then click the Verify button. When this button is clicked,

DiskExpress II will sequentially read and check all blocks on that volume. A status dialog displays a progress indicator and a Stop button.

## **Turning Off Automatic Optimization For All Volumes**

To stop DiskExpress II from automatically optimizing all volumes, uncheck the Optimize Automatically check box located in the Options dialog. This prevents DiskExpress II from automatically optimizing all monitored volumes. Any automatic optimization that is currently active will continue until it has finished or until you tell DiskExpress II to halt the operation. Read the section entitled “Stopping an Automatic Optimization” in this chapter.

## **Turning Off Automatic Optimization For A Single Volume**

To stop DiskExpress II from automatically optimizing a single volume you must stop automatic recording on that volume. Read the section entitled “Turning Off Automatic Monitoring Of A Single Volume” in this chapter.

## **Turning Off Automatic Monitoring Of All Volumes**

To stop DiskExpress II from automatically monitoring file activity on all volumes, first uncheck the Monitor All Volumes check box (located in the Options dialog box). Next, for each volume, select its name from the volume list in the DiskExpress II control panel and uncheck the Monitor check box. This stops DiskExpress II from automatically monitoring and recording all file activity on all eligible volumes.

## **Turning Off Automatic Monitoring Of A Single Volume**

To stop DiskExpress II from monitoring file activity on a single volume, first be sure that the Monitor All Volumes check box (located in the Options dialog box) is unchecked. Next, select the volume from the volume list and uncheck the Monitor check box in the DiskExpress II control panel. This action will stop automatic monitoring and recording of all file activity in the log file of the selected volume. This action also prevents the volume from being automatically optimized.

## **To Stop Everything Temporarily**

To temporarily stop all DiskExpress II operations on all volumes, click the Off button. All file activity monitoring and optimization operations will stop immediately. To resume full operation at any time, click the On button.

## **To Enhance Virtual Memory Performance**

Virtual memory storage files receive special treatment by DiskExpress II. If a virtual memory storage file is open, DiskExpress II will anchor it during optimization. However, DiskExpress II will optimize a closed virtual memory storage file by defragmenting it and moving it to the first allocation block following the volume directory. To allow DiskExpress II to optimize your virtual memory storage file you should start your computer with virtual memory turned off. Then turn virtual memory on and set the amount of virtual memory you want. Next, without restarting the computer, optimize the volume containing the virtual memory storage file. Finally, restart the computer. The virtual memory storage file created by Connectix' Virtual program is given the same special consideration that is given to the System 7 virtual memory storage file.

## **To Enhance Partition Performance**

Partition files created by MultiDisk and MultiPartition receive special treatment by DiskExpress II. If a partition file is open (the partition's volume icon is visible on the desktop), DiskExpress II will anchor it during optimization. However, DiskExpress II will optimize a closed partition file by defragmenting it and moving it to the correct position on the disk according to its priority. To allow DiskExpress II to optimize your partition files you should close all open partitions and optimize the volume on which the partitions were created. This procedure does not optimize the contents of your partitions. The partition contents should be optimized separately.

## **DiskCheck**

### **To Unanchor A File**

To unanchor a file, choose Unanchor Files from DiskCheck's Anchor menu. A standard dialog box will be displayed. Select the file you wish to unanchor and click the Unanchor button. Only files which are anchored will be displayed in the file list. If the selected file cannot be unanchored, or if there is special information you should know about the file, this information will be displayed beneath the file list.

### **To Anchor A File**

To anchor a file, choose Anchor Files from DiskCheck's Anchor menu. A standard dialog box will be displayed. Select the file you wish to anchor and click the Anchor button. Only files which are unanchored will be displayed in the file list. If the selected file cannot be anchored, or if there is special information you should know about the file, this information will be displayed beneath the file list.

# Glossary

## **DiskExpress II Terms and Concepts**

### **Anchored File**

An anchored file is a file that DiskExpress II will not move during optimization. Some files are always anchored, some files are anchored only when they are open, some files are anchored only because they are invisible and DiskExpress II has not been able to verify that it is safe to move them. Files of the last type may be unanchored using DiskCheck. Refer to Chapter 3, **DiskCheck** for more information.

### **Application Program**

An application program is a tool your computer uses to manipulate information and perform a useful function for you. Applications include such things as MacWrite and MacPaint.

### **Block**

A block is one of an integral number of areas that composes a volume. Each block holds as little as 1/2K of data. A double-sided floppy disk has 1,600 blocks while a 20 megabyte hard disk can have over 40,000 blocks. The Macintosh stores files by breaking them into block-size pieces and writing them into unused blocks wherever they are available.

### **Directory**

Blocks set aside by the Macintosh to store the number, names, locations (which blocks), and sizes of files for each volume comprise the directory.

### **Disks**

Disks are the magnetic media on which information is stored. There are both floppy disks, such as the 3.5-inch disk which comes with DiskExpress II, and hard disks, like the Apple Hard Disk 20SC. A disk must be initialized before it can be used.

### **Document**

A document is a type of file that you create with an application. Documents include the information you enter, modify, view or save to your disk.

### **Eligible Volume**

To be eligible for automatic optimization by DiskExpress II, a volume must have been created as an HFS volume. In addition, an eligible volume must be located on a hard disk drive (not a diskette) that is locally attached to the Macintosh, it must not be write protected, and it must have some free space available on it.



**Note About Networks:** DiskExpress II will not work with any volume that you must access via a network because it is on a file server. These volumes are only eligible to another copy of DiskExpress II installed on the file server.

### **File**

A file is a collection of information stored in a volume. Files can be system files, application files or document files.

### **File Server**

A file server is an application program designed to allow many Macintosh users to share common files via a network. Examples of AppleTalk network file server applications are AppleShare, File Share and TOPS.

### **Fragmented File**

A fragmented file is a file that is stored in noncontiguous blocks (blocks not located next to each other). Over time, virtually every file can become fragmented, including the volume directory. To read an entire fragmented file, your hard drive must move its head from one part of a volume to another. The more fragmented files become, the longer it takes to retrieve information from them.

### **Fragmented Volume**

A fragmented volume is a volume that contains fragmented files or fragmented free space. Free space is considered fragmented if the unused blocks are noncontiguous.

### **Free Space**

The free space encompasses all the unused blocks on a volume. As free space, these blocks are available to be allocated to files or to the directory. Once a file is deleted, the blocks previously occupied by the file will be returned to the free space.

### **Partitions**

Many hard disks come with management utilities which allow you to divide a volume into additional volumes called partitions. There is also independent system software, such as MultiDisk™ from ALSoft, SUM, Hard Disk Partition™ and MacServe™ which allows you to partition a hard disk.

### **Startup Volume**

The startup volume is the volume which contains a group of special files stored in the System Folder. Your Macintosh cannot operate without the information in these files. The startup volume appears at the top-right corner of the desktop.

**Volume**

An initialized disk is called a volume. Because a disk often contains only one volume, the terms disk and volume are frequently used interchangeably.

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