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COPY II[®]

**For The Macintosh[™] Computer
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- ✓ REPAIR damaged disks.
- ✓ TRACK EDITOR - spot copy protections, repair damaged blocks.
- ✓ SMART LOCATE - find files anywhere on your drives by name or up to three "key words."

- ✓ TREE DISPLAY - see and change your disk's organization at a glance.
- ✓ UNDELETE files - even on your hard disk.

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Copy II[®]

for the Macintosh

S/N 713280
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Copy II Mac v7.2

Copy II for the Apple Macintosh

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About This Manual

This manual is divided into five sections, each describing a different application.



- **Copy II** is a utility that allows you to make disk backups of "copy-protected" software, as well as quickly formatting and copying non-protected floppy disks. It also features a powerful Track Editor for diagnosing and repairing disks, and allows technical users to find and examine copy protected tracks.



Copy II® Hard Disk

- **Copy II Hard Disk** allows you to transfer some protected software to your hard disk, RAMdisk, or other Macintosh disk volumes.



MacTools



CPSDeleteTracking



CPS TagFix

- **MacTools** is a general disk and file utility with a variety of useful options, including three different kinds of file undeletion. MacTools can even undelete fragmented files.



Mirror



Rebuild



CPSDeleteTracking

- **Mirror** is an INIT and two applications (Mirror and Rebuild) that guard the data on your hard disk. Mirror automatically

saves the “master plan” of your hard disk in a safe place. If your disk ever crashes, the Rebuild program can quickly reconstruct it from the master plan.



Locate™

- **Locate** is a desk accessory that quickly finds files by name or keywords within the file. It allows you to copy and paste, append text to the clipboard, and create a list of found files.

With both Finder and MultiFinder, Locate can search in the background while you use an application. With MultiFinder, you can launch the documents that Locate finds.

Installation Notes

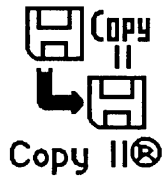
This manual assumes you are familiar with the basic concepts of the Macintosh, including such things as windows, pull-down menus, selecting with the mouse, etc. If you need to know more about these things, you should refer to your Macintosh owner's guide.

The program disk is not copy-protected in any way. You can make a backup of this disk using the Finder, Copy II, or any other standard Macintosh copy program. We encourage you to make a backup copy and put your original disk in a safe place.

Note for Hard Disk Users: Don't copy the entire contents of your program disk onto your hard disk. Install the programs as follows:

- All of the programs except CPS TagFix and CPS Delete Tracking can be copied to your hard disk in the usual way.
- Install CPS TagFix and CPS Delete Tracking in the System Folder of your hard disk.
- **Do not** copy the System Folder of the program disk. Your Macintosh will start to misbehave if you install multiple copies of the System and Finder on your hard disk.

Copy II®



Introduction to Copy II

This manual describes Copy II, a disk backup application for the Macintosh computer. Copy II can make backup copies of your valuable software that have been "copy-protected," as well as copying standard unprotected Macintosh software. Copy II also features a powerful Track Editor for diagnosing and repairing disks, and allowing technical users to find and examine copy-protected tracks.

What does Copy II do?

Copy II makes quick, accurate copies of your disks. It's the same principle as using a tape deck to copy a record the first time you play it; you always have a clean backup if your original is damaged.

Note: Under the copyright law, you are entitled to make backups of the software you own for your own use. You are not allowed to give or sell copies of copyrighted software to others.

Some software companies, to prevent illegal duplication, "copy-protect" the information on their disks. Though the techniques used in copy protection are all quite complicated, the end result is that the protected disk cannot be copied using normal copy methods. This prevents illegal copies from being made, but it also keeps customers from being able to make legal, useful archival backups.

Copy II is designed for copying these protected disks. It basically transfers all of the information from one floppy disk onto another, so that the duplicate disk is a "carbon copy" of the original. If the original disk is copy-protected, the duplicate will be too.

The Copy II application is provided to help you make backups of your copy-protected disks for your own use. It may not be used for illegal copying.

Features of Copy II

Using Copy II is as simple as opening the Copy II application, clicking on the Start button, and inserting the original and duplicate disks. In most cases this is all you need to do to make working backups of your software.

You can make anywhere from 1 to 32,767 copies of an original disk.

If you have a single drive and a megabyte or more of memory, Copy II copies disks without tedious "disk swapping." Copy II makes disk copying easy by making the best use of your computer's memory.

If you have a second disk drive, you can copy from one drive to another; or use just one drive, if you like.

Copy II provides two copy options. The Bit Copy option is useful for making backups of most protected software as it makes very few assumptions about the format of the disk it's copying. The Sector Copy option can make fast, reliable backups of standard, unprotected Macintosh disks, and is also designed to handle a few special, but widely used, copy-protection methods. (The Backup List has information about which option to use in backing up most applications.)

In a few cases, Bit Copy and Sector Copy can be used together to make a more reliable copy than either option can alone. A couple of other options are also available which can help back up a few specific disks, but otherwise slow the copy process down.

Copy II cannot copy onto hard disks. Hard drives store and retrieve information in a different way than floppy drives. Disk copying from one to the other simply doesn't work. If you want to copy individual applications and documents onto a hard disk, you can use either the Copy II Hard Disk application or the Copy Files option found in the MacTools application. (See the manual sections on Copy II Hard Disk and MacTools.)

System Requirements

Copy II runs on any of the following machines with System Version 3.2 or higher:

- Macintosh 512K, 512KE
- Macintosh Plus
- Macintosh SE
- Macintosh II

MultiFinder™

Copy II is compatible with MultiFinder and RAM caching, but does require a megabyte of free memory to copy 800K disks at full speed.

Installing Copy II

There are no special requirements for installing Copy II. It can be copied to a floppy or hard disk in the same way as any other program.

Hard disk installation

1. Insert the program disk and click on its icon.
This opens the program disk window.
2. Drag the Copy II icon onto the hard drive window.

Note: If you are copying several applications onto your hard disk at once, **do not** copy the System Folder onto the hard disk. Your hard disk system will start to misbehave if you install multiple copies of the System and Finder by mistake.

Backing up on a System disk

We recommend you make a copy of Copy II on a disk with a System folder. Store the original program disk in a safe place.

Using Copy II

To use Copy II:

1. Double-click the Copy II icon.
This starts the Copy II program.



After showing an important notice, the Copy II main screen will appear.

Control Options

COPY II® for the Apple Macintosh®

Start

Stop

☒ Bit Copy
☐ Sector Copy with Format
☐ Sector Copy no Format
☐ Track Editor

Original Drive : ☒ Internal
☐ External

Duplicate Drive : ☐ Internal
☒ External

Start Track : ☒ A ☐ B

End Track : ☐ A ☒ B

Messages:

☒ 800K Copy

Copy Status

	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9
0																				
20																				
40																				
60																				

Note: The exact options you see depend on how many and what kind of drives (400K or 800K) you have. The details are discussed in the next section.

Copy II menu commands

The first thing to notice is the menu bar at the top of the screen. If you choose the Apple pull-down menu, you can see that all of the usual Macintosh desk accessories are available. You will also see three new options. **About Copy II** is a copyright message for the Copy II application. **About Features** is a reminder of what options you have available in Copy II. And, **About Backup List** is a reminder to reference the Backup List program if you have problems backing up a particular program.

The only command available from the control menu is **Quit**. Choose Quit whenever you want to quit out of the Copy II application and return to the Finder desktop.

The Options menu contains several commands. The first two commands, **Keep Track Length** and **Synchronize Tracks**, allow you to configure the Bit Copy operation. The **Multiple Copies...** command allows you to select the number of copies to be created by Copy II. And, the **Clear Status Display** allows you to erase the information in the Copy Status box in the main screen.

Making a Backup

Copy II works by reading some of the information from the original disk it's copying, then writing that information onto the duplicate disk. It alternates this reading and writing process until the entire disk is copied.

The amount of free memory is affected by MultiFinder's Size command or the amount of RAM cache that is allocated. For best results, turn the RAM cache off and run Copy II by itself.

Before Copy II will back up a disk, it will first insist that the disk be locked or write-protected (which is not the same as copy-protected). To lock a disk, slide the small tab in the corner toward the edge of the disk, uncovering the hole. To unlock a disk, slide the tab back so the hole is covered again.

Locking a disk guarantees that the computer cannot write or change any information on the disk. Suppose that, while using Copy II, you accidentally inserted the original disk at the wrong time, or into

the wrong drive. Even if this happens, the information on your original disk can't be hurt, because the disk is locked.

Start Copy

In the top of the Copy II window, you'll see two buttons labeled Start and Stop. The Start button starts the copying. (The Stop button is 'dimmed' right now because there isn't any copying to stop.)

Stop Copy

If you want to stop the copying before it's finished, click the Stop button. Copy II may continue for a couple of seconds more if it's busy reading or writing, then stop and display the message: "Copy stopped!"

Copying

To make more than one copy, select **Multiple Copies...** from the Options menu before starting.

Copy II is already set up for you to begin copying most disks. When you want to copy a disk, click on the Start button and Copy II ejects any disks currently in the drives. To continue, refer to the One-drive and Two-drive procedures.

One-drive Copying

If you have one drive, a message appears in the messages box near the bottom of the screen: "Insert Locked Original Disk In Internal Drive." Make sure the disk you want to back up is locked.

To copy a disk using one drive:

1. Insert the locked original.
You hear Copy II read the disk.

Copy II ejects the disk and prints a new message: "Insert Duplicate Disk in Internal Drive."

2. Insert the blank (or reusable) disk.
You now hear Copy II write the disk.

- If you are only making one copy, the disk is ejected when copying is finished. You see the message: "Backup complete!"
 - If you are making more than one copy, you'll see a prompt to insert another destination disk. Continue inserting and removing new disks until you see the "Backup complete!" message.
3. Select **Quit** from the Copy II menu.

Note: Step 2 has several additional steps of "disk-swapping" if your Macintosh has less than a megabyte of free memory. Copy II prompts you for the original and destination disks as necessary.

Two-drive Copying

If you have two or more drives, messages appear in the message box near the bottom of the screen telling you where to insert the original and duplicate disks. Make sure that your original disk is locked.

To copy a disk using two drives:

1. Insert the locked original.
You hear Copy II read the disk.
 2. Insert the blank (or reusable) destination disk when you see the prompt.
You now hear Copy II write the disk.
- If you are only making one copy, both disks are ejected when copying is finished. You'll see the message: "Backup complete!"
 - If you are making more than one copy, Copy II ejects the first destination disk.

You see a prompt to insert another destination disk. Continue inserting and removing new disks until you see the "Backup complete!" message.

3. Select **Quit** from the Copy II menu.

Copy Status

The information stored on a Macintosh disk is divided into 80 circular tracks, numbered track 0 to track 79. (On 800K disks, each track is further divided into two sides, which we call side A and side B.) Notice that, as Copy II backs up a disk, it displays in the messages box: "Reading track..." or "Writing track..." with the track number it's currently reading or writing. This keeps you informed of what Copy II is currently doing.

If any errors or problems occur during the copy, an error message is also displayed in the "Messages" box. This message shows the block and track number where the error was found.

In addition, information about all of the copied tracks is kept in the Copy Status box. The Copy Status box has positions for all 80 tracks: 4 rows with 20 tracks per row.

For every successfully copied track, a dot appears. (When copying 800K disks, two dots appear for each track, one for each side of the disk.) If there is an error copying a track, a letter appears instead.

For example, if tracks 0 through 23 have been copied and a read error happens on track 17, the Copy Status box would appear like this:

Copy Status																				
	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9
0	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	R	.	.
20	.	.	.	.																
40																				
60																				

The letter indicates the nature of the error.

R Read error

If this happens on every track, it means the original disk is probably blank.

If this happens on only one or two tracks, then a portion of the disk may be copy-protected, or there may simply be a problem on that part of the disk.

W Write error

This means the duplicate disk probably isn't formatted correctly on every track. Try Sector Copy with Format.

V Verify or "Unable to format" error

This usually indicates some kind of media problem with the duplicate disk. You should try a different disk.

Copy II Options

This section describes the other options available in Copy II and what they're used for. Additional options become available if you have one or two 800K (double-sided) drives. These extra options are discussed at the end of this section.

Bit Copy and Sector Copy

When Copy II is first started, the Bit Copy method is already selected. You can switch to the Sector Copy method by clicking on either Sector Copy with Format or Sector Copy no Format. Clicking on Bit Copy will switch back to the Bit Copy method.

- ☒ **Bit Copy**
- ☐ **Sector Copy with Format**
- ☐ **Sector Copy no Format**
- ☐ **Track Editor**

Sector Copy matches the way the Macintosh usually reads and writes to the disk in everyday use. Because it 'assumes' that what it's copying is in a normal Macintosh format, it makes a special effort to be sure that everything on the disk is exactly as it should be. This makes for very reliable copies. It will copy some protected disks, but it cannot backup disks that differ too far from the normal Macintosh format.

Since Sector Copy can write only onto formatted disks, you can select **Sector Copy with Format** or **Sector Copy no Format**. If you're sure that the duplicate disk you want to copy onto is already formatted, selecting **no Format** speeds up the copy process a little. Otherwise you should select **with Format**, so that Copy II formats the duplicate disk before it copies.

Bit Copy is designed for copying nearly all copy-protected disks. Because of the widely varying protection schemes possible, Bit Copy makes very few assumptions about the information it's copying.

It simply

- 1) reads the information from the original disk,

- 2) makes enough sense of it so that it can write it correctly,
- 3) then writes it to the duplicate disk.

Bit Copy can copy many more disks than Sector Copy.

Bit Copy formats the duplicate disk as it copies, so the disk does not have to be formatted ahead of time.

Whenever you click on the Start button, Copy II uses the method you selected.

Original Drive and Duplicate Drive

Below the Start and Stop buttons are options for **Original Drive:** and **Duplicate Drive:**. The original drive is where you put the disk you're making a copy of. The duplicate drive is where your copy is made. What appears in the window depends on how many drives you have.

Original Drive : ☒ **Internal**

☐ **External**

Duplicate Drive : ☐ **Internal**

☒ **External**

If you have one drive, then only one option labeled "Internal" appears on each line. Since only the internal (built-in) drive is available, Copy II uses it for both original and duplicate disks. Clicking on the options has no effect; they both remain selected.

If you have more than one drive, you'll see choices for each drive, Internal and External (Internal Lower and Internal Upper on a Macintosh SE with two internal drives, or Right Internal and Left Internal on a Macintosh II). Copy II displays options only for the drives that are actually connected to your Macintosh.

Internal is usually selected for Original Drive, and External is selected for Duplicate Drive. This means Copy II copies from the internal (built-in) to the external (second) drive. If you want to change this, just click on the options you want for original and duplicate drives.

Start Track and End Track

The information stored in Macintosh disks is recorded in 80 circular "tracks," numbered 0 through 79. With a Start Track of 0 and an End Track of 79, Copy II copies all 80 tracks of the disk. You can also copy a range of tracks if you want, though you usually won't need to do this.

Start Track : ☒ A ☐ B
End Track : ☐ A ☒ B

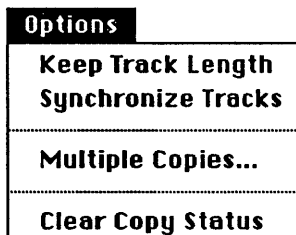
To change the Start Track and End Track values, click the mouse in the box you want to change. The number becomes highlighted (displayed white in a black box). Type in the new track number you want, then either press the Return key or click the mouse somewhere else in the window.

If you type a bad number, then the original value (either 0 or 79) reappears, the speaker beeps, and a message tells you what was wrong (for example, if you typed a number greater than 79 or typed something other than a number). The Start Track must also be less than the End Track. If the Start Track is greater, you'll get an error message when you click on the Start button.

If you want to copy a single track, simply set both Start Track and End Track to that track number.

The Options Menu

The Options menu has several options available:



The **Keep Track Length** and **Synchronize Tracks** options are available only when you use the Bit Copy method for copying a disk. You'll see a checkmark beside an option if it's selected.

Keep Track Length

Because disk drives will not spin at exactly the same speed all the time, the number of "bytes" of information that can fit on a track (called the "track length") will vary slightly. When Copy II copies a disk, the track length on the duplicate disk it makes may be a little different than on the original disk. This is usually no problem, because normal reading and writing takes these slight variations into account.

However, there are a few protected programs that check for the exact track length on one or more tracks of the disk. If the track length is changed, then the protected program "knows" that this is a copy and not the original disk, and refuses to run.

If you choose the Keep Track Length option before doing a Bit Copy of the disk, Copy II will make subtle changes to the information as it writes, so that the track length will be correct even if the disk drive speeds are not exact. This will help copy those programs that check track length.

Choosing Keep Track Length slows the copy process down a little, and the minor changes it makes could conceivably affect other copy protections (though this would be rare). In other words, you may not want to use the Keep Track Length option all the time. (See the note below, under "800K Drive Options," about using Keep Track Length with Apple-brand 800K drives.)

Synchronize Tracks

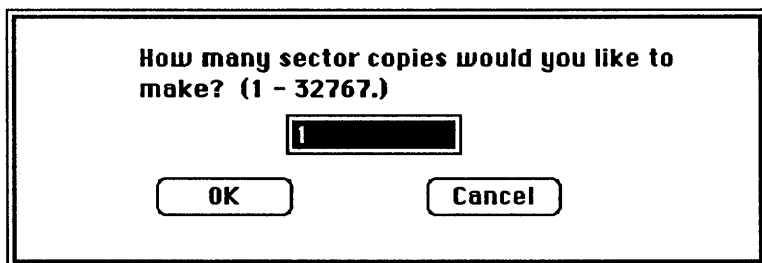
Another thing that a protected program can check for is the positioning or alignment of the information from one circular track to the next. Most copy programs copy all of the information on a track, but do not maintain the alignment from one track to the next. A change in alignment is never noticed unless a protected program specifically checks for it.

If you choose the Synchronize Tracks option, then do a Bit Copy of a disk, Copy II will maintain the track-to-track alignment as it copies. This will help copy those programs which check the

alignment. The Synchronize Tracks option also slows down copying somewhat, but does not cause any problems otherwise.

Multiple Copies

Select **Multiple Copies...** from the Options menu and you see a dialog box asking how many copies you'd like.



Clear Copy Status

The **Clear Copy Status** option clears out all of the status information from the Copy Status box. You may want to clear the Copy Status before copying a range of tracks so you're not confused by status information from a previous copy.

800K Drive Options

Copy II can accommodate any combination of 400K (single-sided) and 800K (double-sided) drives. The disks you can copy are determined by your drives:

- An 800K drive is capable of reading, writing, and formatting both 800K disks and 400K disks.
- An 400K drive can work with only 400K disks. It cannot handle an 800K disk.

Since Copy II makes an exact duplicate of a disk (including its size), the duplicate disk must always be the same size as the original.

If you have only one 800K drive, then to make an 800K backup, you'll need to use this 800K drive for both Original and Duplicate.

If you have two 800K drives, the **800K Copy** box is already checked for you to copy 800K disks. Make sure this box is checked if you are copying an 800K disk. If it isn't, the resulting duplicate disk will be missing much of the information it needs to work correctly.

If you want to make a copy of a 400K (single-sided) disk, click on the **800K Copy** box to remove the check. If you leave this box checked, Copy II will remind you the 800K option is not necessary to make a 400K copy.

Note: Because of hardware differences, Apple's 800K drives cannot carry out Copy II's Track Length adjustments as readily as 400K drives or most third-party 800K drives. If you're using the Keep Track Length option or if you're getting "L" errors when copying a disk, we suggest you use something other than an Apple-brand 800K drive as the Duplicate Drive, if at all possible. This will produce a more accurate, reliable backup.

If you need to recopy just a portion of an 800K disk, notice that the Start Track and End Track options include selections labeled A and B. As mentioned earlier, on 800K disks, each of the 80 circular tracks is further divided into two sides, which we call side A and B. When doing an 800K copy, Copy II must back up both sides of each track.

Copying an entire 800K disk involves copying with a Start Track of 0-A and an End Track of 79-B. To copy just a portion of an 800K disk, you can select which track and side to use for Start Track and End Track.

Note: A common misconception about 800K disks is that you can disk-copy two 400K single-sided disks onto one 800K double-sided disk, one onto the top and one onto the bottom of the disk. The Macintosh drives don't work this way. For each physical disk, only one disk icon can appear on the Finder desktop. The Macintosh can't recognize "two-disks-in-one." It's better to think of double-sided disks simply as disks that can hold twice as much information, and not be concerned with when the top and when the bottom of the disk is being accessed.

If, instead, you want to copy two or more application files onto a single disk, the Copy II Hard Disk application can back up a number of popular copy-protected applications onto a hard disk,

RAM disk, 400K or 800K floppies. (See instructions on Copy II Hard Disk for more information.)

Notes on Backing Up Disks

When backing up a protected disk, the copy may run normally even if an error occurred while copying. Conversely, it's possible for a backup to fail even if there were no errors during copying. This is because of the complicated protection methods used on some disks. The best test in every case is to simply try running the program to see if it works.

Possible Errors

When the Sector Copy method is selected:

R Read error

If this happens on every track, it means the original disk is probably blank.

If this happens on only one or two tracks, then a portion of the disk may be copy-protected, or there may simply be a problem on that part of the disk.

W Write error

This means the duplicate disk probably isn't formatted correctly on every track. Try Sector Copy with Format.

V Verify or "Unable to format" error

This usually indicates some kind of media problem with the duplicate disk. You should try a different disk.

When the Bit Copy method is selected:

R Read error

Means that Copy II is having difficulty making sense of this track. Copy II will do its best to correctly write the track onto the duplicate disk anyway.

This also occurs if the track is completely blank (has never had any information written onto it).

V Verify or "Unable to format" error

This usually indicates some kind of media problem with the duplicate disk. You should try a different disk.

L Keep Track Length error

Means that Copy II could not maintain the track length on the duplicate disk after several tries.

S Synchronize Tracks error

Only occurs if the Synchronize Tracks option was selected. This usually means that track 0 hasn't been copied onto the duplicate disk yet. If you're copying different ranges of tracks, and using the Synchronize Tracks option, be sure to copy the range that includes track 0 first.

Using Sector Copy with Bit Copy

Most Macintosh applications on the market today use a strange copy-protection format on only a few tracks of the disk. The rest of the disk is usually in a standard Macintosh format. Then when you start up the application, it begins by checking those strange tracks to make certain they haven't been changed at all.

What this means is that you can often use the Sector Copy method to make a fast, reliable copy of most of the tracks on a disk. If you copy a protected disk with Sector Copy and get Read errors on only one or two tracks, first try the backup. If that doesn't work, then go back and use Bit Copy to recopy just the bad tracks back onto the same duplicate disk. The backup may now work, and the copying was faster since Sector Copy was used for most of the disk.

A Checklist

A few commercial software products use particularly nasty protection schemes which a straightforward Bit Copy may not duplicate correctly. Here is a checklist of things to try in backing up these disks.

1. Refer to the Backup List on your Copy II disk to see if there are any special instructions for the program you are copying. Often these special instructions provide the only way to successfully make a backup of that particular program.
2. Next try copying using Bit Copy, without changing any options.

3. If that copy doesn't work correctly, try Sector Copying the disk. Then, if there are errors on any tracks, recopy just those tracks onto the same duplicate disk using Bit Copy. (The Start Track and End Track options let you select a single track or a range of tracks to copy.)
4. Try recopying those same tracks again using Bit Copy, after selecting Keep Track Length from the Options menu.
5. Try copying the entire disk using Bit Copy, after selecting Synchronize Tracks and/or Keep Track Length from the Options menu.

If none of these suggestions work, you might want to write us a quick letter about it, so we can continue to improve our product. Also, if one method for backing up a disk worked particularly well for you, you might want to let us know about that, too. Please include:

- The name of the program you were copying
- The publisher's name
- The version number, if any
- What you tried
- Exactly what happened if the backup didn't work.

Address your letter to:

Central Point Software, Inc.
15220 NW Greenbrier Parkway, Suite 200
Beaverton, OR 97006

Track Editor

The Track Editor is a special feature of Copy II which enables you to repair damaged sectors, and allows technical users to find and examine copy-protected sectors. The Track Editor reads and displays data contained on each track of a disk.

About Recovering Using Resource Forks

All levels of users can easily use the Track Editor to repair damaged sectors and to recover data on those damaged sectors. More advanced users may want to use the Track Editor to perform additional sector repairs beyond the scope of the built-in checksum recalcuator.

The Track Editor documentation has two parts:

- **Repairing Damaged Sectors and Recovering Data**
This section gives the basic steps for repairing damaged sectors and recovering data from those sectors.
- **The Track Editor (for Technical Users)**
This section is for the more technical user who wants to perform additional sector repairs and wants to know how Macintosh disks are recorded.

We recommend that you use the Track Editor to read off the locked original disk, and write onto a copy. If you write only to the copy, you are free to try something else if your first attempt at a repair doesn't succeed.

Note: Whenever you select the write option of the Track Editor, confirm that you are writing the copy, **not** the original disk.

Do not use the Track Editor to "repair" damaged tracks on a copy protected disk. Attempting to "repair" a copy protected track will probably modify the data in the track and make the disk unusable.

Repairing Damaged Sectors and Recovering Data

Finding and repairing damaged sectors is easy with FastCopy's Track Editor. To find and repair damaged sectors you perform the following tasks:

1. Lock the damaged disk, then copy it with Copy II.
2. Determine the bad block, track, and sector number of the damaged disk.
3. Start the Track Editor.
4. Read the track off of the original and analyze it.
5. Doublecheck that the error is on that track, using the Inspect Track command.
6. Display the block.
7. Correct the error.
8. Write the corrected information to the copy, **not** to the original damaged disk.

The following example walks you through the procedures for finding and repairing damaged sectors.

Example – Repairing a Damaged File

In this example, let's suppose an important file on one of your disks has become unreadable. You would perform the following steps to repair the problem:

Caution: Copying and moving track data from one disk to another is possible only when both disks are of the same type (400K to 400K, or 800K to 800K). Mixing disk types renders the data unreadable by any program.

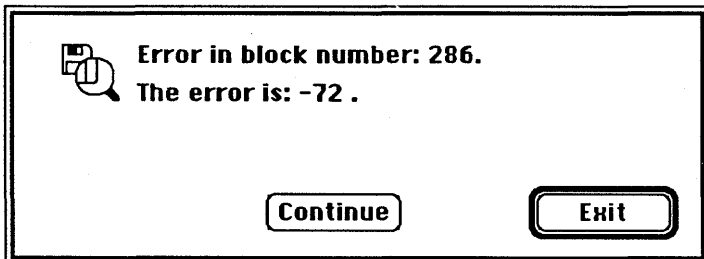
To copy the original disk:

1. Start Copy II by double clicking on the Copy II icon.
2. Click Start.
3. Lock the disk with the damaged block and insert it into the disk drive.
Copy II reads the disk. Wait for Copy II to eject the original disk.
4. Insert a blank disk.
Use this copy for all further editing steps.
5. Choose **Quit** from the Control menu.

