



Apple®

Tape Backup 40SC Owner's Guide



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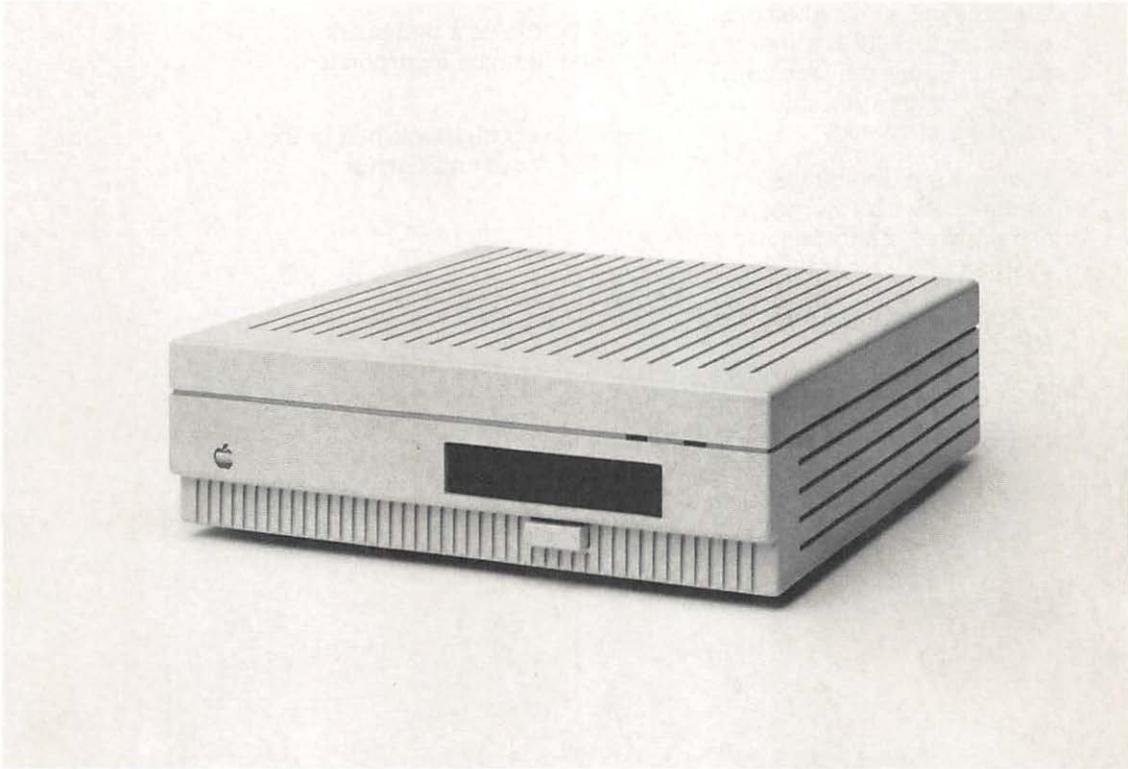
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WARNING

This equipment has been certified to comply with the limits for a Class B computing device, pursuant to Subpart J of Part 15 of FCC rules. See instructions if interference to radio or television reception is suspected.



Apple® Tape Backup 40SC
Owner's Guide



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Radio and television interference

The equipment described in this manual generates and uses radio-frequency energy. If it is not installed and used properly—that is, in strict accordance with Apple's instructions—it may cause interference with radio and television reception.

This equipment has been tested and complies with the limits for a Class B computing device in accordance with the specifications in Subpart J, Part 15, of FCC rules. These rules are designed to provide reasonable protection against such interference in a residential installation. However, there is no guarantee that the interference will not occur in a particular installation, especially if a “rabbit-ear” television antenna is used. (A rabbit-ear antenna is the telescoping-rod type usually found on television receivers.)

You can determine whether your computer is causing interference by turning it off. If the interference stops, it was probably caused by the computer or its peripheral devices.

