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Retrospect®

USER'S GUIDE

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INTRODUCTION

Introducing Retrospect

Retrospect, the world's most popular Macintosh backup software for the past decade, is the ultimate tool for safeguarding your valuable data. It is complete, efficient, and easy to use.

Retrospect Backup products share the same design and many core features. Most importantly, Retrospect Backup products do backup differently from other software. Unlike traditional backup programs, Retrospect does not ask your computer "What files do you have that are new or changed and need to be backed up?" Instead, Retrospect takes from your computer a list of all the files and compares this list against all the files already in a backup set. If a file is already in the backup set, it doesn't need to be backed up again. The technology to perform this operation is called IncrementalPLUS™, and it's at the core of what makes Retrospect "better backup."

IncrementalPLUS offers other advantages as well, including the ability to have multiple backup sets. Because each backup is a complete set of all your files, you can restore everything from any one set. Proper backup requires having multiple backup sets, and only the Retrospect products offer this built-in capability.

In addition to IncrementalPLUS, Retrospect also offers the following advanced features:

• supports backup to recordable CD and DVD drives, tape drives and tape libraries, FTP sites via the Internet, and removable cartridge drives such as Zip, Jaz, MO, DVD-RAM, and SuperDisk

• restores individual files, folders, or entire hard disks

• bootable CD for starting up and restoring Mac OS 9 after a disaster (included in retail packages of Retrospect but not included in some OEM drive bundles and other distributions)

• automation for unattended operations

• EasyScript™ feature simplifies automation

• compression to squeeze more files onto your media

• encryption and password protection for security

• flexible file selection criteria for backing up only certain files

• duplication of volume or folder to volume or folder

• reporting shows recent backups and errors

• scalable network backup by adding Retrospect Clients for Mac OS 7/8/9/X and Windows 95/98/Me/NT/2000/XP

Network Backup

With Retrospect Clients, Retrospect provides a centralized backup solution for a mixed network of Mac OS and Windows computers equipped with Retrospect client software. It allows you to use a single Mac OS computer with a storage device to back up Mac OS, Windows 95/98/Me, and Windows NT/2000/XP computers connected by a network. Users of the networked computers, the backup clients, do not require a backup application or their own backup storage device. Nor do they need to initiate backups themselves, as their files are automatically backed up by the backup computer. With Retrospect, you can schedule your network backups to run unattended—without your presence—during convenient times such as nights or weekends. You can use Retrospect with any network cabling method, as long as it uses the TCP/IP protocol.

How Retrospect Works with Clients

The backup administrator—that's you—installs the Retrospect client software on each of the client computers (also called clients).

The backup administrator designates one Macintosh as the backup computer and installs the Retrospect application on it. This backup computer can be any networked computer with a suitable storage device. The backup computer does not have to be a file server, though Retrospect is often used on servers.
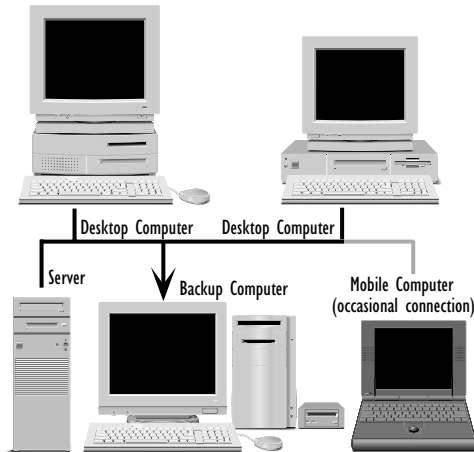
A backup Macintosh with Retrospect can back up Macintosh and Windows computers over a network.

A backup computer with Retrospect can back up other Macintosh and Windows computers over a network. The administrator uses the Retrospect application to log in clients for use. After configuring the clients, the administrator can create and schedule scripts using client volumes as sources, as if the volumes were connected directly to the backup computer.

When you want to back up more computers on your network, you can purchase additional Retrospect Clients in packs of five, ten, fifty or one hundred from your local reseller or from Dantz at www.dantz.com.

Other Dantz Products

Dantz Development Corporation is a leading industry supplier of backup and archive software solutions. Dantz products satisfy all your backup requirements— reliability, performance, unattended operation, network compatibility, security, low administration costs, storage, and future growth—across a range of solutions from individual computer backup to network-wide backup on a large scale.

Retrospect Express Backup

Retrospect Express Backup is easy, basic personal backup software recommended for backing up a single computer to any type of disk, MO, DVD-RAM, Zip, Jaz, SuperDisk, or recordable CD/DVD. Retrospect Express Backup provides one-click instant backups and scheduling capabilities to launch automatic backups according to your schedule. Retrospect Desktop Backup is available for Macintosh and Windows operating systems, except servers.

Retrospect Desktop Backup

Retrospect Desktop Backup is a complete backup application for any individual user backing up to any type of disk, MO, DVD-RAM, Zip, Jaz, SuperDisk, recordable CD/DVD, or tape drive. Retrospect includes built in drivers for supported backup devices, making it easy for anyone to start backing up immediately. Retrospect Desktop Backup is available for Macintosh and Windows operating systems, except servers. As with every Retrospect product, it's scalable—simply purchase Retrospect Clients for every computer on your network that needs backup.

Retrospect Workgroup Backup

The Retrospect Workgroup Backup bundles Retrospect with twenty clients, allowing Retrospect to back up twenty other computers from one location. (Client computers may be running under Macintosh or Windows operating systems, but not servers.) It also includes the ability to back up over routers using subnet broadcast or direct IP addressing, useful for larger network configurations. As with every Retrospect product, it's scalable—simply purchase Retrospect Clients for every computer on

your network that needs backup. Retrospect Workgroup Backup is available for both Macintosh and Windows and will run on a server.

Retrospect Server Backup

Retrospect Server Backup bundles Retrospect with 100 clients, allowing it to back up 100 other computers from one location. (These computers may be running under Macintosh or Windows operating systems, including servers.) It also includes advanced networking features useful for larger network configurations, such as the ability to back up over routers using subnet broadcast or direct IP addressing. This edition also allows backup to all tape libraries supported by Retrospect.

Retrospect Clients

Retrospect Clients allow Retrospect to back up other computers over the network. Adding Retrospect Clients to Retrospect provides a centralized backup solution and allows you to use a single computer with a storage device to back up networked computers. With Retrospect, you can schedule your network backups to run unattended during convenient times such as nights or weekends.

Retrospect Clients are available in packs of five, ten, fifty, and one hundred. All client packs include software for Macintosh and Windows.

About this Manual

If you just want to get started quickly with Retrospect, go to Chapter 1 • Getting Started.

This manual is divided into chapters devoted to a particular area of Retrospect. Appendices provide additional reference information, including a glossary defining the terms used throughout this manual and Retrospect itself.

This manual often mentions network operations with clients, but the information may not directly apply to you if you do not have

Retrospect clients. Chapter 6 • Network Backup is devoted entirely to Retrospect clients.

GETTING STARTED

- **REQUIREMENTS**

- **PREVIOUSLY INSTALLED APPLETALK CLIENTS**

- **INSTALLING RETROSPECT**

- **UPDATING FROM OLDER VERSIONS OF RETROSPECT**

- **USING RETROSPECT**

- **QUICK START**

This chapter defines the hardware and system requirements necessary to use Retrospect, then explains how to install the software on a Mac OS computer and update from a previous version. It also shows how to start and leave Retrospect. Requirements and installation of Retrospect Clients is detailed in Chapter 6 • Network Backup.

The Quick Start section puts you into the thick of things right away by having you do two backups followed by a simple restore.

REQUIREMENTS

Requirements of client computers are detailed in Chapter 6 • Network Backup.

Backup Computer

Retrospect requires the following backup computer hardware and software:

• PowerPC-based Macintosh computer (G3 or better under Mac OS X).

• Mac OS 9.0 or later, or Mac OS X version 10.1.2 or later.

• Under Mac OS 9, minimum 64 MB of RAM memory (128 MB recommended).

• Under Mac OS X, minimum 128 MB of RAM memory (256 MB recommended).

• Hard disk drive with a minimum of 50 MB free space.

• If you are going to use clients, you must have networking hardware and cabling functioning with the TCP/IP protocol, connected or routed to the network on which the backup computer operates.

Do not use Retrospect on a Macintosh running older mail and groupware server software, because some of these programs do not allow Retrospect to operate. For details see "Mail Servers and Groupware Servers" on page 162.

Backup Device

Retrospect requires a suitable backup device. This can be a tape drive, a recordable CD or DVD drive, or a drive that mounts its media as volumes on the Macintosh desktop. (This latter type includes floppy disk drives and removable cartridge drives such as Zip, Jaz, SuperDisk, DVD-RAM, and MO.)

Dantz has an extensive testing procedure to qualify backup hardware devices supported by Retrospect. For the most up-to-date listing of supported drives, see the Dantz web site.

You do not need a backup device to back up to the Internet. However, you do need the appropriate networking hardware or modem and a valid TCP/IP configuration. You also need an account on an FTP site or its server must allow anonymous use.

PREVIOUSLY INSTALLED APPLETALK CLIENTS

If you were using an older version of Retrospect with AppleTalk clients, you must use that older version to change the protocol of those clients to TCP/IP.

To do so, refer to Chapter 6 of your older *Retrospect User's Guide,* under "Changing a Mac OS Client's Protocol" in the "Working with Clients" section.

Use your older version of Retrospect to change the protocol of AppleTalk clients before you install this new version of Retrospect, which supports only TCP/IP clients.

INSTALLING RETROSPECT

Installing

Go to the Finder (the Macintosh desktop) and insert the Retrospect CD-ROM. In the window that opens, double-click the icon named Install Retrospect.

Follow the installer program's instructions.

UPDATING FROM OLDER VERSIONS OF RETROSPECT

If you have Retrospect 4.0 or later on your computer, you can update to the current version and keep intact your existing preferences, scripts, schedules, Subvolume definitions, and the like.

If you do not have Mac OS 9 on the same disk as Mac OS X, copy the Retrospect preferences folder from your Mac OS 9 volume (or its backup) to your Mac OS X volume. Under Mac OS 9 the folder is at the following path.

:System Folder:Preferences:Retrospect:

Copy the "Retrospect" folder to your Mac OS X volume at the following path.

/Library/Preferences/

If you have Mac OS 9 on the same disk as Mac OS X, Retrospect will find your old configuration.

After installing Retrospect as described on page 12, double-click the Retrospect application icon.

After you provide the requested administrator login and password for authentication under Mac OS X, the configuration update dialog appears. Click the Import button to copy your logged-in clients, custom selectors, old scripts, schedules, and preferences for use with the new version of Retrospect.

▲ **WARNING:** If you update from a previous version but choose Retrospect's default configuration, you will lose your logged-in clients, custom selectors, preferences, scripts, schedules, Subvolume definitions, and the like. You must reconfigure these with the new version.

After importing from your previous configuration, Retrospect asks you to enter your registration information, as described under "Registering" on page 13.

Removing Old Files After Upgrading

Once you have Retrospect up and running and you are confident with it, you can remove the old Retrospect application from your computer. Do not remove your backup set catalog files. It is a good idea to store your catalogs in the same folder as Retrospect.

Memory Considerations for Mac OS 9

Under Mac OS 9, during operations such as backing up and restoring, Retrospect uses available memory (that is, memory not used by the System or other applications) to increase its efficiency. This temporary memory usage is above and beyond that which is allocated to the Retrospect application.

In most situations, it is not necessary to increase the Retrospect application's default memory allocation. Changing the memory settings may reduce overall performance.

Installing Retrospect Clients

Installation of Retrospect Clients is detailed in Chapter 6 • Network Backup, which starts on page 83.

USING RETROSPECT

Starting

To start Retrospect, double-click the Retrospect application icon.

Authenticating Under Mac OS X

The first time you open Retrospect under Mac OS X, it requires an administrator login and password for authentication.

Registering

The first time you run the program, Retrospect asks you to enter your name, organization, and license code. (You will find this code in your Retrospect package.) It then asks you to register the product. If you have already registered, click Already Registered. If you have not, you can register on-line by clicking Register Now. Enter the pertinent data in the fields then click Print or E-mail. To e-mail, your system must be configured properly for Internet e-mail. If you

cannot e-mail, then print and send this by mail or FAX.

Exiting

To exit Retrospect choose Quit from the Retrospect menu (Mac OS X) or the File menu (Mac OS 9). Before exiting, Retrospect informs you of the next scheduled operation, if any.

The Retrospect Directory

When you start Retrospect, the program displays its main window, the Directory.

You can access all areas of Retrospect through its Directory.

The Directory is like the tabbed folders in a drawer of a file cabinet. By default, the Immediate tab is the front-most tab. Click a tab to switch to a different tab in the Directory.

Each tab displays a brief summary of its contents at its top, with buttons along the side. Beside each button is a description of its action. Each button's function requires additional steps and involves more windows or dialogs and buttons. This manual explains these functions.

QUICK START

This section introduces you to Retrospect's basic backup and restore operations and walks you through a tutorial in which you perform your own simple backups and a restore. Have your Macintosh with a connected backup device and media ready. This tour does not use the Internet for backups, which will be introduced later in this manual.

You have yet to learn some of the terminology used in this section, but don't worry—it's not necessary to know the terms for this introduction. Just follow along.

Quick Backup

Start Retrospect. Click the Backup button. The following window appears.
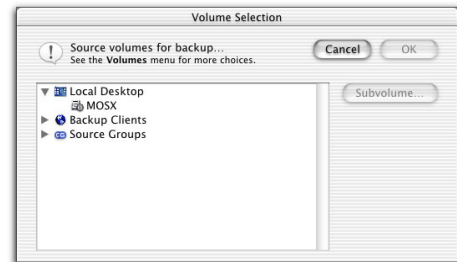
The volume selection window. Additional volumes may appear, depending on your Mac's configuration.

The window's scrolling area lists all volumes available on the Macintosh desktop. Click on the name of your hard disk to select it.

■ **NOTE:** Do not select a volume from a removable cartridge drive unless you are going to back it up to a different drive. This source volume must not be the same drive as the destination drive, which will be determined later.

Click the OK button to accept the selected volume and proceed.

Retrospect needs to know which set of disks, tapes, or CDs will be the backup destination. If this is your first backup and there are no backup sets to choose from, Retrospect brings up another window to let you create a new backup set. If this is not your first backup, click the New button to bring up the following window.
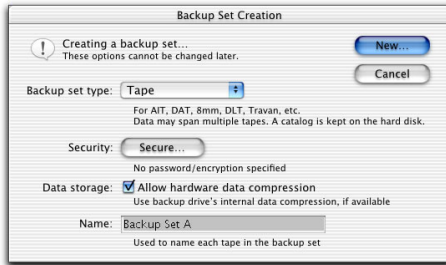
The backup set creation window.

The first and most important thing to do with this window is set the backup set type. The pop-up menu is set to the backup set type Retrospect considers most appropriate for the available backup devices. (The pop-up is set to Tape in the picture above.) Choose a type which matches your backup media, either CD/DVD discs (including CD-R, CD-RW, DVD-R, DVD-RW, and DVD+RW), tapes, or removable disks. If you have only a hard disk rather than a dedicated backup device, choose File for a file backup set. Do not choose the Internet backup set type, which requires more instruction than this quick tour can provide.

Next, enter a name for the backup set in the Name field, or just leave it as is with the default name.

For this tutorial, ignore the security and data compression options entirely, then click the New button or press Return. The next window lets you choose where to save the catalog file, a necessary element of the backup set. Placing it in the same folder as the Retrospect application is a good idea.

■ **NOTE:** Do not save the catalog on a removable cartridge disk that will be used as a backup destination. Retrospect needs to access the catalog on a readily accessible volume, preferably the local hard disk.

With a file backup set, the file you save here serves as both the catalog and the repository of backed-up files. Save it on your designated backup drive.

Set the location then click the Save button or press Return to save the file in the specified place. Retrospect returns to the backup set selection window, which lists available backup sets. The new backup set is automatically highlighted, so you do not have to select it.
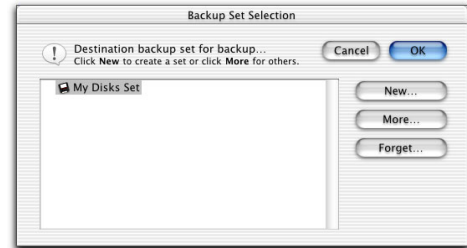
Click the OK button or press Return. The next window appears.

The immediate backup summary window, summarizing the most important aspects of the operation.

Take a moment to look at the various parts of this window, including the source volume you chose and the destination backup set you created. Click Preview to scan the volume and display the files chosen, then close the window which appears. The summary window lists the number and total size of the files to be backed up, which should be all of the files on the source volume.

The top of the window should say Ready to Execute. If not, Retrospect tells you what else is needed for execution. In this case, click the appropriate button to provide the necessary information.

Click the Backup button. A dialog asks whether you really want to execute the backup operation. Click OK. The next window appears. (It may differ slightly from the following example depending on whether you are using disks, tapes, or discs. This window does not appear for a file backup set, in which case Retrospect immediately begins the backup operation.)

The media request window for a removable disks backup set.

This window is asking you to choose a new piece of media for the backup.

▲ **WARNING:** Use only a blank disk, tape, or disc, or one with unwanted data, because any files on it will be permanently removed.

If you do not have a new or erased disk, tape, or disc in the backup drive, put one in. Select the new media in the window and click Proceed. Retrospect shows you a progress window while it backs up your files. Depending on your backup device capacity and the size of the files being backed up, Retrospect may request more media. When it is done, you see the following.
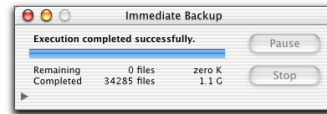
Congratulations on completing your first backup!

Quick Backup of New and Changed Files

Quit Retrospect. Make some duplicates of some files with the Finder. (Make sure the names are different from the originals.) You can also make new documents with an application like a word processor. Do not make them complicated or make a lot of them; we need just a few simple, changed files. For simplicity, place these files in the Documents folder of the hard disk you just backed up.

Start Retrospect and click the Backup button. Retrospect goes directly to the immediate backup summary window because it already has the necessary information, which it is using from our first backup.

Click Preview, then close the window which appears and take a look at the files chosen information.

Retrospect compares all the files for this backup to all the files which exist in this backup set. If a file already exists and has not changed, Retrospect does not need to copy it. Since we made some new files, they are listed to the right of "Need to copy." (This is known as a progressive backup or an incremental backup.)

Click Backup, then OK. Close the execution window when the backup is complete. Congratulations on your first progressive backup.

Quick Restore

So we just backed up some files; now what? Let's assume we have lost some or all of those files and you need to recover them.

Open Retrospect and click Restore. Retrospect asks you to choose the type of restore you want to do.
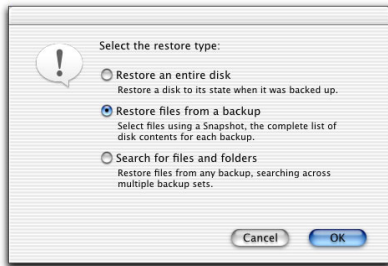
We want to restore files from a backup, so set that radio button and click OK to move on to the next window.

In the top part of the window click the backup set. Retrospect then automatically selects the first Snapshot in the bottom portion of the window.
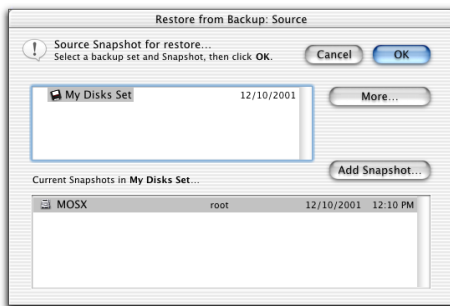
Selecting a backup set and Snapshot.

Click OK to move on, which brings us to the next window, in which we are asked to pick the

location to which the backed up files will be restored.
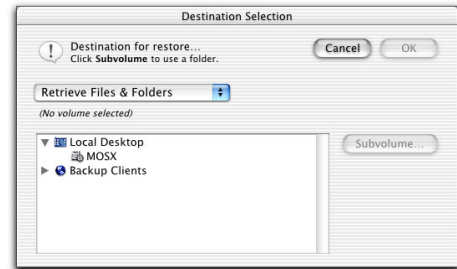
Click on the name of your hard disk to select it as the volume to which you will restore. *Make sure the pop-up menu is set to Retrieve files & folders,* then click OK. Retrospect briefly matches your Snapshot to the files in your backup set, then displays the summary window.

Check over the various parts of this window. Make sure the destination volume is correct and you are copying files and folders within a new folder. Note the part about the files chosen; none are selected, which is why the summary says the operation is not ready to execute. Click Files Chosen and a window opens, showing you the Snapshot of the files on the volume at the time of the backup.

Let's take care of marking the files to restore. Locate the new files you made or copied after you did the first backup. The files should be in the Documents folder, but you may have to scroll to see more files. For each file, click its icon, then click the Mark button. (Or, as a

shortcut, just double-click a file to mark it.) Marked files have check marks next to them.
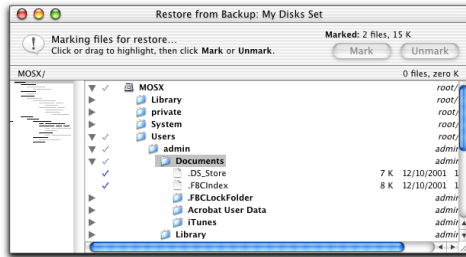
Go ahead and mark other files if you want. The upper right corner of the window shows the number and size of the files you have marked.

When you have marked your files, close the window. The Files Chosen information in the restore summary window reflects your new set of marked files.

▲ **WARNING:** Restoring may destroy data on the destination if you did not exactly follow the previous instructions. The restore destination window's pop-up menu affects this. If you set it to restore entire disk or replace corresponding files, it may destroy data on the destination volume.

Click Restore. After the restore operation is complete, close the execution window and go to the Finder.

On your hard disk Retrospect made a new folder named the same as your backup set. Inside your folder you will find the files you marked. Congratulations on your first restore.

FUNDAMENTALS

- **HOW RETROSPECT WORKS**

- **BACKUP SETS AND THEIR COMPONENTS**

- **BACKUP ACTIONS**

- **ADDING MEMBERS TO A BACKUP SET**

- **SNAPSHOTS**

- **RETROSPECT AND CLIENTS**

- **BACKUP SERVER**

This chapter presents Retrospect's fundamental concepts. This manual and the program itself repeatedly refer to these basic ideas. Understanding these fundamentals is important and useful but not entirely necessary. Dantz designed Retrospect to be powerful and feature-packed, yet very easy to use for basic operations. Feel free to use Retrospect without reading this chapter, but your grasp of these concepts is an important milestone in learning to use Retrospect to its full potential.

HOW RETROSPECT WORKS

Retrospect's backup and archive operations copy files from a source and store them in a backup set. The source can be a hard disk, file server, CD-ROM, any Finder-mountable volume, or even a combination of multiple sources. The destination set can consist of tapes, recordable discs (CD-R, CD-RW, DVD-R, DVD-RW, or DVD+RW), floppy disks, removable cartridge disks or optical cartridges (including DVD-RAM discs), the Internet or a local intranet FTP server, or even a single file on a hard disk or server.

Retrospect uses an archival method of backup that ensures backed up files are not deleted or written over until you specify that to happen, so they stay on the FTP server, disk, tape, or disc indefinitely. This is helpful, for example, if you have been working on an important document every day for the past month and you discover you have been making terrible mistakes for the past week. If you have been backing up every day Retrospect lets you retrieve a good version of the file from a week ago (or any point in time it was backed up). This is an important benefit of Retrospect not found in "disk mirroring" software used for backups.

Retrospect uses a separate catalog (usually stored on your hard disk) to keep track of the different generations of modified files in a backup set. The catalog lets you quickly search for files without having to actually search the backup media itself.

BACKUP SETS AND THEIR COMPONENTS

The basic building block of Retrospect is the *backup set,* which is a set of one or more disks, tapes, or discs, a file, or an FTP site. Individual pieces of media (for example, discs, disks, tapes, or cartridges) are *members* of a backup set.

The *catalog,* a file saved on your hard disk, is an index or table of contents of the files on the backup media of a backup set. The catalog lets you view the contents of a backup set without any of its media on hand. A catalog is required for all operations which copy files to and from a backup set. If a catalog is lost or damaged, Retrospect can reconstruct one from the media. Catalogs typically use 200K of disk space for every 1,000 files.

You may back up as many source volumes as you like to a single backup set. For example, you could have a single backup set as the backup destination for your Macintosh's internal hard disk, your external hard disk, a file server, and a co-worker's hard disk on a computer with an installed Retrospect Client control panel.

Backup Set Types

Tapes

A *tapes backup set* uses tapes from a tape device such as a DAT drive, Travan drive, AIT drive, or DLT drive. Files are backed up to the tapes and the catalog is usually saved on the hard disk of the computer doing the backup. Chapter 3 • Hardware provides more detailed information on tape drives.

Removable Disks

A *removable disks backup set* uses ejectable media which appears on the Macintosh desktop, such as Zip, Jaz, SuperDisk, DVD-RAM, or MO, but not CDs or DVDs. Fixed hard disks are not ejectable and cannot be used in removable disks backup sets. Files are backed up to the cartridges and the catalog is usually saved on the hard disk of the computer doing the backup. Chapter 3 • Hardware provides more detailed information on removable media drives.

CD/DVD

A *CD/DVD backup set* uses recordable compact discs with CD-R, CD-RW, DVD-R, DVD-RW, or DVD+RW drives. Files are backed up to the

discs and the catalog is usually saved on the hard disk of the computer doing the backup. Chapter 3 • Hardware provides more detailed information on recordable disc drives.

This manual uses the term "recordable disc," or simply "disc," to refer to a recordable disc to be used in a CD-R, CD-RW, DVD-R, DVD-RW, or DVD+RW drive. These drives all work nearly the same with Retrospect, though they may use different media. The difference is that data on "R" discs cannot be erased, while "RW" discs can be erased in rewritable drives and reused by Retrospect. Rewritable discs are, of course, recordable, so they are included in the term "recordable discs."

If you are new to Retrospect and you are using recordable but not rewritable discs, we recommend practicing with removable disks backup sets, as these can be erased and reused, unlike CD-R and DVD-R discs. Retrospect novices will find Chapter 4 • Immediate Operations especially helpful.

File

A *file backup set* differs from other backup sets because it does not use removable media. Rather, it combines the catalog and backed-up files into a single file stored on a volume. (This volume can be any volume that mounts on the Macintosh desktop, such as a hard disk, file server or shared disk, or removable cartridge.) The data and the catalog can be separated into two different files. Unlike the other types of backup sets, which require media dedicated only to backups, you can store a file backup set right alongside other files on a volume used for other purposes.

A file backup set can be no larger than the volume on which it is stored. You can decrease the amount of space used by a file backup set by using Retrospect's data compression option.

The size of a file backup set is also limited by the file system, or the disk format.

If you wish to back up to a hard disk, or if you do not have a tape drive, recordable disc drive, removable disk drive, or FTP access, then a file is the only type of backup set you can use. For more information, see "Hard Disk Drives" on page 32.

Retrospect may, without notice, separate the catalog from a file backup set into a new file. It does this when a single file's resource fork is likely to exceed the operating system's 16 MB limit, which happens with a large number of files in the backup set. You can also manually separate a file backup set by using the backup set configuration window. (See "Configuring Backup Sets" on page 149.) If a file is split, keep the two files within the same folder and do not rename either file.

Internet

An *Internet backup set* uses space on an FTP site that is on your office's Intranet or out on the Internet. Files are backed up to the hard disk space of the host FTP server via your TCP/IP network or other connection to the Internet (for example, a modem with PPP software) and the catalog is usually saved on the hard disk of the computer doing the backup.

Internet backup sets offer a way to store data without managing cartridges or discs, as well as an easy way to store backups off-site. This provides additional protection in the event of theft, fire, or other disaster at your computer work site.

In most respects, an Internet backup set is like any other type of backup set. To use an Internet backup set, you must have an account with write privileges on an FTP site or its server must allow anonymous use. And, of course, you must have a connection to the FTP site, such as an Ethernet network or a modem.

With an FTP site connected to the Internet, anyone with access privileges to your FTP site could copy or tamper with your backup set contents. For added security, consider using encryption to keep your backup set contents private.

The connection speed and the amount of space available to you on the FTP site will affect your backups to Internet backup sets so you must plan accordingly. If you do not have enough time or space to back up all files you will have to make a smaller selection of files to back up. For example, the relatively slow speed of a modem may limit you to backing up only critical files, whereas a faster network may allow you to completely back up your hard disk. Limited space on the FTP site may also limit you to backing up smaller files or fewer files, whereas unlimited space allows you to back up everything, even large files. Retrospect's software compression is a useful option when connection speed or disk space is limited.

BACKUP ACTIONS

The main purpose of performing a backup is to copy files into a backup set. You can instruct Retrospect to perform three different types of backup actions. Each backup action has its own special way of determining which files are backed up and controlling the backup set media on which they are stored.

Retrospect's default backup action, *normal,* does progressive backups for efficient backups without any extra effort on your part.

Normal

A *normal* backup, as its name suggests, is the action to use in most situations. It is a typical incremental backup, which saves media space by avoiding redundant files in a backup set. A normal backup copies only files which are new or newly modified. Others refer to these progressive backups as incremental or differential.

During a normal backup, Retrospect compares the list of files selected to be backed up against the list of files in the backup set's catalog, then copies only those files which are not already present on the media. When a normal backup is done to a new backup set, there are no files in the backup set, so everything selected from the source is backed up.

Normal Backup Example

A user creates a new backup set and does a normal backup to it with a new or erased medium in the backup device. Because no files exist in the new, empty backup set, Retrospect copies all the selected files to it. The next day the user does another normal backup to the backup set. Retrospect compares the selected source files to the catalog, then marks several new files and a few files which have changed since the previous day's backup. Only these new and changed files are added to the medium previously used with this backup set, or a new medium if the other fills to capacity.

Recycle

When Retrospect performs a *recycle backup*, it clears the catalog contents (if any) of the backup set so it appears no files are backed up. Then it looks for the first media member of the backup set and erases it if it is available. If the first member is not available, Retrospect uses any available new or erased disk, tape, or disc appropriate for the backup set type. Everything selected from the source is backed up to the backup set.

Recycle Backup Example

The backup administrator decides the catalog is getting too large after a week of normal backups to the backup set. She starts a recycle backup with the first media member in the backup device and Retrospect resets the catalog, erases the files on the media, and copies all the selected files.

New Media

When Retrospect performs a *new media backup*, it makes a new backup set (with a name similar to the old one) using a new or erased disk, tape, disc, file or a new directory for an Internet backup set. This allows the original backup set and its catalog to remain intact for long-term storage in a safe place. The new backup set catalog and the new media member (or directory) are each named with a number in sequence, such as "Office Net [001]" and "1-Office Net [001]". Retrospect updates references to the old backup set in scripts and schedules so they reflect the new backup set.

In the case of a new media backup to a file backup set, Retrospect creates a new file in the same folder.

In the case of a new media backup to an Internet backup set, Retrospect creates a new directory on the FTP server.

New Media Backup Example

The user wants to archive a backup set by taking it off-site, so she starts a new media backup with a new or erased medium in the backup device. Retrospect creates a new backup set with a new catalog, and copies all the selected files to the media. The previous backup set remains intact and the user takes its media to a secure location off site.

New media backups are ideally used for rotating disks, tapes, or discs for off-site storage, but are not as useful in this respect when used with Internet backup sets. A new media backup to an Internet backup set creates a new directory at the same level in the hierarchy, which offers minimal protection from accidental erasure but no protection from a hard disk crash, theft, fire, or similar disaster.

Additional Backup Action Examples

"Backup Strategies" in Chapter 8 • Management, offers several backup strategies which use normal, recycle, and new media backup actions. Study these strategies to see how it is possible to maximize backup safety and effectiveness by alternating among backup sets and rotating media off site.

ADDING MEMBERS TO A BACKUP SET

When a disk, tape, or disc fills with data Retrospect asks for a new one. It uses any available (that is, in the drive) new or erased media of the same type. If the media has the name Retrospect is looking for, Retrospect will erase and re-use it. To reduce the danger of unintentionally destroying data, Retrospect will never automatically use a medium with the wrong name if it has data on it. Retrospect uses the catalog to keep track of files and media, so you never have to think about which files are on which disks, tapes, or discs of a backup set.

SNAPSHOTS

Because Retrospect does progressive backups, it may have several versions of a file scattered among several backup sessions within a backup set. For example, you may update your "Weekly Status Report" document every week, and because each update modifies the file, Retrospect backs up each one to your backup set. A flat list of all versions of all the files in the backup set would be very confusing. For this reason, among others, every time you back up Retrospect places a Snapshot of the source volume in the backup set.

A Snapshot is a list—you can think of it as a picture—of all files and folders on a volume when it is backed up. For each volume, one Snapshot is stored in the catalog and a copy of the same Snapshot is stored on the backup medium (disk, tape, disc, file, or Internet). Following each successful backup, archive, or Fast Add operation, the old catalog Snapshot is replaced but old me-

dia Snapshots remain untouched and Retrospect adds new Snapshots to the medium.

When you want to restore from a backup, you can tell Retrospect to use a Snapshot to restore the entire contents of a disk. Or, you can use a Snapshot as a guide to see the volume as it was at a given point in time when it was backed up, picking and choosing individual files to restore. Snapshots allow you to perfectly restore each volume to its exact state at the time of any completed backup.

Snapshots help Retrospect keep track of the volumes to which a file belongs. When Retrospect first backs up a volume to a new backup set, it copies the selected files and saves a Snapshot. When it subsequently backs up other volumes, it does not copy files which exactly match files already in the backup set. However, they are still noted in each volume's Snapshot. This efficient storage method saves backup media by not redundantly copying exactly matching files.

You can retrieve Snapshots from media if you want to restore a volume, folder, or file as it was at any given backup.

Because a Snapshot represents a volume at a specific point in time, you cannot use a Snapshot to find multiple versions of a file throughout different backup sessions on different dates. However, Retrospect does provide an easy way of doing this, which is explained in Chapter 7 • Restoring, which starts on page 107.

RETROSPECT AND CLIENTS

The Retrospect application can back up any volume that mounts on the Macintosh desktop, whether it is a volume shared over a network or a drive connected directly to your Macintosh. Special software can extend the backup and restore capabilities of Retrospect to other computers on your network. A computer equipped with this software from Dantz is known as a Retrospect client computer, or simply a client. Retrospect can back up any client on the network without the need for installing file servers, starting file sharing, or mounting volumes.

Retrospect Clients are available in packs of five, ten, fifty, and one hundred. All client packs include software for Macintosh and Windows computers. At any time, you can add clients to your backup by purchasing Retrospect Clients.

BACKUP SERVER

Retrospect's Backup Server technology, which is explained in detail in Chapter 5, accommodates changing network and disk configurations. Because it is driven by the availability of volumes and their need for backup, a Backup Server is ideal for environments in which computers and hard disks, such as mobile computers and removable cartridges, irregularly appear on the network. Volumes are backed up to the best available backup set media, so Backup Server scripts give you greater freedom to use the media of your choice. Retrospect client users can even initiate backups of their volumes, an otherwise unavailable feature. A Backup Server script is often best used in concert with regular backup scripts to produce a comprehensive backup strategy.
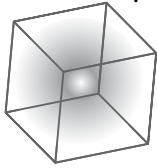
HARDWARE

- OVERVIEW

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- HOW RETROSPECT WORKS WITH MULTIPLE BACKUP DEVICES

This chapter explains device communication technologies used by Retrospect and gives summaries of the various tape drives, recordable disc drives, and removable cartridge drives Retrospect can use for backups. If you are already familiar with SCSI, USB, IDE, ATAPI, and FireWire you may skip the explanations and read the sections which apply to your particular hardware setup and backup device. If you plan to use the Internet instead of a backup device, you may skip this chapter entirely.

OVERVIEW

Retrospect uses hardware intensively. Its purpose is to transfer large amounts of data between a source volume, such as a hard disk, and a backup device, such as a tape drive, as efficiently as possible. If these hardware systems or their ancillary hardware (for example, cables) do not work correctly, Retrospect cannot do its job and cannot back up your data. For this reason you should understand how your hardware functions and how it relates to Retrospect.

COMMUNICATION TECHNOLOGIES

USB

USB (short for Universal Serial Bus) is a specification of mechanical, electrical, and functional standards which lets a computer connect and communicate with input devices, such as keyboards and joysticks, and peripheral devices, such as removable cartridge drives and scanners.

USB connects a computer with peripheral devices by linking as many as 127 devices with special USB cables plugged into USB ports.

Under Mac OS 9, Retrospect needs special software drivers to support USB devices. This software is installed by the Retrospect installer. No additional software is required under Mac OS X. Consult the Dantz web site for the latest details on special software requirements of supported devices.

Refer to your USB documentation (computer user's guide, expansion card user's guide, or device user's guide) for installation and configuration details.

FireWire

FireWire is a specification of mechanical, electrical, and functional standards which lets a computer connect and communicate with storage devices, such as hard disks and removable cartridge drives, and other peripheral devices, such as scanners and video camcorders. The name FireWire is proprietary to Apple Computer; the technology is also known as i.LINK or 1394, from its official IEEE 1394 specification.

FireWire connects a computer with peripheral devices by linking as many as 63 devices with special FireWire cables plugged into FireWire ports. FireWire is hot-pluggable, so you do not have to shut down devices to add or remove them, nor do you have to restart the Macintosh. FireWire is capable of extremely fast transfer rates.

Under Mac OS 9, Retrospect needs special software drivers to support FireWire devices. This software is installed by the Retrospect installer. No additional software is required under Mac OS X. Consult the Dantz web site for the latest details on special software requirements of supported devices.

Refer to your FireWire documentation (computer user's guide, expansion card user's guide, or device user's guide) for installation and configuration details.

ATAPI

ATAPI (ATA Packet Interface) is a standard for connecting peripheral devices such as CD-R drives and tape drives to a computer's IDE interface.

All ATAPI devices are internal on the IDE bus, or channel. There may be one or two devices per channel, numbered 0 and 1, known as the master device and the slave device, respectively. (ATAPI device numbers are set with jumpers or special cables.)

Under Mac OS 9, Retrospect needs special software drivers to support ATAPI devices. This software is installed by the Retrospect installer. No additional software is required under

Mac OS X. Consult the Dantz web site for the latest details on special software requirements of supported devices.

SCSI

Pronounced "scuzzy," SCSI (short for Small Computer System Interface) is a specification of mechanical, electrical, and functional standards which lets the Macintosh connect and communicate with peripheral devices such as hard drives, CD-R drives, tape drives, and scanners.

A single SCSI bus connects a Macintosh with peripherals by linking up to fifteen devices with SCSI cables plugged into SCSI ports. The devices are connected serially—one after the other—in a simple layout known as a daisy chain. Each device on a SCSI bus must have its own unique identifying SCSI address, or ID. (You set a device's ID number on the device itself.)

Both ends of a SCSI chain must be "terminated" to maintain the integrity of communication signals on the chain. This is done with a terminator, a device which plugs into an open SCSI port and acts as a kind of dead end of the chain. If you have an internally terminated or self-terminating SCSI device, it should be the last device of the SCSI chain (that is, at the end and the furthest device from the Macintosh). An in-line terminator plugs into a SCSI port, but the terminator itself also has a port that can have a cable plugged into it. To find out the termination requirements for your specific hardware setup, refer to your SCSI controller's user guide and the documentation that came with your peripheral device.

Setting up a SCSI chain on your Macintosh is easy. All you have to do is use the cables to connect the devices in the daisy chain fashion, give each device a unique SCSI ID number, and terminate the last device. You cannot have duplicate SCSI addresses on your SCSI chain. SCSI controllers reserve a single ID, often ID 7, for their control of SCSI operations, so no other device on

the bus may use the reserved ID. The IDs on your chain do not have to be sequential or in a particular order; the SCSI chain is not affected by the order as long as no devices share the same number.

■ **NOTE:** To ensure proper operation of your SCSI devices, always turn on each SCSI device on your chain before you turn on your Macintosh, and do not turn them off until after you shut down your Macintosh.

SEEING YOUR BACKUP DEVICE

To see available backup devices with Retrospect, click Devices from the Configure tab. Retrospect displays connected recordable disc drives and tape drives, and connected removable disk drives with mounted media (disks or cartridges in the drives).
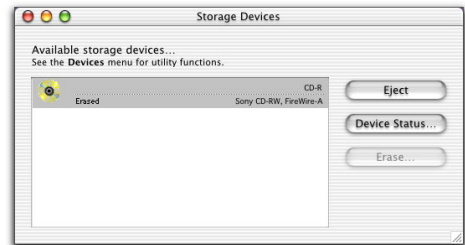
Storage devices window showing a recognized CD-RW drive.

■ **NOTE:** Hard disk drives, whether internal or external, generally do not appear in this window, but some do because their formatting software makes them behave like removable disk drives.

Click the Device Status button. Retrospect scans the computer and opens a new window displaying device ID numbers and their connected devices, if any.
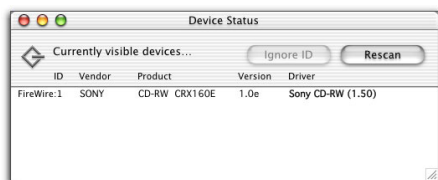
Device status window showing a recognized CD-RW drive.

For each ID, Retrospect lists the device vendor, its product name, and its firmware version number. In the case of a device for which Retrospect has a special, Retrospect-internal driver, the driver is also identified, in boldface. In the case of a device for which Retrospect is not using its own driver, the words "(no driver)" appear.

In the previous example, the Sony CRX160E model is shown as a recognized device on the FireWire bus. The "Sony CD-RW (1.50)" indicates Retrospect's internal driver version for this drive.

Retrospect does not have its own drivers for removable cartridge drives because it can already communicate with them through the operating system.

The fact that Retrospect *recognizes* a drive does not always mean the drive is supported or qualified for use with Retrospect, although usually it is. To make sure Retrospect supports your drive, refer to the Dantz web site.

When You Cannot See Your Backup Device

If you are backing up to removables, make sure you can see and access your removable drive in the Finder. If you cannot, refer to your drive's documentation for information on setting it up properly. When you can access it from the desktop, you should be able to see it in Retrospect.

A drive that does not appear in the storage devices window and device status window may not be supported by Retrospect or may have special requirements. Dantz maintains an extensive

laboratory devoted to testing Retrospect with different backup devices. Nothing taxes storage devices more than backups so if there is a problem, DantzLab's intensive testing will most likely find it. Refer to the Dantz web site for the latest compatibility information and more specific details on supported devices.

Chapter 10 • Problems and Solutions includes troubleshooting instructions to see your device with Retrospect. See "General Device Troubleshooting" on page 207.

You may also contact Dantz for help. The Dantz Technical Support staff is up-to-date on the latest compatibility issues and can help identify the cause of your problem and suggest a solution.

Commands for Seeing Devices

The device status window has commands for seeing devices.

Ignore ID If you select an ID and click Ignore ID, Retrospect will not scan that ID when Retrospect is next opened after you quit. (This is not a feature you will need to use unless directed to do so by Dantz Technical Support.) This button is available under Mac OS 9 only.

Don't Ignore To make Retrospect recognize a previously ignored ID, select the ID and click Don't Ignore. Retrospect will scan that ID when Retrospect is next opened after you quit.

Rescan Clicking this button makes Retrospect scan addresses and display any changes since the window was initially opened.

RECORDABLE AND REWRITABLE DISC DRIVES

When recordable compact disc drives were first used with personal computers, creating a CD required one to make an exact image of the desired CD on a hard disk then transfer the data from the hard disk drive to the CD-R drive in a

single operation. While creating a CD, any interruption of data flow, such as a screen saver launching or new e-mail arriving, would cause the CD to fail to "master" properly, resulting in the loss of the entire CD. This unreliability made CD-R unsuitable for backup.

Dantz has overcome this challenge by implementing packet writing, a technology used in some CD-R, CD-RW, DVD-R, DVD-RW, and DVD+RW drives, as specified in the Orange Book, a compact disc technical standards document. Packet writing allows incremental storage of files, making recordable disc technology appropriate for backup.

Device Support

Retrospect requires that you use a supported recordable disc drive for backing up and restoring files to and from CD/DVD backup sets. (For a list of supported drives, see the Dantz web site.) You cannot restore from a CD-ROM or DVD-ROM drive.

Backup Discs in the Finder

Backup discs created by Retrospect are accessible only by Retrospect or other Retrospect Backup products, only with supported recordable disc devices. The discs do not mount on the desktop for use with the Finder or other software.

Recordable and Rewritable Media

CD-R and DVD-R discs are write-once media which cannot be erased. Use care when choosing your CD/DVD backup set names and when deciding which files to back up.

CD-RW, DVD-RW, and DVD+RW discs are rewritable and can be recorded over and over like floppy disks or removable cartridges. There is a limit to the number of rewrites, but you are not likely to encounter it with Retrospect.

This manual uses the term "recordable disc," or simply "disc," to refer to a recordable disc to be used in a CD-R, CD-RW, DVD-R, DVD-RW, or DVD+RW drive. These drives all work nearly the same with Retrospect, though they may use different media. The difference is that data on "R" discs cannot be erased, while "RW" discs can be erased in rewritable drives and reused by Retrospect. Rewritable discs are, of course, recordable, so they are included in the term "recordable discs."

Retrospect can use any media supported by a given drive. Different brands, speeds, and types of media vary greatly. For best results, use high-quality media. Some drive manufacturers recommend or require particular brands of media with their drives, while some do not support using high-speed media. Check the Dantz web site or your drive manufacturer for media recommendations.

Formatting discs with other programs prior to backup is neither necessary nor recommended. Use only unformatted or erased discs. You can erase formatted rewritable discs with Retrospect as described below.

Preparing Discs for Use

When you insert a disc in a recordable disc drive, the operating system or other software may ask how you wish to prepare or format the disc. Always ignore formatting prompts and exit these windows, as you should not prepare backup discs with anything but Retrospect.

When Retrospect is executing a script unattended and requires a new disc, it will automatically use any appropriate disc that is erased or has the correct name. New, blank CD-R or DVD-R media is considered erased and will be used. New, blank CD-RW, DVD-RW, or DVD+RW media will be prepared by Retrospect and then used. Previously recorded CD-R or DVD-R media cannot be erased and thus cannot be used by Retrospect. Because a disc with any recorded data will not be used by Retrospect in unattended operations, it is a good idea to prepare rewrit-

able media ahead of time by erasing CD-RW, DVD-RW, or DVD+RW discs containing unwanted data.

Before preparing a disc, first make sure the device you want to use is listed in the storage devices window. If the device you want does not appear in the window, see "Seeing Your Backup Device" on page 27.

Retrospect requires the exclusive use of the recordable disc drive and it will first eject any loaded, previously recorded (finalized) CD-ROM or audio disc from the drive. The drive is then reserved for Retrospect's exclusive use until Retrospect quits.

To prepare a disc, insert it in the drive and notice its name and description in the storage devices window.

The storage devices window, showing a CD-RW drive.

Once a disc is loaded, its status appears.

Ready indicates the disc contains Retrospect data.

Erased indicates an empty disc, ready for use by Retrospect.

Write Protected means the disc is locked.

Content Unrecognized means the disc is not empty, but does not contain valid Retrospect data. (See "Content Unrecognized" on page 221.)

Wrong Version may mean the drive's firmware is not supported. Or, it may mean the inserted

disc was written to by Retrospect for Windows. Retrospect for Macintosh cannot read such discs.

Hardware Error indicates a device error has occurred.

Damaged Disc indicates that the disc was damaged during the previous backup. You may not be able to append to this disc.

Running and Busy indicate the drive is busy.

No Media indicates there is no disc in the drive.

Commands for Preparing Discs

Eject unloads the selected disc from its drive.

Erase erases the contents of the selected rewritable disc. It is not available with recordable-only discs. This process takes time, during which you may not access other Retrospect functions when running under Mac OS 9.

REMOVABLE DISK DRIVES

Though Retrospect is often used with discs or tapes, it is just as effective when used with drives with removable media which mount as volumes on the Macintosh desktop. For the purposes of this software, a removable cartridge drive is a device that uses media which can be mounted and ejected with the Finder. This includes Zip, Jaz, SuperDisk, DVD-RAM, and MO. Mac OS 9 and Mac OS X support some removable disk drives but require add-on drivers to support others. (The drive vendors include these drivers with the devices.)

Before using Retrospect to back up to a removable disk drive you should be familiar with the procedures to insert, format, erase, and eject cartridges.

Backup Sets

When you create a backup set to be used for backup to a disk or disks, you can choose a file backup set or a removable disks backup set. A removable disks backup set can grow continuously by spanning multiple cartridges, just as a CD/DVD backup set can span multiple discs. A file backup set cannot grow beyond the available space of its single disk or cartridge.

When adding a disk to a removable disks backup set, Retrospect erases the previous contents, if any, of the disk. Backing up to a file backup set does not affect the other files on the disk to which you are backing up.

Formatting

Before you use an unformatted removable cartridge or similar disk with Retrospect, you must first format the disk with a formatting utility or the operating system. It is a good idea to format all of your cartridges with the same formatter. When you have a choice of multiple file systems, such as with DVD-RAM, use only HFS or HFS+.

Mounting

Disks must be mounted as volumes on the Macintosh desktop for Retrospect to recognize them. When a volume is mounted its icon appears on the Macintosh desktop.

Some drives are mounted at startup while others require you to use software to manually mount volumes. Most removable cartridge drives include software to automatically mount volumes when you are swapping disks or cartridges. Often, this software is a system extension that must be loaded at startup to later mount disks.

Preparing Removable Disks for Use

When Retrospect is executing a script unattended and requires a new piece of media, it will automatically use any appropriate media that is erased or has the correct name. It is a good idea to prepare disks for use ahead of time by erasing or reformatting them. Use the following functions to erase and format disks.

■ **NOTE:** For removable cartridges such as Zip, Jaz, SuperDisk, DVD-RAM, or MO, format with the software that came with your drive.

First make sure the device you want to use is listed in the storage devices window.

To prepare a disk, insert it in the drive and notice its name and description in the storage devices window.

The storage devices window, showing a removable cartridge drive.

Once a disk is loaded, its status appears.

Ready indicates the disk contains Retrospect data.

Erased indicates an empty disk.

Content Unrecognized means the disk is not empty, but does not contain valid Retrospect data. With a removable disk, the unrecognized content likely is other files, which you may not want to lose. (See "Content Unrecognized" on page 221.)

▲ **WARNING:** When a removable disk shows as Content Unrecognized, use caution. Any files on a disk are permanently removed when Retrospect uses the disk for backup. Be especially careful not to use a hard disk which has been formatted to appear as a removable disk, as the

unrecognized content may be your valuable data.

Unloaded usually means a disk is in the drive but must be ejected and reinserted to be used.

Running and Busy indicate the drive is busy.

No Media indicates there is no disk in the drive.

Commands for Preparing Disks

Eject unloads the selected medium from its drive.

Erase erases the contents of the selected disk.

HARD DISK DRIVES

Though hard disk drives generally are not considered true backup devices, you can use one as a backup destination. This includes internal and external hard disks directly connected to the backup computer, and hard disks served over the network. To use a hard disk with Retrospect, it must be accessible through the Finder, as Retrospect uses the file system, not custom drivers, to communicate with hard disk drives. Hard disk drives are generally not listed in the storage devices window.

The main drawback of using a hard disk as a backup device is that the fixed disk does not have removable media for off-site storage and media rotation. ("Backup Strategies" in Chapter 8 describes these important aspects of safe and secure backups.) "Hot-swapable" drives are more flexible in these respects.

To back up to a hard disk, use file backup sets, which are explained in Chapter 2 • Fundamentals.

You can also use Retrospect to duplicate one hard disk to another. See "Duplicate" on page 52. However, because a duplicate is just a mirror of the source volume, not a managed backup, a duplicate lacks the flexibility and ben-

efits of Retrospect's backup operation. The main advantage of a duplicate is that the files on the backup volume can be opened, copied, or otherwise used directly with the Finder, whereas with backups, you must first restore the files with Retrospect.

TAPE DRIVES

Retrospect is all the software required to support most tape drives available for the Macintosh.

Tape drives operate differently from most other drives and devices you are probably familiar with. Unlike random access devices such as hard drives, floppy disk drives, and CD-ROM drives, tape drives are sequential access devices. Since the data reading mechanism cannot immediately go to the correct data position on the media, a tape drive accesses data more slowly than a disk drive (or similar random access device). It is just like fast-forwarding a music cassette to find your favorite song.

Sequential access media is inexpensive, has large capacity, and has a good sustained data transfer rate. Thus, tapes—being cheap, big, and fast—are particularly well suited for backups.

When you use Retrospect to back up a volume to a tape, the data is written sequentially from the beginning of the tape to the end. When you add backups to the tape, the data is appended where the previous data ends, until the tape runs out.

Neither the Macintosh nor Retrospect will mount a tape when you put it in the drive, so do not expect the tape to appear on your Macintosh desktop. You cannot see it in the Finder to drag files to and from the tape like a disk volume. This is not bad because a sequential access device is not optimal for the type of file management you are likely to do with a mounted volume in the Finder. Though the

technology exists to let you mount a tape as a volume and use it like a disk, you probably would not want to do this for regular backups because of the performance issues discussed previously. Retrospect's system for backing up and restoring files to and from tapes is far more powerful, efficient, and reliable.

Tape Capacity

The actual amount of data that will fit on a given tape will vary due to many factors. A tape's capacity can be greatly influenced by the relative speeds of the backup computer and the tape drive.

If you back up a slow source (for example, a slow Macintosh, a slow hard drive, or a shared volume on a network) to a fast tape drive, the tape capacity is reduced by the source's inability to supply a steady flow of data to the tape drive. (This is like dictating to an audio cassette recorder; you can record more words if you speak quickly without pauses, but when you take a breath you are wasting tape because the recorder is still going, recording silence.) When the tape drive runs out of data while backing up, it must stop writing data, reposition the tape, and resume writing at the correct section of the tape. Each reposition reduces the capacity of the tape, and excessive repositioning can lead to accelerated device wear.

Do not be surprised if your tapes end up with less than their advertised capacities. Some tape drives are represented as being capable of higher capacities than the drives normally achieve in day to day use. The representations refer to the amount of data *before* it gets compressed by a tape drive with hardware compression capability—and they often assume generous compression rates. Hardware compression is explained below.

Compression

Compression, which can be done by Retrospect or a capable tape drive, conserves space on media by reducing the size of the data being backed up. Compression does not actually increase the media capacity—a given tape can only hold a certain amount of data. Compression squeezes the original data to a more compact size before the data is put on the tape, allowing you to fit more of your files on a given tape.

Data compression hardware is common on tape drives. (The letters "DC" are often used in the name or model number of tape drives to indicate data compression capability.) Retrospect uses a drive's hardware compression whenever possible, automatically turning off Retrospect's software compression if necessary. It is faster to let the hardware compress the data than to have Retrospect compress it. The amount of compression achieved varies depending on the type of data being backed up. Text files, for example, compress well while applications and system files do not. Compression typically reduces data to half its original size.

Retrospect disables hardware compression when you use encryption because encrypted data compresses poorly. If you need to use encryption and compression together, use Retrospect's software compression option. Retrospect then compresses the data before encrypting it, which is not possible when hardware compression is used.

Tape Drive Mechanisms

Though you may buy your tape drive from one of many companies, the drive is actually built around a mechanism from one of several manufacturers. Typically, companies purchase bare mechanisms from manufacturers and put them in their own cases and packaging, and support the products with their own staff.

Popular types of tape mechanisms available for the Macintosh are AIT, AME, DAT, DLT, DTF, DC2000, DC6000, Exabyte, LTO, Travan, and VXA. In addition, many different robotic tape libraries are available for several types of these

drive mechanisms. Each is briefly explained be-
low.

High speed, large capacity tape drives such as
AIT, AME, DLT, DTF, and LTO require a high
performance environment. Best speed and ca-
pacity results are achieved with a fast computer
platform, such as a Power Macintosh G4 model.
The most important performance factor is the
speed of the source volume. If the source is too
slow, the drive must frequently stop to reposi-
tion the tape while waiting for additional data. If
the drive repositions too often, copy perfor-
mance will decrease dramatically.

DAT

DAT drives span the gap between entry-level
tape drives such as Travan and higher-end
products such as DLT and AIT. Each compact
DAT cartridge, containing a length of 4 mm
wide tape, holds about 2 GB (DDS-1), 4 GB
(DDS-2), 12 GB (DDS-3), 20 GB (DDS-4), or
more depending on how much your files are
compressed. Speeds range from 6 MB per
minute with older DDS-1 drives to 150 MB per
minute with newer DDS-4 drives.

8mm

Eight millimeter tape drives using Exabyte
mechanisms can store 2 to 7 GB of uncom-
pressed data on a tape cartridge.

AIT/AME

Eight millimeter drives using Advanced Intelli-
gent Tapes (AIT, AIT-2, and AIT-3) or Ad-
vanced Metal Evaporated (AME) tapes are
among the fastest tape drives available. Their
mechanisms can store 12 to 100 GB of uncom-
pressed data at very high speed when used under
optimal conditions.

VXA

VXA drives provide tape technology that is reli-
able and relatively inexpensive for small- to me-
dium-sized environments. VXA formats data in

packets, operates at variable speed, and can read
data multiple times in a single pass of the tape.
A VXA mechanism can store 33 GB of uncom-
pressed data.

DLT

DLT and Super DLT drives are among the fast-
est tape drives available. Their mechanisms of-
fer exceptional performance and 2.6 GB to
110 GB uncompressed capacity when used un-
der optimal conditions.

DTF

Digital Tape Format (DTF) drives store 12 or
42 GB of uncompressed data. They are among
the fastest tape drives available when used under
optimal conditions.

LTO

Linear Tape Open drives achieve high capacity
and high speed with two different formats. An
Ultrium format drive can store up to 100 GB of
uncompressed data. An Accelis format drive,
capable of very fast data access times, can store
up to 50 GB of uncompressed data.

Travan

These tape drives have uncompressed capacities
of 1.5, 2, 4, or 10 GB, depending on the tape car-
tridge used. Travan "NS" (Network Series)
drives include hardware compression.

DC6000

These tape drives have uncompressed capacities
of 120 MB to 25 GB. Tapes written by one drive
can typically be read by another of equal or
greater capacity.

A separate formatting step is not required,
though the first time Retrospect uses certain
DC6000 tapes, it performs a "long erase," which
retensions the tape, erases all previous data, and
determines the tape's format and capacity.

Cleaning Your Tape Drive

Regular cleaning of your tape drive is essential for reliable performance. Dirty drive heads are a major cause of tape drive problems and reported media failures (error –206). Cleaning most tape drives is as simple as inserting a special tape cleaning cartridge and letting the drive clean itself. Refer to your drive's documentation for its manufacturer's cleaning recommendations. Retrospect's tape cleaning reminder preference (page 155) can remind you to clean your drive at the interval you specify.

Preparing Tapes for Use

When Retrospect is executing a script unattended and requires a new tape, it will automatically use any appropriate tape that is erased or has the correct name. It is a good idea to prepare media for use ahead of time by erasing or reformatting or retensioning tapes. Use the following functions to erase, retension, or format media.

First make sure the tape drive you want to use is listed in the storage devices window. If the device you want does not appear in the window, see "Seeing Your Backup Device" on page 27. To prepare a tape, insert it in the drive and notice its name and description in the storage devices window.
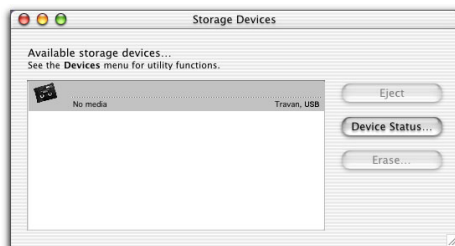
The storage devices window, showing a tape drive.

Once a tape is loaded, its status appears.

Ready indicates the medium contains Retrospect data.

Erased indicates an empty medium.

Content Unrecognized means the tape is not empty, but does not contain valid Retrospect data. Often, this happens when a compressed tape is inserted in a drive without hardware compression abilities. It also happens when you insert a tape written to by other backup software. (See "Content Unrecognized" on page 221.)

Wrong Version usually means the inserted tape was written to by Retrospect for Windows. Retrospect for Macintosh cannot read such tapes. It can also mean the drive's firmware version is not supported by Retrospect.

Write Protected means the tape is locked.

Hardware Error indicates a device error has occurred.

Unloaded usually means a tape is in the drive but is rewound and must be ejected and reinserted to be used.

Running and Busy indicate the drive is busy.

No Media indicates there is no tape in the drive.

Commands for Tape Drives

Eject unloads the selected tape from its drive.

Retension winds the selected tape forward to the end and back to even out the tension and alignment with tape mechanisms which require retensioning. (Some types of tapes are retensioned automatically during execution, and cannot be retensioned manually with this command.) You should retension tapes if they have not been used in a long time or if the temperature or humidity of their storage environment has changed significantly.

Erase erases the contents of the selected tape, and—in the case of some tape drive mechanisms—conditions media to be reused.

Format completely reformats the selected tape and is more time-consuming than Erase. It is only supported by certain tape drives.

TAPE LIBRARIES

Tape libraries are also known as loaders, autochangers, and autoloaders.

Retrospect Desktop Backup supports tape libraries up to and including eight storage slots. Retrospect Workgroup Backup and Retrospect Server Backup support larger capacity tape libraries.

A tape library is a hardware unit which mechanically moves tapes in and out of its drive mechanism from a magazine holding several tape cartridges. Tapes can be arranged in any order and Retrospect will determine which tape it needs to perform an unattended backup. Tape libraries are useful for large-scale network backups because they automatically change tapes when tapes fill up. Many tape libraries are available, each using one or more of the many available tape drive mechanisms. For more information, refer to the libraries' manual.

Configuring the Library for Use with Retrospect

Set up the library according to the vendor's documentation. If applicable, configure the loader to work in random mode (sometimes referred to as SCSI mode), not sequential, POST, or LED mode.

How Retrospect Works with Tape Libraries

Just after its power is turned on, or when its magazine is changed, a tape library goes through a process to determine which storage slots contain tapes. The library does not know the names of the tapes, only that they are present in the magazine.

When Retrospect needs information about each tape it scans the library to get the name or label of each tape. The library inserts each tape in turn, and Retrospect keeps track of the tape names and locations. Each time Retrospect is launched, or the library's door is opened, or the magazine is changed, the library's contents may change, so Retrospect must scan to keep current.

Manual Execution

During immediate operation, Retrospect works in interactive mode and waits at the media request window. Use the Loader pop-up menu to choose the requested tape.

To have Retrospect automatically find and load tapes, force it into unattended mode by using the Control menu. (See "Run Unattended" on page 147.)

Automatic Execution

During a scripted operation, Retrospect works in unattended mode, scanning the library, searching for the appropriate media, and loading whichever tape is required. If a new or erased tape is required, Retrospect will load and use the first one available.

To manipulate the tapes yourself, force Retrospect into interactive mode by using the Control menu. (See "Run Interactively" on page 147.)

Configuring Tapes in Libraries

Click Devices from the Configure tab to bring up the storage devices window. Select a library drive from the list and notice the Loader pop-up menu on the right (where the Eject button would otherwise be). The Loader menu has items to control the tapes in the library.

Commands for Tape Libraries

Scan Media cycles through all the storage slots in the library, moving each tape from slot to drive to learn the name of the tape.

Erase All erases each tape in each storage slot of the library.

Unload ejects all media from the library. Use this command to reload a magazine with new media.

A numbered item loads that particular storage slot's tape into the drive to learn its name and make it ready for use.

Keeping Cleaning Cartridges in Libraries

Retrospect does not support storing a cleaning cartridge in any library storage slot. Never leave a cleaning tape in a library and expect Retrospect to load other tapes as needed.

Retrospect does not have a function for automatically cleaning drives in libraries, but it does have a tape cleaning reminder feature. See "Show Tape Drive Cleaning Reminder" on page 155. Refer to your library's documentation for the manufacturer's cleaning recommendations.

MEDIA LONGEVITY AND STORAGE

Media life depends largely upon how the media is stored and maintained. Proper storage avoids moisture, heat, and particulate contamination, which cause media deterioration, leading to loss of media integrity or loss of data itself.

Magnetic media's worst enemy is moisture. Optical media's worst enemy is heat, which causes distortion, and particulate matter, which causes scratches.

When media get moisture from a humid environment, it deteriorates. Heat can also cause problems. Keep media out of direct sunlight and away from heaters. Avoid extreme temperature changes. Airborne particulates such as dust and cigarette smoke can also harm media.

Tapes are unique in that they use lubricant. The tape media is lubricated, and after many passes over the drive's heads, tapes tend to fail because the lubricant has dissipated. You should be able to get a few thousand passes from a tape, but keep in mind each tape operation involves several passes.
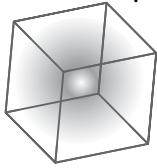
A fire-proof safe in a climate-controlled building is an ideal media storage location. At the very least, keep the media in its original containers inside a cabinet or desk.

HOW RETROSPECT WORKS WITH MULTIPLE BACKUP DEVICES

During an operation, Retrospect searches available backup devices for the appropriate medium. If the medium fills or Retrospect needs another medium for any reason, it searches available drives. This is useful, for example, to have one drive with the tape Retrospect expects and another drive with an empty tape for when the first tape fills during the night. The drives must use similar mechanisms, such as two Travan drives.

Retrospect does not simultaneously write to multiple devices.

IMMEDIATE OPERATIONS

- **BACKUP**

- **ARCHIVE**

- **RESTORE**

- **DUPLICATE**

Whereas previous chapters of this manual mostly touched on ideas and fundamentals, this chapter explains the actual features and use of Retrospect's four main operations.

This chapter covers the steps you take to perform backup, archive, restore, or duplicate operations immediately upon your command, as opposed to scripted operations which automate these tasks.

If you are a casual user and you need only occasional backups, you can do fine with these immediate operations. However, network administrators who frequently back up multiple volumes are better off automating their tasks with scripts. Regardless of whether you plan to do immediate or scripted operations, this chapter is a good introduction to Retrospect.

You can also initiate operations by opening run documents and by choosing items from the Run menu. These features are derived from scripts, described in Chapter 5 • Automated Operations.

BACKUP

This section tells how to perform an immediate backup with Retrospect. At various points in the procedures, the text will direct you to other sections and chapters in which you will find additional information on performing more sophisticated backup operations.

The backup procedure described below (starting with "Preparing the Backup Media") is all you need to know to effectively back up all of your files. You can repeat the steps as needed to ensure the safe duplication of your valuable data.

There are three basic stages in backing up:
• Choosing the source volumes to back up
• Choosing the backup set in which to store the files (or creating a new backup set if none exists)
• Executing the backup

The first time you back up the contents of your hard disk, Retrospect backs up all specified files from the source volume to a backup set. In subsequent normal backups, Retrospect backs up only those files which are new or which have changed since the last backup to that particular backup set. (This is also known as a progressive backup, an incremental backup, and a differential backup.) This means that if you back up frequently, fewer files will be copied in each backup session and backups will require less time, all else being equal. After a few backups, using Retrospect will become part of your work routine and will be only slightly more taxing than turning your computer on and off.