To find the damaged block:

1. Start MacTools by double clicking on the MacTools icon.
2. Insert the original disk with the damaged block. (Make sure this disk is locked.)
3. Select the **Verify Disk** command from the Disk Menu.
This command scans the disk for errors.

As MacTools verifies the disk, you see a message similar to:



This tells you in which block the error occurred and the type of error.

4. Using the "Track Sector Lookup Table" in Appendix A, refer to the table for your disk (400K or 800K). Find the

block number in the chart, then look to the left for the track number and to the top for the sector number.

On the 400K disk used in this example, block 286 is track 24, sector 6.

5. Exit MacTools.
Select the **Quit** command from the Control Menu.

Note: The following procedures describe how to correct error ID numbers -69 and -72 only. If you get a different error ID number, see the section "The Track Editor (for Technical Users)."

To Start the Track Editor:

1. Start the Copy II program by double clicking on the Copy II icon.
2. Select the **Track Editor** option on the Copy II startup screen.
3. Click the Start button.

When the Track Editor begins, the display shows the first track and side of the disk in the original drive. The default for the Track Editor display is the last track number and side selected. For information about relating tracks to sectors and blocks, see the "Track Sector Lookup Table" in Appendix A.

Track Editor									
Vol: System Disk		Size: 800K		Drv: Internal		Spd: 8mHz			
0000:	9C	B7	D7	B9	EF	E9	AD	FF	97
0010:	A5	BB	EB	AB	AD	FF	FF	9D	CE
0020:	B3	CE	BC	AD	FE	FD	F6	CE	FB
0030:	AD	BF	D3	DF	CD	FD	FF	DF	CB
0040:	CF	FA	CF	FD	9B	B3	BC	BC	97
0050:	9D	B3	E6	A6	ED	F6	FD	EE	FB
0060:	F5	FC	E9	B3	FD	DF	AB	F9	D6
0070:	F7	EB	B9	AC	BA	EC	F5	CB	EB
0080:	9E	9D	FC	CD	BB	D6	BF	BC	BE
0090:	DA	AF	E5	AB	9F	F6	FD	BD	96
00A0:	B2	F7	E6	97	CF	FA	E6	9F	BF
00B0:	E7	ED	E7	EF	B9	CB	F4	EC	AD
00C0:	BD	B5	AB	BF	EA	BF	B3	B9	B4
00D0:	B6	DB	A7	DA	FC	BF	CE	B3	B5
00E0:	EA	9D	B6	DF	EA	ED	B7	DA	9F
00F0:	9B	AC	F6	B6	CB	9E	FC	DC	D3

Track: 0
Side: A

Track Length: 0

Track Start: 0000

Track End: 7130

Write Track From: 0000

The Track Editor screen shows the raw data read off the disk. For more information about the screen display, see the "Track Editor for Technical Users" section.

To read the track that contains the damaged block:

1. Confirm that you are reading the disk with the bad block. Does the name at the top match the disk name? Is the disk locked?
 - If it doesn't match, eject the current disk by pressing **Command+E**. Set aside the ejected disk and insert the copy of the bad disk.
 - If the name matches the copy of the bad disk, proceed with the next step.
2. Select the **Read Specific Track** command from the View Commands menu.
3. Type the track number in the edit box. In this example, 24.

**Type in TRACK NUMBER (0-79) and select the
SIDE you wish to read.**

 ☒ A ☐ B

4. Click OK.
5. Select the **Analyze Track** command from the View Commands menu. The track editor selects the beginning and the end track length and marks it for the track.

Track Editor			
Vol: Demo	Size: 400K	Drv: Internal	Spd: 8mHz
0D10: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF			Track: 24 Side: A Track Length: 8491 Track Start: 0D98 Track End: 2E38 Write Track From: 0D0D
0D20: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF			
0D30: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF			
0D40: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF			
0D50: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF			
0D60: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF			
0D70: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF			
0D80: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF			
0D90: FF FF FF FF FF FF FF FF D5 AA 96 BD 96 96 9A BF			
0DA0: DE AA FF FF FF FF FF FF D5 AA AD 96 96 96 96 96			
0DB0: 96 96 96 96 96 96 96 96 96 96 96 96 96 96 96			
0DC0: 96 96 96 96 96 96 96 96 96 96 96 96 96 96 96			
0DD0: 96 96 96 96 96 96 96 96 96 96 96 96 96 96 96			
0DE0: 96 96 96 96 96 96 96 96 96 96 96 96 96 96 96			
0DF0: 96 96 96 96 96 96 96 96 96 96 96 96 96 96 96			
0E00: 96 96 96 96 96 96 96 96 96 96 96 96 96 96 96			

Track Editor screen after Analyze Track

To double check that the error is on that disk:

1. Select the **Inspect Track** command from the View Commands menu.

Copy II displays a screen verifying the error and its location. Make sure that the sector number you got from the "To find the damaged block" procedure is the bad sector.

Track Inspection									
Address Field						Data Field			
Track	Sector	Side	Interleave	Sides	Checksum	Sector	Checksum		
24	0	A	2	DS	OK	0	OK		
24	6	A	2	DS	OK	6	BAD		
24	1	A	2	DS	OK	1	OK		
24	7	A	2	DS	OK	7	OK		
24	2	A	2	DS	OK	2	OK		
24	8	A	2	DS	OK	8	OK		
24	3	A	2	DS	OK	3	OK		
24	9	A	2	DS	OK	9	OK		
24	4	A	2	DS	OK	4	OK		
24	10	A	2	DS	OK	10	OK		
24	5	A	2	DS	OK	5	OK		

OK

- Click OK to exit the display.

To display the specific block:

- Select the **Find Sector** command from the View Commands menu.
- Type the sector number in the edit box. In this example, 6.
- Click OK.

What sector do you wish to find? (0-10)

6

OK

Cancel

To correct a Data Checksum error (error #72):

1. In the track editor display, position the cursor on any data byte in the sector (anywhere after the D5 AA AD—refer to the Sector Diagram in the “Track Editor for Technical Users” section).

Track Editor			
Vol:Demo	Size:400K	Drv:Internal	Spd:8mHz
1010: 96 96 96 96 96 96 96 96 96 96 96 96 96 96 96 96	↑ Track: 24 Side: A Track Length: 8491 Track Start: 0D98 Track End: 2E38 Write Track From: 0D0D ↓		
1020: 96 96 96 96 96 96 96 96 96 96 96 96 96 96 96 96			
1030: 96 96 96 96 96 96 96 96 96 96 96 96 96 96 96 96			
1040: 96 96 96 96 96 96 96 96 96 96 96 96 96 96 96 96			
1050: 96 96 96 96 96 96 96 96 96 96 96 96 96 96 96 96			
1060: 96 96 96 96 96 96 96 96 96 96 96 96 DE AA FF FF FF			
1070: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF			
1080: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF			
1090: FF FF D5 AA 96 BD 9F 96 96 9A CD DE AA FF FF FF FF			
10A0: FF FF D5 AA AD 9F 96 96 96 96 96 96 96 96 96 96			
10B0: 96 96 96 96 96 96 96 96 96 96 96 96 96 96 96 96			
10C0: 96 96 96 96 96 96 96 96 96 96 96 96 A7 96 96 96 96			
10D0: 96 96 96 96 96 96 96 96 96 96 96 96 96 96 96 96			
10E0: 96 96 96 96 96 96 96 96 96 96 96 96 96 96 96 96			
10F0: 96 96 96 96 96 96 96 96 96 96 96 96 96 96 96 96			
1100: 96 96 96 96 96 96 96 96 96 96 96 96 96 96 96 96			

Cursor in data sector

2. Select the edit mode by clicking the mouse button on the data byte.

3. Select the **Recalculate Checksum** command from the View Commands menu.

Copy II recalculates the data checksum and places the correct value in the buffer. You should skip the next section and proceed "To write the corrected information to the disk."

To correct an Address Checksum error (error #-69):

1. In the track editor display, position the cursor on any byte in the sector ID, or address (anywhere after the D5 AA 96—refer to the Sector Diagram in the "Track Editor for Technical Users" section).

Track Editor	
Vol: Demo	Size: 400K Drv: Internal Spd: 8mHz
1010: 96 96 96 96 96 96 96 96 96 96 96 96 96 96 96 96	Track: 24 Side: A
1020: 96 96 96 96 96 96 96 96 96 96 96 96 96 96 96 96	
1030: 96 96 96 96 96 96 96 96 96 96 96 96 96 96 96 96	Track Length: 8491
1040: 96 96 96 96 96 96 96 96 96 96 96 96 96 96 96 96	
1050: 96 96 96 96 96 96 96 96 96 96 96 96 96 96 96 96	Track Start: 0D98
1060: 96 96 96 96 96 96 96 96 96 96 96 DE AA FF FF FF	
1070: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF	Track End: 2E38
1080: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF	
1090: FF FF D5 AA 96 BD 9F 96 9A CD DE AA FF FF FF FF	Write Track From: 0D0D
10A0: FF FF D5 AA AD 9F 96 96 96 96 96 96 96 96 96 96	
10B0: 96 96 96 96 96 96 96 96 96 96 96 96 96 96 96 96	
10C0: 96 96 96 96 96 96 96 96 96 96 A7 96 96 96 96 96	
10D0: 96 96 96 96 96 96 96 96 96 96 96 96 96 96 96 96	
10E0: 96 96 96 96 96 96 96 96 96 96 96 96 96 96 96 96	
10F0: 96 96 96 96 96 96 96 96 96 96 96 96 96 96 96 96	
1100: 96 96 96 96 96 96 96 96 96 96 96 96 96 96 96 96	

Cursor in address header

2. Select the edit mode by clicking on one of the bytes in the sector ID.

3. Select the **Recalculate Checksum** command from the View Commands menu.

Copy II recalculates the address checksum and places the correct value in the buffer.

It is important to write the corrected information to the copy of the damaged disk, not the original disk. This prevents any possibility of further damage to the original disk.

To write the corrected information to the copy disk (two drives):

1. Insert the copy of the damaged disk.
2. Select the **Toggle Drive** command.
3. Check to see that drive specified in the message box is the correct drive. If not, change it to the correct drive.
4. Select the **Write The Track** command.
5. Click OK.

To write the corrected information to the copy disk (one drive):

1. Press **Command+E**. This ejects the current disk.
2. Insert the copy of the damaged disk.
3. Select the **Write The Track** command.
4. Click OK.

The Track Editor (for Technical Users)

This section is for more technical users of Copy II who want additional information about finding and examining damaged tracks. This section is also for users who want to better understand diskette encoding and copy protections.

How Data is Stored on Macintosh Disks

The data on a Macintosh disk is stored on 80 circular tracks numbered 0 to 79. Most Macintosh 3.5" disks are formatted double-sided, meaning they contain information on both the bottom and top surfaces of the disk media. Each of these 80 circular tracks is therefore divided into two "sides." The Macintosh 3.5" drive has two read/write heads, one for the top surface and one for the bottom. The drive can position these heads – as a unit – over and under any track on the disk.

The top and bottom surface of each circular track is further divided into several sectors, much like slices of a pie. Each sector stores 512 bytes of usable data and 12 adjacent "tag" bytes. These tag bytes contain information about the file using the sector.

The number of sectors per track is not constant across the disk, but varies depending on the track number. Because the outer tracks on the disk have a greater circumference than the inner tracks, they are used to store more data.

The tables in Appendix A list sectors (or blocks) per track for 400K single-sided and 800K double-sided disks, starting at the outside—largest circumference—track on the disk.

Blocks and sectors are actually the same thing, but numbered differently. An 800K, double-sided Macintosh disk contains a total of 1600 blocks or sectors. (A 400K, single-sided disk has 800 blocks, or sectors.) When thought of as sectors, they are numbered within each track and side. When thought of as blocks, they are numbered for the entire 800K disk: 0 to 1599 (0000 to 063F in hex).

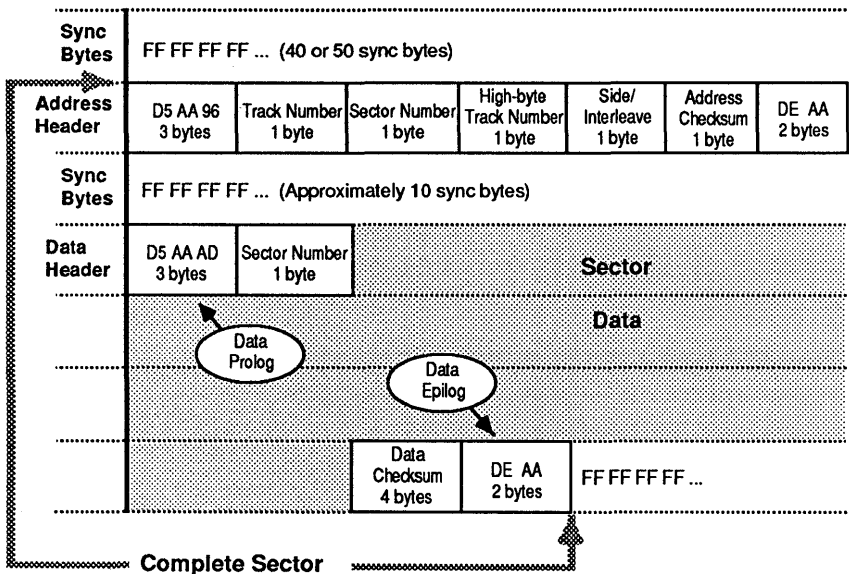
Here are some examples:

- Block 0000 is the same as track 00, side A, sector 0 on a 400K or 800K disk.

- Block 12 (000C) is the same as track 00, side B, sector 0 on an 800K disk.
- Block 12 (000C) is the same as track 01, side A, sector 0 on an 400K disk.

Because the number of sectors per track varies, the conversion from block numbers to equivalent track, side, and sector numbers is less than obvious. For details in converting block numbers, see the “Track Sector Lookup Table” in Appendix A.

The following sector diagram shows how sector data is organized on a Macintosh disk.

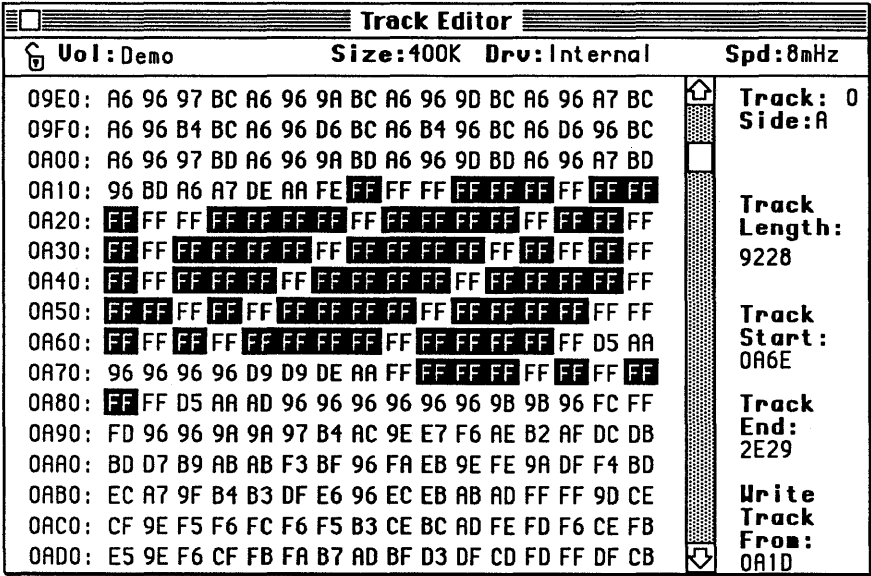


It's important to note here that you can't view the actual data written on a Macintosh disk. Since not all possible byte values can be read correctly, information being written to the disk must first be “encoded” in some way so that only valid bytes are written.

Data is encoded and written to a Macintosh disk using a procedure called 6-and-2 encoded storage. For details on this encoding procedure, see the "Byte Encoding Methods" tables in Appendix B.

Overview of the Track Editor

Below is the Track Editor screen. The following describes the screen and its components.



The Track Editor screen displays the bytes of information read off the disk. The bytes displayed in inverse are called Sync bytes. Sync bytes are unusual because they are 10 bits long, not the normal 8 bits.

The top of the screen displays the following information:

- **Lock icon**
Displayed only if the current disk is write-protected.
- **Vol:**
Displays the name of the current disk in the drive.

- **Size:**
Displays the current disk's size (400K or 800K).
- **Drv:**
Displays what drive the next Read or Write command will affect.
- **Spd:**
Displays what the Reference Clock speed is set to.

The right side of the Track Editor display shows track location and size information.

- **Track:**
Displays the current track number.
- **Side:**
Displays the current track side; A or B (400K disks are always side A).
- **Track Length:**
Displays how many bytes are on the track if an Analyze has been performed.
- **Track Start:**
Displays the track start address if an Analyze has been performed.
- **Track End:**
Displays the last byte of the track if an Analyze has been performed.
- **Write Track From:**
Displays where the write routine will write from if an Analyze has been performed.

The Edit Mode

Use the edit mode to edit selected bytes. You can also use the edit mode to:

- Set the start and end of the track.

- Set where the track is written from.
- Change a sync byte to a data byte.
- Change a data byte to a sync byte.

Once edited, the track can be written to a disk in any drive.

To edit the track data:

1. In the track editor display, move the cursor into the track display and select the byte you want to change by clicking on it. The selected byte is displayed in reverse video. Notice that the data is shown in hexadecimal numbering system format.
2. Edit the byte by typing any 8 bit hexadecimal value (0–9/A–F). Any other character is ignored. For help in translating hexadecimal to decimal, see the “Number Conversion Table” in Appendix C.

To undo your edits:

- Select the **Re-Read This Track** command.

This command re-reads the track. As long as you have not yet rewritten the track, you can undo all edits you have made.

Scrolling in the Edit Mode

In the edit mode, editing the last byte in the display causes the screen to automatically scroll down a line. The screen scrolls up a line when you press the backspace key with the cursor on the first byte in the display. When you select the Find String command, the first byte of the found string flashes when displayed.

Saving Edited Track Data

The track data you edit is saved in the track editor display buffer, but is not written to the disk. You have to save the edited track to disk with the Write The Track command. We strongly recommend writing to a copy of the original, not to the original.

To save an edited track to disk:

1. Select the **Write The Track** command.
Selecting this command displays a message asking if you want to write the track to the disk in the specified source drive.
2. Click OK to write the edited track to the drive it was read from.

To write the edited track to a different drive:

1. Select **Toggle Drive**.
This changes the selected drive (shown in the track editor display).
2. Select the **Write The Track** command.
3. Click OK to write the edited track to another drive.

Note: Editing the data in a sector causes the data checksum to be incorrect (bad). For information on checking the condition of data and header checksums, see the Inspect Track command. For information on correcting a bad checksum, see the Recalculate Checksum command.

Exiting the Edit Mode

To exit the edit mode:

- Press Return or Enter.

Track Editor commands

The Track Editor commands are contained in two menus: View Commands and Edit Commands. The commands and functions described in the following section enable you to find, view, edit, and write the data on any track of a program disk.

View Commands

The following section gives information about the specific View commands.

 Control	Options	View Commands	Edit Commands
		Read Specific Track	%R
		Read Next Track	%N
		Read Last Track	%L
		Re-Read This Track	%T
		Find string	%F
		Find next occurrence	%G
		Find sector	%Z
		Analyze Track	%A
		Inspect Track	%I
		Recalculate Checksum	%M
		Write The Track	%W
		Eject the Disk	%E
		Toggle Drive	%D

Read Specific Track

Reads any side of any track on the disk when you specify a track number, 0–79 decimal, and side, A or B. When reading 400K (single-sided) disks, the B-side selector button is disabled.

Note: The Read Specific Track command defaults to the last track read.

Once you specify the track number and select a side, the track editor reads the track into the display buffer and displays track data as raw data. Use the scroll bars to move through and display the track data.

Read Next Track

For 400K disks, this command reads the next track on the disk.

For 800K disks, this command reads the next side on the disk.

Read Last Track

For 400K disks, this command reads the previous track on the disk.

For 800K disks, this command reads the previous side on the disk.

Re-Read This Track

Reads and displays the current track. When you select this command, the track editor re-reads the current track and positions the display at the beginning of the display buffer.

Find String

Searches for a hexadecimal text string on the displayed track. The Find String command defaults to the last text string found.

Find Next Occurrence

Finds the next occurrence of the string found with the Find String command.

Find Sector

Finds and displays any sector on the track when you specify a sector number. The track editor displays the sector specified, or notifies you that it can't find the sector.

Analyze Track

Finds the beginning and end of the track, the track length, and where the track is written from.

Copy II locates the beginning of a track by searching for the data bytes immediately following the largest group of sync bytes on the track. Copy II then searches for a pattern matching these data bytes. When it finds the match, Copy II defines it as the end of the track.

When you select the Analyze Track command, the track editor performs the analysis and displays the track information.

- Track Length specifies the length of the track analyzed.
- Track Start and Track End specify the start and end of the track in the buffer. You may use the editing mode to set the start and end of the track and where the track is written from.

For detailed information on editing track data, see the section titled The Edit Mode.

Inspect Track

Selecting this command displays the following information for the current track:

- track number
- side A or B
- a list of all sector numbers
- sector interleave
- type of disk (single or double sided)
- condition of the address header and data checksums for each sector. The condition will be either "ok" or "bad."

Track Inspection							
Address Field						Data Field	
Track	Sector	Side	Interleave	Sides	Checksum	Sector	Checksum
24	0	A	2	DS	OK	0	OK
24	6	A	2	DS	OK	6	BAD
24	1	A	2	DS	OK	1	OK
24	7	A	2	DS	OK	7	OK
24	2	A	2	DS	OK	2	OK
24	8	A	2	DS	OK	8	OK
24	3	A	2	DS	OK	3	OK
24	9	A	2	DS	OK	9	OK
24	4	A	2	DS	OK	4	OK
24	10	A	2	DS	OK	10	OK
24	5	A	2	DS	OK	5	OK

OK

If the track editor is unable to locate a data field sector (for example, if a protection scheme has changed the data header), the condition of the data checksum will be flagged as "bad."

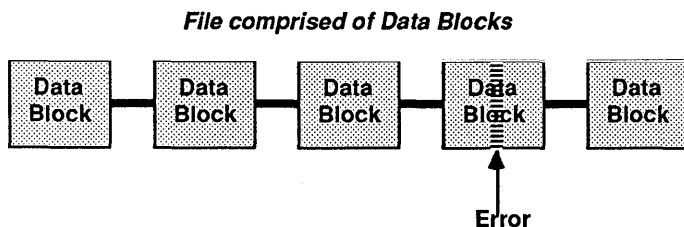
The Inspect Track command allows you to quickly inspect a track for incorrect checksums. Inspect Track also enables you to verify a disk error without having to exit Copy II and start the Verify option in MacTools.

Recalculate Checksum

Recalculates a bad checksum. If you have edited the data in a sector, or if the data on the disk has been electronically damaged, the checksum will be bad. Some applications won't load a file if it contains a bad checksum, or it will only load the data that isn't affected by the bad block. The Recalculate Checksum command enables you to repair the bad block and to recover most of an otherwise unloadable file.

The Recalculate Checksum command is most useful for recovering data for which MacTools has displayed error ID numbers -69 and -72. The Recalculate Checksum command minimizes the task of replacing bad data by enabling you to recover the entire file—possibly including some of the data in the bad block. For more information on error ID numbers, see the Error ID Numbers in the MacTools section of this manual.

For example, you have a file comprised of five blocks and an error occurs in the fourth block. You can use the Recalculate Checksum command to recover the data up to the error, possibly some of the data around the error, and all of the data in the fifth block.



To correct a Data Checksum error (error #-72):

1. In the track editor display, position the cursor on any data byte in the sector (anywhere after the D5 AA AD—refer to the Sector Diagram).
2. Select the edit mode by clicking the mouse button on the data byte.
3. Select the **Recalculate Checksum** command from the View Commands menu.

Copy II recalculates the data checksum and places the correct value in the buffer.

To correct an Address Checksum error (error #-69):

1. In the track editor display, position the cursor on any data byte in the sector ID or address (anywhere after the D5 AA 96—refer to the Sector Diagram).
2. Select the edit mode by clicking the mouse button on one of the bytes in the sector ID.
3. Select the **Recalculate Checksum** command from the View Commands menu.

Copy II recalculates the address checksum and places the correct value in the buffer.

Write The Track

Writes the modified track to the drive specified at the top of the display. After making changes to a track, this command lets you copy the track to another drive. Once copied, changes can be tested without corrupting the original version of the program.

Note: It is much safer to do this procedure with a copy of the original.

To write the track:

1. Make sure that the correct disk is in the drive before you write to it. If the wrong disk is present, eject it by pressing **Command+E**.
2. Select the **Write The Track** command.
Selecting the command displays a message asking if you want to write to the specified drive.
3. Click OK.

To write the modified track to a different drive:

1. Select the **Toggle Drive** command.
This changes the selected drive.

2. Select the **Write The Track** command.
3. Click OK to write the track to the new drive.

Eject the Disk

Ejects the disk in the selected drive.

Toggle Drive

Changes the drive selected for reading and writing data.

Edit Commands

The following section gives information about the specific edit commands.

Control	Options	View Commands	Edit Commands
			Display Track Start %J Display Track End %K
			Set Track Start %B Set Track End %H Set Byte to Write From %C
			Toggle Sync %S
			Toggle Ref. Speed %H ☒ Toggle Cleanup %O

Display Track Start

Moves the display window to the beginning of the track. When you choose this command, you see the address field and the first part of the data field for the first sector on the track.

Display Track End

Moves the display window to the end of the track. When you choose this command, you see the bottom half of the data for the last block on the current track followed by the sync bytes.

Set Track Start

Manually sets the start of the track. Technical users can use this command to mark a track for writing only a part of the track to a disk.

Set Track End

Manually sets the end of the track. Technical users can use this command to mark a track for writing only a part of the track to a disk.

Set Byte to Write From

Enables you to determine where a Write will begin.

Toggle Sync

Changes the current byte from 8 bit to 10 bit (sync bits are 10 bit bytes), or vice versa. Selected sync bytes appear reverse video – white on black.

Toggle Ref Clock

Allows you to change the reference clock rate and then read or write using the new setting.

The Diskette Controller chip (IWM inside the drive has an “internal data separator” which needs a “reference clock” to properly read data from the disk. The Macintosh allows setting this reference clock to either 7mHz or 8mHz.