If your computer system does cause interference to radio or television reception, you can try to correct the interference by using one or more of the following measures:

- Turn the television or radio antenna until the interference stops.
- Move the computer to one side or the other of the television or radio.
- Move the computer farther away from the television or radio.
- Plug the computer into an outlet that is on a different circuit than the television or radio. (That is, make certain the computer and the radio or television are on circuits controlled by different circuit breakers or fuses.)
- Consider installing a rooftop television antenna with a coaxial cable lead-in between the antenna and the television.

If necessary, consult your authorized Apple dealer or an experienced radio/television technician for additional suggestions.

You may find helpful the following booklet, prepared by the Federal Communications Commission: “How to Identify and Resolve Radio-TV Interference Problems.” This booklet is available from the U.S. Government Printing Office, Washington, DC 20402.

Important

This product was FCC-certified under test conditions that included use of shielded cables and connectors between system components. It is important that you use shielded cables and connectors to reduce the possibility of causing interference to radios, television sets, and other electronic devices. For Apple peripheral devices, you can obtain the proper shielded cable from your authorized Apple dealer. For non-Apple peripheral devices, contact the manufacturer or dealer for assistance.



Your Apple® Tape Backup 40SC device provides a reliable way to protect your work. With the Tape Backup 40SC you can make backup copies of the entire contents of a disk or of individual files, according to your needs.

The Tape Backup 40SC works with any Macintosh™ system that has a **Small Computer Systems Interface (SCSI)** connector. SCSI increases the speed, flexibility, expandability, and sophistication of your system. In particular, SCSI speeds up the information flow between your Macintosh, hard disk, and tape backup device. The Tape Backup 40SC backs up all Apple hard disks and hard disks made by most other manufacturers that use the Hierarchical File System (HFS).

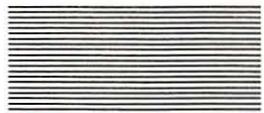
About this manual

This manual describes how to set up and use your Tape Backup 40SC. It explains how to make tape cartridge copies of hard disk contents and how to restore, or transfer, the contents of the tape cartridge back to your disk, in case you need to.

Throughout this manual, “Macintosh” means any computer of the Macintosh family that can connect to a SCSI cable.

This manual assumes that you have read the owner's guide that accompanies your Macintosh computer, the *Apple SCSI Cable System* manual, and your hard disk manual. You should be familiar with basic mouse techniques used with all Macintosh applications, such as clicking, dragging, and using the Finder.

Terms that appear in **bold** type are defined in the glossary.



Chapter 1



Setting Up

To set up your Tape Backup 40SC, read the next section on equipment, then choose the section that describes your Macintosh system from “Connecting the Tape Backup 40SC.” When you have connected your tape backup device, set the priority switch and go on to Chapter 2 to start up the Tape Backup 40SC.

Tape Backup 40SC equipment

The Tape Backup 40SC box holds

- Apple Tape Backup 40SC device
- Apple Tape Backup 40SC Owner's Guide*
- Apple Tape Backup 40SC disk
- 40MB** Tape Cartridge, formatted and factory tested with this tape backup device
- Tape Backup 40SC power cord

Remove the plastic bag from the Tape Backup 40SC. It's a good idea to keep all your packing materials in case you need to transport your Tape Backup 40SC.