Preparing the Backup Media

Before you attempt to back up files with Retrospect, check that your backup device is properly connected to the Macintosh and that your backup medium (recordable disc, removable cartridge, tape, or folder on an Internet FTP site) does not contain valuable data that should not be overwritten.

Starting the Immediate Backup

When you start Retrospect the Directory shows the Immediate tab. If you are already using Retrospect, go to the Directory and click the Immediate tab.

Click the Backup button. If you previously set up an immediate backup, as in "Quick Start" in Chapter 1, Retrospect goes directly to the summary window. This is so you can easily initiate backups with only a few clicks. If you have not set up an immediate backup before, Retrospect automatically displays the volume selection window and will automatically take you to the other windows along the way, so ignore the instructions to click source, destination, and so on.

Choosing Source Volumes

In the backup summary window, click the Sources button to display the volume selection window. It lists all volumes currently available to be backed up, including your internal hard disk, internal floppy disk, any connected cartridges drives or hard disks, any mounted shared volumes, and any logged-in client volumes on the network. Because these volumes contain the files to be backed up, they are known as source volumes. Volumes used as sources for the most recent immediate backup are selected when the window opens.
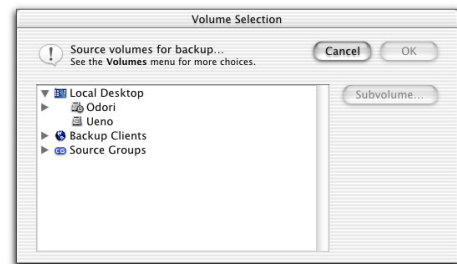
The volume selection window.

Navigating Volumes

The volume list works much like a volume or folder window in the Finder viewed as a list. It is

organized hierarchically by Local Desktop, Backup Clients, and Source Groups. Click on the ▶ icon to expose the contents indented under an item and click on the ▼ icon to hide the contents. All aspects of the volume selection window, including navigating, organizing, and selecting, are fully explained under "Working with Volumes" in Chapter 9.

To Choose a Source Volume

In the volume list, click a volume to select it. To back up more than one volume, Shift-click or Command-click other volumes to make a multiple selection. Use items from the Volumes menu to eject removable disks or put away mounted volumes.

When you have made your volume selection, click OK to continue setting up the immediate backup. The volume selection window closes and Retrospect returns to the summary window.

Choosing the Backup Set

In the immediate backup summary window, click the Destination button to display the backup set selection window, which lists available backup sets and has commands for working with them.
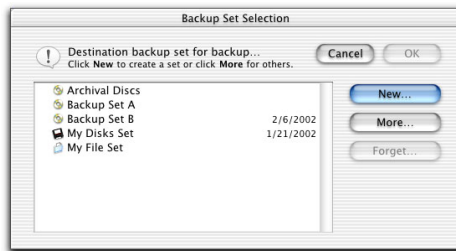
The backup set selection window.

Creating a New Backup Set

If no backup sets are listed in the backup set selection window, or if you do not wish to use any of those listed, click the New button to make a new backup set in the backup set creation window.
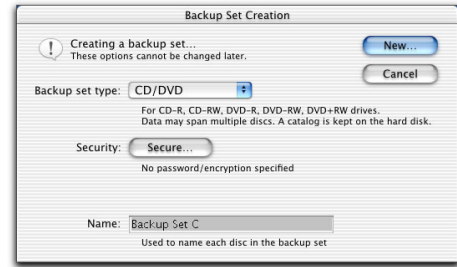
The backup set creation window.

You use this window to set the attributes which make up the backup set. *You cannot change the attributes of a backup set after it is created.*

Backup Set Type The most important item in the window is the backup set type, which specifies the type of media the backup set uses for this and future backups. Use the pop-up menu to choose a backup set type which corresponds to your backup device media—recordable discs, removable disks, tapes, file, or the Internet.

Security Security lets you specify a password for accessing the backup set, with optional data encryption. Click the Secure button to bring up a dialog in which you determine the security options for the backup set.

The backup set security options dialog.

Password Only prevents access to your backup set without a password. Stored data is not encrypted.

SimpleCrypt provides password protection and encrypts backup set data using Dantz's proprietary encryption format.

DES provides password protection and encrypts backup set data using the United States government Data Encryption Standard.

■ **NOTE:** Using encryption increases backup time. DES encryption is slower than Simple-Crypt, which provides adequate security for most needs.

▲ **WARNING:** If you forget your password you cannot access your data. There is no "magic key" or "back door" to circumvent the encryption. Not even Dantz Technical Support can help you.

If you leave Security alone the backup set will not have a password and will not use encryption.

Name In the Name field, enter a unique and descriptive name for the backup set. For example, "Monday Complete Backup," "Accounting Backup," or "Friday Clients Backup." Retrospect uses this name to identify both the catalog file and the backup set media. Name backup sets carefully because they cannot be renamed. File backup sets, however, can be renamed in the Finder.

When the backup set description is complete, click New to create the backup set. Except for an Internet backup set, a dialog appears, prompting you for a location to save the catalog file that keeps track of the contents of the backup set. If you are backing up to a file backup set, the dialog prompts you for a location to save the backup set. Specify a location for the catalog (your hard disk is best) or the file backup set (on the destination volume) and click Save.

For an Internet backup set, another window appears for configuring the connection.
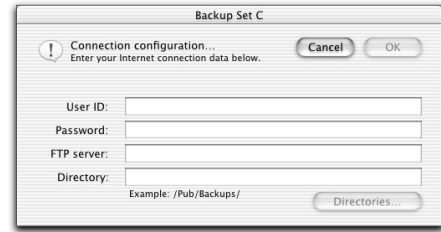
Internet backup set connection configuration window.

Enter your FTP user ID, password, and server name (or IP address). In the directory field, give the path (not including the host server itself) to the directory in which you want to store this Internet backup set, or click Directories to navigate the path to your desired directory and select it.

■ **NOTE** Clicking the Directories button may not be helpful with some FTP servers because some folders may not appear in the dialog's list. In this event, cancel the dialog and type the path into the Directory field of the connection configuration window.

Click OK in the Internet backup set connection configuration window when you have provided the information, and Retrospect will test the connection. Retrospect reports an error if it cannot establish a connection with the FTP server.

When you use an Internet backup set, Retrospect creates a new directory in the directory you specified. Retrospect uses this directory as the Internet backup set. Do not modify, delete, or rename files in an Internet backup set directory by using a third party FTP utility or by working directly on the FTP server.

After you click OK in the connection configuration window and Retrospect tests the connection, a dialog appears, prompting you for a location to save the catalog file that keeps track of the contents of the backup set. Specify a location for the catalog (your hard disk is best) and click Save.

Retrospect returns to the backup set selection window, where the new backup set is now listed as available for backup.
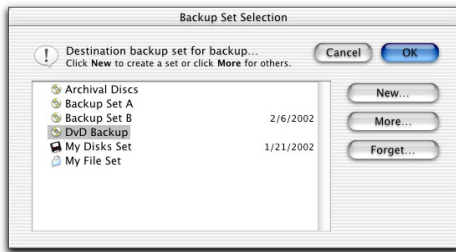
Listing an Unlisted Backup Set

If the backup set you want to back up to is not listed in the backup set selection window, click the More button and use one of its options to pick a backup set and place it in the list.

Selecting the Desired Backup Set

When the backup set you want to use is listed in the backup set selection window, select it and click OK to continue setting up the backup.

The Final Step

After you have specified the source volume to back up and the destination backup set to which it will be copied, the immediate backup summary window appears.

The immediate backup summary window.

Verify your choices for the various items. To change information, click the appropriate button.

Sources lets you add or remove source volumes.

Destination lets you choose a different backup set as a destination.

Selecting lets you choose a selector, a kind of filter for selecting files and folders to be backed up. (Selectors are explained in detail starting on page 176.) We suggest you use the default selector, All Files, which marks all files on the source for backup.

Preview scans the source volume (or volumes) and determines which files need to be backed up by comparing the source files against the list of files in the backup set catalog. When the scan is complete, Retrospect opens a browser window to display a list of the files on the source volume marked for backup. You can use it to mark and unmark individual files and folders to be backed up. (Browsers are explained in detail under "Browsing" on page 170.) When you close the browser, the summary window shows figures for the selected files.

Options displays the options window in which you can specify the backup action (normal or recycle), and turn on or off verification and software data compression. Backup actions are explained under "Backup Actions" on page 22, and options are explained in detail under "Backup Options" on page 141.
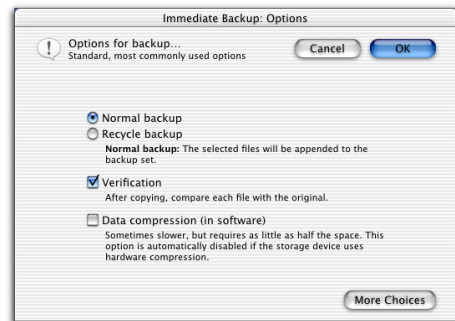

The immediate backup options window.

Executing the Backup

If Retrospect has the information it needs, it says "Ready to Execute" at the top of the immediate backup summary window. If the information is incomplete, it says "Not Ready to Execute" and you must change one or more parts of the information, as described at the top of the window. When it is ready click Backup and a dialog asks you to confirm the operation; click OK.

If you are backing up to an Internet set, Retrospect connects to the FTP server and performs the backup. If this is the first time you are backing up to disks, tapes or discs, or if there is no medium in the backup device, Retrospect next displays a window with options for choosing the disk, tape, or disc for storing the files to be backed up. (It may differ slightly from the following example depending on whether you are using tapes, disks, or a CD/DVD backup set.)
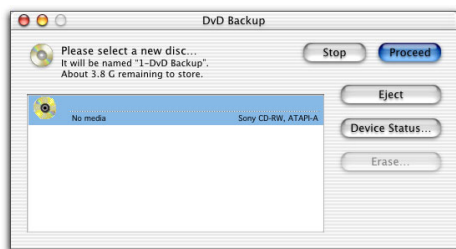
The media request window.

▲ **WARNING:** Use only a blank disk, tape, or disc, or one with unwanted data, because any files on it will be permanently removed.

Put in a blank disk, tape, or disc and click Proceed. Retrospect performs the backup, displaying the progress of the operation and the names of files as they are copied to the backup set. The execution status window also has Pause and Stop buttons for suspending or cancelling the backup.
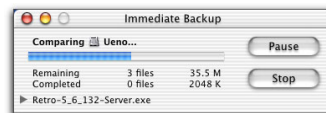
The execution status window for an immediate backup.

When the execution is complete, Retrospect informs you in the status window. Close it to return to the Retrospect Directory. If any errors occurred you can find the offending files in the browser which appears, or see error details in the operations log. (This log is accessible from the Window menu and is described under "Viewing the Operations Log" on page 137.)

Scripting a Backup

When a backup summary window is active, you can choose Schedule from the Script menu to save the immediate backup information and settings as a script. You can then use the script to accomplish automatic, unattended backup operations. See Chapter 5 • Automated Operations.

Planning Subsequent Backups

For subsequent backups, you can repeat the basic backup procedure as often as you want and even switch among multiple backup sets to maintain extra backups.

By default, Retrospect only backs up those files that have changed since the previous backup to a particular backup set.

If you want to automate your backups so they can be performed while your Macintosh is unattended, you can use Retrospect's scripting feature to set up and schedule backups. Creating a backup script involves most of the steps in an immediate backup, but it can be saved for later use and can be scheduled to automatically execute at your convenience. See Chapter 5 • Automated Operations.

ARCHIVE

Archive lets you move files from a volume to a backup set for off-line storage, freeing space on the volume.

To set up an archive operation, first click the Tools tab from the Directory, then click Copy.
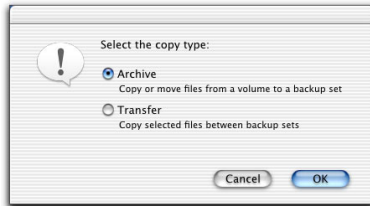
In the dialog, select Archive and click OK. From this point on, the archive operation is set up just like a backup, as described starting on page 40. The only difference in preparation is the additional option of whether to move files, as described on page 142, which deletes the original files from the source after copying them to the destination. This frees space on the volume.

Archiving, by default, does not match source and destination. That is, Retrospect does not compare source files to files in a backup set. This leaves the possibility of it copying redundant files during the archive operation. In this case, Retrospect is foregoing ultimate efficiency for the sake of archive integrity.

Scripting an Archive

When an archive summary window is active, you can choose Schedule from the Script menu to save the archive information and settings as a script. You can then use the script to accomplish archive operations. See Chapter 5 • Automated Operations.

Archiving Tips

Media Plan for the long term. Archive to two or more backup sets and maintain an off-site copy of your archived data. Always store media according to manufacturer's guidelines. See

"Media Longevity and Storage" on page 37 for further information. Periodically transfer your data to new media to ensure storage integrity.

Planning Define an archiving system and follow it every time. Only archive files in specific folders, having defined labels, or modified within a specific date range. When archiving from a server, force users to make a decision on what is to be archived by moving data to a specific location. Never archive data without telling users what was removed from the server.

Before you use the Move files (delete after copy) option, first archive to a different backup set by copying without moving. This provides an extra measure of safety should one backup set become unusable. If you have only a single archive medium and it is lost or damaged, you will have lost all of your data. Be sure not to recycle, lose, or damage your archive media.

Verification Always use verification. If you do not use verification and hardware problems occur when archiving, your data may not be correctly copied to the media.

On-line Archiving To archive documents in place, compress them in a file backup set that you store on your hard disk. This way they take up less room, but are still on-line.

RESTORE

Retrospect allows you to restore an entire volume or restore selected files and folders from the most recent backup or any previous backup session within a backup set. You can either restore by using a volume Snapshot from a backup set, or by searching through one or more backup sets by file name or other criteria. You can restore individual files, multiple files, or entire volumes. This section describes the various ways you can restore with Retrospect and serves as a reference for restore features and

methods. For specific instructions on a broad range of restoring scenarios, including disaster recovery of entire computers, see Chapter 7 • Restoring.

Snapshots

Retrospect's Snapshots make it easy to restore a volume to its exact state as of a given backup. A Snapshot is like a picture of the contents of a volume. It contains a list of all of the files and folders of a volume and the sessions during which they were backed up. Each time you back up a volume, its Snapshot is updated in the backup set catalog and the Snapshot is added to the backup medium.

To restore an entire volume or Subvolume, simply choose the Snapshot you want to restore—you do not have to manually locate and retrieve files from different sessions. A Snapshot allows Retrospect to get the files from a backup set in a single pass through the media, rather than inefficiently going back and forth on the media, even if the backup set contains multiple incremental backup sessions.

You can also restore individual files from a Snapshot. This is the easiest way to retrieve files that you know were on a volume during a given backup. If no Snapshot is available, you must define search criteria to choose which files to restore.

You can retrieve Snapshots from media if you want to restore a volume, folder, or file as it was at any given backup.

Immediate Restore by Snapshot

The process of setting up Retrospect for an immediate restore operation is done in much the same manner as setting up an immediate backup.

From the Retrospect Directory, click the Immediate tab, then click Restore. A dialog asks you to choose the restore type.
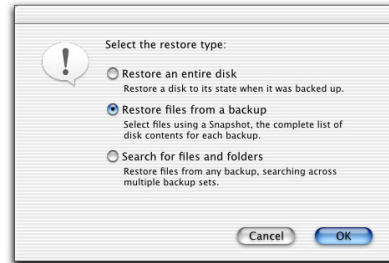
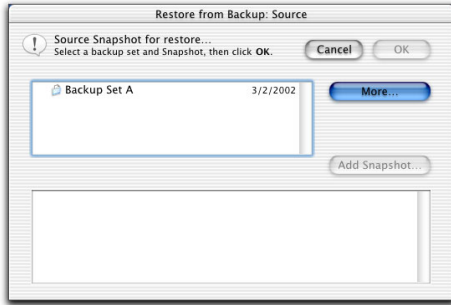Select the type of restore which suits your needs.

Restore an entire disk does so using a volume Snapshot, restoring all files present on a volume at the time of a given backup. It replaces the contents of the volume and effectively recreates the volume in its backed up state.

Restore files from a backup does so from a Snapshot, restoring to a new folder on a volume one or more chosen files present on a volume at the time of a given backup.

Search for files and folders restores to a volume one or more files—regardless of age—by searching one or more entire backup sets.

■ **NOTE:** This tutorial explains only the first two choices in the dialog, which restore files by using a Snapshot. To search entire backup sets for particular files, see "Immediate Restore by Search" on page 49 for an explanation of that method. If you want to restore an entire volume (for example, to replace a crashed disk) you may want to take additional steps as detailed in Chapter 7 • Restoring.

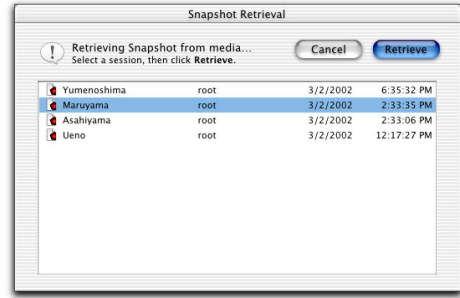After selecting a restore method, click OK.

In this window's top list, select the backup set from which to restore. (Use the More button if your desired set is not listed, or select a set you do not want to see here and press the Delete key to get rid of it.)

In the window's bottom list, select a volume Snapshot. The date and time when the volume was last backed up are listed to the right of the volume's name.
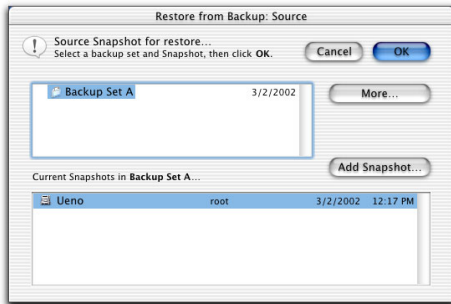
If your desired Snapshot is not listed, click the Add Snapshot button to select it from a list of all Snapshots in the backup set.


Selecting a Snapshot to add to the list.

When you select a Snapshot and click Retrieve Retrospect will obtain the older Snapshot from the backup set media (which may require you to insert media) and add it to the list in the restore source window.

■ **NOTE:** The Retrieve button is disabled when you select a Snapshot that is already available.

With your desired Snapshot selected in the restore source window, click OK to continue.
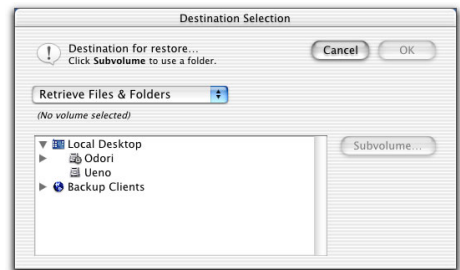
Select a volume on which you want Retrospect to place the restored files. This volume does not have to be the original volume from which the files were backed up; it can be a folder defined as a Subvolume or any volume mounted on your local desktop or belonging to a client on the network. (Navigate through the Local Desktop and Backup Clients outlines as detailed under "Containers" on page 167.)

Set the pop-up menu to determine how Retrospect restores the files to the destination.

Restore entire disk makes the destination disk like your selected Snapshot. It *deletes all files and folders* on the destination which do not match those marked for restore in the Snapshot, leaving files untouched if they are identical to files marked for restore. It then copies remaining files and folders from the backup set, preserving the folder hierarchy. The destination volume is reorganized like the volume Snapshot, less files and folders not marked. This method restores Mac OS X privileges.

Replace corresponding files copies the marked files to the destination volume into the same folders. Corresponding files are overwritten, *even if they are newer.* Retrospect leaves files untouched if they are identical to files marked for restore or if the file names do not match those marked for restore. This method restores Mac OS X privileges.

▲ **WARNING:** Using this option to replace an active Windows folder will crash a Windows client.

Retrieve files & folders creates a new folder on the destination volume (giving the folder the name of the backup set), then copies files into this folder, preserving the folder hierarchy. Nothing is replaced or overwritten. This method does not restore the backed-up Mac OS X privileges of files and folders; it assigns them the privileges of the currently logged-in user (or root if no user is logged in).

Retrieve just files creates a new folder on the destination volume (giving the folder the name of the backup set), then copies only the files into this folder. The folder hierarchy is not preserved. Nothing is replaced or overwritten. (Do not use this option to retrieve a large number of files or a whole volume.) This method does not restore the backed-up Mac OS X privileges of files; it assigns them the privileges of the currently logged-in user (or root if no user is logged in).

▲ **WARNING:** The Restore entire disk and Replace corresponding files methods may destroy data on the destination. If you choose one of these, be sure it is acceptable to erase or replace files on the destination volume.

▲ **WARNING:** Before restoring to a volume other than the current system volume under Mac OS X, use the Finder's Show Info command on the volume. Choose Privileges from the info window's menu then turn off the "Ignore privileges on this volume" option.

After setting the destination restore method with the pop-up menu, click OK to continue. Depending on the restore type and method, Retrospect may scan the destination volume and match files from the selected Snapshot. Then the immediate restore summary window appears.
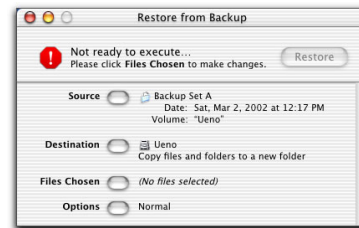
Restore summary, needing file selection criteria before the restore can continue.

Verify your choices for the Source, Destination, Files Chosen, and Options. To change information, click the appropriate button.

Source is the backup set and volume Snapshot from which you want to restore files. Click this button to use the backup set selection window to change the source.

Destination is the volume to which you want to restore files. Click this button to use the volume selection window to change the volume.

Files Chosen are the files you want to restore from the backup set. Click this button to use a

browser to mark and unmark individual files and folders to be restored. Browsers are explained in detail under "Browsing" on page 170.

Options let you reposition icons and update the modification dates of restored files. Click this button, then click More choices to change these options.

Executing the Restore

When Retrospect has the information it needs to do the restore, it says "Ready to Execute" at the top of the immediate restore summary window. If the information is incomplete, it says "Not Ready to Execute" and you must change one or more parts of the information you gave it. When it is ready, click Restore and a dialog asks you to confirm the operation.

▲ **WARNING:** Restoring may destroy data on the destination. Be sure it is acceptable to erase or replace files on the destination volume.

Click OK to confirm.

Make sure the correct backup set medium is in the backup device. If Retrospect does not see the medium, it asks you for it in a window.

Retrospect performs the restore, displaying the progress of the operation and listing the names of files as they are copied from the backup set media to the destination. The Execution Status window also has Pause and Stop buttons for suspending the restore.
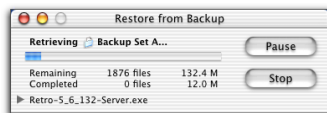
The execution status window for a restore.

When the execution is complete, Retrospect informs you in the status window. Close it to return to the Directory. If any errors occurred you can find the offending files in the browser which appears, or see error details in the opera-

tions log. (This log is accessible from the Window menu and is described under "Viewing the Operations Log" on page 137.)

When you leave Retrospect and go to the Finder, you can see the destination volume is changed to reflect the restored files. The degree of change can be anywhere from a new folder on the volume or a completely restructured volume, depending on the destination restore method and options.

■ **NOTE:** Under Mac OS 9, the desktop needs to be updated after a large restore, such as an entire disk. Restart the Macintosh while holding down the Command and Option keys to rebuild the desktop.

Scripting a Restore

When a restore summary window is active, you can choose Schedule from the Script menu to save the immediate restore information and settings as a script. You can then use the script to accomplish restore operations. See Chapter 5 • Automated Operations.

Immediate Restore by Search

Whereas restoring by Snapshot lets you get files from a given backup, Retrospect has another method of restoring which lets you retrieve one or more files regardless of when they were backed up. This is useful, for example, to get a document named "Budget Amendment" backed up on January 16, which is when you know the report file was saved with incorrect data and backed up after that date. Although you could browse the Snapshot to find the file, Retrospect's search facility is more efficient.
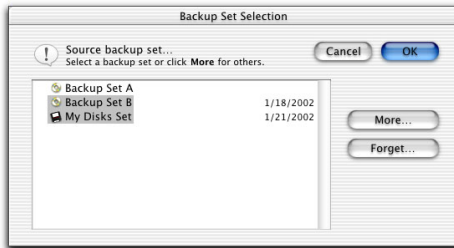
The process of setting up Retrospect for an immediate restore by search is done in much the same manner as restoring by Snapshot.

From the Retrospect Directory, click the Immediate tab, then click Restore. A dialog asks you to choose the restore type.
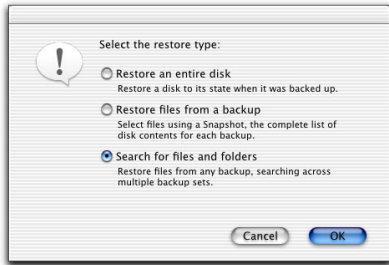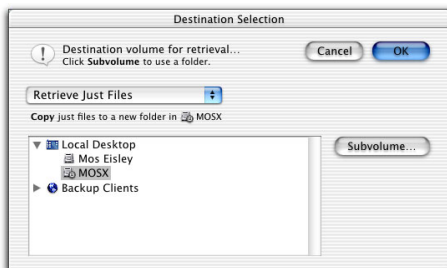
Click the bottom radio button and click OK.

The next window asks you to select the backup sets from which to restore.

Select one or more backup sets. (Use the More button if your desired set is not listed.) Click OK to continue, which then brings up the following window.


Select the volume on which you want Retrospect to place the restored files, and choose a pop-up menu item for the method by which they are to be retrieved.

■ **NOTE:** When restoring by searching, the methods "Restore entire disk" and "Replace

corresponding files" work differently than when restoring from a Snapshot. Retrospect does not scan the destination volume to summarize the files it will be replacing.

▲ **WARNING:** Before restoring to a volume other than the current system volume under Mac OS X, use the Finder's Show Info command on the volume. Choose Privileges from the info window's menu then turn off the "Ignore privileges on this volume" option.

After setting the destination restore method with the pop-up menu (see page 47), click OK to continue. Retrospect puts up the window for defining file selection criteria.
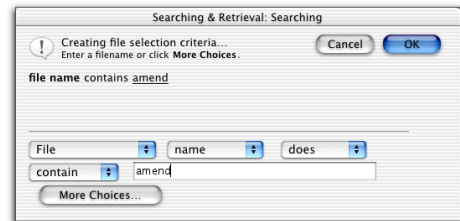
If you want to select all files from the sources, leave this blank and click OK.

Use the pop-up menus and enter text to define the search criteria on file or folder names, or click More Choices to make a custom selector with other search criteria. This window is described in detail under "Finding Files" on page 173, and selectors are described under "Using Selectors" on page 176. When you have defined the search criteria, click OK, and Retrospect searches each backup set catalog before bringing up the summary window.
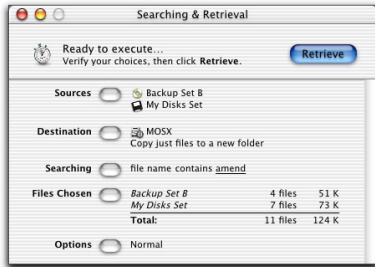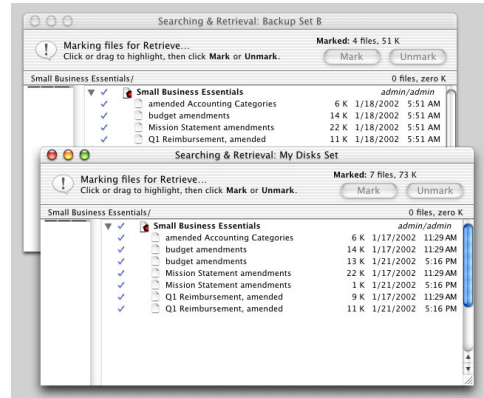
The searching and retrieval summary window.

Your file selection criteria are summarized next to Searching. Next to Files Chosen is a brief quantity and size inventory of the files found by Retrospect in their respective backup sets.

Browsing Chosen Files

Click Files Chosen to open a browser which lists the found files. Retrospect displays one browser window for each backup set in which files are found. You can manually unmark and mark these files for retrieval. (For details on using browsers, see "Browsing" on page 170.) Files with check marks will be retrieved when the operation is executed.

Depending on your search criteria, your browser or browsers may list more than one version of a particular file. For example, the "budget amendments" file shown in the following example was modified daily by the user and backed up on weekdays over a few days, to different backup sets.

Additional Searching

If the browser does not display the files you want, you can close it and return to the summary window to redefine the search criteria by clicking the Searching button. If you change the search criteria, Retrospect displays the following dialog when you close the selector window.
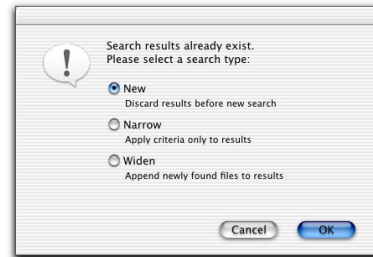
New replaces the results of the previous search with the results of the new search.

Narrow uses the new criteria to further restrict the selection.

Widen uses the new criteria to add files to the current selection.

Select a search type, then click OK to return to the summary window and repeat the process until you are satisfied with the chosen files.

Executing the Restore

If Retrospect has the information it needs, it says "Ready to Execute" at the top of the searching and retrieval summary window. If the information is incomplete, it says "Not Ready to Execute" and you must change one or more parts of the information you gave it. When it is ready, click Restore and a dialog asks you to confirm the operation.

▲ **WARNING:** Restoring may destroy data on the destination volume. When restoring by searching, the methods "Restore entire disk" and "Replace corresponding files" work differently than when restoring from a Snapshot. "Restore entire" erases the destination volume before restoring files. "Replace corresponding" replaces files with the same names as those being restored. Be sure it is acceptable to replace the destination volume or files with the source files.

Click OK to confirm.

Make sure the correct backup set media is in the backup device. If Retrospect does not see the media it asks you for it in a window.

Retrospect performs the restore, displaying the progress of the operation in the execution status window, which gives you buttons to pause or stop its execution.

When the execution is complete, Retrospect informs you in the status window. Close it to return to the Retrospect Directory. If any errors occurred you can find the offending files in the browser which appears, or see error details in the operations log. (This log is accessible from the Window menu and is described under "Viewing the Operations Log" on page 137.)

When you leave Retrospect and go to the Finder, you can see the destination volume is changed to reflect the restored files.

■ **NOTE:** Under Mac OS 9, the desktop needs to be updated after a large restore. Restart the Macintosh while holding down the Command and Option keys to rebuild the desktop.

DUPLICATE

Retrospect allows you to duplicate files on a volume or among volumes. Files and folders are copied without compression or encryption in Mac OS Finder format, which is useful when transporting data to other computers. However, Retrospect optimizes the duplication process by copying only your selected files and by copying only those files which do not already exist on the destination.

The duplicate feature is useful, for example, for a network administrator to do a Finder-format backup of a server or database to a hard disk.

◆ **TIP:** Subvolumes are useful as sources or destinations for duplicating, but you may not duplicate a Subvolume on a client to another Subvolume on the same client.

Click the Immediate tab on the Retrospect Directory, then click the Duplicate button. The first window, Retrospect's familiar volume selection window, asks you to determine the source volume from which files will be copied.
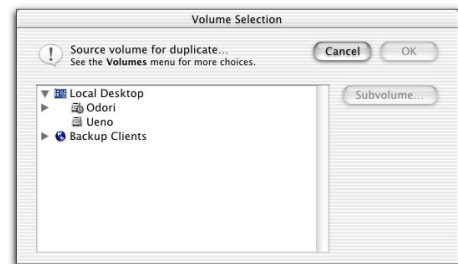
Select the source volume and click OK. (For details on using the volume selection window, see "Working with Volumes" on page 166.) Retrospect next asks you for a destination volume and a method of placing the files on the destination volume.
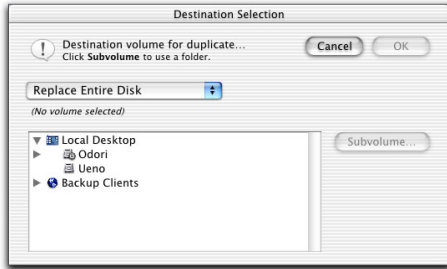
Select a destination volume and choose a method from the pop-up menu.

Replace entire disk *replaces the entire contents* of the destination volume. Identical files already present on the destination are not duplicated.

Replace corresponding files *overwrites any matching files* existing on the destination volume which correspond to the selected files of the source, *even if the destination files are newer.* Retrospect leaves files untouched if their names and locations do not correspond to those files marked for duplication.

▲ **WARNING:** Before duplicating to a volume other than the current system volume under Mac OS X, use the Finder's Show Info command on the volume. Choose Privileges from the info window's menu then turn off the "Ignore privileges on this volume" option.

■ **NOTE:** You may not duplicate a Subvolume on a client to another Subvolume on the same client.

When you have selected the volume and set the pop-up menu click OK. Retrospect brings up the immediate duplicate summary window.
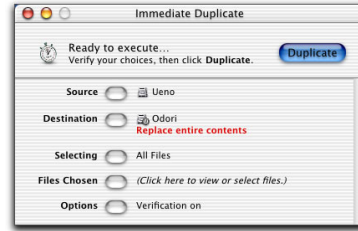
This window lists the source, destination, selection criteria, files chosen preview, and options associated with the duplicate operation. Each item has a button you can click to change the information as with backup and restore operations. You can use the various features for a highly specific duplicate operation, such as the following example summary.
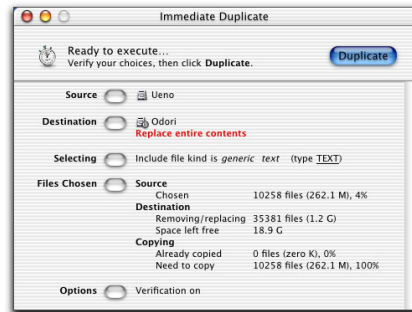
Executing the Duplicate

If Retrospect has the information it needs, it says "Ready to Execute" at the top of the immediate duplicate summary window. If the information is incomplete, it says "Not Ready to Execute" and you must change one or more parts of the information you gave it. When it is ready, click Duplicate and a dialog asks you to confirm the operation.
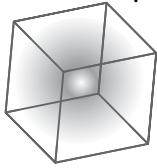
▲ **WARNING:** Duplicating may destroy data on the destination. Be sure it is acceptable to erase or replace files on the destination volume.

Click OK to confirm. An execution window shows the progress of the duplicate operation

and gives you buttons to pause or stop its execution. When the execution is complete, Retrospect informs you in the status window. Close it to return to the Retrospect Directory. If any errors occurred, you can find the offending files in the browser which appears, or see error details in the operations log. (This log is accessible from the Window menu and is described on page 137.)

Scripting a Duplicate

When a duplicate summary window is active, you can choose Schedule from the Script menu to save the immediate duplicate information and settings as a script. You can then use the script to accomplish duplicate operations. See Chapter 5 • Automated Operations.

AUTOMATED OPERATIONS

- **OVERVIEW**

- **EASYSCRIPT**

- **SCRIPTED BACKUP**

- **SCHEDULING SCRIPTS**

- **EXECUTING SCRIPTS**

- **SCRIPTED ARCHIVE**

- **SCRIPTED DUPLICATE**

- **SCRIPTED RESTORE**

- **BACKUP SERVER SCRIPTS**

You learned how to set up and execute Retrospect's immediate backup, archive, restore, and duplicate operations in Chapter 4 • Immediate Operations. This chapter shows you how to automate the process by using scripts, including Retrospect's unique Backup Server scripts. It begins with an overview, then describes EasyScript, which automates backup script creation.

OVERVIEW

Retrospect scripts are unlike programming scripts you may be familiar with. A Retrospect script contains predetermined information for the various elements of an operation, such as the source, destination, and file selection criteria. This is the same information used in an immediate operation, but you can save it in a script for repeated use and unattended, automatic operation. When a script is run, or executed, Retrospect performs the operation using the predetermined information. You can run a script at your command or schedule times when Retrospect is to automatically execute a script. You should create a script for any procedure you perform on a regular basis.

Because Retrospect allows you to schedule your scripts to run automatically and unattended, you can choose backup times that are most convenient for you and for other users. Scheduling scripted backups ensures data is backed up consistently—all you have to do is make certain the computer is turned on and the proper medium is in the backup device. Scripts are an important part of developing a backup strategy. (For more information on developing an effective backup strategy, see "Backup Strategies" on page 132.)

Another advantage of a scripted backup is that it requires less memory than an immediate backup, allowing you to back up more volumes in a single operation. For a scripted backup, Retrospect scans and backs up the sources one volume at a time, meaning the scripted backup requires only enough memory to store the scanned list of the largest source volume. For an immediate backup, however, Retrospect scans all sources before it begins copying files, meaning that it requires enough memory to store the scanned list of all source volumes.

This chapter's "Scripted Backup" section covers the basics of creating scripts. All other script types use the same basic ingredients. Be sure to read the "Scripted Backup" section carefully because the other script sections build upon the foundation of that section, just as the other script types are similar to backup scripts.

For information on managing and maintaining scripts, see "Maintaining Scripts" on page 151.

If you are not sure about what kind of script to make, but you know you want ongoing, unattended backups, EasyScript is probably for you.

EASYSCRIPT

EasyScript interviews you and uses your responses to set up a backup strategy and procedure for you or your network. EasyScript helps people who may be hesitant to create their own backup strategies and scripts. It simplifies creating backup sets, editing scripts, and scheduling. This section describes how to use EasyScript, though details are kept to a minimum because EasyScript is self-descriptive and easy to use.

Before you use EasyScript, you should be familiar with Retrospect's immediate backup (page 40) to better understand the EasyScript steps. Just doing the quick backup (page 14) is a good start.

Backup scripts are the only type of scripts created by EasyScript. If you need another type of script, such as a restore script or a Backup Server script, you must make it yourself because EasyScript cannot. See elsewhere in this chapter for complete instructions on creating scripts.

Starting and Exiting EasyScript

To start EasyScript when Retrospect is open, click the EasyScript button on the Automate tab. To exit EasyScript and return to the Retrospect Directory, click Cancel.

Navigating EasyScript

At any time while using EasyScript, you may click the Previous button to go back to the in-

formation and options shown previously. Clicking Next accepts the options, if any, and takes you to the next set of information and options. Clicking Cancel exits EasyScript, rejecting any options or choices you may have made. Clicking Tell Me More presents additional information about the subject at hand.

Using EasyScript

When EasyScript begins, it puts up a window that tells you some general information. Click Next to begin.

Using Client Sources

EasyScript now wants to know whether you want to back up your whole network or just the computer on which you are using it. If you want to back up only your computer, click No. If you want to back up your computer and other networked computers using Retrospect Client software, click Yes. Click Next to accept your selected choice and continue. If you selected No, EasyScript explains what volumes it will use as sources.

List of Clients

If you selected Yes, EasyScript asks you to confirm the client computers to use as sources. Currently logged in clients are shown in the scrolling list. (If necessary, manage clients using the Network and Configure buttons as described in Chapter 6 • Network Backup.) All clients logged in to Retrospect *when the script executes* are backed up by Retrospect. Therefore, after creating a script you can log in new clients and be assured they will be backed up by the script. Click Next to accept your selection and continue.

Backup Media

EasyScript now wants to know about the media your backup device uses. Click CD/DVDs for recordable discs, Tapes for tape cartridges, Removable Cartridges for removable disk cartridges, File for a hard disk or server, or Internet

for an FTP site. Click Next to continue with your selection.

Internet Connection If you chose the Internet as your backup destination, EasyScript requires specific FTP connection information. Enter your FTP account's user name and password, the server (host) name, and the pathname to the directory in which to keep the backup set. Click Next to proceed.

Internet Security If you chose the Internet as your backup destination, EasyScript suggests encrypting the backup set, which requires a password to access it decrypted. Decide on a password and enter it twice, or do not enter a password to leave the backup set unencrypted. Click Next to proceed.

Internet File Selection If you chose the Internet as your backup destination, EasyScript explains that it will select for backup only the contents of the documents folder and files and folders bearing the Finder's Hot label. (The label name may be something other than Hot; Retrospect uses any name you redefine in the second menu position.) Click Next to proceed.

Backup Frequency

After you have chosen the backup media, EasyScript asks how often you wish to back up. Click Every day or Once a week, then click Next to accept your choice and continue.

Rotating Media

If you chose disks, tapes, or discs as your backup destination, EasyScript asks how often you wish to rotate disks, tapes, or discs. Rotating media lets you move media off-site for safekeeping and gives you other chances of recovery should one piece of media fail. Click Daily, Weekly, or No Rotation, then click Next to accept your choice and continue.

Strategy Overview

EasyScript presents a summary of the backup strategy it came up with based upon your answers to its questions.
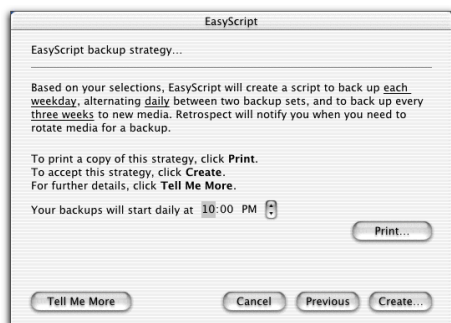
Read the strategy overview and if it is unacceptable click Previous to go back and make changes or click Cancel to start over. If necessary, adjust the time of the day the backups occur. Click Print to make a hard copy of the backup strategy. Study the strategy summary, and if you find it acceptable, click Create to accept the strategy.

Backup Set Creation

EasyScript must create catalogs for each backup set, so it asks you to name your backup sets. The backup set name is used for the catalogs and the discs, tapes, cartridges, files, or FTP server directory. When you have entered the backup set names, click New and save the catalogs on your hard disk, preferably in the same folder as the Retrospect application. (For file backup sets, save these on the hard disk you want to back up to, such as an external hard disk drive.) At this point, EasyScript makes and saves a script.

Final Overview

EasyScript presents a final overview with a reminder about media. You may click Done to return to the Retrospect Directory or click Open Script to view the script summary of the new script.

Script Summary

From the summary window, you may click on buttons to change the source volumes, destination backup sets, file selection criteria, execution options, and scheduled executions.

For detailed explanations of all these items and the summary window, see the other sections in this chapter.

Additional EasyScript Scripts

As EasyScript always uses the same script name, it does not let you have more than one script created by EasyScript. If you want to make two or more EasyScript scripts, rename the first script from EasyScript Backup to something else. To learn how to rename a script, see page 152.
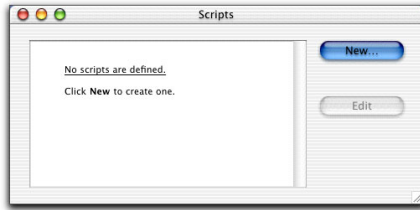
SCRIPTED BACKUP

This section takes you through the steps of creating a backup script. These steps are similar or identical to the steps of creating other scripts for archiving, duplicating, restoring, and so on. If you have never created a backup script before, you should first read "Backup" on page 40. Follow its instructions so you are familiar with the various steps of setting up a backup.
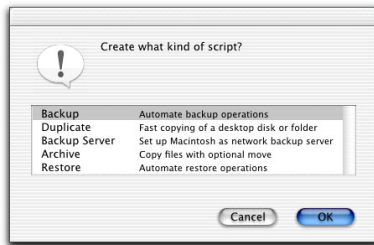
Creating the Script

From the Retrospect Directory, click the Automate tab.

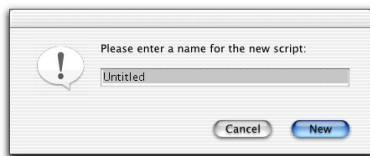Click Scripts, which brings up the script editing window.
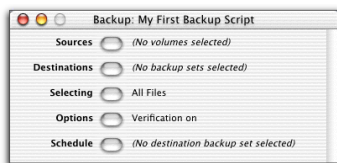

The script editing window.

Click the New button to create a new script. (If no scripts are defined, Retrospect first asks whether you want to use EasyScript; click No.) A dialog asks which type of script you want to make.

Select Backup from the list and click OK. Another dialog asks you to name the script.

Enter a name and click New. The script appears in its own window.

You will recognize that this script window is very similar to the immediate backup summary window, with information for the source volumes, destination backup sets, file selection criteria, and options. Schedule is a new addition not found in immediate operations. To change information, click the appropriate button.

Sources lets you add or remove source volumes.

**Destination** lets you choose one or more backup sets.

Selecting lets you choose a selector, a kind of filter for selecting files and folders to be backed up. Selectors are explained in detail in "Using Selectors," which starts on page 176.

Options displays the options window in which you can toggle verification and data compression. Options are explained in detail in "Execution Options," which starts on page 139.

Schedule lets you set the script to run at certain times or at regular intervals.

Setting the Sources

Because this is a new script, Retrospect says "no volumes chosen" in the script's window. Click the Sources button to get a window which lists sources, but is empty at this time since none are chosen yet.
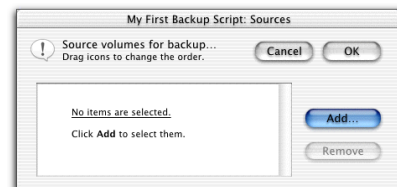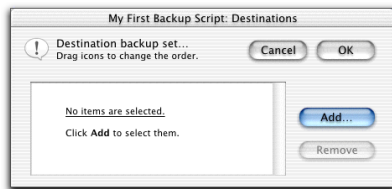

■ **NOTE:** When no items are chosen, as is the case in a new script, Retrospect clicks the Add button for you to take you to the volume selection window.

Click Add to get the Volume Selection window and select a volume. (This is explained in detail

in "Working with Volumes," which starts on page 166.) Click OK to add the volumes to the sources window. If you add more than one volume to the source list, you can drag them to rearrange them in the list and rearrange the order in which they will be backed up. When the volume or volumes to be backed up are listed in the sources window click OK.

Setting the Destinations

Retrospect needs to know the backup sets to which you are going to back up. Because this is a new script, Retrospect says "no backup sets chosen" in the script's window. Click the Destinations button to get a window which lists destinations.

■ **NOTE:** When no items are chosen, as is the case in a new script, Retrospect clicks the Add button for you to take you to the backup set selection window.

If No Backup Sets are Listed

Click Add. Retrospect brings up the backup set selection window to let you add a backup set. If none are known to Retrospect, it automatically clicks the window's New button. If you watch closely, you can see Retrospect quickly scan the communications bus, looking for suitable backup devices before it displays the backup set creation window. Use this window to make a new backup set, as described on page 14 and page 41. You can make Retrospect recognize other backup sets by opening them with the More button.

When Backup Sets are Listed

Select one or more backup sets. You can have multiple destination backup sets so you can rotate among the sets for more safe and effective backups. When at least one backup set is listed in the destinations window, click OK.

Setting the Criteria

Retrospect uses all files as the default criteria for selecting files to be backed up. To change this, click the Selecting button and choose a different selector. Selectors are explained in detail under "Using Selectors," which starts on page 176. We suggest you use the default selector, All Files.

■ **NOTE:** Retrospect's All Files selector does not necessarily cause all the source files to be copied to the destination. It merely selects the files and, during a later stage of the progressive backup, Retrospect decides whether to copy them based on whether the selected files already exist within the backup set. Selected files not in the backup set are then copied to the destination.

Unlike an immediate backup, a script has no "preview" information with which you can manually mark and unmark files. This is because the script executes later and the volume contents can change between now and then.

Setting the Options

Click the Options button to display the options window in which you can toggle verification, data compression, and other options which are explained in detail under "Execution Options," which starts on page 139. Leave all options at their default settings for now.

Setting the Schedule

If you want to execute this script only upon your command and in your presence, you do not need to schedule it for unattended execution. (Instead, make a run document or run it from the menu. For details see "Executing Scripts," which starts on page 66.) To set a time for the

script to execute, click the Schedule button to get a window with a list of scheduled operations. (But because this is a new script, nothing is scheduled and the list is empty.)
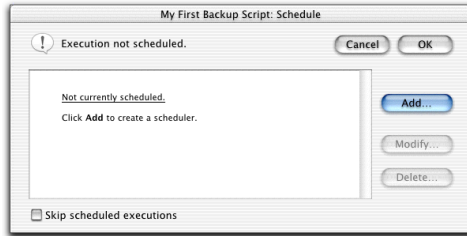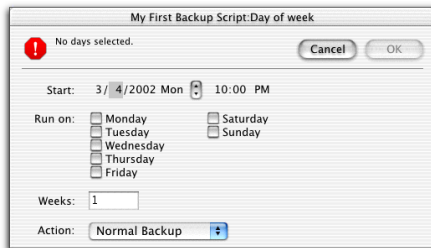

■ **NOTE:** This section explains adding schedules to scripts. For details on creating the schedules themselves, see "Scheduling Scripts," which starts on page 62.

Click Add to get a dialog asking which kind of scheduler you want to make.
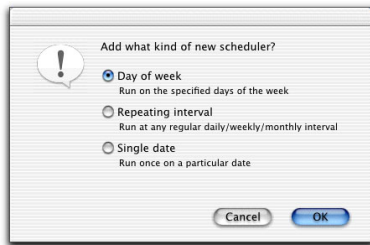
Select Day of Week, Repeating Interval, or Single Date, then click OK. A schedule setup window appears.

The exact controls in the window depend on the type of schedule, but they are all basically similar and easy to understand. Use the controls to set the schedule. Use the Action pop-up menu to set the backup action to either Normal Backup, Recycle Backup, or New Media Backup, which are explained under "Backup Actions" on page 22. If your script has more than one destination, use the To pop-up menu to set the destination backup set for the scheduled execution. When you have set the various aspects of the schedule, Retrospect shows a description of the schedule at the top of the window.

Click OK to return to the window listing the scheduled executions.

Your newly created schedule is listed and, since it is the only one, is shown as the next to execute. This window also allows you to delete or modify existing schedules, or add more schedules.

■ **NOTE:** Do not feel obliged to schedule an execution; there are other ways to run scripts, as detailed in "Executing Scripts," which starts on page 66. If you want to remove the schedule you just made, go ahead and delete it so it does not intrude at a later time.

This part of the manual only touches on Retrospect's scheduling capabilities. Scheduling is explained in detail in "Scheduling Scripts," which starts on page 62.

Click OK to return to the script summary window.

A script summary window.

If you used multiple sources, destinations, and schedulers, a custom selector, and changed some options, the summary window could have more elaborate information, such as the following example.

The script is complete. Choose Save from the Script menu to save it. Once saved, the script is ready for execution upon your command or for scheduled automatic execution.

Checking Validity

While a script summary window is open, you can choose Check from the Script menu and Retrospect informs you whether the script is valid, and shows the next action it will take with this script.

If the script is invalid, Retrospect shows why so you can edit the script to correct the problem.

In the dialog which says the script appears valid, click Check Media to have Retrospect examine the backup device, looking for the specified media member or click OK to return to the script summary window.

Click the summary window's close box to close the script when you are finished with it.

SCHEDULING SCRIPTS

Retrospect allows you to schedule a script to run automatically on specified days or on a repeating schedule, such as every two weeks. You can define multiple schedules for the same script and specify the kind of backup you want for each scheduled execution.

■ **NOTE:** Retrospect's Schedule preference (page 157) defines the time period during which scripts are allowed to execute. Scripts scheduled to execute outside this period will not run.

At the time you schedule the script, you must specify the backup set (if the script has more than one destination) and the type of backup action: normal, recycle, or new media.

Normal backup is a typical progressive backup. It marks for backup only files which are new, newly modified, or new to the backup set.

Recycle backup clears the catalog contents (if any) of a backup set so it appears no files are backed up. Then it looks for the first media member of the backup set and erases it if it is available, or it erases the contents of a file backup set or an Internet backup set directory. If the first member is not available, Retrospect uses any available new or erased disk, tape, or disc appropriate for the backup set type. Everything selected from the source is backed up to the backup set.

New media backup makes a new backup set (named similar to the old one) using a new or erased disk, tape, or disc, or a new file or a new Internet backup set directory. The original backup set and its catalog remain intact for long-term storage in a safe place. The new backup set catalog and the new media member are each named with a number in sequence.

For further information, see "Backup Actions" on page 22.

Schedulers

Retrospect provides three types of schedulers: day of week, repeating interval, and single date. A script can contain any combination of one or more of these schedulers.
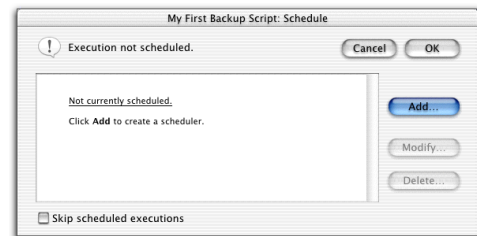
Creating a Script Schedule

Click the Automate tab in the Retrospect Directory.

Click Scripts to display a window listing available scripts. Select the script you want to schedule then click the Edit button, which displays the script window.

Click Schedule and the script's schedule window appears with a list of its currently scheduled dates and times.

The list appears empty if the script is not scheduled. To add a new schedule, click Add, which brings up a dialog asking which kind of scheduler you want to make.
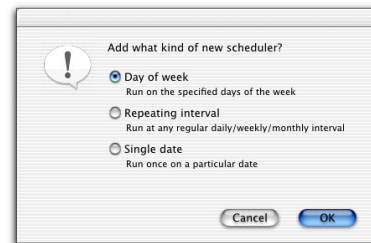
Click a radio button to select the kind of schedule you want to create, then click OK.

Day of Week Scheduler lets you define a schedule for one or more days of the week and specify a weekly repeating interval. For example, every Monday and Wednesday, every other week. Keep in mind that *a week starts on the Sunday of the week of the start date.*

Repeating Interval Scheduler lets you define a schedule that is repeated after a specified interval. For example, the last Friday of every month.

Single Date Scheduler lets you define a schedule for a single date and time. For example, October 17, 2002 at 5:04 P.M.

Common Scheduler Elements

All scheduler types have a few common controls and settings. These are the start date and time and the backup action and destination. Each is described below.

Start Date and Time

This determines the earliest time at which the first backup is allowed to occur. To change the start date and time, click on any individual part of the date or time. When the item is selected, type the new information or click the arrows to change the information. (You can also press the up and down arrows on your keyboard. Press the Tab key to move the selection among the different elements.)

Start: 3/ 4/2002 Mon 10:00 PM
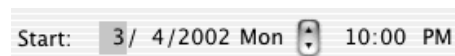
Do not be misled by the start date; execution will not necessarily happen on that date because a week starts on the Sunday of the week of the start date. For example, let's use a start date of 4/24/2002 Wed, set to run on Sunday every two weeks. When you save the script on Friday, April 19, you might expect it to run Sunday, April 28 but it starts May 5. *Observe the summary at the top of the window, which shows the actual date the script will first execute.*

Backup Action Type and Destination

If the schedule is for a backup script, these additional settings are available in the scheduler.

From the Action pop-up menu, choose Normal Backup, Recycle Backup, or New Media Backup.
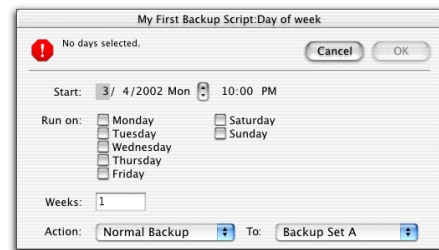
■ **NOTE:** Archiving Scripts do not provide a choice of options—they always use Normal Backup.

If the script has multiple backup set destinations, use the To pop-up menu to choose the backup set to be used for the scheduled execution.

■ **NOTE:** The backup set pop-up menu is not displayed if only one backup set is specified in the script.

Retrospect allows you to have more than one backup set for a script so you can rotate media as part of your backup strategy. You specify the backup set for each schedule or execution.

Using the Day of Week Scheduler

My First Backup Script:Day of week

No days selected.   Cancel   OK

Start: 3/ 4/2002 Mon 10:00 PM

Run on: Monday   Saturday
         Tuesday   Sunday
         Wednesday
         Thursday
         Friday

Weeks: 1

Action: Normal Backup   To: Backup Set A

The day of week scheduler window.

Set the start date and time, backup action, and destination as described previously under "Common Scheduler Elements" on page 64.

Click the checkboxes of the days of the week you want the script to execute.

Enter a number to use as the repeating interval for the weeks. For example, if you enter two and check Monday, the scheduler repeats every other Monday, beginning on the start date. Keep in mind that a week starts on the Sunday of the week of the start date.

When all of the settings are correct in the scheduler window, click OK.

Using the Repeating Interval Scheduler

The repeating interval scheduler window.

Set the start date and time, backup action, and destination as described previously under "Common Scheduler Elements" on page 64.

For weekly backups, the start date's day of the week determines when future backups will occur. For example, if the Start date falls on a Monday, subsequent weekly backups will occur on Mondays. You can see the pop-up menu change when you change the start day.

For monthly backups, the start date's day of the month determines when future backups will occur. For example, if the Start date is the fifteenth of the month, subsequent monthly backups will occur on the fifteenth. If you specify a monthly backup on a date at the end of the month (such as the thirty-first), the backup will be run on the last date of the month for those months that do not extend to the requested date. For example, February usually has only twenty-eight days.

From the Repeat pop-up menu, select the time unit (Days, Weeks, or Months) for the repeating interval. Type a repeat interval in the Weeks, Months, or Days field. The Repeat pop-up menu changes to reflect the Repeat Interval you enter.

When all of the settings are correct in the scheduler window, click OK.

Using the Single Date Scheduler
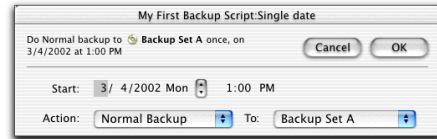
The single date scheduler window.

Set the start date and time, backup action, and destination as described previously under "Common Scheduler Elements" on page 64.

Because this is a single date scheduler, the script will run once at the specified date and time, and no more.

When all of the settings are correct in the scheduler window, click OK.

Completing a Scheduler

Click OK in the script schedule window. The script summary window reappears and lists the next six scheduled events for the script.

Choose Save from the Script menu to save it, then close the script window.

Scheduled Executions

Retrospect keeps track of all of your scheduled scripts and automatically executes them at the time you specified.

■ **NOTE:** Retrospect's Schedule preference (page 157) defines the time period during which scripts are allowed to execute. Scripts scheduled to execute outside this period will not run.

Under Mac OS 9, the Retro.Startup extension (first put in the System Folder by the Retrospect installer and thereafter automatically created when necessary) is responsible for checking the

clock built into the Macintosh and comparing it to the next time a script is scheduled to run. If you move or remove Retro.Startup, your scheduled scripts will not automatically execute.

Under Mac OS X, Retrospect will automatically launch and execute scheduled scripts, even if no user is logged in.

Retrospect is ever-vigilant about scheduled script executions. If a script is scheduled for automatic execution within the look-ahead time (normally twelve hours), Retrospect will not automatically quit (or shut down or restart, depending on a preference setting described on page 158). It instead remains open and waits to execute the script.

See "Controlling Executions," which starts on page 146, for related information.

EXECUTING SCRIPTS

Once you have created and saved a script you need to execute it to perform its intended operation. Retrospect gives you several ways of executing scripts and of pausing or halting their execution. Other methods of controlling operations in progress are discussed under "Controlling Executions," which starts on page 146.

Scheduled Execution

As you learned in the previous section, you can schedule times for Retrospect to automatically execute a script. Retrospect keeps track of all your scheduled scripts and automatically executes them at the time you specified. The script preview window (detailed under "Future Execution Schedule" on page 153) shows upcoming scheduled events.

Immediate Execution

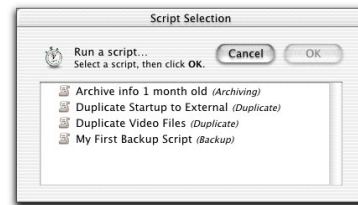There are several ways to execute a script right away.

Run Menu

You can choose a script from Retrospect's Run menu to initiate execution of the script.
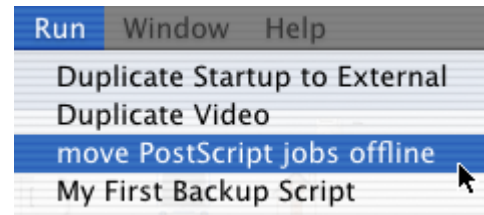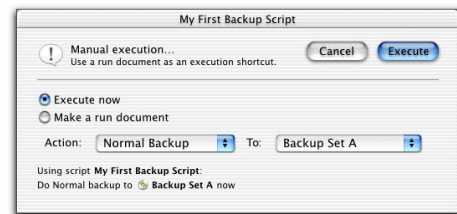

Run Button

When you click the Run button from the Retrospect Directory's Immediate tab, Retrospect asks you to choose a script from a dialog.

Select a script from the list and click OK.

Execution

When you start a script using the Run menu or the Run button, Retrospect first presents an execution window.

If the script being run is a backup script, use the Action pop-up menu to set the backup type to either Normal Backup, Recycle Backup, or New Media Backup, which are explained under "Backup Actions" on page 22. If you are not

sure about which to use, just use Normal. If the backup script has multiple destinations, use the other pop-up menu to specify the backup set to which the files are to be copied.

Leave the Execute Now radio button selected, then click Execute. Prompting you for media if necessary, Retrospect performs the scripted operation, displaying its progress in the execution status window. The window also provides Pause and Stop buttons for suspending or cancelling the operation.

When the execution is complete, Retrospect informs you in the execution status window. Retrospect's Unattended preference (page 158) determines what it does when the script is completed. By default, it quits when done. If any errors occurred you can find the offending files in the browser which appears, or see error details in the operations log. (This log is accessible from the Window menu and is described under "Viewing the Operations Log" on page 137.)

Run Documents

While learning how to immediately execute a script from the execution window, you may have noticed the radio button named Make a "run document". When this button is selected and you click Save in the dialog, then specify a location to save the file, Retrospect creates a special run document.

If you leave Retrospect and go to the Finder, you can see the file is a small Retrospect document. A Finder Info window for an example run document is shown below.

When you double-click (or otherwise open) the run document in the Finder, Retrospect executes the script.

To run several scripts sequentially, select the run documents in the Finder and choose Open from the File menu. When you open several run documents at once, the scripts associated with them will run in alphabetical order by script name, regardless of the run documents' file names.

◆ **TIP:** You can create more than one run document for the same script, each specifying a different backup action and destination backup set.

You can get creative with run documents. For example, you can put them in the System Folder's Startup Items folder for automatic execution when you start your Macintosh, or execute them using AppleScript.

Halting Execution

There are a few different ways to prevent execution or stop imminent execution of a script. To temporarily pause a running script, see "Execution Status Window" on page 146. To temporarily prevent a script from running, see "Skipping Script Execution" on page 153.

When a scheduled script prepares to run automatically, it counts down to execution. To intercept it before it actually begins operating, click the Stop button in the countdown window. The execution choices window appears.
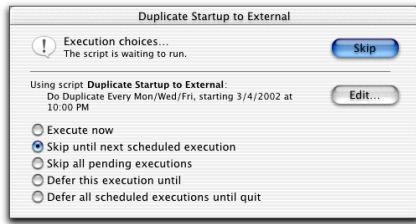
The execution choices window. Note the button shown here named Skip may also appear as Execute or Defer depending on the selected execution choice.

To cancel this execution of the script, select "Skip until next scheduled execution" then click Skip. This option shows as "Skip this execution" when there are no future executions scheduled.

To cancel execution of all pending scripts, select "Skip all pending executions" then click Skip.

To execute the script, select "Execute now" then click Execute.

To delay execution of the script (and all other scripts) until after you quit Retrospect, select "Defer all scheduled executions until Quit" then click the Defer button. You should defer a script when you do not want it to run while you are using Retrospect but you do want it to run after you quit.

To delay execution of the script until a future date, select "Defer this execution until" then set the date and time then click Defer. You should defer a script when you do not want it to run now but you do want it to run after a certain time.

To edit the script, click the Edit button.

Media Requests

When necessary with tapes, removable disks, or CD/DVD backup sets, Retrospect prompts you to insert media by displaying the media request window. In most cases, Retrospect continues with the operation when you insert correctly named or erased media and click Proceed.

However, chances are you want a script to run unattended while you are away and unable to satisfy any media request from Retrospect. You can avoid this prompt if you insert the proper media member before you execute the script or before its next scheduled execution. Retrospect is very particular about media names for recycle and new media backups—if the inserted medium is not erased, its name must be the one requested in order for Retrospect to proceed without prompting you. When performing new media backups or recycle backups, erase the media in advance to be sure Retrospect will proceed automatically.

Should you ever wonder whether your backup device has the correct medium for the next script execution, you can have Retrospect check whether the correct backup set member is available. Check the script as described under "Checking Scripts" on page 151, and click the Check Media button.

When performing a normal backup, Retrospect requires the backup set's most recently used medium, though it will use a blank medium if the other medium was skipped. (See "The Options tab" on page 150 and "Media Request Preferences" on page 154.)

SCRIPTED ARCHIVE

The process of creating and using an archive script is almost identical to that of a backup script. Read "Scripted Backup," which starts on page 58, to learn how to create a backup or archive script. This section only explains the differences between the two script types.

An archive script is just like a backup script, but it has the added option of moving—rather than copying—files from the source to the archive media.

Archiving allows you to remove seldom-used files from a hard disk without permanently getting rid of them.

Archiving, by default, does not match source and destination. That is, Retrospect does not compare source files to files in a backup set. This leaves the possibility of it copying redundant files during the archive operation. In this case, Retrospect is foregoing ultimate efficiency for the sake of archive integrity.

Be sure to read "Archiving Tips" on page 186 for other important information.

Move Files Option

To set this option, click the Options button in the script summary window to get the archive options window.
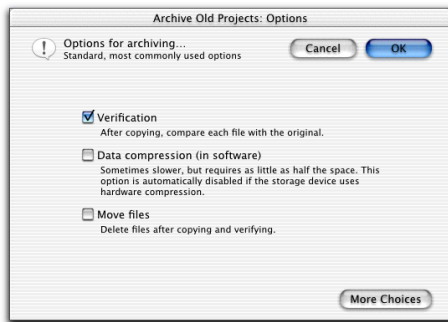
Archive scripts have the matching option off by default, which results in archiving all selected files, regardless of whether they are already in the backup set. Unless you turn on the Move files option, matching is the only difference between archive and backup scripts.

When the Move files checkbooks is checked, Retrospect copies the files to the backup set as usual and verifies them, then *deletes the files* from the original source volume or volumes. In the event the files do not exactly compare (Verification is on by default), the originals are not deleted.

◆ **TIP:** Before you use the Move files option, first archive to a different backup set by copying without moving. This provides an extra measure of safety should one backup set become unusable.

See page 142 for details on archive options.

See "Archiving Tips" on page 45 for helpful suggestions.

SCRIPTED DUPLICATE

Duplicating means copying files among volumes, much like using the Finder to drag files or folders from one disk to another. Retrospect's duplicate function is intelligent, which makes it faster than the less sophisticated duplicate function of the Finder.