Normally, the Macintosh sets the reference clock in the IWM to 8mHz, however some protected programs have one track (usually track 79) written with the IWM reference clock set to 7mHz. When a normal 8mHz read is then attempted, the information on the track has many incorrect values.

Use the Toggle Ref Clock command to change the reference clock speed in the IWM and then read or write at that speed.

Note: This reference clock rate is different than the disk drive speed. Also, as this option toggles an internal Copy II flag, it will have no effect on the displayed information for the track until you do a read or a write command.

Toggle Cleanup

Cleans the buffer after you perform a read.

While doing a read, the Copy II read routine decides if the byte read off the disk is an 8 bit byte or a 10 bit byte (sync byte) and then flags the byte in the buffer. Sometimes, due to the limits of the Macintosh hardware for measuring such small periods, the read routine makes a mistake in flagging a byte. Copy II has a built-in routine which clears these errors.

To see the track data as it was read from the disk without the cleanup, turn this option off.

Examining Protection Schemes

The following is an example procedure for examining a copy-protected disk. Also included are some examples of various protection schemes you may come across while examining copy protections.

Example procedure for examining a protected disk

The steps in the following example outline one approach you can take to examine copy protection.

1. Start MacTools and verify the protected disk.
2. Locate all errors on the disk, and note the error numbers and block locations.
3. Exit MacTools and start the Copy II Track Editor option.
4. Choose one of the errors and convert its block number to a track and sector location. See the "Track Sector Lookup Table" in Appendix A.
5. Use the track editor to read and display the track and sector.

Now, compare the sector with one from a file that you know to be correct.

Protection Schemes

Following are some examples of various protection schemes:

Example #1: MacTools gives error #-67 on every block on track 79.

Performing a Read Specific Track of track 79 shows a track with no sync gaps, and no address or data headers.

🍎 **Control Options View Commands Edit Commands**

Track Editor		
No Volume in drive	Drv:Internal	Spd:8mHz
0000: 9F FF FF FF FF D9 BE B4 9B B5 BC B7 FB FD FE FF		Track: 79
0010: FF DB FA D2 DD A9 F2 DF EF F3 FD FE FF DB FA D2		Side:A
0020: DD A9 F2 DF EF F7 FB FD FF B6 FA D2 DD A9 F2 DF		Track Length: 0
0030: E7 F9 FE FF FF DB FA D2 DC D4 BC B7 FB FD FE FF		
0040: FF DB FA D2 DD A9 F2 DF E7 FB FD FE FF DB FA D2		Track Start: 0000
0050: DD A9 F2 DF EF F3 FC FF FF DB FA D2 DC D4 BC B7		
0060: F9 FE FF FF FF DB FA D2 DD A9 F2 DF EF F7 F9 FE		Track End: 7130
0070: FF D9 BE B4 9B B5 BC B7 FB FC FF FF FF D9 BE B4		
0080: 9B B5 BC B7 FB FD FE FF FF DB FA D2 DD A9 F2 DF		Write Track From: 0000
0090: E7 F9 FE FF FF DB FA D2 DD A9 F2 DF EF F7 FB FD		
00A0: FF B6 FA D2 DD A9 F2 DF EF F3 FD FE FF DB FA D2		
00B0: DD A9 F2 DF E7 FB FD FE FF DB FA D2 DD A9 F2 DF		
00C0: EF F3 FC FF FF DB FA D2 DD A9 F2 DF EF F7 F9 FE		
00D0: FF DB FA D2 DD A9 F2 DF E7 FB FC FF FF DB FA D2		
00E0: DD A9 F2 DF EF F3 FC FF FF DB FA D2 DD A9 F2 DF		
00F0: EF F7 F9 FE FF DB FA D2 DD A9 F2 DF EF F3 FD FE		

8mHz track read

If you change the Reference Clock speed and then Re-read the track, you will see a repeating pattern throughout the read buffer.

Track Editor																						
No Volume in drive								Drv:Internal					Spd:7mHz									
0000: B7 D4 BC B7 F9 FE FF FF FF D9 BE B4 9B 9A 97 96 0010: FF FF FF FF FF D9 BE B4 9B 9A 97 96 FF FF FF FF 0020: FF D9 BE B4 9B 9A 97 96 FF FF FF FF FF D9 BE B4 0030: 9B 9A 97 96 FF FF FF FF FF D9 BE B4 9B 9A 97 96 0040: FF FF FF FF FF D9 BE B4 9B 9A 97 96 FF FF FF FF 0050: FF D9 BE B4 9B 9A 97 96 FF FF FF FF FF D9 BE B4 0060: 9B 9A 97 96 FF FF FF FF FF D9 BE B4 9B 9A 97 96 0070: FF FF FF FF FF D9 BE B4 9B 9A 97 96 FF FF FF FF 0080: FF D9 BE B4 9B 9A 97 96 FF FF FF FF FF D9 BE B4 0090: 9B 9A 97 96 FF FF FF FF FF D9 BE B4 9B 9A 97 96 00A0: FF FF FF FF FF D9 BE B4 9B 9A 97 96 FF FF FF FF 00B0: FF D9 BE B4 9B 9A 97 96 FF FF FF FF FF D9 BE B4 00C0: 9B 9A 97 96 FF FF FF FF FF D9 BE B4 9B 9A 97 96 00D0: FF FF FF FF FF D9 BE B4 9B 9A 97 96 FF FF FF FF 00E0: FF D9 BE B4 9B 9A 97 96 FF FF FF FF FF D9 BE B4 00F0: 9B 9A 97 96 FF FF FF FF FF D9 BE B4 9B 9A 97 96																	⬆ ⬇		Track: 79 Side:A Track Length: 0 Track Start: 0000 Track End: 7130 Write Track From: 0000			

7mHz track read

The repeating pattern in this example is:

\$9B 9A 97 96 FF FF FF FF FF D9 BE B4

This is the pattern the copy protection is looking for.

This is a case where the copy protection scheme uses the 7mHz reference clock on a track. When you try to read it with the normal 8mHz rate, the data is bad. But when you change the rate to 7mHz, it reads OK.

Copy II's bitcopy option automatically reproduces this track.

Example #2: MacTools verify option shows error #-70 on one or more blocks.

In this scheme, the normal data prolog bytes (\$D5 AA AD) are replaced by some other bytes. You will find the address prolog (D5 AA 96) and address epilog bytes (DE AA) followed by sync bytes (FF FF FF) followed by non-normal header bytes. (In the example shown, an AB CD AD.)

Control Options View Commands Edit Commands

The screenshot shows the MacTools Track Editor window. The title bar includes a menu icon and the text "Track Editor". Below the title bar, there are three status fields: "No Volume in drive", "Drv: Internal", and "Spd: 8mHz". The main area is a table of hex data organized into sectors (0DF0 to 0EE0). Several sectors contain "FF" bytes, which are highlighted with a black background. An arrow points from the text "Reversed Data bytes" to these "FF" bytes. On the right side of the window, there are track parameters: "Track: 49", "Side: A", "Track Length: 6922", "Track Start: 087C", "Track End: 2352", and "Write Track From: 0848".

Sector	Hex Data
0DF0:	EB EC BD F9 BC CD AC DB DB A7 AC D7 E5 FA F5 F2
0E00:	E6 F4 B6 E6 F5 DD 9E F9 9A E5 97 B4 BC DB CF 97
0E10:	D9 CE DB AF FF FD DF FE 9D E9 96 DE B3 FF D9 DD
0E20:	9F 9D AC BF F2 AD FB F9 EA D9 9B F9 97 AF A6 9D
0E30:	DC AB EB BA F2 E7 FB B2 FB BE AE DC 96 BC BC B5
0E40:	9F EE F6 BE D6 EB F2 96 FD E5 B9 E5 F9 EE DE AA
0E50:	FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
0E60:	FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
0E70:	FF FF FF FF FF FF FF FF FF FF D5 AA 96 EE 97 96
0E80:	9A EF DE AA FF FF FF FF FF FF FF AB CD AD 97
0E90:	96 96 96 96 AC BD CB 9B 96 96 D7 DC EB F5 DB D6
0EA0:	EC FA 96 EA ED E6 DD FF CE E6 AE FF F2 BA DB F9
0EB0:	CB CB 96 F7 F4 9F CF CE FF CD B6 E7 E7 E7 AC DB
0EC0:	FC AF 96 FA E9 BC A6 BC D7 EC EB BD AB BA AC B6
0ED0:	DE AF B7 B4 CB 9D 9E EA AE FE FA FE FD BA E9 A7
0EE0:	F7 E5 E7 EC EF AD DA B5 EA D3 ED BC F4 EC F5 DC

Reversed Data Prolog bytes

Copy II's bitcopy option automatically reproduces these reversed data headers.

Example #3: MacTools verify does not detect any errors.

In the example shown, the normal sync bytes (FF's) have been replaced with a different byte: AA's. This makes the sectors slightly unreliable (because the AA, as a sync byte, violates the GCR 6-and-2 encoding scheme) and the read routines on the protected disk simply double check that the bytes before the address and data prologs are AA's.

 **Control Options View Commands Edit Commands**

Track Editor

No Volume in drive

Drv:Internal

Spd:8mHz

1720:	F3 AC AB AE F3 A7 B6 AE DF AE F3 B6 DE AA FF B8	Track: 1 Side:A					
1730:	AA AA AA AA AA AA AA AA AA AA AA AA AA AA AA		Track Length: 9233				
1740:	AA AA AA AA AA AA AA AA AA AA AA AA AA AA AA			Track Start: 17AA			
1750:	AA AA AA AA AA AA AA AA AA AA AA AA AA AA AA				Track End: 3B49		
1760:	AA AA AA AA AA AA AA AA AA AA AA AA AA AA AA					Write Track From: 1738	
1770:	AA AA AA AA AA AA AA AA AA AA AA AA AA AA AA						
1780:	AA AA AA AA AA AA AA AA AA AA AA AA AA AA AA						
1790:	AA AA AA AA AA AA AA AA AA AA AA AA AA AA AA						
17A0:	AA AA AA AA AA AA AA AA AA AA AA D5 AA 96 97 96 96						
17B0:	9A 9B DE AA FF AA AA AA AA AA D5 AA AD 96 96 96						
17C0:	96 96 AC 9F A6 97 96 96 CD 9B AC DA E7 FF B5 A7						
17D0:	BE AF D7 B4 BE AF 97 D7 BF AF B5 9A BF AF D7 9D						
17E0:	BF AF 97 AB CB AF 97 B6 CB AF 97 DB CB AF B5 A7						
17F0:	CB AF D7 B4 CB AF 97 D7 CD AF B5 9A CD AF D7 9D						
1800:	CD AF 97 AB CE AF 97 B6 CE AF 97 DB CE AF B5 A7						
1810:	CE AF D7 B4 CE AF 97 D7 CF AF B5 9A CF AF D7 9D						

AA's in sync gaps

Example #4: MacTools verify does not detect any errors.

Using the normal Macintosh ROM format routines, the gap between the address header and the data field are usually 10 – 16 bytes long. In the example shown, the gap fields are all exactly 6 bytes long.

Control Options View Commands Edit Commands

Track Editor	
No Volume in drive	Drv:Internal Spd:8mHz
1A20: AD 9E B9 B7 AE 9E DB DD AE 9E B9 AF AF 9E DB BF	Track: 1 Side:A
1A30: AF 9E 9D F4 B2 9E B9 E6 B2 9E F3 B9 B2 9E DB E5	
1A40: B3 9E B9 B7 B4 9E DB DD B4 9E B9 AF B5 9E DB BF	Track Length: 9250
1A50: B5 9E 9D F4 B6 9E B9 E6 B6 9E F3 B9 B6 9E DB E5	
1A60: B7 9E B9 B7 B9 9E DB DD B9 9E B9 AF BA 9E DB BF	Track Start: 17A6
1A70: BA 9E 9D F4 BB B4 BB 9E F4 DE AA FF FF FF FF FF	
1A80: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF	Track End: 3B5A
1A90: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF	
1AA0: FF FF D5 AA 96 97 9F 96 9A 9E DE AA FF FF FF FF	Write Track From: 1738
1AB0: FF FF D5 AA AD 9F 96 96 96 96 AC 97 9A 9B 96 96	
1AC0: 9B B6 B4 F5 EE BE BB A7 FC BD DB DE CD F2 AE BE	
1AD0: DE B4 AC 9F 97 CB B4 AE E6 F3 D9 EA B2 D3 AC BA	
1AE0: BA FC 9E 97 CD 9F EC 9A F5 EB AF B4 B9 A7 F4 DF	
1AF0: CF E7 FF DB F5 EE E5 AD D7 EB F6 EA FF B5 DE DB	
1B00: FB EC DE F6 FA DE BD DA 96 B6 E7 F5 9B E7 DE BC	
1B10: FC E7 FB CF 9D DA DC FF FD DA BC FE FD DA F6 FC	

Small gap

When the copy protected program runs, it checks that all the gaps before data headers are exactly 6 bytes long.

Example #5: MacTools verify shows -67's on every sector on a track.

When the protected disk was created, a 64 byte pattern was written to cover the entire track. (All the valid 6&2 encoded byte values in ascending order.) The protection uses special "Key" bytes to mark where they started writing the track and where they finished writing the track. In the example shown the "key" bytes for the last bytes written to the disk are "D6 AB."

Control Options View Commands Edit Commands

Track Editor																
No Volume in drive					Drv:Internal					Spd:8mHz						
23B0:	D5	D7	D9	DA	DB	DC	DD	DE	DF	E5	E6	E7	E9	EA	EB	EC
23C0:	ED	EE	EF	F2	F3	F4	F5	F6	F7	F9	FA	FB	FC	FD	FE	FF
23D0:	96	97	9A	9B	9D	9E	9F	A6	A7	AA	AC	AD	AE	AF	B2	B3
23E0:	B4	B5	B6	B7	B9	BA	BB	BC	BD	BE	BF	CB	CD	CE	CF	D3
23F0:	D5	D7	D9	DA	DB	DC	DD	DE	DF	E5	E6	E7	E9	EA	EB	EC
2400:	ED	EE	EF	F2	F3	F4	F5	F6	F7	F9	FA	FB	FC	FD	FE	FF
2410:	96	97	9A	9B	9D	9E	9F	A6	A7	AA	AC	AD	AE	AF	B2	B3
2420:	B4	B5	B6	B7	B9	BA	BB	BC	BD	BE	BF	CB	CD	CE	CF	D3
2430:	D5	D7	D9	DA	DB	DC	DD	DE	DF	E5	E6	E7	D6	AB	97	FF
2440:	E7	E9	EA	EB	EC	ED	EE	EF	F2	F3	F4	F5	F6	F7	F9	FA
2450:	FB	FC	FD	FE	FF	96	97	9A	9B	9D	9E	9F	A6	A7	AA	AC
2460:	AD	AE	AF	B2	B3	B4	B5	B6	B7	B9	BA	BB	BC	BD	BE	BF
2470:	CB	CD	CE	CF	D3	D5	D7	D9	DA	DB	DC	DD	DE	DF	E5	E6
2480:	E7	E9	EA	EB	EC	ED	EE	EF	F2	F3	F4	F5	F6	F7	F9	FA
2490:	FB	FC	FD	FE	FF	96	97	9A	9B	9D	9E	9F	A6	A7	AA	AC
24A0:	AD	AE	AF	B2	B3	B4	B5	B6	B7	B9	BA	BB	BC	BD	BE	BF
											Track: 4 Side: A Track Length: 0 Track Start: 0000 Track End: 7130 Write Track From: 0000					

Repeating - Splice marked by key bytes

It is very hard to determine the track start and end. Copy II has been hard-coded to handle many of these protection schemes.

Example #6: MacTools verify shows error #-71.

In this scheme, the sector starts out looking normal – D5 AA AD data prolog bytes, followed by what looks like normal bytes. But then the sector hits some unusual bytes. What happened is that when the block was originally written, there was a zero byte written out. When the drive tries to read that byte back in, it will read it in different ways on different reads. Reading it as a zero byte will cause the hardware to “lose sync,” since it violates the GCR encoding rules. The protection scheme checks to make sure that, if it reads the block several different times, it gets several different checksum values returned.

Control Options View Commands Edit Commands

Track Editor	
No Volume in drive	Drv:Internal Spd:8mHz
22B0: FF DC FC 96 CB FE EB 9A EC B5 EA EF D6 9E CE CE	Track: 30 Side:A
22C0: EB DE F2 B4 D9 ED EE AF B9 B9 F4 D3 D3 BF ED D3	
22D0: DE AA FF FF FF FF FF FF FF FF FF FF FF FF FF	Track Length: 8419
22E0: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF	
22F0: FF FF FF FF FF FF FF D5 AA 96 CF 9A 96 9A CF DE	Track Start: 170F
2300: AA FF FF FF FF FF FF D5 AA AD 9A 96 96 96 96 96	
2310: 96 96 96 96 96 96 96 96 FF FF FF FF FF FF FF FF	Track End: 37B2
2320: FF FF FF FF FF FF FF FF FF FF FF FF FF FF F3	
2330: FF FF FF F3 FF F7 FF F5 FF FF FF FF FF FB FF FF	Write Track From: 16CF
2340: FF FC FF FF FF FF FF FF FF FF FF FF FF FF FF	
2350: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF	
2360: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF	
2370: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF	
2380: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF	
2390: FF FF FF FF FF FF FF FF FF FF FF FF FF FC FF FF	
23A0: FF FF FF FF FF FA FF FF FF FF FF FC FF FC FF FF	

Zero in sector

Example # 7: MacTools verify shows no errors.

A normal data field is the D5 AA AD prolog, followed by the sector number, followed by 698 bytes of encoded data, followed by 4 checksum bytes, followed by a DE AA. In this scheme, two extra bytes are attached to the end of every data epilog (DE AA BB AA). Then, when the program runs, it double checks that the extra bytes are at the end of every sector it reads.

Control Options View Commands Edit Commands

The screenshot shows the MacTools Track Editor window. The title bar is "Track Editor". The status bar at the top shows "No Volume in drive", "Drv: Internal", and "Spd: 8mHz". The main window displays a list of sectors from 16D0 to 17C0. Each sector is represented by a row of hexadecimal values. The sectors 1720 through 17C0 are highlighted in black, indicating they are the current track. The track information on the right shows "Track: 1", "Side: A", "Track Length: 9245", "Track Start: 1790", "Track End: 3B40", and "Write Track From: 1723". A line points from the text "Extra bytes after data epilog bytes" to the extra bytes (DE AA BB AA) at the end of each sector.

Address	Hex Data
16D0:	E9 BB 9F FB BD BB 9F E7 EE BC 9F CB DA BD 9F FB
16E0:	9F BD 9F E7 AF BE 9F AD CB BF 9F AD F5 BF 9F CB
16F0:	E9 BF 9F FB BD BF 9F E7 EE CB 9F CB DA CD 9F FB
1700:	9F CD 9F E7 AF CE 9F AD CB CF 9F AD F5 CF 9F BD
1710:	E9 CF EA CF 9F E9 DE AA BB AA FF FE FF FF FF FF
1720:	FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
1730:	FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
1740:	FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
1750:	FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
1760:	FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
1770:	FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
1780:	FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
1790:	D5 AA 96 97 96 96 9A 9B DE AA FF FF FF FF FF
17A0:	D5 AA AD 96 96 96 96 96 96 96 96 96 96 96 96
17B0:	96 96 96 96 96 96 96 96 96 96 96 96 96 96
17C0:	96 96 96 96 96 96 96 96 96 96 96 96 96 96

Extra bytes after data epilog

Copy II's bitcopy option automatically reproduces these extra bytes.

Example #8: MacTools verify shows no errors.

The very last block of this disk contains a very special set of bytes. When you read it in the Track Editor, you will see 96 bytes, then at the end of the sector you will see about 150 bytes of E7's. The protection scheme is complicated in that the first part of the E7's are not all 8-bit bytes. They are sometimes 10-bit bytes (Sync) and 9-bit bytes (short sync). The Track Editor will sometimes display 9-bit bytes as 10-bit sync, and sometimes the track editor will display the 9-bit byte as an 8-bit byte.

Control Options View Commands Edit Commands

Track Editor	
No Volume in drive	Drv:Internal Spd:8mHz
24D0: 96 96 96 96 96 96 96 96 96 96 96 96 96 96 96 96	Track: 79 Side:A
24E0: 96 96 96 96 96 96 96 96 96 96 96 96 96 96 96 96	
24F0: 96 96 96 96 96 96 96 96 96 96 96 96 96 96 96 96	
2500: 96 96 96 96 96 96 96 96 96 96 96 96 96 96 96 96	
2510: 96 96 96 96 96 96 96 96 96 96 96 96 96 96 96 96	Track Length: 6455
2520: E7 E7 E7 E7 E7 E7 E7 E7 E7 E7 E7 E7 E7 E7 E7 E7	
2530: E7 E7 E7 E7 E7 E7 E7 E7 E7 E7 E7 E7 E7 E7 E7 E7	Track Start: 0D1B
2540: E7 E7 E7 E7 E7 E7 E7 E7 E7 E7 E7 E7 E7 E7 E7 E7	
2550: E7 E7 E7 E7 E7 E7 E7 E7 E7 E7 E7 E7 E7 E7 E7 E7	Track End: 25C3
2560: E7 E7 E7 E7 E7 E7 E7 E7 E7 E7 E7 E7 E7 E7 E7 E7	
2570: E7 E7 E7 E7 E7 E7 E7 E7 E7 E7 E7 E7 E7 E7 E7 E7	Write Track From: 0C8C
2580: E7 E7 E7 E7 E7 E7 E7 E7 E7 E7 E7 E7 E7 E7 E7 E7	
2590: E7 E7 E7 E7 E7 E7 E7 E7 E7 E7 E7 E7 E7 E7 E7 E7	
25A0: E7 E7 E7 E7 E7 E7 E7 E7 E7 E7 E7 E7 E7 E7 E7 E7	
25B0: E7 E7 E7 E7 E7 E7 BC ED B4 EF DE AA FE FF FF FF	
25C0: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF	

96-E7 on last sector of disk

Copy II is hard-coded to handle this scheme.

Copy II® Hard Disk



Copy II® Hard Disk

Copy II Hard Disk

Copy II Hard Disk is an application on your Copy II disk that allows you to transfer some copy-protected software to your hard disk, RAM disk, 800K HFS disk, or 400K MFS disk. All hard disk and RAM disk brands are supported. Not all protected software, however, can be transferred. Copy II Hard Disk is updated often to support additional protected programs. You can choose the option "Copyable Programs" from the Information menu to see what programs Copy II Hard Disk can transfer.

System Requirements

Copy II Hard Disk runs on any of the following machines with System Version 3.2 or higher:

- Macintosh 512KE
- Macintosh Plus
- Macintosh SE
- Macintosh II

MultiFinder™

Copy II Hard Disk is compatible with MultiFinder. Copy II Hard Disk will use all available memory for the copy process, so if you turn RAM cache off before you start, the copy process will be faster.

Installing Copy II Hard Disk

There are no special requirements for installing Copy II Hard Disk. It can be copied to a floppy or hard disk in the same way as any other program.

Hard disk installation

1. Insert the program disk and double-click on its icon. This opens the program disk window.
2. Drag the Copy II Hard Disk icon onto the hard drive window.

Note: If you are copying several applications onto your hard disk at once, **do not** copy the System Folder onto the hard disk. Your hard disk system will start to misbehave if you install multiple copies of the System and Finder by mistake.

Backing up on a System disk

We recommend you make a copy of Copy II Hard Disk on a disk with a System folder. Store the original program disk in a safe place.

Using Copy II Hard Disk

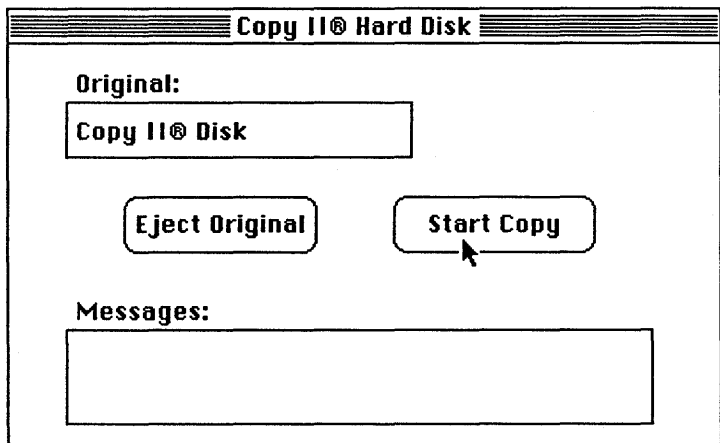
Before starting Copy II Hard Disk, you must have already turned on the Macintosh and your hard disk, and performed whatever steps are required for the Macintosh to recognize and work with the hard disk. We recommend that you create a new folder for each program you wish to transfer to the hard disk. (Some older MFS hard disks are segmented into “volumes.” If your hard disk is one of these, you may want to create a new volume for each program, and make sure it is “mounted.”)

To use Copy II Hard Disk:

1. Double-click the Copy II Hard Disk icon.
This starts the Copy II Hard Disk program.



After showing an important notice, the Copy II Hard Disk main screen will appear.



The first thing to notice is the menu bar at the top of the screen. In the "Information" menu is an item called "Copyable Programs." To see a list of the programs that can be transferred to hard disk, choose the Copyable Programs item from the Information menu. When you later want to leave the Copy II Hard Disk application, choose the "Quit" option from the "Control" menu.

If you started Copy II Hard Disk from your Copy II disk in the internal drive, the Original Volume will display "Copy II Disk." If you started it from the hard disk, the Original Volume will most likely be blank, or will contain the name of whatever disk is in the internal drive.

The disk to be copied needs to be in the Mac's internal drive. If another disk is already in the drive, remove it now by clicking on the "Eject Original" button. Insert the new disk into the internal drive. The disk's name will be shown in the Original Volume box. In the above example, this is the Copy II program disk.

Once this is done, click the "Start Copy" button. (The Macintosh may ask you to swap disks. Don't worry; Copy II Hard Disk will make sure it has the correct disk before it begins the copy.) A dialog will appear for you to choose where to transfer the protected

application. The actual appearance of the dialog depends on which file system (HFS or MFS) you are working with. You'll notice that it is similar to the usual "Save" dialog you see in many other applications, except that there is no space to enter a filename. This is because Copy II Hard Disk will be copying a number of files, keeping their original names.

Click on the "Drive" and "Eject" buttons to select which drive or volume you want to copy to. (If you're using HFS, you can also select which folder to copy into.) If you want to copy to an 800K diskette, simply select it as the destination volume. When you have the proper volume/folder selected, click on "Continue."