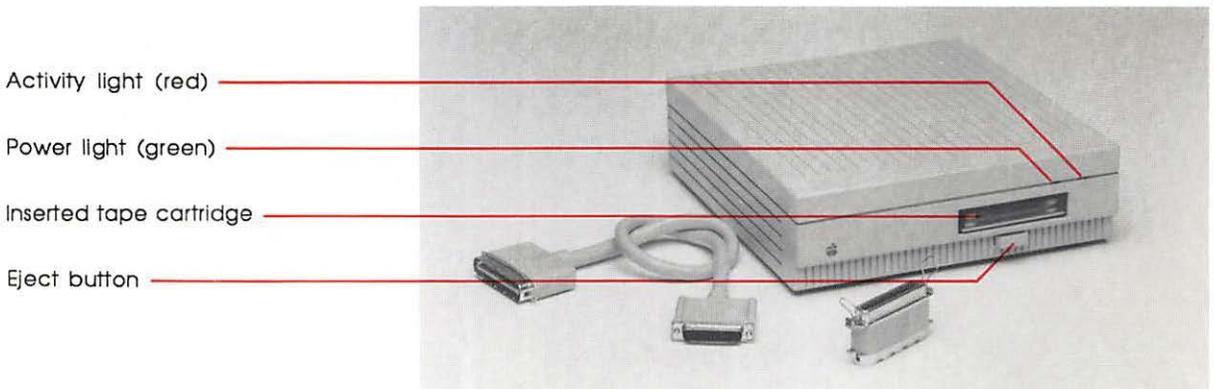


Figure 1-1
Tape Backup 40SC

You can place the Tape Backup 40SC where it's convenient as long as the total length of the **cable** system you use to connect your Macintosh system and other devices is no longer than 20 feet (6.5 meters).

SCSI background

To connect the Tape Backup 40SC you need an Apple **SCSI** Cable System. You can purchase this system from your authorized Apple dealer. Your Macintosh™ personal computer **system** requires some combination of the following cables and the Cable Terminator. Figure 1-2 shows you these cables:

- **System Cable**—an 18-inch cable with a DB-25 connector (25 gold pins embedded in plastic) at one end and a DB-50 connector (50 gold pins embedded in plastic) at the other end. This cable connects a SCSI device to the SCSI connector on your Macintosh.
- **Peripheral Interface Cable**—a cable about 3 feet long with identical DB-50 connectors at each end. This cable is for connecting SCSI **peripheral devices** after the first two (your computer and the first peripheral device) in your Macintosh system.
- **Cable Extender**—a cable with different connectors at each end used as an extension cord. One end receives the Peripheral Interface Cable or System Cable, and the other end plugs into a Cable Terminator or the next device.

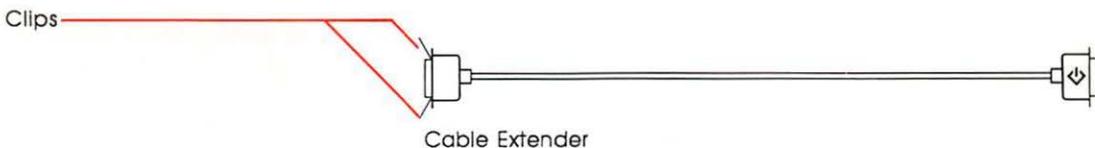
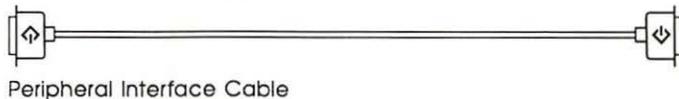
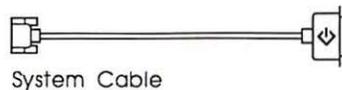


Figure 1-2
SCSI cables

- **Cable Terminator**—the Cable Terminator ensures signal integrity along the SCSI Cable System. It keeps the signals from bouncing off one end of the line and rippling back, interfering with new messages. Figures 1-3 and Figure 1-4 demonstrate the effect of the Cable Terminator.

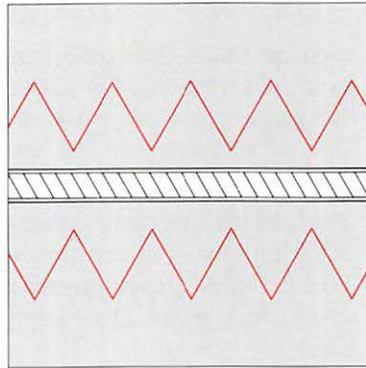


Figure 1-3
Noisy without Cable Terminator

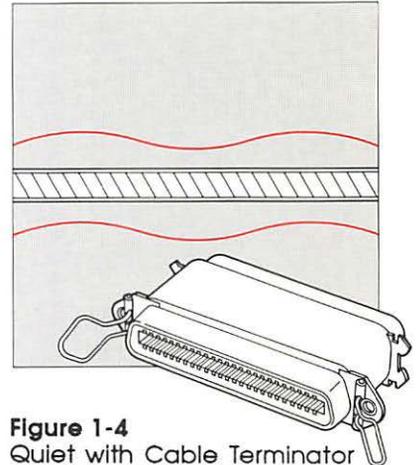


Figure 1-4
Quiet with Cable Terminator

Here are some rules to follow when connecting SCSI devices:

- You can connect as many as seven peripheral devices to your Macintosh with the Apple SCSI Cable System. The cables attach to a SCSI connector on each device.
- You must begin the SCSI chain with a Cable Terminator and end it with another one.
- You can have only two Cable Terminators in the SCSI Cable System chain. More terminators can damage your computer or cause loss of **data**.
- When you attach only one SCSI device to a Macintosh system, you attach just one Cable Terminator to your **device** to end the chain unless you use a Cable Extender. A cable system longer than 18 inches requires two terminators.
- When the Macintosh has an internal **hard disk**, it has a terminator. You only add one terminator to the last SCSI device in the SCSI chain.

- It doesn't matter which of the two SCSI connectors you connect to on an Apple SCSI peripheral device.
- The maximum length of your SCSI cable system should be no more than 20 feet (6.5 meters) of cables.

Table 1-1 shows what you need for a given combination of devices.

Table 1-1
SCSI cable formula

Macintosh System	System Cable	Peripheral Interface Cable	Cable Terminator	Cable Extender
Macintosh				
Macintosh and 1 SCSI peripheral device, less than 18 in. apart	1		1	
Macintosh and 1 SCSI peripheral device, more than 18 in. apart	1		2	Yes*
Macintosh and 2 or more SCSI peripheral devices, less than 3 ft. apart	1	Yes*	2	
Macintosh and 2 or more SCSI peripheral devices, 3 ft. or more apart	1	Yes*	2	Yes*
Macintosh with internal hard disk				
Macintosh with internal hard disk and 1 SCSI peripheral device, less than 18 in. apart	1		1	
Macintosh with internal hard disk and 1 SCSI peripheral device, more than 18 in. apart	1		1	Yes*
Macintosh with internal hard disk and 2 or more SCSI peripheral devices, less than 3 ft. apart	1	Yes*	1	
Macintosh with internal hard disk and 2 or more SCSI peripheral devices, 3 ft. or more apart	1	Yes*	1	Yes*

*"Yes" means you need this cable, but the number of cables you need depends on the distance between devices and how many devices you are connecting.

Important Be sure to read *The Apple SCSI Cable System* manual, which accompanies the SCSI cables, before attempting to connect any devices.

Warning You can have no more than two terminators in the entire SCSI chain.

Connecting the Tape Backup 40SC

The sections that follow explain how to connect your tape backup device with SCSI cables to a Macintosh system with external SCSI devices; to a Macintosh system with non-SCSI devices; and to a Macintosh system with an internal hard disk. You need to read only the section that describes your Macintosh system.

Macintosh system with external SCSI devices

If your Macintosh already has other *external* SCSI peripheral devices connected, use this section to connect your Tape Backup 40SC.

When you have a SCSI chain attached to your Macintosh, you connect the tape backup device to the last device in your chain and move the Cable Terminator to the tape backup device. If you want to put the Tape Backup 40SC in another place in the chain, or if you want more information on the SCSI chain, see *The Apple SCSI Cable System* manual.

You need a Peripheral Interface Cable, a Cable Terminator, and the Tape Backup 40SC power cord. Follow these steps to connect your system:

1. Make sure your computer is plugged in and *switched off*.
2. Place the Tape Backup 40SC where you want it.
3. Touch any one of the metal connectors on the back of the computer.

Doing this discharges any static electricity that may be on your body.

4. If you have two or more devices connected, remove the Cable Terminator from the last connected device in your SCSI chain.