You can use duplicate scripts for doing Finder format backups to hard disks, folders, or file server volumes. A duplicate script would be useful, for example, for copying a folder from a hard disk to a folder on a file server at the end of every week.

◆ **TIP:** Subvolumes are useful as sources or destinations for duplicating, but you may not duplicate a Subvolume on a client to another Subvolume on the same client.

Making a duplicate script is much like doing an immediate duplicate operation. The main ingredients you specify are the volume from which to copy and the volume to which the files are to be copied.

Creating the Script

From the Retrospect Directory, click the Automate tab, then click Scripts, which brings up the script editing window.

Click the New button to create a new script. A dialog asks which type of script you want to make; select Duplicate from the list and click

OK. Another dialog asks you to name the script; enter a name and click New. The script appears in its own window.

Because this is a new script, Retrospect says "volume not chosen" for the source. Click the Source button, then Retrospect's familiar volume selection window asks you to determine the source volume from which files are to be copied.
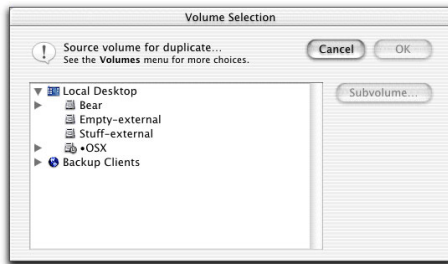
Select the source volume and click OK. (For details on using the volume selection window, see "Working with Volumes," which starts on page 166.)

There are also no volumes chosen for the destination, so click the Destination button. In the window, select the volume to which to copy the files. Also choose an item from the pop-up menu, which controls what happens to the existing contents of the destination drive.

Replace entire disk *deletes all files and folders* on the destination which do not match those marked for duplication, leaving files untouched if they are identical to files marked. It then duplicates remaining files and folders from the source, preserving the folder hierarchy.

Replace corresponding files copies the marked files to the destination volume into the same folders. Corresponding files are overwritten, *even if they are newer.* Retrospect leaves files untouched if they are identical to files marked for duplication or if the file names do not match those marked.

▲ **WARNING:** Duplicate operations can destroy your files. Destination items are replaced by those duplicated from the source, or deleted entirely. Verify this is acceptable before continuing.

▲ **WARNING:** Before duplicating to a volume other than the current system volume under Mac OS X, use the Finder's Show Info command on the volume. Choose Privileges from the info window's menu then turn off the "Ignore privileges on this volume" option.

Click OK to accept your destination choices. At this point, you have given the minimum information required for the script to run, but you may want to change some other script settings.

You can leave the default file selection criteria for copying all files from the source or click the Selecting button to apply a selector. (For details on selectors, see "Using Selectors," which starts on page 176.)

If you want to change one or more of the duplicate options, click the Options button. One such option is moving—rather than just copying—files from the source to the destination. (For details on duplicate options, see "Duplicate Options" on page 142.)

To schedule the script, click the Schedule button and see "Scheduling Scripts," which starts on page 62.

Click the script window's close box and save your changes.

You can now execute the script in any manner you wish. For details, see "Executing Scripts," which starts on page 66.

SCRIPTED RESTORE

Making a restore script is much like setting up an immediate restore operation. The main elements you specify are the backup set and Snapshot to copy from and the volume to which the files and folders are to be restored.

A restore script would be useful, for example, in a student computer lab environment in which the hard disks are restored from a common source every night.

Creating the Script

From the Retrospect Directory, click the Automate tab then click Scripts, which brings up the script editing window.

Click the New button to create a new script. A dialog asks which type of script you want to make; select Restore from the list and click OK. Another dialog asks you to name the script; enter a name and click New. The script appears in its own window.

You will recognize this script window as similar to the immediate restore window, with information for the Source backup set, Destination volume, Selecting files, Options, and Schedule. To change information, click the appropriate button.

Source lets you choose a backup set and Snapshot from which to copy.

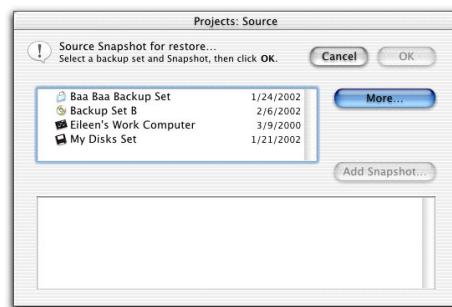**Destination** lets you specify the volume to which to copy.

Selecting lets you choose a selector, a kind of filter for selecting files and folders to be restored. See "Using Selectors," which starts on page 176.

Options displays the options window in which you can specify whether to recompute icon positions or update modify dates of files. The default options suit most people but for more information see "Execution Options," which starts on page 139.

Schedule lets you set the script to run at specific times or at regular intervals. See "Scheduling Scripts," which starts on page 62.
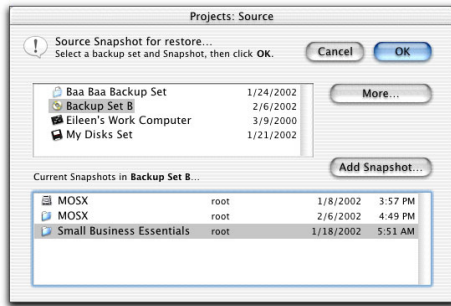
Setting the Source

Because this is a new script, Retrospect says "backup set not chosen" in the script summary window. Click the Source button to get a window with a list of backup sets and Snapshots.
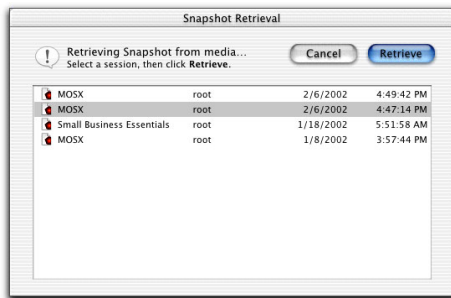

In this window's top list, select the backup set from which to restore. (Use the More button if your desired set is not listed, or select a set you do not want to see here and press the Delete key to get rid of it.)

In the window's bottom list, select a volume Snapshot. The date and time when the volume was last backed up are listed to the right of the volume's name.

If your desired Snapshot is not listed, click the Add Snapshot button to select it from a list of all Snapshots in the backup set.


Selecting a Snapshot to add to the list.

When you select a Snapshot and click Retrieve Retrospect will obtain the older Snapshot from the backup set media (which may require you to insert media) and add it to the list in the restore source window.

With your desired Snapshot selected in the restore source window, click OK to continue. The backup set and Snapshot date, time, and volume name are listed in the script window.

Setting the Destination

Because this is a new script, Retrospect says "volume not chosen" in the script window. Click the Destination button to get the volume selection window with its familiar volumes list.
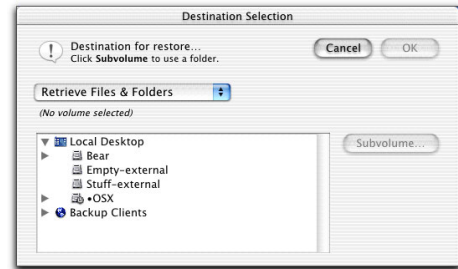
As with an immediate restore (which you learned about in Chapter 4), select a volume on which you want Retrospect to place the restored files and set the pop-up menu to determine how Retrospect restores those files to the destination. (See page 47.) Click OK to continue and return to the script summary window.

▲ **WARNING:** Before restoring to a volume other than the current system volume under Mac OS X, use the Finder's Show Info command on the volume. Choose Privileges from the info window's menu then turn off the "Ignore privileges on this volume" option.

At this point, you have given the minimum information required for the script to run. You may also change the file selection criteria, change the options, or schedule the script. Click the script window's close box and save your changes.

You can now execute the script in any manner you wish. For details see "Executing Scripts," which starts on page 66.

BACKUP SERVER SCRIPTS

Backup scripts are powerful and versatile, but in backup environments which change regularly, another kind of operation—Backup Server—may be better suited to your needs. A regular backup script copies specific volumes in a certain order to a designated backup set. If the backup environment changes and volumes or media become unavailable, the backup will not

happen until its next scheduled time, if ever. This is why Retrospect includes Backup Server technology.

Backup Server Benefits

Retrospect's Backup Server technology accommodates changing network and disk configurations. Whereas a regular backup script follows a rigid schedule for its clearly defined source volumes and destination backup sets, a Backup Server script is driven by the availability of those resources and their need for backup. Source volumes are backed up in order according to need—that which was backed up least recently is first to be backed up. The volumes are copied to the best available backup set media, so Backup Server scripts give you greater freedom to use the media of your choice.

Backup Server scripts are ideal for environments in which computers and volumes irregularly appear on the network. For example, in an office that has ejectable disks and mobile computers which appear on the network at unpredictable times, the Backup Server recognizes the new volumes when they become available and backs them up. Client users can even initiate backups of their volumes, an otherwise unavailable feature.

Though Backup Server scripts can be used independently, it is often best to use them in concert with regular backup scripts to produce a comprehensive backup strategy.

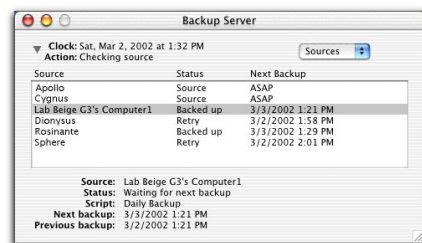## How the Backup Server Works

You start with a Backup Server script, which is similar to other Retrospect scripts. The backup computer running the script becomes a Backup Server during its scheduled time of operation and is idle during its scheduled period of inactivity, when you may use it for other purposes. You may want to dedicate a Macintosh to Backup Server operations during periods of activity and avoid running other programs while the Backup Server is active.

The Backup Server determines which backup media is available and makes a queue based on the most recent backups of the source volumes. The least recently backed up volume is moved to the head of the queue and other volumes are arranged in descending order according to the priority of need. Then the Backup Server examines the Local Desktop and polls the network, looking for the volumes.

■ **NOTE:** Polling the network does not adversely affect network performance.

The Backup Server starts at the top of the volumes queue, determining the availability of each source volume and, if there is a choice, backing up each to its most suitable backup set. Retrospect moves the most recently backed up volumes to the bottom of the queue as it goes along. When it is satisfied that all available source volumes are backed up for the current backup interval, the Backup Server periodically polls clients on the network. Polling involves checking for volumes which have recently appeared, and checking whether any client users have requested backups of their volumes. This whole process ensures a volume in need of backing up gets it.

The Backup Server status window, expanded with the drop arrow.

If allowed by the backup administrator and the Backup Server, a client user can, at any time, request to be backed up as soon as possible. When

Retrospect next polls the client, it will recognize the ASAP request and back up the client.

When the Backup Server script's wrap up time is reached, Retrospect continues the current volume backup but will not start any new backups. When the script's stop time is reached, Retrospect halts the backup in progress, if any, and will not start any new backups until the script's next scheduled start time.

■ **NOTE:** The Backup Server uses only the normal backup action because recycle and new media backups are inappropriate for use with a Backup Server script.

When to Use Backup Server

Table 5-1 on page 74 compares a regular backup script to a Backup Server script.

See "Network Backup Strategies" on page 133 for descriptions of situations which are suited to a Backup Server and for instructions on implementing a strategy based on a Backup Server.

Managing Resources

With abundant resources (large storage capacity, fast network, and powerful backup

Macintosh with plenty of time to operate) and relatively few source volumes, the Backup Server can completely back up all volumes during its window of opportunity. However, with limited resources (small storage capacity, slow network, slow backup Macintosh with little time to operate) and relatively many source volumes, the Backup Server is not likely to completely back up each volume during its given time period. Fortunately, Retrospect's Backup Server effectively manages limited backup resources so that it eventually completes all of its backups.

Trust Backup Server to Do Its Job

Whether your setup is resource-lacking or resource-abundant, the Backup Server always backs up the volumes in order starting with those which need it most. For example, if you need to back up 100 client computers but you can do backups only during an eight hour period each night, chances are Retrospect will be unable to back up all 100 clients the first night before the script's eight hours are up. Leftover volumes will be backed up the next night, and so on, until all 100 volumes are backed up. After the initial backups, the Backup Server will move

Feature	Backup Script	Backup Server Script
Destination Backup Sets	Copies to a single backup set as specified in the schedule or at execution. Fails if media is unavailable. Media rotation is scripted.	Copies to the most ideal available backup set in the destinations list. Automatic media rotation among multiple available backup sets.
Source Volumes	Backs up volumes in the order of the source list. If a backup fails, the next backup does not occur until the next time the script runs.	Backs up volumes in the priority order of their most recent backup dates. After each backup, the queue is re-evaluated, including previously unavailable volumes.
Schedule	Starts backup at a specific time and stops when the last source is completed. Optionally ends at a specific time.	Runs between start and stop times. Backups of available volumes occur as necessary.
Execution	One script runs at a time. Conflicting scripts run one after the other.	All Backup Server scripts run concurrently. Other scripts run as scheduled, but not while Backup Server backs up a volume.
User Requested Backups	No.	Yes.

Table 5-1: Standard backup scripts compared to Backup Server scripts.

more quickly through the queue as it performs subsequent incremental backups.

As the backup administrator, you do not have to separate the clients into different groups for different days based on your estimation of backup times. The Backup Server distributes the load over the scheduled time period.

The main thing to remember about the Backup Server is that all of the source volumes eventually are backed up with no additional effort on your part. In the worst case, the period of time between backups of a given volume will be too long for comfort and you must allot more resources.

If you want your volumes to be backed up more often than they are, you must allocate more resources to the Backup Server script. Increase the script's operating time, use selectors to limit the files to back up, use a faster backup Macintosh, or speed up your network. Setting up a second backup Macintosh with the Backup Server handling half of your clients effectively divides the load in half for each backup Macintosh.

Monitoring Progress

Periodically view the Backup Report (see page 136) to see which volumes were backed up by the Backup Server and their intervals between backups. Of particular interest is the "Elapsed Days" column which shows how many days have passed since each volume's previous backup.

■ **NOTE:** The interval between backups will tend to be smaller when the Backup Server is performing incremental backups after the first backup of each volume. Incremental backups require far less time for most volumes and thus can occur more often.

Deleting a backup event from the Backup Report causes the Backup Server to not consider that backup occurrence when it evaluates the priority of volumes to be queued for backup.

Consequently, that volume is given a backup priority higher than its previous priority.

Interaction with Other Scripts

You can use multiple Backup Server scripts operating simultaneously to manage limited backup resources. You can use separate scripts with different schedules to give some volumes a higher backup priority.

For example, one script could run eighteen hours in a day, backing up volumes from the sales department. Another script could run six hours in a day, backing up volumes from the accounting department. The sales department would be more likely to get completely backed up, whereas the accounting department script may not complete all its volumes in a single six hour period. Still, these volumes would eventually get backed up because volumes in greatest need of backup are backed up before volumes which have more recent backups.

As another example, consider volumes which are available intermittently, such as removable cartridges and notebook computers. Another script could back them up twenty-four hours a day, because they are available at random times during the day. For further discussion of Backup Server strategies, see "Backup Strategies," which starts on page 132.

Other, non-Backup Server scripts scheduled for execution during the active operating time of Backup Server scripts can run without conflict. When a regular script wants to run while the Backup Server is backing up a volume, the Backup Server completes the backup in progress, then allows the other script to execute. When the regular script finishes, the Backup Server resumes where it left off. When a regular script is scheduled to run while the Backup Server is idle, it executes immediately.

Backup Server Tips and Techniques

Choose the Right Backup Server Macintosh

The Macintosh you use for the Backup Server is important. Backup Server scripts work best on a dedicated backup Macintosh that is not running other file serving or sharing software. The Backup Server can run effectively on most Power Macintosh models, but, of course, a high-end G3 model helps get things done more quickly.

The Backup Server does not quit or shut down the backup Macintosh when it is finished; rather, it waits idle until the next scheduled start time.

Use Containers as Sources

Use containers to specify sources in your Backup Server scripts, not individual volumes, especially when you back up clients. When you use containers, any new volumes added to a client are automatically included in backups. Also, using containers avoids a potential problem when backing up Mac OS clients under certain conditions. When you select multiple volumes from a Mac OS client that is set to wait at shutdown and the script's client system option is set to shut down clients after backups, Retrospect will shut down the client after backing up its first volume. This prevents backups of the client's other selected volumes until the client is restarted.

Rotate Among Backup Sets

Create multiple backup sets and use them all as destinations in your Backup Server script. Rotate through the sets by inserting different media in the backup device each day. The Backup Server uses whatever media you inserted.

Introduce New Media

As with any backup strategy, rotate among different backup sets. The Backup Server makes this easy, as it allows you to insert different media at your leisure. Periodically do new media backups to introduce new media. Store old media off-site after each new media backup.

Between new media backups, periodically do recycle backups to avoid catalogs eventually becoming cumbersome and to ensure fast restore operations should they be necessary.

When you want to rotate or introduce new media, do recycle or new media backups by executing regular backup scripts using the same backup sets used by your Backup Server scripts. You can schedule these, execute them from Retrospect's Run menu, or save them as run documents and execute them.

To manually set a backup set for a recycle or new media backup, configure the backup set and use media control. (See "The Options tab" on page 150.)

Monitor Media Availability

Because the Backup Server does not initially put up media request windows, you may not know when it does not have a legitimate medium available to it. When it needs media it shows "media" in the status column of the status window when the pop-up menu is set to either Sources or backup sets. Choose backup sets from the status window's pop-up menu so the window shows which destination backup sets have media available and which do not. Insert media as needed.

If a backup set needs a new or erased medium and you have to erase one, stop the Backup Server, erase the medium from Configure❯ Devices, then start the Backup Server again.

Use Other Scripts to Complement the Backup Server

Retrospect can have multiple Backup Server scripts running concurrently, and it will manage the sources and destinations.

Other, non-Backup Server scripts can execute while the Backup Server is running. You can schedule them or run them at will using run documents. Other scripts can complement

Backup Server scripts by starting recycle and new media backups, and by forcibly backing up volumes which do not get backed up by the Backup Server.

Tape Libraries

An automatic tape loading device with the Backup Server is a powerful combination. All tapes in the loader's magazine are available for backup as backup set destinations. The Backup Server rotates between sets with no additional effort from you. It uses blank or erased tapes when a backup spans over two tapes, or when you set up a new media backup with Retrospect's media control options.

Allow Early Backups

By default, Backup Server scripts allow early backups. These occur when the Backup Server is polling through the list of possible sources and finds a client that has requested to be backed up as soon as possible. When a client user selects this option in his or her Retrospect Client control panel, the client software does *not* send a message to Retrospect on the backup computer. Rather, Retrospect contacts clients as the Backup Server polls, which it does when it is not actually performing backups during its scheduled active time.

If many clients are due for backup, a client with a current backup may wait a long time before the Backup Server gets to it. Regardless of the client user's desire for backup ASAP, Retrospect backs up other clients which do not have current backups. Retrospect always polls starting with clients who need backups the most.

For more information, see "Allow Early Backup" on page 140.

Manage User Deferments

When a client user repeatedly defers his or her backups (as indicated in the operations log), you should make future backups occur at a time which is more convenient for the user, such as when he or she is not using the computer. Or, create a script with the countdown time option at zero to prevent the user from deferring execution.

Set Priority by Volumes

If certain critical volumes are not getting backed up as often as you would like, consider using multiple scripts with different schedules to give some volumes higher backup priority than others. Schedule the higher-priority volumes script to run for a longer duration than the lower-priority volumes script. With more time allotted to the higher-priority volumes, they are more likely to get completely backed up.

Set Priority by Files

If you find the Backup Server is not completely backing up all its sources, another way to set the backup priority is by files rather than volumes, though you can also do both. Use multiple scripts with different selectors to give some files or folders higher backup priority than others. For example, a higher-priority selector would include documents modified in the last seven days, and a lower-priority selector would include all files. Schedule the higher-priority script to run for a longer duration than the lower-priority script.

Creating a Backup Server Script

From the Retrospect Directory's Automate tab, click Scripts, then click New in the window which appears. The next dialog asks which type of script you want to make; select Backup Server and click OK. Enter its name and click New. The script summary window appears.

As with regular backup scripts, click Sources to add source volumes with the volume selection window and click Destinations to add destination backup sets with the backup set selection window. Click Selecting to apply a predefined or custom selector to the source volumes.

So far, these elements are just like those in regular backup scripts, but you will see Backup Server scripts are radically different in terms of options and scheduling.

◆ **TIP:** To back up multiple volumes from a single client, use a container for the source, not a multiple selection of volumes. See "Use Containers as Sources" on page 76.

Script Options

From the Backup Server script summary window, click Options to display the basic Backup Server options.

Click More Choices to see all of the available options categories and notice that many categories parallel those of regular backup scripts. Categories specific to Backup Server scripts are Backup Server, Client Countdown, and Polling. These are detailed in "Execution Options," which starts on page 139.

Setting the Schedule

A Backup Server script's schedule is one of the major differences between it and a regular backup script. From the script summary window, click the Schedule button. The following window appears.

Select a schedule:

Always Active makes Retrospect run the script twenty-four hours a day, seven days a week.

Custom Schedule brings up another window in which you can customize the script schedule. This is described below.

Never Active prevents Retrospect from running the script.

Defer Scheduled Execution checkbox prevents the Backup Server from running until the time you specify.

Customizing the Schedule When you select Custom Schedule and click Custom, you get the custom schedule window. Though similar to the Schedule Preferences window, it is specific to this Backup Server script rather than global to all Retrospect executions.
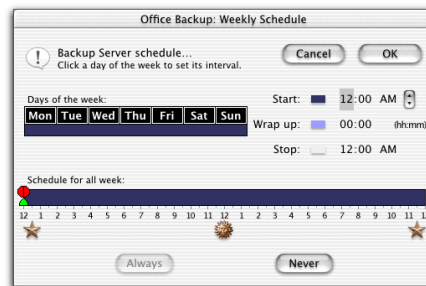
If the schedule was previously Always Active, all twenty-four hours of each of the seven days of the week are selected, as above.

To select a day of the week, click on it. Click and drag to select contiguous days of the week. Use the Shift or Command key and click or drag to select days without de-selecting the previous selection.

To change a time, click on it and type or use the control.

Start is the time at which the script begins.

Wrap Up is the period of time (in hours and minutes) before the stop time, during which Retrospect should complete the current backup but not begin new backups.

Stop is the time at which Retrospect absolutely must halt this script's backups (until the next start time).

◆ **TIP:** You can also set times by dragging the icons on the hourly schedule bar, but you should first experiment by typing the times to see how these controls work.

When a time is changed, the hourly schedule bar changes accordingly to graphically represent the start, wrap up, and stop times of the script.

Each selected day has a scaled-down hourly schedule bar, though it does not have controls.

You can revert a customized schedule with the Always and Never buttons.

Using the Backup Server

Automatic Starting

When you save a Backup Server script, the Backup Server is enabled after the backup computer is idle (that is, no mouse movement, clicks, or keystrokes) for ten minutes. Retrospect starts the Backup Server when a script's scheduled start time arrives. If Retrospect is not open at the start time, it will open automatically.

Run Menu

After you have saved at least one Backup Server script, Retrospect's Run menu includes two pre-

viously unavailable items: Start Backup Server and Disable Backup Server. Choose Start Backup Server to manually enable the Backup Server, which will then run Backup Server scripts at their scheduled times of execution.

Choose Disable Backup Server from the Run menu to prevent any scheduled Backup Server scripts from executing until you later choose Start Backup Server or Enable Backup Server to re-enable the Backup Server.

Control Menu

When the Backup Server is running, Retrospect has a Control menu on its menu bar. Following is a list of its items and descriptions of their functions.

Show Log displays the operations log.

Stop on Errors makes the Backup Server halt when it encounters any error, rather than just logging the error and continuing.

Just Log Errors ensures the Backup Server continues operating when it encounters an error, rather than halting execution. You can find any errors which occur by viewing the operations log.

The Backup Server Control menu items parallel their counterparts of the Control menu available when regular scripts are running.

Status Window

When the Backup Server is running, the status window shows you what it is doing. Click its triangle icon to expand the window for more information.

selected item   expanded status information for selected item
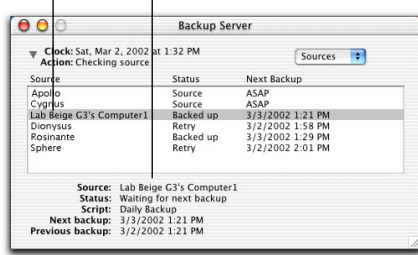
Use the pop-up menu to choose a status category.

Sources shows the source volumes from all running scripts.

Backup Sets shows the backup sets from all running scripts.

Scripts shows all Backup Server scripts.

Retrospect lists the status of each item under the status heading.

Blank means the Backup Server has yet to connect with the item.

Active means the script is functioning.

ASAP means the source will be backed up as soon as possible. This may be either because the client user initiated the backup or the client's most recent backup is older than the script's backup interval.

Backed up means the source volume has been backed up within the specified interval.

Deferred means the client user has intercepted and postponed the backup. Such user deferments are entered in the operations log.

Inactive means the script was deactivated or its schedule does not currently permit it to run.

Media means the Backup Server cannot find the proper media for the item's backup set.

Ready means a source is currently being backed up or is about to be. It also means a backup set is ready as a backup destination.

Retry means the Backup Server failed to back up the source and will try again.

Scheduled means the source has never been backed up, but the administrator has scheduled a pending backup.

Source means the Backup Server cannot find the source volume.

Wrap up means a Backup Server script is in its wrap up period.

Click on an item to see more status information in the lower part of the expanded status window.

Closing the Status Window

Click the Backup Server status window's close box to stop all scripts in progress. When one or more scripts are scheduled, Retrospect waits a period of time, then the Backup Server starts and executes scheduled Backup Server scripts. The wait period is ten minutes if you are still using Retrospect, or one hour if you quit Retrospect.

Deactivating a Script

Retrospect allows you to temporarily deactivate a Backup Server script so its sources are not included in the Backup Server's routine operations. When the Backup Server is stopped and later started, the script will be active.

To prevent a Backup Server script from executing, first choose Scripts from the Backup Server status window's pop-up menu. Then select the script from the list and choose Deactivate Script from the Server menu.

Reactivating a Script To allow a deactivated Backup Server script to execute and include its sources in the Backup Server's routine opera-

tions, follow the same steps as deactivating but choose Activate Script from the Server menu.

Scheduling a Backup of a Source

Retrospect allows you to schedule a backup of a source from a running Backup Server script. This lets you set a definite time for the Backup Server to back up the source, rather than wait for the Backup Server to back it up at its convenience. This is useful, for example, when the backup administrator knows a salesperson will be leaving the office with her PowerBook. The administrator can schedule that client for backup immediately.

To schedule a backup of a source, first choose Sources from the Backup Server status window's pop-up menu. Then select the source from the list and choose Schedule Backup from the Server menu (or double-click on the source), which brings up the following dialog.
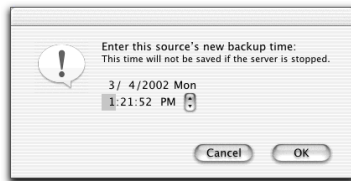
Use the controls to set the date and time to back up the source, then click OK. Retrospect changes the priority of the source in the Backup Server queue according to your scheduled time.

A backup scheduled this way is not remembered by Retrospect when the Backup Server is stopped.

Resuming the Paused Backup Server

When you use the Backup Server Macintosh's mouse or keyboard while Retrospect is the active application, Retrospect pauses the Backup Server in anticipation of you issuing commands. The Backup Server automatically resumes after two minutes of mouse or keyboard inactivity.

To resume the paused Backup Server before the two minutes have passed, choose Resume Server from the Server menu.

Backup Server Runs Continuously

Unlike other scripts, when Backup Server scripts finish they do not take the action specified by the Unattended preference. For example, a Backup Server script will not quit when done. If you quit Retrospect, the Backup Server will automatically launch Retrospect when the next script is scheduled to start.

NETWORK BACKUP

- **OVERVIEW**

- **INSTALLING CLIENTS**

- **WORKING WITH CLIENTS**

- **UPDATING CLIENTS**

- **UNINSTALLING A CLIENT AND ITS SOFTWARE**

- **ADVANCED NETWORKING**

- **CLIENT USER PREFERENCES**

- **BACKING UP CLIENTS**

- **WORKING WITH WINDOWS CLIENTS**

- **COPYING MAC OS FILES TO A WINDOWS CLIENT**

- **NETWORK BACKUP GUIDELINES**

This chapter provides instructions on installing, configuring, and otherwise administering the client software that allows you to access networked Retrospect client computers from the backup computer. It also describes the options and controls at the hands of the user of the Retrospect client. In addition, this chapter explains how to back up these clients and gives information specific to clients used under the different operating systems. Finally, it gives information and worksheets for setting up workgroup backups and offers advice on choosing the computer to do the job.

OVERVIEW

Retrospect allows you to use a single computer with a storage device to back up networked Windows and Macintosh computers equipped with Retrospect client software.

The backup administrator—that's you—installs the Retrospect client software on each of the client computers (also called clients). The backup administrator uses the Retrospect application to log in clients for use by the backup computer. After configuring the clients, the administrator can create and schedule scripts using client volumes as sources, as if the volumes were connected directly to the backup computer.

Licensing

Retrospect will work with as many clients as you have licensed. You can add licenses to support more clients.

Retrospect's license manager keeps track of your client licenses with the license codes you enter. Client license codes are included as part of Retrospect Workgroup Backup and Retrospect Server Backup, and are available separately in Retrospect Clients. You get additional codes when you purchase additional licenses.

To view current licenses, click Licenses from the Directory's Special tab, or choose License Manager from the Window menu.
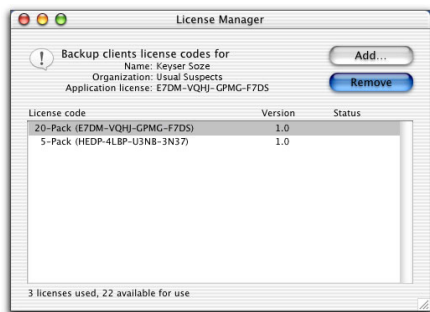
The license manager summarizes the quantities of used and available clients and lists client licenses you have added.

To add a client license, click the Add button and enter your new license code in the dialog that follows.

Backup Computer Memory Use

If you will use more than 100 clients with Retrospect under Mac OS 9, increase the application's default memory allocation by 2K per client. For example, with 150 clients you would increase the default memory size by 300K.

Security

Clients connected to the Internet are at risk, however slight, of unauthorized access. The Retrospect client installer program requires you to assign passwords (as explained on page 84, page 86, and page 91) to clients to prevent access by Internet users who have Retrospect.

Network Protocols

Prior versions of Retrospect could access Mac OS client computers using either AppleTalk or TCP/IP network protocols. This version of Retrospect can access clients using only TCP/IP, which is generally much faster than AppleTalk for network backup.

To use Retrospect clients, you must have a functioning TCP/IP network. For more information, contact your network administrator or Internet service provider.

INSTALLING CLIENTS

System Requirements of Macintosh Client Computers

To be backed up or otherwise accessed by Retrospect from the backup computer, the following is required of each networked client Macintosh.

• PowerPC-based computer running under Mac OS 7.1 or later with Open Transport 1.1 or later

• Networking hardware and cabling functioning with TCP/IP protocol, connected or routed to the network on which the backup computer operates

System Requirements of Windows Client Computers

To be backed up or otherwise accessed by Retrospect from the backup computer, the following is required of each networked Windows client computer.

• Computer running under either Windows 95/98/Me, Windows NT 4.0 Workstation, Windows 2000 Professional, Windows XP Home Edition, or Windows XP Professional

• Networking hardware and cabling functioning with the TCP/IP protocol, connected or routed to the network on which the backup computer operates

• Winsock 2.0 for Windows 95

You can install TCP/IP networking software from the Windows installation software. Windows 95 requires the Winsock 2.0 Update from Microsoft. It is available free from Microsoft at:
http://www.microsoft.com/windows95/

Installing the Client Software on Macintosh Computers

Use the following procedures to install the client software on each Macintosh computer you want to back up over the network.

◆ **TIP:** For installing many clients on a network from a file server, or for installing on computers without CD-ROM drives, you can make a shared folder on a server with the contents of the Retrospect Clients Installer application. Run the Installer program from that folder instead of from the CD.

To Install Retrospect Client Software on a Macintosh Computer:

1. Save all unsaved documents and quit other running application programs.

2. Under Mac OS X, log in to the client computer so that you have administrator privileges.

3. Insert the Retrospect or Retrospect Clients CD in the client computer's CD-ROM drive.

4. Double-click the Installer icon to launch the program.

5. Follow the instructions of the installer program to place the client software on the startup disk. Create and enter a password to prevent unauthorized access to the client; do not forget this password. Under Mac OS 7/8/9, restart the computer.

After Installation

When the computer starts up it automatically loads the client software. The client is now ready to be accessed from the backup computer, as detailed under "Working with Clients" on page 86.

Installing the Client Software on Windows Computers

Use the following procedures to install the client software on each Windows computer you want to back up over the network.

◆ **TIP:** For installing many clients on a network from a file server you can make a shared folder with the Retrospect Clients Setup application then run the Setup program from that folder instead of from the CD.

1. Save all unsaved documents in other running application programs.

2. Under Windows NT/2000/XP, log in to the client computer so that you have Administrator privileges.

3. Insert the Retrospect or Retrospect Clients CD in the client computer's CD-ROM drive.

4. Click the Install Client button.

5. Follow the instructions of the Setup program to place the client software on the startup disk. Create and enter a password to prevent unauthorized access to the client; do not forget this password. Restart the computer.

Cloning Installations

You may wish to use popular disk cloning software to clone a client installation. After installing client software on a computer, you can use the computer as the master from which to create other cloned computers. Do not use Retrospect to access the newly-installed client before using it as the clone master. You must clone the master before you access it with Retrospect.

Starting and Automating the Registry Backup Manager (NT/2000/XP Only)

These steps are unnecessary under Windows 95/98/Me. You should already be logged in to the client computer with Administrator privileges. Go to the default installation path Program Files/Dantz/Client and double-click RegCopy.

Enable daily, unattended saving of the registry by clicking On and Apply. Click the Help tab for more information.

After Installation

When the computer starts up it automatically loads the client software. The client is now ready to be accessed from the backup computer, as detailed under "Working with Clients" below.

WORKING WITH CLIENTS

The Clients button on the Retrospect Directory's Configure tab lets you work with client computers.

Click the Clients button to bring up Retrospect's client database window.
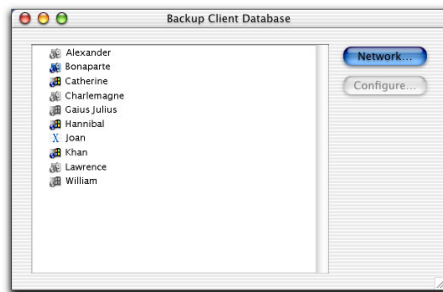
The client database window.

The scrolling list shows all the client computers currently logged in for use with Retrospect, if any.

Mac OS 7/8/9 clients are represented by the icon, Mac OS X clients use the icon, and Windows clients use the icon.

Click Network to bring up the clients on network window.

Working with Clients on the Network
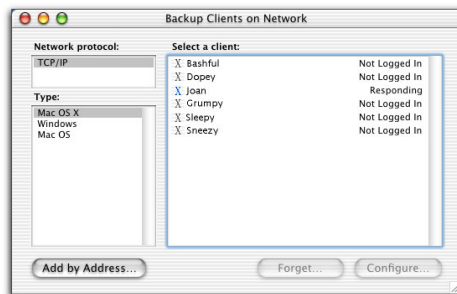
The clients on network window.

This window's large, scrolling list on the right shows all the computers with Retrospect client software Retrospect found on a specific network with a specific protocol. (Presently, Retrospect and its clients use only the TCP/IP protocol.)

By default, Retrospect uses its Piton multicast method of searching for clients in the local subnet. (A subnet is a group of local computers physically networked together without a router

or gateway, though they may use a gateway to connect to other networks.)

Retrospect Desktop Backup does not search for clients outside the local subnet. If you want to access clients outside the backup computer's subnet, upgrade to Retrospect Workgroup Backup or Retrospect Server Backup edition.

Retrospect Workgroup Backup and Retrospect Server Backup editions include advanced networking features to access clients outside the local subnet using a variety of methods. These features are described under "Advanced Networking," which starts on page 93.

Click to select a type of client, either Mac OS X, Mac OS (7/8/9), or Windows. The large scroll list shows installed clients of this type on the network.
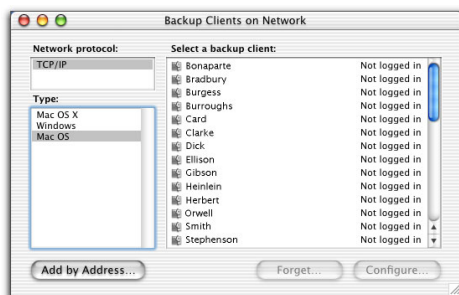
The clients on network window, showing Mac OS 7/8/9 clients. While this window is open, Retrospect actively looks for clients on the network.

To the right of each client name, Retrospect lists its status. "Not Logged In" means the client has not been logged in for use with Retrospect. "Responding" means the client is logged in and ready for backups or other uses.

Commands

The clients on network window provides commands for working with client computers on the network. To issue a command, select a client from the list, then click a button.

Log in lets you log in the client for use with Retrospect. This is necessary for Retrospect to include it in dialogs listing possible sources or destinations for operations. When you log in a client, Retrospect's license manager decrements the available pool of individual client licenses.

Forget removes the selected client computer from the client database, effectively "logging out", and removes its volumes from all scripts and other source listings within Retrospect. After you forget a client, it shows as "Not Logged In." The client software on the computer is not affected by this operation. Files already copied from this client are not affected in your backup sets. The "forgotten" client may still be used by other backup computers with Retrospect. Forgetting a client makes one more client license available in the license manager (page 84).

Configure allows you to configure various aspects of the selected client, including its name, password, link encryption, and clock. Configure is often used to determine which volumes mounted on the client computer should be displayed in Retrospect's list of possible sources. See below for more information.

Configuring a Client

After you have logged in a client, you need to configure it. If a client is not logged in, you can select it in the clients on network window and click the Log in button to log in and configure the client. If the client is logged in but you need to reconfigure its settings, you can select it in the client database window and click Configure.

The top of the client configuration window shows the client name. This window is arranged with tabs like the Retrospect Directory. Each tab is a category of configuration options: General, Configure, and Volumes.

General Tab Configuration Options

The General tab has an option to protect data over the network and options for specifying

which volumes on the client computer are accessible to Retrospect over the network.
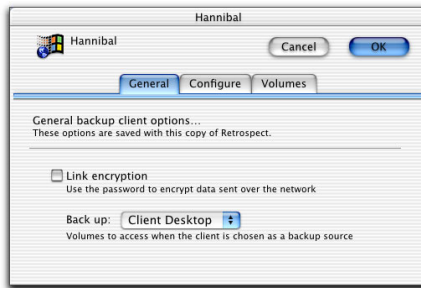
Link Encryption The link encryption option, which is off by default, is only available if this client uses a password. When the Link Encryption checkbox is checked Retrospect protects against network eavesdropping by encrypting data transferred over the network then decrypting it before writing it in the backup set. (Client link encryption is distinctly different from backup set encryption.)

Volumes to Access The setting of the pop-up menu affects how Retrospect resolves client containers during operations. Usually you do not need to change it from its Client Desktop default.

• **Client Desktop** resolves to all volumes local to the client computer, except for floppy disks,

shared volumes (such as file servers), read-only volumes (such as CD-ROMs), and empty volumes.

• **Startup Volume** resolves to the volume from which the client computer booted.

• **Selected Volumes** resolves to all volumes selected in the Volumes tab of the client configuration window.

Table 6-1 below uses the example of a client computer with several mounted volumes. It shows the volumes to which the client container resolves, respective to the different Volumes to Access settings.

■ **NOTE:** Retrospect does not let you use drive A: or B: from any Windows client, regardless of whether A: or B: is a floppy disk drive or is mapped to a server, for example. These drives are always excluded from backups and other operations.

Configure Tab Configuration Options

The Configure tab lists the client name, whether it has a password, its clock offset (the time difference between the client computer clock and the clock of the backup computer), and the version number of the client software.

These volumes mounted on a client computer…	…with this Volumes to Access configuration…	…resolves to these volumes.
		MOSX Startup Extra HD
		MOSX Startup
		Extra HD

Table 6-1: Examples of client container resolutions with different Volumes to Access configurations.
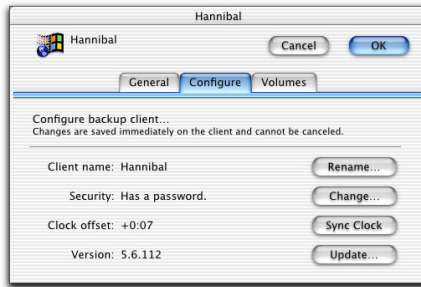
To change the client name, click Rename. (A dialog then asks you to enter the new name.) To add, change, or remove the password, click Change. (A dialog then asks you to enter the new password.) To change the time of the client computer to match that of the backup computer, click Sync Clock, which is not available when the client allows read access only (page 97). If the client version is old you can update it over the network by clicking Update. (A file selection dialog then asks you to locate the Retrospect Client software to use as the master from which to update. See "To Update an Individual Client Computer" on page 92 for detailed instructions.)

Volumes Tab Configuration Options

The Volumes tab lists on-line volumes which you can make accessible over the network.
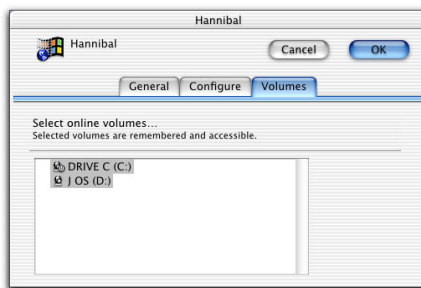
Within the scrolling list of the client computer's on-line volumes, you can have any selection (including no selection). The selection determines which volumes appear in a volume selection list (such as for a backup script's sources). It also determines the volumes to which the client container resolves when the General tab's pop-up menu is set to Selected Volumes.

Retrospect does not list drive A: or B: from any Windows client, regardless of whether A: or B: is a floppy disk drive or is mapped to a server, for example. These drives are always excluded from backups and other operations.

See "Volumes to Access" on page 88 for further information.

When you have made your selections in this window, click OK. (If you click Cancel, none of your changes will take effect.)

Forgetting a Client

After a client has been logged in, there may come a time when you no longer need it and its volumes. (For example, a computer is no longer on the network.) In this case, you can tell Retrospect to forget it, which is the opposite of logging it in.

In the clients on network window, select the client and click the Forget button. Or, in the client database window, select the client and choose Forget from the Clients menu. Retrospect asks you to confirm this. By clicking OK, you are removing the client volumes from scripts and other lists in Retrospect. This only affects Retrospect on the backup computer in use at the time. It does not affect other copies of Retrospect running on other computers on the network, which remain logged in to the client as usual. Forgetting a client does not affect that client's existing backups.

Getting Information About a Client

From the backup computer, you can use the Get Info command in the File menu to see status and other information about any client that appears in the client database window, or a responding client in the clients on network window. For example, you may want to determine

whether a client is available for backup operations, or verify a client has been updated to the latest version.

To get information about a client, go to the client database window and select the client you want information about. Then choose Get Info from the File menu. The client info window appears.

This client is ready to be backed up or used for some other operation

This client has a password installed

The client info window.

The client info window gives the following information about the client.

The name at the top is the given client name. Below the name is the client's IP address.

Status indicates the client's availability for backups and other operations. *Ready* means the client is ready and available. *Shutdown wait* means the user has given the Shut Down command to the Mac OS 7/8/9 client computer and the Retrospect client software is waiting for a Retrospect backup computer. *Locked* means the user at this client workstation has checked the "Read Only" access preference in the client control panel. (The client can be backed up, but you cannot restore to it or delete files from it.) *Busy* means the client is currently being accessed by a different copy of Retrospect on the network.

Turned Off means the user at this client clicked the "Off" radio button in the client control panel. A client that is turned off is unavailable for operations until it is turned on manually or the client computer is restarted.

Version is the version number of the client software installed on the client computer.

Machine (Windows clients only) shows the type of CPU in the client computer.

Memory is the total amount of RAM in the client computer.

System is the operating system used by the client computer.

OT Version (Mac OS 7/8/9 clients only) is the version of Open Transport running on the client Macintosh.

Application (Mac OS 7/8/9 clients only) is the active application or program.

Idle time (Mac OS 7/8/9 clients only) is the amount of time since the keyboard or mouse on the client Macintosh were last used.

Echo time is the time delay, in seconds, experienced in communicating with this client (usually 0.0 to 0.2). If the network or client is busy, or you are using routers, the echo time could easily be higher without indicating a problem.

Speed is the transfer rate of the network connection between the backup computer and the client computer.

Clock offset is the difference in hours:minutes:seconds between the internal clocks of the client computer and the backup computer.

Priority (Windows and Mac OS 7/8/9 clients only) is the priority setting the user has chosen in the client control panel. A 20% priority means the user has set the slider all the way to "User," giving other applications and tasks

some of the computer's processing time that would otherwise be used for Retrospect tasks. A 100% priority means the client's priority slider is set all the way to "Backup," giving client tasks (namely, transferring files) all of the client software's processing time allotted by its operating system.

Volumes displays the number of volumes the backup computer knows about for this client.

Security summarizes the data security specified for this client computer. *No Password* means no security code was installed. Anyone using Retrospect on the network can log into this client. *Password Protected* means a security code must be entered in order to log in to this client. *Link Encrypted* means that the administrator has selected the "Link Encryption" general client option for this client. This means data from this client is being encrypted before being copied over the network. You cannot select the Link Encryption option unless you have a password.

To close the info window, just click the close box.

UPDATING CLIENTS

Updating Clients from the Backup Computer

There may come a time when you need to update older client software to take advantage of improvements in a newer version. You can update client computers individually, or update a group of client computers with a single command from the backup computer.

You can update all Mac OS X clients, all Mac OS 7/8/9 clients, or all Windows clients at any time. It is a good idea to update all clients even if you know some of them are turned off. You can later repeat this operation without affecting the clients that are already updated.

To Update All Clients of a Given Type

Go to the Retrospect Directory's Configure tab then click the Clients button. The client database window appears, listing all client computers (Windows, Mac OS 7/8/9, and Mac OS X) currently logged in for use with Retrospect.
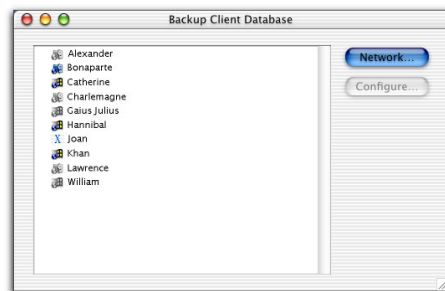
The client database window.

Choose Update All from the Clients menu. Retrospect asks whether you want to update Mac OS X clients, Mac OS 7/8/9 clients, or Windows clients.
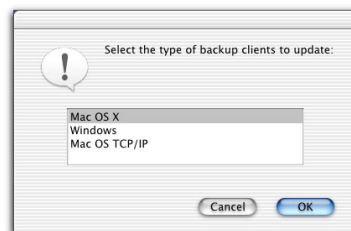
Select a type and click OK to continue.

Another dialog appears, asking you to confirm the updating of the client software on selected client computers using your chosen protocol. Click OK to continue.

Another dialog appears, prompting you to specify the location of the most recent version of the Retrospect client software.
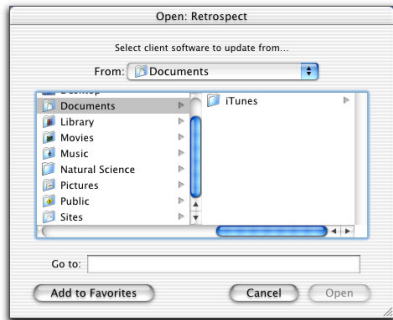
Select a copy of the appropriate client update file, for either Macintosh or Windows, and click Open. Retrospect begins updating the client software on selected client computers.

■ **NOTE:** If a client computer has virus protection software installed, it may require confirmation at the client computer before allowing the update to continue.

When the update is complete, Retrospect reports the results in a dialog and the operations log. Click OK.

To confirm the status of each client update, open the operations log. (To do this click the Reports tab then click the Log button, or choose Log from the Window menu.)

Restart each Mac OS 7/8/9 client computer. The update does not take effect under Mac OS 7/8/9 until the computer is restarted.

To Update an Individual Client Computer

Go to the Retrospect Directory's Configure tab then click the Clients button. The client database window appears, listing all client computers (Windows, Mac OS 7/8/9, and Mac OS X) currently logged in for use with Retrospect.

Select the client you want to update then click the Configure button (or double-click the client). In the client configuration window that appears, click the Configure tab.
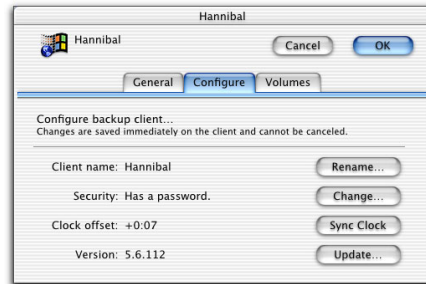
Click the Update button. A dialog appears, prompting you to specify the location of the most recent version of the Retrospect client software.
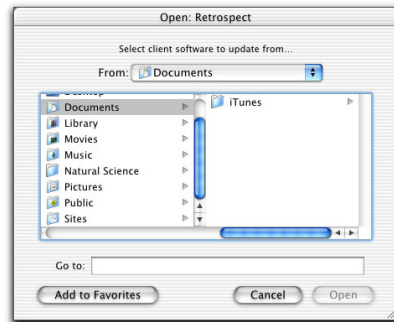
Select a copy of the appropriate client update file, for either Macintosh or Windows, and click Open. When the update is complete, another dialog appears, telling you the update completed. Click OK.

The update does not take effect under Mac OS 7/8/9 until the computer is restarted.

Updating a Client from Its Workstation

If you do not want to update clients from the backup computer as described above, you can update clients directly from the users' workstations. This is done with the Client Installer application (Mac OS) or Setup application (Windows), which can also update clients.

Follow the instructions on page 85 which correspond to the computer's operating system.

UNINSTALLING A CLIENT AND ITS SOFTWARE

In the event that you would like to remove the client software from a computer, take the following steps.

Forget the client as described on page 89.

Mac OS 7/8/9 Remove the Retrospect Client control panel from the computer by placing the file in the Trash.

Mac OS X Open the client installer application. Choose Uninstall from the pop-up menu and select the volume from which to uninstall Retrospect client software. Click the Uninstall button to remove the client software from the computer, then exit when you are done.

Windows From the Start menu, choose Add/Remove Programs. Follow the instructions to remove the client software from the computer, then exit when you are done.

ADVANCED NETWORKING

The features described in this section are available only with Retrospect Workgroup Backup and Retrospect Server Backup editions.

Overview

Retrospect normally uses TCP/IP multicast addressing to access backup clients. This allows the live network window to list clients directly connected to the local network segment, or local subnet. You will need to use Retrospect's more sophisticated techniques of accessing clients if your network has routers between the backup computer and its clients, or if your backup computer has multiple network cards connected to different physical networks.

Retrospect Workgroup Backup and Retrospect Server Backup have the ability to use several different methods of accessing clients.

Access Methods

Retrospect can either use the standard DNS and WINS directory services, or its own Piton Name Service based on TCP/IP.

Adding a client to the Retrospect client database also stores its access information for later use. When Retrospect tries to connect to the client for a backup, it resolves the access information into its current IP address using the original access method.

On each client computer, Retrospect client software waits for queries from Retrospect on the backup computer. Just exactly how Retrospect gets in touch with the clients depends on the access method Retrospect is using.

Multicast

When you first open the clients on network window, the default access method is multicast. With this method, Retrospect sends out a multicast request to the listening client computers, asking them to respond with their identities. After you have added a client with this method, when Retrospect later tries to connect to the client for a backup, it handles IP address changes automatically by sending out another request to update its client database and connect with the proper client.

If you use a network analyzer to monitor the packets it sends with the multicast method, you will see Retrospect uses well-known port 497 for its communications. The packet format conforms to the proprietary Dantz protocol Piton (for PIpelined TransactiONs), which gives Retrospect much of its network speed and reliability. Multicast Piton Name Service uses the assigned address 224.1.0.38, which allows Piton to direct its queries only to those computers running Retrospect client software.

Multicast access is simple, requiring no configuration, but does not operate across routers. It works only in the local subnet.

Subnet Broadcast

The subnet broadcast access method allows you to access clients through virtually any network topology, including the Internet.

According to TCP/IP standards, every subnet has both a network address and a subnet mask, such as 192.168.6.0 and 255.255.255.0. Routers use these to identify the physical network to which computers are connected. Routers also support queries to all the computers on a particular subnet. Retrospect takes advantage of this ability for its subnet broadcast access method, using the same Piton protocol as for multicast access.

With Retrospect's subnet access method, you must define the address and mask of each subnet you wish to use, and update these configurations if your network changes.

Direct Access

You can use the direct client access method to add a specific backup client to Retrospect's client database. This method requires you to know the IP address or DNS or WINS name of each backup client. Do not use a numeric IP address for computers which get a dynamic IP address from a DHCP server, because Retrospect has no way to learn when the address changes.

Adding clients by direct access is most useful for a few clients; adding many might be tedious. One of the other methods would probably be better for adding numerous clients.

Using and Configuring the Different Access Methods

Configuring Subnets for Broadcasting

You can define subnets other than the local subnet in which Retrospect searches for clients.

Choose Configure Subnet Broadcast from the TCP/IP menu to configure a new subnet to search. The first time you use this feature, no subnets are configured so none appear in the configuration window.
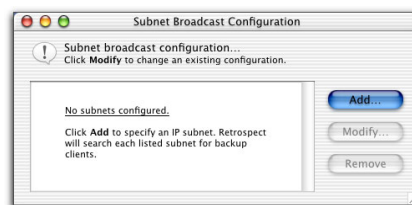
Click Add to configure a new subnet to search.
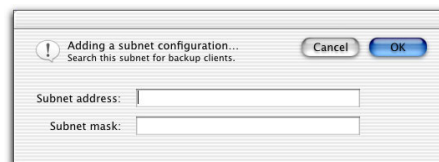
Enter an IP address within the subnet and enter its subnet mask.

The IP subnet you defined appears in the subnet configuration window.
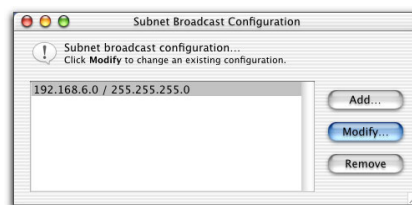
You can later add, modify, or remove subnets as needed.

Click OK to return to the clients on network window.

With one or more subnets configured for broadcast, Retrospect searches your defined subnets and displays found backup clients in the clients on network window.
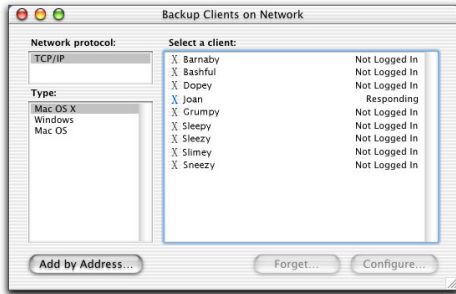
When you add a client with the subnet broadcast access method, Retrospect knows to look for that client in your defined subnets.

Each subnet you configure will be accessed by Retrospect when it searches for clients. This includes not only when this window is open, but also when Retrospect searches for a client in an operation.

Directly Adding a Specific Client

In the live network window, click the access method button Direct. The client list is replaced with an entry box for you to enter the known IP address or DNS or WINS name of a client.

Enter the name or address and click Add. (Should it fail to connect to a client at the specified IP address, see "Troubleshooting" on page 198.) When it finds a client at the specified address, Retrospect asks you for its password before logging it into the client database. When logged in, Retrospect displays its client properties window (detailed under "Configuring a Client," which starts on page 87).

CLIENT USER PREFERENCES

Overview

After the client software has been installed, users of client computers can control some aspects of network backup operations with the Retrospect Client control panel (Mac OS 7/8/9 and Windows) or Retrospect Client application (Mac OS X).

You do not need to change any of the settings to perform backups. In most cases, the existing settings are the ones you will want to use.

The Retrospect Client control panel displays information about the client computer on which it is installed, including the user or computer name, the access status of the client, and a report about the last several backups.

The Mac OS X client application.
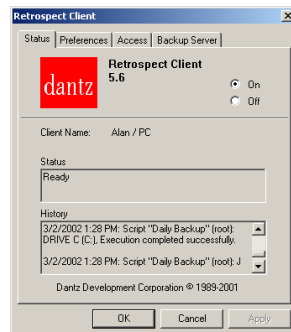
The Windows client control panel, showing the Status tab.

Access Master Control

The On and Off radio buttons let you allow or deny network access to your client by the backup computer. When you install the client software and each time the client computer starts up, the control is on to allow access. When the control is turned off, the data on the client computer cannot be accessed over the network by Retrospect.

◆ **TIP:** To permanently prevent access to the client computer, uninstall the Retrospect client software as described on page 93.

Preferences

The Retrospect Client control panel has additional user preferences for managing client operations. Click the Preferences button (Macintosh) or tab (Windows).

Execution Preferences (Mac OS 7/8/9 Only)

The execution preference settings allow client users to control how Retrospect interacts with the client computer.

Wait at Shutdown determines what happens when a client user chooses Shut Down from the Finder's Special menu. When this option is selected and Shut Down is chosen, the "waiting for backup" dialog is displayed until the backup takes place. By default, this preference is selected.

When this dialog is on the client Macintosh screen, the client user may click Restart to restart the client Macintosh, click Shut Down to shut it down, or click nothing and leave it for unattended operation. When the client computer is not used for thirty seconds, a screen saver appears until the user presses a key or moves the mouse to return to the dialog. When the backup computer finishes its operation with this client, it shuts down the client Macintosh.

Run in Background allows the backup computer to operate at the same time the client user

is using the client Macintosh. If the checkbox is not checked, a dialog appears on the client during network operations. This preference is on by default.

When the dialog appears, the user of the client Macintosh can cancel the network operation to continue working or wait until the operation is finished. When "Run in Background" is checked, the dialog does not appear during backups, and the client user can set priority levels for local and network operations. See below for details.

Priority Preference

This preference is available under Mac OS 7/8/9 and Windows. It is not available under Mac OS X, as the operating system's multi-tasking makes it unnecessary.

The priority preference allows the client user to make the client computer favor either the user's task at hand or the operation requested by the backup computer. (With a Macintosh client, this applies only when the "Run in Background" execution preference is on.) Drag the slider and set it to somewhere in the range between "User" and "Backup." When the slider is set all the way to "User," the computer devotes more of its attention to its user, slowing Retrospect client operations slightly. When the slider is set all the way to "Backup," the client operation is given priority and the client computer is slightly less responsive to its user.

This setting has no effect until the client is actively communicating with the backup computer.

With a Macintosh client, the Priority setting is ignored if the client Macintosh is displaying the "waiting for backup" dialog.

Access Restrictions Preferences

These preferences allow the client user to control access to the files and folders on his or her computer.

Read Access Only allows the client computer to be backed up across the network, but prevents writing by the backup computer. This means it cannot restore, move, or delete files on the client computer, nor can Retrospect be used to rename volumes. The options "Set Volume Backup Date," "Move Files," and "Synchronize Clock" cannot be used on the client. This setting is off by default.

Private Files/Folders/Volumes makes any files, folders, or volumes designated as private unavailable to the backup computer. This preference is off by default. Select the checkbox and designate private items as described below.

To designate an item as private on a Macintosh, type a bullet ("•", Option-8) at the beginning or end of its name (placing it at the end will preserve its sort order in the Finder). For example, you could designate the folder "Personal" as private by renaming it "Personal•".

To designate an item as private under Windows, click the Add button to enter a pathname in a dialog, then click OK. Add more pathnames to exclude more volumes, folders, or individual files. The privacy feature uses the literal pathnames you specify. If you move or rename a file or folder it may no longer be private. If you mount a volume to a different drive letter, its files and folders may no longer be private.

Notification Preferences

These two preferences allow client users to specify how they are informed about Retrospect network operations.

Notify after Backup directs the client to display a message after the completion of a backup or other operation. Clicking OK dismisses the message. By default, this preference is selected.

Notify if no Backup in n days directs the client to display a message after 9:00 a.m. if the client has not been backed up within the number of days specified in the entry box. By default, this preference is selected and the number of days is seven.

Controlling the Backup Server

Schedule

When the backup computer uses a Backup Server script the client user can control when the Backup Server should back up the client computer.

Mac OS 7/8/9 Click the Schedule button to bring up the Backup Server control dialog.

Mac OS X Click the Preferences button to bring up the Backup Server preferences.

Windows Click the Backup Server tab to bring its controls to the front.

These controls lets the user determine when the client computer can be backed up by the backup computer (using a Backup Server script). The user would normally use it to initiate a backup or defer a backup, but the user can also revert the Backup Server back to its normal schedule for this client.

As soon as possible makes the backup computer back up the client computer as soon as the Backup Server is available to do so.

According to normal schedule makes the backup computer back up the client computer at its regularly scheduled time in the Backup Server script. (This is the default.)

After prevents the backup computer from backing up the client computer before the specified time and date, up to one week from the present time. (Click on the time and date and type or click the arrows to change them.)

Click OK to accept the settings.

Execution

When the Backup Server is about to back it up, a dialog appears on the screen of the client computer.

The dialog gives the client user three ways to control the execution of the impending Backup Server operation:

• Waiting for the countdown to reach zero lets the Backup Server operate.

• **Backup** lets the Backup Server operate immediately.

• **Defer** lets the user set a later time for the backup to operate.

When a user defers, Retrospect makes an entry in the backup computer's operations log.

BACKING UP CLIENTS

You back up a client volume the same way that you would back up a volume directly connected to the backup Macintosh.

When you set up an immediate or scripted backup, the volume selection window for the source lists available clients under the Backup Clients container and available client volumes under the individual client containers.
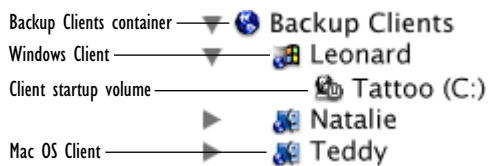
The Backup Clients container with some of its clients and a client volume.

When you set up an immediate backup or make a backup script you have a few different ways of selecting clients and client volumes in the volume selection window for the sources. You can select a client container, one or more specific volumes, or the Backup Clients container. We recommend using client containers or the Backup Clients container. Following are advantages of each method.

Selecting the Backup Clients container selects all individual client containers (described below) logged in at the time of the backup, including new clients you add later.

Selecting a client container selects volumes determined by a client general configuration setting, which is explained in detail on page 88. Using a client container is simple and maintenance-free, as volumes which are renamed, replaced, or partitioned continue to be backed up with no administrator intervention.

Selecting individual volumes selects only those specific volumes, unlike containers. Retrospect continues to select volumes which are renamed but does not automatically adjust for new, replaced, or partitioned volumes. When the client configuration changes you may need to intervene. This way of selecting volumes is useful, for example, when you do not want to back up all volumes on a particular client.

Selecting folders or groups in your script selects whatever volumes and client containers are placed in the folder or group. This method simplifies script management by allowing you to control your sources in a single place, the Configure❯Volumes window. Using folders in the Backup Clients container lets you better organize a large number of clients. Using groups lets you build lists of volumes and clients which should be backed up together.

For detailed instructions on selecting volumes, see under "Working with Volumes" in Chapter 9.

WORKING WITH WINDOWS CLIENTS

Fixing Microsoft Windows 95

Two different bugs in Microsoft's network software can cause Retrospect to report networking errors with Windows 95 clients. Microsoft has resolved both problems and free fixes are available for Windows 95. Other Windows operating systems do not require these updates.

We strongly urge you to update your Windows 95 systems.

Windows 95 TCP/IP Fix

The hot fix for Windows 95 is installed by the client software Setup program. After installation, choose Run from the Start menu, then type "C:\Program Files\Dantz\Client\VTCPUPD" (or your different installation path) and click OK. Follow the instructions in Microsoft's installer, then restart to complete the fix. Repeat for each Windows 95 computer to be used with Retrospect. Windows 98 does not require an update.

Windows 95 Winsock Update

Microsoft's Winsock 2.0 update fixes another networking problem present in Windows 95 only. It is available free from Microsoft at: http://www.microsoft.com/windows95/

Windows NT/2000/XP Registry Backup

To fully restore a Windows NT/2000/XP computer, you must back up its registry. The registry changes as programs are installed and removed, control panel settings are changed, and application preferences are changed, so you must back it up regularly to keep up with its changes. Because Retrospect cannot directly back up the NT/2000/XP registry, Dantz supplies the Registry Backup Manager, a tool that automates and simplifies registry backup.

The client software Setup program installs the Registry Backup Manager application to the client software path (C:\Program Files\Dantz\

Client by default). Start and automate the Registry Backup Manager as detailed on page 86. For detailed instructions on using the Registry Backup Manager, click its Help tab.

Windows 95/98/Me Registry Backup

Retrospect backs up the Windows 95/98/Me registry when the Windows folder is included in the file selection criteria. You do not need to take any extra steps to preserve its registry, other than doing your normal backups of computers.

NTFS Security

Retrospect for Macintosh does not back up or restore NTFS security permissions. If you need to back up Windows workstations where NTFS security is important, you must use Retrospect for Windows.

Windows NT/2000 Servers

Retrospect for Macintosh does not support backing up Windows NT or 2000 Servers. Because Retrospect for Macintosh does not back up or restore NTFS security permissions, multiple data stream files, or Active Directory, it simply cannot restore a Windows server back to an operable state. You can, however, use Retrospect for Macintosh to back up user data from a Windows server, with some exceptions, noted below.

Services for Macintosh

Because Retrospect for Macintosh does not back up or restore multiple data streams or permissions from NTFS volumes, Services for Macintosh data cannot be backed up to a Macintosh using Retrospect Clients. If you try this, you get a warning in the log.

We recommend you use Retrospect Server Backup for Windows to back up Windows NT or 2000 servers.

If you wish to use Retrospect for Macintosh to back up Services for Macintosh data from a Windows NT or 2000 Server, you must back up

the data as a mounted AFP volume. To do this, mount the volume on your Macintosh desktop using the Chooser. Then add it to your backup scripts as a local source. You can configure Retrospect to automatically mount the volume during execution. To do this, highlight the volume and choose Configure from Retrospect's Volumes menu.

Excluded Volumes

Retrospect does not let you use drive A: or B: from any Windows client, regardless of whether A: or B: is a floppy disk or other type of drive. These drives are always excluded from backups and other operations.

Excluded Files

Retrospect excludes certain files from backups and does not show these files in Browsers because they cannot or should not be backed up or restored. The files are active virtual memory swap files (.Swp or .Par and Pagefile.Sys), some client software files, and the Windows NT/2000/XP registry (when active).