The copy process itself will take from a few seconds to a couple of minutes as it moves all the application and data files from the Original Volume to the destination volume or folder you've selected. When it is done, you will see the message "Copy Complete!"

Important Considerations

Copy II Hard Disk will not automatically transfer files normally found in the system folder (i.e. System, Finder, Desktop, Imagewriter, Clipboard, Scrapbook, etc.). This is done to conserve space (as it is not necessary to have many copies of the same files on the hard disk) and to avoid problems with certain brands of hard disks that get upset about having "unpatched" versions of the system files around.

However, in some cases it is helpful to transfer these files to the hard disk volume. Some applications, such as Jazz, require their own "patched" system files in order for certain features of the application to work right. If an application does need a special system file, hopefully a note in its manual will mention this. You can then use either the Finder desktop or MacTools' Copy Files option to copy system files from the original disk to the hard disk volume, if necessary...except that: Some hard disks also need their own special system files to operate correctly. If you replace the hard disk's system file with another, the hard disk may develop problems working with files.

In the case of Jazz, you can get around this problem: After you've used Copy II Hard Disk to move Jazz to a new hard disk volume or folder, copy the hard disk's system files into the volume or folder.

Then use the "Jazz System Update " application (as described in the "Jazz Update Sheet" that accompanied your Jazz package) to modify the system files on the new hard disk volume or folder.

There are a few applications which Copy II Hard Disk can back up to another 3.5 inch disk, but not to a hard disk. These applications have inherent disk-access limitations, which, unfortunately, prevent them from working correctly from a hard disk.

Occasionally you may find that Copy II Hard Disk won't successfully transfer a program to hard disk, even if the program is listed as one of the "Copyable Programs." Keep in mind that the software publishers who copy-protect their products will sometimes – without fanfare – change the protection scheme used on the disk. When this happens, the methods used by Copy II Hard Disk may not work with the new scheme. Central Point Software periodically updates Copy II Hard Disk to work with new programs and new protection schemes.

If there is a program you'd like to transfer to a hard disk that Copy II Hard Disk cannot handle, you might want to write us a quick letter to let us know about it, so we'll know which products are in demand. If it was listed as a "Copyable Program," also let us know what happened when you tried to use the hard disk backup. Address your letter to:

Central Point Software, Inc.
15220 NW Greenbrier Parkway, Suite 200
Beaverton, OR 97006

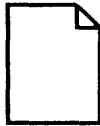
MacTools®



MacTools®



CPSDeleteTracking



CPS TagFix

Introduction to MacTools

This manual describes MacTools, a disk and file utility program for the Macintosh computer. MacTools does many of the same things the Finder does, including copying, renaming, and deleting files (documents and applications) or entire disks. MacTools provides these features as pull-down menu options. To select which files you want to work with, you can click on the files with the mouse, or use the Select Files option to select a number of files at once.

In addition, MacTools provides several useful features not found in the Finder. MacTools can often recover files that have been accidentally deleted, and can repair some damaged disks. It can make files “invisible,” so that they don’t appear at all when you’re in the Finder, and can “lock” files so they can’t be renamed or deleted.

MacTools includes these features:

- Copy files
- Copy disk
- Rename files
- Rename disk
- Verify that a file has no errors
- Verify that a disk has no errors
- Format a disk
- Delete files
- Lock and unlock files
- Make files visible or invisible to the Finder
- Protect or unprotect files from normal copying
- Change the ‘startup’ application on a disk to something other than the Finder
- Recover deleted files and repair some damaged disks
- Look at or change the information stored on disk
- Print a list of files on the disk

This manual is intended to give you a quick start on the features of MacTools. The first portion, “Using MacTools,” tells you how to start up MacTools.

The five main menus in MacTools are:

- Disk Options
- File Options

- Control Options
- ViewEdit Options
- Miscellaneous Options

Each of the menus has its own section. These sections give a step-by-step description of how to use the basic features of MacTools.

The more complex “ViewEdit” and “Undelete Files” options are discussed next. The “Notes” section at the end gives you a few helpful hints about MacTools, including information about hard disks.

A short note about the two file systems for the Macintosh – the original Macintosh File System (MFS) and the Hierarchical File System (HFS): On the original MFS system, folders were a convenient illusion created and maintained by the Finder. The Finder was responsible for storing the names and positions of the folders in an invisible file called “DeskTop.” These folders were “transparent” to most Macintosh applications, including MacTools. On the newer HFS system, folders are real. You are able to store documents inside a folder, and unless you open the folder, you never “see” the document. Applications recognize these folders and allow you to open or close them to select where you wish to store your file.

A few words need to be said about copy-protected files. Under the copyright law, you are allowed to make backups of software for your own use, so that if a disk is damaged or accidentally erased, the information is not lost. You are not allowed to give or sell copies of copyrighted software to others.

System Requirements

MacTools runs on any of the following machines with System Version 3.2 or higher:

- Macintosh 512KE
- Macintosh Plus
- Macintosh SE
- Macintosh II

MultiFinder™

MacTools is fully compatible with MultiFinder.

Installing MacTools

MacTools has three parts:

- The MacTools application. This should be installed on your hard disk, although it will run from a floppy.
- The Delete Tracking INIT. This should be installed in the System Folder of your system disk if you want MacTools to support file undeletion on floppy or hard disks.
- The CPSTagFix INIT. This should be installed in the System Folder of your system disk if you want MacTools to support file undeletion on floppy disks.

The CPSTagFix program corrects a bug in Macintosh 512KE and Mac Plus tag creation, and speeds up the upper drive in the Macintosh SE.

To install MacTools on your system

1. Insert the program disk and click on its icon. This opens the program disk window.
2. Drag the MacTools icon onto the hard drive window.
3. Drag the Delete Tracking icon and the CPSTagFix icon from the program disk into the System Folder of your system disk. **Do not** copy the System Folder of the program disk.

Using MacTools

Starting MacTools:

1. The MacTools icon resembles a disk under a magnifying glass. Open MacTools by double-clicking the icon or selecting Open from the File menu.
2. After a moment, the Disk Window will appear. MacTools is now ready to work on your disk.

The Disk Window

You'll see a display similar to the following:

		Hard Disk				
		Amt. Used: 6936K		Amt. Free: 12235K		
Size	Name	Modified Date	Prtct	Lckd	Invis	
--	Apple Utilities	Mon, Aug 22, 1988	--	--	--	⬆
253K	C	Sat, Oct 24, 1987	☐	☐	☐	
--	CPS Applications	Thu, Sep 1, 1988	--	--	--	
10K	CPSDeleteInfo	Thu, Sep 1, 1988	☐	☐	☒	
32K	Desktop	Thu, Sep 1, 1988	☐	☐	☒	
	Manual	Thu, Sep 1, 1988	--	--	--	
--	Manual @ 72%	Thu, Aug 25, 1988	--	--	--	
350K	Micro	Mon, Aug 1, 1988	☐	☐	☐	
5K	MsgDialogArtWork	Thu, Sep 1, 1988	☐	☐	☐	
5K	Program	Fri, Jul 15, 1988	☐	☐	☐	
9.5K	Screen 0	Thu, Sep 1, 1988	☐	☐	☐	⬇
6.5K	Screen 1	Thu, Sep 1, 1988	☐	☐	☐	⬇

This is the main MacTools display, which shows you information about the disk currently in the drive.

Title Bar

The top of the window is called the title bar. Within the title bar are three items that provide information about the drive, the disk name, and its format:

- The icon just left of the title indicates either an internal or external 3.5 inch drive, any hard disk volume, or an open folder on an HFS disk.
- The center of the title is the name of the disk or the name of the open folder.
- If there is a box around the title, then the disk is an HFS disk. If the title appears without a box around it, then the disk is MFS. (See section later on Open Folder for more information about the HFS title box.)

Underneath the title bar are three more items:

- A lock icon, which shows whether or not the disk is write-protected.
- The amount of disk space that is used.
- The amount of space that is free.

Below the line of disk information is a list of all the files and folders on the disk or inside the folder. Each line includes:

- The size of the file. (Note: folders do not take up separate space on the disk, so the size field is replaced by "--".)
- An icon representing whether the entry is a folder, an application, or a document.
- The name of the file.
- The date the file was last modified.
- Boxes which show if the file is currently
 - protected (Prtct),
 - locked (Lckd), or
 - invisible (Invis).

(Note: these status flags make no sense when applied to a folder, so they have been replaced with "--".)

When the mouse is pointing inside the window, the pointer appears as a hand. With the hand pointer, you can select which files you want to

work with. Outside of the window, the pointer becomes the usual arrow.

If there are more files on the disk than will fit in the window, the scroll bar on the right will become active so you can scroll through the window to see all the files.

Desktop File

You can see there is a file on the disk called DeskTop. The “Invis” box for this file is blacked out, which means that this file is invisible. If you look at other disks with MacTools (we’ll tell you how to do this shortly), you will find that most normal Macintosh disks have an invisible file called DeskTop. The Finder uses this DeskTop file to keep track of how the icons and windows for the disk are supposed to be arranged on the screen. However, the DeskTop file itself doesn’t appear when you’re in the Finder, because it’s marked as invisible.

Status Flag

If the Protect (Prtect), Locked (Lckd) or Invisible (Invis) boxes for any files are blacked out, it means those files have that status flag set.

Protect (Prtect): A protected file cannot be copied either from the Finder or with the Macintosh Disk Copy application. However, MacTools can copy these files using the Copy Files options.

Locked (Lckd): A locked file cannot be renamed or deleted (thrown in the Trash) from the Finder. It must be unlocked first. (You can lock or unlock files one at a time when you’re in the Finder, using the Finder’s Get File Info option.)

Invisible (Invis): An Invisible file cannot be seen from the Finder, or by Macintosh’s Standard File Package. As discussed earlier, the Finder uses the invisible “DeskTop” file to keep track of where the icons, windows, and folders appear on the screen. If you make this file visible with MacTools, it will show up as another icon from the Finder.

You can set or clear these status flags by pointing to the box with the “Hand” pointer and clicking the mouse button. The status will be set to the reverse of what it was. (i.e. If the prtct box is blacked in – protected – then it will become just an outline box, which means the file is no longer protected.)

Note: The Macintosh will not let you protect/unprotect files on the disk that you started up from.

Changing Disks

To work with disks other than the MacTools disk, you simply eject the MacTools disk and insert the disk you want to work with. There are three ways to eject a disk:

- Click the Close box in the window.
- Select the Eject option from the Disk pull-down menu.
- Hold down the command key and type the letter “e.”

All three methods do the same thing: They eject the disk from the drive and remove the disk’s window from the screen. When you insert another disk, a new disk window for that disk will appear.

If you have two or more disk drives connected to your Macintosh, you can insert disks into any drive. If, for example, there are disks in two drives at the same time, there will be two windows on the screen, one for each disk. Only one window can be "active" at a time. The active window is the one MacTools uses when you select to rename, delete, eject, etc. You can bring any window to the front and make it active simply by clicking on it. Remember that the icon to the left of the window title shows you which drive the disk is in.

Custom Disk						
Write/Paint Disk						
Amt. Used: 104K			Amt. Free: 675K			
Size	Name	Modified Date	Prct	Lckd	Invis	
3K	Clown picture	Mon, Dec 7, 1987	☐	☐	☐	
6.5K	Desktop	Tue, Jul 12, 1988	☐	☐	☒	
3K	Doggie picture	Thu, Dec 10, 1987	☐	☐	☐	
3K	Happy Birthday	Tue, Dec 22, 1987	☐	☐	☐	
2K	Horse picture	Thu, Feb 4, 1988	☐	☐	☐	
3.5K	Letter to Mom	Thu, Feb 4, 1988	☐	☐	☐	
58.5K	MacPaint	Fri, Apr 5, 1985	☐	☐	☐	
--	MacPaint Docs	Tue, Jul 12, 1988	--	--	--	
--	MacWrite Docs	Tue, Jul 12, 1988	--	--	--	
24.5K	Option Menu	Tue, Feb 16, 1988	☐	☐	☐	

Disk Options

By choosing the Disk pull-down menu, you can see what disk options are available.

 Control	Disk	File	Misc
	Verify Disk Format Disk Copy Disk Rename Disk		
	View/Edit Disk UnDelete Files		
	Eject Disk		⌘E
	Create New Folder Open Folder		⌘O
	Tree Display		⌘T

Verify Disk

The first option, Verify Disk, lets you verify that all of the information on an initialized Macintosh disk is readable. Sometimes a disk, or the information on the disk, can become damaged. If you accidentally turn off the Macintosh (or the power fails) while the Macintosh is writing data to the disk, a portion of that data can become unreadable, even though the disk itself is not damaged. If you drop a disk into a pot of hot coffee, however, the entire disk is most likely ruined forever. The Verify Disk option cannot determine whether just the information is bad or the disk itself is damaged; it simply tells you whether or not all of the information was readable. (Verify Disk does not work with uninitialized disks, because there is no information to read.)

To use Verify, make sure the disk you want to verify is in the drive, then choose the Verify Disk option. (Point at the Disk menu, press and hold the mouse button while dragging the pointer to Verify Disk, then release the mouse button.) The pointer changes to a wristwatch and the disk whirs for several seconds as MacTools verifies the disk.

If there are no errors in reading the disk, a dialog box appears, saying "The verify action was successful!" Click the "OK" box to continue. If any part of the disk is unreadable and an error occurs, a dialog appears giving the "block number" of the error, and an error ID number. (The errors are rather technical in nature. A list of possible error numbers appears in the Appendix.) You can choose to either continue verifying, or cancel the verify option.

If a disk that doesn't verify contains any important files, you should try to copy the files onto another disk using the MacTools Copy Files option. Then try to re-format the bad disk. If the format fails, then the disk itself is probably damaged and should be discarded.

Note: Many copy-protected disks contain errors and will not verify. The errors are part of the copy protection and are normal.

Format Disk

The Format Disk option is used to reformat (or "initialize") a Macintosh disk, completely removing any old information and preparing the disk for storing new files. Any normal disk which does not verify (see above) should be reformatted with the Format Disk option, so you won't be plagued with disk errors later.

To use Format Disk, make sure the disk you want to format is in the disk drive, then choose Format Disk from the Disk menu. A dialog box will appear, asking what size you want to format the disk. If the disk is in an 800K drive, you will have the option to format the disk as a 400K or 800K disk. Click on "Cancel" if you don't want to format the disk. (Note: 400K disks are formatted MFS and 800K disks are formatted HFS.) The disk will keep the same name it had before it was formatted. You can use the Rename Disk option if you want to give it a new name.

Note: If you want to format a brand new unformatted disk, simply insert it into the disk drive. MacTools will notice that the disk is unreadable, and ask you if you want to initialize the disk. If you want to reformat an already formatted disk, then use the Format Disk option from the Disk menu.

Copy Disk

You can make backups of entire disks with the Copy Disk option. The copied disks are given the same name as the original disk (unlike copies made with the Finder, which keep the name they had), and copying takes fewer disk swaps than with the Finder. In addition, Copy Disk can make backups of many protected disks. When a copy of a protected disk is made, the copy is still protected in the same way as the original disk. The directions for copying a disk vary slightly, depending on whether you have one disk drive or two.

Note: If you have one 400K drive and one 800K drive and you insert an 800K disk in the 800K drive and ask it to do a Copy Disk, you will

be doing a one-drive copy. The reason is that the 400K drive cannot read or write an 800K disk!

Copy Disk (one-drive)

To use Copy Disk with one-drive systems, insert the disk you want to make a copy of, then choose Copy from the Disk menu. MacTools will briefly read the disk and eject it, then display a dialog box asking you to insert the disk you want to copy to. Insert this new disk. If the disk has never been used, MacTools will begin copying immediately. If the disk is already initialized, another dialog box will appear, asking you to confirm that it's OK to completely replace the old information with the new.

As copying progresses, MacTools will tell you when to insert the original disk you're copying and when to insert the copy disk.

To speed up copying, MacTools makes use of as much memory in the Macintosh as possible by "purging" everything it doesn't need. When the copy is finished, the Macintosh will ask you to insert the MacTools disk so that it can reload this information. If you were copying a disk other than the MacTools disk, you should then choose Eject from the Disk menu, and reinsert the disk you want to work with.

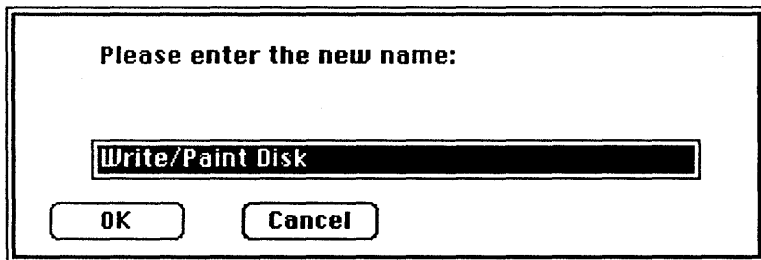
Copy Disk (two-drive)

To use Copy Disk on a two-drive system, insert the disk you want to copy into either drive and, if necessary, click on that disk's window to make it the active window. Then choose Copy Disk from the Disk menu. MacTools uses both drives when copying disks. If there is no disk in the other drive, MacTools will first display a dialog box asking you to insert the disk you want to put the copy onto. If this disk has never been used, MacTools will begin copying immediately. If the disk is already initialized, a dialog box will appear asking you to confirm that it's OK to completely replace the old information with the new.

To speed up copying, MacTools makes use of as much memory in the Macintosh as possible by "purging" everything it doesn't need. If you've copied a disk other than the MacTools disk, the Macintosh will ask you to insert the MacTools disk so it can reload the purged information. You should then choose Eject from the Disk menu, and reinsert the disk you want to work with.

Rename Disk

To rename a disk, insert the disk and choose the Rename Disk option from the Disk menu. A dialog box appears asking what you want to name the disk. The current name of the disk is also shown.



You can either type in a whole new name, or edit the current name using the Macintosh mouse features. (If you change your mind and don't want to rename the disk, you can click the Cancel button.) When you've finished entering the name, either press Return or click on the OK button. The disk will be renamed to the new name.

ViewEdit Disk and Undelete Files

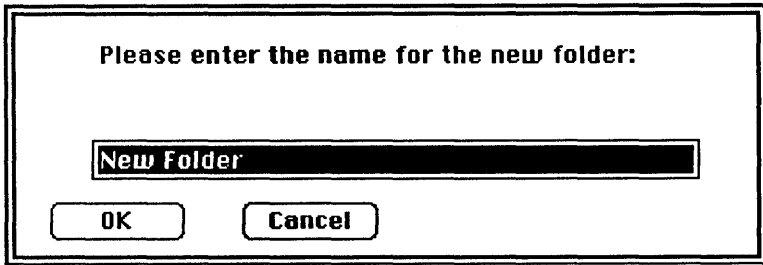
The ViewEdit Disk and Undelete Files options are described in a later section of the manual.

Eject Disk

As described earlier, there are three ways to eject a disk: choose Eject from the Disk menu, click the close box for the disk window, or hold down the command (cloverleaf) key and type the letter "e."

Create New Folder

The Create New Folder option allows you to create a folder on an HFS disk. (This option is disabled for MFS diskettes, because MFS disks don't have real folders!) A dialog box appears asking what you want to name the new folder.



You can either type in a whole new name, or edit the current name using the Macintosh mouse features. (If you change your mind and don't want to create the folder, you can click the Cancel button.) When you've finished entering the name, either press Return or click on the OK button. A folder with the specified name will be created on the disk.

Open Folder

There are three ways to open a folder on an HFS disk.

- Click on the folder name and select Open Folder from the Disk menu.
- Click on the folder name, press and hold command (cloverleaf) key and press the "O" key.
- Double-click on the folder name.

The disk window will be updated to show that you have a folder open, and it will display information about all the files and folders contained in the folder just opened.

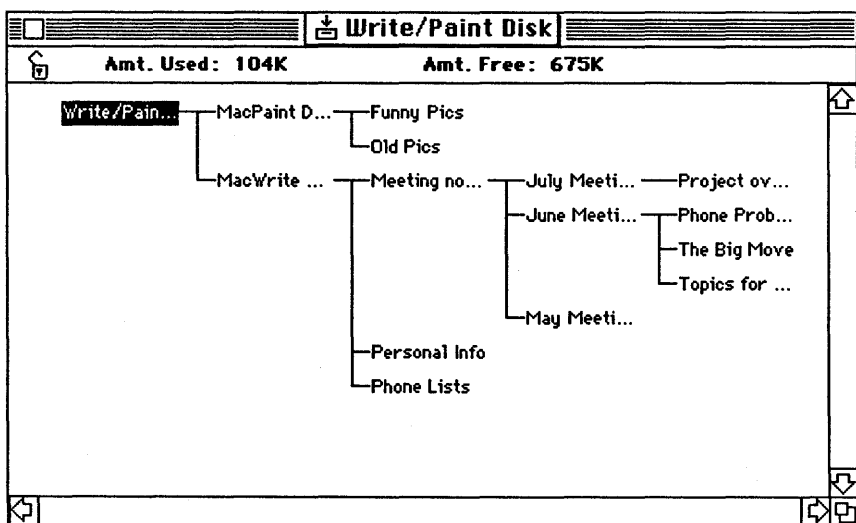
Remember that for HFS disks, a box appears around the title at the top of the window. If you are done looking at the information for the folder and you wish to see the information from the previous folder or from the main volume, move the mouse pointer inside this box and press and hold the mouse button. You will see a pull-down menu appear, showing the names of all the folders you opened to get to the one you are currently displaying. Here is an example:



You may select what previous folder to display by using the standard Macintosh menu selection features. The information for the folder you select will now be in the window.

Tree Display

Tree Display is a new MacTools option that enables you to see the organizational structure of your HFS volume in a "tree" display. You can make changes to that structure by moving folders. The Tree Display example shows folders at five hierarchy levels. You may have more or less levels depending on your volumes.



The Tree Display screen shows the following information:

- **Lock icon:**
Displays whether or not the volume is write-protected.
- **Amt. Used:**
Displays how much space on the volume is used.

- **Amt. Free:**
Displays how much space on the volume is available.

To start the Tree Display:

1. Select the **Tree Display** command from the Disk menu.

The first Tree Display screen highlights the top level of hierarchy (your hard drive's name) in the upper-left corner of the display.

2. Use the horizontal scroll bar to view more hierarchy levels, if any.
3. Use the vertical scroll bar to view other folders at the level currently being displayed.

To move a folder to another folder on your hard drive:

Note: You cannot drag the selected folder to a location that is not another folder. You must move the folder to another folder.

1. Click and hold the mouse button on the folder to select it. A dotted outline of the folder appears.
2. Drag the selected folder to the new folder.
MacTools highlights the folder as you drag it over the top of the destination folder. This helps you determine the correct destination folder.
3. Release the mouse button to complete the move.

The selected folder and any folders attached to it at lower levels are moved into the new folder.

Note: If you select a folder and begin dragging it to a new location and then decide you don't want to move it, you can drag the folder into the white space or outside of the window. This stops the moving procedure and the folder remains where it was.

To list the contents of a folder:

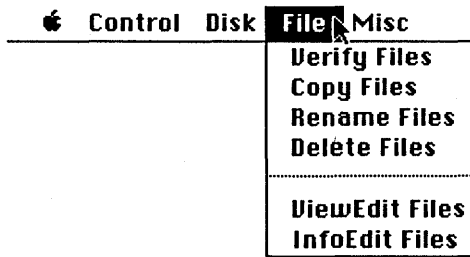
1. Select the folder by clicking on it or use the arrow keys to move the selection point.
2. Select the **Catalog Display** option (Command +T) from the Disk menu.

This option toggles between the Catalog display and the Tree display. Notice that the option name changes depending upon which display you are currently using.

Selecting any folder in Tree Display and returning to Catalog Display lists the contents of the selected folder. Selecting Tree Display from any folder in Catalog Display highlights that folder when the tree is displayed.

File Options

If you click on one of the files in the window, then choose the File menu, you can see what file options are available.



Selecting Files

When working with the MacTools file options, you first select which file or folder you want to work with, then choose the appropriate option from the File menu. When you select a file, it is shown as white letters over a black bar. There are several ways to select files using the Macintosh mouse:

- To select just one file, click on the desired file with the hand pointer. (It can point anywhere in the line.)
- To select several adjacent files, press the mouse button and drag the hand pointer over those files.

- To select additional files, hold down the shift key on the keyboard while clicking on the new files. (This is called shift-clicking.)
- If you change your mind and want to deselect a selected file, then shift-click on that file. Just keep in mind that shift-clicking on a deselected file selects it, and shift-clicking on a selected file deselects it.
- If you decide you don't want to select any files, then click the mouse in either the free space in the window below the last file or in the file header bar where it shows "Size Name Prtct," etc.

Notice that the File menu is dimmed until you select one or more files to work with. This is because you need to select the files before you can choose what you want to do with them.

Verify Files

Verify Files works much like Verify Disk. (See the Verify Disk discussion on bad blocks.)

To use Verify Files, click on the file you wish to verify and choose Verify Files from the File menu. The pointer changes to a wristwatch and the disk whirs for a few seconds as MacTools verifies all blocks in that file.

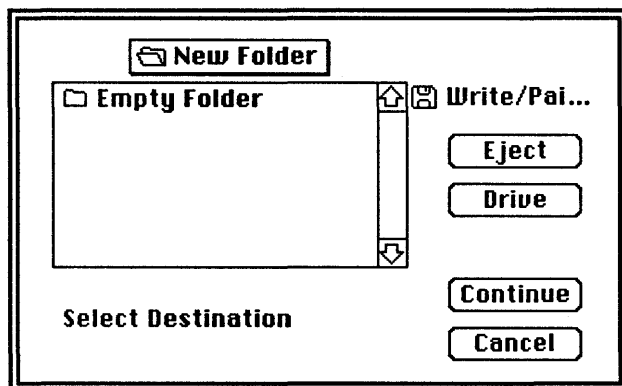
If there are no errors in reading the file, a dialog box appears saying "The verify action was successful!" Click the "OK" button to continue. If any part of the file is unreadable, a dialog appears giving the relative block number of the file (the 3rd block of the file, for example) and an error ID number. (Error numbers appear in the Appendix.) You can choose to either "Continue" verifying the file, or to "Cancel" the verify option.

If you select a folder to verify, then a dialog will appear asking if you really want to verify all files and folders inside the selected folder. Click on OK to continue, or Cancel to exit. If you click on OK, the Verify Files option will proceed to verify every file and folder it finds inside the selected folder.

Copy Files

You can back up individual files with the Copy Files option. MacTools can copy files more quickly than the Finder, and it can copy files that are marked as protected.