5. Attach the Cable Terminator to the Peripheral Interface Cable 50-pin connector.
6. Press the diamond-shaped wire clips toward the connector, snapping them into the clip brackets to secure the connection.

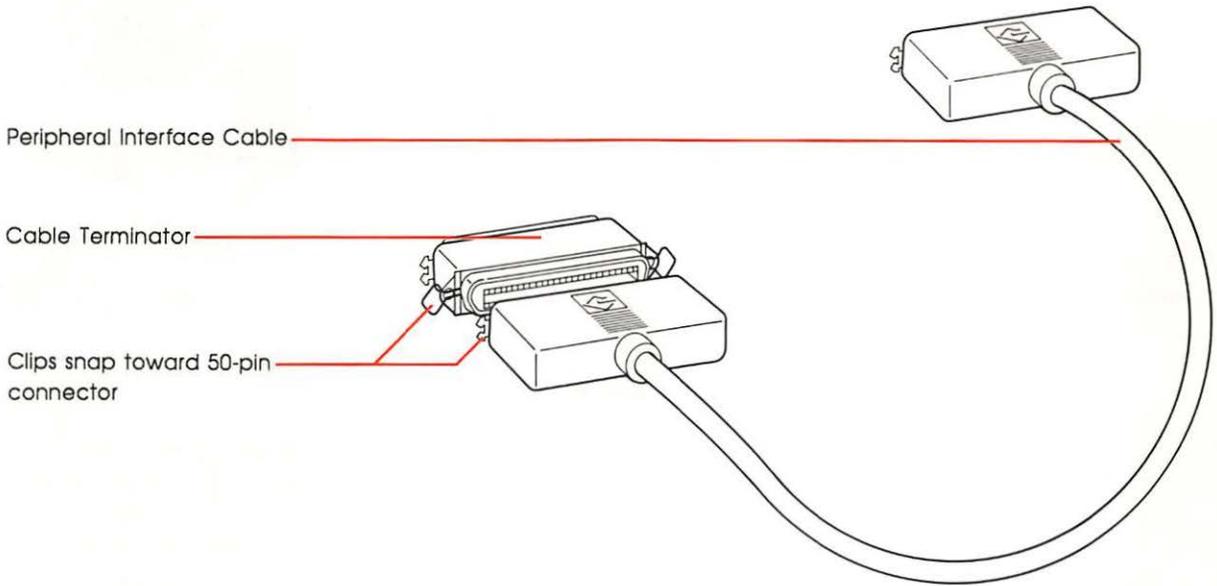


Figure 1-5
Attaching the Cable Terminator to the Peripheral Interface Cable

7. Attach the Cable Terminator—already clipped to the Peripheral Interface Cable—to either 50-pin SCSI connector on the back of the Tape Backup 40SC. Snap the clips into the clip brackets to secure the connection. See Figure 1-6.