Netware Volumes Under NT/2000/XP

Under Windows NT/2000/XP, the Retrospect client software is running as a service and it cannot recognize Netware volumes.

Selecting Files

You can use a Browser to manually select files to back up, or you can automate file selection with a Selector. Some Selectors and Selector conditions do not function with Windows clients as they do with Mac OS clients. The differences are detailed under "Using Selectors" on page 176.

Case-Sensitive File Systems

Some file systems used with Windows clients are case-sensitive with file names. On a Windows client volume, multiple files with names identical except for case (for example, Foo, foo, and FOO,) will confuse Retrospect. For example, if during a backup it encounters a

directory containing multiple file names differing in case only, it backs up only one of the files.

Hard Links

When it encounters a hard link to a file on a POSIX-compliant Windows client volume, Retrospect treats the link as a separate file.

HPFS Attributes

Retrospect does not support HPFS volumes of Windows clients.

Screen Savers

For best performance during a backup, do not use a processing-intensive screen saver on a client computer.

Copying Mac OS Files to a Windows Client

Data and Resource Fork Files

Unlike files on Windows volumes, many Macintosh files are made up of two parts, called forks: one fork includes data and the other includes resources. When Retrospect copies a dual-fork Macintosh file to a Windows client volume, it takes the following steps to separate the forks into different files.

• It stores the data fork in a new file, which has the same name as the original file.

• It creates a new folder named Resource.Frk, which is hidden and resides in the same folder path as the data fork file.

• It stores the resource fork in a new file, which resides in the Resource.Frk folder and has the same name as the original file.

• It tracks fork-separated files in a hidden file named Finder.Dat, which resides in the same folder path as the data fork file.

If you move one of these Macintosh files on a Windows computer, it is unusable unless you also move the other files and folder. When you use a Retrospect Browser to view a Windows client volume containing these split Macintosh

files, only a single file appears. When viewed from Windows, the extra files appear (unless Windows is set to hide hidden files). When you back up the files to a backup set or duplicate them to a Macintosh volume, Retrospect integrates them into the single original file.

Illegal Characters in File Names

Mac OS file names can include several characters Windows does not allow in its file names. These illegal characters are /, \, :, *, ", <, and >. When restoring or duplicating Macintosh files to a Windows volume, Retrospect replaces each of these illegal characters with a hyphen (-). Retrospect tracks renamed files in a file named Finder.Dat. When copying the files back to a Macintosh, Retrospect replaces the hyphens with the original characters.

If you move one of these Macintosh files on a Windows computer, also move the Finder.Dat file with it, or the hyphens become permanent.

NETWORK BACKUP GUIDELINES

This section provides information, advice, and worksheets to help you set up a workgroup backup using Retrospect.

In general, the same principles that apply to individual backups also apply to network backups of client computers. The major difference between an individual backup and a network backup is the amount of data, which may overwhelm storage limitations. As a consequence of the sheer amount of data and the often slower speed of network backups, time may also impose limitations. If you cannot back up the entire network in a single night, you may want to consider splitting the backup over several nights, backing up only documents, or using the Backup Server.

Although the information in this section can be applied to any local area network, the examples assume a basic Ethernet network installation. Most calculations will still apply if your network contains inter-network devices (such as routers or gateways), unless one or more members of the backup workgroup are separated from the rest by an inter-network device. Running backups through routers or gateways increases the time it takes to complete a backup.

Choosing the Backup Device

The capacity of the backup device is usually the most important consideration for automatic, unattended workgroup backups. There is no such thing as too much capacity for network backups. More capacity almost always means you can back up more files from more volumes from more client computers, broaden the criteria for selecting files to be backed up, increase the amount of time between media changes, and increase the number of backup sessions per piece of media.

Advantages of Desktop	Advantages of Server
• You can use the Macintosh closest to you for easy access to the tape drive and Retrospect.	• Optimizes your backup speed since servers are often a high performance Macintosh model.
• Avoids expense of a dedicated server.	• Takes advantage of the server's inactivity during the nights and weekends.
• You can select the Macintosh best suited in terms of memory and speed. Retrospect can be run at night or on weekends, allowing normal use of the Macintosh during work hours.	• Gains added security for your backup sets if your server is located in a secure area.
• Allows your server to run at full speed for those who are accessing it while the backup is running.	• Backs up large server disks using faster local transfer rates rather than the slower network transfer rates.

Table 6-2: Advantages of using a desktop computer or a server as the backup computer.

If your backup device is not large enough, you will not be able to complete an automatic, unattended backup because you will have to change the media before the backup is finished.

Choosing the Backup Computer

This section offers some advice on how to select the correct backup device and backup computer to suit your planned network backups.

You need not use a file server as the backup computer; you can use any Retrospect-capable Macintosh on the network. Table 6-2 lists various advantages of using a desktop computer or a server as the backup computer.

Deciding Which Macintosh Model to Use

Although the backup computer can be any PowerPC-based Macintosh compatible with Mac OS 9 or Mac OS X, consider using a Macintosh with adequate power to perform your network backups. For example, if you are backing up a small number of client computers with small to medium capacity hard disks, a Power Macintosh G3 should be able to do the job. However, if you are backing up large file servers and several client computers with thousands of files, a later model would be more suitable. Following are some considerations when choosing the Macintosh model.

The performance of the backup computer often determines the performance of the entire system. Generally, a higher performance Macintosh supports a network backup of more data from a larger number of client computers.

Software compression and encryption increase CPU use significantly. If you are considering using either of these features, choose a computer with a more powerful CPU and more memory.

Make sure the backup computer has enough RAM to handle the network volume that contains the most files. The more files you have, the more RAM you need. See page 224 for information on avoiding out-of-memory errors.

If the backup computer is not completing backups in its scheduled time periods or if you want volumes to be backed up more often than they are, you may need a faster backup computer or a faster backup device, if not both. A faster network interface card may speed network backups and a faster SCSI controller may increase throughput with the backup device.

Encryption and Compression Considerations

Retrospect provides an encryption feature that lets you protect your data from unauthorized access as it is being backed up, and a compres-

Feature	Description	Procedure	Implementation
Compression	Allows the backup device to store more files on its media.	Finds patterns in the data; the more patterns, the greater the compression.	If you have a compression drive, Retrospect leaves the task of compression to the hardware since it compresses data faster than Retrospect.
Encryption	Adds security to your backup.	Randomizes the appearance of data to prevent unauthorized access.	Retrospect always manages encryption.
Compression with encryption	Allows the backup device to store more files on its media and adds security to your backup.	Compression must take place before encryption.	Retrospect must perform both functions. If you have a compression drive, you must choose between using encryption or using hardware compression because you cannot use both. (Retrospect automatically disables hardware compression when you use encryption.)

Table 6-3: Comparison of compression and encryption.

sion feature that saves space on the backup device by compressing stored data. The decision to use one or both of these features can affect the type of backup device you choose. Keep in mind that Retrospect's encryption and software compression can slow a backup down, especially when using a backup computer with a slow central processing unit. If you have a tape drive that supports hardware compression, it will perform the task of compression itself, because it compresses data faster than Retrospect.

Use Table 6-3 to determine whether to use compression and encryption and whether a compression tape drive is appropriate to use as the backup device.

Device Capacity Worksheet

Use this worksheet to estimate the minimum required capacity of a backup device for your workgroup. The number you come up with for *G* is the minimum backup device media capacity for completing an unattended backup without having to change the media.

Item	Description	Amount
A. Total disk capacity *user-defined*	On a separate page, list your workgroup's computers and the disk size (in megabytes) of each. Work out the sum and enter it for *A*.	$A =$
B. Estimated data redundancy *user-defined*	Estimate how much data is redundant, which Retrospect backs up only once. If everyone in your workgroup uses the same applications, dictionaries, fonts, extensions, and so on, you might have as much as 60% (0.6) redundancy. If your network is average, enter 0.3 for 30%. Enter your estimate of the redundancy percentage *B*, expressed in decimal form.	$B =$
C. Reduction factor $C = 1 - B$	Subtract the amount *B* from 1 to get the data reduction factor. For example, if *B* is 0.3 the reduction factor is 0.7 (because $1 - 0.3 = 0.7$). Work out the difference and enter it for *C*.	$C =$
D. Reduced data $D = A \cdot C$	To estimate the actual amount of data you need to back up (before any compression) multiply the total disk capacity *(A)* and the reduction factor *(C)*. Work out the product and enter it for *D*.	$D =$
E. Estimated compression *user-defined*	The compression rate depends on the files. Text files compress well; application files do not. The most compression you can hope for is 50% (0.5). Average compression to expect for network backups is 30% (0.3). If you do not plan on using compression, enter 0. Enter your estimate of the compression percentage *E*, expressed in decimal form.	$E =$
F. Compression factor $F = 1 - E$	Subtract the estimated compression *(E)* from 1. For example, if *E* is 0.35 (35%) then *F* is 0.65 (because $1 - 0.35 = 0.65$). Work out the difference and enter it for *F*.	$F =$
G. Required backup capacity $G = D \cdot F$	To get the minimum required backup device capacity multiply the reduced data amount *(D)* by the compression factor *(F)*. Work out the product and enter it for *G*.	$G =$

Backup Duration Worksheet

Once you have determined the size of your backup device, use the worksheet below to determine the number of hours your network backup requires. If the total number of hours is less than twelve, a recycle backup is likely able to complete in a single night. If the total number of hours is more than twelve, you may need to examine alternative strategies, such as performing recycle backups only on weekends or backing up only documents and preferences. Alternative strategies are suggested under "Backup Strategies" in Chapter 8.

Item	Description	Amount
H. Backup capacity requirement $H = D$	For H, enter the total reduced data requirement from item D in the Device Capacity Worksheet.	$H =$
I. Verification multiplier *user-defined*	If you plan to use verification enter 1.5. If you do not plan to use verification enter 1. Note: If you are using software compression or encryption, increase it by 0.1 to 0.5; the slower the backup computer, the higher the number. Enter your verification multiplier for I.	$I =$
J. Total transmission $J = H \cdot I$	To get the total amount of data transmitted across the network multiply the backup capacity requirement (H) by the verification multiplier (I). Work out the product and enter it for J.	$J =$
K. Network throughput *user-defined*	Throughput rates vary greatly according to the network cabling method and transmission protocol. Use the following figures as a guide to estimate your network's speed. Cabling Protocol Throughput 10BaseT TCP/IP 2400 MB per hour 100BaseT TCP/IP 4800 MB per hour Enter the number of megabytes per hour for K.	$K =$
L. Adjusted network throughput $L = K(1 - .05n)$	Backing up through routers typically reduces performance so subtract 5% for each router. (Use n as the number of routers.) Work out the difference and enter it for L. If you are not using routers or bridges assign the K value to L.	$L =$
M. Hours required $M = \dfrac{J}{L}$	To determine the total number of hours required for the backup to complete divide the total transmission (J) by the adjusted network throughput (L). Work out the result and enter it for M.	$M =$

Restoring

- **O V E R V I E W**

- **R E S T O R I N G   F I L E S   A N D   F O L D E R S**

- **R E S T O R I N G   E N T I R E   C O M P U T E R S**

- **R E S T O R I N G   E N T I R E   S E R V E R S**

This chapter tells you what to do to recover your lost files and folders or restore an entire hard disk, under several different circumstances.

OVERVIEW

Everything you do with Retrospect is aimed at the ultimate goal of restoring files which have been lost or damaged. You may need to recover a few inadvertently deleted files or restore an entire computer that is no longer working. Following are sets of instructions to accomplish different restoring tasks.

Restoring Files and Folders

- To restore from your latest backup, see page 109.

- To restore from an older backup, see page 110.

- To restore by name or other searchable criteria, see "Restoring by Searching" on page 111.

- To restore when you are not sure which backup set the files are in, see "Restoring by Searching" on page 111.

- To restore files and folders when you are not certain of their names, see page 113.

- To restore files and folders that you know you backed up on a particular date, see page 114.

Restoring Entire Computers

Use the following topics to restore entire computers. These methods do not restore file sharing privileges. To restore an AppleShare server or a Macintosh that uses file sharing privileges, see "Restoring Entire Servers" below.

- To restore an entire Mac OS 9 computer, see "Restoring Your Mac OS 9 Computer with the Bootable CD after a Disaster" on page 114.

- To restore an entire Mac OS 9 computer that will not start from the Retrospect CD, see page 117.

- To restore an entire Mac OS X computer, see page 117.

- To restore an entire Macintosh from an Internet backup set or a backup that does not include all files, see "Restoring Your Mac from a Partial Backup" on page 119.

- To restore an entire Macintosh client computer, see "Restoring a Macintosh Client" on page 121.

- To restore an entire Windows client computer, see "Restoring a Windows Client" on page 123.

Restoring Entire Servers

- To restore an entire pre-Mac OS X Macintosh file server computer including AppleShare, AppleShare IP, or Mac OS file sharing, see "Restoring Pre-Mac OS X File Servers" on page 125.

- To restore an entire Mac OS X Server, see page 130.

## RESTORING FROM YOUR LATEST BACKUP

From the Retrospect Directory, click the Immediate tab, then click Restore. A dialog asks you to choose the restore type.
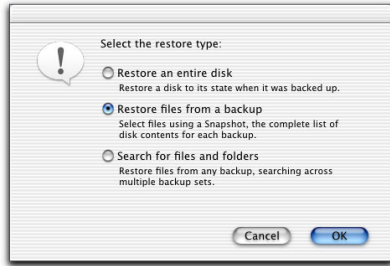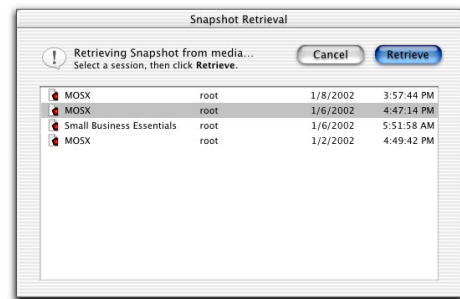

Select Restore files from a backup and click OK.

In the top list of the window that appears, select the backup set from which to restore. (Use the More button if your desired set is not listed.)
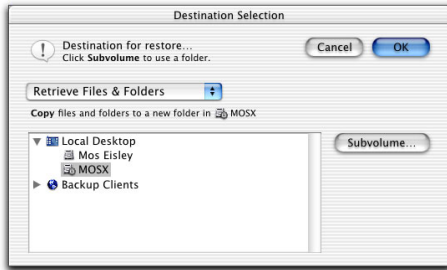
In the window's bottom list, select a volume Snapshot. The date and time when the volume was last backed up are listed to the right of the volume's name.
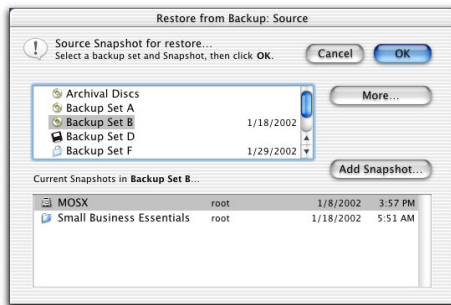
Select your desired Snapshot and click OK to continue.

Select the volume on which you want Retrospect to place the restored files. This volume does not have to be the original volume from which the files were backed up.

▲ **WARNING:** Before restoring to a volume other than the current system volume under Mac OS X, use the Finder's Show Info command on the volume. Choose Privileges from the info window's menu then turn off the "Ignore privileges on this volume" option.

Set the pop-up menu to Retrieve Files & Folders and click OK to continue. Retrospect scans the destination volume and matches files from the Snapshot. The immediate restore summary window appears.

Restore summary, waiting for you to select files to restore.

Click the Files Chosen button to use a browser to find and mark the files you want to restore. (Click to select a file and press the Command or Shift keys while clicking to select more files, then click the Mark button to designate selected files to be restored.) When you have marked the files, close the browser window to return to the summary window. Click Restore and a dialog

asks you to confirm the operation. Click OK to confirm.

Make sure the correct backup set media is in the backup device. If Retrospect does not see the media, it asks you for it.

When the execution is complete, Retrospect informs you in the status window. Close it to return to the Retrospect Directory. If any errors occurred you can find the offending files in the browser which appears, or see error details in the operations log.

When you leave Retrospect and go to the Finder, you can see the root level of the destination volume has a new folder, named the same as the backup set from which you restored. Within this folder are your restored files and folders. They do not have their Mac OS X privileges as they were when backed up; they instead have the privileges of the currently logged-in user.

RESTORING FILES FROM AN OLDER BACKUP

When you do not want the most recent files in the most recent backup, you can retrieve a Snapshot from an earlier date to restore a file or folder from an older backup.

From the Retrospect Directory, click the Immediate tab, then click Restore. A dialog asks you to choose the restore type.
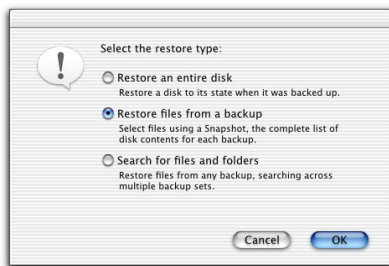
Select Restore files from a backup and click OK.

In the top list of the window that appears, select the backup set from which to restore. (Use the More button if your desired set is not listed.)

In the window's bottom list, you can see the volume's current Snapshot.
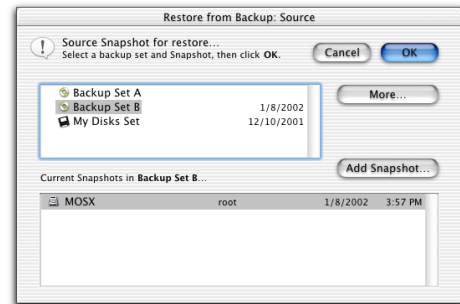
The older file you want does not exist in this current Snapshot, but you know it is in the backup set. Click the Add Snapshot button to select your desired Snapshot from a list of all Snapshots in the backup set.

Selecting a Snapshot to add to the list.

When you select a Snapshot and click Retrieve Retrospect will obtain the older Snapshot from the backup set media (which may require you to insert media) and add it to the list in the restore source window.

With your desired Snapshot selected in the restore source window, click OK to continue.

Select the volume on which you want Retrospect to place the restored files. This volume does not have to be the original volume from which the files were backed up.

▲ **WARNING:** Before restoring to a volume other than the current system volume under Mac OS X, use the Finder's Show Info command on the volume. Choose Privileges from the info window's menu then turn off the "Ignore privileges on this volume" option.

Set the pop-up menu to Retrieve Files & Folders and click OK to continue. Retrospect scans the destination volume and matches files from the Snapshot. The immediate restore summary window appears.

Restore summary, waiting for you to select files to restore.

Click the Files Chosen button to use a browser to find and mark the files you want to restore.

When you have marked the files, click Restore and a dialog asks you to confirm the operation. Click OK to confirm.

Make sure the correct backup set media is in the backup device. If Retrospect does not see the media, it asks you for it.

When the execution is complete, Retrospect informs you in the status window. Close it to return to the Retrospect Directory. If any errors occurred you can find the offending files in the browser which appears, or see error details in the operations log.

When you leave Retrospect and go to the Finder, you can see the root level of the destination volume has a new folder, named the same as the backup set from which you restored. Within this folder are your restored files and folders. They do not have their Mac OS X privileges as they were when backed up; they instead have the privileges of the currently logged-in user.

RESTORING BY SEARCHING

You can set up a searching restore to recover older files which are not in a current Snapshot. This works best when you know the specific file attributes such as name and type. Searching is also useful to see all versions of given files so you can mark the ones you need and retrieve files regardless of when they were backed up. This restore method also lets you search multiple backup sets at once, a convenient way to find files when you are not sure which backup set they were backed up to.

Preparing to Restore

From the Retrospect Directory, click the Immediate tab, then click Restore. A dialog asks you to choose the restore type.
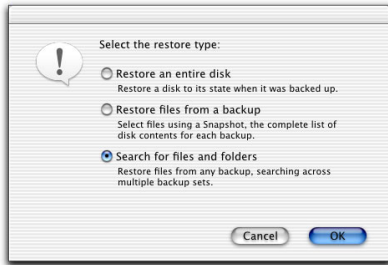
Select Search for files and folders and click OK.

The next window asks you to select the backup sets from which to restore.
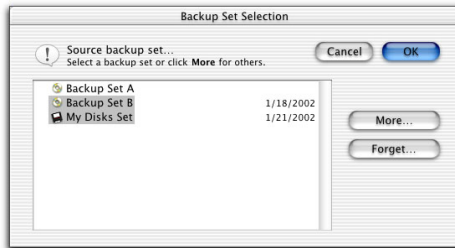
Select one or more backup sets, each of which will be searched. (Use the More button if your desired set is not listed.) Click OK to continue, which then brings up the following window.
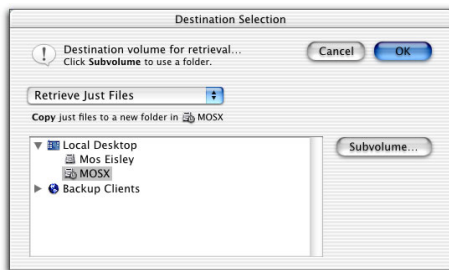
Select the volume on which you want Retrospect to place the restored files, set the pop-up menu to Retrieve Files & Folders, and click OK to continue.

▲ **WARNING:** Before restoring to a volume other than the current system volume under

Mac OS X, use the Finder's Show Info command on the volume. Choose Privileges from the info window's menu then turn off the "Ignore privileges on this volume" option.

Retrospect puts up the window for defining file selection criteria.
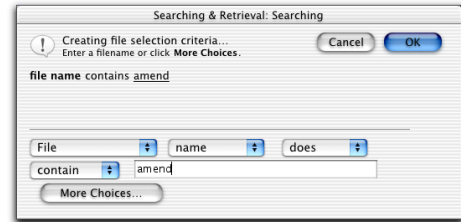
Enter the name of the file you want. If you need to use more searching criteria, click More Choices to create a custom selector. (File selection criteria are detailed in Chapter 9 • Tools.)

After Retrospect searches, it summarizes what it found.

The searching and retrieval summary window.

Click the Files Chosen button to display a browser of the files match your search criteria, which are all marked to be restored. Retrospect displays one browser window for each backup set in which files are found.
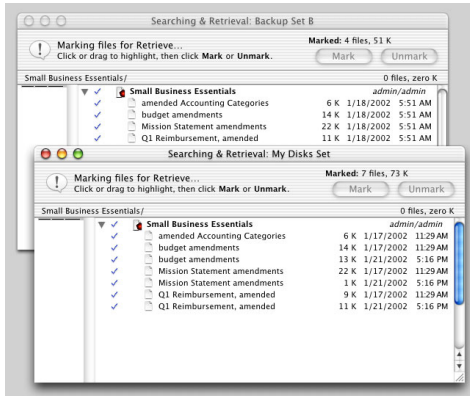
By default, Retrospect lists the name, size, and backup date, but you probably are looking for a certain modification date. To view the files by modification date, choose View Options from the Browser menu and choose Name–Size–Modify Date from the Display pop-up menu.

If a searched backup set was used for progressive backups of a source volume, there may be multiple versions of a given file that was repeatedly modified and backed up over time. In this case, be sure to examine the backup dates.

Unmark the files you do not want to restore. Make sure only the files to be retrieved are marked, then close the browser window.

Click Retrieve in the summary window, then click OK to confirm and start restoring.

Make sure the correct backup set media is in the backup device. If Retrospect does not see the media it asks you for it.

When you leave Retrospect and go to the Finder, you can see the top level of the destination volume has a new folder, named the same as the backup set from which you restored. Within this folder are your restored files and folders. They do not have their Mac OS X privileges as they were when backed up; they instead have the privileges of the currently logged-in user.

RESTORING FILES WHEN YOU ARE NOT SURE OF THE NAMES

If you know part of a file's name, Retrospect can help you find it. Retrospect also lets you search for files by size, kind, date, and many other attributes, so even if you haven't a clue about the file's name Retrospect can still help you find it.

Set up a searching restore according to "Restoring by Searching" on page 111. If you specify just part of the file's name in the searching window, Retrospect will probably find the file you are looking for, but may also find others.

◆ **TIP:** Leave the name field blank to find every file in the backup set.

If you do not know the file's name, click the More Choices button and create a selector to choose files by date, kind, label, size, parent folder, client name, and several other criteria you know the desired file possesses.

After Retrospect searches, click the Files Chosen button in the summary window. In the browser window that appears, if there are too many unwanted files, select all and unmark, then use the Browser menu to sort the list of files and find files you want to mark for restoring. You can also find related files using the browser's cross reference feature: select a file in the list and choose Cross Reference from the Browser menu to find, for example, other versions of that file. (For more information see "Cross Reference" on page 173.)

Make sure only the files to be retrieved are marked, then close the browser window.

▲ **WARNING:** Before restoring to a volume other than the current system volume under Mac OS X, use the Finder's Show Info command on the volume. Choose Privileges from the info window's menu then turn off the "Ignore privileges on this volume" option.

Click Retrieve in the summary window, then click OK to confirm and start restoring.

RESTORING FILES FROM A GIVEN DATE

Retrospect gives you a few different ways to recover files from a certain point in time. The process to choose depends upon when the files were backed up and what has happened to them since then. It also depends upon how much you know about the files you want and your knowledge of the backups.

A file in the current volume Snapshot may actually have been backed up long ago. Likewise, a file may not be in a current Snapshot because it was deleted from the source volume prior to the most recent backup, though the file is still available to restore. Finally, there may be multiple versions of a given file that was repeatedly modified and backed up over time.

One way to recover older files is to restore by Snapshot according to "Restoring Files from an Older Backup" on page 110. This works best when you know the files you are looking for were on a volume at a certain date and time. Use the older Snapshot that corresponds to the date of the files you are looking for. Browse the files chosen in the Snapshot and manually mark the ones you want to restore.

Another way to recover older files is to set up a searching restore according to "Restoring by Searching" on page 111. This works best when you know the specific file attributes such as name and type, or you want to see all versions of given files so you can mark the ones you need. Give Retrospect the criteria to search by; if you know the name, just enter it. Click More Choices if you need to create a custom selector.

To restore files that were *backed up* on a specific date, set up a searching restore according to

"Restoring by Searching" on page 111. In the searching window, click More Choices and create a date selector. Set the pop-up menus in the date selector to File, Backup date, is, exactly, Fixed date, no offset. Set the fixed date to the day the file was backed up.
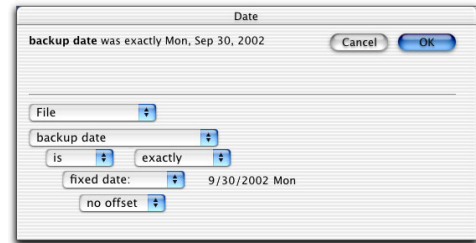
After Retrospect searches, click the Files Chosen button in the summary window to review the files selected for restore. Make sure only the files to be retrieved are marked. Click Retrieve to proceed.

RESTORING YOUR MAC OS 9 COMPUTER WITH THE BOOTABLE CD AFTER A DISASTER

The Retrospect CD can boot a Macintosh for disaster recovery. This CD is included in retail packages of Retrospect but it is not included in some OEM drive bundles and other distributions. If you do not have the Retrospect CD, use the disaster recovery instructions under "Restoring Your Mac OS 9 or Mac OS X Computer Without the Bootable CD" on page 117.

These instructions assume your Macintosh has encountered a disastrous data loss that cannot be easily remedied. For example, it fails to start up; instead it displays a blinking question mark on a disk icon or a sad Mac icon. The following instructions will help you get the computer back in working order using Retrospect and the bootable CD included with it. Due to the nature of Mac OS TCP/IP networking, these instructions cannot be used to restore from Internet backup

sets. To restore from an Internet backup set, follow the instructions under "Restoring Your Mac from a Partial Backup" on page 119.

The steps below, which should be taken only in the event of serious trouble, involve completely replacing the contents of your hard drive with a previous backup in which you backed up "all files." To restore from a partial backup in which you backed up only some of the files, follow the instructions under "Restoring Your Mac from a Partial Backup" on page 119.

The steps below are not for a Macintosh that runs under Mac OS X or serves data via file sharing or AppleShare. To restore a Mac OS X computer, see "Restoring Your Mac OS 9 or Mac OS X Computer Without the Bootable CD" on page 117. To restore a server, see "Restoring Pre-Mac OS X File Servers" on page 125.

If your backup device requires special drivers or extensions, you cannot use it when your computer has started from Retrospect's bootable CD. To restore from such a drive, follow the instructions "Restoring Your Mac OS 9 or Mac OS X Computer Without the Bootable CD" on page 117.

1. Restart and Try to Repair the Disk

Restart your Macintosh and insert the Retrospect CD, which can start any computer that can run Mac OS 9. Press and hold the "C" key during startup to force the computer to boot from the CD-ROM. If your Macintosh will not start from this CD, see "Restoring Your Mac OS 9 or Mac OS X Computer Without the Bootable CD" on page 117. When your Macintosh has started up, open the Disk First Aid application from the CD and use it to examine your hard disk for problems. (You should also try other disk repair utilities if you have them.) Use the low-level verification or test function of the Drive Setup utility or your disk

formatter to examine the hard disk for defects that other utilities will not find.

2. Assess the Current State of the Hard Disk

If you were able to repair all damage and no low-level problems are found, stop here! You do not need to restore or reformat your hard disk.

If you could not make any repairs with the disk utilities, or if the hard disk still does not mount on the desktop, you probably need to reformat your hard disk. Go on to step 4.

If you were able to repair some damage, but problems remain with the hard disk, you may need to reformat it. But first you must safeguard your data as described below in step 3.

3. Make New Backups Before Reformatting

Now is a good time to back up your repaired hard disk. You may want to make two new backups (with the verification option on) to new backup sets. (Do not do a recycle backup to an existing backup set, as the damaged drive might not have all of your files on it and you don't want to erase your previous backups.) Once you are sure you have redundant backups of your data, copy your backup set catalogs to a floppy disk, removable cartridge, or server.

4. Reformat the Disk

If the disk repair utilities could not fix the disk, you may have to reformat the disk in order to prepare it for restoration.

▲ **WARNING:** Formatting a hard disk destroys all data stored on the disk. If you are not sure whether you should format your hard disk, contact its vendor for assistance.

To reformat the disk, use the formatting software that came with the hard disk or use the Drive Setup application from the Retrospect CD.

5. Restore from Backup

If you copied your catalog files to floppy or re-movable disks, copy them back to your hard disk. Start the Retrospect application, which prompts you to open or create a Retrospect configuration file. For this restore, create a new configuration on the hard disk to which you are restoring. If you did not make copies or backups of your catalog files, rebuild the catalog or catalogs from your backup media. (To do this, click Repair from the Tools tab, then choose the rebuild option that matches your media, as described on page 190.)

Now that your hard disk is working again and Retrospect is available along with your backup catalogs, you can restore your hard disk. From the Immediate tab, click Restore.

Select "Restore an entire disk" and click OK. A window appears for you to select the source from which to restore backed-up files. (Use the More button to access the backup set catalog.)

Selecting a backup set and Snapshot.

In the top part of the window, select the backup set that has your most recent backup of the hard disk you have recently repaired. In the bottom portion, select the most recent Snapshot of that hard disk. Click OK to proceed. A window appears for you to select the destination to which to restore files.

Destination selection window.

Because your whole hard disk was wiped out and needs to be completely restored, select it and leave the pop-up menu set to "Restore Entire Disk." Click OK to proceed. Retrospect compares the source and destination and displays the restore summary window.

Restore summary.

Put the first disc, tape, or cartridge from the backup set in your backup device and click Restore.

6. Restart and Rebuild Desktop

After restoring, choose Startup Disk from the Apple menu, select the restored hard disk, then close the window. Restart the computer, pressing and holding the Command and Option keys while it starts (until the Macintosh asks you to confirm rebuilding the desktop).

After it starts and rebuilds the desktop, use the Date & Time control panel to set your local time and time zone, and, if necessary, change the Daylight Saving setting. Your computer is now ready to use.

RESTORING YOUR MAC OS 9 OR MAC OS X COMPUTER WITHOUT THE BOOTABLE CD

These instructions assume your Macintosh has encountered a disastrous data loss that cannot be easily remedied, but for whatever reason you cannot start your Macintosh with Retrospect's bootable CD, or it is a Mac OS X computer. Following are instructions on getting the computer back in working order.

The steps below, which should be taken only in the event of serious trouble, involve completely replacing the contents of your hard drive with a previous backup in which you backed up "all files." To restore from a partial backup in which you backed up only some of the files, follow the instructions under "Restoring Your Mac from a Partial Backup" on page 119.

The steps below are not for a Macintosh that serves data via file sharing or AppleShare. To restore a server, see "Restoring Pre-Mac OS X File Servers" on page 125.

1. Restart and Try to Repair the Disk

Find your Mac OS 9 or Mac OS X CD-ROM, restart your Macintosh, and put in the CD. Press and hold the "C" key during startup to force the computer to boot from the CD-ROM. Under Mac OS 9, open the Disk First Aid utility application from the CD. Under Mac OS X, choose Open Disk Utility from the Installer menu then click the First Aid tab. Use Disk First Aid to examine your hard disk for problems and repair them, if possible. (You should also try other disk repair utilities if you have them. Use the low-level verification or test function of the Drive Setup utility or your disk formatter to examine the hard disk for defects that other utilities will not find.)

2. Assess the Current State of the Hard Disk

If you were able to repair all damage and no low-level problems are found, stop here! You do not need to restore or reformat your hard disk.

If you could not make any repairs with the disk utilities, or if the hard disk still does not mount on the desktop, you probably need to reformat your hard disk. Go on to step 4.

If you were able to repair some damage, but problems remain with the hard disk, you may need to reformat it. But first you must safeguard your data as described below in step 3.

3. Make New Backups Before Reformatting

Now is a good time to back up your repaired hard disk, so restart from the hard disk and open Retrospect. You may want to make two new backups (with the verification option on) to new backup sets. (Do not do a recycle backup to an existing backup set, as the damaged drive might not have all of your files on it and you don't want to erase your previous backups.) Once you are sure you have redundant backups of your data, copy your backup set catalogs to a floppy disk, removable cartridge, or server.

4. Reformat the Disk

If the disk repair utility can not fix the disk, you may have to erase or reformat the disk in order to prepare it for restoration.

▲ **WARNING:** Erasing or formatting a hard disk destroys all data stored on the disk. If you are not sure whether you should erase or format your hard disk, contact its vendor for assistance.

If the disk is beyond repair under Mac OS 9, use the Finder to select the damaged volume and

choose Erase Disk from the Special menu. If the disk is beyond repair under Mac OS X, use Disk Utility to select the damaged volume, click the Erase tab, choose a format, supply a name, and click Erase. If erasing is unsuccessful from the Mac OS 9 Finder, you need to reformat the disk. To do this, start the Drive Setup application from the Disk Tools disk or CD, or the formatting software that came with the hard disk, and use it to format your hard disk.

5. Re-install Software

Restart your Macintosh from the Mac OS 9 or Mac OS X CD-ROM, pressing and holding the "C" key during startup to force the computer to boot from the CD.

Install new Mac OS system software on your newly-formatted hard disk.

▲ **WARNING:** You must install the same exact version number of Mac OS X as the version of Mac OS X you will restore. For example, if the client was backed up running version 10.1.3, you must install Mac OS X 10.1.3.

Eject any CDs and restart from the new system on the hard disk. Use the Date & Time control panel or system preference to set your local time and time zone, and, if necessary, change the Daylight Saving setting. Under Mac OS 9, re-name the System Folder to "temp."

Install Retrospect according to the instructions under "Installing Retrospect" in Chapter 1. If you copied your configuration file and catalog files to floppy or removable disks, copy them back to your hard disk.

Start the Retrospect application. If you did not make copies or backups of your catalog files, re-build the catalog or catalogs from your backup media. (To do this, click Repair from the Tools tab, then choose the rebuild option that match-es your media, as described on page 190.)

If you copied your catalog files from floppy or removable disks you must get Retrospect to rec-ognize them. From the Configure tab, click backup sets, then click More and Open to add the catalogs to the list of available backup sets.

6. Restore from Backup

Now that your hard disk is working again and Retrospect is available along with your backup catalogs, you can restore your hard disk. From the Immediate tab, click Restore.


Select "Restore an entire disk" and click OK. A window appears for you to select the source from which to restore backed-up files.

Selecting a backup set and Snapshot.

In the top part of the window, select the backup set that has your most recent backup of the hard disk you have recently repaired. In the bottom portion, select the most recent Snapshot of that hard disk. Click OK to proceed. A window ap-pears for you to select the destination to which to restore files.

Destination selection window.

Because your whole hard disk was wiped out and needs to be completely restored, select it and leave the pop-up menu set to "Restore Entire Disk."

▲ **WARNING:** Before restoring to a volume other than the current system volume under Mac OS X, use the Finder's Show Info command on the volume. Choose Privileges from the info window's menu then turn off the "Ignore privileges on this volume" option.

Click OK to proceed. Retrospect compares the source and destination and displays the restore summary window.

Restore summary.

Put the first disc, tape, or cartridge from the backup set in your backup device and click Restore.

7. Restart and Rebuild Desktop

Under Mac OS X, restart the computer.

Under Mac OS 9, restart the computer, pressing and holding the Command and Option keys while it starts (until the Macintosh asks you to confirm rebuilding the desktop). After it starts and rebuilds the desktop, place the "temp" System Folder in the Trash and empty the Trash.

Your computer is now ready to use.

RESTORING YOUR MAC FROM A PARTIAL BACKUP

These instructions assume you have not been backing up all files, only a subset of files. (For example, you have been backing up documents only to an Internet backup set because of limited FTP space and limited modem speed.) To restore the whole hard disk when you have been doing "all files" backups, refer to page 114 of this document. To restore one or more files, but not the whole hard disk, refer to page 109 or page 110.

The steps below are not for a Macintosh that serves data via file sharing or AppleShare. To restore a server, see "Restoring Pre-Mac OS X File Servers" on page 125.

1. Get the Computer Working

Follow steps one through four starting on page 114. Install new Mac OS system software on your newly-formatted hard disk. Eject any CDs and restart, which boots from the new system on the hard disk. If you used Internet backup sets, configure TCP/IP networking. Use the Date & Time control panel or system preference to set your local time and time zone, and, if necessary, change the Daylight Saving setting.

2. Get Retrospect Working

Install Retrospect from the Retrospect CD. If you copied your configuration file and catalog files to floppy or removable disks, copy them back to your hard disk. Start the Retrospect application. If you did not make copies or backups of your catalog files, rebuild the catalog or catalogs from your backups. (To do this, click

Repair from the Tools tab, then choose the rebuild option that matches your media, as described on page 190.)

3. Restore from Backup

Now that your hard disk is working again and Retrospect is available along with your backup catalogs, you can restore your hard disk. From the Immediate tab, click Restore.
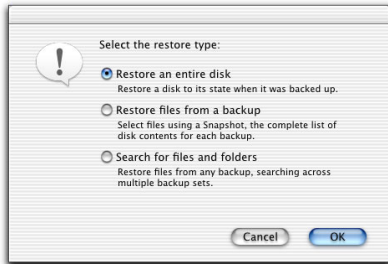
Select "Restore an entire disk" and click OK. A window appears for you to select the source from which to restore backed-up files.
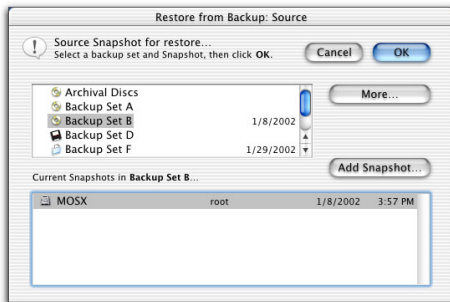
Selecting a backup set and Snapshot.

Select your backup set and its latest Snapshot of your hard disk then click OK. A window appears for you to select the destination to which to restore files. (Use the More button to access the backup set catalog.)
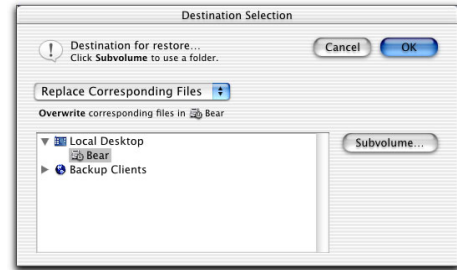
Destination selection window.

Select your hard disk as the destination, and set the pop-up menu to "Replace Corresponding Files."

▲ **WARNING:** Before restoring to a volume other than the current system volume under Mac OS X, use the Finder's Show Info command on the volume. Choose Privileges from the info window's menu then turn off the "Ignore privileges on this volume" option.

Click OK to proceed. Retrospect compares the source and destination and displays the restore summary window.
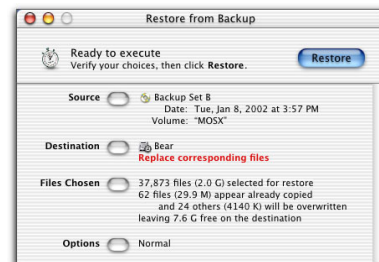
Restore summary.

When you click Restore to proceed from the restore summary window, Retrospect restores the files you chose to back up. Because you did not back up all files your hard disk is not at the state of its last backup. For example, if you chose to back up only documents, you will have to install your applications.

After restoring and installing applications, restart the computer. Under Mac OS 9, press and

hold the Command and Option keys while it starts, until the Macintosh asks you to confirm rebuilding the desktop.

RESTORING A MACINTOSH CLIENT

The following instructions tell how to restore an entire disk on a Macintosh client volume. The restore is done over the network; you do not have to move the backup device from the backup Macintosh.

You must first work at the client computer to get it operating with the network before performing the actual restore operation from the backup Macintosh.

The steps below, which should be taken only in the event of serious trouble, involve completely replacing the contents of a client computer's hard drive with a previous backup in which you backed up "all files."

The steps below are not for a Macintosh that serves data via file sharing or AppleShare. To restore a server, see "Restoring Pre-Mac OS X File Servers" on page 125.

1. Restart and Try to Repair the Disk

Find the Mac OS 9 or Mac OS X CD-ROM, restart the Macintosh, and put in the CD. Press and hold the "C" key during startup to force the computer to boot from the CD-ROM. Under Mac OS 9, open the Disk First Aid utility application from the CD. Under Mac OS X, choose Open Disk Utility from the Installer menu then click the First Aid tab. Use Disk First Aid to examine the hard disk for problems and repair them, if possible. (You should also try other disk repair utilities if you have them. Use the low-level verification or test function of the Drive Setup utility or your disk formatter to examine the hard disk for defects that other utilities will not find.)

2. Assess the Current State of the Hard Disk

If you were able to repair all damage and no low-level problems are found, stop here! You do not need to restore or reformat your hard disk.

If you could not make any repairs with the disk utilities, or if the hard disk still does not mount on the desktop, you probably need to reformat your hard disk. Go on to step 4.

If you were able to repair some damage, but problems remain with the hard disk, you may need to reformat it. But first you must safeguard your data as described below in step 3.

3. Make New Backups Before Reformatting

Now is a good time to back up your repaired hard disk, so restart from the hard disk and open Retrospect on the backup computer. You may want to make two new backups of the client (with the verification option on) to new backup sets. (Do not do a recycle backup to an existing backup set, as the damaged drive might not have all of your files on it and you do not want to erase your previous backups.)

4. Reformat the Disk

If the disk repair utility can not fix the disk, you may have to erase or reformat the disk in order to prepare it for restoration.

▲ **WARNING:** Erasing or formatting a hard disk destroys all data stored on the disk. If you are not sure whether you should erase or format your hard disk, contact its vendor for assistance.

If the disk is beyond repair under Mac OS 9, use the Finder to select the damaged volume and choose Erase Disk from the Special menu. If the disk is beyond repair under Mac OS X, use Disk Utility to select the damaged volume, click the Erase tab, choose a format, supply a name, and click Erase. If erasing is unsuccessful from the Mac OS 9 Finder, you need to reformat the disk.

To do this, start the Drive Setup application from the Disk Tools disk or CD, or the formatting software that came with the hard disk, and use it to format the hard disk.

5. Re-install Software

Restart the Macintosh from the Mac OS 9 or Mac OS X CD-ROM, pressing and holding the "C" key during startup to force the computer to boot from the CD.

Install System Software

Install new Mac OS system software on the newly-formatted hard disk.

▲ **WARNING:** You must install the same exact version number of Mac OS X as the version of Mac OS X you will restore. For example, if the client was backed up running version 10.1.3, you must install Mac OS X 10.1.3.

Eject any CDs and restart from the new system on the hard disk. Use the Date & Time control panel or system preference to set your local time and time zone, and, if necessary, change the Daylight Saving setting. Under Mac OS 9, rename the System Folder to "temp."

Configure TCP/IP

Make sure the computer is properly set up for use with TCP/IP networking. (If you need help configuring TCP/IP contact your network administrator or Internet service provider.)

Install Client Software

Install Retrospect client software according to the instructions "Installing the Client Software on Macintosh Computers" on page 85. Remember the password. After restarting, when the computer starts up it automatically loads the client software.

6. Prepare the Client Macintosh for Restore

Open the Retrospect client control panel (under Mac OS 9) or Retrospect client application

(Mac OS X) and verify the client software is turned on and is waiting for first access.

For ideal restoring conditions under Mac OS 9, shut down the client Macintosh so the Retrospect client shutdown dialog appears.
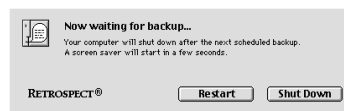
Leave the client Macintosh with this dialog; do not shut down or restart.

For ideal restoring conditions under Mac OS X, log out so the single-user login window or multiple-user login list window appears. Leave the client Macintosh at this window; do not log in, shut down, or restart.

7. Log In Client from Backup Computer

From the backup computer, log in the client as detailed under "Working with Clients on the Network" on page 86.

8. Restore from Backup

Now that the client is fully functional, you can restore it from the backup computer. From Retrospect's Immediate tab, click Restore.

Select "Restore an entire disk" and click OK. A window appears for you to select the source from which to restore backed-up files.

*Selecting a backup set and Snapshot.*

In the top part of the window, select the backup set that has your most recent backup of the hard disk you have recently repaired. In the bottom portion, select the most recent Snapshot of that hard disk. Click OK to proceed. A window appears for you to select the destination to which to restore files.

Destination selection window.

Because the whole client hard disk was wiped out and needs to be completely restored, select it and leave the pop-up menu set to "Restore Entire Disk."

▲ **WARNING:** Before restoring to a volume other than the current system volume under Mac OS X, use the Finder's Show Info command on the volume. Choose Privileges from the info window's menu then turn off the "Ignore privileges on this volume" option.

Click OK to proceed and confirm when Retrospect asks whether to replace the entire contents. Retrospect compares the source and destination and displays the restore summary window.
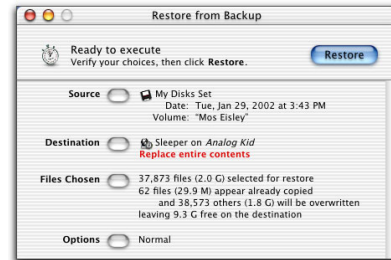
Restore summary.

Put the first disc, tape, or cartridge from the backup set in your backup device and click Restore.

9. Restart and Rebuild Desktop

Under Mac OS X, restart the computer.

Under Mac OS 9, restart the computer, pressing and holding the Command and Option keys while it starts (until the Macintosh asks you to confirm rebuilding the desktop). After it starts and rebuilds the desktop, place the "temp" System Folder in the Trash and empty the Trash.

Your computer is now ready to use.

◆ **TIP:** If you often restore clients consider setting up a hard disk with System software and a logged in Retrospect Client control panel. Connect this hard disk to the Macintosh you need to restore and you are well on your way to restoring more quickly.

RESTORING A WINDOWS CLIENT

Restoring Some Files to a Functioning Computer

You can restore files to a functioning Windows client computer by following instructions in previous sections of this chapter. In the event a Windows client computer crashes or suffers

from other serious problems, you must take the following approach.

1. Fix What Broke or Format What Is Not Fixable

Restart from an emergency boot disk and use a disk repair utility to examine the hard disk for problems and fix them. If the disk repair utility cannot fix the disk, you may have to reformat the disk before you can restore it.

▲ **WARNING:** Formatting a hard disk destroys all data stored on the disk. If you are not sure whether you should format your hard disk, contact its vendor for assistance.

2. Install Windows

95/98/Me/NT

Restart from the Windows CD and install the new operating system software on the repaired or newly-formatted hard disk, in a folder named WINTEMP.

2000/XP

Restart from the Windows CD and install the new operating system software on the repaired or newly-formatted hard disk. After the installer copies temporary files and restarts from the hard disk, boot from the CD again. Repeat the installation steps until the installer cautions you that a WINNT folder already exists. Choose to install to a different folder, named WINTEMP, then finish the installation. Assign a unique identifying computer name; do not use the same computer name as the client you are restoring.

Configure TCP/IP

Make sure the computer is properly set up for use with TCP/IP networking. (If you need help configuring TCP/IP see your network administrator or Internet service provider.)

3. Install Client Software

Use the Setup program to install the client software as instructed under "Installing the Client Software on Windows Computers" on page 85, but do not use the default path. Instead, install to the newly-created WINTEMP folder.

4. Log In Client

From the backup computer, log in the client, using a temporary name.

5. Restore Files

Now that the hard disk is working again, you can restore the client from the backup computer. From Retrospect's Immediate tab, click Restore.
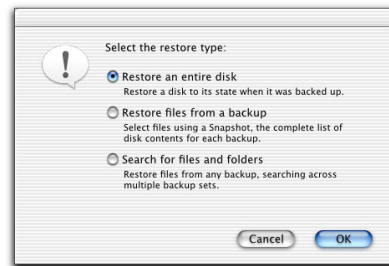
Select "Restore an entire disk" and click OK. A window appears for you to select the source from which to restore backed-up files.
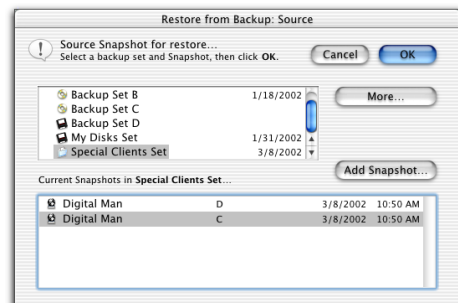
Selecting a backup set and Snapshot.

In the top part of the window, select the backup set that has your most recent backup of the hard disk you have recently repaired. In the bottom

portion, select the most recent Snapshot of that hard disk. Click OK to proceed. A window appears for you to select the destination to which to restore files. Because the whole client hard disk was wiped out and needs to be completely restored, select it and set the pop-up menu set to *replace corresponding files.* (Do *not* use restore entire disk.)
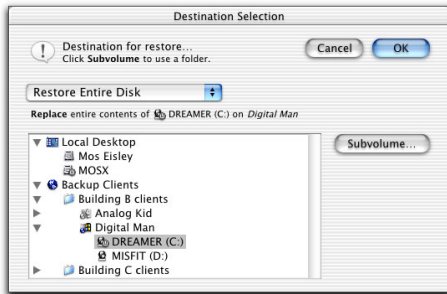
Destination selection window.

Click OK to proceed. Retrospect compares the source and destination and displays the restore summary window. Verify your choices for the Source, Destination, Files Chosen, and Options.
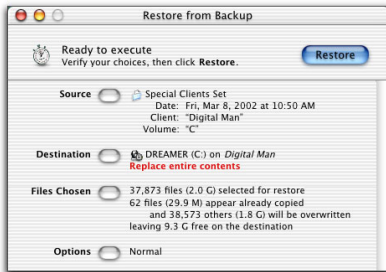
Restore summary.

Put the first disc, tape, or cartridge from the backup set in your backup device and click Restore.

▲ **WARNING:** After restoring the files, do not restart Windows NT/2000/XP before restoring the registry information, as described below.

Restore NT/2000/XP Registry

Restore the Windows NT/2000/XP registry with the Registry Backup Manager (page 86). Start the Registry Backup Manager from its shortcut and click its Replace tab. Click the top Browse button and specify the source folder, which you just restored. Click the bottom Browse button to change the destination folder; specify the restored Windows system folder (often WINNT). Click Replace Now to replace the current registry with the backup.

The Windows 95/98/Me registry is restored by Retrospect when you restore all files, so it does not need the Registry Backup Manager.

6. Clean Up

Restart the client computer. Delete the temporary folder WINTEMP. Forget the temporary client in Retrospect's client database.

RESTORING PRE-MAC OS X FILE SERVERS

This section describes how to use Retrospect to restore volumes shared by AppleShare or Mac OS file sharing from operating systems prior to Mac OS X. These restore instructions include special procedures to ensure access privileges are intact after the volume is restored.

Partial Restore to an Undamaged Server

Access privileges are restored for a server only if file sharing was active when the backup was made *and* if file sharing is active during the restore operation.

If your server is undamaged and you need to restore only some of the files and folders from a backup (for instance, because somebody accidentally deleted some folders from the server), just follow one of the first three sets of instructions in this chapter.

Restoring an Entire Crashed or Damaged Server

Access privileges are restored for a server only if file sharing was active when the backup was made *and* if file sharing is active during the re-store operation.

The steps to take to restore a server depend on how the server was backed up. There is a restore method for servers which were backed up local-ly or as clients, and another method for servers which were backed up as mounted volumes.

If the server was backed up locally or as a client, Dantz recommends you restore the server local-ly. (That is, with the backup device connected to the server and Retrospect running on the serv-er.) The time and trouble of restoring a large volume over a network may outweigh the in-convenience of temporarily moving the backup device to the server Macintosh. If the server was backed up as a mounted volume, you must re-store it as a mounted volume.

Restoring an Entire Server Backed up Locally or as a Client

Follow these instructions to restore an AppleShare file server which was backed up lo-cally or as a client. If you backed up the server as a mounted volume, skip ahead to the heading "Restoring an Entire Server Backed Up as a Mounted Volume" on page 128.

1. Restart and Try to Repair the Disk

Restart the Macintosh and insert the Retrospect CD, which can start any computer that can run Mac OS 9. Press and hold the "C" key during startup to force the computer to boot from the CD-ROM. If the Macintosh will not start from this CD, use the CD-ROM included with the computer. When the Macintosh has started up, open the Disk First Aid application from the CD and use it to examine the hard disk for prob-lems. (You should also try other disk repair utilities if you have them.) Use the low-level ver-ification or test function of the Drive Setup utility or your disk formatter to examine the hard disk for defects that other utilities will not find.

2. Assess the Current State of the Hard Disk

If you were able to repair all damage and no low-level problems are found, stop here! You do not need to restore or reformat the hard disk.

If you could not make any repairs with the disk utilities, or if the hard disk still does not mount on the desktop, you probably need to reformat the hard disk. Go on to step 4.

If you were able to repair some damage, but problems remain with the hard disk, you may need to reformat it. But first you must safeguard the data as described below in step 3.

3. Make New Backups Before Reformatting

Now is a good time to back up the repaired hard disk. You may want to make two new backups (with the verification option on) to new backup sets. (Do not do a recycle backup to an existing backup set, as the damaged drive might not have all of the files on it and you don't want to erase the previous backups.) Once you are sure you have redundant backups of the data, copy the backup set catalogs to a floppy disk, removable cartridge, or another server.

4. Reformat the Disk

If the disk repair utility can not fix the disk, you may have to erase or reformat the disk in order to prepare it for restoration.

▲ **WARNING:** Erasing or formatting a hard disk destroys all data stored on the disk. If you are not sure whether you should erase or format your hard disk, contact its vendor for assistance.

To reformat the disk, use the formatting soft-ware that came with the hard disk or use the Drive Setup application from the Retrospect CD.

5. Start from CD or Install System Software

Start your computer with the bootable CD included with Retrospect, if possible. If not, install a temporary System Folder on the volume and rename it "temp." Restart the machine so it boots from the temporary System. Install Retrospect on the hard disk. Copy the backup set catalog to the hard disk. (If you do not have the backup set catalog you must rebuild it. See "Recreating a Catalog" on page 190.)

6. First Restore for Files

Now that the hard disk is working again, you can restore the server from the backup computer. From the Immediate tab, click Restore.
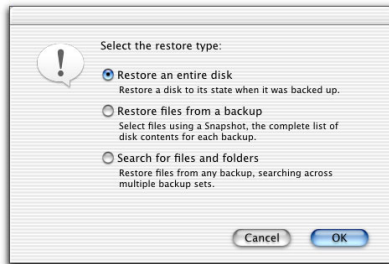
Select "Restore an entire disk" and click OK. A window appears for you to select the source from which to restore backed-up files.
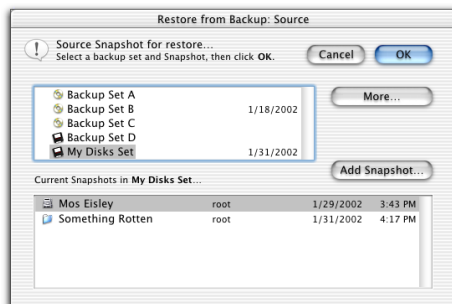
Selecting a backup set and Snapshot.

In the top part of the window, select the backup set that has the most recent backup of the hard disk prior to its repair. In the bottom portion, select the most recent Snapshot of that hard

disk. Click OK to proceed. A window appears for you to select the destination to which to restore files.
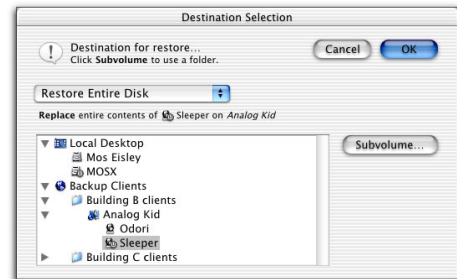
Destination selection window.

Because the whole server hard disk was wiped out and needs to be completely restored, select it and leave the pop-up menu set to "Restore Entire Disk." Click OK to proceed. Retrospect compares the source and destination and displays the restore summary window.
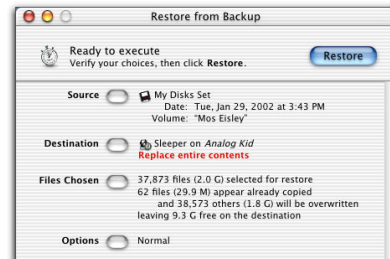
Restore summary.

If the server volume is not supposed to be a startup volume, unmark one file in the preview browser so it is not restored. (This is so you can do step 7 to restore the privileges.)

Put the first disc, tape, or cartridge from the backup set in your backup device and click Restore from the summary window. When the restore operation is complete, Retrospect may report copying errors on a few of its files. Ignore these errors and quit Retrospect.

Unless it is not a startup volume, restart the Macintosh and discard the "temp" System Folder by placing it in the Finder's Trash can and emptying the Trash.

■ **NOTE:** Under Mac OS 9, the desktop needs to be updated after a large restore, such as an entire disk. Restart the file server while holding down the Command and Option keys to rebuild the desktop.

7. Second Restore for Privileges

If you are using AppleShare IP, start the AppleShare IP Web & File Admin application and AppleShare IP Web & File Server. If you are using AppleShare, start the AppleShare File Server and AppleShare Admin application. If you are using Mac OS file sharing, start file sharing.

Choose which volumes or folders you wish to share, then select the appropriate Owner and Group for root access privileges and set your desired options.

With sharing on, perform another restore operation with the same backup set, again using the Restore entire disk option. Retrospect performs a "smart" incremental restore, copying only a few files (or the one unmarked file from the non-startup volume), and then sets the access privileges.

When the restore is complete, Retrospect may report copying errors on a few of its own files. Ignore these errors and quit Retrospect.

Restart the server, and rebuild the desktop by holding down the Command and Option keys until a confirming dialog appears.

8. Extra steps for AppleShare IP

After restoring an AppleShare IP server, you should perform the following steps before launching any of the server applications:

1. Open the Editor Setup control panel and let OpenDoc initialize, then close the control panel.

2. Launch AppleShare IP Web & File Admin and re-point the Web server to the restored web folder and welcome.html page.

3. If you are restoring a MacDNS server, launch MacDNS by double-clicking on the restored zone information file.

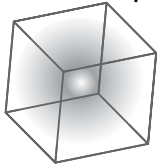**4.** If you are restoring an AppleShare IP Mail Server and have been using the special Retrospect Event Handler to shut down the mail server for backup, create a new folder named "AppleShare IP Mail Folder" at the root level of the hard drive if there is not already one there. Move the backup copy of the AppleShare IP Mail Database from the restored "AppleShare IP Mail Backup" folder to the "AppleShare IP Mail Folder". If necessary, click OK to replace any existing copy of the AppleShare IP Mail Database and start the AppleShare IP Mail Server.

Your server should now be up and running with all privileges intact.

Restoring an Entire Server Backed Up as a Mounted Volume

Follow these instructions to restore an AppleShare file server that you backed up as a mounted volume.

1. Restart and Try to Repair the Disk

Restart the Macintosh and insert the Retrospect CD, which can start any computer that can run Mac OS 9. Press and hold the "C" key during startup to force the computer to boot from the CD-ROM. If the Macintosh will not start from this CD, use the CD-ROM included with the computer. When the Macintosh has started up, open the Disk First Aid application from the CD and use it to examine the hard disk for problems. (You should also try other disk repair utilities if you have them.) Use the low-level verification or test function of the Drive Setup utility or your disk formatter to examine the

hard disk for defects that other utilities will not find.

2. Assess the Current State of the Hard Disk

If you were able to repair all damage and no low-level problems are found, stop here! You do not need to restore or reformat the hard disk.

If you could not make any repairs with the disk utilities, or if the hard disk still does not mount on the desktop, you probably need to reformat the hard disk. Go on to step 4.

If you were able to repair some damage, but problems remain with the hard disk, you may need to reformat it. But first you must safeguard the data as described below in step 3.

3. Make New Backups Before Reformatting

Now is a good time to back up your repaired hard disk. You may want to make two new backups (with the verification option on) to new backup sets. (Do not do a recycle backup to an existing backup set, as the damaged drive might not have all of the files on it and you don't want to erase the previous backups.)

4. Reformat the Disk

If the disk repair utility can not fix the disk, you may have to erase or reformat the disk in order to prepare it for restoration.

▲ **WARNING:** Erasing or formatting a hard disk destroys all data stored on the disk. If you are not sure whether you should erase or format your hard disk, contact its vendor for assistance.

To reformat the disk, use the formatting software that came with the hard disk or use the Drive Setup application from the Retrospect CD.

5. Install Software and Set Up Sharing

Install Apple System software and AppleShare on the Macintosh and restart from the hard disk. Copy your previously saved Users &

Groups data file (page 161) from the floppy disk to the System Folder's Preferences folder. Use the Date & Time control panel to set your local time and time zone, and, if necessary, change the Daylight Saving setting. Start the server and share the volumes you need to restore.

6. Restore Files

Now that the hard disk is working again, you can restore the server from the backup computer. Mount the shared volume then start Retrospect. From the Immediate tab, click Restore.

Select "Restore an entire disk" and click OK. A window appears for you to select the source from which to restore backed-up files.

Selecting a backup set and Snapshot.

In the top part of the window, select the backup set that has your most recent backup of the hard disk you have recently repaired. In the bottom portion, select the most recent Snapshot of that hard disk. Click OK to proceed. A window ap-

pears for you to select the destination to which to restore files.

Destination selection window.

Because the whole server hard disk was wiped out and needs to be completely restored, select it and leave the pop-up menu set to "Restore entire disk." Click OK to proceed. Retrospect compares the source and destination and displays the restore summary window.

Restore summary.

Put the first disc, tape, or cartridge from the backup set in your backup device and click Restore.

■ **NOTE:** Under Mac OS 9, the desktop needs to be updated after a large restore, such as an entire disk. Restart the file server while holding down the Command and Option keys to rebuild the desktop.

Your server should now be up and running with all privileges intact.

RESTORING A MAC OS X SERVER

Follow the instructions to restore an entire Mac OS X computer, which begin on page 117.

After restarting the computer in the final step of those instructions, share points may be missing or replaced with improper share points. Using Server Admin, take the following steps to correct these problems.

1. Remove invalid share points.

2. Re-establish desired share points

3. Reset the Home Directory Defaults for any affected users and groups lists (or NetInfo domains).

MANAGEMENT

- **BACKUP STRATEGIES**

- **REPORTS**

- **EXECUTION OPTIONS**

- **CONTROLLING EXECUTIONS**

- **MANAGING BACKUP SETS**

- **MAINTAINING SCRIPTS**

- **PREFERENCES**

- **MOVING RETROSPECT**

- **CATALOG AND CONFIGURATION BACKUPS**

- **WORKING WITH MACINTOSH FILE SERVERS**

- **WORKING WITH OTHER SOFTWARE**

This chapter describes how to perform various tasks to manage backup sets and scripts, including viewing reports and maintaining scripts. It offers several strategies for doing backups. It also offers advice on using Retrospect and shows some techniques for more effective backups, including tips on using Retrospect with other software.

BACKUP STRATEGIES

Introduction

This section suggests several strategies for backing up your Macintosh or your entire network. Review each strategy and decide which will work best for your situation. Perhaps you will need to slightly modify a strategy to better fit your needs. Perhaps you will devise your own strategy which bears no relation to these suggestions. Realize these are but a few suggested strategies, and Retrospect's features allow an unlimited number of different strategies. Just remember the basic backup rules when you go about creating a backup strategy of your own.

Different backup actions are often integral parts of effective strategies. Know and understand them. They are described under "Backup Actions" on page 22.

Basic Backup Rules

While Retrospect is a powerful tool for safeguarding your data, it is most effective when you follow some basic backup rules.

Back up often because you cannot restore what is not backed up. For example, if your hard disk malfunctions today but you most recently backed it up a week ago, you have lost the data you have accumulated over the week. Retrospect is most effective when you back up everything and back up often, which is ensured by setting up scripts to automate backups.

Keep multiple backups of your data. Rotate among different backup sets when you make subsequent backups. Using more backup sets makes you less likely to lose data if you misplace or damage media.

Do not repeatedly back up to the same backup sets for months. Regularly retire old media and introduce new media using new media backups, because having all of your backups on one media set leaves you too vulnerable.(If even one

tape of a set is damaged, you no longer have a complete backup.) A benefit of new media in your backup strategy is that it is faster to restore from a few media members than to restore from a set that has many members and backup sessions.

Back up the backup computer. You probably have put more time and energy than you realize into your Retrospect configuration and catalogs.

Always store at least one backup set off-site to guard against fire, theft, and natural disaster.

Take care of your backup media, which can easily be damaged by the environment. Media can also wear out. See "Media Longevity and Storage" on page 37 for further information.

With Internet backup sets, the connection speed and the amount of space available to you on the FTP site will affect your backups. You may not be able to back up all files and you may have to determine which of your files will be backed up. For example, the relatively slow speed of a modem may limit you to backing up only critical files, whereas a faster Internet connection may allow you to completely back up your hard disk. Limited space on the FTP site may also limit you to backing up smaller files or fewer files, whereas unlimited space allows you to back up everything, even large files. Retrospect's software compression is a useful option when connection speed or disk space is limited.

Leave the Verification option on so Retrospect can confirm the backup data matches the original data.

Periodically verify your backups are working properly. Retrospect provides tools that allow you to compare data and verify media to ensure valid backups. It also creates logs and reports that detail backup successes and failures.