To use Copy Files, insert the disk you want to copy files from, select the files or folders you want to copy, then choose Copy Files from the File menu. A dialog message will then appear asking you to select where you want to copy to. Use the options provided to get to the destination volume/folder. (If you insert a disk here and the Macintosh doesn't respond, try clicking in the scroll bar area of the dialog. This should get the Macintosh to "wake up!" and recognize the disk insertion. You may then proceed.) When everything looks good, click on the Continue button to continue with the copy (or click on Cancel to stop the copy process).



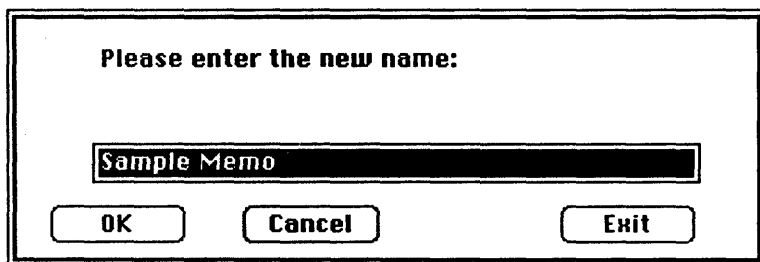
When you click on the Continue button, MacTools begins copying the selected files, prompting you for disk inserts when and if it needs any. If it finds that the file you are copying already exists on the destination disk/folder, MacTools will display a dialog asking if you want to replace the file on the destination disk. If you've asked MacTools to copy folders, it will display a dialog asking if you really want to copy all files and folders inside the folder. Folders can be copied only onto HFS disks. If you select an MFS volume as the destination disk, then MacTools will display a dialog telling you that it cannot copy folders to that volume, but it will copy any other files you may have selected.

To speed up copying, MacTools makes use of as much memory in the Macintosh as possible by "purging" everything it doesn't need. When the copy is finished, the Macintosh will ask you to insert the program

disk so that it can reload this information. If you were copying from a disk other than the program disk, you should then choose Eject from the Disk menu, and reinsert the disk you want to work with.

Rename Files

To rename one or more files, select the files you want to rename, then choose Rename from the File menu. For every file that you select, a dialog box will appear in turn, asking what you want to name each file. You can either type in a whole new name, or edit the current name using the Macintosh mouse features. If you change your mind and don't want to rename this file, click the Cancel button. If you decide you don't want to rename any more of the files you've selected, click the Exit button.



When you've finished entering the name, either press Return or click on the OK button. The file will be renamed to the new name. If there are more files to rename, another dialog box will appear for you to rename the next file.

Delete Files

You can delete one or more files with the Delete Files option. Deleting a file from MacTools is the same as throwing it in the trash from the Finder, then emptying the trash.

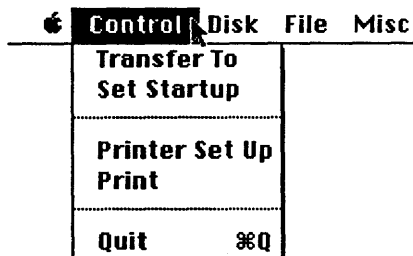
Select the file or folder you want to delete, then choose Delete from the File menu. A dialog box will appear, asking "Are you sure you want to delete the selected files?" If you click on the OK button, MacTools will delete the selected files and folders from the disk. Note: If you delete a folder, MacTools will delete any files or folders inside the folder before it will delete the selected folder.

ViewEdit and InfoEdit

The ViewEdit and InfoEdit options are described in a later section.

Control Options

By choosing the Control pull-down menu, you can see what Control options are available.



Quit

When you're finished using MacTools, use the Quit option from the Control menu to quit out of MacTools and return to the Finder.

Transfer To

If you want to go from MacTools directly to another application without returning to the Finder first, you can use the Transfer To option. Insert the disk you want to use. With the MacTools window for that disk on the screen, use the mouse to select the application file to go to, then choose Transfer To from the Control menu or double-click on the application file. The application you selected will be opened and run.

Set Startup

Whenever you turn on your Macintosh and insert a disk, the disk will "start up" an application. With most disks, this application is simply the Finder. With the Set Startup option, you can change this so that a disk will start up with any application. Simply click to select the application file you want the disk to start up with, then choose Set Startup from the Control menu. MacTools will make a change to the startup information on this disk: The next time you turn on your computer to use this disk, the application you selected (rather than the Finder) will start up.

Printer Setup

This option lets you set up the page size and other options for printing in MacTools. The most common paper settings are already set. If you want to change them, choose Printer Setup and click on the appropriate buttons. To save your changes for printing, click on the

OK button. If everything was already set up correctly, click on Cancel to leave everything as it was.

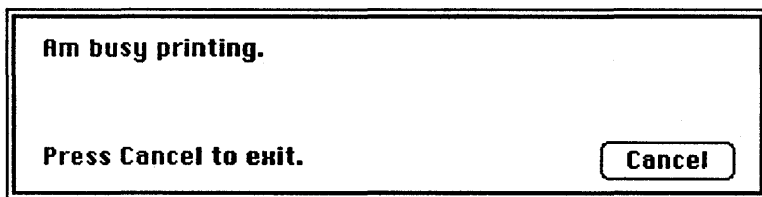
ImageWriter		v2.6	OK 
Paper:	☒ US Letter	☐ A4 Letter	Cancel
	☐ US Legal	☐ International Fanfold	
	☐ Computer Paper		
Orientation	Special Effects:	☐ Tall Adjusted	
		☐ 50 % Reduction	
		☐ No Gaps Between Pages	

Print

The print option allows you to print out a copy of the catalog screen (the list of files) to your printer. Insert the disk that you want a printout of and select Print from the Control menu. A dialog will appear asking whether you want a high quality copy or a normal quality copy. Select the options you wish and click the OK button to continue with the printout. (Clicking on the Cancel button will abort the print process.)

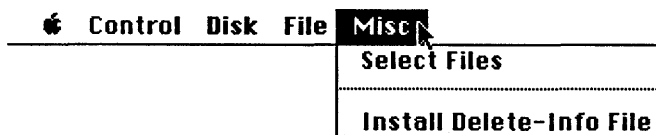
ImageWriter		v2.6	OK 
Quality:	☒ Best	☐ Faster	☐ Draft
Page Range:	☒ All	☐ From:	To:
Copies:	1		Cancel
Paper Feed:	☒ Automatic	☐ Hand Feed	

When you press the OK button, another dialog appears telling you that MacTools is busy printing out the information. There is a Cancel button available if you wish to stop the printer before it is finished with the printout.



Miscellaneous

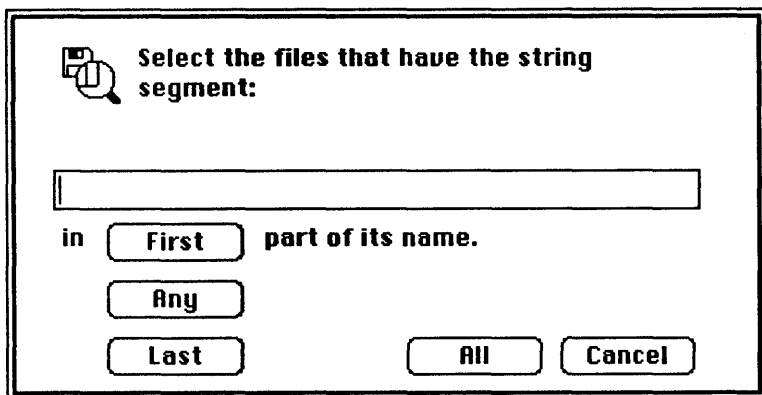
There are two options available in the Miscellaneous menu.



Select Files

The Select Files option provides a convenient way to select a number of related files with similar names before selecting one of the File menu options. For example, suppose you have a disk with the files "Screen 0," "Screen 1," "Screen 2," etc., and you want to delete these files. You can use the Select Files option to select all files that begin with the word "Screen." You could also select the files "PICTURE.BAS," "PAYROLL.BAS," and "INVENTORY.BAS" by using Select Files to select all files that end in ".BAS."

To select files by filename, choose Select from the Miscellaneous menu. A dialog box will appear:



First type the letters or characters that you want to match with the files on the disk. Then click on the appropriate button. If you click "First," then every file that begins with the characters you typed will be selected. If you click "Any," then every file that contains the characters anywhere in the filename will be selected. If you click "Last," then every file that ends with the characters you typed will be selected.

You can click on the "All" button without typing anything to select every file on the disk. If you change your mind and don't want to select any files, you can click on the Cancel button.

After you've used the Select Files option to select a number of files, you can still shift-click to select additional files or deselect some of the selected files before choosing a File menu option.

Install Delete-Info File

This option is described in the "About the Delete Tracking Method" section.

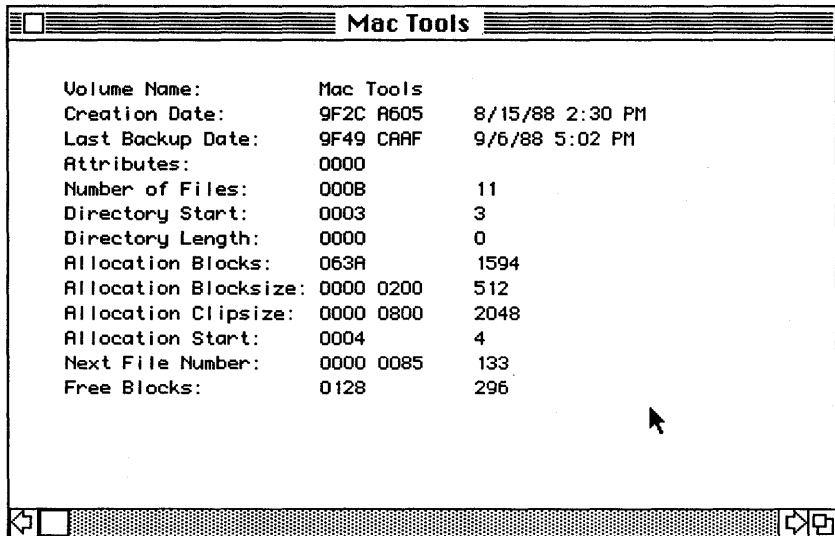
ViewEdit

The ViewEdit options in MacTools allow you to look at the contents of any file or any block on a disk, and make changes to the information if you want. This can sometimes be useful for double-checking what is in a file before copying it, deleting it, etc. Experienced Macintosh programmers will also find ViewEdit a powerful tool for debugging, repairing disks with damaged files, etc.

The ViewEdit option is easy to use, but much of the information it displays is technical in nature. If you want to change the contents of the disk (or to better understand what information you are looking at), you should be familiar with such things as disk blocks, bytes, hexadecimal, and ASCII.

The ViewEdit option appears in both the Disk menu and the File menu. If you want to view or edit any block on the disk, choose ViewEdit from the Disk menu. If you want to view or edit a particular file on the disk, first select that file by clicking on it with the mouse, then choose ViewEdit from the File menu.

When you choose either ViewEdit option, a new window and a new menu will appear. The new menu, titled ViewEdit, contains all the new options available to you while using ViewEdit. These options are Read Next Block, Read Previous Block, Read Specific Block, Write Block, Undo, Resource Fork, and Data Fork. The new window that appears displays information about the disk volume or the file that you want to look at. The display will be similar to the following:

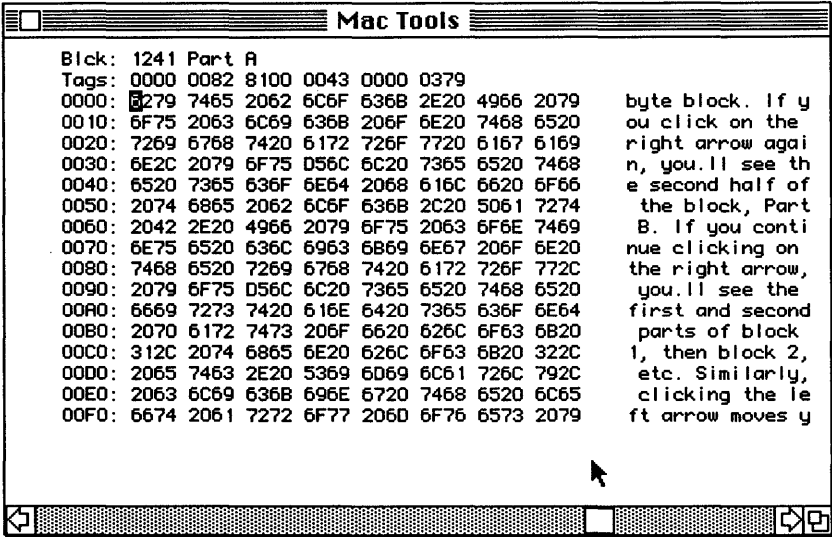


Two columns of numbers appear. The first column contains the actual values (in hexadecimal) that the Macintosh stores for each item. The second column shows the same numbers in (more readable) decimal form. This information will usually be of use only to programmers.

The usual MacTools file window will still be lurking behind the ViewEdit window. Anytime you want to exit the ViewEdit option, just click on the Close box in the upper-left corner, or click back in the file window.

At the bottom of the window is a horizontal scroll bar. If you click on the arrow on the right, then a new display will appear, showing the contents of the first block in the file or disk. If you drag the white square at the bottom, you can move quickly through the entire disk.

Note: All information on the disk is stored in “blocks.” Each block contains 512 bytes of data. Therefore it takes two blocks to make one “K” of information. A normal 400K disk contains 800 disk blocks numbered 0 through 799, while a normal 800K disk contains 1600 disk blocks numbered 0 through 1599.



Notice the “Block: 1241 Part A.” The window shows the first half (256 bytes) of the 512-byte block. If you click on the right arrow again, you’ll see the second half of the block, Part B. By clicking on the right arrow, you can move forward through the disk or file a half-block at a time. Similarly, clicking the left arrow moves you backwards through the disk or file a half-block at a time.

(Note: If you selected ViewEdit from the Disk menu, the block number shown is the actual block number on the disk. If you selected ViewEdit from the File menu, the block number shown instead tells you how many blocks from the beginning of the file this block is, not its real disk block number.)

All of the values in the window (except for the block number) are hexadecimal. Each line includes an offset number followed by a colon, then 16 bytes from the block (2 digits per byte, shown as 8 groups of 4 digits each), then those same 16 bytes interpreted as ASCII characters. The offset number simply shows how many bytes into the block each line is. For example, byte number \$10 is the first byte after the "0010:" Byte number \$11 is the byte after that, etc.

If words or text appear on the right, then those bytes in the block are strings of valid ASCII characters. However, the characters on the right will often be meaningless. This means that the bytes are more likely part of a program or numeric data area. Any byte which is not a valid ASCII character is shown instead as a period.

You can change any byte in the block by typing either new hexadecimal values or new text characters. Notice that the first digit of the block is inverse (white-on-black). If you type one or more hexadecimal digits (0-9 or A-F), those digits will change and the inverse cursor will move to the right. The corresponding text characters on the right will also change, depending on what you type. (Feel free to experiment. The changes you make are strictly temporary until you choose the Write Block option, which is described below.)

To change bytes somewhere else in the block, move the mouse pointer to the digit where you want to start the changes. The pointer will appear as a small box. Put the box around the digit, then click the mouse button. The inverse cursor will move here, and you can start typing new values.

Similarly, if you want to change bytes by typing new text characters, move the pointer over one of the characters in the text area and click the mouse. The inverse cursor will move here. Any characters you now type will replace those already in the block. (As you type, the corresponding hexadecimal values on the left will also change.)

The ViewEdit Menu Options

ViewEdit	
Read Next Block	⌘N
Read Previous Block	⌘P
Read Specific Block	⌘B
Write Block	⌘W
Undo	⌘Z
Resource Fork	⌘R
Data Fork	⌘D

Read Next Block

This reads the next block from the disk or file. This is equivalent to clicking the right arrow of the scroll bar once or twice (since clicking the arrow will move by half a block).

Read Previous Block

Reads the previous block.

Read Specific Block

If you know exactly what block you want to read, then choose Read Specific Block. A small window will appear, with a field for entering a new block number. Type the number of the block you want to read, then click the OK box or press Return. That block will be read.

Write Block

To make a change to the disk itself, first read the block, make the changes to the block in the ViewEdit window, then choose Write Block. Write Block writes the displayed block back to the disk. Be careful in using Write Block; bad information written to the disk can make a file or the whole disk unusable.

Undo

The Undo option simply re-reads the current block from the disk, effectively removing any changes you might have made since you last read the block.

Resource Fork and Data Fork

These are available only if you've chosen ViewEdit from the File menu to look at a file on the disk. Some Macintosh files have two parts, called the resource fork and the data fork. Other files have a resource fork, but no data fork. If the file you're looking at does not have a data

fork, then the Data Fork option in the Misc menu will be dimmed. If the file has both a data fork and a resource fork, then both options will be available.

When you first ViewEdit a file, MacTools shows you the resource fork. You can see a check beside the Resource Fork option. If the file contains both forks, you can view either fork by choosing Resource Fork or Data Fork from the ViewEdit menu. The check will show you which fork you are viewing at any time. As one example, the text of a MacWrite document is stored in the data fork of the file (as long as the document was stored as TEXT only). If you want to use ViewEdit to look at a MacWrite document, be sure to choose the Data Fork option. You can then see the text characters on the right as you read through blocks of the file.

Undeleting Files & Repairing Damaged Disks

MacTools includes an Undelete Files option to help you recover “lost” information from disks. Undelete Files can often recover files that you have accidentally deleted with MacTools or thrown in the trash from the Finder.

Undelete Files can also recover files from some “damaged” disks. These are disks that the Macintosh cannot recognize as readable, giving you the “This diskette is unreadable. Do you wish to eject or initialize?” alert.

MacTools provides three different undelete methods:

- **Delete Tracking Method.** This works with any Macintosh HFS disk device, including hard disks. It requires the installation of the Delete Tracking INIT in the System Folder and running the MacTools “Install Delete-Info File” before it can offer undelete protection.
- **Tag Recovery Method.** This works with 3.5 inch disks (both HFS and MFS), but is not supported by most hard disks. The CPS TagFix and the InfoEdit options provide additional support for this method.
- **Resource Forks Method.** This works with both floppy and hard disk volumes.

Whenever you choose Undelete Files, MacTools finds the most effective Undelete methods for that disk, then lets you choose the method.

About the Delete Tracking Method

Normally, when a file is deleted, the Macintosh destroys all record of what kind of file it was and where the file resides on the disk. Without this information, recovering an accidentally deleted file is usually impossible (if tags are not supported). The Delete Tracking method is designed to save this information as the file is being deleted, so that the file can later be recovered.

The Delete Tracking approach must be set up before you delete any files, for those files to be recoverable later. This method, if it's in effect,

“watches over” all file deletes that take place. It saves the important information about the file being deleted into a special Delete-Info file on that disk. If the file was deleted accidentally and needs to be undeleted, MacTools can then use the information in the Delete-Info file to bring the deleted file back.

The Delete Tracking method consists of three parts:

- Delete Tracking INIT.
- MacTools “Install Delete-Info File” option.
- MacTools “Undelete Files” option.

The “Delete Tracking” INIT is a special initialization program that provides the actual Delete Tracking capabilities. The Delete Tracking INIT only works in the System Folder of your hard disk volume (or any disk you use to start up your Macintosh).

The MacTools “Install Delete-Info File” option, which can be found in the “Misc” menu, provides a place for the deleted-file information to be stored on a disk. Choosing this option actually places a new file (named “CPSDeleteInfo”) on the disk. (This file is “invisible,” which means it can be seen from MacTools, but not from the Finder desktop.)

Whenever any file is later deleted from that disk, the necessary information from the file is saved into the Delete-Info file. If you want to be able to recover files from more than one disk, you need to choose “Install Delete-Info File” for each disk.

MacTools lets you decide how big the Delete-Info file will be, which determines how many deleted files it can keep track of. The Delete-Info file always remembers the most recently deleted files.

Once both the Delete Tracking INIT and one or more Delete-Info files are set up, the disk or disks that have the Delete-Info files are protected against accidental file deleting. If you do accidentally delete one or more files and you want to recover them, you can start up MacTools, choose the Undelete Files option, see the names of the files that have been deleted, and select which of those files you want to recover.

Using the information from the Delete-Info file, MacTools undeletes the selected files, placing them into a new folder called Recovered Files. You can then see the files from MacTools, or Quit to the Finder

desktop and access them from there. Either way, you'll probably want to move the files out of the Recovered Files folder to a more appropriate place.

Using the Delete Tracking Method

Installation

This procedure sets the size of the CPSDeleteInfo file. When this procedure is completed, all further deletions are tracked by the INIT program and saved into the CPSDeleteInfo file. MacTools can then use the CPSDeleteInfo file to undelete files.

1. Make sure that the Delete Tracking program is in your System Folder of the disk you want to protect. If it isn't, copy it from the program disk.
2. Start up MacTools.

For every disk which you want protected with the Delete Tracking method, insert the disk if necessary, and click on the window for that disk to make it the foremost (active) window. Choose the Install Delete-Info File option from the Misc menu. You'll see a dialog similar to the following:

Please select the amount of disk storage space to use for your deleted file information.

☐ 5k - room for approx 30 deleted files

☒ 10k - room for approx 60 deleted files

☐ 20k - room for approx 120 deleted files

☐ 40k - room for approx 240 deleted files

☐ 60k - room for approx 360 deleted files

Cancel

Install 

The bigger you make the Delete-Info file, the more deleted files it can keep track of. However, a bigger Delete-Info file also takes up more space on the disk, space which could have been used for other files. In most cases, you probably won't need a Delete-Info file bigger than 20K, unless you expect to

be deleting large numbers of files at a time.

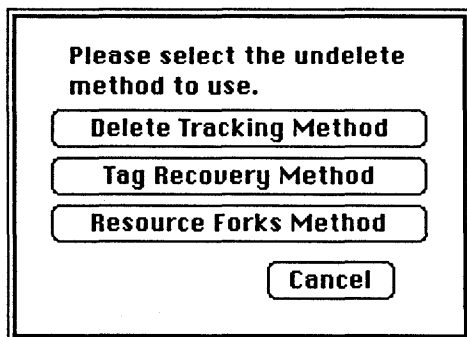
Select the size of Delete-Info file you want, then choose Install. A file named "CPSDeleteInfo," of the size you've chosen, will be added to the disk.

3. Whenever you want the Delete Tracking method to be in effect, be sure to start up from a hard disk or disk that has the Delete Tracking INIT in its System Folder. Below the "Welcome to Macintosh" message, you'll see another message in its own box: "Delete Tracking installed." When you see this, the Delete Tracking method is in effect.

Undeleting a file:

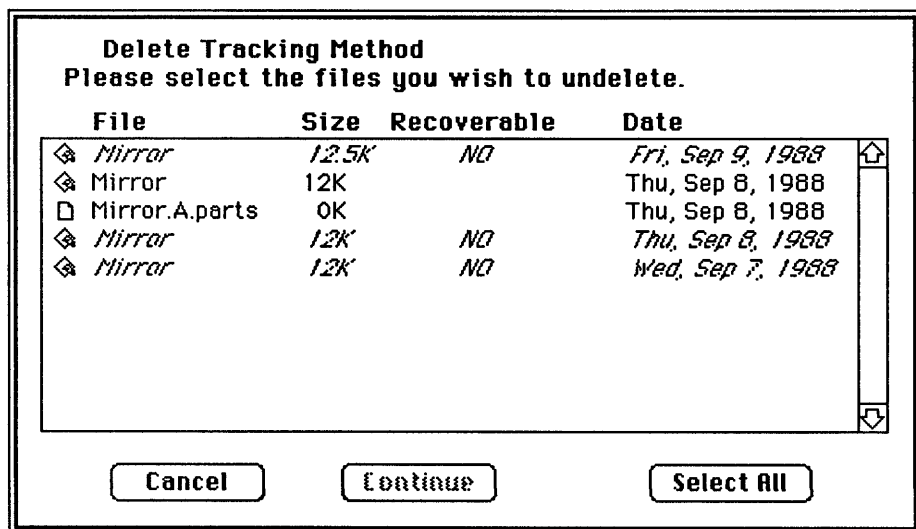
This recovers a file that has been accidentally deleted.

1. Start up MacTools. Insert the disk if necessary, and click on the disk's window to make it the frontmost (active) window. Choose Undelete Files. You'll see a dialog similar to:



Note: If the "Delete Tracking Method" button is greyed out, which means it cannot be chosen, that means that there was no CPSDeleteInfo file on the disk, and the deleted files cannot be recovered by this method.

2. Click on the Delete Tracking Method button. After a few seconds, another dialog will appear:



This dialog shows all of the files that have been deleted while the Delete Tracking method was in place. Each line shows:

- Whether the file was a document or an application
- The name of the file
- The size of the file.
- The last modified date of the file before it was deleted
- Whether or not the file is recoverable

Note: If a deleted file is not recoverable, the entry is shown in italics and a NO appears in the Recoverable column. This means that other files have been saved on the disk (or have changed size) since this file was deleted, and the new files overwrote some or all of the contents of the deleted file. This deleted file cannot be recovered.

If many files are listed, but not the one you wanted, it may be that the Delete Info file was not big enough to hold all the files you've deleted. The Delete Info file always keeps track of the most recently deleted files, for as many files as it can keep track of at any one time.

3. Using the mouse, select the files you want to recover, then click on the Recover button to proceed. MacTools will recover

these files, placing them in a new folder called Recovered Files. (If the Recovered Files folder already contains a file with the same name as one of the files you've selected, it will append a 001, 002, etc. to the end of the name to make a unique name.)

The Undelete is now complete. You can use MacTools to see the contents of the Recovered Files folder, to show that the files have been recovered. Using either MacTools or the Finder desktop, you can move these files into other folders if you want. If you've undeleted a large number of files, it may take the Finder a few seconds the first time to rearrange the desktop to accommodate all these new files.

The next time you choose Undelete Files, you'll notice that the files you've already recovered are no longer listed in the Undelete Files display. MacTools always "cleans up" the Delete-Info file after every Undelete.

About CPS TagFix

A file on the program disk, named "CPS TagFix," fixes two problems with 3.5 inch disks on Macintosh computers: (1) unreliable tags which interfered with file recovery, and (2) slow disk access in the upper drive of the Macintosh SE. The CPS TagFix file should be copied to the System Folder of a hard disk or any startup disk. Whenever the Macintosh is started up, the system will "see" the CPS TagFix file in the System Folder and install its features, fixing the problems.

Disk "tags" are a feature of the Macintosh which provide for more reliable recovery of accidentally deleted files and some damaged disks. Tags are a few bytes of information associated with each block on a disk, describing which part of which file this block belongs to. The MacTools Undelete Files option reads this tag information from each block on the disk to help recover deleted files.