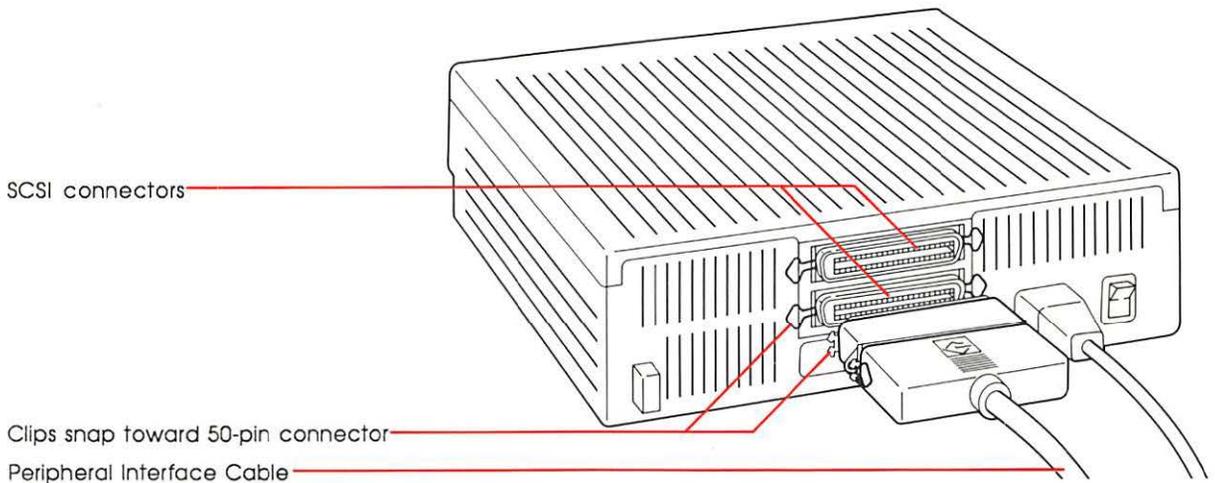


Figure 1-6
Connecting the Peripheral Interface Cable to the Tape Backup 40SC



Hard disk icon



SCSI icon

8. Attach the other end of the Peripheral Interface Cable to the available SCSI connector on the last connected SCSI device in your chain. (The **icon** by the connector may be a SCSI or hard disk icon.) Snap the clips into the clip brackets to secure the connection.
9. With the Tape Backup 40SC connected to your Macintosh system and *all devices switched off*, attach the Tape Backup 40SC power cord to the Tape Backup 40SC, and plug the power cord into a grounded (three-prong) AC outlet.

Important Remember that you must have a Cable Terminator on the first and last SCSI device in your chain.

Warning **This equipment is intended to be electrically grounded.**

Your Tape Backup 40SC is equipped with a three-wire grounding plug—a plug that has a third (grounding) pin. This plug will fit only a grounding-type AC outlet. This is a safety feature.

If you are unable to insert the plug into the outlet, contact a licensed electrician to replace the outlet with a properly grounded outlet.

Do not defeat the purpose of the grounding plug!

Now skip to the section “Setting the Tape Backup 40SC Priority” in this chapter.

Macintosh system with non-SCSI hard disk drive(s)

If your Macintosh has non-SCSI **hard disk drives** connected, use this section to connect your Tape Backup 40SC.

You create a SCSI chain by connecting the System Cable to the SCSI connector on your Macintosh and the SCSI connector on your tape backup device. The System Cable enables the tape backup device to communicate with your non-SCSI hard disk drives. If you want more information on the SCSI chain, see *The Apple SCSI Cable System* manual.

You need a System Cable, a Cable Terminator, and the Tape Backup 40SC power cord. Follow these steps to connect your system:

1. Make sure your computer is plugged in and *switched off*.
2. Place the Tape Backup 40SC where you want it.
3. Touch any one of the metal connectors on the back of the computer.

Doing this discharges any static electricity that may be on your body.

4. Attach the Cable Terminator to the large end (50-pin connector) of the System Cable.
5. Press the diamond-shaped wire clips toward the connector, snapping them into the clip brackets to secure the connection. See Figure 1-7.