If you make a mistake or see a problem, do not panic. Instead, take a break and read Chapter 10 • Problems and Solutions. If you cannot find a solution, contact technical support.

Individual Backup Strategies

The four following strategies are useful for backing up a single computer. If you need to back up more than one computer, see "Network Backup Strategies" which follows.

Strategy 1—Run Documents

Create a backup script and make one recycle backup run document and one normal backup run document. (See "Run Documents" on page 67.) Execute the normal backup run document at your leisure, such as daily, and every few weeks execute the recycle backup run document to keep your backup sets from becoming large and cumbersome.

To introduce new media for rotation with other sets or off-site storage, periodically configure the backup set to use new media, as described under "The Options tab" on page 150.

Strategy 2—Scheduled Script

Instead of using the run documents tied to the script of the strategy described above, schedule the script to run automatically. Add one scheduler operating repeatedly Monday through Thursday, doing a normal backup. Add another scheduler operating repeatedly on Friday, doing a recycle backup. The two schedulers look like this:
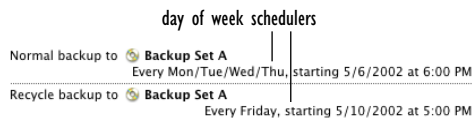
day of week schedulers

Normal backup to 🔘 **Backup Set A**
Every Mon/Tue/Wed/Thu, starting 5/6/2002 at 6:00 PM
Recycle backup to 🔘 **Backup Set A**
Every Friday, starting 5/10/2002 at 5:00 PM

To introduce new media for rotation with other sets or off-site storage, periodically configure the backup set to use new media, as described under "The Options tab" on page 150.

Strategy 3—EasyScript

Use Retrospect's EasyScript, letting it set up a strategy based on its interview with you. EasyScript has different strategies optimized for the type of backup set you choose. Its removable disks strategy tends to conserve media, compared to its strategies for tapes and discs. Its Internet strategy is biased toward conserving space on the FTP server. See "EasyScript" on page 56.

Strategy 4—EasyScript Local and Off-site

Use Retrospect's EasyScript, letting it set up a strategy for your backup device. (See "EasyScript" on page 56.) From Automate❯ Scripts, rename the created script to "Local Backups." Use EasyScript again, this time for an Internet backup set. Rename the created script "Off-site Backups." Together these two scripts give you far more protection than either one alone. Preview the scheduled operations from Automate❯Preview.

Network Backup Strategies

When you need to back up a network of client computers, you must decide which kind of backup scripts to use. Table 8-1 on the following page lists situations which are suited to Backup Server scripts or regular backup scripts.

If you choose to use a strategy which includes the Backup Server, skip ahead to network backup strategy number five on page 135.

Strategy 1—EasyScript

Use Retrospect's EasyScript module, letting the program set up a strategy based on your needs. See "EasyScript" on page 56. Tell EasyScript you want to back up other computers on the network.

Strategy 2—Scheduled Script

Create a backup script. Change the script destination to use three backup sets. Add a day of week scheduler to run the script daily to a particular backup set, every three weeks. Add a

similar scheduler to run the script daily to the second backup set, every three weeks starting one week after the first scheduler. Add a similar scheduler to run the script daily to the third backup set, every three weeks starting one week after the second scheduler. The three schedulers look like this:

day of week schedulers

Normal backup to 📇 **Red**
Every 3 weeks on .MTWTF., starting 3/4/2002 at 10:00 PM
Normal backup to 📇 **Green**
Every 3 weeks on .MTWTF., starting 3/11/2002 at 10:00 PM
Normal backup to 📇 **Blue**
Every 3 weeks on .MTWTF., starting 3/18/2002 at 10:00 PM
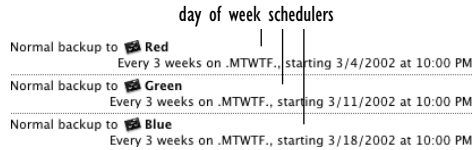
This strategy does not include scheduled recycle and new media backup actions, so you should manually configure the backup sets for recycle and new media backups at appropriate times. See "The Options tab" on page 150.

Strategy 3—Scheduled Script with Full and New Rotation

Create a backup script. Change the script destination to use three backup sets. Add a day of week scheduler to run a normal backup Monday through Thursday to the first backup set, every three weeks. Add a day of week scheduler to do a recycle backup on Friday, every three weeks. Add similar schedulers for the second and third backup sets, but *offset their starting*

times one and two weeks later, respectively. Add a repeating interval scheduler to do a new media backup to one of the backup sets every six weeks. (After a new media backup take the old backup set media off site for safe keeping.) The schedulers look like this:

day of week scheduler

day of week (or repeating interval) scheduler

Normal backup to 📇 **Red**
Every 3 weeks on Mon/Tue/Wed/Thu, starting 2/4/2002 at 7:00 PM
Recycle backup to 📇 **Red**
Every 3 weeks on Friday, starting 2/8/2002 at 6:00 PM
Normal backup to 📇 **Green**
Every 3 weeks on Mon/Tue/Wed/Thu, starting 2/11/2002 at 7:00 PM
Recycle backup to 📇 **Green**
Every 3 weeks on Friday, starting 2/15/2002 at 6:00 PM
Normal backup to 📇 **Blue**
Every 3 weeks on Mon/Tue/Wed/Thu, starting 2/18/2002 at 7:00 PM
Recycle backup to 📇 **Blue**
Every 3 weeks on Friday, starting 2/22/2002 at 6:00 PM
New Media backup to 📇 **Red**
Every 6 weeks on Friday, starting 3/1/2002 at 6:00 PM

repeating interval (or day of week) scheduler

Strategy 4—Scheduled Script with Rotating Daily Backup Sets

Make a script with five backup set destinations, named Monday through Friday. Add five day of week schedulers to back up to each respective backup set. Add five repeating interval schedulers to stagger recycle backups every four weeks to each respective backup set, starting with Monday the first week, Tuesday the second

Situations Suiting Backup Server	Situations Suiting Backup Scripts
You have a backup computer dedicated solely to that purpose.	Your backup computer has other duties at other times.
You have too many clients with too much data to be entirely backed up in a single night.	Your scheduled backups are completed before the client computers are used in the mornings.
You find yourself trying to catch up with your backups, making special scripts and immediate backups for certain clients which are not completely backed up by your regular backup script.	Your scheduled backups are completed before the client computers are used in the mornings and unsuccessful backups are rare.
You have mobile clients and portable drive volumes which appear on the network at random times.	Your network includes only desktop computers, no removable disks or notebook computers.
You want Retrospect to back up to whatever media is in the backup device.	You always insert the correct media beforehand for unattended backups.

Table 8-1: Backup Server and standard script comparison.

week, and so on. But for Friday, make the repeating interval the last Friday of the month, doing a new media backup to the Friday backup set. (Take the old backup set media off site for safe keeping.) The schedulers look like this:

day of week scheduler

Normal backup to 💾 **Monday**
　　　　Every Monday, starting 2/11/2002 at 7:00 PM
Normal backup to 💾 **Tuesday**
　　　　Every Tuesday, starting 2/12/2002 at 7:00 PM
Normal backup to 💾 **Wednesday**
　　　　Every Wednesday, starting 2/13/2002 at 7:00 PM
Normal backup to 💾 **Thursday**
　　　　Every Thursday, starting 2/14/2002 at 7:00 PM
Normal backup to 💾 **Friday**
　　　　Every Friday, starting 2/15/2002 at 7:00 PM
Recycle backup to 💾 **Monday**
　　　　Every 4 weeks on Monday, starting 3/11/2002 at 6:00 PM
Recycle backup to 💾 **Tuesday**
　　　　Every 4 weeks on Tuesday, starting 3/19/2002 at 6:00 PM
Recycle backup to 💾 **Wednesday**
　　　　Every 4 weeks on Wednesday, starting 3/27/2002 at 6:00 PM
Recycle backup to 💾 **Thursday**
　　　　Every 4 weeks on Thursday, starting 4/4/2002 at 6:00 PM
New Media backup to 💾 **Friday**
　　　　Every month on the last Friday, starting 4/26/2002 at 6:00 PM

repeating interval scheduler

■ **NOTE:** When you schedule the new media backup, make sure it occurs at the same time as the scheduled Friday normal backups. When Retrospect encounters the new media backup scheduled for the same execution time as the normal backup, it executes only the new media backup. If you were to schedule them at different times, both backups would execute, which is undesired.

Strategy 5—Basic Backup Server

Create a Backup Server script backing up all client sources. Schedule it to work from 7:00 P.M. to 7:00 A.M. during the work week, so as not to interfere with the users during their workdays. Set the backup interval so Retrospect backs up every twelve hours.

Strategy 6—Basic Backup Server Including Mobile Computers

Duplicate the basic Backup Server script described above. Make mobile clients its only sources. Remove these volumes from the original script. Schedule the new script to run

twenty-four hours per day, with a backup interval of eighteen hours.

◆ **TIP:** Should you decide to implement a strategy which includes the Backup Server, read "Backup Server Tips and Techniques" on page 76. It includes information to help you devise a more effective strategy

Strategy 7—On-Demand Backup Server

Create a Backup Server script backing up all client sources. Leave the schedule always active so it works twenty-four hours a day. Set the backup interval option so Retrospect backs up every ninety-nine days. Leave on the script option to allow early backup. Except for the initial backups when this strategy is first implemented, and every ninety-nine days thereafter, clients are not backed up unless they request it from their control panels. This strategy requires that you clearly communicate the responsibility to the users and, ideally, is supplemented with a regular backup script.

REPORTS

Using Logs and Reports

Retrospect's Reports tab lets you monitor backup execution history and error messages by viewing three logs and reports. You may need to examine these to find out why an operation was unsuccessful in order to diagnose problems or provide information to Dantz Technical Support.
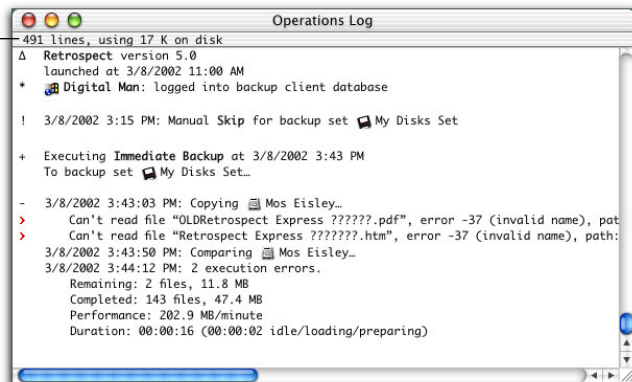
The Backup Report shows a detailed account of backup operations for each local and networked volume.

The operations log shows a record of each Retrospect operation, transaction, and event, and any errors that occurred.

The Contents Report shows the files that were actually backed up in a specific backup session.

To view any of these reports, first click the Reports tab in the Retrospect Directory.

Viewing the Backup Report

Click the Report button from the Reports tab to view the Backup Report.

Unlike the operations log, to which Retrospect repeatedly appends new information, the Backup Report is completely updated each time a backup is performed. It allows you, as the backup administrator, to see, on a volume-by-volume basis, any problems with recent backups.

The example below shows how information appears in the standard Backup Report, which contains the following information.

User/Volume is the source volume name. Client computer names, if logged in, are also listed.

Elapsed Days is the number of days since the backup.

Errs indicates any errors that occurred for each backup. (Use the Find in Log command to isolate an error in the operations log.)

Date is the date of the most recent backup of the volume.

Backup Set (Script) are the names of the backup set and the script of the most recent successful backup.

When the Backup Report is viewed in the performance data format (see "Changing the View" which follows), it contains the following additional information.

Duration shows the time duration of the backup, in hours and minutes. Large numbers may indicate sources with heavy backup needs.

MB is the amount of data, in megabytes, backed up from the volume.

MB/Min is the speed, measured in megabytes per minute, of the source's backup. Abnormally slow performance may indicate problems with the network, backup device, or other hardware.

You can select a line in the report and open the script it refers to by using the Edit Script button. You can select a line in the report and click the Find in Log button to cross-reference the operations log. You can select any line listed in the report and clear it by choosing Clear from the Edit menu or by pressing the Delete key. If you clear a script or forget a backup set, that information is removed from the report. This may cause a volume to appear as if it were never backed up.

Changing the View

You can change various aspects of the Backup Report view and format. Choose View Options from the Report menu to bring up a dialog in which you can make changes.
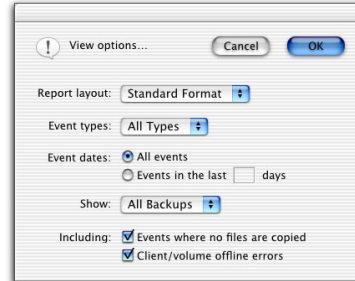
The view options are self-explanatory.

How the Backup Report Works

The Backup Report is a kind of database of backup events. Each time it completes a backup Retrospect puts a new backup event in its database. For each combination of source, destination and script, it saves all unsuccessful backup attempts and the latest successful backup.

Forgetting Events

To remove events from the Backup Report, choose Forget Events from the Report menu. This brings up a dialog with which you can remove the following execution events from the report:

• All but the most recent successful backup

• All successful backups

• All unsuccessful attempts

• Events older than one week

• All execution events

• All Backup Server events

Deleting a backup event from the Backup Report causes the Backup Server (page 72) to not consider that backup event and gives the volume a backup priority higher than its previous priority. When you forget a script, source, or backup set, Retrospect removes that item's backup events from the Backup Report database.

Finding in the Operations Log

Select a line from the Backup Report and click Find in Log to open the operations log with the corresponding action selected.

Editing a Script

Select a line from the Backup Report and click Edit Script to open the script window for the script which executed and created the event.

Printing or Exporting the Backup Report

To print the Backup Report, view it then choose Print from the File menu. If you have only a portion of the report selected, only that portion will print. If you have nothing selected, the entire report will print. To export the Backup Report to a text file, view it then choose Export from the File menu. A preference option, described on page 154, makes Retrospect automatically export the Backup Report.

Viewing the Operations Log

Retrospect's operations log lets you monitor backup execution history and error messages. The log stores any messages that are generated during an operation such as a backup or restore. You may need to examine the log to find out why an operation was unsuccessful in order to diagnose problems or provide information to Dantz Technical Support.

To view the operations log click the Log button or choose Log from the Window menu.

The example on the following page shows how information appears in the operations log.

The log shows the following information for each successful operation.

Completed indicates the number and size of the files that were copied. If you used Retrospect's

Log size

Δ Retrospect started

* client logged in

! user skipped member

+ execution began

— operation began on this volume

❯ error occurred

```
○○○                    Operations Log
491 lines, using 17 K on disk
Δ  Retrospect version 5.0
   launched at 3/8/2002 11:00 AM
*  🖥 Digital Man: logged into backup client database

!  3/8/2002 3:15 PM: Manual Skip for backup set 🗄 My Disks Set

+  Executing Immediate Backup at 3/8/2002 3:43 PM
   To backup set 🗄 My Disks Set…

-  3/8/2002 3:43:03 PM: Copying 🖥 Mos Eisley…
❯      Can't read file "OLDRetrospect Express ??????.pdf", error -37 (invalid name), pat
❯      Can't read file "Retrospect Express ???????.htm", error -37 (invalid name), path:
   3/8/2002 3:43:50 PM: Comparing 🖥 Mos Eisley…
   3/8/2002 3:44:12 PM: 2 execution errors.
       Remaining: 2 files, 11.8 MB
       Completed: 143 files, 47.4 MB
       Performance: 202.9 MB/minute
       Duration: 00:00:16 (00:00:02 idle/loading/preparing)
```

data compression feature, the log also shows compression achieved for this session.

Performance indicates the number of megabytes of information copied per minute. If the Verification option is turned on, additional performance figures are listed for comparing.

Duration shows the total time required to complete the operation. If you clicked Pause during the operation or there were delays while you inserted media, the waiting time is shown separately.

Finding Items in the Log

Retrospect has commands for finding items in the operations log. When the operations log window is active, Retrospect adds a Log menu to the menu bar.

Find Choose Find from the Log menu, which brings up a dialog. Enter the text you want to search for, then click OK. Retrospect searches for the text, top down from the current selection. When the specified text is not found, Retrospect beeps. When the text is found, Retrospect selects the entire line in which the text appears.

Find Backwards This command works like the Find command, except it searches bottom-up instead of top-down.

Find Again After you have used the Find or Find Backwards command, this command continues the search from the current selection forward, or down. Upon reaching the end of the log, it continues searching from the beginning.

Find Again Backwards After you have used the Find or Find Backwards command, this command continues the search from the current selection backward, or up. Upon reaching the log's beginning, it continues searching backward from the end.

Clearing the Log

To delete the contents of the operations log, view it then choose Clear from the Edit menu. You do not have to clear the log, because Retrospect removes old log entries as the log fills to its capacity, determined by the log size limit preference (page 154).

Printing the Log

To print the operations log, view it then choose Print from the File menu. If you have only a portion of the log selected, only that portion will print. If nothing is selected, the entire log will print.

Viewing Backup Set Contents

Retrospect can report files copied to a backup set during a specific backup or archive session.

To view the contents of a backup set, first click the Reports tab from the Retrospect Directory, then click Contents. The following window appears.
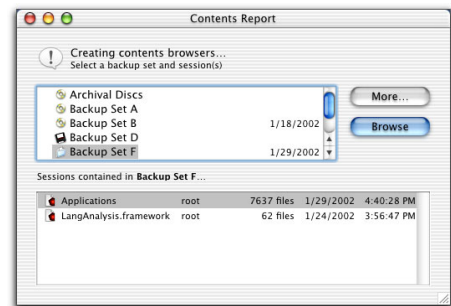
The backup set contents report window.

In the upper list box, select the backup set you want information about. (Click More to open another catalog to add to the listed backup sets.) After you select a backup set the lower list box displays the backup sessions contained within the selected backup set. In the lower list box, select the backup session or sessions you want to review.

At this point, you can choose Export from the File menu to export the list to a text file, or click

Browse. When you do the latter, a browser window appears listing the files and folders which were backed up during the session or sessions you selected.
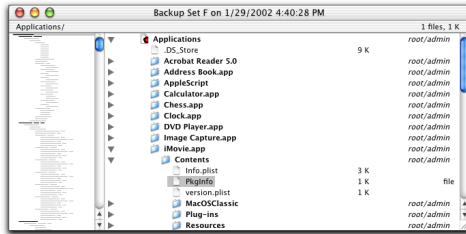
A browser reporting backed up files.

You can print the file list, export it to a text file, search for specific files, get information about a specific file, or change the view format in the browser window. You can view browser windows for multiple sessions at the same time by performing the same steps and selecting multiple sessions. When exporting, Retrospect exports the fields in the following order, regardless of the view format: file name, size, create date, create time, modify date, modify time, backup date, backup time, type, creator, backup set (if any), and path. For information about using the browser window and menus, see "Browsing" on page 170.

EXECUTION OPTIONS

Retrospect has many options you can set to determine how your backup, duplicate, copy, and restore operations are executed. For example, you could set a backup script to turn on software data compression and synchronize client computer clocks. You can set options while setting up an immediate operation or while editing a script. Execution options are local rather than global, so they apply only to the current operation or script, not to all operations and scripts.

Retrospect also has global program preferences which affect execution, described under "Preferences" in Chapter 8.

Setting Options for an Immediate Operation or a Script

Begin the immediate operation, or edit the script. Once you reach the summary window click the Options button. A window appears listing the basic options for the operation you are performing. The following example shows the basic options initially available for a backup script.

The basic options window of a backup script, showing options for the Backup category.

If you click More Choices, the window changes to show a list of option categories, as shown below.
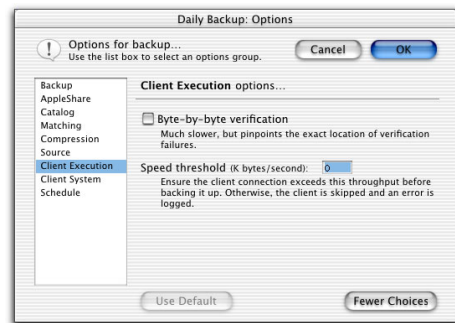
The extended options window of a backup script, showing the Client Execution category.

You can display the options for each category by clicking the category name in the list.

To turn an option on or off, click its checkbox or radio button. Some options use time and date controls, and others let you enter numbers or text. If any options in a category have been changed from their default settings, the category name is shown in boldface. Clicking Use Default reverts all visible options to their default states. Clicking Fewer Choices returns you to the basic Options window.

When you have finished setting options, click OK.

The options for each category are described in detail below.

Backup Server Options

This options category is available only with Backup Server scripts, which are explained under "Backup Server Scripts" in Chapter 5.
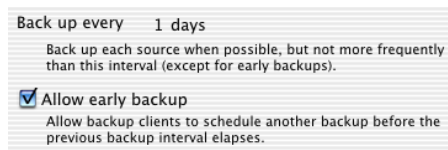
Back up every: n days/hours This time interval, which is one day by default, specifies the minimum time between backups. Each source is backed up when possible, according to the priority of need, but not more often than this interval unless the Allow Early Backup option is on and a client user initiates a backup.

Allow Early Backup When this option is on, which is the default, client users may initiate backups from their Retrospect Client control panels, overriding the backup interval. A request for an early backup does not necessarily move the user's volume to the top of the priority list, depending on the priority of other volumes listed as sources in the script. Retrospect begins a user-requested early backup only after the

Backup Server has current backups of its other source volumes.

Client Countdown Options

This options category is available only with Backup Server scripts.
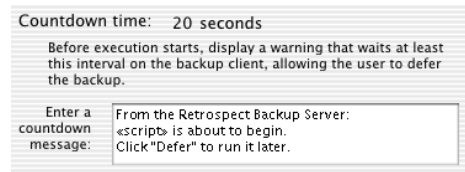
Countdown time: n minutes/seconds Retrospect gives client users advance notice of when a backup is about to begin, counting down the time specified here. Enter a number here and set the time units to seconds or minutes. (When the countdown time is zero Retrospect does not notify client users before backing them up.) When it is going to back up a source from a client computer, Retrospect puts up a dialog on the client. This dialog displays the countdown message (see below) and offers buttons to defer the backup to a later time or bypass the countdown and immediately begin backing up. (If the client user does not take any action Retrospect backs up when the countdown reaches zero.)

Countdown message The text in this box is shown to a client user when a backup is about to begin, according to the countdown time option. Retrospect will replace the text "«script»" with the name of the script it is executing.

Polling Options

This options category is available only with Backup Server scripts.

Retry failure after   30 minutes
    Wait at least this interval after a source's backup fails or is
    canceled.
Check source every   90 seconds
    Wait at least this interval between attempts to access each
    source.
Connect to client every   5 minutes
    Wait at least this interval before checking whether a backup
    client user has changed their backup schedule.

Retry failure after: n minutes/hours After a backup has failed or was canceled, Retrospect waits at least this long, thirty minutes by default, before again trying to back up a source.

Check source every: n seconds Retrospect uses this time interval, which is ninety seconds by default, to access a source just to check whether it is available for backup. Retrospect does not check sources while a backup is in progress.

Connect to client every: n minutes/seconds Retrospect uses this time interval, which is five minutes by default, to access a client to check whether the user has changed the backup schedule for the client. Retrospect does not connect to clients while a backup is in progress.

Backup Options

This options category is available with backup operations and Backup Server scripts.

⦿ Normal backup
◯ Recycle backup
    Normal backup: The selected files will be appended to the
    backup set.
☑ Verification
    After copying, compare each file with the original.
☐ Data compression (in software)
    Sometimes slower, but requires as little as half the space. This
    option is automatically disabled if the storage device uses
    hardware compression.

Normal Backup Only available with immediate backups, this option makes Retrospect perform a normal (progressive) backup, as described under "Normal" on page 22.

Recycle Backup Only available with immediate backups, this option makes Retrospect perform

a recycle backup, as described under "Recycle" on page 22.

Verification Verification ensures files are copied correctly by comparing files in the backup set with the original source files after the backup is performed. If the backup set spans multiple tapes, discs, or cartridges in the session done with verification, you must reinsert all members to which data has been written. Although verification increases the time it takes for a backup to complete, it ensures that information is correctly written to the backup set. This option is on by default.

Data Compression Data Compression saves space in the backup set by compressing files to about half their original size while copying them into the backup set. Files are automatically decompressed back to their original state when restored. Compression savings achieved during an operation are reported in the expanded status window and the operations log. The amount of compression savings you can expect depends on the types of files you are compressing. Text files compress substantially; application and system files do not. Backups using data compression are slower than those without, as are restores.

When copying to a tape device that has built-in compression, Retrospect automatically turns off software compression in favor of the faster hardware compression.

Retrospect uses its built-in Compression filter selector to identify files that are already compressed (such as those compressed with a utility such as StuffIt) so it will not attempt to re-compress them with software data compression. See "Compression Options" on page 144 for more information.

The Data Compression option is off by default.

Archiving Options

This options category is available only with archiving operations.
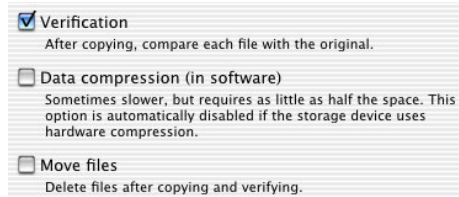
The archiving options include Verification and Data Compression, as with backups (page 141) and Move Files, as with duplicate operations (below). An archive is much like a backup unless you move files.

Duplicate Options

This options category is available only with duplicate operations.
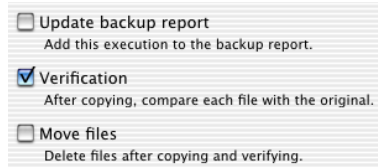
Update Backup Report When this option is checked, Retrospect treats the duplicate operation like a backup and adds or changes information in the backup report.

Verification Same as with backups (page 141).

Move files This option, which is only available for archive and duplicate operations, deletes files from the Source volume after they have been copied. If Verification is turned on and the files do not match exactly, the originals will not be deleted. Do not turn on the Move Files option without also turning on the Verification option. You should perform at least one additional verified archive, backup, or duplicate before deleting files from the Source. Retrospect cannot move files from a client computer if its

Retrospect Client control panel has been set to allow read access only. By default, this option is off. Also see "On Move, don't delete empty folders" on page 145.

File Copying Options

This options category is only available with duplicate and restore operations.
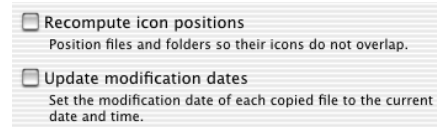
Recompute Icon Positions Repositions icons of restored files and folders to prevent overlapping. By default, this option is off.

Update Modify Dates Changes the modification information of the restored files to the date and time of the restore operation. This option is only available with restore operations and is off by default.

Fast Add Options

Options categories for a Fast Add are the same as those for backups (page 141).

Backup Set Transfer Options

These options are available only with backup set transfer operations initiated with the Copy command from the Tools tab.

Copy Snapshots This option transfers a backup set's current Snapshots to the destination catalog before copying files. Snapshots are not copied to the destination backup set's media.

Snapshots which exist in the destination backup set are not replaced. This option is on by default.

Only most recent versions Of files which match the search criteria, Retrospect uses only those most recently added to the backup set. It ignores files from older sessions. By default, this option is off.

Merge Sessions This option merges the files from multiple sessions of the source backup set to a single session in the destination backup set, as if they were all backed up at once. With the option off, which is the default, files transferred from several different sources are listed separately by session in the destination backup set.

Retrieval Options

This options category is only available during an immediate restore by searching for current or older files.
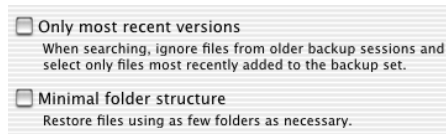
Only most recent versions Of files which match the search criteria, Retrospect uses only those most recently added to the backup set. It ignores files from older sessions. By default, this option is off and Retrospect also uses matching files from older sessions.

Minimal folder structure Restores files to their original folders, in the minimum required hierarchy. Empty folders are not restored. This option is off by default.

AppleShare Options

This options category, which applies to both AppleShare and Mac OS file sharing, is available with all types of operations except restore.
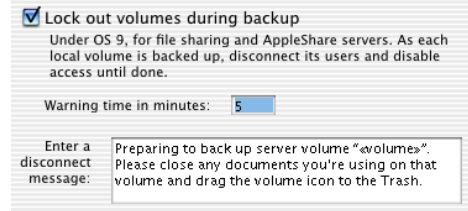
It is enabled here to show the default time and message.

Lock out volumes during backup This option, which works under Mac OS 9 only, disconnects users and prevents them from using a shared volume during backup. When you check this option, you can enter a warning message that is displayed to users before they are disconnected. You can also specify how many minutes advanced warning users will be given. This option will lock out users only if you are running Retrospect on the server itself. By default, this option is off.

Catalog Options

This options category is available with all types of operations except duplicate and restore.
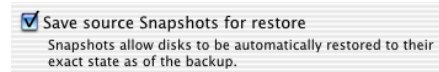
Save Source Snapshot for Restore This option directs Retrospect to save a Snapshot to the catalog and replace it every time a volume is backed up, and to save the Snapshot on the backup medium. Snapshots make it easy to restore a volume to its exact state as of a given backup, or retrieve files that you know were on a volume during a given backup. Empty folders are only backed up in Snapshots. If you deselect this option, no Snapshot is saved to the catalog. Should you need to restore files, you will have to use a selector (and/or browser) to choose which files to restore—a time-consuming process. By default, this item is on.

Matching Options

This options category is available with all types of operations except duplicate and restore.
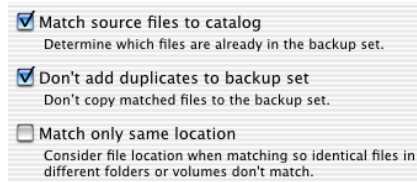
Match source volumes to catalog This option directs Retrospect to identify previously backed up files during normal backups. Retrospect compares the files on the source volume to file information in the catalog for the selected destination backup set. The Mac OS file matching criteria are name, size, type, creator, creation date, and modify date. The Windows file matching criteria are name, size, creation date, and modify date. Retrospect considers a file already backed up if all of these criteria match. When you view the preview browser while setting up an immediate backup, files that have already been backed up are preceded by a diamond symbol (◆). By default, this option is on (except for archives) and you should keep it that way unless you have a specific need to change it.

Don't add duplicates to backup set This option works with the "Match source volumes to catalog" option to prevent previously backed up files from being added to the backup set again. Select both of these options when you want to perform a standard incremental backup; that is, you only want new or modified files copied to the backup set. If this option is deselected, Retrospect adds all files, including previously backed up files, to the backup set every time a Normal Backup is performed. By default, this option is on and you should keep it that way unless you have a specific need to change it.

Match only same location This option, which is only available if "Match source volumes to Catalog" is selected, affects how strict

Retrospect is about matching so-called "identical" files from a source to a destination. (Normally, files are considered identical files when they have the same name, size, type, creator, creation date, and modification date.)

When this option is selected, Retrospect uses the unique (and hidden) Mac OS file identification number as an additional part of the matching criteria. This causes separate copies of otherwise-identical files to not match. (And unmatched files get backed up, so your backups are larger and slower.)

When this option is not selected, Retrospect is less strict about what it considers identical files for the purpose of matching. If the name, size, type, creator, creation date, and modification date match, the files are considered identical and matched. (And matched files do not get backed up, which leads to smaller, faster backups.) By default, this option is off and you should keep it that way unless you have a specific need to change it.

Compression Options

This options category is available with all types of operations except duplicate and restore.
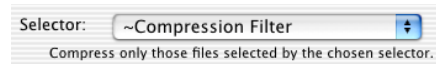
Selector This option, which is available only when the Data Compression option is on, lets you determine the selector used to filter files when compressing. Retrospect normally uses the built-in Compression filter selector to identify and avoid compressing files that are already compressed. You are not likely to need to change this option. If you want to use a different selector to tell Retrospect which files to compress, you can modify the Compression filter selector or create your own. (See "Using Selectors" in Chapter 9.) By default, this option is set to use the Compression filter selector when Da-

ta Compression is on. See "Data Compression" on page 141 for further information.

Source Options

This options category is available with all types of operations except restore.
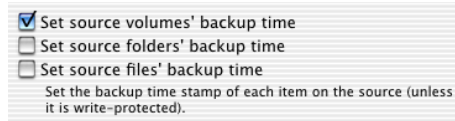
Set source (volume's/folders'/files') backup time These options, not available with duplicate operations, record a backup time for each source volume, folder, or file. (The Mac OS keeps track of the creation date, modification date, and backup date for each file, folder, and volume.) Using these options allows you to create selectors based on the "backup time," which is the moment execution begins. Retrospect cannot set the source backup time on a client computer if its Retrospect Client control panel has been set to allow read access only. By default, the volume option is on and files and folders options are off.

■ **NOTE:** When matching files for incremental backups, Retrospect does not use the backup time stamp. It uses more sophisticated and flexible criteria, as introduced in "How Retrospect Works" in Chapter 2.

On Move, don't delete empty folders This option is only available for archive and duplicate scripts and operations. It keeps folders that become empty as a result of the move instead of automatically deleting them. By default, this option is off.

Client Execution Options

This options category is available with all types of operations except restore, and these options apply only when backing up Retrospect client computers.
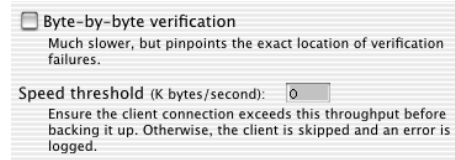
Byte-by-byte file comparison This option overrides Retrospect's fast client compare, verifying files the same way Retrospect does for local backups. When this option is turned off, Retrospect uses a faster, checksum-based technique to verify copied files. Both methods compare backed-up data to the original files. By default, this option is off and you should keep it off.

Speed threshold This option, which is available only with scripts, is useful for preventing backups which would be too slow. The number you enter here determines the minimum acceptable rate at which the client computer is accessed. If Retrospect finds the network or client is not working fast enough it will terminate the operation and log an error. Retrospect checks the client speed only once, as an operation starts.

This option is useful, for example, for preventing the Backup Server from trying to back up a PowerBook volume when its user connects with Apple Remote Access.

◆ **TIP:** To determine a working speed threshold, use the Get Info command on several different clients from the clients database window. For about a minute, observe the speed of each client.

Client System Options

This options category is available with all types of operations except restore, and these options apply only to Retrospect client computers.
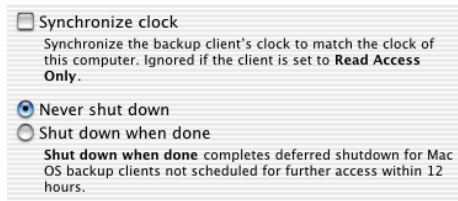
Synchronize clock This option sets the date and time on each client computer to match the clock on the backup computer. This is useful to get times and dates to agree and is especially useful when changing to and from daylight savings time. Retrospect cannot synchronize a client computer's clock if its Retrospect Client control panel has been set to allow read access only. By default, the synchronize option is off.

Never shut down/Shut down when done This option specifies how Retrospect handles the Finder's Shut Down process on a Mac OS client computer—it does not work on Windows clients—after Retrospect is done with its operation. The desired behavior only happens when the client Macintosh is waiting for a deferred shutdown after the Retrospect Client control panel intercepts its user's Shut Down command. Never Shut Down prevents shut down entirely. Shut Down when Done completes shut down if the client is not scheduled for an operation by a automatic script execution within the look-ahead time period (see "Schedule Preferences" on page 157). By default, this option is set to Shut Down when Done.

Schedule Option
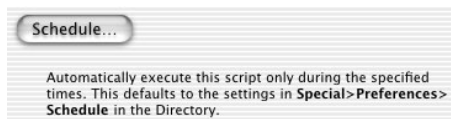
Click Schedule to define a time period during which this script may execute. The default schedule reflects the global schedule preference, described under "Schedule Preferences" on page 157.

CONTROLLING EXECUTIONS

Retrospect gives you many options to control operations in progress. For example, you can pause or stop an operation, view additional volume and performance details, and switch between interactive and unattended modes. These options are available once execution of an operation begins.

You can use any one of following methods to begin an operation:

• Initiate a backup, restore, or duplicate from the Immediate tab.

• Initiate an archive, fast add, or backup set transfer from the Tools tab.

• Run a script immediately using the Run menu or the Immediate tab.

• Open a run document in the Finder.

• Wait until a scheduled script begins automatic execution.

When an operation is in progress, Retrospect displays the execution status window and the Control menu. When it needs a backup set member, Retrospect displays the media request window.

Controlling Backup Server Executions

Though many of the features described in this section apply to both regular scripts and Backup Server scripts, this section is intended for use with regular scripts. Backup Server scripts have their own, unique features for controlling executions, which are described under "Using the Backup Server" on page 79.

Execution Status Window
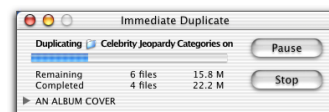
The execution status window.

The execution status window is available during all file transfer operations and contains the following features:

The Pause button temporarily suspends the current operation. Click Continue to resume the operation.

The Stop button halts the current operation, bringing it to a premature end.

The ▶ drop arrow expands the window to display more detail about the execution in progress. This includes the source and destination names, source and script start times, source and overall execution speed, and (when software data compression is being used) source and overall compression.

The execution status window (in its expanded state).

Control Menu

The Control menu is available during all file transfer operations and contains the following command items.

Show Log displays the operations log. See "Viewing the Operations Log" on page 137.

Run Interactively switches the execution to interactive mode. In this mode, the "When Done" options in the Control menu are dimmed and Retrospect always remains open after execution. The interactive mode cursor is a pair of rotating gears. All Immediate and Tools operations default to interactive mode.

◆ **TIP:** You do not have to wait for the Control menu to appear (while scanning a volume, for example) to switch between interactive and un-

attended modes. At any time, you can use the keyboard shortcut Command-Option-A, twice in quick succession.

Run Unattended switches the execution to unattended mode. During executions in this mode, the "When Done" options in the Control menu are available and determine what Retrospect does after execution. The unattended mode cursor is an animated grid. All automatic executions, run documents, and scripts launched from the Run menu default to unattended mode. In this mode only, Retrospect automatically searches autoloader media. (See "How Retrospect Works with Tape Libraries" on page 36 for details.)

Stop on Errors tells Retrospect to report errors by pausing execution and displaying a dialog. Retrospect will resume execution if possible after the OK button is clicked.

Just Log Errors tells Retrospect to report errors to the operations log, but continue execution if possible. The Run Control general preference determines the default for this menu option.

When Done determines what Retrospect will do when completing the current operation in unattended mode: Wait, Quit, Restart, or Shut Down. These commands are not available in interactive mode. The Unattended general preference determines the default for this menu option.

Retrospect will not quit, restart, or shut down (depending on the preference setting described on page 158) if another script is scheduled for automatic execution within the look-ahead time (as determined in the Schedule preferences). Retrospect remains open and waits for the script to execute.

Media Requests

When necessary for disks, tapes, or CD/DVD backup sets, Retrospect prompts you to insert

media by displaying the media request window. In most cases, Retrospect continues with the operation when you insert correctly named or erased media and click Proceed. Because file backup sets and Internet backup sets do not use media, Retrospect never makes media requests when operating with file backup sets and Internet backup sets.

You can avoid this prompt if you insert the correct medium before you execute the backup. So it does not overwrite valuable data, Retrospect is very particular about media—they must be blank or erased, or their names must exactly match the requested names in order for Retrospect to proceed without prompting you. When performing new media backups or recycle backups, consider erasing the media beforehand to be sure Retrospect will proceed automatically without your attention.

The media request window has a Stop button which halts execution of the currently running operation, bringing it to a premature end. It also has an Eject button which unloads the selected medium from the backup device. (Some devices require you to manually eject their cartridges.) If you have a tape autoloader, the Eject button changes to a Loader pop-up menu used to control the loader device.

Whenever the media request window is active, Retrospect adds the Devices menu to the menu bar. The items on this menu are as follows.

Device Status scans the communications bus and lists the ID numbers and their corresponding devices.

Eject unloads the selected disk, tape, or disc from its drive. (Some devices require you to manually eject their cartridges.)

Retension runs the selected tape forward and backward to even out the tension and alignment. Retensioning applies only to some types of drive mechanisms.

Erase erases the contents of the selected tape, removable disk, or rewritable disc.

If the media request window does not show your backup device, refer to "Seeing Your Backup Device" in Chapter 3 • Hardware.

New Medium Request

When Retrospect says, "Please select a new" medium, it wants a blank medium or one it can erase.
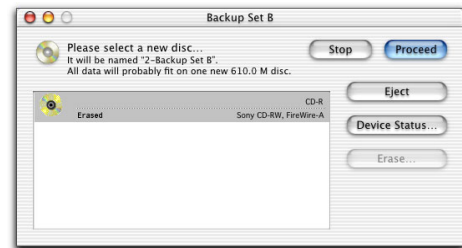
The media request window asking for a new disc.

When there is a medium in the drive and you click the Proceed button, Retrospect erases and names the media then continues with the operation using that medium.

■ **NOTE:** Retrospect may ask you to confirm before erasing a medium which appears to belong to another backup set. It will not allow you to erase a member of the backup set currently in use.

Specific Member Request

When Retrospect says, "Please insert" a specific medium, it wants that member of the backup set currently in use.

The media request window asking for a specific member of a backup set.

You should insert the requested medium, but if it is unavailable you can click the Choices button to handle the situation. The media choices dialog asks the action to take. These choices are as follows.

Missing tells Retrospect to designate the requested member as permanently unavailable from the backup set. Retrospect will ask for a new member and, if possible, copy the missing data to it during the next backup or archive.

■ **NOTE:** Select Missing only when you have permanently lost or damaged the requested member. It is not appropriate for other situations.

Skip tells Retrospect to skip the requested member and ask for a new member. Data on the requested member remains intact. Effectively, you are saying, "Stop copying to this member and start copying to a new medium." This is useful when a member is nearly full and you think it may not make it through a complete unattended backup before Retrospect fills it and asks for a new medium.

▲ **WARNING:** Do not select Skip when you have lost or damaged the requested disk, tape, or disc, or you may lose your data. Select Missing instead.

For more information on media requests, see "Retrospect refuses to use the inserted disk, tape, or disc." on page 202.

MANAGING BACKUP SETS

Retrospect allows you to pre-configure catalogs and backup sets for later use or perform maintenance operations on backup sets which already exist. To configure catalogs and backup sets first click the Configure tab from the Retrospect Directory.

Configuring Backup Sets

Click Backup Sets and the backup set selection window lists available backup sets and has commands for working with them.

Adding Backup Sets

If your backup set does not appear in the backup set selection window, click More, then Open to locate its catalog file.

Removing Backup Sets

To remove a backup set from the backup set selection window's list, select it and choose Forget from the Backup Sets menu or press the Delete key. Forgetting a backup set does not affect the contents of the backup set, nor does it delete its catalog file. However, it does remove the backup set from any scripts which use it.

Backup Set Configuration

In the backup set selection window, select the backup set to configure and click OK. The backup set configuration window appears.
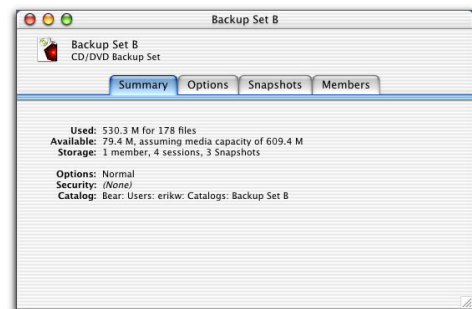
The backup set configuration window.

The window is divided into three or four tabs: Summary, Options, Snapshots, and Members (for tapes, disks, and CD/DVD backup sets) or Internet (for Internet backup sets). The window has only three tabs for file backup sets.

The Summary tab displays general information about the backup set, which is self-explanatory for the most part.

"Used" shows the number of files in the set and their aggregate size. "Storage" summarizes the media members and sessions of the backup set and the Snapshots in its catalog. "Available" shows how much space remains on the current member. "Security" shows the set's level of password protection. "Catalog" shows the path to the location at which the backup set's catalog is stored. "Options" summarizes the options determined by the Options tab described below.

The Options tab has buttons for catalog compression, catalog separation, configuring password access, controlling future media for this backup set, and estimating capacity of the set's members.

The "Catalog" compression buttons give you the option of compressing the catalog file, saving space on your hard disk, but possibly slowing catalog manipulation such as matching files.

The "Catalog" Separate button, available only with file backup sets, allows you to split a combined file set into separate files for the data and the catalog. See page 21 for further information.

The "Password" radio buttons allow you to choose the level of password protection of your secure backup set. Password protection is not available if you did not specify encryption when you created the backup set.

The "Media" Action button allows you to set how the media will be handled the next time you perform a backup to this backup set:

• Normal makes no changes, as with Cancel.

• Recycle erases and reuses the media. This is known as resetting the backup set.

• New Media creates a new backup set that expects a new medium. For more information on backup actions, see page 22.

• Skip requests a new member to add to the current backup set. Skip is useful when the current member (tape, disc, or cartridge) is almost full and you wish to get a complete, unattended execution without changing media.

The "Media" Capacity button, available only with CD/DVD and tapes backup sets, allows you to change Retrospect's estimate of your tape or disc capacity. The capacity estimates are used for display purposes only and do not affect how much data Retrospect will copy to a medium because it uses all the space it can. Leave the default (automatic) to let Retrospect estimate the capacity, unless your media consistently get higher capacity than Retrospect estimates. To see the actual capacity, configure a few of your backup sets which have full tapes or discs and click the Members radio button.

The Snapshots tab shows the volume Snapshots in the backup set catalog. You can remove Snapshots from the catalog by clicking the Delete button. A deleted Snapshot will be replaced when its volume is next backed up. You can add Snapshots to the catalog from the media by clicking the Add button. For details, see page 47 in the immediate restore instructions.

The Members tab shows the members of the removable media backup set. (This tab is not available for file and Internet backup sets.) If a backup set member is no longer available (for example, it is lost or damaged), you can designate it as permanently unavailable by clicking Set Missing. This causes Retrospect to try to copy the missing files during the next backup or archive to this backup set.

The Internet tab shows the various aspects of the FTP server and location of the Internet backup set. You can change this information if your FTP settings change after you have created the backup set.

Folders

Folders in backup set selection windows work just like folders in volume selection windows, as documented on page 166.

Managing Large Numbers of Backup Sets and Catalogs

When you have to manage a large number of backup sets and their catalogs, such as with network backups, there are a few things you can do to keep things organized.

One thing you can do is to create folders in the backup set configuration window.
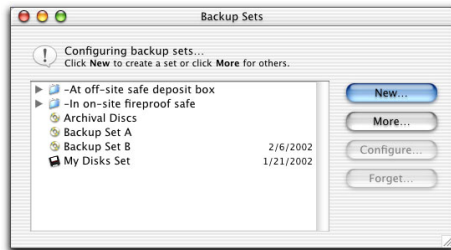
Move your inactive backup sets (that is, those no longer used for backups) into the folders. Name the folders to match the physical location of the media, such as an on-site safe or an off-site safe deposit box.
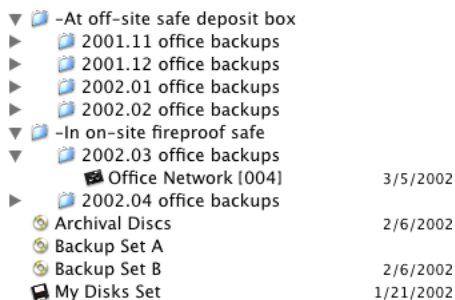
Label individual media and the containers in which they are stored.

Set up a duplicate script to automate copying your catalog files from the backup computer to a different hard disk. Include the catalogs in your backups, with their parent folder defined as a Subvolume. You can find more tips under "Catalog and Configuration Backups" on page 159.

MAINTAINING SCRIPTS

This section provides instructions for various tasks you may need to perform in maintaining the scripts you have created. Maintenance tasks include:

• checking script settings to confirm a script is ready for unattended operation;

• modifying script settings, such as sources, destinations, or the schedule;

• duplicating a script to create a similar one;

• Renaming a script;

• deleting a script;

• previewing and modifying the script execution schedule;

• skipping script execution until a later date.

To perform any of these tasks, first click the Automate tab in the Directory.

Checking Scripts

Before leaving Retrospect to run a script unattended, it is a good idea to confirm the script is ready for unattended operation. When appropriate, a script check also tells you what media Retrospect will request when the script runs.

To check a script, click Check from the Directory's Automate tab and a dialog appears, listing the available scripts.
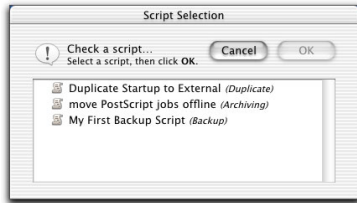
The script checking dialog.

Click the script you want to test and click OK. Retrospect checks the script definition to make sure that a Source and Destination have been properly defined. A message informs you if the script is missing necessary information. If the script is complete, a message appears telling you the script is ready.
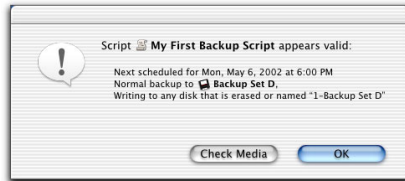
■ **NOTE:** The information presented in this dialog varies with the backup set and active media member.

Click OK to return to the Retrospect Directory, or click Check Media to have Retrospect check whether the desired backup set member is available.

Modifying Script Settings

You can change any of the choices you made in creating a script—you can choose different source volumes or destination backup sets, change the file selection criteria, the options, or the schedule. You can modify a script from the script summary window by clicking the buttons and choosing different settings.
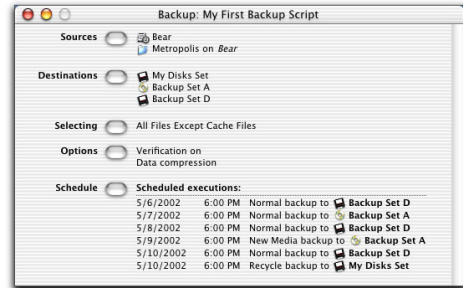
The script summary window shows the script's current settings.

Modifying script settings is done just like creating them. For further explanation, read Chapter 5 • Automated Operations. For details on using selectors to set the criteria, see "Using Selectors" on page 176. For details on Options, see "Execution Options" on page 139. For details on using schedulers, see "Scheduling Scripts" on page 62.

Duplicating, Renaming, or Deleting a Script

You can base a new script on an existing one by duplicating a script and then modifying the settings of the duplicate. Existing scripts can also be renamed or permanently deleted.

To duplicate, rename, or delete a script, first click the Automate tab in the Retrospect Directory. Then click Scripts to display the list of scripts. Next, click the desired script to select it before issuing one of the commands described below.

Duplicate

Choose Duplicate from the Scripts menu. Retrospect asks you to name the new script; type a name and click New. The new script is added to the list.

Rename

Choose Rename from the Scripts menu. Retrospect asks you to give the script's new name; enter a name and click Rename. The

script is renamed in the list. You can also re-name a script when its script summary window is active.

Delete

Choose Forget from the Scripts menu. Retrospect asks for confirmation; click OK to confirm. The script is removed from the list and its scheduled executions are eliminated.

If you do not want to receive a confirmation message when you delete or duplicate scripts, press and hold the Option key as you issue these commands.

Future Execution Schedule

You can view the script execution schedule to see when each script is scheduled to run. You can also modify the execution schedule by delet-ing scheduled events or by editing a script and changing its schedule.

Click Preview from the Automate tab to view the execution schedule for all scheduled scripts. (The following example shows a typical schedule.)
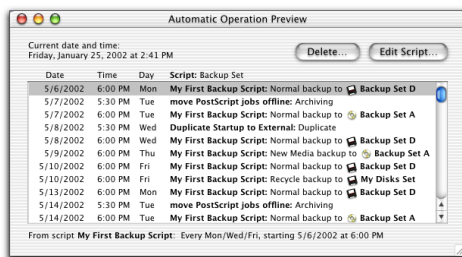
The scheduled event preview window.

Deleting

To delete a scheduled event and all prior events for its scheduler, click the event to select it then click Delete. The event and all prior events for its scheduler are removed.

Editing

To edit the script associated with an event listed in this window, click the event to select it then click Edit Script. The script summary window appears, and you can click the Schedule button to modify the schedule. For details on modify-ing schedules, see "Scheduling Scripts" on page 62.

Skipping Script Execution

If you do not want a script to run for a period of time, you can turn the script schedule off and specify when it is to be turned on again. This is useful, for example, if your office closes a week for holidays and nobody will be there to change media in the backup device.

To skip script execution, click Scripts from the Automate tab to display the list of scripts. Select the desired script then click Edit. The script summary window appears. Click Schedule. Retrospect lists the currently scheduled dates and times for this script.
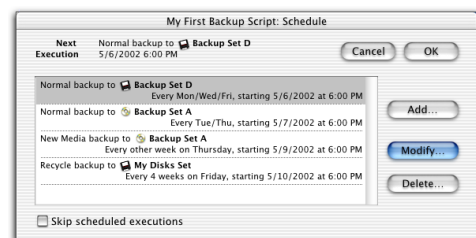
Click the Skip scheduled executions checkbox at the bottom of the window. A date and time field appears at the bottom of the window.
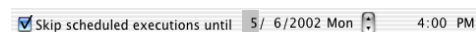
Set the date and time at which the script is to again be allowed to execute, then click OK. Retrospect ignores execution events prior to the deferred date.

■ **NOTE:** When multiple schedulers are shown in the script schedule window, the selected

scheduler is not the only one skipped by this feature. It skips *all* the scheduled executions for this script.

PREFERENCES

Use the following steps to set general program behavior for Retrospect. This section provides steps for setting these preferences and a detailed description of each option.

Setting Preferences

Click the Special tab in the Retrospect Directory, then click the Preferences button and the preferences window appears.

The preferences window.

On the left is a list of the different categories of preferences. The options for the selected category appear on the right. Click to select your desired preferences category in the list. Select or deselect options by clicking their checkbox or radio button controls, or enter text or numbers where necessary.

■ **NOTE:** If you change the default setting for an option, the category name will appear in bold in the list.

When you have finished setting options, click OK.

Logging Preferences
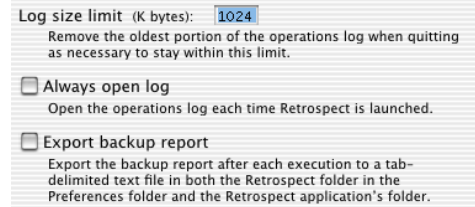
Log size limit (K Bytes) maintains the operations log size within the limit you set in the field provided. You can set the limit anywhere between 32K and 9999K. When the log reaches the limit, the oldest portion of the log is deleted to keep its size within the limit. The bigger the log is, the longer it will take to open. The default size is 1024K.

Always open log automatically opens the operations log each time you start Retrospect. By default, this preference is turned off.

Export the Backup Report produces or updates two identical files after each execution. (One Backup Report file is in the folder with the Retrospect application and the other is in the Retrospect preferences folder.) The tab-delimited text files contain all the information from the Backup Report. See "Viewing the Backup Report" on page 136 for more information on how to export it manually.
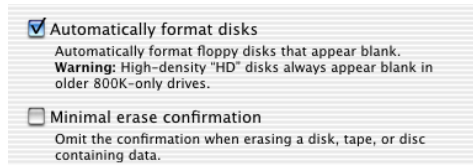
Media Request Preferences
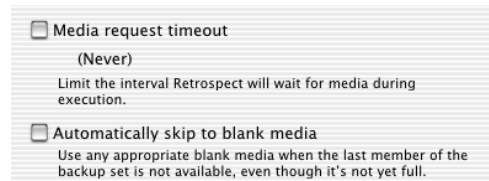
Media Request Timeout specifies a period of time for Retrospect to wait for media during execution. When Retrospect times out, the execution stops and Retrospect proceeds according to the next scheduled event. This preference is off by default, so it never times out.

Automatic Skip to blank media makes Retrospect use an erased tape, CD, or disk for subsequent normal backups when the current member of the backup set is not available. For example, select this option and leave an erased tape in the drive when the current tape of the backup set is almost full. Then you need not wait for the old tape to fill and be prompted to change tapes. When this option is not selected, Retrospect always prompts for the most recent member of the backup set until it becomes full. By default, this preference is turned off.

Media Erasure Preferences
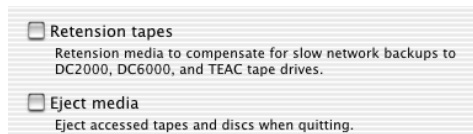
> ☑ Automatically format disks
> Automatically format floppy disks that appear blank.
> **Warning:** High-density "HD" disks always appear blank in older 800K-only drives.
>
> ☐ Minimal erase confirmation
> Omit the confirmation when erasing a disk, tape, or disc containing data.

Auto Format Disks automatically formats un-formatted floppy disks when you perform a backup. By default, this preference is turned on.

Minimal Erase Confirmation skips the confirmation message that normally appears when you proceed with a backup operation and Retrospect needs to erase the media. By default, this preference is turned off.

Media Handling Preferences
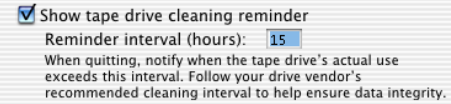
> ☐ Retension tapes
> Retension media to compensate for slow network backups to DC2000, DC6000, and TEAC tape drives.
>
> ☐ Eject media
> Eject accessed tapes and discs when quitting.

Retension Tapes winds a tape forward to the end and back to even out the tension and alignment. (This applies only to Travan, DC2000, DC6000, and TEAC drives.) By default, this preference is turned off.

Eject Media does so with tapes and discs when you quit Retrospect. By default, this preference is turned off.
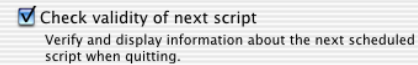
Maintenance Preference

> ☑ Show tape drive cleaning reminder
> Reminder interval (hours): 15
> When quitting, notify when the tape drive's actual use exceeds this interval. Follow your drive vendor's recommended cleaning interval to help ensure data integrity.

Show Tape Drive Cleaning Reminder does so at the specified interval of hours of tape drive use. The reminder appears as a note in the log and as a notification dialog in the Finder after you quit Retrospect. If you never quit you will never get a reminder. By default, this preference is on, with an interval of fifteen hours. Use your drive vendor's recommended cleaning interval.
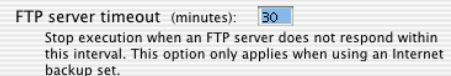
Quit Action Preference

> ☑ Check validity of next script
> Verify and display information about the next scheduled script when quitting.

Check Validity of Next Script does so when you quit Retrospect. It automatically verifies and displays information about the next script scheduled to execute. By default, this preference is turned on.
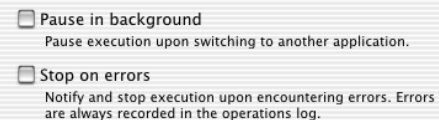
Internet Preference

> FTP server timeout (minutes): 30
> Stop execution when an FTP server does not respond within this interval. This option only applies when using an Internet backup set.

FTP server timeout is the period of minutes Retrospect shall wait for a response from an FTP server during an operation with an Internet backup set. If the time passes without a response from the server, Retrospect will disconnect and terminate the operation. This preference is thirty minutes by default.

Run Control Preferences

> ☐ Pause in background
> Pause execution upon switching to another application.
>
> ☐ Stop on errors
> Notify and stop execution upon encountering errors. Errors are always recorded in the operations log.

Pause in Background automatically pauses any operation Retrospect is performing when the Retrospect application is moved to the background. By default, this preference is turned off.

Stop on Errors automatically pauses a Retrospect operation and displays an alert message if any error occurs. By default, this preference is turned off.

Notification Preferences

Show Apple Menu Icon displays the Retrospect application icon in the Mac OS 9 Apple menu when a script is ready to execute. By default, this preference is turned on.

Autolaunch Retrospect automatically starts Retrospect when a scheduled script is waiting to execute. By default, this preference is turned on.

Launch Option at Shutdown displays a message at shutdown if a script is scheduled to run within the look ahead time. (See "Schedule Preferences" on page 157.) The message asks whether you want to start Retrospect or continue to shut down. By default, this preference is turned on.

Under Mac OS 9, the Retro.Startup extension is responsible for launching Retrospect and executing scheduled scripts. This extension is automatically installed by the Retrospect installer program and by the Retrospect application if it discovers Retro.Startup is missing.

Animate Dock icon causes the Retrospect icon in the Mac OS X Dock to bounce when Retrospect is requesting media.

Security Preferences
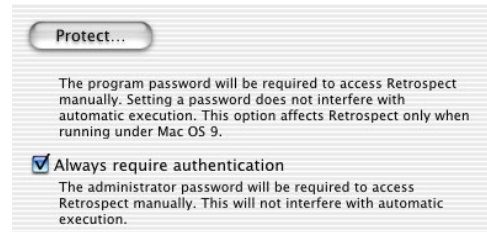
Protect allows you to specify a password that must be entered to start Retrospect manually, though it does not interfere with automatic script execution. If a user enters three incorrect passwords an error is recorded in the operations log. By default, there is no password protection.

When protection is added Retrospect enables the Lock Application item in the Run menu. Choose this item to force Retrospect into locked, unattended mode to prevent someone from interrupting executions. Click the mouse or press a key to enter the password and unlock the application.

Unprotect lets you enter the password and remove the protection from the Retrospect application. Unprotect appears only when protection is added

Always require authentication causes Retrospect to prompt the user to supply an administrator login and password each time the application is opened by a user under Mac OS X.

Schedule Preferences
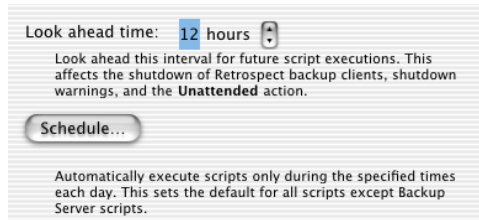
Look ahead time: *n* **hours** defines the number of hours Retrospect looks ahead for scheduled script executions. This affects what happens when you begin to shut down the backup computer or a client, and what Retrospect does when it completes an unattended operation. (For details see "Notification Preferences" on page 156, "Client System Options" on page 145, and "Unattended Preferences" on page 158, respectively.) The default preference is twelve hours.

Schedule lets you define a default time period during which scheduled non-Backup Server scripts are allowed to execute. You can change the allowed schedule of an individual script with its Schedule option (page 146). The default schedule is twenty-four hours a day, seven days a week.

Customizing the Schedule

When you click Schedule you get the weekly schedule window. Though similar to the Backup Server custom schedule window, it applies *only* to scripts other than Backup Server scripts.
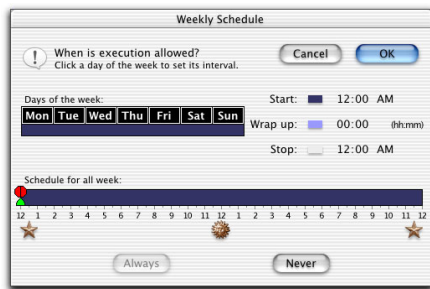
By default, all twenty-four hours of each of the seven days of the week are selected, as above.

To select a day of the week, click on it. Click and drag to select contiguous days of the week. Use the Shift or Command key and click or drag to select days without deselecting the previous selection.

To change a time, click on it and type or use the control.

Start is the earliest time at which scheduled executions may begin.

Wrap Up is the period of time (in hours and minutes) before the stop time, during which Retrospect should complete the current operation but not begin new operations.

Stop is the time at which Retrospect absolutely must halt scripted operations (until the next start time).

◆ **TIP:** You can also set times by dragging the icons on the hourly schedule bar, but you should first experiment by typing the times to see how these controls work.

When a time is changed, the hourly schedule bar changes accordingly to graphically represent the start, wrap-up, and stop times.

Each selected day has a scaled-down hourly schedule bar, though it does not have controls.

You can revert a customized schedule with the Always and Never buttons.

Sounds Preferences
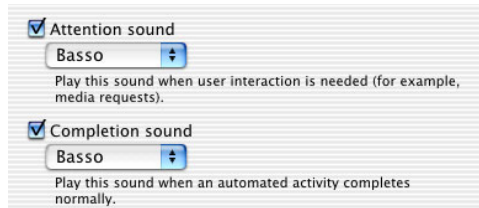
Attention sound lets you choose one of the available system sounds to use when Retrospect requires user interaction, such as during a request for media. The default sound is Simple Beep.

Completion sound lets you choose one of the sounds in the System file to use when Retrospect completes an automated operation. The default sound is Simple Beep.

Mac OS X Preference
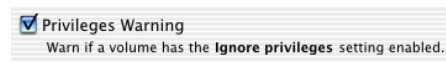
Privileges Warning displays an alert message if a volume you are working with is set to ignore privileges under Mac OS X. By default, this preference is turned on.

Unattended Preferences
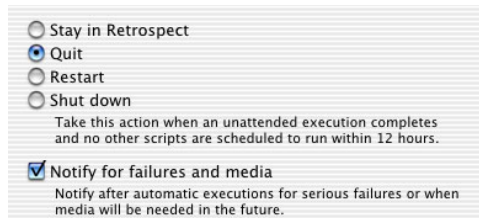
Stay in Retrospect, Quit, Restart, and Shut down determine what Retrospect does when a script is completed and no additional scripts are scheduled in the specified look ahead time. (See "Schedule Preferences" on page 157.) By default, this preference is set to Quit.

Notify for Failures and Media displays an alert message if errors occur during the automatic execution of a script. It also displays an alert message when CDs, tapes, or disks will be needed in the future. This option is only available if you have selected the Quit, Restart, or Shut Down preferences described above. By default, this preference is turned on.

■ **NOTE:** The Restart and Shut down preferences require the Retro.Startup extension under Mac OS 9. Retrospect installs this extension automatically whenever any of these preferences are checked.

MOVING RETROSPECT

If you would like to move Retrospect to a different computer and keep your existing setup, you must do a little more than just install Retrospect and the backup device on the new machine. You must move other files to keep the preferences, clients, catalogs, scripts, and schedules intact.

Install Retrospect

The first thing you must do is install Retrospect on the new Macintosh.

Move Catalogs

Copy the catalog files from the old backup computer to the new Macintosh. For best results, place the catalogs in the same folder as the Retrospect application.

Move Preferences

The old computer has a Retrospect folder in its Preferences folder.
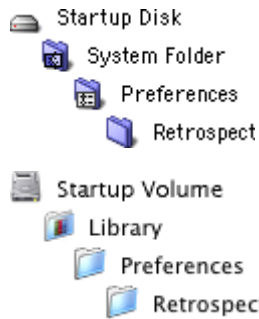
Paths to Retrospect preferences folder (Mac OS 9 at top, Mac OS X at bottom).

Copy this entire Retrospect folder into the same location on the new Macintosh, replacing any existing Retrospect folder there.

Initialize Catalogs

If your catalog files are not stored in the same folder as the Retrospect application, you must force Retrospect to take notice of them. The easiest way to do this is to select all of the catalogs in the Finder, and double-click one to open all of them. Retrospect opens a backup set configuration window for each catalog, causing it to recognize the catalogs.