Unfortunately, tags written by a Macintosh 512E or Macintosh Plus (both with "128K ROMs") are unreliable. This has prevented the MacTools Undelete Files option (and other disk recovery programs that rely on tags) from working correctly.

CPS TagFix corrects this problem. When CPS TagFix is installed at system startup, it "patches" the Macintosh disk routines so that all files written to the disk have correct and reliable tags. If these files are later

accidentally deleted, the MacTools Undelete Files option can recover them.

CPS TagFix also corrects a problem on a Macintosh SE with two internal drives. Without the fix, the upper drive on a Macintosh SE runs more slowly and more noisily than it should. This difference can be noticed easily by starting up the Macintosh first from a disk in the lower drive, then restarting again with the same disk now in the upper drive. The upper drive makes about twice as many “noises” as the lower drive and it takes a few seconds longer to start up. This problem occurs during practically all disk accesses to the upper drive.

CPS TagFix, when installed in a Macintosh SE, makes a patch to fix this problem, allowing the upper drive to work at a normal speed. (Apple might provide their own fix to the SE upper drive in a future release of system software. CPS TagFix is designed to “respect” other system patches. If it finds another patch already installed, it does not install its own patch, so there will be no conflict.)

Using CPS TagFix

To get the benefits of CPS TagFix (reliable disk tags on a Macintosh Plus or enhanced 512K Macintosh so you can later recover accidentally deleted files, and faster disk access on the upper drive of a Macintosh SE), you should copy the file “CPS TagFix” from the program disk into the System Folder of any disk (or hard disk) you use for starting up your Macintosh. Then, anytime you start up with that disk, the CPS TagFix features will automatically be installed. On a Macintosh Plus or enhanced 512K Macintosh, below the “Welcome to Macintosh” message you’ll see another message in its own box: “CPS TagFix installed.” If you’re using a Mac SE with two internal drives, you’ll instead see “CPS SE upper drive fix installed.”

(Note: If your startup disk is an MFS disk, CPS TagFix does not have to be in the System Folder. It just needs to be copied onto the MFS disk. If your startup disk is an HFS disk, CPS TagFix must be in the System Folder in order to be installed at system startup.)

(Another Note: On a Macintosh II, Macintosh SE, or unenhanced 512K Macintosh, you won’t see the message “CPS TagFix installed,” because the tag patches that CPS TagFix makes are not needed, and not made, on these computers. Disk tags are already correct.)

To fix the tags on your existing disks, make sure CPS TagFix has been installed, then copy all the files onto new initialized disks from the Finder desktop or use the Copy Files option in MacTools. (Don't use the Copy Disk option to make the copies.) The copies made will then have correct tags.

About the Tag Method

Whenever a file is deleted, the record of the file in the disk's directory is removed. Fortunately, the Macintosh marks each block with a tag, as described above. If CPS TagFix has been installed and the tags on a 3.5 inch disk are correct and reliable, the MacTools Undelete Files option can be used to recover files that have been deleted from the disk. (Undelete Files can also recover files from any hard disk that correctly supports tags. Unfortunately, tags are not supported on most hard disks.)

For most kinds of files, the Macintosh also leaves behind a little additional "scavenging" information as part of the file itself. MacTools finds this scavenging information for every deleted file that has it, to provide the correct filename and other useful information about the file. A few kinds of data files do not have this scavenging information, and undeleting these files takes a little more work on your part.

When you choose Undelete Files from the Disk menu then choose the Tag Method, MacTools reads all of the tags on the disk and pieces together information about all the deleted files. The names of all or most of the deleted files are then listed for you to choose from. (For the few types of data files that do not have "scavenging" information, the name of the deleted file is not available.) You can then select which of the deleted files you would like to recover. (Note: If you try to Undelete Files from a volume that does not support tags, MacTools will inform you that the volume doesn't support tags and an Undelete cannot be done.)

MacTools will also ask you where you want to store the files it undeletes. MacTools does not undelete "in place"; it instead copies the files being recovered onto another volume. Nothing is written back to the original disk, which is especially helpful if you're having some problem with the disk and want to also try other methods for recovery.

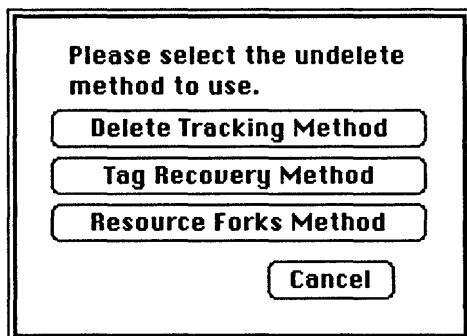
If the name of the deleted file was known, MacTools gives the new recovered file that same name. (If a file of the same name already exists

on the destination disk, MacTools adds a number to the recovered file, such as SAMENAMEFILE001.) If the scavenging information was not available for this deleted file, MacTools assigns a new filename to the recovered file, such as RECOVEREDFILE001, etc. This is done for each deleted file you've selected to recover. If the original disk has a large capacity or contains many deleted files, the entire process may take several minutes.

Most recovered files will be ready to use at this point. Recovered files for which there was no scavenging information need a little more help before they can be used. MacTools includes an InfoEdit option for you to determine and fill in this missing information.

Using the Tag Method

To use the Tag Method of Undelete Files, make sure the disk or volume you want to undelete files from is the frontmost (active) window, then choose Undelete Files from the Disk menu. You'll see a dialog similar to:



Choose the Tag Method. (If the "Tag Method" button is greyed out, which means it cannot be chosen, that means this disk device does not support tags, so the Tag Method will not work.)

MacTools will begin looking on the disk for deleted files. This part will take less than a minute for 3.5 inch diskettes, and several minutes for a hard disk. (You can click on Cancel if you need to stop.) MacTools will then display a dialog asking you to select which files you wish to undelete:

Tag Recovery Method
Please select the files you wish to undelete.

File	Size	Recoverable	Date
Simple letter	3.5K	3.5K	Wed, May 20, 1987
Birthday	29K	29K	Wed, May 20, 1987
Letter to Mom	21.5K	21.5K	Wed, May 20, 1987
\$00000014	4K	4K	Invalid Date
\$00000013	5.5K	5K Invalid	Invalid Date
Simple and Quick ...	3K	3K	Wed, May 20, 1987
\$00000011	5K	5K	Invalid Date
DeskTop	1K	1K	Wed, May 20, 1987

Cancel

Continue

Select All

The information shown in the dialog helps you determine which file or files you want to undelete. For most files, the actual filename will be listed. (If you had ever renamed the file, be careful: The original name of the file, not the "renamed" name, will usually be listed here, simply because of the way the Macintosh recorded this scavenging information.)

If the name of the file could not be determined (scavenging information was not available for this type of data file), the file's hexadecimal file "number" is listed instead. This file number is helpful, for instance, if the file you want to undelete was created just recently. The Macintosh assigns a unique number to every file ever stored on the disk; the larger the number, the more recently the file was created. (The Undelete display shows all of the deleted files sorted by file number, by how recently they were created, whether the filename or file number is listed. The most recently created files are at the beginning of the list.)

The Size column shows how big the file was, and the Recoverable column shows how much of the file is still actually recoverable. (If other files have since been saved on the disk, a portion of the deleted file may have been overwritten with a new file.) If the Recoverable value does not equal the Size of the file, then the word "Invalid" will appear as an indication that not all of this file can be successfully recovered.

The actual date shown in the Date column depends on a couple of things. On MFS disks, the date the file was last modified is provided in the tag information which MacTools reads from the disk. On HFS disks, this date is not available in the tags. So... if the tags contain a valid modified date for this file (if the disk is MFS), that date is listed in the Date column. Otherwise (the disk is HFS), if MacTools has listed the filename for this deleted file (which means the scavenging information is available), then the date this file was created is also known to MacTools, and that date is listed in the Date column. If neither date is available, then the phrase "Invalid Date" is shown instead, because no date is available for MacTools to list.

Select the files you wish to undelete, or click in the Select All button to select all the deleted files. Then click on Continue. MacTools will read and organize the deleted file information from the original disk. (This may also take several minutes for a hard disk.) Another dialog will then appear, this time for you to select which disk/volume/folder you want to save the recovered files to. Follow the usual Mac methods to select the destination, then click on Continue. MacTools will write the recovered files onto the disk you've selected.

For the recovered files that have the correct names (for which there was scavenging information), recovery is complete, and the files are ready to use.

About InfoEdit

For files named RECOVEREDFILEnnn (data files that didn't have the special "scavenging" information), MacTools needs a little help from you. The Macintosh system requires that two additional pieces of information be supplied about each file. These are called the file "TYPE" and the file "CREATOR."

The Type and Creator are used by the Finder Desktop to help determine which icon to display, and to match a document file with the application that it belongs to. An application always has a Type of "APPL" and some other 4-letter Creator. The documents made with that application will have the same Creator as the application, and some other 4-letter Type.

Whenever you open a document from the Finder desktop, the Finder actually looks for an application that has the same Creator value as the selected document and a Type of "APPL," and opens that! For

example, if you open a MacWrite document, which has a Creator of "MACA" and a Type of "WORD," the Finder actually opens the MacWrite application, which has a Creator of "MACA" and a Type of "APPL."

The InfoEdit option in MacTools shows you the Type and Creator values for any file, and lets you change them if you want. You need to use InfoEdit to set the correct Type and Creator for the recovered file, so that the Macintosh will recognize what kind of file it is.

In order to set the correct Type and Creator for a RECOVEREDFILEEnnn, you have to know, or guess, what kind of file it was. When you selected the file to be undeleted, the Undelete Files display gave you some helpful information about the file, such as file number (how recently the file was created), size, and date. Once you know what kind of file it was, then you can usually determine the file's Type and Creator simply by using InfoEdit to look at another file that is the same kind of file. (For example, if you know that RECOVEREDFILEEnnn is a MacWrite document, its Type and Creator will be the same as any other MacWrite document you have.)

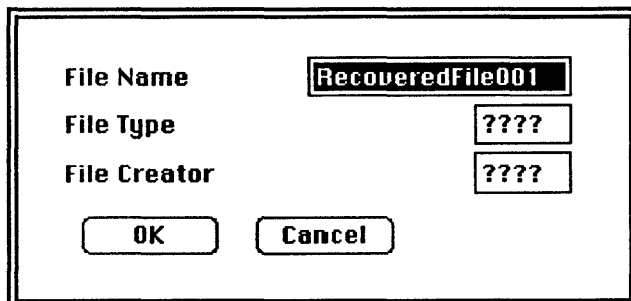
Find (or make) another file of the same kind, then select it in MacTools and choose InfoEdit. InfoEdit will show you the Type and Creator values for that file. Write down the 4-letter values for each. Now cancel the InfoEdit, select the RECOVEREDFILEEnnn now and choose InfoEdit again. Type in the Type and Creator values that you just wrote down for the same kind of file. You can also rename the recovered file within InfoEdit to something more meaningful.

One helpful hint is to use InfoEdit to discover the Type and Creator for your various files before your data disks are damaged. By doing this, you'll be ready when disaster strikes. Here is a table of TYPE and CREATOR information for several popular applications:

DOCUMENT	TYPE	CREATOR
MacWrite	WORD	MACA
FactFinder	FACT	NARU
1st Base	1STD	M1ST
Filevision	PICB	TELO
MegaFiler	MFIL	MEGA
Multiplan	TEXT or MPBN	PLAN
ThinkTank	TEXT	TANK
MacPaint	PNTG	MPNT

Using InfoEdit

To use InfoEdit, select the appropriate file and choose InfoEdit from the Disk menu. You will see a display similar to the following:

A rectangular dialog box with a double-line border. It contains three labels on the left: "File Name", "File Type", and "File Creator". To the right of "File Name" is a text field containing "RecoveredFile001". To the right of "File Type" is a text field containing "????". To the right of "File Creator" is a text field containing "????". At the bottom of the dialog are two buttons: "OK" and "Cancel".

File Name	RecoveredFile001
File Type	????
File Creator	????
OK Cancel	

The file name is displayed on the first line. You can give this recovered file a new name if you like. This isn't absolutely necessary, but file names such as "RECOVEREDFILE001" aren't very informative. Underneath this are two lines labeled "File Type" and "File Creator." To their right are the current values. If the file has just been recovered, you may see question marks as the current values. If the file has not been undeleted, the values shown are correct. If you are recovering a deleted file, type in the correct Type and Creator, using capital letters. When you are done, select the OK button, and you will be returned to the main MacTools display.

Recovering using resource forks

This is a new MacTools option for repairing damaged disks and undeleting files. This option helps you recover "lost" information from disks. It can also recover files from some damaged disks. These are the disks that the Macintosh cannot recognize as readable, giving you the "This diskette is unreadable. Do you wish to eject or initialize?" alert message.

This method for recovering data is different from the "Tag Method" in that the Tag method reads the tag for the block and, using that information, reconstructs a file. The resource forks method reads a block of information and determines if the block is a resource fork. If it is a resource fork, this method uses the information inside that block to reconstruct a file.

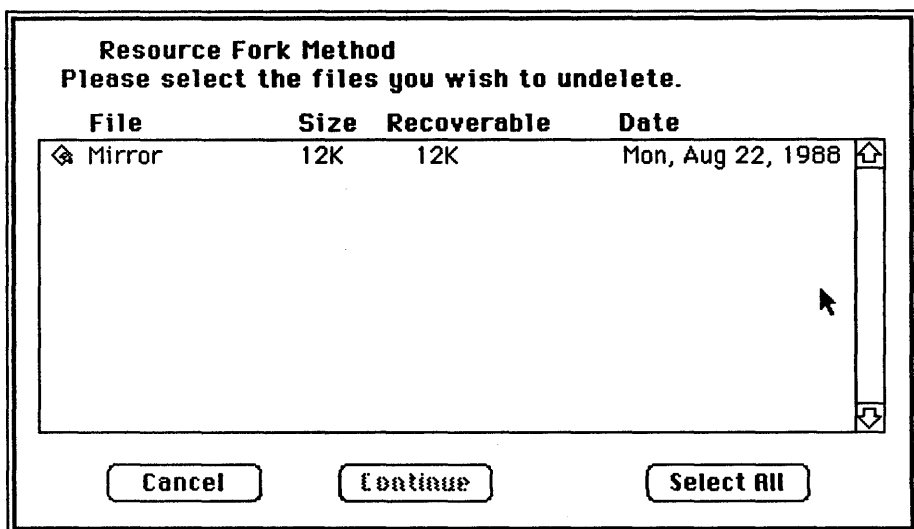
The recover using resource forks option can recover files from a disk whose directory and/or bit map has been destroyed. It identifies resource information and then recovers the file name and deduces where the data is stored. The word deduce is used here because it is possible that a file's data is not stored in one section on the diskette. This new option can get the start of the data, but since the bit map has been lost, it must guess where the rest of the data is. In the event of such conflicts, recovering using resource forks will recover as much of your file as possible.

To recover information using resource forks:

Note: When using this option, make sure the disk or volume you want to undelete files from is in the active window.

1. Select the **Undelete** command from the Disk menu.
2. Choose the **Resource Forks Method** option.

MacTools begins looking on the disk for deleted files. This takes less than a minute for 3.5 inch diskettes and several minutes for a hard disk. When it's finished, MacTools displays a dialog box asking you to select which files to undelete.



The information in the dialog box helps you determine which file or files to undelete.

Note: If you've changed the name of some of your files, the new name may not appear in this dialog box. This is because, when you change a file name, the Macintosh doesn't always update the fork. Instead, the original file name may appear.

Size:

The size column shows how big the file was.

Recoverable:

The Recoverable column shows how much of the file is still recoverable. If other files have been saved on the disk, a portion of the deleted file may have been overwritten with a new file. If the recoverable value does not equal the size of the file value, the word "Incomplete" appears telling you that all of the file cannot be successfully recovered.

Date:

The date the file was created. The date shown in the display depends on a couple of things:

On MFS disks, the date the file was last modified is provided in the resource fork information which MacTools read from the disk.

On HFS disks, the date is not available in the resource forks.

3. Select the files to undelete, or click the Select All button to select all the deleted files.
4. Click continue.

MacTools reads and organizes the deleted file information from the original disk. When it's finished, another dialog box appears asking you to select which disk, volume, or folder you want to save the files to.

Note: You must recover to a different diskette rather than to the original diskette. This protects your original diskette from further damage and gives you the option to try another undelete method.

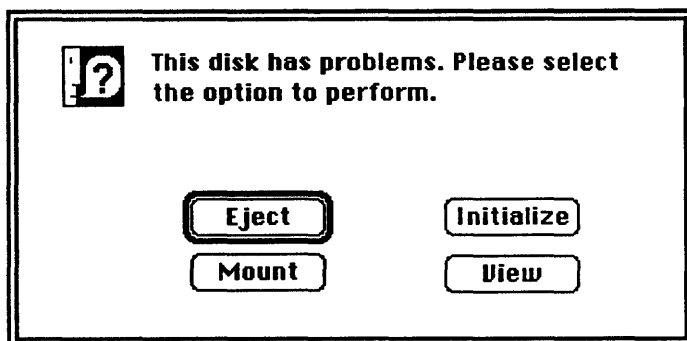
5. Use the normal Macintosh methods to select which disk, volume, or folder you want to save the files to.
6. Click continue.

MacTools writes the recovered files onto the disk you've selected.

Repairing Damaged Disks

MacTools can often successfully recover files from disks which have become damaged and produce the message "This disk is unreadable. Do you wish to eject or initialize?" Note: If you also have other software tools that might help you recover this damaged disk, you may want to use the Copy II Sector Copy option to copy the damaged disk, then use the MacTools Mount option on the copy rather than the original. That way, the original damaged disk is not changed in any way.

The recovery process takes a few steps. To attempt recovery, first insert the damaged disk (or a copy) while in the MacTools application. MacTools will notice that there are problems with the disk, and provide a display similar to the following:



MacTools is now telling you what you already have discovered: this disk is dead. But rather than just giving you the option to eject or initialize it, two additional options are available, Mount and View.

The Mount option places a new, "clean" directory on the disk. This will make the disk usable but appear to be empty. You will see a window for this disk labeled "RECOVERED DISK" and no files. The files are still lurking out there on the disk, and can usually be recovered with Undelete Files.

The View option will take you directly to the MacTools sector editor. This is for adventurous souls who wish to manually look around and see what happened to the diskette.

You will normally want to choose the Mount option, then choose Undelete Files Tag Method as described above to recover the files from the disk, placing them onto another disk. (Note that the Undelete Files display will show you both the previously "active" files and the files that were already deleted on the disk. The information included in the display can help you determine which files you want to recover.)

(If you use the Mount option with the original damaged disk, take note: Even after the Mount option is used, the damaged disk may still have other problems. We suggest that after you've recovered the files from the disk, you choose Format Disk from the Disk menu to re-initialize the disk, completely overwriting any old damage. If Format Disk fails, then the disk itself is probably permanently damaged and should be discarded.)

Checklist for Handling Disk Problems

Trashed File

You threw the file in the Trash or deleted the file from MacTools. If nothing else has been done to the disk, the file can usually be successfully recovered. (If other files have been added or changed on the disk, part of the file may have been overwritten with new files.)

1. Choose Undelete Files, then either the Delete Tracking Method or the Tag Method.
2. Select the file you threw away (using the information shown in the Undelete Files display to help you identify it).
3. Click on Continue to undelete it.
- If the original filename was not available (if it recovered as RECOVEREDFILEnnn), then use InfoEdit to set the Type and Creator and rename the undeleted file.

Unreadable Disk

Inserting the disk at the Finder desktop shows the message "This disk is unreadable" or "This is not a Macintosh disk."

1. Start up MacTools and insert the problem disk.
2. If a window for the disk correctly appears, then copy all files onto a new disk. However, MacTools might say that:
 - You're using an 800K disk in a 400K drive.
 - You're using an HFS disk in an MFS Macintosh.
 - The disk has problems. If the disk has problems, choose Mount, then choose Undelete Files on the mounted disk. Use InfoEdit to set Type and Creator for any files named RECOVEREDFILEnnn.

Can't find application

You try to open a document from the Finder desktop and get the message "There is no application to open this document."

1. Make sure the associated application is available.

2. If it is, then the Type and Creator for the document must be wrong.
3. Use InfoEdit to check the Type and Creator for another document made by the same application, then set the same Type and Creator for the problem document.

Application can't open file

From within an application, you get a message similar to "Cannot open the selected file."

1. This is usually not recoverable. Either there is a disk error (bad block) in some part of this file, or the file itself is okay but some information stored in the file is not correct for this application.
2. Use the MacTools Verify Files option to verify the problem file. If it detects errors, then one or more blocks of the file are bad.
3. In either case, call the publisher of the application to see if they have any helpful hints for recovering the file.
4. If Verify Files shows any bad blocks for the file, here is a "last chance" rescue effort: Use the Copy II Sector Copy option to copy the entire disk.
5. Try using the file from the copy. (This gives you a file that has no bad blocks, but may not contain the right information in the blocks that had been bad.)
6. If that doesn't work, then go back to the problem disk. Check the size and date of the file and use InfoEdit to note its Type and Creator.
7. Delete the file, then immediately undelete it using the Tag Method. If necessary, use InfoEdit to set Type and Creator on the recovered file.
8. Try this recovered file. (This gives you a file in which the bad blocks were "extracted." The application may not be able to tolerate a document with large sections of information "missing.")

Notes

The Macintosh is a powerful computer, and along with the power there are also a few interesting “quirks.” It can be helpful to know what a few of these peculiarities are when working with MacTools.

When running an application such as MacTools, the Macintosh system may sometimes discover that it needs some information it doesn't currently have, and will eject the disk in the drive and ask you to insert a different disk so that it can load this information. After the information is loaded, the application will continue running as before. The disk swap is done by the Macintosh system, not the application. The only drawback is that the application doesn't “know” that a different disk is now in the drive, unless it can second-guess when the Macintosh is going to want to switch disks.

Because of this, MacTools may occasionally have one disk window on the screen (or no window at all) when a different disk is actually in the drive. If this happens, don't worry! If you choose one of the options, the Macintosh is smart enough to ask you to reinsert the disk that appears in the window. If the difference between the window and the disk in the drive ever bothers you, just eject the current disk then insert the disk you want to work with.

The invisible DeskTop file found on most Macintosh disks was discussed earlier. It contains information about the icons, folders, and windows that appear when you're in the Finder. If you're using the Copy Files option to copy files from one disk to another, don't copy the DeskTop file. If you do, you'll lose whatever folders you had on the copy disk (If you are using an MFS disk). Use the Copy Disk option when you want to copy all files and folders from one disk to another.

Using Hard Disks

MacTools can work with files on many hard disks as well as with floppy diskettes. To use MacTools with a hard disk, first start up your hard disk in its usual way (which with some earlier hard disks is often by starting up the Macintosh with a diskette that was supplied with your hard disk), then open the MacTools application. You can now copy files, rename files, etc., on the hard disk with MacTools.

(Note: If you “eject” a hard disk volume from MacTools, you can't mount that volume again without quitting out of MacTools first.)

In some cases, you can use MacTools to back up copy-protected applications onto your hard disk. Start up the hard disk and open MacTools (as described above). Then insert the application disk in the floppy drive and use the Copy Files option to copy the individual files of the application onto the hard disk. Don't change the protected, locked, or invisible status of any of the files.

Some protected applications will work just fine when running from a hard disk. Others "insist" that the original application disk remain in the floppy drive. This is an integral part of the protected program and cannot readily be changed. Other applications will simply not work correctly, as the methods they use exclude hard disks. The best test is to copy the application to the hard disk and give it a try.

Mirror™



Mirror™



Rebuild™



CPSDeleteTracking

Introduction to Mirror

Mirror safeguards your disk from a number of potentially serious problems, such as:

- Disk crashes
- Disk initialized by mistake
- Directory infected by virus
- Files or Folders deleted by mistake

If Mirror is installed when any of these problems happen, you can quickly recover right where you left off. Run the Rebuild portion of Mirror, and it faithfully reconstructs the damaged portion of the disk. When Rebuild finishes, your hard disk or floppy is back to normal, ready for use.

If a file or folder is accidentally deleted, you can use MacTools to recover them. (MacTools shares the Delete Tracking INIT program with Mirror.)

How does Mirror work?

The Macintosh System uses hidden information to locate, open, and close files and applications. Normally, this information is placed on a reserved area of the disk. If this area is damaged or corrupted, the entire disk can become unusable, despite the files themselves being intact.

This is why a virus can be so devastating; the files themselves are unaffected, but the vital links connecting them to the directory structure are corrupted or erased by the virus program.

The same thing can happen if the disk is jostled during a file access; the reserved area of the disk can be physically damaged or the data corrupted.

One of the Mirror programs, Delete Tracking, keeps an up-to-date reflection of the hidden information on a separate part of the disk. It copies everything required by the System, tags it with key bytes, and writes it all into an invisible storage file. This storage file is usually at least 300K for a 20MB hard disk.

The Delete Tracking program automatically updates the storage file whenever you eject a disk or shut down the Macintosh. You can also

manually update by double-clicking on the Mirror icon and selecting Run Mirror.

The storage file can be copied to a floppy disk, providing another layer of protection. No matter where you keep it, this file contains all the hidden information needed by the Macintosh System:

- Boot blocks
- Volume information
- Bitmap
- Extent B-Tree
- Catalog B-Tree

If your disk ever crashes, the Rebuild program finds the storage file amongst the scattered data on the crashed disk by looking for the key bytes. (Rebuild will ask for the floppy disk storage file if it can't find one on the hard disk.)

Rebuild then uses the storage file to reconstruct the reserved area of the disk. When it finishes, your hard disk is fully restored.

Note: Although Rebuild fully restores the disk, the files on the disk are no more current than the last Mirror update. If you don't use the Delete Tracking INIT program to automatically update Mirror, try running Mirror at least once a day.

Recovering Files

The Delete Tracking program automatically saves information about deleted files in a second invisible file. MacTools can use this file to recover deleted documents or applications.

This second invisible file occupies about 20K of the hard disk and can recover about 120 deleted files. If you want to change the size of this file, refer to the MacTools documentation for the Install Delete-Info File option.

System Requirements

Mirror runs on any of the following machines with System Version 4.2 or higher:

- Macintosh 512KE
- Macintosh Plus

- Macintosh SE
- Macintosh II

Safeguarding Floppies

Although Mirror is primarily designed for safeguarding a hard disk, you can use it to protect an especially important floppy, provided you observe a few restrictions:

- Mirror only supports the HFS file system, so it cannot be used for MFS 400K disks or MFS hard disk volumes.
- The storage file created by Mirror requires proportionally more space on a floppy disk. See the space requirements below.