Mediating Client and Local Volume Changes

Moving a Retrospect Network Backup Computer

If you have moved Retrospect and its components to a new computer and you want to back up either or both the old computer and the new computer, you must perform a few extra steps.

Previously Networked Volume is Now Local

You used to be able to back up the volumes from the new computer using Retrospect Client software, but now that is no longer necessary since its volumes are now local. Forget the client (see Chapter 6 • Network Backup) and remove the "°Retrospect Client" file from the Control Panels folder of the System Folder. Edit the sources in any Retrospect scripts which used

client volumes from the new computer and add the volumes which are now local.

Previously Local Volume is Now on a Client

You used to be able to directly back up the local volumes of the old Macintosh, but now you must install a Retrospect Client control panel on that machine to access its volumes with Retrospect from the new backup computer. (See Chapter 6 • Network Backup.) After installing and configuring the client, add its volumes to the scripts. Use the volumes database's Forget command (page 170) to get rid of the remnants of the previously local volumes. Forgetting volumes removes them from the volumes database and any scripts which use them.

If You Moved to Another Network Zone

Make sure all client computers are turned on, then start Retrospect on the new backup computer. Click the Configure icon, then click Clients. In the network database window, click Network. Select the zone for the previous backup computer, then select the zone for the new backup computer. This allows Retrospect to update the network database.

CATALOG AND CONFIGURATION BACKUPS

Catalog Backups

Catalog files are important adjuncts to backup sets, but face the same risks as your files since they often share the same hard disk. If you lose your catalog files, Retrospect cannot restore any files until the catalogs are rebuilt, which can be a lengthy process. For this reason, back up your catalog files as well as your regular files.

Configuration Backups

You should also back up your Retrospect configuration file, which contains your client database, scripts, schedules, preferences, custom selectors, and other important

information, and the Retrospect icons file and the log file. Move the Retro.Config, Retro.Icons, and Operations Log files from the Retrospect preferences folder (in your system's Preferences folder) to your Retrospect folder (the folder that contains the application and in which you should store your catalog files). This makes your Retrospect environment more self-contained and more easily backed up, which in turn, allows you to more easily restore it in case of disaster.

You can use the Finder or Retrospect to back up catalogs and configuration files; each method is explained below.

Copying in Finder Format

Catalogs and configuration files copied with the Finder or with Retrospect's duplicate operation can be easily copied back to a new or resurrected hard disk after a hard disk crash or similar disaster.

If you have a few small to moderately-sized catalogs, copy catalogs to a removable cartridge, shared volume, or another hard disk.

◆ **TIP:** Create and schedule a script to automatically duplicate your catalog files and configuration files to another volume, such as a file server.

Backing Up to Independent Backup Sets

Another method for backing up catalogs is to create a new backup set dedicated to backing up your catalogs files. Define as a Subvolume the folder in which your catalogs are stored—usually the Retrospect folder—and create a script that backs up just this Subvolume. Run the script periodically or schedule it for weekly backups. Alternatively, create an archive script which copies and moves catalogs which have not been modified in over a month. Should a disaster damage this backup set's original catalog, Retrospect takes very little time to rebuild it.

WORKING WITH MACINTOSH FILE SERVERS

This section describes how to use Retrospect to back up volumes shared by AppleShare or Mac OS file sharing. These operations require special procedures to ensure access privileges are intact after the volume is restored. Restoring servers is detailed in Chapter 7's "Restoring Pre-Mac OS X File Servers" on page 125 and "Restoring a Mac OS X Server" on page 130.

Overview

Shared volumes maintain access privileges that determine which users and groups of users can see and change files and folders. These privileges are active only when the server is running and the volume is shared.

To retain access privileges for a server, file sharing must be on during the backup. During a subsequent restore operation, Retrospect reassigns privileges to the same users and groups that were active during the backup. Otherwise, any privileges for the restored and retrieved folders revert to the volume owner or server administrator.

There are three ways to back up Mac OS file sharing servers, AppleShare servers, and Mac OS X Servers. The methods are local, client, and mounted volume, each explained below.

Server Backup Methods

Local backup of a server involves running Retrospect Workgroup Backup or Retrospect Server Backup on the server Macintosh with a backup device connected and file sharing activated. This is the fastest way to back up a server. Under Mac OS 9, you may want to use Retrospect's AppleShare Lockout option to disconnect users before backing up the server.

Client backup of a server uses the Retrospect client software on the server computer.

Retrospect runs on another computer and backs up the server without using file sharing.

The mounted volume method, for use under Mac OS 9 only, is done by logging in to the server as the administrator or other user with full access privileges. You can configure Retrospect to automatically log in to the server and mount a volume, then unmount it when its backup is complete. (See "Configure Password for Automount" on page 170.) With this backup method, you must manually copy the Users & Groups data file to a removable disk or burn it on a recordable disc any time you make changes to the users and groups, and keep the copy with your backup media in a safe place.

Do not use the mounted volume method under Mac OS X, as it will not preserve privileges. Use one of the other methods to back up a server from Mac OS X.

AppleShare and Mac OS file sharing do not permit the copying of files which are in use, so you will not be able to back up busy files if you use the mounted volume method. AppleShare IP has so many files in use, backup as a mounted volume is impractical. Retrospect client and local backups do not present this problem.

AppleShare IP Mail

Apple recommends stopping the AppleShare IP Mail Server before backing up the AppleShare IP Mail Database. You can accomplish this with a special Retrospect Event Handler, which shuts down the Mail Server and lets Retrospect duplicate the Mail Database folder. This inactive copy can then be backed up by other Retrospect scripts, even when the Mail Server is running. For more information on how to maintain the AppleShare IP Mail Database refer to the AppleShare IP Manual.

How It Works

Retrospect uses an AppleScript to disable the AppleShare IP mail server, allowing Retrospect

to back it up. After the backup, the AppleScript enables the mail server.

Setup

In the AppleScript Utilities folder is the Retrospect Event Handler for AppleShare IP Mail. Copy it to the Retrospect preferences folder (in your system's Preferences folder). Double-click the Retrospect Event Handler icon to launch it, then quit. From now on, the Retrospect Event Handler launches every time Retrospect launches.

Create a new folder named Mail Backup on the AppleShare IP Server. In Retrospect, define both this folder and the active AppleShare IP Mail Folder as Subvolumes and create a Retrospect Duplicate script named Mail Backup that duplicates the server's Mail Folder to the Mail Backup folder. Schedule the duplicate script to start earlier than your backup scripts. Modify your regular scripts to contain a custom selector that excludes the active AppleShare IP Mail Folder.

If you would like to change the name of the script that triggers the Retrospect Event Handler, run the Retrospect Event Handler and choose Edit Script from the Edit menu. Change the text of the property scriptName definition between the quote marks to the desired name, and save the Retrospect Event Handler.

Backing Up a Server to Move its Contents

If you are going to back up a server to move its contents (for example, you have a more powerful Macintosh to be the new server) you should make two separate verified backups. Verification, which is on by default, ensures the integrity of the data; having two backups will not leave you stranded if one fails for some reason.

WORKING WITH OTHER SOFTWARE

No program is an island. Among the thousands of other software programs available for the Macintosh, there are but a few which can cause problems with Retrospect or which require special attention. These programs are described below.

Read the contents of the "read me" file installed by the Retrospect installer program. It may contain late-breaking information on software which requires special attention for use with Retrospect.

Mail Servers and Groupware Servers

You cannot run Retrospect on a Macintosh running older mail and groupware server software, including QuickMail LAN and Meeting Maker. To avoid problems with these older servers, disable the server software before backing them up. Many newer products, including AppleShare IP (5.0 or later) mail server, QuickMail Pro server and Now Up-to-Date server, allow normal Retrospect operation while the server is active. Contact your server software vendor for their latest backup recommendations.

File Servers

Retrospect is compatible with AppleShare, AppleShare IP, AppleShare Print Server, and Mac OS X Server.

Security Programs

Security programs are designed to prevent access to your files on your disk. Because Retrospect tries to access your files, there is an obvious conflict of interest and problems may arise. If your security program locks files and folders and prevents Retrospect from backing them up, turn it off before backing up.

Some security programs lock the screen and may prevent Retrospect from launching automatically for unattended backup. You can avoid this problem by starting Retrospect manually and leaving it running at the Retrospect

Directory window. Scripts should then run automatically as scheduled.

Some security programs balk when Retrospect attempts to back up their configuration files. You can avoid this by excluding these files with a custom selector. See "Using Selectors" on page 176.

If you have questions about compatibility, contact your security product's publisher to determine which features are compatible with Retrospect and which features undermine backups.

Invisible Files

In general, Retrospect backs up all files you ask it to back up, whether or not they are invisible. The exceptions to this are the Mac OS 9 files Desktop DB, Desktop DF, VM Storage, Shutdown Check, and AppleShare PDS. Retrospect excludes these files because they are of no use to restore. In fact, unlike other invisible files, these do not even appear in volume browsers.

Soft Partitions

Soft partition files, which typically are invisible, are backed up as large files. However, we strongly recommend you back up soft partitions as mounted volumes and exclude the large partition files with a custom selector.

DOS Partitions

DOS partition files, which are created by DOS and Windows software emulators and compatibility cards, are backed up as large files. Each time you use the PC emulator, the partition file is modified (and, accordingly, needs to be backed up).

To avoid huge progressive backups of partition files, configure the software to individually store the DOS files on a Macintosh volume. Retrospect can back up these individual files and restore them as needed.

Auto-Compression Programs

The following are issues and considerations you need to be aware of when using Retrospect with a file-level compression utility, such as Auto-Doubler or SpaceSaver. Refer to the "read me" file installed with Retrospect for specific information on each compression application.

If a Macintosh is using an auto-compression utility, files that have been compressed may be decompressed before they are backed up. When you restore a volume, any decompressed files are not re-compressed unless your compression utility is installed and running during the restore.

Some auto-compression utilities change the type of a file when compressing. For example, the application MacWrite may become a compressed document even though it appears to be an application. In these cases, Retrospect's selectors Documents & Preferences and Applications appear to behave improperly. The Applications selector does not select compressed applications because they are now documents of the compression utility. Likewise, the Documents & Preferences selector selects compressed applications.

To find out if your auto-compression utility changes an application's file type when compressing, refer to the documentation that came with the utility or contact the developer.

Programs Which Do Not Update File Dates

Some programs may save some files without updating the file modification dates and times, which is a transgression of normal file handling procedures. Below is a list of known software which misbehaves in this way.

• ChiroMac

• DentalMac

• Great Plains

• MediMac

This poses a problem with Retrospect because it optimizes backups by backing up only one file when it finds multiple files with the same name, size, type, creator, creation date, and modification date. When you use software which changes a file without updating its modification date, the file does not appear changed to Retrospect so it does not get backed up (unless you do the following).

To back up files used by the above-listed software, you should take the following steps to ensure complete backups, allowing complete restores.

Try to keep all of the files and folders related to a particular program within a single folder, and declare each such folder a Subvolume (page 169).

Make a script, separate from your regular backup script, with its own, unique destination backup set. Use these new Subvolumes as sources and disable matching (page 144) or schedule recycle backups (page 22). This script always copies all the files in the Subvolumes to the backup set.

To restore your accounting data, always use the "Restore an entire disk" option to restore the Snapshot of the accounting Subvolume to a new, empty Subvolume.

4D Server
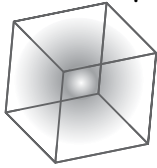
4D Server databases cache data in memory, periodically writing to disk. Even if all users are logged off you cannot be sure all of the most recent modifications have been saved to disk. Because of this, we recommend that you use one of the following two options for backing up a 4D Server.

Quit 4D Server before starting your Retrospect backup. This guarantees a backup of all the data. You can use AppleScript and/or a macro program like QuicKeys to quit and start your database as needed.

Use 4D Server's built-in backup module in combination with Retrospect. 4D Backup forces users to log out for the duration of the backup, is fully scriptable, and copies your database to another hard disk. Use Retrospect to back up this non-active data file.

FileMaker Pro and FileMaker Server

Before backing up FileMaker Pro databases, we recommend that you close them, regardless of whether you are running locally or with the File-Maker Server. You can use AppleScript and Retrospect to do this. For an example, see "AppleScript Support" on page 192.

Tools

- **WORKING WITH VOLUMES**

- **BROWSING**

- **USING SELECTORS**

- **COPY OPERATIONS**

- **MAINTENANCE AND REPAIR**

- **APPLESCRIPT SUPPORT**

- **E-MAILING BACKUP REPORTS**

Retrospect has a number of features which go above and beyond the basics required for backup and restore operations. Your knowledge of these features is not essential to use Retrospect, but knowing them allows you to work with the program faster and more efficiently.

WORKING WITH VOLUMES

A volume is the operating system's representation of a random-access storage device, such as a hard disk drive or partition, removable cartridge, floppy disk, or CD-ROM. It can also be a file server mounted on the desktop. A volume is the basic storage unit containing files and folders. Retrospect uses volumes as sources for backups and other operations and helps keep track of files with volume Snapshots.

Volume List Windows

Many Retrospect operations use the volume selection window for you to select one or more volumes for the operation at hand.
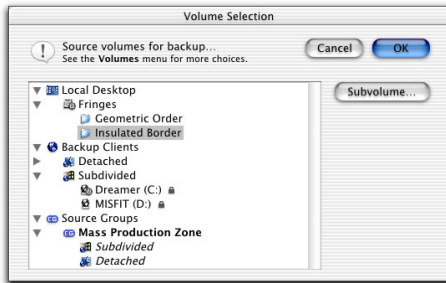
The volume selection window for an immediate backup.

Though some features may not be available for some operations, this window is very similar to the volumes database window.
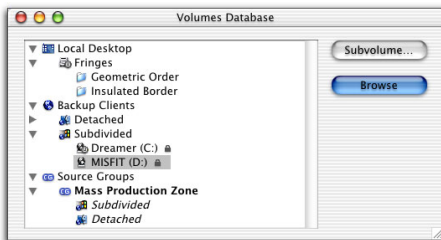
The volumes database window.

Using either window is fairly straightforward; you click on the volumes you want, then click a button or choose a menu item to proceed or act on the selected volume. However, the volumes

database window's list is organized for and includes controls for more involved navigation and selection of the listed volumes.

To practice the techniques described here, open the volumes database window by first clicking the Retrospect Directory's Configure tab, then clicking the Volumes button.

The volumes listed in the scroll box are organized in an outline format similar to that of the Finder's "view by name" list view.

Outline Controls

In a volume list window, the triangle icons on the left work just like those in the Finder. Click on a ▶ icon to show the contents of its container or folder. Click on a ▼ icon to hide the contents of its container or folder. A volume does not have this control unless it has one or more defined Subvolumes
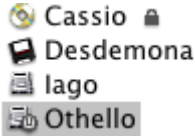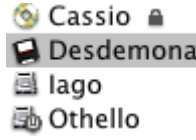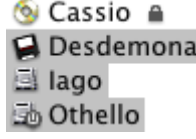
Selecting

In a volume list window, you click on a volume to select it. This deselects any other selected volumes.

Press and hold the Command key and click a volume to select it without deselecting any currently selected volumes. You can make a multiple non-contiguous or contiguous selection this way. Except with duplicates or a restore destination, you can have a multiple selection.

Press and hold the Shift key and click a volume to select all volumes listed from the current selection to the Shift-clicked volume. This is called a contiguous multiple selection.

Following are examples of these selection methods.

Original selection	Clicking on Desdemona following original selection
◉ Cassio 🔒 💾 Desdemona 🗄 Iago 📀 **Othello**	◉ Cassio 🔒 💾 **Desdemona** 🗄 Iago 📀 Othello
Command-clicking on Desdemona following original selection	Shift-clicking on Desdemona following original selection
◉ Cassio 🔒 💾 **Desdemona** 🗄 Iago 📀 **Othello**	◉ Cassio 🔒 💾 **Desdemona** 🗄 **Iago** 📀 **Othello**

These methods of making individual and multiple selections work throughout Retrospect, not just in the volume list.

Containers

In a volume list, volumes, clients, and groups are organized under the three containers Local Desktop, Backup Clients, and Source Groups.

▶ 🖥 Local Desktop
▶ 🌐 Backup Clients
▶ 🗂 Source Groups
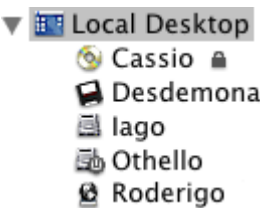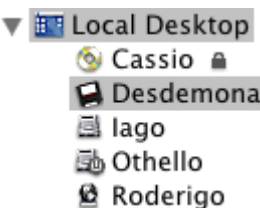
You could back up every hard disk and removable cartridge attached to the backup computer, and every client logged into Retrospect, simply by selecting the Local Desktop and Backup Clients containers as sources.

Local Desktop

The Local Desktop container holds volumes mounted on the backup Macintosh desktop. This may include the internal hard disk, an inserted removable disk, external drives, and file servers.

When you select the Local Desktop container itself, you are instructing Retrospect to select all such volumes on the backup computer, except floppy disks, shared volumes (such as file servers), read-only volumes (such as CD-ROMs), and empty volumes.

The following table shows some examples of Local Desktop container selections and the volumes to which they resolve. (For example, if the selection were used in a backup operation, the resolved volumes would be backed up.)

Using this selection with these volumes…	…resolves to these volumes.

▼ 🖥 Local Desktop
    ◉ Cassio 🔒
    💾 Desdemona
    🗄 Iago
    📀 Othello
    👤 Roderigo
	Iago
	
	 Othello

▼ 🖥 Local Desktop
    ◉ Cassio 🔒
    💾 **Desdemona**
    🗄 Iago
    📀 Othello
    👤 Roderigo
	Desdemona
	
	 Iago
	
	 Othello

Backup Clients

The Backup Clients container holds client computers which are logged in to Retrospect. Clients themselves contain one or more volumes, which are made available according to how they are configured with the General tab of the client configuration window. For details, see Chapter 6 • Network Backup.

Source Groups

The Source Groups container holds volumes grouped together for better organization. Groups, which you define, do not contain the

actual volumes themselves, but aliases like the Finder which "point" to actual volumes (which are in Local Desktop or Backup Clients). For example, you could make an Accounting group containing the volumes from the accounting department. Later when you are creating a backup script, instead of tediously selecting each individual accounting volume, you can just select the Accounting group and Retrospect knows you mean all of the volumes within that group. Source Groups are not available in volume lists of duplicate and restore operations.

Creating Groups To create a new group, choose Make Group from the Volumes menu. After you enter its name in the dialog, the new group appears under the Source Groups container. Any items that were highlighted when the group was created will belong to the new group.

Adding Volumes to Groups You can drag any volume from the Local Desktop and the Backup Clients containers into a group.

Arranging Group Items You can drag any volume out of one group and into another group. You can drag a volume to a different location within its group to rearrange the order of the group.

Removing Groups You can remove an unwanted group or item by selecting it and choosing Forget from the Volumes menu or pressing the Delete key.

Folders

You can make folders to help organize the information which appears in the volume list window. For example, while setting up a backup you can select a folder as a backup source and Retrospect will use the volumes in the folder. These folders are specific to Retrospect and do not appear outside the program.

When you make a folder in the volume list it does not make an actual folder on an actual volume. When this manual mentions folders, it generally means those actual Mac OS or Windows folders, except within the context of containers and the volume list, as described here.

Creating Folders

To create a folder, choose New Folder from the Volumes menu. Retrospect asks which type of folder you want, which determines whether it is in the Local Desktop container or the Backup Clients container. After you make your choice, the folder, represented by the icon, then appears with the volumes in the list.
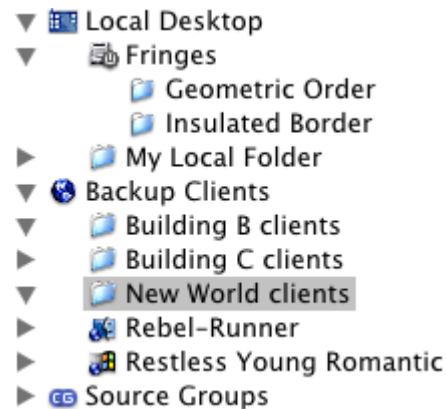
Arranging Folders

You can drag any volume into or out of a folder to better organize the list of volumes. Just like folders on a hard disk, folders are useful for hiding numerous items to avoid cluttering your work space. For example, if you are administering a large number of clients, you can arrange them in a logical order by placing the individual volumes into their respective department folders, such as Accounting, Engineering, and Manufacturing. You can then select a folder in a volume selection window and Retrospect selects all the volumes within the folder.

Removing Folders

You can remove an unused folder by selecting it and choosing Forget from the Volumes menu or pressing the Delete key. However, you must move its contents out of the folder before you forget it.

Subvolumes

A Subvolume is a folder on a volume you define to work like a volume for use within Retrospect. After a folder is designated as a Subvolume it can be specified as a Source or Destination for Retrospect operations. Subvolumes have no function outside Retrospect and their mere existence does not affect a volume's files and folders in any way.

If you only want to back up files in a single folder, specifying a Subvolume (instead of specifying a volume and using a custom selector) reduces the file scanning time, minimizes the number of files displayed in a browser, and reduces the needed amount of memory.

Retrospect treats a Subvolume as another volume on your system. Once it has been defined as a Subvolume, you may rename the folder in the Finder and Retrospect will continue to recognize it—with its new name—as a Subvolume. However, if you remove the folder, Retrospect will not be able to locate the Subvolume, even if you put a new or different folder with the same name in its place.

Specifying Subvolumes

In a volume list, select a volume, then choose Make Subvolume from the Volumes menu or click the Subvolume button in the window. A dialog appears, listing folders at the top level of the selected volume.
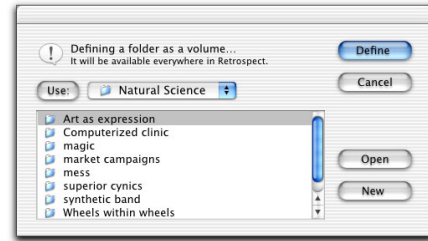
The Subvolume definition dialog.

You can specify any folder in the selected volume as a Subvolume, including folders nested deep within the folder hierarchy. Select the folder you want to specify as a Subvolume and click Define. (To define the folder name currently displayed in the pop-up menu as a Subvolume, click Use.) The Subvolume folder, identified by the 📁 icon, then appears with the volumes in the volume list.
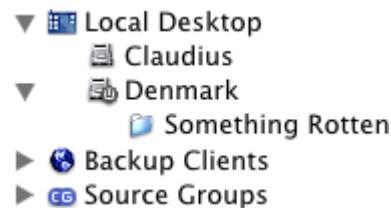
Redundancy

If you specify both a Subvolume and its parent volume as Sources, they will be treated as separate objects. However, operations involving the parent volume will include the contents of the folder designated as a Subvolume.

Discarding Defined Subvolumes

To discard a Subvolume definition, select the Subvolume and choose Forget from the Volumes menu or press the Delete key. Forgetting a Subvolume does not affect the contents of the original folder or any file you may have already backed up from it.

Volume Utilities

The Volumes menu has commands for defining and forgetting Subvolumes and for renaming, ejecting, putting away, and erasing listed volumes.

Make Subvolume

To define a folder as Subvolume, select it and choose Make Subvolume from the Volumes menu.

Rename

To change the name of a volume or Subvolume, select it and choose Rename from the Volumes menu. Enter a new name in the dialog which follows then click the Rename button.

Eject

To eject removable media from a drive, select its volume name and click the Eject button or choose Eject from the Volumes menu.

Put Away

To unmount a mounted volume (such as a server), select its volume name and choose Put Away from the Volumes menu.

Erase

To erase the contents of a volume, select it and choose Erase from the Volumes menu. Be careful; this command permanently removes all files from the volume.

Forget

To remove a volume or Subvolume from the list, select it and choose Forget from the Volumes menu. You may forget any volume Retrospect has previously accessed, but not currently mounted volumes, including floppy disks, and shared volumes.

Configuring Shared Volumes and Clients

Configure Password for Automount

You can make Retrospect use a password to automatically mount a shared volume when it is needed—typically, while executing a backup script—and unmount it when Retrospect is done with it. To configure the password of a shared volume, such as from a file server, first log in to mount the volume on the desktop. Select the volume and choose Configure from the Volumes menu. The password configuration dialog appears, listing the server, volume, and user names. In the space provided, enter the password for the shown user name, then click OK. Unmount the volume from the desktop before adding the volume to your scripts.

When it needs to access the volume, Retrospect will mount the volume on the desktop, access it, and then unmount it when done.

■ **NOTE:** When Retrospect has mounted the volume under Mac OS X, you will not be able to see the volume's contents from the Finder.

Configure Client

To configure a client, select the client or one of its volumes from the list and choose Configure from the Volumes menu. The client configuration window appears. For details on how to use this window, see Chapter 6 • Network Backup.

Browsing

The volumes database window has a Browse button which is not found in the similar volumes selection window. To view and work with the contents of a volume, select the volume and click the Browse button to open a browser. Browsing a volume is explained in detail in the following section.

BROWSING

Browsers are Retrospect's powerful tools for viewing, selecting, and manipulating files and folders on your source and destination volumes. From within Retrospect, browser windows provide file management facilities similar to those

in the Finder, and include other features not available in the Finder.

Browsers "unfold" the contents of a volume so you can work with all of its contents all at once. This is better than the icon-oriented view structure of the Finder, which does not let you select multiple files within different folders, or a flat-file structure, which loses the hierarchy organization.

Browsers allow you to see the files chosen for backup, restore, duplicate, and copy operations. You can also use browsers in a "stand-alone" manner to view and manage the contents of volumes. In backup, restore, duplicate, and copy operations, browsers show you which files have been chosen by the selector you designated and allow you to mark and unmark files.

You can open any number of browser windows, including different browsers for the same volume. You can also leave browser windows open while performing other Retrospect operations and switch back and forth between browser windows and other Retrospect windows.

When a browser window is active, Retrospect adds a Browser menu to the menu bar. It has commands for finding, selecting, and managing folders and files in the browser listing. These commands are described later in this chapter.

Viewing a Stand-alone Browser

To view a stand-alone browser of a volume, go to the Retrospect Directory's Configure tab and click Volumes. The volumes database window appears, listing the names of available volumes. Select a volume, then click Browse. Retrospect scans the selected volume, then displays a browser window listing all the folders and files contained in the selected volume.

To view a stand-alone browser of a backup set, see "Viewing Backup Set Contents" on page 138.

Viewing a Browser from an Operation

To view a browser within an immediate backup, restore, duplicate, or copy operation, click the summary window button named either Files Chosen or Preview. Retrospect displays a browser window for each source.

Browsers and Scripts

You cannot use a browser within a script because scripts are meant for unattended execution at a later time. Using a browser would not be useful because a volume's contents are likely to change between the time you edit the script and the time the script is executed.

About Browsers

A browser window displays a hierarchical file list of folders and files in the selected volume.
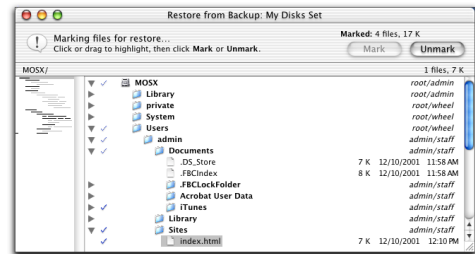
A browser window.

At the top of the list (and at the highest level of the hierarchy) is the name of the volume. Folders have triangle icons to their left; click a triangle to show the contents of the folder. Click the triangle icon again to hide the contents of the folder. Open folders have triangles pointing downward rather than to the right.
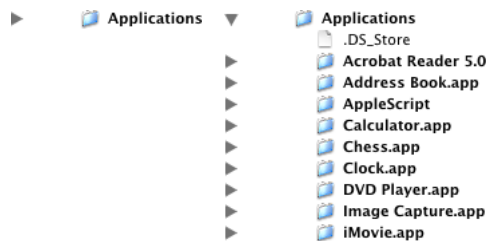
| Folder contents hidden. | Folder contents showing. |

The scrolling folder index on the left of the window provides a thumbnail view of the folders on the volume. Click on the folder index to display the associated file list on the right side of the window. The pathname of the current selection is shown above the index. Tick marks in the folder index indicate the location of selected items in the file list. Index lines appear grey for unopened folders or black for open folders.

A highlight count in the upper right corner of the window indicates how many files are highlighted and shows their total size.

Selecting Files and Folders

In a browser window, you select files and folders on which to perform operations. Select files by clicking on entries in the file list. Drag through the list or Shift-click to select a range of files or folders. Command-click to select or deselect non-contiguous items. Select all items by choosing Select All from the Edit menu. Double-clicking a file both selects (highlights) and marks it. Marking is described below, under "Marking Files and Folders."

Getting Additional Information

Retrospect provides a Get Info command you can use to view information about the selected files and folders. In addition to location, size, and dates of creation and modification, the Retrospect Get Info window provides information about a file's Mac OS 9 label, its file type and creator, its UNIX permissions, and compression achieved if you backed it up using Retrospect's software data compression.

To View Information About Files or Folders

From a browser, select the files or folders for which you want more information, then choose Get Info from the File menu. An Info window appears for each selected file or folder, displaying additional information about them.

The Info window.

Marking Files and Folders

A marked file or folder is one that is designated to be used in some way (for example, backed up, archived, duplicated, or restored). When performing operations, Retrospect marks files according to the rules of the selectors in the search criteria, but you have no way of knowing which files are marked unless you use browsers. In addition to simply viewing a list, you can manually mark and unmark files and folders within a browser.

■ **NOTE:** Because marking is only useful when performing operations, the stand-alone browser from Configure❯Volumes does not have Mark and Unmark buttons.

You mark files and folders in a browser by selecting them and clicking the Mark button. A check mark appears to the left of a file or folder when it is marked. Click Unmark to remove marks. You can also mark and unmark files and folders by double-clicking them.

To mark or unmark an item without affecting the highlighting of other items, press and hold the Command key while double-clicking.

By marking or unmarking a folder you perform the same operations on all the files (and folders) contained within that folder. For example, to specify a single folder for backup, you would double-click on the volume name at the top of the file list to unmark all of the files, then scroll to the folder you want to back up and double-click the folder icon to mark it and its contents.

The Browser menu provides additional commands for highlighting and marking in the window.

Skip Next scrolls the list forward to display the next highlighted file.

Highlight Marks highlights marked files.

Cross Reference allows you to locate files in the same hard disk or session which are related to a specified file. Specifically, Cross Reference finds duplicate files, older versions of the same file, and even files which have been renamed but were originally from the same file. This command highlights, but does not mark, cross-referenced files.

Selecting View Formats

The Browser menu has a View Options item that you can use to specify how you want to view the contents of a volume. This menu item brings you to the browser view options dialog.
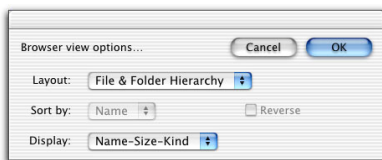
The browser view options dialog.

The Layout pop-up menu provides two different layouts for displaying the contents of a volume.

File & Folder Hierarchy displays files and folders in the same hierarchical structure in which they are stored on the volume. This is the default layout that Retrospect uses when you first open a browser window.

Sorted Files—No Folders displays all files stored in the selected volume as a single "flat file" list, discarding any folder designations.

For both types of browser layouts, the Display pop-up menu allows you to specify the type of file information displayed in the browser window. You can choose from Name-Size-Kind, Name-Size-Label, Name-Size-Modify Date, and Name-Size-Backup Date.

When the Sorted Files layout is specified, the Sort By pop-up menu becomes available, allowing you to choose one of six sorting options for displaying files in the flat file format: Name, Size, Kind, Label, Modify Date, and Backup Date.

When you choose a sorting option, Retrospect normally sorts the files in ascending order. For example, if sorting by size is specified, the browser lists the smallest files at the top of the list and largest files at the bottom. You can specify a descending order for the current sorting option by clicking Reverse.

When you specify layout and display options for the current browser window and click OK, Retrospect re-displays the files using the specified options.

Finding Files

The Browser menu has a Find item that you can use to locate specific files or folders (but not empty folders) on the volume.
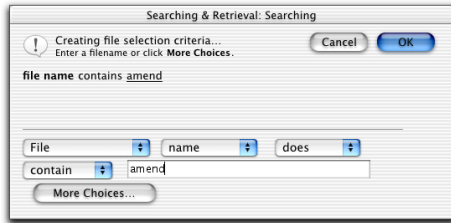
The Find window (showing Fewer Choices).

In the text entry field, type the text for which you are searching.

■ **NOTE:** This feature is not case-sensitive. It makes no difference whether you use lower or upper case letters.

The window also provides pop-up menus for specifying the type of search you want to perform.

File lets you specify which items you want to find, using one of three search variations: File matches the name of the file, Folder matches the name of the folder and selects the files immediately inside the folder, and Enclosing Folder matches the name of the folder and selects all files within the folder, including files nested in other folders.

Name specifies whether you are looking for the search text in the name of a file or folder, or in a path name. Path names always begin with the volume name and list the hierarchy of folders, separating folder names with colons (Mac OS 9) or slashes (Mac OS X). When you use "path name" and "End With" or "Match" (see below) to find a folder, you must type a colon or slash at the end of the path name. For example, "Startup Drive:Documentation:" and "Reports/TPS/".

Does specifies inclusive or exclusive searches. For example, if you choose "does not," and perform a search on file names, Retrospect selects all the files and folders whose names do not contain the search text.

Contain specifies where the search text is positioned within the name. You can specify that the search text be located at the beginning (Start With) or end (End With) of the name, or contained somewhere within a name (Contain). Or you can specify that the name exactly match the search text and no additional text (Match).

More choices lets you build a custom selector to use in searches for a file or folder. The window that appears is identical to the selector details window you use to build Retrospect selectors. For more information on using the Find window to build search conditions, see "Using Selectors" on page 176.

To perform a search, choose Find from the Browser menu. Edit the search criteria in the Find window and click OK. Retrospect highlights all files and folders that meet the search criteria. You can mark the highlighted files by clicking the Mark button in the browser window.

Printing or Exporting a File List

Any time a browser window is active, you can print the contents of the file list or export it to a file. To print, choose Print from the File menu. If you use Page Setup to reduce the printing size, Retrospect will print a browser in more than one column to save pages. To export to a text file, choose Export from the File menu. Retrospect exports the following fields in order: file name, size, create date, create time, modify date, modify time, backup date, backup time, type, creator, backup set (if any), and path.

Copying and Pasting Selections

You can copy selections between browser windows or into the Scrapbook for temporary storage. When you copy a selection, only the file and pathname information is copied, not the files themselves. This feature is useful for copying selections from a stand-alone browser

window into a browser window opened during a Retrospect operation such as restore.

■ **NOTE:** You can only paste a copied selection into a browser window or the Scrapbook. You cannot paste a copied selection into any other applications or documents.

To Copy Selections Between Browser Windows

Make your file and folder selection then choose Copy from the Edit menu. Open (or bring to the front) the appropriate browser window for the same volume, then choose Paste from the Edit menu. Retrospect pastes the selection into the new browser window, highlighting only the same files and folders (in the same folder hierarchy) which were selected and copied in the other browser window.

Saving Selections as a Selector

You can also save file and folder selections as a selector that you can use to reselect files for future Retrospect operations on the same volume, including backups and restores.

■ **NOTE:** Before you save a selection as a selector, consider creating a custom selector as described under "Using Selectors" on page 176. You can easily review and modify custom selectors at any time. A selector created with a browser's Save Highlights command cannot be reviewed or modified once it has been defined.

To Save Selections as a Selector

Select the files/folders you want to apply to a selector then choose Save Highlights from the Browser menu. The Saved selections window appears, displaying a field for entering a selector name for the selected files and folders. For example:

The Saved selections window.

The window also provides pop-up menus for specifying the type of search you want to perform:

Folder lets you specify which files and folders you would like to save in this selector. The Folder pop-up menu has three options: File saves the names and pathnames of all currently selected files, Folder saves the names and pathnames of all currently selected files as well as files in the top level of any selected folders, and Enclosing Folder saves the names and pathnames of all currently selected files and folders, including all files and folders that are within selected folders.

Is specifies inclusive or exclusive searches. For example, if you choose "is not," Retrospect selects all files except the selected files.

Type a selector name and choose any options for applying the selection then click OK. Retrospect creates the new selector, which is now available for other Retrospect operations.

Rescanning a Volume

You can update the contents of the browser window by choosing Rescan from the Browser menu. This is useful, for example, if you make changes to the volume (for example, in the Finder or another browser window) while the volume's browser window is open.

The Rescan item appears in the Browser menu only when Retrospect is working with a volume directly. For example, you can not rescan a volume when you are Browsing a backup set.

Deleting Files

Retrospect browsers have a Delete command to remove files from a volume, which is like placing a file in the Finder's Trash can and emptying the trash.

■ **NOTE:** Retrospect does not allow you to delete files from a backup set.

To Delete Files

Select the file or files you want to delete in the file list then choose Delete from disk from the Browser menu. A dialog appears, asking you to specify whether you want to remove the selected files only or remove the selected files and any empty folders that may result from the file deletions. Make your choice, then click OK. Retrospect permanently deletes the selected files from the volume.

▲ **WARNING:** A delete command may not be undone with the Undo command, nor may a file be pulled from the Trash can. When a file is deleted, it is gone.

The Browser menu has Delete from disk only when Retrospect is working with a volume directly. For example, you can not delete a file when you are Browsing a backup set.

USING SELECTORS

Selectors let you choose files based on almost any criteria, including name, date, type, or size. For example, you can create a selector that will choose all SimpleText document files modified after October 17, 2001.

■ **NOTE:** Retrospect's selectors do not select empty folders.

Retrospect allows you to create and save any number of selectors, which you will typically use with scripts to fully automate and customize your backup operations. You can also use Retrospect's built-in selectors. For more infor-

mation on using selectors in scripts, see Chapter 5 • Automated Operations.

■ **NOTE:** For each selector, there is the implied meaning of "select this file, but do not copy it if it already exists in the destination." There is no need for a special selector to do progressive backups.

The Selectors Window

You create and modify selectors through Retrospect's selectors window.

To display the selectors window, first click the Special tab in the Retrospect Directory, then click Selectors. The selectors window lists all of the predefined and user-defined selectors.
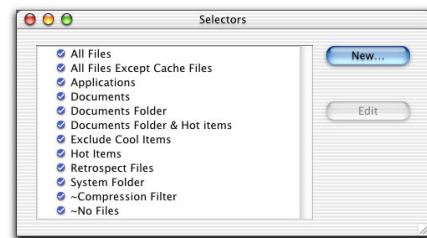
The selectors window showing Retrospect's built-in selectors.

The selectors window has two buttons for working with the selectors.

New creates a new selector.

Edit allows you to add new conditions or modify existing conditions for a selector.

When the selectors window is open, Retrospect adds a Selectors menu to the menu bar. Its items are as follows.

New Folder makes a folder container for organizing selectors.

Duplicate makes a copy of the currently highlighted selector.

Rename lets you change the name of the currently highlighted selector.

Forget removes the currently highlighted selector.

Built-in Selectors

Retrospect includes twelve built-in selectors, with predefined conditions for selecting files.

■ **NOTE:** You may not have these selectors if you upgraded from a previous version of Retrospect and retained your older configuration. You can create your own versions of these built-in selectors. See Dantz Technical Note #407, available from the Dantz web site.

Some selectors and selector conditions do not function with Windows clients as they do with Mac OS clients. The selectors window lists all the selectors, including the following built-in selectors.

All Files marks all files on the source, including the system folder. This is the default selector.

All Files Except Cache Files marks all files on the source, except cache files used by certain applications, such as web browsers. These cache files, which are often large, are not needed for restoring.

Applications marks only applications except those which are selected by the System Folder selector. On Windows clients, this marks file names using the extensions .COM, .EXE, and .DLL.

Documents marks files which are not selected by the System Folder or Applications selectors. On Windows clients, this marks all files outside the current Windows folder except .COM, .EXE, and .DLL files. (It does not mark NT profiles, because they are stored in the Windows folder.)

Documents Folder marks the contents of any folder named "My Documents" or "Documents".

Documents Folder & Hot Items marks the contents of any folder named "My Documents" or "Documents" and files and folders bearing the Mac OS 9 Hot label. (The label name may be something other than Hot; Retrospect uses any name you redefine in the second menu position.)

Exclude Cool Items marks everything except files and folders with the Mac OS 9 Cool label. (The label name may be something other than Cool; Retrospect uses any name you redefine in the fourth menu position.)

Hot Items marks only files and folders bearing the Mac OS 9 Hot label. (The label name may be something other than Hot; Retrospect uses any name you redefine in the second menu position.)

Retrospect Files marks files having the "Pery" creator code used by the Retrospect Backup family.

System Folder marks only the contents of the Mac OS 9 system folder or the Mac OS X core operating system folders. On Windows clients, this marks the current Windows folder.

Compression filter is used by Retrospect to determine which files to compress when using its software compression option. It is not for use in script criteria. (See "Data Compression" on page 141.) This selector tells Retrospect which files have already been compressed by commercial applications like StuffIt, PKZIP, DiskDoubler, and Now QuickFiler so they are not compressed again. You do not need to modify this selector unless you use a compression program that Retrospect does not know about. (Also see "Compression Options" on page 144.)

No Files does not back up any files. Use the No Files selector when you are creating a Script for the purpose of shutting down client computers on nights when they will not be backed up. For more information, refer to page 213.

■ **NOTE:** A file that is marked by a selector will not necessarily be copied to the destination. All copying operations (such as backups) using selectors are "smart," or incremental, because of Retrospect's matching feature. For each selector, there is the implied meaning of "select this file, but do not copy it if it already exists in the destination."

You can easily incorporate these selectors into your own scripts. You can view these selectors to better understand them, and you can even modify them to suit your needs. Do not modify the built-in selectors until you have some experience creating your own. In fact, it is instead better to duplicate a predefined selector and modify the copy.

To view a built-in selector, click on it to select it in the selectors window and click Edit (or just double-click the selector), which brings up a window with the selector's condition details. For example, select System Folder and click Edit to display the following window.
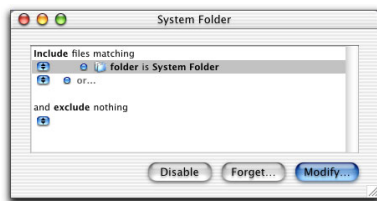
The selector details window for the System Folder selector.

In addition to viewing the selector, this window also lets you modify it to make your own custom selector, explained below.

Selector Conditions

You build a selector by adding conditions for including or excluding files or folders which

meet the selection criteria. As you build the selector you can add and relate multiple conditions, and even use logical operators to create sophisticated criteria for file selection.

To view selector conditions, in the selectors window click on a selector then click Edit. The selector details window appears, displaying two distinct areas for adding conditions; one for conditions which include files or folders for an operation, and one for conditions which exclude files or folders.
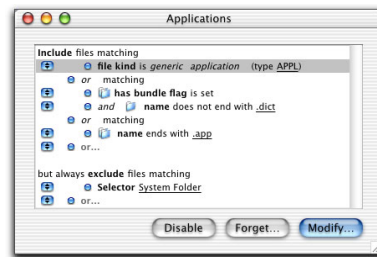
The arrow buttons underneath the Include and Exclude headings are pop-up menus of condition types.

The conditions pop-up menu in the selector details window.

You can build your own selectors from these conditions as follows.

Date uses creation, modification, or backup dates as conditions. Windows operating systems do not implement a backup date for files; they instead use an archive attribute. When the archive attribute is on, one is to assume the file has changed since its last backup and needs to be backed up.

Retrospect uses the archive attribute when it evaluates the backup date condition with files from a Windows client volume. When a file's archive attribute is off Retrospect assumes its backup date is one second after its modification date. When a file's archive attribute is on Retrospect assumes its backup date is in the year 1904.

Retrospect's interpretation of the archive attribute lets you use a selector condition such as "modify time ≥ file backup" with both Windows and Macintosh clients achieving the same functionality.

■ **NOTE:** You do not have to use backup dates to perform incremental backups; Retrospect does incremental backups by default. For more information see "How Retrospect Works" in Chapter 2.

File Kind uses file creator and type as conditions. The Mac OS uses type and creator codes to identify files, but the Windows operating systems use three character name extensions following files. Retrospect maps some extensions into type and creator codes. Appendix D • DOS File Name Extensions and Mac OS Codes lists Retrospect's type and creator codes for file name extensions. To select by file kind on Windows clients, use the name condition to select file names ending with a period and the three character extension.

Flags uses file attributes, such as file marked, matched, busy, locked, invisible, alias, name locked, stationery, or custom icon as the conditions. The following flags, when used with files from Windows clients, behave differently than when they are used by Mac OS files. The behavior is as follows:

• **Busy** is not useful.
• **Locked** indicates a file which allows read access only.
• **Invisible** indicates a hidden file.

• **Alias** is not useful.
• **Name Locked** indicates a system file.
• **Custom Icon** is not useful.
• **Stationery** is not useful.

Label (Icon Color) uses a file or folder's label as a condition. The Label menu or submenu in the Finder contains seven labels (and colors, if your monitor displays colors or shades of gray) and the "None" option. Each checkbox in this window corresponds to a specific item position in the Label menu and not to the actual color or label name. This condition is not useful with Windows clients.

Name (File or Folder) uses the name of the file or folder as the condition. The File pop-up menu has three options: "File" matches the name of the file, "Folder" matches the name of the folder and selects the files immediately inside the folder, and "Enclosing Folder" matches the name of the folder and selects all files within the folder, including files nested in other folders.

Name (Client) uses the name from Retrospect's client database as the condition.

Name (Sharing) uses file sharing owner, group or login names as the condition. This condition is not useful with Windows clients.

Name (Volume) uses the name of the volume as the condition. For Windows clients, this is the drive label, such as C:, not its volume label shown in its properties.

Selector uses another selector as the condition.

Size (File or Folder) lets you specify file or folder size as the condition.

Special Folders uses certain system-defined folders, such as the Volume Root, Desktop Folder, and Control Panels Folder, as the conditions to be used with local and client volumes. The only part of this condition useful with

Windows clients is System Folder, which selects the active Windows folder.

Condition Details

Each condition type has its own window in which you enter and specify details for the condition. For example, the Name (File/Folder) condition window is as follows.
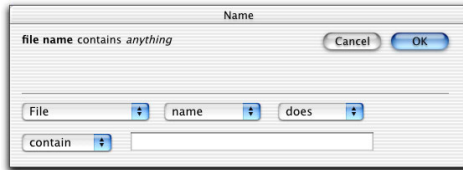
When you add or change a condition it appears in the selector detail window.

You can add multiple conditions to a selector by choosing other conditions from a ⬥ pop-up menu. The location of the ⬥ pop-up menu determines the relationship between the conditions; it may add a condition with the And operator or may add a condition with the Or operator. Each pop-up menu has its operator type as its first item (though it is grayed out because you may not choose it) so you know whether you are And-ing or Or-ing a new condition.

The And operator allows you to combine conditions so that a file or folder must meet the combined conditions before it is selected. Each condition uses an And operator, except each final condition of the Include and Exclude areas.

The Or operator allows you to build conditions where a file or folder must meet at least one con-

dition—but not necessarily all conditions—before it is selected. The last condition under each Include and Exclude area always uses an Or operator.

Click on this to add an "And" condition to the "name" condition.
Click on this to add an "Or" condition to the Exclude area.

To gain a better understanding of how this works, follow along with "Creating a Custom Selector" on page 181 and experiment with conditions on your own.

Condition Examples

Table 9-1 below shows an example of a custom selector and its effect when applied to some files.

Precedence

Exclude statements always take precedence over Include statements when Retrospect applies the selector. For example, if a selector has a statement which includes the Preferences folder and a statement which excludes the System Folder, the files in the Preferences folder will not be marked.

Creating a Custom Selector

Retrospect allows you to quickly build selectors that can perform the most sophisticated file and folder selection. In this example, we create a custom selector which will exclude certain applications and a folder called "Games" from backup.

Creating a New Selector

From the Directory's Special tab, click the Selectors button, then click New. Retrospect prompts you to name the new selector. This example uses "Unwanted music files" but you can enter a name of your own.

After typing the name, click New. Retrospect displays a selector details window for the new selector. Notice the window name is the selector name.

The contents of the scroll box in this window specify the conditions the new selector uses to mark files or folders.

Excluding Files

Use the arrow pop-up menu beneath the exclude heading to choose the File kind condition. Retrospect displays the following window.

Using this Selector	On these Files	Marks these Files
Include files matching ⊕ ⊖ **file name** contains <u>something</u> ⊖ *or* matching ⊕ ⊖ **file name** contains <u>nothing</u>	nothing can survive in a vacuum some things I'd like to say something for nothing something more to give	nothing can survive in a vacuum something for nothing something more to give
Include files matching ⊕ ⊖ **file name** contains <u>something</u> ⊕ ⊖ *and* **file name** contains <u>nothing</u>	nothing noble in your fate something breaks the silence something for nothing	something for nothing

Table 9-1: Examples of custom selector conditions and their effects.

Condition description   Scroll box of file kinds
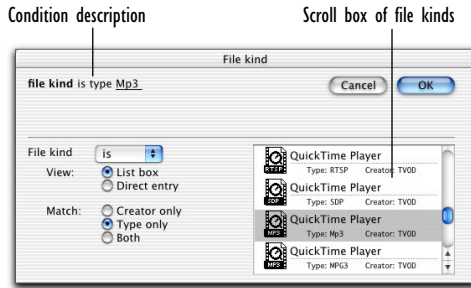
The File Kind selector condition window.

This window lets you specify a file type and/or creator as a condition. Select the "Mp3" type only, which is likely associated with QuickTime Player, then click OK. The selector details window now reflects our new condition.
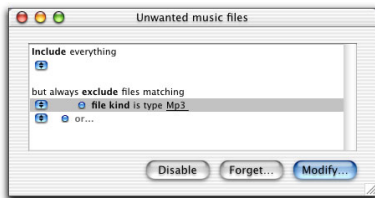
At this point, the selector excludes some MP3 files on some systems. We are ready to add a second condition to exclude more MP3 files.

Use the lowest arrow pop-up beneath the Exclude heading again and choose the Name (File/Folder) condition type. The Name (File/Folder) window appears. Change the menus so it says, "File name does end with," then enter ".mp3" in the box.
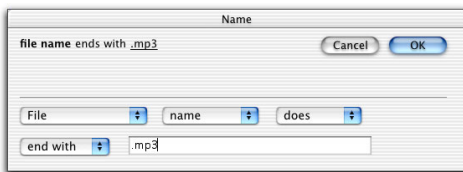
Click OK to return to the selector details window. At this point, the selector excludes some MP3 files on some systems or files ending with

".mp3". Because we chose this condition from the lowest arrow pop-up, Retrospect added the condition to the selector with the Or operator. (Or and And operators are explained on page 180.)

We are ready to add a third condition. Use the arrow pop-up alongside the file kind condition to choose the Special folders condition.

Click and hold this arrow button to create the And operator

(By using this particular pop-up, Retrospect adds the new condition with the And operator.) The Special folders condition details window appears.
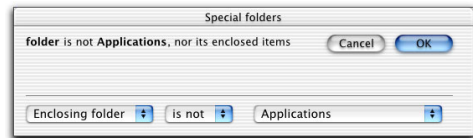
Change the menus so it says, "Enclosing folder is not Applications," then click OK. The selector details window appears with the now-finished selector.
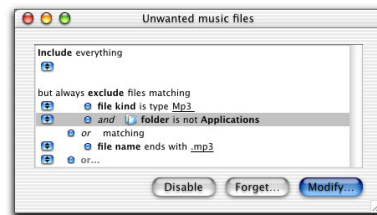
The multiple conditions work together in the finished selector to exclude all files ending in ".mp3" and exclude files having the Mac OS

type "Mp3" which are not in the Applications folder. You may now use it in scripts or immediate operations, including browsing. You may later edit it to add conditions which further exclude unwanted MP3 music files.

Selector Menu

When a selector details window is active, Retrospect adds a Selector menu to the menu bar.

Saving

Choose Save or Save As from the Selector menu to save the selector.

Reverting

Choose Revert from the Selector menu to discard your current changes to a selector and revert it back to its original state.

Renaming

Choose Rename from the Selector menu to change the name of the selector. Enter the new name in the dialog which follows, then click Rename.

Testing

After you have made your own custom selector (see "Creating a Custom Selector" on page 181), test it by opening it and choosing Check Selector from the Selector menu. Retrospect asks you to select a volume for browsing with your selector. Do so and it opens a browser window with the files that match the selector criteria marked with checks.

If the correct files are marked, the selector is working correctly and you can begin using it for immediate operations or in scripts.

If the files that are marked are not the correct ones, you need to modify your selector and check it again. You may need to add conditions, delete conditions, or modify the conditions. Pay close attention to the And and Or operators which may affect the results of your selector.

When you have finished modifying your selector, save it and check it again to see if the correct files are now marked. Repeat this process as needed until your selector is working correctly.

Using a Selector

You can easily incorporate built-in or custom selectors into your own scripts or immediate operations. Here's how:

1. Follow the normal steps to create your script or immediate operation, up to the summary window. (See Chapter 4 or Chapter 5 if you do not know how to set up an operation or a script.)

2. In the summary window, click Selecting to bring up the selecting window.

3. Choose a selector from the pop-up menu, then click OK to return to the summary window.

4. Close and save your script or execute the immediate operation.

The selector will be applied when the operation is executed.

Printing a Selector

You can print the contents of selector details windows to keep for reference. To print a selector window, edit the selector and choose Print from the File menu.

Modifying a Selector

Any condition that appears in a selector details window can be modified. After you modify a condition, Retrospect returns to the selector window, where you can add new conditions or modify existing conditions.

To open a selector from the selectors window, click on the selector you want to modify then click Edit (or just double-click the selector). Retrospect opens the details window for the selector.

To edit a selector's existing condition, open a condition for editing by selecting it and clicking Modify, or by double-clicking the condition line. When a condition is reopened, you can modify its options. Click OK to save the changes to the condition.

To add a new condition, choose the type of condition you want to add from an arrow pop-up menu. A condition window appears, providing options for specifying the type of condition you chose. Make the appropriate choices and settings in the window then click OK to add it to the selector. The condition window closes and the selector window now displays the new condition.

Disabling Conditions

At any time, you can disable a condition within a selector. When a condition is disabled, it has no effect on file selection and will remain inactive until it is enabled. This feature is useful when a selector becomes very complex and you want to resolve problems by testing parts of it.

To disable a condition open a selector and select the condition you want to disable. Click Disable and Retrospect disables the selected condition, displaying it in grayed out text to identify it as inactive.

You can restore a disabled condition by selecting the condition and clicking Enable.

Moving Conditions

Within a selector details window, you can move a condition by dragging the 🖼 button that accompanies the condition description and dropping it at a new location within the window's scroll box.

You can drag any condition to a new location, either in the same group or another group or heading. For example, if you added "file kind" as a condition for inclusion under the Include heading, you can change the same condition to an exclusionary condition by dragging it beneath the Exclude heading.

When you move a condition, its outline follows the hand cursor, indicating the new location for the condition. Release the mouse button when a new outline appears in your desired destination. After you drop it, Retrospect moves the condition to the new location, inserting it before the outlined destination condition.

To copy the condition, press and hold the Option key while dragging. Dragging an "or matching" heading moves the entire group. Option-dragging an "or matching" heading copies the group.

■ **NOTE:** Be careful to pay attention to the operator type (And or Or) of what you are dragging; moving it may change the operator.

Removing Conditions

At any time, you can remove a condition from within a selector.

To delete a condition open a selector and select the condition you want to remove. Click Forget and Retrospect removes the selected condition from the window.

Deleting a Selector

If you no longer need a selector you can delete it through the selectors window.

To delete a selector, click on the selector to be removed from the list to select it, then choose Forget from the Selector menu or press the Delete key. A dialog appears, asking you to confirm the deletion; click OK. Retrospect deletes the selector.

Duplicating a Selector

Sometimes, you will want to duplicate a selector so that you can make slight modifications to fit your needs. For example, you may want to modify a copy of one of Retrospect's built-in selectors but leave the original untouched. You

can make a duplicate through the selectors window.

To duplicate a selector, click on the selector to be duplicated from the list to select it, then choose Duplicate from the Selector menu. A dialog appears, providing a field for entering a new selector name. Type a new name and click New. Retrospect creates an exact copy of the selector, using the name you provided in the dialog.

Selector Examples

Following are examples of selectors and explanations of each.

Backup Selector

This selector excludes some unessential files which sometimes cause Retrospect to report errors when the files change during a backup.

A backup selector that excludes recent items in the Mac OS 9 Apple menu.

Network Backup selector

This selector marks all documents to be backed up, except for files in a folder named "Games" on Leslie's client computer. In this example, the backup administrator knows that Leslie has a large folder with games that do not need to be backed up.

A network backup selector that excludes a specific folder on a specific client computer.

Restore Searching Selector

This selector searches for PDF documents modified after the year 2001. This selector is a good example of how and/or logic works and shows how you often must use multiple conditions to select files from different operating systems. This example also shows how you can define often-used search criteria in a selector so you do not have to define the criteria each time you want to restore by searching.

Client Restore Searching Selector

This selector searches for a named file that was created on a particular client user's computer. In this case, the name of the file is "Dissertation" and client's name is "Neil." This selector could be used during an immediate restore operation.

COPY OPERATIONS

Retrospect has three different specialized operations to copy or move files among backup sets and disks. Archive lets you move files from a volume to a backup set for off-line storage. Transfer lets you copy files from one backup set to another. Fast Add copies a series of floppy disks or removable cartridges to a backup set.

To set up a copy operation, first click the Tools tab from the Retrospect Directory.

Archive

Click Copy from the Tools tab. A dialog asks you to choose the type of copy operation you wish to perform.
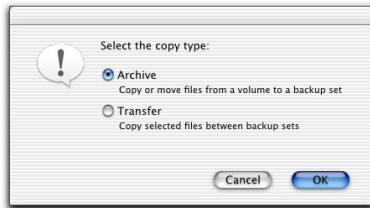
Leave the Archive radio button selected, then click OK. From this point on, the archive operation is set up just like a backup, as described starting on page 40. The only difference is the additional option of whether to move files, as described on page 142, which deletes the original files from the source after copying them to the destination.

Scripting an Archive

When an archive summary window is active, you can choose Schedule from the Script menu to save the archive information and settings as a script. You can then use the script to accomplish archive operations. See Chapter 5 • Automated Operations.

Archiving Tips

Media Plan for the long term. Archive to two or more backup sets and maintain an off-site copy of your archived data. Always store media according to manufacturer's guidelines. See "Media Longevity and Storage" on page 37 for further information. Periodically transfer your data to new media to ensure storage integrity. Do not use device-specific options such as hardware compression, because your next backup device may not support features of an older model.

Planning Define an archiving system and follow it every time. Only archive files in specific folders, having defined labels, or modified within a specific date range. Force users to make a decision on what is to be archived by moving data to a specific location. Never archive data without telling users what was removed.

Before you use the Move files (delete after copy) option, first archive to a different backup set by copying without moving. This provides an extra measure of safety should one backup set become unusable. If you have only a single archive medium and it is lost or damaged, you will have lost all of your data. Be sure not to recycle, lose, or damage your archive media.

Verification Always use verification. If you do not use verification and hardware problems occur when archiving, your data may not be correctly copied to the media.

On-line Archiving To archive documents in place, compress them in a file backup set that you store on your hard disk. This way they take up less room, but are still on-line.

Transferring Files Between Backup Sets

Retrospect can copy files between backup sets to change the media on which your files are stored or copy selected files from one backup set to another.

Transferring does not use any kind of matching files among the source and destination. Transfer is designed to copy specific files from one backup set to another, for consolidation and long-term archiving. It is not designed to clone, or

make an exact copy of, a backup set. A backup set created by transfer has only the latest Snapshot for each source in its catalog; it has no Snapshots on its media. Therefore, you cannot retrieve Snapshots from media created by backup set transfer.

To copy files between backup sets, you must have a separate backup device for each backup set, even if both backup sets are on the same type of media. In the case of file backup sets or Internet backup sets the need for separate backup devices does not apply.

If you do not have separate drives for each backup set, you can first copy files temporarily to a file backup set on a hard disk and then copy them from the file backup set to the destination backup set.

To copy files between backup sets, click Copy from the Tools tab. The following dialog appears.

Click Transfer and click OK. The backup set selection window appears, asking you to choose one or more backup set sources from which to transfer.
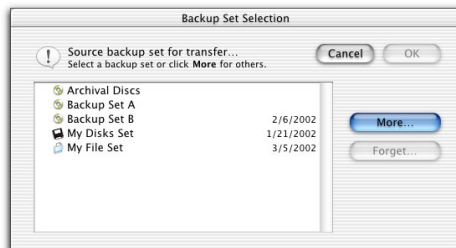
Select one or more source backup sets, and click OK. Another backup set selection window appears, this one asking you for the one to which to transfer. Select a destination backup set, and click OK. Another window asks you to choose file selection criteria for selecting the files to transfer. Specify search criteria and click OK. (For details on using selectors, see "Using Selectors" on page 176.) The backup set transfer summary window appears.

The backup set transfer summary window.

If you want to view the files found in the search or mark or unmark some of the files, click Files Chosen to display a browser. (For details on using browsers, see page 170.)

Additional Searching

If the files chosen browser does not display the files you want, you can close the browser and return to the summary window to redefine the search criteria by clicking Searching. If you change the search criteria, Retrospect displays the following dialog when you close the selector window.
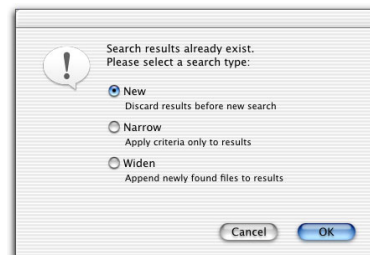
New replaces the results of the previous search with the results of the new search.

Narrow uses the new criteria to further restrict the selection.

Widen uses the new criteria to add files to the current selection.

Select a search type, then click OK to return to the summary window.

Transfer Options

If you want to change the default transfer settings, click the Options button in the summary window. The options are described under "Backup Set Transfer Options" on page 142.

Transfer Summary

After you have changed the options, click OK. When you have finished setting options, the backup set transfer summary window reappears. Check that the summarized information is correct.

Transfer Execution

When you are ready to proceed and Retrospect says "Ready to Execute" at the top of the window, click Transfer and a dialog asks you to confirm the operation; click OK. Retrospect performs the transfer operation, displaying its progress in the execution status window. Retrospect may ask you to insert media.

When the execution is complete, Retrospect informs you in the status window. Close it to return to the Retrospect Directory. If any errors occurred, you can see their details in the operations log (which is accessible from the Window menu and is described under "Viewing the Operations Log" on page 137).

Fast Add

Retrospect's Fast Add feature provides the most convenient way to copy files from several floppy disks and removable cartridges to a backup set.

This feature is only available under Mac OS 9; Fast Add is not available under Mac OS X.

Using Fast Add

Click Copy from the Tools tab. When the dialog asks you to choose the type of copy, select Fast Add.
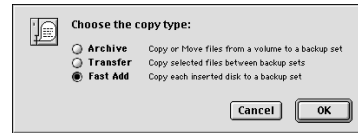
Click OK. The backup set selection window appears, asking you to choose a backup set destination.
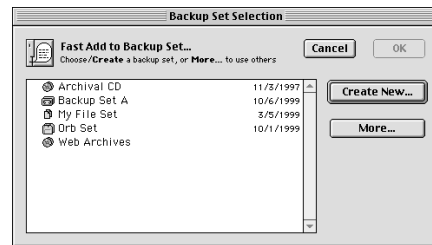
After you specify a destination backup set, Retrospect's Fast Add summary window appears.
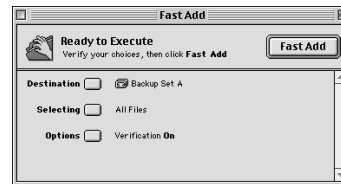
■ **NOTE:** If you are wondering about a source, Retrospect does not ask you for one because the source is a series of removable disks.

If you do not want all files on the disks to be copied to the backup set, click the Selecting button and use a selector. (For details on selectors, see "Using Selectors" on page 176.) There is no

Files Chosen information because Retrospect does not yet know the contents of the source disks.

When you have set and verified the information and options, Retrospect says "Ready to Execute" at the top of the window.

Click the Fast Add button to begin the operation and a dialog asks you to confirm the operation; click OK. An execution window shows the progress of the operation and gives you a button to stop its execution. Retrospect says "Waiting for a disk…" until you insert a disk to back up.

When Retrospect is done with a disk, it ejects it and waits for you to insert another. Click Stop when you have no more disks to add.

Close the status window to return to the Retrospect Directory. If any errors occurred, you can see their details in the operations log (described under "Viewing the Operations Log" on page 137).

Fast Add disk copy operations cannot be done with scripts.

MAINTENANCE AND REPAIR

This section provides instructions for maintaining and repairing catalogs and media by performing the following tasks:

• Update catalogs that are out-of-date or "out of sync".

• Rebuild catalogs that are missing or damaged. (If it produces "chunk checksum" errors, it is damaged.)

• Repair damaged file backup sets.

• Verify backup set media integrity to confirm that all files are readable.

To perform these tasks, first click the Tools tab from the Retrospect Directory.

Updating a Catalog

When to Update a Catalog

Update a backup set's catalog when Retrospect reports a "catalog out of sync" error while operating with the backup set. You must update the catalog to synchronize it with the media or you will be unable to use the backup set.

A "catalog out of sync" error indicates Retrospect was unable to update the catalog the last time it copied data to this backup set—possibly because of a crash or power failure. This error may also be caused by a full disk (error –34) or by an out of memory error (–108).

■ **NOTE:** If, after updating a catalog, you continue to get "out of sync" errors when using the backup set, do not attempt to repair the catalog again. You must skip to new media, reset with a recycle or new media backup, or create a new backup set. See page 220 for more information on the error message.

To Update a Catalog

To update a catalog, click Repair from the Tools tab. The following dialog appears.
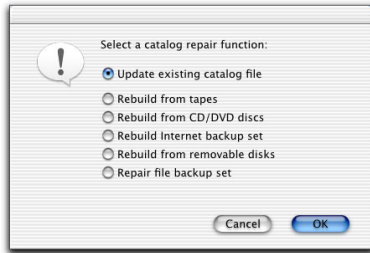
The catalog repair dialog.

Select Update existing catalog file then click OK. The following window appears.
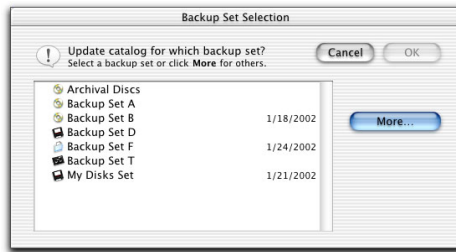
Select the backup set to update then click OK. The media selection window appears. Insert the backup set member requested by Retrospect.

Retrospect recatalogs the backup set, informing you of its progress with the execution status window. When Retrospect is finished with a particular member of a backup set it asks whether there are any more members.
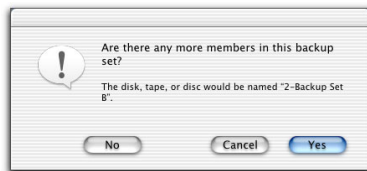
If there are no more members because you have already given Retrospect the final medium in the backup set, click No to complete the update. If there are more members in the backup set, click Yes. Retrospect continues to ask you for additional backup set members until you click No or Done.

The execution status window informs you whether the update was successful. If the operation was not successful, refer to the operations log for additional information.

Recreating a Catalog

When to Rebuild a Catalog

Because you cannot use a backup set unless it has a catalog file, you should rebuild the catalog whenever the original catalog file is lost or damaged. If the catalog file is unavailable, you can have Retrospect rebuild it by reading each piece of media in the backup set. Recreating may take a long time, depending on the amount of data in the backup set.

To rebuild a catalog, click Repair from the Directory's Tools tab. The following dialog appears.
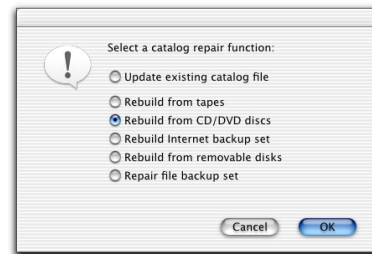
The catalog repair dialog.

Select one of the rebuild functions then click OK. For a tapes, removable disks, or CD/DVD backup set, the following window appears.
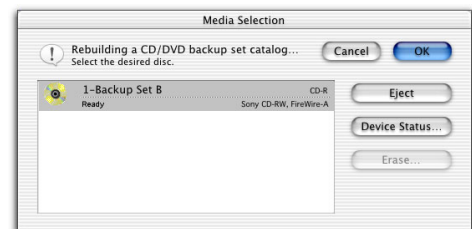
The media selection window.

In the media selection window, Retrospect requests the first media member of the backup set. If you do not have the first member, insert any other member of the backup set to be recataloged. Click OK when you have inserted the medium.

If you are recreating a catalog for a backup set that is still known by Retrospect, it asks whether you want it to recognize the rebuilt backup set instead of the known backup set.

Next, if the backup set is encrypted, Retrospect asks for its key. Enter the key or password and click OK.

Specify a location to save the rebuilt catalog file in the dialog which follows.

Retrospect recatalogs the backup set, informing you of its progress with the execution status window. When Retrospect has finished recataloging a particular member of a tapes, disks, or CD/DVD backup set it asks whether there are any more members to recatalog.
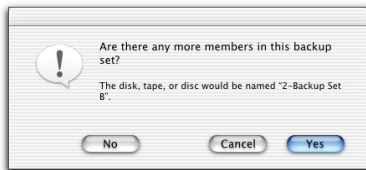
If there are no more members because you have already given Retrospect the final medium in the backup set, click No to complete the recataloging. If there are more members in the backup set, *even if one or more members are lost or damaged,* click Yes and the media request window appears. Insert the requested member of the backup set, or if you do not have it, click Choices and a dialog asks you what happened to the member.

The choices dialog.

If you have already given Retrospect the final medium in the backup set, click Done. If you do not have the requested backup set member, or if it is damaged, click Missing.

Retrospect continues to ask you for additional backup set members until you click No or Done.

The execution status window informs you whether the recreation was successful. If the operation was not successful, refer to the operations log for additional information.

■ **NOTE:** After Retrospect informs you the recataloging was successful, you should edit the scripts which used the backup set and add the newly recognized, rebuilt backup set as the destination within each script.

Repairing File Backup Sets

To repair a damaged file backup set, click Repair from the Tools tab. The following dialog appears.
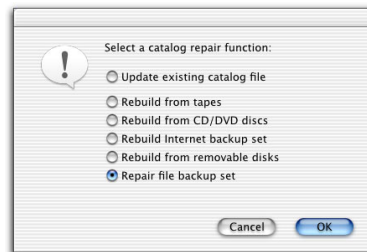
The catalog repair dialog.

Select Repair Macintosh File backup set and click OK. Retrospect displays the backup set selection window.

Locate the file backup set that needs repair and click Open. A message asks you to confirm the backup set repair. Click Yes to repair the backup set.

A status box shows how the repair is proceeding. When it is complete, you are returned to the Retrospect Directory. If the repair was not successful, the execution status window reports errors occurred and you can find them in the operations log.

Incomplete Catalog Repair

Any time you stop a cataloging operation while it is working with the second or subsequent member, the following dialog appears.

Revert stops recataloging and allows you to continue updating the catalog from the current medium later. (To continue later, use the Update existing catalog function.)

Save should be used when you do not wish to try to catalog any more data from the current medium. All data cataloged so far should be retrievable. (To continue later, use the Update existing catalog function.) Recataloging will resume with the next disk, tape, or disc if there is one. If you back up more data to the backup set after using this option, Retrospect will ask for a new medium, treating this one as full.

■ **NOTE:** If you stop Retrospect before it completes recataloging an Internet backup set, you must later start over to ensure all files are intact. (Do not use the "Update existing catalog file" repair function.)

Verifying Media Integrity

Retrospect can check all files on your backup set media to make sure that they are readable, then report files lost or damaged by media failure. For example, if Retrospect informs you that the file you just retrieved is damaged, you may want to verify the backup set media to ensure that other files are intact.

Verifying media does not mean Retrospect compares the files on the media with the original files. It only verifies that the files on the backup set media are readable.

To verify media integrity, click Verify from the Tools tab. Retrospect displays the backup set selection window. Select the backup set to be verified, and click OK. If the backup set is a CD/DVD, removable disks, or tapes backup set, Retrospect asks you to insert each backup set member as it is needed.

If you do not have the requested backup set member, but have more members of the backup set to verify, click Choices then Missing, then insert the next requested piece of media.

After verifying the last available member of the backup set, Retrospect displays a final status window, which tracks the number of files verified. If there are errors, a browser displays the files that could not be verified and you should examine the operations log for additional information.

■ **NOTE:** Consider backing up unverified files to a new backup set.

APPLESCRIPT SUPPORT

This section assumes your knowledge of AppleScript. It is intended only for advanced users who wish to further automate Retrospect with AppleScript. If you want to learn AppleScript,

read a tutorial book and study the sample scripts included with Apple system software.

Due to the complex nature of AppleScript, Dantz Development can only offer minimal technical support for these features.

Installing Apple Event Support for Retrospect

When you install Retrospect, a folder named AppleScript Utilities is put in the same folder as the Retrospect application. This folder contains the Retrospect Event Handler script application and example AppleScript scripts you can use or examine to help you start scripting Retrospect on your own.

■ **NOTE:** When updating from an older version of Retrospect, you must also update the Retrospect Event Handler.

To activate script triggering, you must copy the Retrospect Event Handler script application to Retrospect's preferences folder. (Under Mac OS X, its path is /Library/Preferences/ Retrospect/. Under Mac OS 9 its path is :System Folder:Preferences:Retrospect:.) If you only want to control Retrospect with Apple events, you do not need to activate script triggering.

Installing AppleScript Support for Retrospect Client

Retrospect clients running under Mac OS X do not support AppleScript.

Under Mac OS 9 and earlier systems running AppleScript, the Retrospect client installer places the Retrospect Client Commands file in the Scripting Additions folder in the System Folder. (If AppleScript was not running when you installed, you can rerun the installer and custom install these AppleScript items.)

You can Custom Install the Retrospect Client AppleScripts folder. It contains example AppleScript scripts you can use or examine to help you start scripting the Retrospect Client control panel on your own.

Further Automation with AppleScripts

In addition to its built-in scripting and scheduling features, you can also use Retrospect and the Retrospect Client control panel with scripts created with the AppleScript Script Editor, UserLand Frontier, and other Apple event scripting utilities. There are three ways to use Apple events to script Retrospect and the Retrospect Client control panel:

• Retrospect is scriptable, so you can send events to Retrospect to initiate various operations. For example, you can use an AppleScript script to back up a volume, start a prepared Restore script, or poll Retrospect to see if it is busy.

• Retrospect is attachable, meaning Retrospect can trigger scripts to run. For instance, Retrospect can run a script that quits your database application before a backup and starts it again when the backup completes. Or it can run a script that sends a message to your text pager warning you that the wrong media is in the backup device. This is accomplished with the Retrospect Event Handler.

• With the Retrospect Client Commands scripting addition installed, the Retrospect Client control panel is scriptable. You can use scripts to set the preferences and scheduling features of the Retrospect Client control panel. For example, you can use an AppleScript script to adjust the Backup Priority during certain hours or to request a backup ASAP from Backup Server.

■ **NOTE:** When saving scripts, use the syntax-checking option in your script editor to help avoid errors.

Sending Apple Events to Retrospect

You can use Apple events to perform a variety of operations, including starting Retrospect scripts, finding out what script is running, and spontaneously running backups. Following is

an example AppleScript script to back up your hard disk to a backup set:

```
tell application "Retrospect"
    activate
    back up "Local Desktop:Macintosh HD" to "Backup Set A"
end tell
```

Nearly everything you need to know to control Retrospect with Apple events is in Retrospect's dictionary and in the example scripts. (To view the dictionary, choose Open Dictionary from the Apple Script Editor's File menu and open Retrospect.) Refer to the Read Me file in the AppleScript Utilities folder for more information about scripting Retrospect and about the example scripts.

■ **NOTE:** When you use AppleScript to send a script name to Retrospect, the capitalization of the name must match that of the name as it appears in Retrospect.

■ **NOTE:** When you refer to a volume or Subvolume in Retrospect, you must use the hierarchy that appears in the volume configuration window. For example, to refer to a Subvolume named "Reports" on the local hard disk "Macintosh HD" you would use "Local Desktop:Macintosh HD:Reports".

Using Retrospect to Trigger Scripts

Some events cause Retrospect to send messages to the Retrospect Event Handler script application, "triggering" it to run one of its handlers. The default handlers are surrounded by comment marks so Retrospect's messages are ignored. If you remove the comment marks, the handlers will display a dialog as each event occurs, naming the event and in some cases listing information about the event. These handlers are included only as examples to help you with your own scripts.

To make Retrospect trigger your own scripts, first copy the handler representing the event

that triggers your script. Paste it at the top of the script, outside the comment marks. (Leave the original handler in place, in case you need it later while debugging your own scripts.) Then place your own AppleScript code between the handler's "on" and "end" statements.

■ **NOTE:** If you save a copy of the Retrospect Event Handler script application by choosing Save As from Apple Script Editor's File menu, select both the Stay Open and Never Show Startup Screen checkboxes.

The following example AppleScript script quits FileMaker Server when Retrospect starts a script that backs up the database, and then opens the server again when the backup is completed.

```
on scriptStart given scriptName: theScript, startDate: theDate
    if theScript is "Back Up Database" then
        tell application "FileMaker Server"
            force quit
        end tell
    end if
end scriptStart


on scriptEnd given scriptName: theScript, ¬
    scriptErrorMessage: theError, errorCount: theErrorCount
    if theScript is "Back Up Database" then
        tell application "FileMaker Server"
            activate
        end tell
    end if
end scriptEnd
```

Sending Apple Events to the Retrospect Client Control Panel

■ **NOTE:** Retrospect clients running under Mac OS X do not support AppleScript.

You can use Apple events to perform a variety of operations, including setting your client preferences and examining the status of your client to determine if a backup is in progress. Following is an example AppleScript script to turn on your

client's Wait At Shutdown preference only on Fridays:

```
on run
    set thePreferences  to Retrospect Client preferences
    if "Friday"  is in ((current date)  as string)  then
        set wait at shutdown  of thePreferences  to true
    else
        set wait at shutdown  of thePreferences  to false
    end if
    set Retrospect Client preferences to thePreferences
end run
```

Nearly everything you need to know to control the Retrospect Client control panel with Apple events is in the Retrospect Client Commands dictionary and in the example scripts. (To view the dictionary, choose Open Dictionary from the Apple Script Editor's File menu and open Retrospect Client Commands.) Refer to the Read Me file in the Retrospect Client Apple-Scripts folder for more information about scripting the Retrospect Client control panel and about the example scripts.

E-MAILING BACKUP REPORTS

Retrospect includes AppleScript applications which enable Retrospect to send backup reports via e-mail. These Retrospect Event Handler applications are for Microsoft Entourage and Mac OS X's Mail application. Additional legacy Retrospect Event Handlers are included for Claris Emailer, Eudora, Outlook Express, and QuickMail Pro.

Requirements

The scripts require access to an SMTP/POP mail system through a permanent connection to the Internet or via your organization's intranet.

These setup instructions assume that you have already set up the backup Macintosh's TCP/IP software, and that you have access to a DNS

(Domain Name System) server and an SMTP/POP mail server on your local area network.

Installation

Retrospect's installer places the AppleScript Utilities folder in the Retrospect folder. Within it are additional folders for e-mail applications. Open the folder appropriate for your e-mail application and copy the Retrospect Event Handler into the Retrospect preferences folder. (Under Mac OS X, its path is /Library/Preferences/Retrospect/. Under Mac OS 9 its path is :System Folder:Preferences:Retrospect:.) Double-click to run the Retrospect Event Handler and point it to the location of your e-mail application on your hard drive, then quit. The Retrospect Event Handler launches every time Retrospect launches.

Configuring Your Retrospect Event Handler

Recipient Groups

There are four groups of recipients to which the Retrospect Event Handler sends e-mail.

• The Success Group receives mail on successful backups.

• The Error Group receives mail if there is an error.

• The Media Request Group is sent mail when Retrospect requires a new member to add to a backup set and when a media request times out.

• The Main Group is sent mail on successful backups, any error, any media request, Backup Server starts and stops, and script starts. It is a superset of the other groups.

Edit the Retrospect Event Handler in Retrospect's preferences folder. Either use your favorite script editor, or run the Retrospect Event Handler and choose Edit Script from the Edit menu. Scroll down to the first property definition and add one or more e-mail addresses to each group if desired. Be sure to enclose the re-

cipient's e-mail address in quote marks and separate multiple recipients using commas.

A simple configuration would be to put one user account in the main group only as follows:

property kMainGroup : {"yourname@yourcompany.com"}
property kSuccessGroup : {}
property kErrorGroup : {}
property kMediaRequestGroup : {}

To add two recipients to one group, separate with commas:

property kSuccessGroup : {"yourname@yourcompany.com", "yourboss@yourcompany.com"}

You can subscribe to all groups, but that's the same as subscribing to the Main Group. When you have finished, save the script.

Script Start Settings

To receive messages when scripts or the Backup Server starts, change the property sendMailOnStart to true.

Notes on Operation

Backup, archive, duplicate, and restore scripts generate one summary message at the end of each script. (Immediate operations do not generate e-mails.) When all volumes in the script are completed successfully, a summary is sent to the Success and Main Groups. If any errors occurred, the summary is sent to the Error and Main Groups.

While Backup Server is running, the Retrospect Event Handler sends a summary e-mail every twelve hours. (If you prefer a different time interval, open the script and change the property kSendBackupServerReport value to the desired number of hours.) This summary e-mail contains the error and success messages for each volume in the Backup Server script. It also contains the error and success messages for regular scripts that run while Backup Server is running.

■ **NOTE:** When you stop Backup Server, the events which occurred after the last summary e-mail are not included in an e-mail.

When you have specified a media request timeout in Retrospect, the Retrospect Event Handler sends a reminder e-mail after the media request timeout period has expired. (If you did not specify a timeout the Retrospect Event Handler will not send an e-mail.) Also, simultaneously, it renews the media request timeout period once. Adjust the media request timeout value to give you enough time to give Retrospect the media it wants, and to avoid sending an e-mail if you are already sitting in front of the backup Macintosh waiting to give Retrospect its media. These messages are sent to the Main and Media Request Groups.

PROBLEMS AND SOLUTIONS

- **TROUBLESHOOTING**

- **COMMON QUESTIONS**

- **ERROR MESSAGES**

- **TECHNICAL SUPPORT**

This chapter offers solutions to problems you may encounter with Retrospect and its clients. In the next few sections, we present general troubleshooting help, answer frequently asked questions, and introduce you to the same troubleshooting techniques Dantz Technical Support uses to solve problems.

"Troubleshooting" includes common problems encountered during installation and backup and restore operations and offers explanations and solutions. "Common Questions" presents frequently asked questions. These questions do not involve error messages and are more general than the troubleshooting problems. "Error Messages" provides a numerically ordered list of error numbers with detailed explanations. "Technical Support" offers troubleshooting techniques and procedures for getting help.

It is not necessary to read these start to finish, as the information herein is more for reference than for tutoring. Feel free to go directly to the area that best applies to your situation.

TROUBLESHOOTING

Most problems encountered while using Retrospect fall into a few general categories. Dantz Technical Support follows some basic troubleshooting procedures for each of these categories. With a little effort, you can learn how to troubleshoot many problems on your own. This section outlines those procedures and shows you the most common problems and their treatments.

We recommend that you keep notes of your troubleshooting efforts. Even if you are unable to resolve a problem right away, your notes can establish a pattern of behavior to help us both understand the problem. If, after reading this section, you find you are still unable to solve a problem, contact Dantz Technical Support. Your troubleshooting notes will allow us to get to the heart of the problem more quickly.

Troubleshooting Road Map

The first step in troubleshooting a problem is to isolate the problem by identifying exactly when and where it occurs. Knowing when an error occurs gives you a fixed point of reference to help you solve a problem. Retrospect has different phases of operation. For example, a backup typically includes scanning, matching, copying, and verification phases in that order. If you can determine the problem happens while matching, you are on your way toward solving it. The situations described over the next several pages are listed in the likely order in which they would occur.

Installation Issues

Before installing Retrospect, we recommend you restart your Macintosh. Under Mac OS 9, restart with non-essential extensions disabled. (Use the Extensions Manager's pop-up menu to select the Mac OS Base set.)

The Retrospect Client control panel is not loaded at startup; it appears with an X over its icon.

Open the Retrospect Client control panel to see its status message indicating why it failed to load, then refer to page 233.

Client Configuration Issues

TCP/IP protocol does not appear in Retrospect's clients on network window.

There are a few possible causes and steps you can take to correct them.

TCP/IP is not set up or configured properly. Consult your network administrator or Internet service provider.

You mistakenly launched an old version of the Retrospect application. If you have an earlier version, purchase an upgrade from Dantz and remove the older version.

A TCP/IP client in the local subnet or in another Retrospect-configured subnet does not appear in Retrospect's clients on network window, or appears intermittently.

Open the Retrospect Client control panel on the client computer and check whether the client software was loaded at startup and whether it is turned on. (If the client software was not loaded, refer to page 233.) Check that its status field says "Ready" or "Waiting for first access." If it is a Mac OS client check that it is actually a TCP/IP client and that it does not say "Apple-Talk" next to its version number.

Make sure the client database window does not show a client with exactly the same name as the client you are looking for. If it does, select this client and choose Forget from the Clients menu.

Make sure the client computer is connected to the network and its network settings are correct.

Should these measures not work, see "Pinging to Verify TCP/IP Communication" on

page 210. If the backup computer and client ping successfully yet the client still does not appear, your network may not fully support TCP/IP and UDP. Passive networking hardware, such as hubs and bridges, may not forward network information Retrospect needs to work with TCP/IP clients.

After taking the appropriate measure you may log in the client.

A Windows client is not visible to Retrospect, but it returns an IP ping, and adding by address produces error 541.

Retrospect may not see a Windows client which has TCP/IP Dial-Up Networking installed. Even though the computers will respond to ping troubleshooting, the Windows client does not appear in Retrospect's clients on network list, and the Add by Address command produces error 541. The problem most likely results from two conflicting TCP/IP protocols, one for the network card and one for the dial-up service.

Windows 95/98/Me workaround: Open the Network control panel. Select the TCP/IP -> Dial-Up Adapter component, and click Properties. Select Obtain an IP address automatically, then click OK. Close and restart. If the computer is configured to automatically dial when an application requests a TCP/IP connection, the user will be prompted to dial out whenever the Retrospect client software loads (usually at startup). Cancel this dialog when it appears at startup for the client software. To prevent this dialog from appearing, turn off the auto-dialing feature by highlighting The Internet on the desktop, right-clicking for Properties, and unchecking the Use AutoDial option.

Windows NT/2000/XP workaround: Open the Network control panel and click Bindings. From the pop-up menu at the top, choose to display bindings for all protocols. Click the + to open TCP/IP Protocol. Select the network

adapter, then click Move Up to position it above the Remote Access WAN wrapper and anything else.

A TCP/IP client outside the local subnet does not appear in Retrospect's clients on network window.

The clients on network window lists only clients in the same physical subnet as the backup computer and in other subnets you have configured Retrospect to search.

To configure Retrospect Workgroup Backup or Retrospect Server Backup to search for clients outside the local subnet, choose Configure Subnet Broadcast from the TCP/IP menu (page 94).

To add a single client from another subnet to the list with Retrospect Workgroup Backup or Retrospect Server Backup, click the Add by Address button (page 95) then enter its IP address or name. (Should this not work, see below.)

The Add by Address button fails to connect with the client at the specified IP address or name.

Make sure the client computer is connected to the network and its network settings are correct.

Open the Retrospect Client control panel on the client computer and check whether the client software was loaded at startup and whether it is turned on. (If the client software was not loaded, refer to page 233.) Check that its status field says "Ready" or "Waiting for first access."

Make sure the IP address you are using is current. If the client is using dynamic IP addressing its IP address may have changed. It is not a good idea to use Add by Address with a dynamic address unless it has a long-term lease.

If you are using the client's IP name try using its IP address.

Ping the computers to check whether they are correctly communicating with TCP/IP. See "Pinging to Verify TCP/IP Communication" on page 210.

There may be a "firewall" between the client's network and the backup computer's network, restricting outside access. Contact the network administrator.

The Add by Address button added the wrong client.

Make sure the IP address you are using is current. If the client is using dynamic IP addressing (for example, DHCP) its IP address may have changed. Also see "Common Questions" on page 211.

Mac OS clients have conflicting IP addresses because they don't renew DHCP leases while waiting for shutdown.

When a Mac OS TCP/IP Retrospect client has a DHCP-supplied IP address and its lease expires while the client is waiting for shutdown, the Mac does not renew its IP lease and continues using its old IP address. This can lead to a conflict when the DHCP server, thinking the IP address is now available, leases the IP address to a different computer.

There are two possible workarounds: leave DHCP-served Mac OS computers idle in the Finder instead of in the Retrospect client "Wait at Shutdown" mode and uncheck "Load Only When Needed" in the TCP/IP control panel; or, lengthen your DHCP server's lease period. The likelihood of encountering this problem decreases as the length of DHCP leases increases.

Backup Issues

Immediate backups and scripted backups differ in the way they are started and what they do when they are done. Otherwise, both follow the same procedure after starting: scanning, matching, requesting media, copying, comparing, and then closing.

Retrospect fails to automatically launch to execute a scheduled script.

There are several reasons why this may happen:

• **Confusion About Start Date** The date you expect a script to run may not be its actual start date. See "Start Date and Time" on page 64.

• **Incorrectly Scheduled Script** Check the list of future scripted operations to confirm that Retrospect has the same schedule you expect your scripts to run. To do this, click Preview from the Retrospect Directory's Automate tab. Check that you have not set a limited schedule of possible execution times with the Schedule preference (page 157).

• **Lack of Memory Under Mac OS 9** Make sure Retrospect has enough memory to start under Mac OS 9. In the Finder, choose About This Computer from the Apple menu to determine the size of the largest unused block of available memory. Compare this with Retrospect's memory size. Make more memory available by quitting other applications. See page 224 for information on how to see and change its memory allocation.

• **Autolaunch Preference Not On** Check that the Notification preference to automatically launch Retrospect (page 156) is turned on.

• **Multiple Users Prevents Autolaunch** Mac OS 9's Multiple Users prevents Retrospect from launching automatically to execute its scheduled scripts. Before you leave the backup Macintosh, start Retrospect manually from within Multiple Users.

• **Retro.Startup Trouble Under Mac OS 9** Make sure the Retro.Startup file is in the Extensions folder of your Mac OS 9 System Folder. Sometimes extension managers remove Retro.Startup when they should not. If you use an extension manager, open it and verify that Retro.Startup is not disabled and is set to load. As a last resort, try throwing away the Retro.Startup file then restart the Macintosh and start Retrospect. Click Preferences from the

Retrospect Directory's Special tab. Make sure the Schedule (in the Schedule options category) allows execution during the scheduled time and verify the Notification preference to automatically launch Retrospect is turned on. Then schedule a script to run a few minutes in the future, quit Retrospect, and restart the Macintosh again. At the script's scheduled time, the Macintosh should display a flashing Retrospect icon over the Apple menu icon. Within a few minutes, Retrospect should start and run the script. If you do not see the Retrospect icon in the menu bar after you restart or if Retrospect does not start automatically, contact Dantz Technical Support for further assistance.

Retrospect crashes while it is being launched.

The Retro.Config file may be damaged. Move the Retrospect folder out of the operating system's Preferences folder. Try launching again. If this solves the problem, place that suspect Retrospect folder in the Trash after pulling out the operations log file so you can retain the history. (Retrospect creates a new folder in the Preferences folder and uses the default settings.) If you have a recent backup of this drive and you do not want to recreate your scripts and settings and log in clients again, try restoring an earlier version of the Retro.Config file from a backup.

Retrospect reports an error during scanning or matching.

There may be a problem with the volume being scanned. In this case, Retrospect reports a specific error in the operations log. Look up the error number under "Error Messages" on page 220.

In a normal backup Retrospect marks every file for copying, though not all have changed.

This happens on HFS+ (Mac OS extended format) volumes for one of two reasons.

When the local time zone is changed in the Date & Time control panel, the Mac OS shifts the local creation and modification times of files on HFS+ volumes. This affects Retrospect's normal backups when it scans the volumes for files which need to be backed up. Because file date/time stamps are different, Retrospect marks every file for backup. Retrospect is simply performing a progressive backup as it usually would; the only abnormality is that every file appears to have been modified. As a workaround, you can change the time zone back.

This happens with AppleShare servers backed up as mounted volumes when the system clocks of the server and the backup Macintosh are not synchronized within a certain range, AppleShare compares the two system clock times and performs a time translation based on the differences. This affects Retrospect as described above. Synchronize both the backup Macintosh's clock and the server's clock with their respective appropriate control panels, to within the acceptable margin.

Retrospect does not see the backup device.

If your device is a removable cartridge drive (such as Zip, Jaz, SuperDisk, DVD-RAM, or MO), check that the media is fully inserted and that the volume is mounted on the Macintosh desktop. Retrospect may not recognize a DVD-RAM drive unless it is loaded with writable media.

See "General Device Troubleshooting" on page 207 and the bus-specific device troubleshooting sections which follow it.

A tape or CD/DVD drive does not appear in the storage devices window.

Check Device Status (from Configure❯Devices). If a non-Retrospect "driver" appears installed for your tape drive, some other software loaded itself inappropriately.

Under Mac OS 9, try restarting with extensions off. If this solves the problem, an extension is loading a device driver for your backup device, keeping Retrospect from using it. See "Mac OS 9 System Software Issues" on page 209 for methods to isolate the troublesome extension.

For a drive that uses a communication bus other than SCSI, make sure it is connected before launching Retrospect. Also make sure any needed extensions (for example, a USB/SCSI bridge) are installed and loaded at startup.

If you have a new type of drive or a new model, it may not be supported by the version of Retrospect you are using. To find out if a newer version of Retrospect is required for this drive, first refer to the Dantz web site, then contact Dantz Technical Support and be ready to describe what information for this drive appears in the device status window.

See "General Device Troubleshooting" on page 207 and the bus-specific device troubleshooting sections which follow it.

Retrospect can't use the inserted disk, tape, or disc because it is "busy."

There are several possible causes.

• You saved the removable disks backup set catalog on a disk that is a backup set member. Catalogs must be saved on different volumes. Move the catalog to your hard disk and double-click on it from the Finder to force Retrospect to recognize it.

• You are using the disk as both a source and destination, which is illogical and not allowed. For example, you are trying to back up the 2-Dunsinane volume to the Dunsinane backup set, of which 2-Dunsinane is a member.

• Some other software may be creating or using files (which may be invisible) on your backup disk. Likely suspects are compression programs and file sharing; see the Retrospect "read me" file for conflicts and workarounds. Try running

with fewer extensions to determine which one is preventing Retrospect from using your disk.

• The drive may be malfunctioning. Contact the drive vendor for assistance.

• The disk, tape, or disc may be damaged. Designate it as missing (pages 149, 150) and use a new medium.

Retrospect refuses to use the inserted disk, tape, or disc.

Retrospect has a system for recognizing tapes, discs, and disks and for adding them to backup sets. If Retrospect is not automatically using the medium you think it should, carefully read the text that appears in the medium request window. It explains what media Retrospect needs.

You may not have inserted the exact disk, tape, or disc required by Retrospect. Check that the name of the medium you are inserting exactly matches the requested name. If the name is the same and Retrospect does not proceed with the operation when you insert the medium, you probably have two pieces of media with the same name and are inserting the wrong one. This can happen if you switch disks, tapes, or discs when you perform a recycle backup to a particular backup set.

Retrospect may require new media. Insert the medium you want Retrospect to use, wait for it to appear in the window, and then click Proceed. Retrospect will not use media that is part of a known backup set, as detailed below. It will automatically use any media that is erased or correctly named.

Retrospect asks for a new disk, tape, or disc, but then complains "You can't use '1-Birnam Wood', it already belongs to a backup set!"

This is a feature designed to prevent accidental erasure. If you are sure you want to erase this disk, tape, or disc and use it for the current backup, choose Erase from the Devices menu,

then click Proceed if necessary. Erasing the medium removes the entry for this disk, tape, or disc from the backup set it previously belonged to.

Retrospect asks for a particular disk, tape, or disc, but then reports "'2-Dunsinane' is not a member of this backup set. Although it is named correctly, it has a different creation date."

This means you have more than one disk, tape, or disc with the same name. This can happen if you run a recycle backup to new media and later try to do a normal backup with older disks, tapes, or discs. If possible, locate the proper medium for the restore.

Try other disks, tapes, or discs to see if any match the catalog you are using.

If you are sure this disk, tape, or disc has the files you want, rebuild its catalog. Go to the Tools tab, click Repair, and select the appropriate repair function to rebuild the catalog (page 190).

Retrospect asks for a particular disk, tape, or disc, but you do not have it.

If you know where it is, but it is not available right now and you must back up, follow these instructions. Click Choices, then click Skip. Retrospect treats the requested member as if it were full and backs up progressively to a new piece of media. Files previously backed up to the requested member are not backed up again. Future backups will require the new member and you will need to use both members later if you need to restore.

If you know it is lost, damaged, or erased, follow these instructions. If this is the first member of the backup set, it is easiest to start a new backup set or run a recycle backup to this backup set. Either way, Retrospect asks for a new disk, tape, or disc, which becomes the new first backup set member. If this is not the first member and you wish to continue backing up progressively to the members you do have, click the Choices button,

then click Missing. Retrospect will start backing up to a new disk, tape, or disc. Files that were backed up to the missing member will be backed up again, if possible, during your next progressive backup.

Retrospect does not auto-search a loader for the appropriate tape.

Retrospect automatically searches autoloaders only when it runs in unattended mode, but not in interactive mode (page 147). If you start an immediate operation, you can force Retrospect to search your loader by choosing Run Unattended from the Control menu. See "How Retrospect Works with Tape Libraries" on page 36.

Retrospect reports a catalog out of sync error at start of backup.

Update your catalog from the media. (See "Updating a Catalog" on page 189.)

Your Macintosh hangs or crashes while copying during a backup.

Serious problems during copying can be caused by software or hardware. To solve this problem under Mac OS 9, reduce your extensions to the minimum necessary and try the backup again. If the backup succeeds, you probably have a problem with your system software or extensions. If the backup fails again, it's more likely to be a communications bus or hardware problem. See "Mac OS 9 System Software Issues" on page 209, and "General Device Troubleshooting" on page 207 for methods to isolate the problem.

Retrospect reports a chunk checksum error.

If the error occurs only with a particular backup set, repair its catalog and try again. (See "Updating a Catalog" on page 189.) Contact Dantz Technical Support if it occurs again.

Retrospect reports compare errors.

If Retrospect reports "different modify date/time…" for a particular file, the most likely explanation is that the file was modified during the backup. In this case, no action is required. When you next back up, Retrospect will re-copy the file.

Errors such as "File … didn't compare at data offset…" or "File … didn't compare at resource offset…" usually indicate a device communication problem. Back up again to re-copy the file.

Note, however, that these "offset" error messages usually point to serious data corruption problems you should not ignore. If the error occurs with many or all clients or with a source connected to the backup Macintosh itself, troubleshoot its communications bus and device connections. If the error occurs only on a particular source being backed up over the network, troubleshoot the communications bus of that Macintosh and possibly the network connection to that computer. See "General Device Troubleshooting" on page 207 and "Network Troubleshooting Techniques" on page 210. Consider using diagnostic software on affected volumes.

When it has finished executing an operation, Retrospect does not quit, restart, or shut down according to the Unattended preference.

Retrospect quits, restarts, or shuts down when it finishes only if it is executing an operation in unattended mode and no additional operations are scheduled within the look-ahead period (page 157). Retrospect automatically enters interactive mode when you start an immediate operation and unattended mode when you start a script. While Retrospect is copying, use the Control menu to switch between modes.

A Mac OS 9 client does not shut down after the backup.

Retrospect shuts down Mac OS 9 client computers when all three of the following conditions are met.

• The Shutdown when Done option is enabled in the client options of your script. (This is the default.)

• The client Macintosh is displaying the "waiting for backup" dialog.

• The client Macintosh is not scheduled for another backup within the Look Ahead Time (page 157).

Retrospect is not backing up a particular client volume.

Check that your backup script includes the volume as a source.

Make sure the client volume is not designated as private (page 97).

Make sure the client's volume is mounted for use with the client computer. (Under Mac OS, the volume icon is on the desktop; under Windows, the drive letter is accessible.)

Use the client container as the source, rather than specific client volumes, to select all volumes connected to the client. Then go to Configure❯Clients, configure the client in question, and choose Client Desktop from the pop-up menu. For more information about using client containers see "Configuring a Client" on page 87.

The client crashes during the backup.

Failing network hardware, a virus, or an extension conflict may be causing the client to crash. Use diagnostic utilities to look for viruses and hard disk problems. If it is a Mac OS client, refer to the system extensions troubleshooting techniques on page 209. Use the latest network software which matches your network hardware.

Backup Server Issues

Backup Server indicates "media," but there is a medium in the drive.

Backup Server is reporting it needs a specific media member to back up a source. To determine which backup set needs more media, choose backup sets from the pop-up menu in the Backup Server status window and look for any with a status showing "media."

If you have never backed up to the backup set that needs media, Retrospect accepts any new or erased medium. Stop the Backup Server, use Configure›Devices to erase the disk, tape, or disc you want to use, then start the Backup Server again.

If you still cannot determine why Backup Server isn't accepting your medium, start a backup to that backup set using Immediate›Backup. Retrospect displays a window naming the medium being requested.

Retrospect does not quit when Backup Server completes its backups.

Backup Server is optimized to run continuously. If you have other kinds of scripts, they will start at their scheduled times even though Backup Server is still running.

If you schedule the Backup Server to run only part of the time (for example, from 7:00 A.M. until 7:00 P.M. each day), you can quit Retrospect after the Stop time without affecting the Backup Server. Retrospect will automatically launch when the next script is scheduled to start.

The Retrospect Client control panel's Backup Server Schedule was set to "As soon as possible" but the client was not immediately backed up.

The "As soon as possible" preference waits for the Backup Server to poll the client; the client does not initiate contact itself. Meanwhile, Backup Server may be busy backing up other sources or polling other clients; it may even be inactive, according to its schedule. When Retrospect gets around to polling the client set to ASAP, it backs it up. See "Allow Early Backups" on page 77.

Restore Issues

When you start a restore, you first select the backup set from which you are restoring. You then go through the following stages: selecting a volume (specifying where the files are going), matching or selecting files, requesting media, copying, and setting privileges if necessary.

You have problems selecting a backup set.

If your backup set is not in the list, click the More button. Click Open if the catalog for your backup set is available, or click Rebuild to rebuild it from the media.

If Retrospect reports a chunk checksum error after selecting a backup set, see "–24201 (chunk checksum failed)" on page 225.

You have a disk, tape, or disc that you want to restore from, but you do not see its backup set in the selection window.

Use the Finder to look for the backup set catalog file on your hard drive. It will have the same name as the disk, tape, or disc in Retrospect's storage devices window. For example, if the medium is named "1-Macduff" look for a catalog file named "Macduff". Double-click the catalog file to show Retrospect where it is.

If you cannot find the catalog file on your hard drive, go to the Tools tab, click Repair, and select the appropriate function to rebuild it (page 190).

You cannot find the files you want to restore.

If you are using "Restore files from a backup," be sure the Snapshot you select is for the right volume. By default, the chosen files preview browser shows your files and folders in alphabetical order, organized as they were on the

backed-up hard disk. Once you find the file you want, double-click it to mark it for retrieval. If you cannot find your file, select Find from the Browser menu to search by name or other attributes. A file with a ☀ poof icon indicates the file is on a missing member of the backup set.

If you are restoring older versions of files, use "Search for files and folders." Click Searching to tell Retrospect to look for a particular file or folder name, and if necessary click More Choices to use Retrospect's selector interface for finding files. (See "Restore" in Chapter 4 and "Using Selectors" in Chapter 9. Also, to restore files when you are not sure which backup set the files are in, see "Restoring by Searching" on page 111, or to restore files and folders when you are not certain of their names, see page 113.)

While retrieving an older Snapshot from media, Retrospect says no Snapshot is available.

There are three possible causes, which follow.

You cancelled the backup before it was completed. Retrospect does not save a Snapshot for a volume until the backup is finished.

You turned off the "Save Source Snapshot for Restore" option (page 143).

You are trying to retrieve a Snapshot from a backup set created by a backup set transfer. Transferred backup sets have no Snapshots on the media.

Retrospect refuses to use the inserted disk, tape, or disc, reporting it is named correctly but has a different creation date.

This means that you have more than one disk, tape, or disc with the same name. This can happen if you run a recycle backup to new media and then try to restore with older disks, tapes, or discs. If possible, locate the proper medium for the restore.

Try other media to see if any match the catalog you are using.

If you are sure this disk, tape, or disc has the files you want, rebuild its catalog. Go to the Tools tab, click Repair, and select the appropriate repair function to recreate the catalog. (See "Recreating a Catalog" on page 190.)

Your Macintosh hangs or crashes while copying during restore.

This is the same as hanging or crashing while copying during backup. Repeat the operation with system extensions turned off or minimized to determine if the problem is a software or hardware problem, then refer to "Mac OS 9 System Software Issues" on page 209 and "General Device Troubleshooting" on page 207.

Retrospect reports error –34 (disk full) while copying.

This error means the volume you are restoring to does not have enough space for the files you are restoring. You will need to manage your disk space by moving or deleting files, or avoid the problem by marking fewer files to restore. If you are restoring a volume that was using a compression utility, you may need to restore your files in batches and use your compression utility between restores to make room for the next batch of files.

After restoring, Mac OS file sharing privileges are not set.

Retrospect will only set the privileges for file sharing and AppleShare while sharing is active. (Note that sharing also had to be on during backup.) Turn on sharing and restore again. (See "Restoring Pre-Mac OS X File Servers" on page 125.)

After restoring a Mac OS 9 computer, documents have generic icons in the Finder.

The desktop usually needs to be updated after a large restore. Restart your Macintosh while

holding down the Command and Option keys to rebuild the desktop.

After restoring a backup to a new hard disk, the volume icon on the Finder desktop is no longer custom. It is now generic.

Restart the computer.

You can't retrieve or restore data to a client.

Take the following steps:

1. Attempt to access the client. From the client database, select the client and select Get Info from the File menu to check whether the client can be accessed. Make sure the client status is not locked.

2. Go to Configure❯Volumes, select the volume to which you wish to restore data, and choose Get Info from the File menu. Make sure the volume has enough free space to accommodate the files you want to restore, and that there is no lock symbol on the Attributes line. (If there is no Attributes line it is not locked.)

If you are sure that the volume to which you are restoring data is both unlocked and has free space but you still experience difficulty restoring, refer to Chapter 7 • Restoring for general assistance.

Recreating an Internet Backup Set

When you rebuild an Internet backup set catalog Retrospect may immediately show "resynchronizing (slow)" in the execution status window. This is because the backup set is encrypted and when you began the repair operation one of the following was true:

• You neglected to tell Retrospect the backup set is encrypted.

• You gave Retrospect an incorrect password for the encrypted backup set.

General Device Troubleshooting

Check with your drive vendor to make sure you have the necessary firmware for your device.

Retrospect lists a drive's firmware version in its Device Status window (from Configure❯Devices). If there is a known problem with a firmware version, it will be listed on the Dantz web site.

Completely uninstall any other backup software that may be on your machine, including any drivers other software may have loaded for the device.

Verify the device cables are solidly connected to their proper ports.

Make sure the drive's power switch is turned on and its power cables are plugged in.

If other devices on the communications bus are off, turn them on and restart.

Use a new piece of media to see if the problem is related to a faulty or damaged medium.

Check to make sure you are using the correct type, length, speed, or capacity media. Follow your drive manufacturer's list of supported media.

Use a different brand of media because the drive may be particular about the brand. Follow your drive manufacturer's recommended list of media brands.

If you are using a tape drive, clean the heads with a cleaning cartridge. Follow your drive manufacturer's recommended cleaning instructions.

Replace the cable that connects the device to the computer.

Troubleshoot your drive with the specific FireWire, USB, ATAPI/IDE, or SCSI suggestions which follow.

FireWire and USB Device Troubleshooting

Check with Apple to make sure you have the latest USB or FireWire firmware update for your

computer. Apple often releases firmware updates that may help to resolve USB or FireWire issues. Search the Apple web site for relevant updates.

Isolate the device in question from other devices connected to the same communications bus. If your backup device is connected to your computer through a hub or another FireWire or USB device, unplug it and connect it directly to a port on the computer. If it is already connected directly to the computer, try changing ports. If the problem persists, do not reconnect the other devices, and continue down the checklist.

Update or reinstall the adapter drivers with the latest versions from your drive vendor's web site. Corrupt drivers can cause issues that may not be otherwise detectable.

The system board or adapter in the computer may be defective. On another computer, disconnect other devices and connect your drive, then install Retrospect and start a backup.

If you have taken all of the preceding general and bus-specific troubleshooting steps but you still get failures or errors, then the backup device may be defective, as it is the only component that has not changed. Contact your drive vendor for further diagnosis and tests, or to inquire about repair or replacement.

ATAPI/IDE Device Troubleshooting

For an internally connected device, make sure the cable is firmly connected and it is correctly set as either the master or slave device.

SCSI Device Troubleshooting

If the SCSI chain is not set up properly, communication errors may cause data corruption or system failures during copy operations. The following information is designed to give you guidance when you encounter SCSI problems. See also "SCSI" in Chapter 3, your Macintosh user's guide, and the manual that came with your hardware device.

These sample errors can indicate communication errors on a SCSI bus:

• File "Home" didn't compare at resource offset 10,750

• File "Tech Note" didn't compare at data offset 3,253

• Trouble reading: "1-Office Backup 2" (0), error 102 (trouble communicating)

• Trouble writing: "1-Macbeth" (0), error 205 (lost access to storage medium)

These errors can usually be traced to a failure in the SCSI configuration, whether it is termination, a particular device, cabling, or device order. The most common cause of SCSI bus communication problems is improper termination or bad SCSI cables. Try changing terminators, trying a powered terminator, changing cables, isolating the device, and moving the device to a different computer.

Termination

The general rule for termination is to use only two terminators on the SCSI bus, one at the beginning and one at the end. If you have only a single device on the SCSI bus, then only one terminator is needed. Some SCSI peripherals come with internal termination built in, and must be placed at the end of a SCSI chain.

Unlike hard drives in other Macintosh computers, PowerBook internal hard drives are not internally terminated. Even if you have only a single device on the SCSI bus, you need two terminators: a normal terminator at the end of the SCSI chain and an in-line, or pass-through, terminator between the PowerBook and the first device.

Consult your computer's user guide for its specific termination requirements.

SCSI Cables

Communication problems can be caused by bad or loose-fitting SCSI cables. Check all cables to ensure they are properly seated in each connector. The entire length of your SCSI bus should not exceed 20 feet. Whenever possible, try to use short (12 to 36 inches) cables and avoid cables over six feet in length.

Device Order and Device Conflicts

To avoid problems caused by device order or device conflicts, make sure that each device has a unique SCSI address. To see the SCSI address of every device, go to the Configure tab and click Devices. Then choose Device Status from the Devices menu to view all of your SCSI devices. You may print this window for future reference or to have handy when calling Dantz Technical Support. If problems occur (for example, a device does not appear that you know is turned on and connected), try changing the order of SCSI devices or temporarily removing unneeded devices. Recheck that each device has a unique SCSI ID.

Some devices, such as scanners, SCSI Ethernet connectors, and removable cartridge drives, can cause communication failures on the SCSI bus, especially if they are turned off. If you are experiencing SCSI communication problems, make sure all of your SCSI devices are turned on when you use your Macintosh. Even if you are not experiencing SCSI problems, we highly recommend you turn on all SCSI peripherals before starting the computer. Do not turn them off until after you shut down the computer.

When All Else Fails

If you have taken all of the preceding general (page 207) and SCSI-specific troubleshooting steps but you still get failures or errors, then the backup device may be defective. Contact your drive vendor for further diagnosis and tests, or to arrange repair or replacement.

Mac OS 9 System Software Issues

If you restarted your Macintosh with extensions off and the problem went away, there could be a conflict between the extensions themselves, or between some of your extensions and Retrospect. You need to find and eliminate possible conflicts. A common technique to test extensions is to drag half of the items in your Extensions folder to the desktop and restart, then try to reproduce the problem. If you still experience the problem, remove half of the remaining extensions, restart and try again. Repeat this process as necessary. You can use an extension manager to help this process.

Control panels are also system extensions, so they should be part of the testing process.

Sometimes changing the loading order of system extensions helps avoid conflicts. Within a particular folder (that is, Extensions folder or Control Panels folder) extensions load in alphabetical order.

If the problem persists even though all extensions are off, then the system software may be corrupt and need to be reinstalled as follows.

1. Run the Mac OS 9 installer. At the installer window, press Command-Shift-K. Choose Install New System Folder and the Installer will create a new System Folder and rename your old System Folder to "Previous System Folder."

2. Move the Retrospect folder from the Preferences folder of Previous System Folder to the Preferences folder of the new System Folder.

3. Try to reproduce your problem. If the problem re-occurs, call Dantz Technical Support. If you cannot reproduce the problem, proceed to the next step.

4. Move any third-party software, fonts, preferences files, etc. from "Previous System Folder" to the new System Folder. Be careful not

to replace any of the new system files with old ones.

5. Throw away the old System file and "Previous System Folder."

Network Troubleshooting Techniques

Pinging to Verify TCP/IP Communication

Use other computers on the network to "ping" the troublesome computers to check whether they are communicating with TCP/IP.

Mac OS system software does not include a ping utility, but you can obtain a ping-capable utility from the Internet. Such utilities include:

• AGNetTools (www.aggroup.com)

• IPNetMonitor (www.sustworks.com)

• Mac TCP Watcher (www.stairways.com)

• OTTool (www.neon.com)

• WhatRoute (homepages.ihug.co.nz/~bryanc).

◆ **TIP:** If you have Windows computers on your network configured for TCP/IP, even if they are not Retrospect clients, you can use their built-in ping commands. Go to the MS-DOS prompt and type "ping" followed by a space and the IP address.

■ **NOTE:** TCP/IP must be loaded when you ping a Mac OS computer. To ensure it is loaded, open the TCP/IP control panel, un-check the option "Load only when needed" (available only in Advanced and Administrator modes) and restart.

Using an IP pinging utility on the troublesome client computer or FTP server, first ping the IP address of the backup computer. A reply tells you the pinged computer's TCP/IP setup is operational. If it times out or reports it as unreachable there is a problem with the TCP/IP setup, the network interface hardware, or the network itself.

If pinging the backup computer is successful, use it or another computer to ping the IP ad-dress of the troublesome client computer or FTP server.

Successful pinging does not necessarily mean a client will appear in the clients on network window. See page 86 and the troubleshooting items on page 198 for more information.

Selecting the Appropriate Network Driver

Windows client computers should be using 32-bit network drivers for best network performance and compatibility. Windows NT uses 32-bit network drivers by default. For Windows 95/98, open the Network control panel and select the computer's network interface adapter. Click the Properties button, select Enhanced mode, and click OK. You may need to get updated software from your network adapter vendor.

Verifying Open Transport Version

To work with TCP/IP, Mac OS clients and the backup Macintosh must have Open Transport version 1.1 or later. Each computer's TCP/IP control panel should be set to always load, as described previously.

Troubleshooting Networks

When you have network problems with Retrospect or clients, start by identifying a pattern of failure. If the problem occurs on a single client, begin your troubleshooting by examining that particular computer. If the problem occurs on multiple client computers, find out if those Macintosh computers share a common hub, router, bridge, or gateway. You may be able to identify a faulty network component that should be repaired or replaced. If you encounter failures on multiple client computers but cannot identify a pattern, troubleshoot the networking hardware on the backup computer.

Troubleshooting Mac OS Clients

When troubleshooting an individual Macintosh, the first step is to determine wheth-

er the problem lies with the Macintosh's software or its network hardware.

Start by limiting extensions and control panels on the client Macintosh to the Retrospect Client control panel, needed networking software, and minimal default Apple system software. Do this with the Extensions Manager and follow the troubleshooting steps under "Mac OS 9 System Software Issues" on page 209.

If the client continues to experience the problem, there may be an incompatibility with networking software. If the client has a third party networking card, update to the latest version of its software. If the client uses its built-in Ethernet, get the latest version of Apple's network software installer or Open Transport, available from various on-line services and Apple Internet FTP sites.

If the client continues to experience the problem, exchange the network hardware with that of another client Macintosh. If you are using LocalTalk, built-in Ethernet, or a SCSI/Ethernet adapter, it is sufficient to exchange all components external to your Macintosh. If your Macintosh has an internal network card, you will need to exchange the card as well. Make sure to exchange the cables along with the other components. After exchanging the network hardware, try an operation with both clients. If the error moves to the other client, then the problem lies in the network hardware.

If the problems persist after minimizing extensions and exchanging network hardware, see "Mac OS 9 System Software Issues" on page 209 for instructions on performing a clean installation of the System software.

COMMON QUESTIONS

Client Configuration Questions

How do I find out the IP address of a client so I can log it in with Add by Address?

It depends on the operating system and how the client computer is configured. If the client has a static IP address you can use it in the Add by Address dialog. However, if the client automatically obtains a dynamic IP address from a DHCP server you probably should not be using the Add by Address button. Dynamic IP addresses may change later and Retrospect may find a different machine at that address if you used Add by Address with a dynamic IP address.

Here's how to determine a computer's IP address and whether it is static or dynamic.

Mac OS Open the TCP/IP control panel on the client. It shows the "IP Address" the computer is currently using. Above the IP address is the Configure pop-up menu. If it shows "Using DHCP Server" it is a dynamic address. If it shows "manually" it is a static address.

Windows 95/98/Me Open the Windows system folder (usually named Windows, but it could be something else) on the boot drive. From the Run dialog or the DOS prompt, enter WinIPcfg, which shows some configuration information in a window. Click its More Info button to see the full configuration.

Windows NT/2000/XP Open the DOS prompt and enter "IPconfig -All", which lists the full IP configuration.

Windows The IP configuration information shows the IP address the computer is currently using. It shows whether the computer is using a DHCP server and, if so, shows the lease dates of the automatically obtained IP address. If it does not show DHCP server and lease information, the IP address was specified manually (that is, it is static).

How do I change the name of a client?

The client is named when the client is first logged in from the backup computer.

If a client has already been installed and you want to change its name, go to Configure❯ Clients, double-click the client to be renamed, then click the Configure tab in the client configuration window. Click the Rename button then enter a new name and click Rename.

The name change will not affect previously backed up files—they are still stored under the old client name. New files and Snapshots will be stored under the new name.

How do I log in a client when I forgot its password?

Uninstall the client. (For Mac OS, drag the °Retrospect Client control panel file to the Trash, restart, and install a new copy. For Windows, use the client uninstaller.) Restart the client. From the backup computer, go to the client database window, click Network, log in the client, and enter the password. Then edit any existing scripts that include this client.

How can I get back a client volume after accidentally using Forget?

If you forget a client's volume, you can put it back into Retrospect's volume lists by configuring the client (page 87). Remember to add the volume to the appropriate scripts, if necessary.

Backup Questions

How do I back up to a hard disk drive?

Use a file backup set on the hard disk. See "Backup Set Types" on page 20 and "Hard Disk Drives" on page 32.

How do I back up a Snap Server or other NAS? How do I use it as a backup device?

Retrospect works with a Network Attached Storage (NAS) device the same way it works with any other network volume.

To back up a NAS device, mount the share point on the desktop of the backup Macintosh then make it a backup source volume in your script or immediate backup.

To use a NAS device as a backup storage destination, create a file backup set and save it on the mounted NAS volume.

How do I back up only files that have changed?

Retrospect does this automatically. The first time you back up, Retrospect copies all selected files. On subsequent normal backups, it copies only the selected files that are new or changed.

How do I specify complete (full) or progressive (incremental or differential) backups?

Specify the backup action (page 22): recycle, normal (progressive), or new media (recycle to new backup set). Do this when executing an immediate backup, by changing the backup options (page 141). Do this when running a script by selecting an item from the manual execution dialog's pop-up menu (page 66). Do this beforehand when scheduling a script (page 62). Finally, you can do this by configuring the backup set and using Retrospect's media control feature (page 150).

How do I back up multiple volumes to the same disk, tape, or disc?

Use the same destination backup set. To back them up at the same time, select each volume you want to back up in the volume selection window. You can make a non-contiguous selection using the Command key or select a range of volumes using the Shift key (page 166). When you execute the backup, Retrospect backs up each of the selected volumes, one after another.

You can later do backups of other volumes to the same backup set and Retrospect will add them to the medium until it is filled.

What is the best way to back up many removable disks at once?

Using Retrospect's Fast Add feature (page 188), you can easily copy files from several removable disks (such as DVD-RAM, SuperDisk, Zip, Jaz, and MO cartridges, or floppy disks) one after another to a backup set. By default Retrospect copies all files, but you may use selectors to choose specific files.

How do I run an operation from the Finder?

To run an operation from the Finder, you must first create a script in Retrospect. Then create and use a run document (page 67) to start that script directly from the Finder.

How do I include or exclude files with particular attributes?

You can specify which files Retrospect backs up by using selectors. These allow you to include or exclude files by their size, kind, dates, and many other attributes. See "Using Selectors" on page 176.

Does Retrospect back up hard links and symbolic links under Mac OS X?

Yes.

Network Backup Questions

How do I see what was backed up last night? How can I tell if everyone has been backed up by the Backup Server?

The Backup Report shows a summary of the backup operations for each volume. To view the report, click Report from the Retrospect Directory's Reports tab. See page 135.

The operations log shows by date and time which volumes were backed up, how much data was copied, and whether the backup completed successfully. To view the log, click Log from the Retrospect Directory's Reports tab. The log also lists any errors which occurred. See page 137.

To view files backed up during the most recent backup, choose Reports in the Retrospect Directory and click Contents. Select the appropriate backup set from the top list in the contents report window, select one or more sessions from the bottom list, and click Browse. A browser appears, listing the files in the order they were backed up. See page 138.

To see all files on a particular volume at the time of a given backup, set up an immediate restore. Select the desired backup set and volume Snapshot. From the summary window, click Files Chosen to get a browser showing the volume. See page 45.

How can I prevent the "waiting for backup" dialog from appearing on pre-Mac OS X clients on nights when no operation is scheduled?

Under Mac OS 9 and earlier, the Retrospect Client control panel has no way of knowing when an operation is scheduled to occur, so it always waits at shutdown if this option is turned on in the Retrospect Client control panel preferences dialog. There are several ways to get around this if you do not perform operations every night.

Make a script using client sources and the No Files selector then schedule it to run on nights when no backups are scheduled. Retrospect shuts down the script's sources.

Tell users which days they should click the Shut Down button in the "waiting for backup" dialog when they leave for the day.

Turn off the Wait at Shutdown preference in the Retrospect Client control panel on each user's Macintosh. Tell the users which nights to leave their Macintosh computers on. Remind them to turn down the monitor brightness or turn off its power to prevent screen burn-in.

Set up an AppleScript (page 192) to enable the Wait at Shutdown option only on certain days.

Can Retrospect shut down a Windows client computer when it is done with its backup?

No. Retrospect does not have an option to shut down Windows clients, as it does for pre-Mac OS X clients.

How do I back up a Services for Macintosh volume located on my NT Server?

Use Retrospect Server Backup for Windows to back up Windows NT or 2000 servers.

How do I avoid -37 (invalid name) errors when I backup my NT Server that contains Services for Macintosh directories?

Use Retrospect Server Backup for Windows to back up Windows NT or 2000 servers.

Why do my network backups take too long?

For a discussion of backup performance, including guidelines for estimating your backup speed, see "Network Backup Guidelines", and "Choosing the Backup Computer" in Chapter 6. If you notice that your backups have suddenly become much slower, or if one particular client backs up more slowly than others with a similar configuration, you may be experiencing a problem. Potential problems may lie with the following:

• **The amount of activity on the backup and client computers during the backup.** Other applications running on either computer draw processing power away from Retrospect. Try a backup with Retrospect as the only application running on the backup Macintosh and the client in the "waiting for backup" mode for optimal performance.

• **The amount of data being copied.** Recycle backups tend to show higher performance figures than incremental backups. For each backup, Retrospect must spend time examining the entire volume to determine which files need to be backed up, regardless of the amount of data that needs to be backed up. The ratio of this overhead time to total backup time will be higher for a small amount of data (incremental backup), as compared to a large amount of data (for a recycle backup or when an empty backup set is first used in a normal backup). Backups of small amounts of data may therefore report slower performance times than backups of large amounts. Table 10-1 below shows actual data from several backups. Performance figures for the recycle backup are much higher than for subsequent backups of the same client due to the lower proportion of overhead time to the amount of data actually backed up.

• **The total number of sessions for which a backup set has been used.** The greater the number of sessions created, the longer Retrospect takes to match sessions to determine what files need to be backed up. Periodically resetting your backup set with a recycle backup or adding new media to your rotation using a new

Backup Action (iteration)	Number of Files	Megabytes Copied	Time (mm:ss)	MB per minute
Initial Backup	8345	719.6	24:00	30
Incremental (1)	51	5.7	00:22	15.4
Incremental (2)	360	19.7	01:26	13.8
Incremental (3)	43	5.7	00:25	13.5
Incremental (4)	53	6.1	00:30	12.6

Table 10-1: Sample values for TCP/IP client backups over an Ethernet network.

media backup will limit the number of sessions in your backup set, thereby speeding up both your backup and restore operations.

• **File sharing.** Mac OS file sharing slows copying on both clients and the backup Macintosh. Turning off file sharing when it is not needed can help optimize network performance.

• **Backing up across network segments.** The backup Macintosh and a client may reside on two physically different networks connected by a bridge or router that may slow the progress of data from one machine to the other. Backup performance may also suffer if the two networks vary greatly in terms of their relative network activity or performance. You can confirm the speed of the connection between the backup Macintosh and the client by using Get Info from Configure❯Clients. If the echo time seems higher than under normal circumstances (for example, consistently above 0.3) or the KB/second performance figure seems lower than normal, a network problem may be affecting your backup speed. Use Get Info to view and print the performance figures for various client computers and compare them to determine current levels of network performance.

• **The performance of the backup and/or client computer.** Problems with either machine affect the speed of your backup. Specifically, you should check for hard drive fragmentation, problems on the SCSI bus, and network problems (page 210).

• **The speed of the backup Macintosh.** Different Macintosh models feature various central processing units (for instance, the relatively slow 68030 central processing unit or the relatively fast G3 CPU) that determine how quickly they perform tasks. The performance of similar CPUs also varies based on their clock cycles (as expressed in megahertz). Finally, the speed of the SCSI bus varies across Macintosh models, influencing how fast each Macintosh can transfer data across its SCSI bus. For optimal backup performance, assign a relatively fast Macintosh to run Retrospect.

• **Using encryption or software compression.** If possible, avoid using encryption on the backup media or link encryption for client computers. Encryption requires additional processing power the backup Macintosh would otherwise use to increase backup performance. Whenever possible, use hardware compression (if your tape drive includes hardware compression capabilities), since hardware compression works faster than software compression. Because backup speed influences tape capacity, hardware compression also allows more data to fit on a tape.

Can I duplicate the system from one Windows computer to another?

No, because too much of a Windows computer's information is specific to that computer. Each card, peripheral, and software program requires specific settings which are unlikely to carry over from one PC to another, even if they were identical models and configurations.

Can more than one backup computer run on the same network at the same time?

Yes, you can run multiple backup computers at the same time on the same network with no problems, though when they transfer data at the same time both backups will probably slow. If you run backups in different physical network segments, traffic on one segment will not affect other segments.

How many client computers can I back up from a single backup computer?

There is no fixed limit to the number of clients you can access from one backup computer. It is not a question of numbers, but more a question of resources. You can back up more clients with a faster backup computer, a faster backup device with higher capacity media, and simply more time to do the backups.

If the backup computer is not completing backups in its scheduled time periods or if you want volumes to be backed up more often than they are, you may need a faster backup computer or a faster backup device, if not both. You may find helpful information under "Managing Resources," which starts on page 74.

I want to make a Macintosh on a different network segment the backup computer. What should I do?

Moving to a new backup Macintosh is explained in detail in Chapter 8 • Management, which starts on page 131.

What do I do when a client Macintosh moves to a different AppleTalk zone?

Configure the client and click the Network tab. Select the zone or zones where the client is now located or may later be located.

Will Retrospect wake a sleeping PowerBook to back it up?

Retrospect cannot wake a PowerBook in sleep mode, but a PowerBook will not go to sleep while it is plugged in and AppleTalk is on.

What is Retrospect's network port number?

Retrospect uses a well-known port, 497, assigned by the Internet Assigned Number Authority (IANA), for both TCP and UDP.

Do I have to upgrade my Macintosh clients to the latest version?

Not necessarily, but Dantz strongly recommends using the latest version of the client software with Mac OS clients used with the latest version of Retrospect.

Restore Questions

How do I restore just one file when I am not sure of its name?

If you know part of the file's name, Retrospect can help you find it. Set up a searching restore according to "Immediate Restore by Search" on page 49. If you specify just part of the file's name in the searching window, Retrospect will probably find the file you are looking for, but may also find others.

After Retrospect searches, click the Files Chosen button in the summary window. In the browser window that appears, use the Browser menu to find files in the list.

Make sure only the files to be retrieved are marked, then close the browser window. Click Retrieve in the summary window to start restoring.

How do I restore an earlier version of a file?

To restore any version of the file in the backup set, set up a searching restore according to "Immediate Restore by Search" on page 49. In the searching window, type the name (or portion thereof) of the file you want.

After Retrospect searches, click the Files Chosen button in the summary window to display a browser of the files found, then click Unmark. The files are listed with their backup dates. To see a file's creation and modification dates, select it and choose Get Info from the File menu. Mark the file or files to be restored, close the browser, and click Retrieve.

Does Retrospect restore empty folders?

Yes. Empty folders are restored when you do an immediate restore from a Snapshot using Restore an entire disk, the top option in the restore dialog. Set the destination window's pop-up menu to replace corresponding files or retrieve files and folders if you do not want to restore over the whole disk.

How do I restore empty folders without restoring the entire hard disk?

Go to Immediate❯Restore and in the dialog which follows, select "Restore an entire disk" (the top radio button). Then select the source backup set and Snapshot. At the destination

window, select your target volume and, from the pop-up menu, choose any restore method other than "Retrieve just files."

In the files chosen browser, double-click either the root of the source volume or an entire enclosing folder which contains empty folders. Empty folders will be highlighted but not marked. When you execute the restore, all the enclosed empty folders will be restored. No other combination of restore types or file selection will restore any empty folders.

▲ **WARNING:** Be very careful when restoring. If you choose Restore entire or Replace corresponding files in the restore method pop-up menu, Retrospect will replace and/or delete files on the destination volume.

I backed up multiple volumes using a single backup script. How do I restore all of the volumes at once?

Create and schedule a restore script for the first Snapshot you wish to restore. Duplicate this script. Edit the copy of the first script, changing the source and destination to reflect the next Snapshot to restore. Repeat this process for each volume you wish to restore. Retrospect runs each script, one after the other, alphabetically by script name, starting at the time you specified.

Backup Set and Catalog Questions

What if I forget my catalog?

If you forget a backup set catalog from within Retrospect, its file remains on your hard disk until you drag it to the Trash. If you have mistakenly told Retrospect to forget a catalog, you can open the catalog file from within Retrospect or from the Finder. After forgetting a catalog, you must add the backup set to your scripts again because Retrospect removes them when you forget the catalog.

What if I lose my catalog?

If you lose your backup set catalog (perhaps because it was deleted, corrupted, or lost), you can have Retrospect rebuild the catalog by scanning all of the disks, tapes, or discs in the backup set. See "Recreating a Catalog" on page 190.

It may take several hours to rebuild a catalog if there is a large amount of data in the backup set.

Can I delete files from a backup set?

No, you cannot delete files from a backup set because most types of storage devices do not allow it. If you want to keep only selected files from a backup set, you can copy these files to a different backup set using Retrospect's backup set transfer operation. See "Copy Operations" on page 186.

Can I rename a backup set?

Retrospect has no facility for renaming backup sets but you can rename a file backup set in the Finder. (Other types of backup sets cannot be renamed.) Open the backup set after you rename it to make Retrospect recognize the change.

Can I put more than one backup set on a disk, tape, or disc?

You cannot have more than one backup set on a tape or disc but you can have multiple file backup sets on a disk. When you add a medium to a backup set, Retrospect reserves the entire medium for that backup set.

You can, however, back up as many volumes as you want to a single backup set (page 212).

What is the best way to manage catalog files?

Catalogs typically contain about 200K for each thousand files that you back up. Keep your often-used catalogs on your hard disk. If you do not have enough room on your hard disk, here are a few alternatives:

• Store infrequently used catalogs on a file server.

• Archive old catalogs to their own backup set.

• Compress the catalogs. See "Configuring Backup Sets" on page 149.

I back up by moving a drive from computer to computer. What is the best way to do this?

It is not necessary to create a separate backup set for each computer unless you plan to use a different set of disks, tapes, or discs for each workstation. If you use a single backup set for the computers, do not do a recycle backup of each workstation; use normal backup only, and new media backup when you need to rotate media.

After each backup, copy your backup set catalog to a server or removable cartridge and then, once you move to the next computer, copy the catalog to its hard disk. You may want to use Retrospect's catalog compression option (page 150) to keep the catalog as small as possible.

Alternatively, keep the catalog on a server accessible from each computer. This, though, assumes all of your computers are connected by a network, in which case you will save yourself a great deal of trouble by purchasing Retrospect Clients. The client software allows Retrospect to back up Mac OS and Windows computers over a network without moving the backup device.