Space Requirements

The storage file created by Mirror is invisible; that is, you won't see it on the Macintosh desktop. It does require disk space, though:

- Hard disks have about 1% of their capacity used by the Mirror storage file.
- Floppy disks have about 6% of their capacity used by the Mirror storage file.

MultiFinder™

Mirror is compatible with MultiFinder. When the **Start** button is clicked, though, Mirror retains control of MultiFinder until it is finished. When Mirror finishes, you can switch MultiFinder to other programs.

Installing Mirror

Mirror has three parts:

- The Mirror application. This should be installed on your hard disk, although it will run from a floppy.
- The Delete Tracking INIT. This should be installed in the System Folder of your hard disk if you want Mirror to automatically guard your disk.
- The Rebuild application. This should be copied onto a floppy with a current System and Finder. Since you'll only need Rebuild if your hard disk crashes, you should keep it on a bootable floppy (a disk that can start your Macintosh).

To install Mirror on your system:

1. Insert the program disk and click on its icon. This opens the program disk window.
2. Drag the Mirror icon and the MacTools icon onto the hard drive window.
3. Drag the Delete Tracking icon from the program disk into the System Folder of your hard disk. **Do not** copy the System Folder itself.
4. Make a backup copy of Rebuild on a floppy disk with a System folder. Store the original program disk in a safe place. If you ever need to use Rebuild, use the copy, not the original disk.

Using Mirror

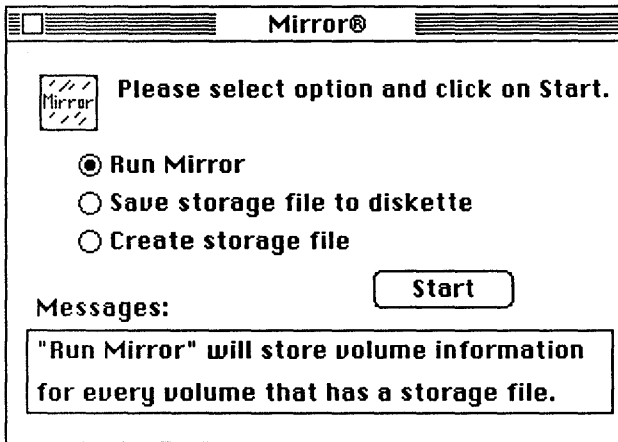
This section describes how to set up Mirror, choosing a place to save the storage file, and using it on a day-to-day basis.

To set up Mirror (automatic operation):

1. Double-click on the Mirror icon to launch it from the desktop.

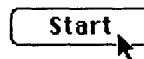


After a moment, you'll see the main window for Mirror. It has three option buttons, a Start button, and a help message box at the bottom.



2. Select **Create storage file**.

☒ **Create storage file**



3. Click **Start**.

You now see a prompt asking where you want the new storage file.

4. Choose the name of the hard disk you're using.

Mirror creates a new storage file on your hard disk. This file is where the hidden information about the layout of your disk is going to be "mirrored." In the following step, you'll load in this information for the first time.

When Mirror finishes making the new storage file, it returns you to the main menu.

5. Select **Run Mirror**.
6. Click **Start**.

Mirror is now saving, or mirroring, all of the hidden information into the storage file. If you ever have any trouble with your disk, the Rebuild part of Mirror can use this storage file to rebuild your disk.

When Mirror is through saving all the hidden information, it returns you to the main menu.

7. Choose **Quit** from the File menu.
8. When you return to the Desktop, select **Restart** from the Special menu. This activates the Delete Tracking INIT.

From now on, the Delete Tracking INIT keeps the storage file current with no further effort on your part.

Note: As long as you have the Delete Tracking INIT in your System File, the storage file is automatically updated every time you eject a disk or shut down the Macintosh.

Manual Updates

The best time to do a manual update is when you've finished a major project. This is similar to doing frequent Saves within an application; if anything happens to your disk, there's that much less work to do if a failure happens.

If you use an optimize or compress program on your disk, do a manual update after you finish..

If you choose to remove the Delete Tracking INIT from your System Folder, you must manually update to get any benefit from Mirror. Removing the INIT does speed up the shutdown of the Macintosh; you must weigh that convenience against the possibility of forgetting to do an update.

To update manually:

1. Double-click on the Mirror icon to launch it from the desktop.



2. Select **Run Mirror**.

- ☒ **Run Mirror**
- ☐ **Save storage file to diskette**
- ☐ **Create storage file**

Start

3. Click **Start**.
Wait for Run Mirror to finish.
4. Choose **Quit** from the File menu, or press Command+Q.

Copying the Storage File to a floppy disk

This doubles the protection for your hard disk. If the hard disk is so badly disorganized that the storage file is unrecoverable, having the file duplicated on a floppy gives Rebuild a last-chance opportunity to reconstruct the disk.

Copying the storage file to a floppy disk isn't something you need to do all the time; save it for those important milestones when you want to be extra sure that the data is recoverable.

To copy the storage file:

1. Insert a formatted floppy disk. Double-click on the disk to check if it has at least 300K of available space.



2. Return to the hard disk. Double-click on the Mirror icon to launch it from the desktop.



3. Select **Save storage file to diskette**.

- ☐ Run Mirror
- ☒ **Save storage file to diskette**
- ☐ Create storage file

Messages:

Start

"Save storage file" will copy storage file
off selected volume to another volume.

4. Click **Start**.

Mirror asks where it should look for the storage file.

5. Select the name of your hard disk.

Mirror asks where it should copy the storage file.

6. Select the name of the floppy disk you inserted earlier.

Mirror copies the storage file onto the floppy disk. When Mirror finishes, it returns you to the main window.

7. Choose **Quit** from the File menu, or press Command+Q.

Rebuilding your hard disk

Well, the worst has happened. Your Macintosh won't start from the hard disk. What now? With the Rebuild part of Mirror, you can quickly reconstruct your disk and be up and running.

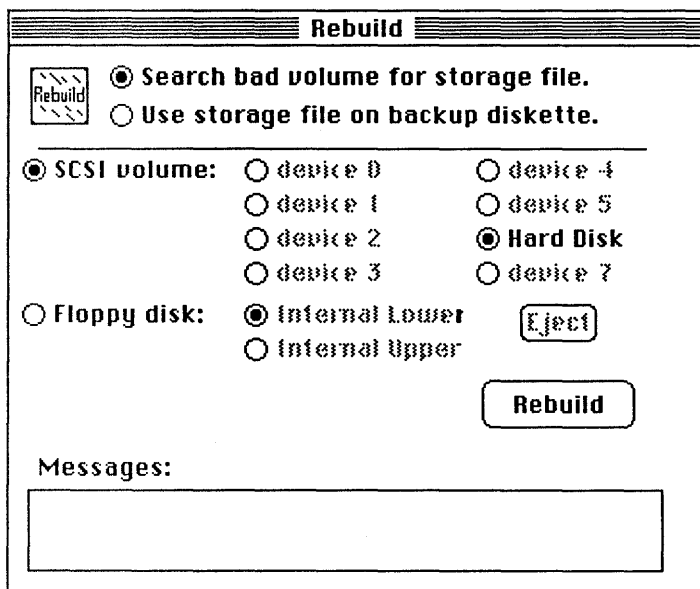
Before you start, you need a floppy disk with a System and a copy of Rebuild. A disk with a recently updated storage file may turn out to be useful, too.

To rebuild a hard disk:

1. Start your Macintosh from the floppy disk with Rebuild on it.
2. Double-click on the Rebuild icon.



In a moment, you'll see the Rebuild window.



3. Select **Search bad volume for storage file.**

4. Select **SCSI volume**. If you have more than one hard disk, select the one where you created the storage volume.
5. Click **Rebuild**.

Rebuild starts to search your hard disk for the storage file. This may take a few minutes, since Rebuild has to scan every block on the disk for the key bytes.

If Rebuild cannot find the storage file:

This is when the floppy disk copy of the storage file becomes very important. Here's what to do if this happens:

- a. Click on **Use storage file from backup diskette**.
- b. Click **Rebuild**.

Rebuild prompts for the disk that contains the storage file.

- c. Insert the floppy disk.

Rebuild reconstructs your hard disk. The file structure may not be current since it reflects the state of the disk at the time you copied the storage file.

6. Rebuild finishes reconstructing your disk. Choose **Quit** from the file menu.

When you look at the desktop, you should see the hard disk icon and the name of the disk. Double-click on the icon to see if all the folders are there, particularly the System Folder.

7. Select **Restart** from the Special menu. Your Macintosh ejects the floppy disk and restarts from the hard disk.

Your Macintosh and hard disk are ready for use.

Deleting Files

Mirror and MacTools can recover files after they are thrown in the Trash and emptied out. The Macintosh System doesn't actually erase files; it just removes the directory links and frees up the disk space.

The Delete Tracking INIT keeps track of the old directory links and disk locations, writing this information into an invisible storage file.

As long as the old files aren't overwritten by new files, they can be recovered. MacTools reads the storage file and puts the recovered files in a new folder called Recovered Files.

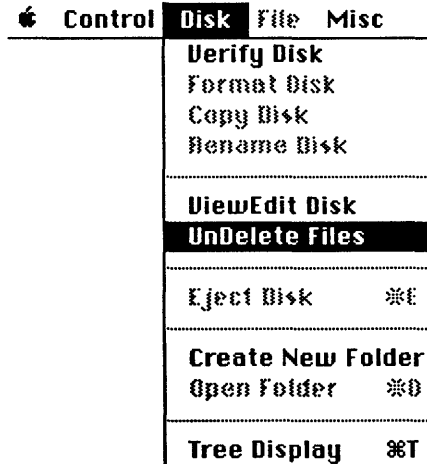
To undelete a group of files:

1. Double-click on the MacTools icon.

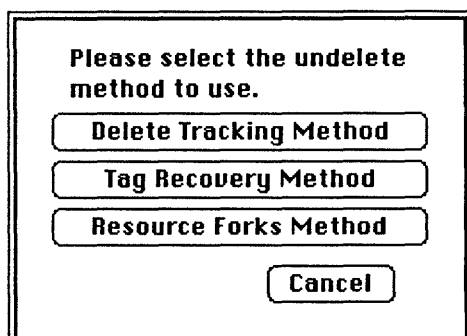


MacTools opens a window showing the contents of your hard disk. If you have a floppy inserted, you'll see a window for that also. If necessary, click on the hard disk window to bring it to the top.

2. Choose **UnDelete Files** from the Disk menu.

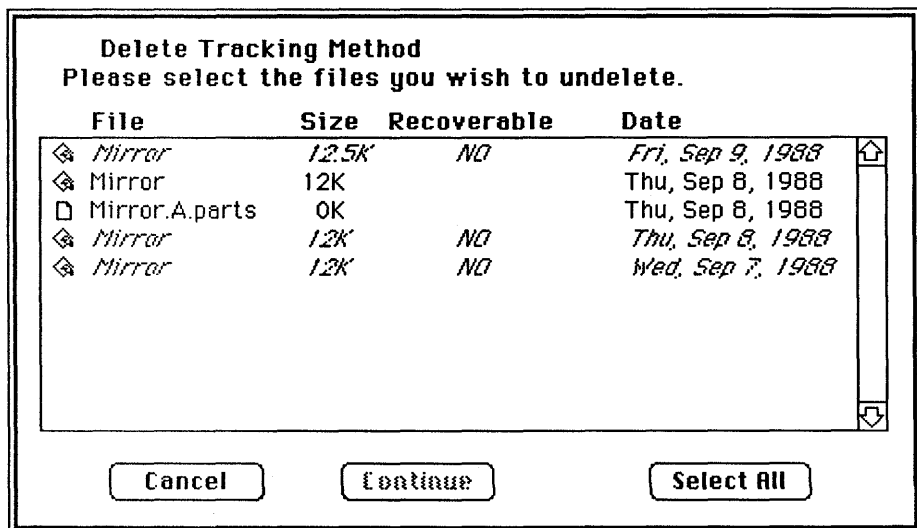


This opens a window where you can select the undelete method.



3. Select **Delete Tracking Method**.

The files tracked by Delete Tracking appear in a new window. The files in normal lettering are recoverable; the files in italics are not recoverable.



4. Select the files you want to recover.
5. Click **Continue**. This starts the recovery process. When the recovery is finished, MacTools returns to the main menu.
6. Choose **Quit** from the Control menu.

The new Recovered Files folder on the desktop contains the recovered files.



Recovered Files

LocateTM

Desk Accessory



LocateTM

Introduction to Locate

Locate is a fast and powerful information finder in a desk accessory.

Even while you're using your favorite program, you can have Locate search for a keyword, a filename, or both. It scans your disk, shows you the file(s) it found, and the text within the file. You can then copy any part of that file to the Macintosh clipboard, search again and append more text, and paste all of the text right into your document.

Locate scans all of the documents on your disk, looking for a filename or keyword.

System Requirements

Locate runs on any of the following machines:

- Macintosh 512KE
- Macintosh Plus
- Macintosh SE
- Macintosh II

MultiFinder™

When you use Locate with MultiFinder, you can find a number of documents, select the one you want, and launch it. In effect, Locate lets you search, find, and double-click a document.

Installing Locate

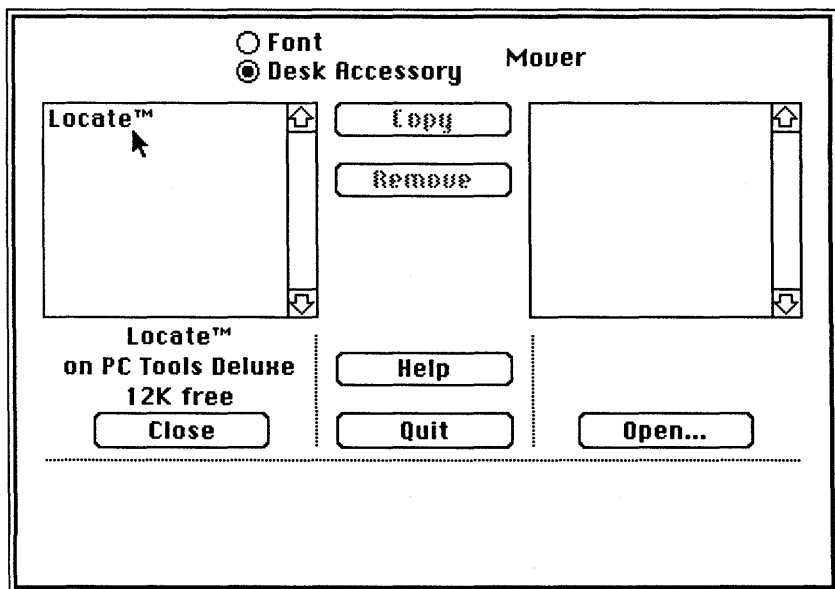
This procedure shows how to use the Apple Font/DA Mover to install the Locate desk accessory in your System file. Once Locate is installed, you can access it like any other desk accessory by pulling down the Apple menu and selecting it.

To install the Locate DA:

1. Double-click on the Locate "suitcase".



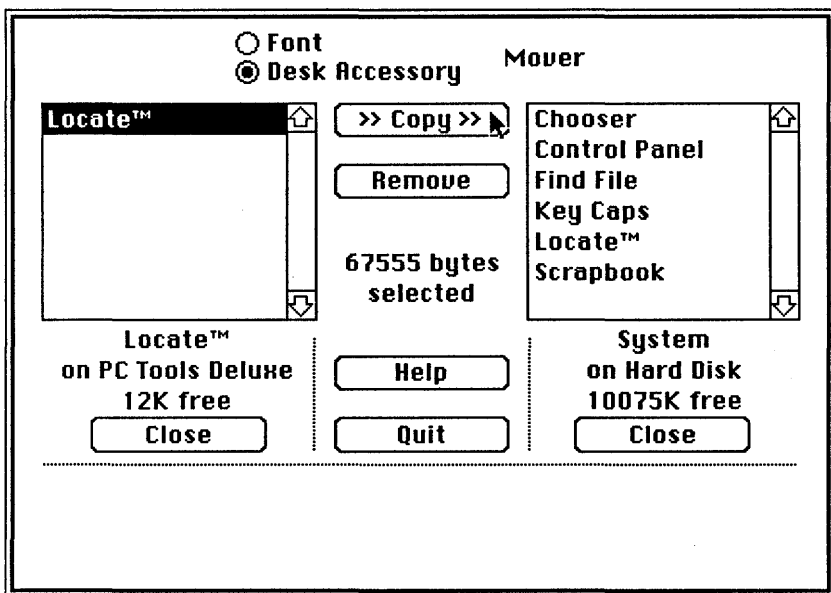
This launches Font/DA Mover, an Apple utility program for installing or removing desk accessories.



2. Insert your system disk.

Note: If you are installing Locate on your hard disk, click **Open** instead of inserting a floppy disk. Next, click the **Drive** button. The name of your hard disk should appear on the right side of the screen.

3. Double-click on the system folder in the box on the right side of the screen.
4. When the system folder opens, double-click on the System file. You should see a display like the one below. Your System file is now ready to receive Locate.



5. Click on Locate in the left box, then click on **>>Copy>>** to install it in the System.

When it appears on the right side of the screen, in the System, the installation is complete.

6. Click on **Quit** to leave Font/DA Mover and return to the desktop.

7. Repeat this process for every system disk where you want to install Locate.

Note: If you are using a hard disk, you only need to install Locate in the hard disk System.

There is a maximum of 15 desk accessories in any System file. You may have to remove a desk accessory in order to install Locate.

Using Locate

Using Locate is simple: enter a filename or one to three keywords, and click the Go button. To stop a search, click Stop. When Locate finds a file, it shows you the filename, size, type, and date.

Clicking the filename shows the text within. You can copy or append any part of the displayed text to the clipboard. The text in the clipboard can then be pasted into any Macintosh document that accepts text.

Finding and copying text

This procedure shows you how to locate text in a file, copy it to the clipboard, find another file, append the new text to the clipboard, and paste the clipboard text into a document.

To find a file:

1. Start a program that can accept text: a word processor, a page layout program, or even a drawing program. Find a place where you can insert a phrase of text.
2. Choose the **Locate** command from the Apple menu. The Locate window opens.

Locate™					
File Name:				☒ and ☐ or	
Keywords to search for:				☐ Hard Disk	
Name	Size	Kind	Modified	Created	
					
					
					
					

- Enter a filename, one to three keywords, or both. A single keyword can be any string of characters, including spaces. If you use two or three keywords, Locate selects files that contain any one of them.

Note: If you enter a filename and one or more keywords, the **And/Or** buttons are activated.

- If you want to restrict the search to keywords found only in a certain file, click the **And** button.
- If you want to find either a certain file, or certain keywords, click the **Or** button.

File Name :

scroll bar

Key words to search for :

☒ and ☐ or





☐ Hard Disk

Name	Size	Kind	Modified	Created
☐ Backup of Locate	8K	WDBN	Thu, Aug 11, 1988	Thu, Aug 11, 1988
☐ Backup of MacTool...	99K	WDBN	Thu, Aug 11, 1988	Tue, Jul 12, 1988
☐ HD	68K	WDBN	Tue, Aug 2, 1988	Tue, Jul 12, 1988
☐ Locate	9K	WDBN	Fri, Aug 12, 1988	Thu, Aug 11, 1988

43

9

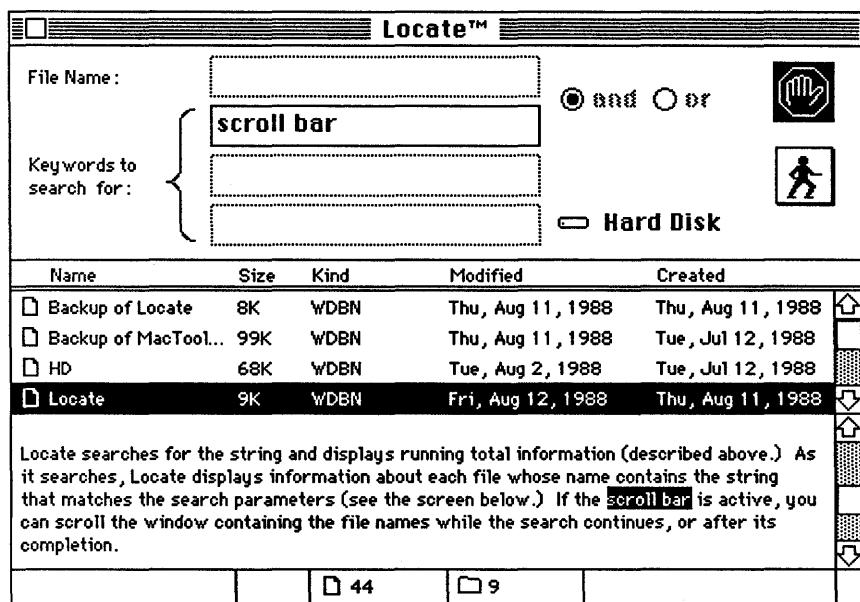
- Click the **Go** button (the running man icon) or the Return key.

While it searches, Locate displays the following information on the bottom line of the display:

- The name and size of the file being searched.
- A running total of the files (by file icon) and folders (by folder icon) searched.
- A thermometer that indicates the percentage of disk searched.
- A blinking box that indicates a search in progress.

Locate lists files as it finds them. Without stopping the search, you can view the contents of the files by selecting a filename. If you want Locate to continue searching while you do something else, click another window. This puts Locate in the background. Click the Locate window to put it in the foreground again.

If you want to stop the search, click the **Stop** button or press Command+period. To restart the search from the beginning, click **Go**.



5. Select a filename by clicking on it. The text window now shows the text within the selected file.

The first occurrence of the keyword is highlighted in the text window. You can scroll the window if the scroll bar is active.

To copy and append text to the clipboard:

Choosing Copy from the Edit menu replaces the current contents of the clipboard with the selected text. Choosing Copy More appends the selected text to the end of the text already on the clipboard.

1. Select the text you want to copy.
2. Choose **Copy** from the Edit menu, or press Command+C. This puts the selected text on the clipboard, where it can be pasted into nearly any Macintosh document.
3. Choose **Show Next Match** from the Locate menu to find the next instance of the keyword.

4. Select the next text you want to copy and choose **Copy More** from the Edit menu.
This appends the selected text to the clipboard.

To paste text in a document:

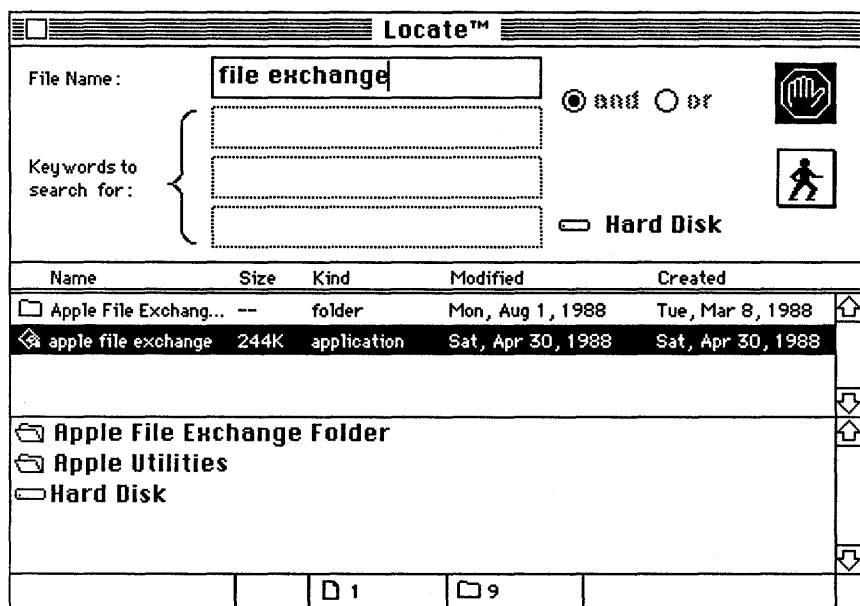
1. Click the document window, bringing it to the front.
2. Click on a location in your document where you want to add the new text.
3. Choose **Paste** from the Edit menu, or press Command+V.
The contents of the clipboard are pasted into your document.

Finding the path to a file

This procedure shows you how to find a file, then find the location of its folder. If you are using MultiFinder, you can then launch the file.

To find a file:

1. Choose the **Locate** command from the Apple menu.
The Locate window opens.
2. Enter a filename, one to three keywords, or both.
3. Click the **Go** button (the running man icon).
Locate displays the files it finds.
4. Select a file by clicking on the filename.
Locate shows text from the file in the bottom window.
5. Choose **Show Path** from the Locate menu.
When you make this selection, Locate displays the file path in the bottom window instead of text. The display starts with the current folder on the top, moves down through the folders, and ends with the volume name at the bottom.



6. Choose **Show Path** again.
Making this selection a second time toggles Show Path off.
The bottom window now displays text from the selected file.
7. If you are running MultiFinder, choose **Launch Document** from the File menu. This starts the program that created the file.

Menu Commands

Although many of Locate's features can be used by pointing and clicking in the main window, Locate gives you additional options in its four menus: File, Edit, Search, and Locate. Most of these commands can be accessed with function-key combinations, such as Command+C for Copy.

File Menu

The File menu creates a Match List document that contains a list of keyword matches, saves it, or prints it. You can also close the currently selected file, move it to the desktop, or launch applications under MultiFinder.

 File	Edit	Search	Locate™
Close			⌘W
Move to Desktop			⌘M
Launch Document			⌘L
Save Match List...			⌘S
Page Setup...			
Print Match List...			
Quit			⌘Q

Close

Unselects the currently selected file.

Move to Desktop

Moves the selected file from its current folder onto the desktop. This pulls up deeply buried files and puts them where they are readily available.

Launch Document

Starts the program that created the selected file. If Locate can't find the program, you are given a file dialog and asked to choose an application. Pressing the Option key while you choose **Launch Document** bypasses the program search and gives you the file dialog.

This feature is only active with MultiFinder.

Save Match List...

Creates a text file listing all matched keywords. Each match shows the filename, its path, and several lines of text surrounding each occurrence of the keyword.

If a file is selected, the match list is restricted to that file. If a file is not selected, the match list shows all of the files.

Page Setup...

Sets up the appearance of the match list file before it is printed.

Print Match List...

Prints a text file listing all matched keywords. Each match shows the filename, its path, and several lines of text surrounding each occurrence of the keyword.

If a file is selected, the match list is restricted to that file. If a file is not selected, the match list shows all of the files.

Edit Menu

The Edit menu copies and appends selected text to the clipboard, where it can be pasted into the current application. The other standard editing commands can be used for editing keywords.

File	Edit	Search	Locate™
	Undo	⌘Z	
	Cut	⌘H	
	Copy	⌘C	
	Paste	⌘V	
	Clear	⌘D	
	Copy More		
	Select All	⌘A	

Copy

Copies the currently selected text to the clipboard. Any text previously in the clipboard is deleted.