Devices and Media Questions

Why is Retrospect requesting more media? Why are my disks, tapes, or discs filling up sooner than I expected?

Retrospect requests a new medium for one of three reasons:

• The drive reports the current medium is full.

• An error occurred while writing to the medium. Open the log to see if an error occurred.

• You selected Skip or Missing while configuring a backup set, or you are performing a new media backup.

A 74-minute CD-R disc has a nominal capacity of 650 megabytes. For everyday use this means you will typically achieve capacities around 600MB.

For typical everyday use, when your tape is full, it may store up to 30% less data than its ideal maximum capacity.

You can effectively increase the capacity of your media by using compression, either Retrospect's data compression option (page 141) with a removable cartridge drive or recordable disc drive, or the hardware compression of an equipped tape drive (page 33). This capacity depends largely upon how well the data you are copying compresses. Text compresses well, for example, but applications do not.

How much space is left on my medium?

Click Backup Sets from the Retrospect Directory's Configure tab. In the backup set selection window, select your backup set and click Configure. The window that appears lists the available space on that backup set's current member.

What do I do when I know my medium is going to fill up during tonight's backup?

If you think there is not enough space for the next backup on the current disk, tape, or disc of your backup set, you can tell Retrospect to ask for a new one.

To skip to a new member, see "The Options tab" under "Configuring Backup Sets," which starts on page 149. The next time Retrospect adds files to that backup set it will ask for a new medium, in effect skipping past the current member's remaining space.

If this situation arises frequently, consider using Retrospect's Automatic Skip to blank media preference. When this preference is on, Retrospect automatically uses any erased media if the current member is not available.

You might also consider purchasing a tape auto-loader, a backup device which holds a magazine of many tapes. When one tape fills, Retrospect uses an empty tape from the magazine.

When I try to erase a tape, rewritable disc, or removable cartridge disk. Retrospect asks for the catalog file, but I no longer have it. How can I erase the medium?

When you erase a disk, tape, or disc, Retrospect tries to remove the member's contents from the catalog for that backup set. If it is missing, Retrospect asks you for it. You need to tell Retrospect to forget the catalog because it is gone, which will then allow you to erase the medium. Click Backup Sets from the Configure tab and forget the backup set then click Devices from the Configure tab and erase your medium.

If I have two tape drives, will Retrospect use them both when performing unattended backups?

Yes it will if the devices are similar, such as two DAT drives or two AIT drives. When it fills up a tape, Retrospect looks in any available drive for any tape that is new or erased, or has the correct name.

How do I start over at the beginning of the disk, tape, or disc?

■ **NOTE:** You cannot do this with CD-R or DVD-R discs because they cannot be erased.

To start over on a removable disk, tape, or rewritable disc, you must reset the entire backup set. One way to do this is to do a recycle backup to the backup set. Another way is to manually reset the backup set to recycle. (See "The Options tab" under "Configuring Backup Sets," which starts on page 149.)

How do I recycle disks, tapes, or discs from old backup sets?

■ **NOTE:** You cannot do this with CD-R or DVD-R discs because they cannot be erased.

To reuse a removable disk, tape, or rewritable disc from a backup set you no longer need, insert the disk, tape, or disc, choose Configure in the Directory, and click Devices. The window that appears shows you the name of the medium. Select the disk, tape, or disc and choose Erase from the Devices menu. The next time Retrospect requests a new member for a backup set, it will automatically use this or any other erased medium in the backup device.

You should also remove the old backup set's catalog. Click Backup Sets from the Retrospect Directory's Configure tab. In the backup set selection window that appears, select the old backup set and choose Forget from the backup sets window. In the Finder, drag the old backup set catalog file to the Trash.

How do I determine the name of a certain disk, tape, or disc?

To view the name of a medium, click Devices from the Retrospect Directory's Configure tab. Retrospect scans for available storage devices. The devices window appears, listing each drive, its type and status, and the name of the inserted medium. Insert the disk, tape, or disc if you have not done so.

Once you know the name of a medium, use a soft-tip pen on its label.

Miscellaneous Questions

How do I get rid of a backup set I don't need anymore?

Click Backup Sets from the Retrospect Directory's Configure tab. In the backup set selection window, select the backup set to be removed and choose Forget from the Backup Sets menu. This removes the backup set from the destination lists of all your scripts. To remove a backup set completely, you must also use the Finder to drag the backup set's catalog file to the Trash. The catalog file is usually kept in the same folder as your Retrospect applica-

tion. Use Retrospect to erase rewritable CD or DVD discs (page 35) and use the Finder to erase removable disks.

How do I get rid of a volume that no longer exists?

Click Volumes from the Retrospect Directory's Configure tab. In the volume selection window, select the volume to be removed and choose Forget from the Volumes menu. This removes the volume from the source lists of all your scripts.

How do I prevent Retro.Startup from being created on my Mac OS 9 computer?

The Retro.Startup extension is created by Retrospect and allows the application to automatically start for scheduled backups. To prevent Retro.Startup from installing, click Preferences from the Retrospect Directory's Special tab. Select the Notification preferences category and uncheck all three checkboxes shown there. Then select the Unattended preferences category and select Quit or Stay. Quit Retrospect. Use the Finder to drag the Retro.Startup extension from your Extensions folder (in the System Folder) to the Trash, and restart your Macintosh.

Without Retro.Startup, scheduled backups automatically run only while Retrospect is running and it will not restart or shut down the Macintosh after an unattended operation.

When I quit Retrospect, how can I prevent the message that tells me the next time Retrospect will execute?

Click Preferences from the Retrospect Directory's Special tab. Select the Quit Action preferences category and turn off Check Validity of Next Script.

Where are my scripts stored?

Your Retrospect scripts are stored in the Retro.Config file in the Retrospect folder of your system's Preferences folder. Many other customizations you make to Retrospect are stored there as well.

ERROR MESSAGES

Retrospect Errors

Execution Errors Browser

When Retrospect detects compare errors while backing up, write errors while retrieving, or read errors while retrieving or verifying, it opens a browser displaying the files involved. The execution errors browser may be printed for reference, or copied and pasted into another browser for easy re-selection. Look in the operations log for the error message associated with each file and act appropriately.

When Retrospect is performing operations over the network, either the client or the backup computer can generate errors, which are then reported by Retrospect on the backup computer. In general, errors that are reported at the client occur when the Retrospect client software surveys the system and determines that Retrospect will not be able to use it over the network.

Catalog out of sync

Retrospect was unable to update the catalog the last time it copied data to this backup set.

This may have been due to equipment failure or power failure, or was caused by a full disk (error –34) or by an out of memory error (–108).

Repair the catalog. See "Recreating a Catalog" on page 190.

If updating the catalog does not eliminate the "catalog out of sync" error Retrospect cannot add files to that medium. You have three options:

• Perform a recycle backup, which resets the catalog and erases the disk, tape, or rewritable disc,

removing its existing backup files. (This is not an option for CD-R or DVD-R.)

• Skip to a new medium with media control (page 150), forcing Retrospect to use a new piece of media for the next backup.

• Create a new backup set and do a backup to new media.

Bad backup set header

Retrospect encountered a missing or damaged file header, which contains information such as the file's name and size.

This error can indicate communication problems. See "General Device Troubleshooting" on page 207 and the bus-specific device troubleshooting sections which follow it.

Content Unrecognized

Retrospect can see data on the medium, but the data is not recognized as data formatted by Retrospect. With a removable cartridge, the unrecognized content most likely is other files, which you may not want to lose.

▲ **WARNING:** When a medium other than a recordable disc or tape shows as Content Unrecognized, use caution. Any files on a disk are permanently removed when Retrospect uses the disk in an operation with a removable disks backup set. Be especially vigilant for hard disks which may be formatted to appear as removable disks.

For recordable discs, only a few common CD formats are recognized, though they may have data readable with other software or under other operating systems. Make sure the disc you are inserting is compatible with your mechanism because not all drives support all recordable media. Refer to the drive's documentation for information on which media it supports.

For tapes this usually means that the tape was damaged, used by an incompatible backup program, or used with an incompatible drive. This

often results with tapes used with hardware compression drives then used with drives which do not support the same hardware compression. Do the following to troubleshoot:

• Make sure the tape you are inserting is compatible with your tape drive. For example, DDS-4 150 meter tapes cannot be read by DDS-1, -2, or -3 drives. Refer to the drive's documentation for information on which tapes it supports.

• Clean your tape drive and continue to clean it according to your drive vendor's recommendations. Tape drives need to be cleaned regularly with special cleaning cartridges (page 35).

• Check if other tapes also show as content unrecognized. If only one tape does then either it is damaged, it has been written to by other backup software, or it was created in a different, incompatible tape drive. If all tapes are unrecognized, then they were either all created in a different tape drive, there is a problem with your communications bus, or your tape drive may be broken. See "SCSI Device Troubleshooting" on page 208 for detailed instructions on troubleshooting a SCSI bus. Contact Dantz Technical Support to find out if one tape drive is compatible with another.

• If possible, try your tape or tapes in a compatible tape drive. If tapes are recognized in one drive but not another of the same type, it is possible that one drive needs repair. Contact your drive vendor for advice before assuming a drive needs repair.

Content Damaged

You or someone changed the name of a disk that is a member of a removable disks backup set.

To preserve this data, rename the disk to the original name it was given by Retrospect. The original disk name uses the format *1-The Name*. If you do not want to save the data and instead want to use the disk for a new media backup or

other purposes, erase the disk. (Under Mac OS 9, use the Erase Disk command from the Special menu in the Finder. Under Mac OS X, use the Disk Utility application.)

Media too different

Retrospect reports that your media is too different in two cases:

• You are trying to append to a tape backup set that is damaged. If you crashed or experienced a power failure while last writing to your tape and are now getting this error when trying to append, your backup set is damaged. You will not be able to append to this backup set, but you can retrieve all files from it. Create a new set, or do a recycle backup to this set if you wish to start over. The media is not damaged, but the backup set is damaged such that Retrospect cannot append to it.

• You are trying to append to a tape backup set using a drive with a different kind of mechanism. Use similar drives when creating mixed drive backup sets.

System Clock and Tick Timer

Retrospect has internal checks to warn you if something strange or unexpected happens with your computer's clock. These warnings are entered in the operations log.

When the system clock appears to have changed, it usually means you changed your computer's clock while Retrospect was open.

When the tick timer appears inconsistent with the system clock, something may have stopped CPU activity, such as a modal dialog or the use of a debugger.

Verification Errors

The following messages indicate a verification error:

• File "Home.html": different modify date/time

• File "Bore Dimensions": didn't compare at data offset 263,078

• File "port flow specs": didn't compare at resource offset 731,429

A verification error occurs during verifying (page 141) when Retrospect determines a file it copied to the destination is not identical to the file copied from the source. The file in question is not considered valid in the destination. If this happened during a backup, for example, Retrospect would try to copy the file again during the next normal backup to this backup set.

When you know the file was in use at the time the copying was done, a compare error is usually nothing to worry about. It simply means the file changed between backup and verification. Compare errors which mention data or resource offsets usually indicate SCSI communication problems. See "SCSI Device Troubleshooting" on page 208.

If you have a G3 upgrade card in an older Macintosh, it may be the cause of errors mentioning an offset. See Dantz Technical Note #408 (available on the Dantz web site) and contact your G3 card vendor for a software update.

Internet Backup Set Error Messages

The following error messages may occur with Internet backup sets. Error numbers 220 through 234 (on pages 228-230) also may occur with Internet backup sets.

The backup set could not be completely cleared.

While attempting a recycle backup or manually resetting the backup set for a recycle backup, Retrospect would not completely clear the backup set directory because it contains non-Retrospect data.

Verify the path to the backup set directory in the connection configuration window. Retrospect's incomplete clearing deletes only Retrospect data, leaving the non-Retrospect data untouched. Delete the other data yourself (using an FTP

utility such as Fetch) and repeat the recycle backup or manual reset. Furthermore, unless you personally placed the non-Retrospect files in the backup set directory, contact your FTP server administrator to find the owner of the files and change write privileges so this does not happen again.

The folder Backup Set A in /FTPtop/Users/Mongo/ cannot be used because it already contains data.

While attempting to create the backup set folder at the specified path, Retrospect discovered an existing directory of the same name but it cannot use the directory because it contains data.

Delete the data from the directory on the FTP server (using an FTP utility such as Fetch) or create a new backup set with a different name.

Error Numbers

–28 (driver not loaded)

Retrospect cannot find certain Open Transport networking software on the backup Macintosh.

This may occur when you start Mac OS 9 with extensions disabled. Restart with the extensions enabled.

–34 (volume full)

A volume has little or no available storage space.

There are three causes of this error:

• You are restoring or duplicating more files than will fit on the destination volume.

• Retrospect is updating a backup set catalog and the volume on which it is saved runs out of room.

• You are backing up to a file backup set and the destination volume runs out of free space.

Go to the Finder and make more space on the full hard disk by removing unnecessary files and emptying the Trash. Try marking fewer files to restore or duplicate, or select a larger destina-

tion volume. Use catalog compression (page 150) to make your catalogs use less space.

–35 (volume doesn't exist) and –53 (volume off-line)

Retrospect cannot find a certain volume. Make sure the volume is actually connected to the client or backup computer and it is mounted on the desktop.

If the volume is mounted, Configure›Volumes to browse it. If Retrospect is able to scan the volume, the original error will probably not occur again. If the scan encounters the same error, Configure›Volumes again, Forget the client's volumes, then Configure›Clients and put the client volumes back into Retrospect's volume lists. Remember to add the volume to the appropriate scripts, if necessary. You may avoid this error with clients by using client containers (page 88 and page 98).

–36 (I/O errors)

A media problem occurred on a source volume.

Try verifying your source volume using a disk utility or the formatting program that came with your hard drive. If you are using an Apple hard drive, try using the Test command in its included drive setup utility. The Disk First Aid utility usually is not helpful in this case because it only checks for directory problems.

–37 (invalid name)

This is usually caused by backing up a Services for Macintosh folder on a Windows NT Server. See "Services for Macintosh" on page 99. If a volume contains NT Services for Macintosh folders, you must back up these folders via file sharing. Using the "Private files/folders/volumes" option within the Retrospect client, exclude all the Services for Macintosh folders. Mount the Services for Macintosh folders as volumes on the backup computer desktop to back up the folders.

We recommend you use Retrospect Server Backup for Windows to back up Windows NT or 2000 servers.

–39 (unexpected end of file)

A file may be corrupt or damaged. Use a disk repair utility such as Disk First Aid to scan the volume for problems.

–43 (file not found)

Retrospect cannot find a file.

This usually means you or someone moved or deleted one or more files and folders while an operation was in progress. The Apple Menu Options of Mac OS 9 can move files during backups, resulting in harmless errors with folders such as Recent Items and Recent Servers.

Try backing up again. If this error continues to occur, run Apple's Disk First Aid, or a third party disk checking utility to check for possible directory corruption. Ignore the harmless errors sometimes generated by Apple Menu Options.

–49 (file busy)

The file cannot be accessed because it is in use.

This may happen with a Windows client. Close all applications open on the client.

–53 (volume off-line)

Effectively the same as error –35.

–54 (file busy/locked)

The file cannot be accessed because it is in use.

There are two causes of this error:

• You are trying to back up System files while using Mac OS file sharing or AppleShare.

• Another application, such as FileMaker or 4th Dimension, had the files open, preventing Retrospect from accessing them.

Back up the busy files from the local Macintosh, quit the application that owns the busy file, or

use Retrospect client software to back up your server instead of mounting it on the desktop.

–108 (out of application memory)

There is not enough memory available to Retrospect for it to continue the operation. This error occurs most often under Mac OS 9 when scanning volumes and catalogs, and when using file backup sets.

Under Mac OS 9, when Retrospect needs more memory to start an operation, it temporarily takes memory not in use by other running applications. Because of this, you usually do not have to change the default memory settings of the Retrospect application. Changing the memory settings may reduce overall performance. However, Retrospect does not use temporary memory when using file backup sets, so you may have to increase the memory settings when you work with file backup sets.

Retrospect may report error –108 when other applications and extensions are using most of the memory or your Macintosh does not have enough RAM installed.

Try quitting your other applications or restarting with fewer extensions to make more memory available to Retrospect. Repeat the operation which brought about the error.

If Retrospect still reports this error under Mac OS 9, try setting Retrospect's memory settings as shown in the table below.

Number of Files/Folders	Memory Allocation
up to 30,000	8,000K (default)
per 10,000 additional	add 3,000K

Table 10-2: Recommended memory increases.

■ **NOTE:** These requirements increase by approximately 1010K without virtual memory turned on.

If you have more than 100 clients logged in to Retrospect, increase the Retrospect application's memory allocation by 2K per client.

Increasing the Memory Allocation To increase the memory allocation of the Retrospect application under Mac OS 9, follow these steps. Quit Retrospect if it is open, go the Finder, select the Retrospect application icon, and choose File❯ Get Info❯Memory. The Info window appears, listing Retrospect's memory allocation. Enter a new preferred memory allocation number in the space provided in the lower right corner of the window.

–1028 (not visible on network)

Retrospect cannot find the client computer on the network. Make sure the client computer is connected to the network and turned on and that it is not powered off by energy saving software. If it is a mobile computer make sure it has not been "suspended" or put into "sleep" mode. (Restart a suspended Windows computer to let Retrospect see it.) Make sure the client has the most recent version of the Retrospect client software and that the client software loads at startup. If not, follow the suggestions provided for the error "Retrospect Client not loaded at system startup" on page 233 or "Client service not loaded at system startup" on page 234.

Test the connection between the backup computer and the client by using Get Info from Configure❯Volumes. If it can connect with the client, Retrospect displays its measured transfer rate in kilobytes per second.Try pinging it. (See "Pinging to Verify TCP/IP Communication" on page 210.)

If this error occurs with a Windows 95 client it may be caused by a bug in the operating system. Microsoft's Winsock 2.0 update fixes the problem. It is available free from Microsoft at: http://www.microsoft.com/windows95/downloads/contents/wuadmintools/s_wunetworkingtools/w95sockets2/default.asp

–1277 (can't open connection)

The client is registered on the network but does not respond to the backup Macintosh's attempts to communicate. This may mean:

• The client has crashed or otherwise failed.

• The client is occupied with a computation-intensive or communication-intensive operation, such as running game software.

• The client is running an older version of security software that is incompatible. Security software known to cause problems include old versions of DiskLock and Empower.

–3205 (TCP/IP closed down)

Open Transport closed down the TCP/IP connection. This may result from a serious problem such as another computer using the same IP address as the backup computer.

Verify TCP/IP is properly configured or refer to Open Transport documentation.

–3221 (TCP/IP inactive)

A Mac OS client cannot be changed from AppleTalk to TCP/IP because something is wrong with its network, TCP/IP or Open Transport configuration.

–24004 (media request timeout)

Retrospect could not find a requested disk, tape, or disc before the Media Request Timeout period elapsed.

Turn off the Media Request Timeout preference (page 154) so Retrospect waits indefinitely for the requested media.

–24201 (chunk checksum failed)

One of Retrospect's files, likely a catalog, is corrupt.

If the error occurs during a backup or archive, you need to rebuild the catalog (page 190) of the destination backup set.

If the error occurs when you launch Retrospect, see "Retrospect crashes while it is being launched." on page 201.

–25040 (Catalog invalid or damaged)

Effectively the same as error –24201.

–25048 (Snapshot not found)

Retrospect could not find the requested Snapshot on the medium. For more information, see page 206.

100 (device rejected command)

This means that a command sent by Retrospect to your backup device was rejected by the device. Following are possible causes and their solutions.

• Your backup drive may not be supported by Retrospect. Check the Dantz web site to make sure your device is supported.

• Other software may conflict with Retrospect. Try running a backup with minimal extensions to eliminate the possibility of a software conflict.

• The media may not be supported by the backup device. Try different brands of media, if applicable. Check with the drive manufacturer to see if they have specific recommendations.

If Retrospect continues to report this error, see the device troubleshooting steps appropriate to your device and interface ("General Device Troubleshooting" on page 207 and either "FireWire and USB Device Troubleshooting" on page 207 or "SCSI Device Troubleshooting" on page 208).

102 (trouble communicating)

The Macintosh lost contact with the backup device. Following are common causes of this error:

• You are backing up to removable disk cartridges and you have file sharing or AppleShare enabled. Retrospect cannot erase removable disks when sharing is enabled. Turn off sharing when Retrospect needs to erase a new cartridge.

• You are using a file backup set (for example, backing up to a hard disk) and it has exceeded the maximum file size allowed on the volume. Perform a new backup or a recycle backup (page 22).

• The SCSI chain is not properly terminated. See "SCSI Device Troubleshooting" on page 208.

If Retrospect reports this error with a FireWire or USB device, quit Retrospect and restart the Macintosh. Also see "General Device Troubleshooting" on page 207 and "FireWire and USB Device Troubleshooting" on page 207.

106 (data overwrite attempt)

For tape drives, errors 106 and 212 indicate a media failure.

If you see this error on a tape drive, run the Verify operation from the Tools tab to check the extent of the failure on the tape. If this error occurs on any drive other than a tape drive, contact Dantz Technical Support for more assistance.

203 (hardware failure)

The backup device is having problems because of a bad medium, a device communication problem, or a mechanical error.

If the error occurs only when you use a particular medium, that medium is probably damaged. Try using a new medium. If the error occurs when you use any medium, you may have a problem with your communications bus or device. Try quitting Retrospect, turning off the backup device and computer for two minutes, and then turning them back on again before opening Retrospect. See "General Device Troubleshooting" on page 207 or "SCSI Device Troubleshooting" on page 208.

204 (device busy)

There is something else preventing Retrospect from accessing your backup device. Here are some possibilities:

• You stored the catalog for a removable disks backup set on a disk used as a member of that backup set. Keep the catalog on your hard disk.

• Retrospect is prevented by the operating system from erasing the disk. Turn File Sharing off.

• Retrospect may be trying to use a disk both as a source *and* destination at the same time. Choose only your local hard drive as the source instead of the Local Desktop Container.

If these do not apply, then this error is a sign of media, device or communication problems. See hardware troubleshooting information for your device and interface.

205 (lost access to storage media)

Usually indicates the SCSI bus was reset during a backup, causing Retrospect to lose contact with the disk, tape, or disc.

This error usually indicates a SCSI problem and may be accompanied by an error 102 (trouble communicating). If error 102 accompanies error 205, see "SCSI Device Troubleshooting" on page 208. If error 102 does not accompany error 205 and SCSI communication problems have been ruled out, the next step is to check for media failure on the source volume. Some hard drives reset the SCSI bus when they sense they are experiencing a media failure. Try testing the hard drive with the software that was originally used to format it.

206 (media failure)

There is trouble reading from or writing to the backup set medium. This error is always generated by the backup device, and is usually due to one of the following causes.

The media is physically defective and needs to be replaced. Try using a different removable disk, tape, or disc.

The heads on the tape drive are dirty and need to be cleaned. Consult the manual that came with your tape drive or contact the drive manufacturer for cleaning recommendations.

Another device is causing interference. If you have a drive immediately next to another electronic device, try moving the devices further apart. Try removing one or more devices temporarily to see if there is some other device conflict. Try using your backup device on another computer to see if interference is caused by your monitor or other nearby electronic devices. Also see "General Device Troubleshooting" on page 207 and "FireWire and USB Device Troubleshooting" on page 207 or "SCSI Device Troubleshooting" on page 208.

Retrospect can also report error 206 when a crash or power failure interrupts the backup computer or tape drive. Some tape drives require an end of data (EOD) marker on a tape to append data. If a tape does not have an EOD marker Retrospect may report error 206 (media failure) when it next tries to append to the tape. Tape drives are responsible for writing EOD markers, but a drive may not get the chance if you shut down or restart the backup computer or the power is interrupted. Lacking an EOD, the tape will later produce error 206 when you try to append (write data) to it with Retrospect.

To avoid problems, take the following precautions: do not disable the "Verification" option in scripts and immediate operations; let the tape drive fully rewind or eject the tape before you power off or restart the computer; and if the computer crashes, try to eject the tape (using the drive's eject button) before restarting or turning off the computer.

When Retrospect reports error 206 on a tape because it lacks an EOD marker, that tape is unusable for future appends until you erase it, though it is not physically damaged and you can use it to restore. The tape cannot be repaired with Retrospect's repair tool. To use the tape for additional backups or archives, you must first either reset the tape's backup set from Configure❯Backup Sets or erase the tape from Configure❯Devices.

When the error persists on multiple media and you have eliminated the above possibilities, the device may be failing. Contact the vendor.

212 (media erased)

Retrospect thinks the content of the medium has been erased. If you suspect that is untrue, try the media in another drive to test for device or communication problems with the original drive. Check for device and communication integrity based on the hardware troubleshooting steps for your device and interface. If it reports the same error in all drives, then the media itself is damaged.

With a tape drive, this error may indicate a possible problem with the drive. See error 106 (data overwrite attempt).

220 (server is not responding)

The FTP server did not respond to Retrospect.

Verify the FTP server name (including domain) or IP address is correct. There are many possible causes: the server may not exist, the domain may not exist, the name may not be used by a domain name server, the server may not be an FTP server, the IP address may not be found, the network may not be operating, or the backup computer's TCP/IP connection may not be operating.

221 (user name or password incorrect)

Retrospect could not log in because the FTP server rejected the user name or password.

Verify both are correct. Often, they are case-sensitive.

222 (server name lookup failed)

Retrospect could not log in to the FTP server because either the host name (server and domain) is incorrect or the domain name server (DNS) is not functioning.

Verify the host name (the "FTP Server" field of Retrospect's connection configuration window). If the name is correct, your computer is not working with the DNS it uses to look up domain names and IP addresses. Contact your FTP server administrator or DNS administrator to troubleshoot your computer and/or the DNS.

223 (backup set not found)

Retrospect could not find the backup set folder in the specified path.

Verify the path and server are correct. This error can mean your Internet backup set directory has been moved or deleted from the FTP server. Contact your FTP server administrator.

224 (backup set is damaged)

Retrospect determined some backup set internals are unsound. It cannot use the backup set until it is repaired.

Go to Tools❯Repair and choose "Rebuild Internet backup set."

225 (no write privileges, bad name, or disk full)

This error has three possible causes:

• Your user account on the FTP server does not have server privileges to write data in the directory or on the server.

• You supplied an invalid name for a new folder.

• The FTP server volume on which the backup set resides is full.

The solutions, respectfully, are:

• Verify the path to the backup set directory. Contact your FTP server administrator to verify your user account information, including write privileges.

• Verify the new folder or backup set name; it may contain characters not allowed by the FTP server. (Some servers allow only the letters A through Z in names.)

• Contact your FTP server administrator to make more space available on the FTP server volume. You can do this in part yourself by deleting unwanted files from your user directory.

226 (backup set segment is missing)

The backup set is damaged; a data segment is missing from the backup set directory on the FTP server.

You or somebody with write privileges to the backup set directory moved or deleted one or more Retrospect data files (e.g., "0-data," "1-data," etc.) from the directory. Contact your FTP server administrator.

227 (bad name or no write privileges)

This error has two possible causes:

• Your user account on the FTP server does not have server privileges to write data in the directory or on the server.

• You supplied an invalid name for a new folder.

The solutions, respectively, are:

• Verify the path to the backup set directory. Contact your FTP server administrator to verify your user account information, including write privileges.

• Verify the new folder or backup set name; it may contain characters not allowed by the FTP server. (Some servers allow only the letters A through Z in names.)

228 (folder is not a backup set)

Retrospect cannot find the Internet backup set directory at the specified path.

Verify the path to the backup set directory in the connection configuration window. Contact your FTP server administrator.

229 (backup set name/creation date do not match)

The given backup set is not the one Retrospect expected. It has the same name but different internal information.

Locate the correct backup set and enter its directory path in Configure❯Backup Sets. If you cannot find the correct backup set, you can repair the backup set in question: go to Tools❯ Repair and choose "Rebuild Internet backup set."

230 (pathname exceeds 255 characters)

The pathname to the backup set contains 255 or more characters.

Retrospect limits FTP server pathnames (including the backup set name) to 255 characters. Rename directories so the pathname is 254 characters or less.

231 (server disconnected or disk full)

The FTP server deliberately disconnected Retrospect.

This often happens when the server volume is full. Check the FTP server's volume and determine whether it is full. If it is full, you must make space for future backups. If it is not full, look for signs of network trouble which might cause the FTP server to drop connected users. Check the physical connection to the server, making sure the modem or network cabling plugs are fully seated. Use a TCP/IP or FTP utility such as WhatRoute or Fetch to try to connect to your server. You may need to contact your

Internet Service Provider to check its connections.

Further attempts to add to the Internet backup set will likely produce "catalog out of sync" errors. After checking the server volume, and—if necessary—making space available on it, update the backup set from Tools❯Repair.

232 (directory not found)

The FTP server does not have the specified backup set directory at the specified path.

Go to Configure❯Backup Sets to verify the path to the backup set in the connection configuration window.

233 (connection timed out)

Retrospect terminated the operation because it failed to receive a response from the FTP server within the time specified in Retrospect's FTP server timeout preference. (The default is 30 minutes.)

If this happens repeatedly, check the physical connection to the server, making sure the modem or network cabling plugs are fully seated. Use a TCP/IP or FTP utility such as WhatRoute or Fetch to try to connect to your server. You may need to contact your Internet Service Provider or FTP server administrator.

234 (server disconnected or timed out)

The connection between the FTP server and the backup computer failed.

Check the physical connection to the server, making sure the modem or network cabling plugs are fully seated. Use a TCP/IP or FTP utility such as WhatRoute or Fetch to try to connect to your server. You may need to contact your Internet Service Provider or FTP server administrator to check its connections and/or determine its connection timeout setting. (Some providers limit how long users can stay connected.)

Further attempts to add to the Internet backup set will likely produce "catalog out of sync" errors. Update the backup set from Tools❯Repair.

503 (client turned off)

The client was turned off by the user at the client Macintosh before the operation started. The Retrospect Client control panel will automatically turn on when that client is restarted.

505 (client reserved)

The client is in use by another backup Macintosh. A client may be used by only one backup Macintosh at a time.

This can also happen when the backup computer or client computer crash during an operation. Restart both computers.

506 (duplicate activator code)

Update the client software to version 4.2 or later (Mac OS) or 5.0 or later (Windows).

507 (incorrect password)

Make sure you are properly typing the password. It is case sensitive, so you must type the password's proper upper case and lower case letters.

If you cannot remember the password for a client, you must reinstall the Retrospect Client control panel as instructed on page 212.

508 (access terminated)

The client user has turned off the Retrospect Client control panel during the operation. When this occurs, the backup Macintosh logs the error and moves on to the next client.

515 (piton protocol violation)

Retrospect sees its data is becoming corrupt while being transferred over the network. It is usually caused by a hardware failure.

Look for a pattern to these errors. If the problem occurs only on one client, it is likely that there is

a problem with the client's network connector or its connection to the network. If the problem happens on several clients with no coherent pattern, the problem may be with the backup Macintosh's network card or connection, or with a gateway/router common to all network transactions. See page 210 for more information.

519 (network communication failed)

The backup and client computers ceased to communicate, a situation which has many causes and solutions, as detailed below.

A user shuts down a client during the backup, or the client fails or is disconnected from the network during a backup. Determine why the client is failing or what part of the network communication link is failing (for example, a router, bridge, hub, or individual network connector). See the next item for help in determining if the problem is due to a software conflict.

A user is using too many applications on the client during the backup, or an application takes up most of the computer's processing power. Schedule backups for periods when the client is idle.

A network communication problem caused by hardware or software is making transactions unreliable. A failed network connector on a client will cause errors on that client. To determine whether a failed network connector is causing the problem, try switching connectors with a nearby computer that is not experiencing problems. See "Network Troubleshooting Techniques" on page 210.

A bad or failing hard disk is hanging the client computer. If the hard disk read light on the client is stuck "on," and not blinking, and the client must be restarted before it will work, the client has a failing hard disk or a bug in the hard disk's firmware or software. For the hard disk that is hanging, update its driver to the latest version from its vendor. Then try running a disk-checking program.

Your network software is incompatible with your network hardware. Use the latest network software which matches your network hardware because older software might have problems.

Mac OS An extension or some other software on the Macintosh has broken the network connection. Make sure you are not using software applications which prevent communication, such as older versions of security or compression programs that are active during a backup. Try starting up the Macintosh with the Retrospect Client control panel turned on, but all non-Apple extensions turned off.

This error may be caused by a problem with built-in Ethernet on all non-G3/G4 PCI-based Mac OS computers. It tends to occur during large data transfers on a busy network. One solution is to upgrade to Mac OS 8.6, which has a new extension that fixes the problem. Another solution is to install and use third-party Ethernet cards. For more information, see Dantz Technical Note #414, available on the Dantz web site.

Windows Two different bugs in the Windows 95 operating system can cause the client to lose contact with Retrospect. Make sure the appropriate TCP/IP patch has been installed on Windows clients using these operating systems and Winsock 2.0 has been installed on Windows 95 clients. See "Working with Windows Clients" on page 99.

525 (name/login conflict)

Usually this error appears when a client has been uninstalled and re-installed or replaced by client software which is not logged in.

On the backup computer, go to Configure❯ Clients, select the client experiencing the problem, then Forget the client. Click Add to go to the live network window and add the client of the same name. Add the client to your scripts.

527 (client was renamed)

Another backup administrator has renamed a client from another backup computer. Simply configure the client again to update the name in your own client database.

541 (client not installed or not running)

The backup computer can see the client computer at the IP address but no client software is operational.

Make sure the client computer is turned on and that it is not powered off by energy saving software. If it is a mobile computer make sure it has not been "suspended" or put into "sleep" mode.

Open the Retrospect Client control panel and examine its Status field for an error message about why the client software is not working. Consult the appropriate error message or troubleshooting problem in this chapter. You may need to reinstall the client software. If it is a Windows client, also see page 199.

546 (TCP/IP not properly configured)
547 (TCP/IP not available)

A Mac OS client cannot be converted from AppleTalk to TCP/IP because something is wrong with its network, TCP/IP or Open Transport configuration.

548 (Client is not a PowerPC)

A Mac OS client cannot be used because the computer does not have a PowerPC CPU.

Internal consistency check error

Retrospect experienced a major problem not due to normal errors or circumstances. When this happens, Retrospect creates an error log in the Retrospect preferences folder named "Retrospect.error.log.*n*" where *n* is a number.

Retrospect does internal consistency checks to ensure internal operations are fine. If you get this error, restart the computer and do what you were doing when the error occurred. If the error recurs, Retrospect most likely detected that an internal file in use for backup has been corrupted. Often the context of the error is most important.

If the error occurs during backup, archive, or restore, when Retrospect accesses the backup set's catalog file, this may indicate the catalog is corrupt. The solution to a corrupt catalog is to rebuild it from the media using Tools❯Repair❯ Rebuild.

If the error occurs when you open Retrospect or when you are merely clicking tabs and buttons as you navigate the program, this may indicate the configuration file is corrupt. Test for a corrupted configuration by moving the Retro.Config file and the Retro.Icons file from their default location (in the system's Preferences folder, within the Retrospect folder) to another location, such as the desktop. Relaunch Retrospect, provide the requested password or authentication if asked, then enter your application license code. Retrospect then creates new configuration and icon files. Try to reproduce the error. If you can reproduce the error, your original configuration files were not the cause, so return them to the Retrospect preferences folder to regain your scripts and preferences. If you cannot reproduce the error, it was probably caused by a corrupt configuration and you will have to use the new configuration. The side effect is that your scripts and preferences are gone and you must create new scripts and set new preferences.

If these suggestions do not help, see the Dantz web site for a technical note on internal consistency check troubleshooting, or contact Dantz Technical Support as detailed under "Technical Support," which starts on page 234.

Client Login Errors

After installing Retrospect client software on the computers to be backed up across the network,

you must use Retrospect on your backup computer to log in each client. The errors listed below may occur during log in of clients. Additionally, errors 506 and 507 (page 230) are apt to occur during log in.

Can't use client, version too old

Update the client software.

Mac OS Client Control Panel Errors

When everything is set up normally, and no errors have occurred, the Retrospect Client control panel should say "Ready" in the Status field. Below the status is the History area with information about the most recent operation or error messages.

Retrospect Client not loaded at system startup

If the message "Retrospect Client not loaded at system startup" is followed by one of the explanations in Table 10-3 on page 233, proceed as indicated.

If this message appears by itself in the Status area, there are several possible causes.

• The °Retrospect Client control panel file is not in its proper location. Place it in the Control Panels folder within the System Folder.

• You have not restarted the client after installing the Retrospect client software. Restart the client.

• You held down the Shift key when you restarted the Macintosh, which prevented extensions from loading. Restart without holding down Shift.

• You have an extensions manager program that specifies that the Retrospect Client control panel not be loaded. Open the extensions manager and ensure the Retrospect Client control panel gets loaded at startup.

• Another control panel or system extension is conflicting with the Retrospect Client control panel. Test for a conflict by temporarily removing several system extensions and control panels from the System Folder, leaving the Retrospect Client control panel and standard Apple extensions then restarting the client Macintosh. After restarting, open the Retrospect Client control panel. If you see the message "Ready" or "Waiting for first access," you know one of the items you removed prevented the Retrospect Client control panel from loading. You may avoid the conflict by making the Retrospect Client control panel load first on startup by replacing the ° symbol in its name with a space. For a more detailed discussion of system extensions troubleshooting techniques, see "Mac OS 9 System Software Issues" on page 209.

Message	Action/Comment
No computer name or owner name specified in file sharing settings	For System 7, open the Sharing Setup control panel. For System 8 or later, open the File Sharing control panel. Enter computer and owner names then restart.
Network Name conflict: "Name"	Another client on the network is already installed with this Chooser or Owner Name. Install a fresh copy of the Retrospect Client control panel using the Retrospect Client installer.
Open Transport TCP/IP not installed	Install Open Transport and set up TCP/IP networking.
Mouse button held down	Holding down the mouse button during startup inactivates the control panel.
Your activator code conflicts with John Doe (123.45.67.8). Please tell your backup administrator.	Update the client software to version 4.2 or later.

Table 10-3: Mac OS client control panel startup errors.

Windows Client Control Panel Errors

When everything is set up normally and no errors have occurred, the control panel's Status tab should say "Ready" in the Status field. Below the status is the History area with information about the most recent operation or error messages.

Client service not loaded at system startup

If the status shows this error message, examine the history field for one of the messages from Table 10-4 on page 234, then proceed as indicated.

There are a few possible reasons (in addition to those in the table) why the client software may not load at startup.

• The client software files are not in their proper location. The client software must be in the location you specified during the installation. Put it back in place or run the Setup program to re-install the software. Log in as the administrator or another user with full access privileges when you install.

• You have not restarted the computer after installing the client software. The client software loads when the system boots. Restart the client computer.

• The client's service was terminated. This is unusual. You may be able to run Retroclient.exe to get the service operating, but because you do not know what terminated the service in the first place, it is best to restart the client computer.

TECHNICAL SUPPORT

Web-Based Technical Resources

The Dantz web site has technical resources which may provide a solution to your problem. These resources include tutorials, which cover specific areas in great detail, common questions, new product and upgrade information, and helpful tips. The technical resources web URL is:

http://www.dantz.com/support

The knowledgebase search engine can find the right resource for your problem. Search the knowledgebase before you contact technical support. The knowledgebase web URL is:

http://www.dantz.com/knowledgebase

If this manual and the Dantz web site have not helped you solve your problem, the Dantz Technical Support team is available to answer your questions, provide help, resolve conflicts, and troubleshoot problems. We will try to answer

Message	Action/Comment
Retrospect Client startup error: Winsock initialization failed.	There is a problem with the Winsock network interface. The file WINSOCK.DLL or WSOCK32.DLL may be an incorrect version (e.g., a non-standard Winsock). Re-install the DLL from the Microsoft Windows installation media.
Retrospect Client startup error: Protocol initialization failed. Make sure protocol is working.	Make sure the computer is using a valid IP address.
Retrospect Client startup error: Initialization failed. Make sure IP protocol is installed.	Install the TCP/IP network protocol from the Microsoft Windows installation media.
Your activator code conflicts with John Doe (123.45.67.8). Please tell your backup administrator.	Update the client software to version 5.0 or later.

Table 10-4: Windows client control panel startup errors.

your questions as thoroughly as possible. If we do not have an immediate answer we will get back to you within a reasonable period of time.

Before Contacting Technical Support

Before contacting Dantz, try to reproduce the problem and be able to describe the steps which cause the problems. Make a note of what has changed on your computer since the last time Retrospect worked successfully. These details could provide essential clues for Dantz Technical Support.

When you call Technical Support, please make the following preparations. It helps us answer your questions and ensures you receive efficient technical support.

Be at your computer; this makes it easier to walk through any problem. Be prepared to describe your hardware and software setup as thoroughly as possible.

Have your original package and CD-ROM close at hand. Note the current version number you are using and your license code. To see your license code, choose About Retrospect from the menu (Mac OS 9) or from the Retrospect menu (Mac OS X). Your license code is required in order to receive technical support from Dantz.

If you are having problems with your backup device, print the device status window and have the printout when you call.

If you are having problems with Internet backup sets, when you call, have the TCP/IP control panel open or a record of its settings and have Retrospect's Internet backup set connection configuration window open. Also have a record of the FTP information (server, user name, and password).

Determine whether the problem occurs only when you are using a specific type of backup media. Try backing up to a different medium.

(That is, try a short backup to a file backup set if you have been using recordable discs or removable cartridges.)

Determine whether the problem occurs if you start up without extensions.

Determine the point in the backup or restore procedure at which the problem occurs.

Note any error messages and the point in the procedure at which they occurred. Check the operations log and print or write down any error messages before contacting us.

▲ **WARNING:** If your problem involves disks, tapes, or discs being unreadable or you suspect malfunctioning backup hardware, do not try to reproduce your problem with other, undamaged backup sets. Contact Dantz Technical Support first.

Contacting Technical Support

As technical representatives we assume two roles—we are Retrospect troubleshooters and teachers. If you are a seasoned professional, we will try to answer your questions with as much technical proficiency as we can. If you are new to computers, do not be afraid to ask us questions that seem trivial. If we use a term you do not understand, please ask us for a clearer explanation. In any case, we will try to make your time spent with us a learning experience. We are here to help solve your problem, so do not be afraid to ask us for help.

Technical Support Options

Dantz offers different support options to fit different needs. For detailed information on these options, call 888-777-5664 or 925-253-3050 from the United States or Canada, or visit the Dantz web site.

APPENDICES

- **A: SYMBOLS**

- **B: FILES**

- **C: GLOSSARY OF TERMS**

- **D: DOS FILE NAME EXTENSIONS AND MAC OS CODES**

APPENDIX A • SYMBOLS

General Symbols

Button to change the information for a script or operation.

Drop arrow indicating a closed item. Click to open and show its contents.

Drop arrow indicating an open item. Click to close and hide its contents.

Local Desktop container.

Backup Clients container.

Groups container or an individual group.

Startup disk volume of the backup computer.

Disk volume (other than the startup volume).

CD-ROM volume.

Folder (file system, Retrospect container, or Retrospect Subvolume).

Shared disk volume, such as a file server or client volume.

Startup disk volume of a client computer.

CD-ROM volume from a client computer.

Subvolume on a client computer.

Mac OS X client. When dimmed, it indicates Retrospect has *not* recently communicated with it.

Mac OS 9 client. When dimmed, it indicates Retrospect has *not* recently communicated with it.

Windows client. When dimmed, it indicates Retrospect has *not* recently communicated with it.

Removable disks backup set.

CD/DVD backup set.

Tapes backup set.

File backup set.

Internet backup set.

Script.

The item is locked, allowing only read access.

Snapshot or session.

Media Symbols

This medium is a member of a known backup set.

This medium is not a member of a known backup set, but its name matches that of a known backup set.

This member of the backup set is intact.

This member of the backup set is missing.

Cursor Symbols

Cursor when Retrospect is running in unattended mode.

Cursor when Retrospect is busy, such as when it is scanning, matching, copying, or communicating with a client computer.

Cursor when the user has complete control of Retrospect.

Selector Symbols

Selector.

Pop-up menu for choosing selector conditions.

Condition handle used to move or copy the conditions.

Condition set to select folders *and any files in the top level of those folders* that match the given criteria.

Condition set to select folders *and all items enclosed in those folders* that match the given criteria.

Browser Symbols

Completely marked item. If the item contains other items, it means all the items within it are marked.

Partially marked item. One or more items—but not all—within the item are marked.

Matched file that exists in or on the destination and will not be copied in an operation.

Missing item that exists in a missing backup set member.

Snapshot.

Folder.

Document.

Application.

Report Symbols

Δ   Retrospect Express opened.

+   Start of script, operation, event, or module.

–   Start of operation with a volume.

!   User-initiated action.

∗   Other action.

❭   Error.

APPENDIX B • FILES

Files Created by the Retrospect Installer or Retrospect
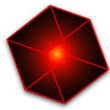
Retrospect

The Retrospect application program.

Read Me-Retrospect.htm

This hypertext document contains late-breaking news about Retrospect. It also includes tips, compatibility notes, and information on conflicts and workarounds.

Retrospect User's Guide.PDF

This is the manual you are presently reading, in PDF format. It is best viewed and navigated with Acrobat or Acrobat Reader, but you can open it with other applications, such as Mac OS X's Preview.

Retrospect Preferences Folder

This folder, which is created the first time you start Retrospect, is stored in the system's Preferences folder. It contains many of the files listed in this appendix. Under Mac OS X, its path is /Library/Preferences/Retrospect/. Under Mac OS 9 its path is :System Folder:Preferences:Retrospect:.

Retro.Config

Created automatically by Retrospect and placed in its preferences folder. It contains most of your customized settings, including scripts and their schedules, passwords, preferences, known backup sets, defined Subvolumes, selectors, AppleShare and client login names, and recent choices.

Retro.Icons

Created automatically by Retrospect and placed in its preferences folder. It stores information on all of the file types and icons encountered.

Operations Log

This text file is created automatically by Retrospect and placed in its preferences folder. It keeps a record of each Retrospect activity and can be opened and edited by any text editing application or viewed from within Retrospect. Formatting codes that start with "$[" are visible when the Log is opened in a text editing application. These codes are used by Retrospect to display symbols, as well as bold and underline font styles.

Retrospect Plug-in Extension

Updates to the main application come in the form of these plug-in files. For instance, Dantz adds support for new tape and recordable disc drives by periodically releasing Retrospect Driver Update plug-in files. (You may even have an RDU included with Retrospect right now.) When circumstances permit, Dantz includes the latest driver update with Retrospect and it is automatically installed when you install Retrospect. (To reinstall the driver update, reinstall Retrospect.) As soon as a new driver update is available, it is posted on the Dantz web site for you to download.

Device Support System Extension for Mac OS 9

Retrospect needs special software drivers to support some devices under Mac OS 9. The installer places required device suport extensions in the System Folder.

Retro.Startup for Mac OS 9

Under Mac OS 9, this system extension compares the system clock with the next scheduled script event and automatically launches Retrospect when required. It is installed by the Retrospect installer. The Retrospect application creates a new Retro.Startup if it discovers the file is missing.

retrorunfile, LaunchRetroHlper

Under Mac OS X, these files work together to compare the system clock with the next scheduled script event and automatically launch Retrospect when required. They are created by the Retrospect application when you schedule executions and it creates new files if it discovers the files are missing.

AppleScript Utilities folder

This folder contains utilities to script Apple events, as described under "AppleScript Support" in Chapter 9.

Update Files

These files may be included on the Retrospect CD or you may download them from the Dantz web site.

Retrospect Client Update File

Updates to Retrospect client software come in the form of a client update file. You can use it from Retrospect to update client computers individually, or update a group of client computers with a single command from the backup computer. Retrospect client update files for Macintosh and Windows are on the Retrospect CD and on the Retrospect Clients CD. As soon as new client software is available, Dantz posts a client update file on the Dantz web site for you to download.

Files Created by the User

Run Document

These files are created when you create a run document. You can save a run document file on any disk, and double-click the file whenever you want to run the script without having to first start Retrospect manually. When you save a run document, you can give it any name you want.

Catalog for Removable Disks Backup Set

This is a catalog file for a removable disks backup set. It is created when you first make a new backup set and it bears the name of that backup set. To do any kind of operation with the corresponding backup set, such as back up or restore, you must have this catalog file. If you lose or damage the catalog, you can have Retrospect rebuild it from the backup set disks.

Catalog for Tapes Backup Set

This is a catalog file for a tapes backup set. It is created when you first make a new backup set and it bears the name of that backup set. To do any kind of operation with the corresponding backup set, such as back up or restore, you must have this catalog file. If you lose or damage the catalog, you can have Retrospect rebuild it from the backup set tapes.

Catalog for CD/DVD Discs Backup Set

This is a catalog file for a recordable compact discs backup set. It is created when you first make a new backup set and it bears the name of that backup set. To do any kind of operation with the corresponding backup set, such as back up or restore, you must have this catalog file. If you lose or damage the catalog, you can have Retrospect rebuild it from the backup set discs.

Catalog for Internet Backup Set

This is a catalog file for an Internet backup set. It is created when you first make a new backup set and it bears the name of that backup set. To do any kind of operation with the corresponding backup set, such as back up or restore, you must have this catalog file. If you lose or damage the catalog, you can have Retrospect rebuild it from the FTP site's directory in which the backup set resides.

File backup set combined data and catalog

A file backup set combines both the catalog (the index for the backup set) and the data being backed up into a single file stored on a single volume.

File backup set catalog only

This file is the catalog separated from a file backup set.

File backup set data only

This file is the data separated from a file backup set.

access privileges – The privileges given to (or withheld from) users to see folders, see files, and make changes to shared volumes.

Advanced Driver Kit – A discontinued "plug-in" product for older versions of Retrospect that added support for several high-speed, high-capacity tape devices and libraries. This support has been incorporated into Retrospect Workgroup Backup and Retrospect Server Backup.

append – To write additional data to a backup set. In a normal backup, Retrospect appends file data to the current backup set member.

AppleTalk – Apple Computer's network protocol, used by the Mac OS. Slower than **TCP/IP**. Previous versions of Retrospect could communicate with Retrospect clients through AppleTalk. You must change these clients to TCP/IP before you use them with Retrospect 5.0 or later.

archive (verb) – To copy files from a volume to a backup set. For example, "Let's archive these QuickTime movies." Archiving may, optionally, involve removing the copied files from the source. Also see **back up**.

archive (noun) – 1. An operation in which files are archived. For example, "The archive was successful last night." 2. An entity of backup materials. For example, "Retrieve the 1997 accounts from the archive." In this respect, a backup set is an archive. Also see **backup set**.

back up (verb) – To copy files from a volume to a backup set (such as recordable discs). You should back up regularly in case something happens to your hard disk or any files.

backup (noun) – 1. An operation in which files are backed up. For example, "I just did today's backup." 2. An entity of backup materials. For example, "Fortunately, we can get the backup from the safe and restore the files." In this respect, a backup set is a backup. Also see **back up** and **backup set**.

backup action – See **recycle backup, new media backup,** and **normal backup**.

Backup Clients – The Backup Clients container holds client computers which are logged in to Retrospect.

backup computer – The computer on which you are using Retrospect with a backup device. In a networked environment, it is the computer used to back up client computers.

backup date – The most recent date and time a file, folder, or volume was copied to a backup set. Retrospect sets this date for volumes, folders, and/or files *only* when you check the appropriate boxes under Options in the Execution window. Also see **creation date** and **modification date**.

Backup Report – Displays the information in the detail log in terms of individual volumes. In the Backup Report, all known volumes are displayed with information about when they were last backed up.

Backup Server – 1. Retrospect's technology allowing flexible, resource-driven or user-initiated backups. 2. A backup computer running a Backup Server script.

backup set – A set of storage media and catalog. Retrospect stores all files in backup sets. There are different types of backup sets for different media and devices: Internet backup sets for FTP servers, removable disks backup sets for multiple ejectable volumes, file backup sets for a single volume, tapes backup sets for tape cartridges, and CD/DVD backup sets for recordable and rewritable compact disc drives.

boot – To start a computer's operating system. A Macintosh boots when you turn on its power or when you or software restarts it.

browser – Retrospect's tool that allows you to view the folder and file structure of a volume or contents of a backup set. You can also use a browser to see the files and folders in a backup set. The browser allows you to manipulate files and mark them to be worked within an operation such as a backup.

catalog – Retrospect's index of the files and folders contained in a backup set. The catalog file allows you to mark files for restore or retrieval without having to load or insert your backup set media.

CD/DVD discs backup set – For use with supported recordable compact disc drives (CD-R, CD-RW, DVD-R, DVD-RW, or DVD+RW). Also see **backup set**.

client – A network Macintosh or Windows computer with Retrospect client software whose volumes are available for backup by the backup computer. Also see **backup computer**.

compression – Reduces the size of the data being copied to the backup set media in a backup or archive. Retrospect can do it with software compression, or a capable tape drive can do it with hardware compression.

condition – In Retrospect's file selectors, a distinguishing criterion relating to file or folder characteristics. You can choose multiple conditions to make your own custom selectors. Also see **selector**.

container – An item for organizing other items such as volumes or clients in certain Retrospect windows. Also see **Local Desktop** and **Backup Clients**.

configured subnet – A **subnet** that Retrospect has been configured to search for clients.

Contents Report – A Retrospect report that shows a single backup set in terms of the sessions it contains. A list of all sessions is displayed for each backup set. Double-clicking a session creates a browser of all files in that session.

creation date – The time and date a file, folder or volume was created. A file's creation date is set when the file is first saved or made. A folder's creation date is set when you select New Folder. A volume's creation date is set any time the volume is formatted or erased. Also see **backup date** and **modification date**.

creator code – The four-letter code that represents the creator of a file. For example, documents created by SimpleText have a creator code of ttxt. Retrospect lets you select files according to creator code.

day of week scheduler – A type of scheduler that lets you schedule a script to run every week on specified days of the week (for example, every Monday, Wednesday, and Friday).

destination – The storage medium to which files are being moved, copied, or otherwise transferred. When backing up or archiving, the destination is a backup set. When restoring or duplicating, the destination is a volume.

device – Any piece of peripheral equipment connected to your Macintosh, such as a hard disk drive, removable cartridge drive, or CD-RW drive. In this manual, the term "backup device" refers to any device that accepts backup set media, such as a CD-R drive or removable cartridge drive. When using Internet backup sets, think of the **FTP server** as the device.

directory – A hierarchical structure on a volume that may contain files or more directories. The Mac OS refers to these as folders.

disc – A CD-R, CD-RW, DVD-R, DVD-RW, or DVD+RW **medium**, Compare to **disk**.

disk – A perhaps too-general term for a storage medium. It may refer to a hard disk, a floppy disk, or a Zip, Jaz, SuperDisk, DVD-RAM, MO, or other removable cartridge. This manual uses the term disk in two contexts: 1. as a desktop-mountable volume, whether fixed or removable, for general storage; and 2. as a medium for use in a removable disks backup set. Compare to **disc**.

disks backup set – See **removable disks backup set**.

EasyScript – An interactive scripting assistant that creates and implements a scripted backup strategy based on your replies to a few simple questions.

encryption – A way of encoding data so that it cannot be used by others without the password.

file header information – A file's name, size, type, creator, and dates (creation date, modification date, and backup date). This information is part of every file, and is also indexed in a backup set's catalog.

file server – A computer running file server software, which allows users to share information over a network.

file backup set – This type of backup set combines the catalog and the data in a single Macintosh file. The backup set media must be a single volume that appears on the Macintosh desktop, such as a file server or hard disk. Also see **backup set**.

FireWire – A specification of mechanical, electrical, and functional standards which lets a computer connect and communicate with storage devices, such as hard disks and removable cartridge drives, and other peripheral devices, such as scanners and video camcorders. FireWire is a built-in part of some Power Macintosh computers and allows you to easily attach additional devices to your computer.

folder – 1. A directory on a volume. 2. A Retrospect container for organizing items such as scripts, volumes, or clients.

Forget – The Forget menu item allows you to remove an item from certain windows. Use Forget to clear listings for volumes, Subvolumes, clients, or backup sets you no longer wish to use. Note that "forgetting" a backup source volume does not affect any of the backup sets it has been backed up to; its files may be restored at any time as long as the backup set media is intact.

FTP – File Transfer Protocol, an Internet communication standard for accessing, storing, and retrieving files on an **FTP server**. FTP itself uses another protocol, **TCP/IP**.

FTP server – A computer running **FTP** file server software, which allows users to share files over a network using the File Transfer Protocol.

group – A Retrospect container for organizing items such as volumes and clients.

interactive mode – Retrospect's mode of operation when you perform an immediate operation. Interactive mode assumes you are at the Macintosh and available to respond to prompts. See also **unattended mode**.

Internet backup set – For use with **FTP servers** on the Internet or your local Intranet. Also see **backup set**.

Local Desktop – A container which holds certain volumes mounted on the backup computer desktop.

local subnet – The **subnet** in which the backup computer resides.

marking – Selecting files in the browser to be backed up or restored. Files can be marked (or unmarked) manually, or they can be marked according to various criteria using file selectors. In the browser, a check mark appears next to any

marked file. Files that are highlighted in the browser are not necessarily marked.

matching – The scheme for comparing file attributes to determine whether files are identical, which then allows intelligent copying to avoid redundancy. Also see **progressive backup**.

medium – Any hard drive, tape, recordable disc, floppy disk, DVD, MO, or cartridge to which files can be copied. In this manual, media usually refers to the removable media of a backup set. When using Internet backup sets, think of the **FTP server** as the media.

member – An individual **medium** used in a backup set.

modification date – The time and date a file was last changed. This date is automatically attached to the file by the Macintosh. A file's modification date is reset any time you make changes and save the file (see "backup date" and "creation date"). A folder's modification date is updated any time a folder or file is added, changed or removed from it.

new media backup – Allows you to periodically introduce new media into your backups, keeping the original backup set media and catalog intact for archival purposes. A new media backup copies all selected files to a new backup set of the same name as the old, with the addition of a generation number, such as "Backup Set A [001]."

normal backup – Retrospect's usual backup action, performing a progressive backup to copy new or changed files.

operations log – A Retrospect report that tracks all actions by Retrospect. The operations log documents all start-ups, executions, errors, and completions, as well as information on the number of files copied, duration of backup, and backup performance.

progressive backup – A **backup** operation that intelligently copies only files that are new or have changed since the previous backup to a given **backup set**. Files from the **source volume** are compared to those in the backup set, and any file without an exact match is backed up. Progressive backups avoid redundantly copying files, saving time and conserving **media**, while being more reliable than traditional backup methods. Retrospect's **normal backup** action performs a progressive backup. See also **matching**.

recycle backup – A recycle backup is useful to periodically reset a backup set so that it does not grow out of control. A recycle backup completely erases the backup set and catalog before copying all selected files to the backup set. All previous data in the backup set is lost.

removable disks backup set – For use with removable cartridges such as Zip, Jaz, SuperDisk, DVD-RAM, or MO disks. Also see **backup set**.

repeating interval scheduler – A type of scheduler that lets you schedule a script to repeat automatically at a specified interval of time, such as once every three weeks.

restore – An operation which copies files from a backup set to a volume.

Retro.Config file – The file containing your customized settings, including scripts and their schedules, passwords, preferences, known backup sets, defined Subvolumes, selectors, AppleShare and client login names, and recent choices. This file is automatically created the first time you start Retrospect, and is used while Retrospect is open. If you delete this file, all of your custom information will be lost and the default configurations will be used.

Retro.Icons file – The file containing the type and creator database, and the creator and type codes for all scanned volumes. This file is creat-

ed and updated automatically during operations.

Retro.Startup file – A system extension that, under Mac OS 9, compares the system clock with the next scheduled script event and automatically launches Retrospect when required.

Retrospect preferences folder – A folder automatically created within your system's Preferences folder that contains Retro.Config, Operations Log, and other important files used by Retrospect. Under Mac OS 9, its path is :System Folder:Preferences:Retrospect. Under Mac OS X, its path is /Library/Preferences/Retrospect.

root – 1. The highest level of folders in a data structure. When you double-click a Macintosh desktop volume icon in the Finder, you see the root folders and files. 2. The highest level user account under Mac OS X, the "superuser" with complete and absolute privileges and control.

run document – A file that automatically starts a Retrospect script when opened. A run document allows you to run predefined Retrospect scripts by double-clicking on the run document file.

script – A saved backup procedure that you can schedule to run at some future date and time or on a repeating schedule, such as daily. You can create as many scripts as you want.

SCSI (Small Computer System Interface) – A specification of mechanical, electrical, and functional standards for connecting peripheral devices (hard drives, tape drives, printers) to a computer. SCSI allows you to easily attach additional devices to your computer. Older Macintosh computers had SCSI built-in, but a more recent Macintosh needs an add-on SCSI card.

SCSI chain – The means of connecting multiple SCSI devices to a single computer. SCSI devices are serially attached to each other and to the computer by SCSI peripheral cables. Macintosh SCSI allows up to seven devices on a single chain. Each device must have its own unique SCSI ID number.

SCSI Manager 4.3 – Apple's system software technology that speeds SCSI operations by using asynchronous SCSI communication. If your backup device requires SCSI Manager 4.3, it is already on any Macintosh that can run Retrospect, so you do not need to take any action.

SCSI terminator – A device used on a SCSI chain to maintain the integrity of signals on the chain.

selector – A feature that lets you search for or filter files which match certain conditions. You can use Retrospect's standard selectors, or create your own custom selectors. Also see **browser**.

session – A group of files from a single operation stored within a backup set.

single date scheduler – A type of scheduler that lets you schedule a script to automatically run at a specific date and time.

Snapshot – A Retrospect Snapshot is created during a backup operation to depict a volume's state (that is, all its files and the folder paths to them). It makes it easy to restore a hard disk to its exact state as of a given backup.

source – In a backup, duplicate, or archive operation, the volume from which files are copied. In a restore, the backup set from which files are copied.

subnet – A group of local computers physically networked together without a router or gateway, though they may use a gateway to connect to other networks. Also see **configured subnet** and **local subnet**.

Subvolume – A folder you designate as an independent volume for use within Retrospect.

tapes backup set – For use with tape drives. Also see **backup set**.

TCP/IP – An industry standard network protocol, analogous to AppleTalk, but much faster. It is the standard protocol of the Internet, web servers, and **FTP servers**.

unattended mode – Retrospect's mode of operation when you run a script. Unattended mode assumes no one is currently at the Macintosh, and therefore Retrospect must make assumptions about media use. See also **interactive mode**.

USB (Universal Serial Bus) – A specification of mechanical, electrical, and functional standards for connecting peripheral devices (keyboards, storage drives, printers) to the USB-capable computers. USB is a built-in part of the iMac and later G3 computers and allows you to easily attach additional devices to your computer.

volume – A hard or floppy disk, partition of a hard disk, Subvolume, file server, or any data storage medium that is logically recognized by both Retrospect and the Macintosh as a file and folder storage location.

APPENDIX D • DOS FILE NAME EXTENSIONS AND MAC OS CODES

When you restore or duplicate a file from Windows to a Mac OS computer, Retrospect interprets the kind of file it is. The Mac OS uses type and creator codes (not normally visible to users) to identify files, whereas the Windows operating systems, derivative of DOS, use name extensions following files. Retrospect maps some DOS extensions into Mac OS type and creator codes. The following table lists Retrospect's type and creator codes corresponding to DOS file name extensions.

DOS Extension	Macintosh Type	Macintosh Creator	Comments
AI	EPSF	ARTZ	Adobe Illustrator EPS document
API	PRS2	PLP2	Persuasion document
API	PRIF	PLP2	Persuasion interchange
APP	07$A	07$$	Omnis 7
APT	PRT2	PLP2	Persuasion template
ASM	TEXT	MPS	assembler source code
BAT	TEXT	ttxt	DOS batch file
C	TEXT	MPS	C source code
CGM	CGM	CDMV	CGM format graphic
COM	APPL	????	executable
CPP	TEXT	MPS	C++ source code
CWP	CWWP	BOBO	Claris Works/AppleWorks word processor document
CWS	CWSS	BOBO	Claris Works/AppleWorks spreadsheet document
CWG	CWGR	BOBO	Claris Works/AppleWorks graphic document
CWD	CWDB	BOBO	Claris Works/AppleWorks database document
DBF	F+DB	FOX+	FoxPro/FoxBase database
DEF	TEXT	MPS	definition file
DFI	07$D	07$$	Omnis 7 document
DLL	APPL	????	Dynamically Linked Library
DOC	WDBN	MSWD	Microsoft Word document
DXF	TEXT	CDMV	DXF format graphic
EPS	EPSF	ARTZ	EPS document
EXE	APPL	????	executable
FM	FMPR	FMPR	FileMaker Pro document
GIF	GIFF	Bozo	Graphic Interchange File Format
H	TEXT	MPS	C include file
IGS	TEXT	CDMV	IGS format graphic
INC	TEXT	MPS	assembler include file

DOS Extension	Macintosh Type	Macintosh Creator	Comments
INI	TEXT	MPS	system file
MOV	MooV	TVOD	QuickTime movie document
MPP	MPP	MSPJ	Microsoft Project document
MPV	MPV	MSPJ	Microsoft Project View document
MW2	MW2D	MWII	MacWrite II document
PM3	ALB3	ALD3	PageMaker 3 document
PM4	ALB4	ALD4	PageMaker 4 document
PM5	ALB5	ALD5	PageMaker 5 document
PPT	SLD2	PPT2	Microsoft PowerPoint document
PSD	8BIM	8BIM	Adobe PhotoShop document
PT3	ALT3	ALD3	PageMaker 3 template
PT4	ALT4	ALD4	PageMaker 4 template
PT5	ALT5	ALD5	PageMaker 5 template
QXD	XDOC	XPRS	Quark XPress document
RC	TEXT	MPS	resource file
RSA	TEXT	MPS	assembler resource file
RSC	TEXT	MPS	C resource file
RTF	TEXT	MSWD	Rich Text Format document
SIT	SIT!	SIT!	StuffIt! document
TIF	TIFF	????	Tagged Image File Format
TXT	TEXT	ttxt	text
WK1	LWKS	L123	Lotus 1-2-3 Release 2 worksheet
WK3	LWKS	L123	Lotus 1-2-3 Release 3 worksheet
WKS	LWKS	L123	Lotus 1-2-3 Release 1A worksheet
WKZ	WZSS	WNGZ	Informix Wingz document
WPD	WPD2	WPC2	Word Perfect document
XLA	XLA4	XCEL	Microsoft Excel add-in
XLB	XLB4	XCEL	Microsoft Excel toolbar
XLC	XLC3	XCEL	Microsoft Excel chart
XLL	XLL	XCEL	Microsoft Excel code module
XLM	XLM4	XCEL	Microsoft Excel macro sheet
XLS	XLS4	XCEL	Microsoft Excel spreadsheet
XLT	sLS3	XCEL	Microsoft Excel template
XLW	XLW4	XCEL	Microsoft Excel workbook
(all others)	TEXT	dosa	

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