Copy More

Appends the currently selected text to the text in the clipboard. Any text that is in the clipboard from previous operations is unaffected.

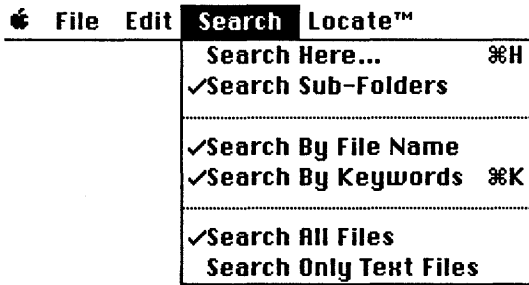
If the existing contents of the clipboard are graphics, Copy More replaces the graphics with the selected text.

Select All

Selects all of the text in the current file.

Search Menu

The Search menu controls the way that Locate searches for a file, a keyword, or both.



Search Here...

Narrows the search to a folder. When this is selected, Locate asks you which folder you want to search.

Search Sub-Folders

Searches for sub-folders in the selected volume or folder. Unless you specify otherwise, Locate searches every sub-folder in the selected volume or folder.

Unselecting this command noticeably shortens the search time in large folders, or in folders containing many sub-folders.

Search By File Name

Searches for the partial or full name of a file. Selecting this command activates the Filename box in the upper portion of the Locate screen.

Unselecting this command automatically selects the Search By Keywords command and activates the first Keyword box.

Any time you enter text in the Filename box, Search by File Name is automatically activated. If you unselect this command, the filename entry temporarily disappears from the box. If you reselect Search by File Name, the entry reappears.

Search By Keywords

Searches for one to three text strings within a file. This command is automatically selected when you unselect the Search By File Name command.

Search by Keywords is automatically activated by typing in any of the three Keywords boxes. If you unselect this command, the keyword entries temporarily disappear from the boxes. If you reselect Search by Keywords, the entries reappear.

Search All Files

Searches for document files, font files, applications, and DAs. Locate normally searches all files.

Search Only Text Files

Searches everything except applications, font files, and DA's. This increases the search speed of Locate.

Locate Menu

The Locate menu controls the path display and skips forward to the next keyword match or next file.

🍏	File	Edit	Search	Locate™	
				Show Path	⌘P
				Show Only Names	
				Show Next File	⌘F
				Show Next Match	⌘G
				Show Match Number...	⌘N

Show Path

Displays the folder path leading to the file. Locate displays the contents of the selected file when this command is turned off.

Show Only Names

Shows only the names of files matching the search parameters. The complete file names are displayed in the file window.

Show Next File

Selects the file to display next when more than one file is listed. Locate displays the file's matching string.

If you don't select a file to display next, Locate automatically selects the first file in the list. If there are no more files, Locate notifies you with a beep.

Show Next Match

Finds the next match of the keyword within a file.

If the file contains no more instances of the keyword, Locate jumps to the first instance of the string in the next file. If there are no more files, Locate notifies you with a beep.

Show Match Number...

Finds successive uses of the same keyword within the current file. If you want to find where a keyword is used for the third time in a file, choose **Show Match Number...** from the Locate menu, and enter **3** in the dialog box. Locate skips to the correct place in the file.

Appendices

Appendix A – Track Sector Lookup

To use this chart, find the block number in the chart. Look to the left for the track number and to the top for the sector number.

400K DISK

Track	Sector											
	0	1	2	3	4	5	6	7	8	9	10	11
0	0	1	2	3	4	5	6	7	8	9	10	11
1	12	13	14	15	16	17	18	19	20	21	22	23
2	24	25	26	27	28	29	30	31	32	33	34	35
3	36	37	38	39	40	41	42	43	44	45	46	47
4	48	49	50	51	52	53	54	55	56	57	58	59
5	60	61	62	63	64	65	66	67	68	69	70	71
6	72	73	74	75	76	77	78	79	80	81	82	83
7	84	85	86	87	88	89	90	91	92	93	94	95
8	96	97	98	99	100	101	102	103	104	105	106	107
9	108	109	110	111	112	113	114	115	116	117	118	119
10	120	121	122	123	124	125	126	127	128	129	130	131
11	132	133	134	135	136	137	138	139	140	141	142	143
12	144	145	146	147	148	149	150	151	152	153	154	155
13	156	157	158	159	160	161	162	163	164	165	166	167
14	168	169	170	171	172	173	174	175	176	177	178	179
15	180	181	182	183	184	185	186	187	188	189	190	191
16	192	193	194	195	196	197	198	199	200	201	202	
17	203	204	205	206	207	208	209	210	211	212	213	
18	214	215	216	217	218	219	220	221	222	223	224	
19	225	226	227	228	229	230	231	232	233	234	235	
20	236	237	238	239	240	241	242	243	244	245	246	
21	247	248	249	250	251	252	253	254	255	256	257	
22	258	259	260	261	262	263	264	265	266	267	268	
23	269	270	271	272	273	274	275	276	277	278	279	
24	280	281	282	283	284	285	286	287	288	289	290	
25	291	292	293	294	295	296	297	298	299	300	301	
26	302	303	304	305	306	307	308	309	310	311	312	
27	313	314	315	316	317	318	319	320	321	322	323	
28	324	325	326	327	328	329	330	331	332	333	334	
29	335	336	337	338	339	340	341	342	343	344	345	
30	346	347	348	349	350	351	352	353	354	355	356	
31	357	358	359	360	361	362	363	364	365	366	367	

400K DISK

Track	Sector									
	0	1	2	3	4	5	6	7	8	9
32	368	369	370	371	372	373	374	375	376	377
33	378	379	380	381	382	383	384	385	386	387
34	388	389	390	391	392	393	394	395	396	397
35	398	399	400	401	402	403	404	405	406	407
36	408	409	410	411	412	413	414	415	416	417
37	418	419	420	421	422	423	424	425	426	427
38	428	429	430	431	432	433	434	435	436	437
39	438	439	440	441	442	443	444	445	446	447
40	448	449	450	451	452	453	454	455	456	457
41	458	459	460	461	462	463	464	465	466	467
42	468	469	470	471	472	473	474	475	476	477
43	478	479	480	481	482	483	484	485	486	487
44	488	489	490	491	492	493	494	495	496	497
45	498	499	500	501	502	503	504	505	506	507
46	508	509	510	511	512	513	514	515	516	517
47	518	519	520	521	522	523	524	525	526	527
48	528	529	530	531	532	533	534	535	536	
49	537	538	539	540	541	542	543	544	545	
50	546	547	548	549	550	551	552	553	554	
51	555	556	557	558	559	560	561	562	563	
52	564	565	566	567	568	569	570	571	572	
53	573	574	575	576	577	578	579	580	581	
54	582	583	584	585	586	587	588	589	590	
55	591	592	593	594	595	596	597	598	599	
56	600	601	602	603	604	605	606	607	608	
57	609	610	611	612	613	614	615	616	617	
58	618	619	620	621	622	623	624	625	626	
59	627	628	629	630	631	632	633	634	635	
60	636	637	638	639	640	641	642	643	644	
61	645	646	647	648	649	650	651	652	653	
62	654	655	656	657	658	659	660	661	662	
63	663	664	665	666	667	668	669	670	671	
64	672	673	674	675	676	677	678	679		
65	680	681	682	683	684	685	686	687		
66	688	689	690	691	692	693	694	695		
67	696	697	698	699	700	701	702	703		
68	704	705	706	707	708	709	710	711		
69	712	713	714	715	716	717	718	719		
70	720	721	722	723	724	725	726	727		
71	728	729	730	731	732	733	734	735		
72	736	737	738	739	740	741	742	743		
73	744	745	746	747	748	749	750	751		
74	752	753	754	755	756	757	758	759		
75	760	761	762	763	764	765	766	767		
76	768	769	770	771	772	773	774	775		
77	776	777	778	779	780	781	782	783		
78	784	785	786	787	788	789	790	791		
79	792	793	794	795	796	797	798	799		

To use this chart, find the block number in the chart. Look to the left for the track number and to the top for the sector number.

Note: On 800K disks, every track has two sides. The first line of the track is side A and the second line of a track is side B (see examples on tracks 0 through 3).

800K DISK

		Sector											
Track	0	1	2	3	4	5	6	7	8	9	10	11	
0	A	0	1	2	3	4	5	6	7	8	9	10	11
	B	12	13	14	15	16	17	18	19	20	21	22	23
1	A	24	25	26	27	28	29	30	31	32	33	34	35
	B	36	37	38	39	40	41	42	43	44	45	46	47
2	A	48	49	50	51	52	53	54	55	56	57	58	59
	B	60	61	62	63	64	65	66	67	68	69	70	71
3	A	72	73	74	75	76	77	78	79	80	81	82	83
	B	84	85	86	87	88	89	90	91	92	93	94	95
4		96	97	98	99	100	101	102	103	104	105	106	107
		108	109	110	111	112	113	114	115	116	117	118	119
5		120	121	122	123	124	125	126	127	128	129	130	131
		132	133	134	135	136	137	138	139	140	141	142	143
6		144	145	146	147	148	149	150	151	152	153	154	155
		156	157	158	159	160	161	162	163	164	165	166	167
7		168	169	170	171	172	173	174	175	176	177	178	179
		180	181	182	183	184	185	186	187	188	189	190	191
8		192	193	194	195	196	197	198	199	200	201	202	203
		204	205	206	207	208	209	210	211	212	213	214	215
9		216	217	218	219	220	221	222	223	224	225	226	227
		228	229	230	231	232	233	234	235	236	237	238	239
10		240	241	242	243	244	245	246	247	248	249	250	251
		252	253	254	255	256	257	258	259	260	261	262	263
11		264	265	266	267	268	269	270	271	272	273	274	275
		276	277	278	279	280	281	282	283	284	285	286	287
12		288	289	290	291	292	293	294	295	296	297	298	299
		300	301	302	303	304	305	306	307	308	309	310	311
13		312	313	314	315	316	317	318	319	320	321	322	323
		324	325	326	327	328	329	330	331	332	333	334	335
14		336	337	338	339	340	341	342	343	344	345	346	347
		348	349	350	351	352	353	354	355	356	357	358	359
15		360	361	362	363	364	365	366	367	368	369	370	371
		372	373	374	375	376	377	378	379	380	381	382	383

800K DISK

Track	Sector										
	0	1	2	3	4	5	6	7	8	9	10
16	384	385	386	387	388	389	390	391	392	393	394
	395	396	397	398	399	400	401	402	403	404	405
17	406	407	408	409	410	411	412	413	414	415	416
	417	418	419	420	421	422	423	424	425	426	427
18	428	429	430	431	432	433	434	435	436	437	438
	439	440	441	442	443	444	445	446	447	448	449
19	450	451	452	453	454	455	456	457	458	459	460
	461	462	463	464	465	466	467	468	469	470	471
20	472	473	474	475	476	477	478	479	480	481	482
	483	484	485	486	487	488	489	490	491	492	493
21	494	495	496	497	498	499	500	501	502	503	504
	505	506	507	508	509	510	511	512	513	514	515
22	516	517	518	519	520	521	522	523	524	525	526
	527	528	529	530	531	532	533	534	535	536	537
23	538	539	540	541	542	543	544	545	546	547	548
	549	550	551	552	553	554	555	556	557	558	559
24	560	561	562	563	564	565	566	567	568	569	570
	571	572	573	574	575	576	577	578	579	580	581
25	582	583	584	585	586	587	588	589	590	591	592
	593	594	595	596	597	598	599	600	601	602	603
26	604	605	606	607	608	609	610	611	612	613	614
	615	616	617	618	619	620	621	622	623	624	625
27	626	627	628	629	630	631	632	633	634	635	636
	637	638	639	640	641	642	643	644	645	646	647
28	648	649	650	651	652	653	654	655	656	657	658
	659	660	661	662	663	664	665	666	667	668	669
29	670	671	672	673	674	675	676	677	678	679	680
	681	682	683	684	685	686	687	688	689	690	691
30	692	693	694	695	696	697	698	699	700	701	702
	703	704	705	706	707	708	709	710	711	712	713
31	714	715	716	717	718	719	720	721	722	723	724
	725	726	727	728	729	730	731	732	733	734	735

800K DISK

Track	Sector									
	0	1	2	3	4	5	6	7	8	9
32	736	737	738	739	740	741	742	743	744	745
	746	747	748	749	750	751	752	753	754	755
33	756	757	758	759	760	761	762	763	764	765
	766	767	768	769	770	771	772	773	774	775
34	776	777	778	779	780	781	782	783	784	785
	786	787	788	789	790	791	792	793	794	795
35	796	797	798	799	800	801	802	803	804	805
	806	807	808	809	810	811	812	813	814	815
36	816	817	818	819	820	821	822	823	824	825
	826	827	828	829	830	831	832	833	834	835
37	836	837	838	839	840	841	842	843	844	845
	846	847	848	849	850	851	852	853	854	855
38	856	857	858	859	860	861	862	863	864	865
	866	867	868	869	870	871	872	873	874	875
39	876	877	878	879	880	881	882	883	884	885
	886	887	888	889	890	891	892	893	894	895
40	896	897	898	899	900	901	902	903	904	905
	906	907	908	909	910	911	912	913	914	915
41	916	917	918	919	920	921	922	923	924	925
	926	927	928	929	930	931	932	933	934	935
42	936	937	938	939	940	941	942	943	944	945
	946	947	948	949	950	951	952	953	954	955
43	956	957	958	959	960	961	962	963	964	965
	966	967	968	969	970	971	972	973	974	975
44	976	977	978	979	980	981	982	983	984	985
	986	987	988	989	990	991	992	993	994	995
45	996	997	998	999	1000	1001	1002	1003	1004	1005
	1006	1007	1008	1009	1010	1011	1012	1013	1014	1015
46	1016	1017	1018	1019	1020	1021	1022	1023	1024	1025
	1026	1027	1028	1029	1030	1031	1032	1033	1034	1035
47	1036	1037	1038	1039	1040	1041	1042	1043	1044	1045
	1046	1047	1048	1049	1050	1051	1052	1053	1054	1055

800K DISK

Track	Sector								
	0	1	2	3	4	5	6	7	8
48	1056	1057	1058	1059	1060	1061	1062	1063	1064
	1065	1066	1067	1068	1069	1070	1071	1072	1073
49	1074	1075	1076	1077	1078	1079	1080	1081	1082
	1083	1084	1085	1086	1087	1088	1089	1090	1091
50	1092	1093	1094	1095	1096	1097	1098	1099	1100
	1101	1102	1103	1104	1105	1106	1107	1108	1109
51	1110	1111	1112	1113	1114	1115	1116	1117	1118
	1119	1120	1121	1122	1123	1124	1125	1126	1127
52	1128	1129	1130	1131	1132	1133	1134	1135	1136
	1137	1138	1139	1140	1141	1142	1143	1144	1145
53	1146	1147	1148	1149	1150	1151	1152	1153	1154
	1155	1156	1157	1158	1159	1160	1161	1162	1163
54	1164	1165	1166	1167	1168	1169	1170	1171	1172
	1173	1174	1175	1176	1177	1178	1179	1180	1181
55	1182	1183	1184	1185	1186	1187	1188	1189	1190
	1191	1192	1193	1194	1195	1196	1197	1198	1199
56	1200	1201	1202	1203	1204	1205	1206	1207	1208
	1209	1210	1211	1212	1213	1214	1215	1216	1217
57	1218	1219	1220	1221	1222	1223	1224	1225	1226
	1227	1228	1229	1230	1231	1232	1233	1234	1235
58	1236	1237	1238	1239	1240	1241	1242	1243	1244
	1245	1246	1247	1248	1249	1250	1251	1252	1253
59	1254	1255	1256	1257	1258	1259	1260	1261	1262
	1263	1264	1265	1266	1267	1268	1269	1270	1271
60	1272	1273	1274	1275	1276	1277	1278	1279	1280
	1281	1282	1283	1284	1285	1286	1287	1288	1289
61	1290	1291	1292	1293	1294	1295	1296	1297	1298
	1299	1300	1301	1302	1303	1304	1305	1306	1307
62	1308	1309	1310	1311	1312	1313	1314	1315	1316
	1317	1318	1319	1320	1321	1322	1323	1324	1325
63	1326	1327	1328	1329	1330	1331	1332	1333	1334
	1335	1336	1337	1338	1339	1340	1341	1342	1343

800K DISK

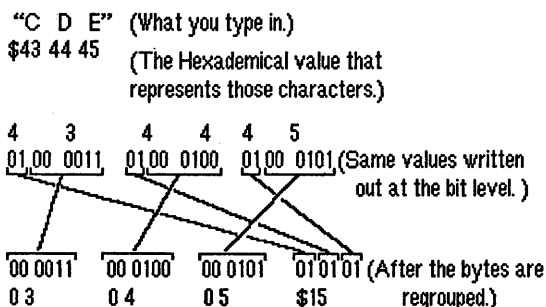
Track	Sector							
	0	1	2	3	4	5	6	7
64	1344	1345	1346	1347	1348	1349	1350	1351
	1352	1353	1354	1355	1356	1357	1358	1359
65	1360	1361	1362	1363	1364	1365	1366	1367
	1368	1369	1370	1371	1372	1373	1374	1375
66	1376	1377	1378	1379	1380	1381	1382	1383
	1384	1385	1386	1387	1388	1389	1390	1391
67	1392	1393	1394	1395	1396	1397	1398	1399
	1400	1401	1402	1403	1404	1405	1406	1407
68	1408	1409	1410	1411	1412	1413	1414	1415
	1416	1417	1418	1419	1420	1421	1422	1423
69	1424	1425	1426	1427	1428	1429	1430	1431
	1432	1433	1434	1435	1436	1437	1438	1439
70	1440	1441	1442	1443	1444	1445	1446	1447
	1448	1449	1450	1451	1452	1453	1454	1455
71	1456	1457	1458	1459	1460	1461	1462	1463
	1464	1465	1466	1467	1468	1469	1470	1471
72	1472	1473	1474	1475	1476	1477	1478	1479
	1480	1481	1482	1483	1484	1485	1486	1487
73	1488	1489	1490	1491	1492	1493	1494	1495
	1496	1497	1498	1499	1500	1501	1502	1503
74	1504	1505	1506	1507	1508	1509	1510	1511
	1512	1513	1514	1515	1516	1517	1518	1519
75	1520	1521	1522	1523	1524	1525	1526	1527
	1528	1529	1530	1531	1532	1533	1534	1535
76	1536	1537	1538	1539	1540	1541	1542	1543
	1544	1545	1546	1547	1548	1549	1550	1551
77	1552	1553	1554	1555	1556	1557	1558	1559
	1560	1561	1562	1563	1564	1565	1566	1567
78	1568	1569	1570	1571	1572	1573	1574	1575
	1576	1577	1578	1579	1580	1581	1582	1583
79	1584	1585	1586	1587	1588	1589	1590	1591
	1592	1593	1594	1595	1596	1597	1598	1599

Appendix B – Byte Encoding Methods

6&2 encoded bytes

In this encoding scheme, three normal bytes become four encoded bytes. The encoder takes the low six bits of every number and performs a lookup in the write translate table to get the byte value to write to the diskette.

The top two bits of every number are rotated into the fourth byte and then that fourth 6-bit byte is used to do a lookup in the write translate table.



These new numbers (all in the range of 0–\$3F) are put through the write translate table to get the number to store on the diskette. So, in our example:

\$03	→	\$9B
\$04		\$9D
\$05		\$9E
\$15		\$BA

Write Translate Table 6 and 2

00 = 96	10 = B4	20 = D6	30 = ED
01 = 97	11 = B5	21 = D7	31 = EE
02 = 9A	12 = B6	22 = D9	32 = EF
03 = 9B	13 = B7	23 = DA	33 = F2
04 = 9D	14 = B9	24 = DB	34 = F3
05 = 9E	15 = BA	25 = DC	35 = F4
06 = 9F	16 = BB	26 = DD	36 = F5
07 = A6	17 = BC	27 = DE	37 = F6
08 = A7	18 = BD	28 = DF	38 = F7
09 = AB	19 = BE	29 = E5	39 = F9
0A = AC	1A = BF	2A = E6	3A = FA
0B = AD	1B = CB	2B = E7	3B = FB
0C = AE	1C = CD	2C = E9	3C = FC
0D = AF	1D = CE	2D = EA	3D = FD
0E = B2	1E = CF	2E = EB	3E = FE
0F = B3	1F = D3	2F = EC	3F = FF

The bytes AA and D5 are reserved bytes and should never appear inside of the sector data. (They are used in address and data prologs and epilogs.)

Appendix C – Disk Error ID Numbers

These are the possible Macintosh disk error numbers that can appear when using MacTools (usually with the Verify Disk option). These disk error numbers are of use only to programmers, and the errors usually can only be fixed by reformatting the disk.

- 67 couldn't find valid address mark
- 69 address mark checksum didn't check
- 70 bad address mark bit slip nibbles
- 71 couldn't find a data mark header
- 72 bad data mark checksum
- 73 bad data bit slip nibbles
- 74 write underrun occurred
- 78 tried to read 2nd side on a 1-sided disk
- 80 track number wrong on address mark
- 81 sector number never found on a track

Appendix D – Number Conversion Tables

The table below lets you convert between decimal and hexadecimal numbers.

<u>Dec</u>	<u>Hex</u>	<u>Dec</u>	<u>Hex</u>	<u>Dec</u>	<u>Hex</u>
0	\$00	32	\$20	64	\$40
1	\$01	33	\$21	65	\$41
2	\$02	34	\$22	66	\$42
3	\$03	35	\$23	67	\$43
4	\$04	36	\$24	68	\$44
5	\$05	37	\$25	69	\$45
6	\$06	38	\$26	70	\$46
7	\$07	39	\$27	71	\$47
8	\$08	40	\$28	72	\$48
9	\$09	41	\$29	73	\$49
10	\$0A	42	\$2A	74	\$4A
11	\$0B	43	\$2B	75	\$4B
12	\$0C	44	\$2C	76	\$4C
13	\$0D	45	\$2D	77	\$4D
14	\$0E	46	\$2E	78	\$4E
15	\$0F	47	\$2F	79	\$4F
16	\$10	48	\$30	80	\$50
17	\$11	49	\$31	81	\$51
18	\$12	50	\$32	82	\$52
19	\$13	51	\$33	83	\$53
20	\$14	52	\$34	84	\$54
21	\$15	53	\$35	85	\$55
22	\$16	54	\$36	86	\$56
23	\$17	55	\$37	87	\$57
24	\$18	56	\$38	88	\$58
25	\$19	57	\$39	89	\$59
26	\$1A	58	\$3A	90	\$5A
27	\$1B	59	\$3B	91	\$5B
28	\$1C	60	\$3C	92	\$5C
29	\$1D	61	\$3D	93	\$5D
30	\$1E	62	\$3E	94	\$5E
31	\$1F	63	\$3F	95	\$5F

<u>Dec</u>	<u>Hex</u>	<u>Dec</u>	<u>Hex</u>	<u>Dec</u>	<u>Hex</u>
96	\$60	128	\$80	160	\$A0
97	\$61	129	\$81	161	\$A1
98	\$62	130	\$82	162	\$A2
99	\$63	131	\$83	163	\$A3
100	\$64	132	\$84	164	\$A4
101	\$65	133	\$85	165	\$A5
102	\$66	134	\$86	166	\$A6
103	\$67	135	\$87	167	\$A7
104	\$68	136	\$88	168	\$A8
105	\$69	137	\$89	169	\$A9
106	\$6A	138	\$8A	170	\$AA
107	\$6B	139	\$8B	171	\$AB
108	\$6C	140	\$8C	172	\$AC
109	\$6D	141	\$8D	173	\$AD
110	\$6E	142	\$8E	174	\$AE
111	\$6F	143	\$8F	175	\$AF
112	\$70	144	\$90	176	\$B0
113	\$71	145	\$91	177	\$B1
114	\$72	146	\$92	178	\$B2
115	\$73	147	\$93	179	\$B3
116	\$74	148	\$94	180	\$B4
117	\$75	149	\$95	181	\$B5
118	\$76	150	\$96	182	\$B6
119	\$77	151	\$97	183	\$B7
120	\$78	152	\$98	184	\$B8
121	\$79	153	\$99	185	\$B9
122	\$7A	154	\$9A	186	\$BA
123	\$7B	155	\$9B	187	\$BB
124	\$7C	156	\$9C	188	\$BC
125	\$7D	157	\$9D	189	\$BD
126	\$7E	158	\$9E	190	\$BE
127	\$7F	159	\$9F	191	\$BF

<u>Dec</u>	<u>Hex</u>	<u>Dec</u>	<u>Hex</u>
192	\$C0	224	\$E0
193	\$C1	225	\$E1
194	\$C2	226	\$E2
195	\$C3	227	\$E3
196	\$C4	228	\$E4
197	\$C5	229	\$E5
198	\$C6	230	\$E6
199	\$C7	231	\$E7
200	\$C8	232	\$E8
201	\$C9	233	\$E9
202	\$CA	234	\$EA
203	\$CB	235	\$EB
204	\$CC	236	\$EC
205	\$CD	237	\$ED
206	\$CE	238	\$EE
207	\$CF	239	\$EF
208	\$D0	240	\$F0
209	\$D1	241	\$F1
210	\$D2	242	\$F2
211	\$D3	243	\$F3
212	\$D4	244	\$F4
213	\$D5	245	\$F5
214	\$D6	246	\$F6
215	\$D7	247	\$F7
216	\$D8	248	\$F8
217	\$D9	249	\$F9
218	\$DA	250	\$FA
219	\$DB	251	\$FB
220	\$DC	252	\$FC
221	\$DD	253	\$FD
222	\$DE	254	\$FE
223	\$DF	255	\$FF

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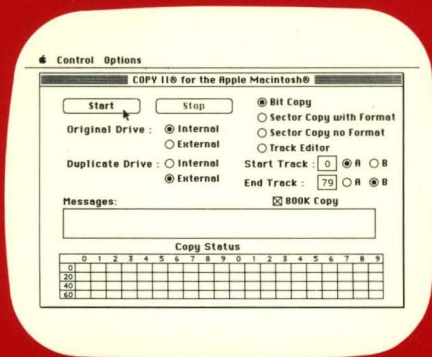
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Hardware requirements:
Apple® Macintosh™
computer or Mac® Plus
computer, 512e,
SE or Mac® II. Needs at
least one 800K floppy
drive, supports hard disks.

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Mac User.
- **"Copy II Hard Disk is extremely easy to use."**
Mac User.
- **"It may be the copying function that gets you interested in COPY II in the first place, but MacTools itself is worth the cost of the software."**
Compuserve.
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