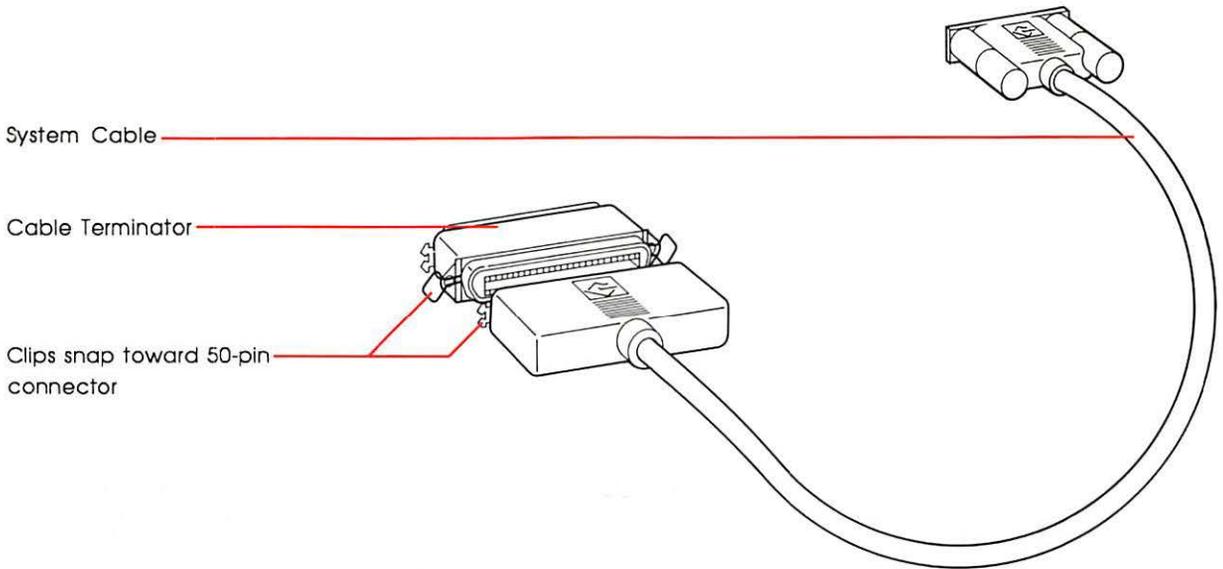


Figure 1-7
Attaching the Cable Terminator to the System Cable

6. Attach the Cable Terminator—already clipped to the large end of the System Cable—to either one of the 50-pin SCSI connectors on the back of the Tape Backup 40SC. Snap the clips into the clip brackets to secure the connection.

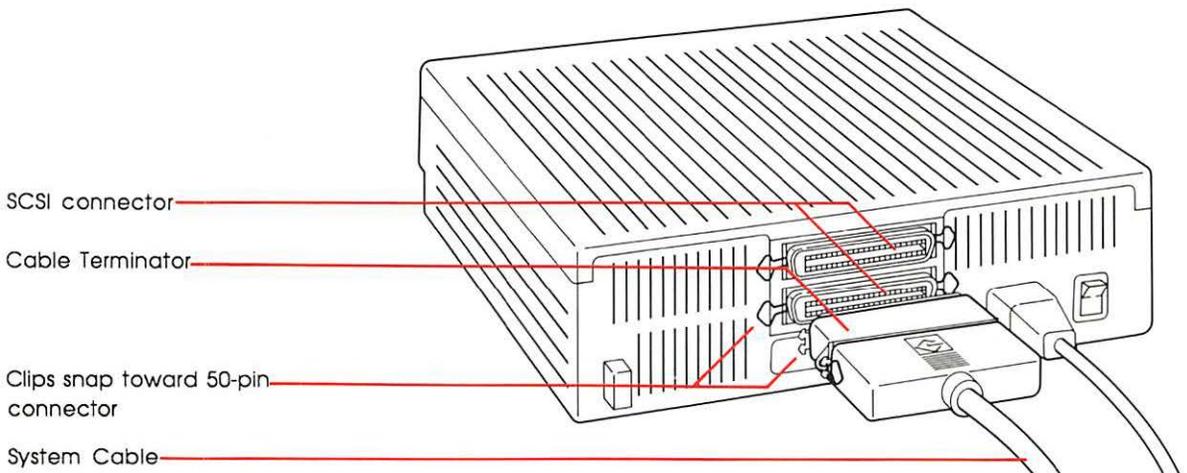


Figure 1-8
Connecting the System Cable to the Tape Backup 40SC



Hard disk icon



SCSI icon

❖ *If you're using a Cable Extender:* If you have one SCSI external device and more than 18 inches in the SCSI bus, you risk more noise interference. You need to add a second Cable Terminator between the System Cable and the Cable Extender.

7. Without touching the metal pins, attach the System Cable 25-pin connector to the SCSI connector on the back of your Macintosh. (The icon by the connector may be a SCSI or a hard disk icon.)

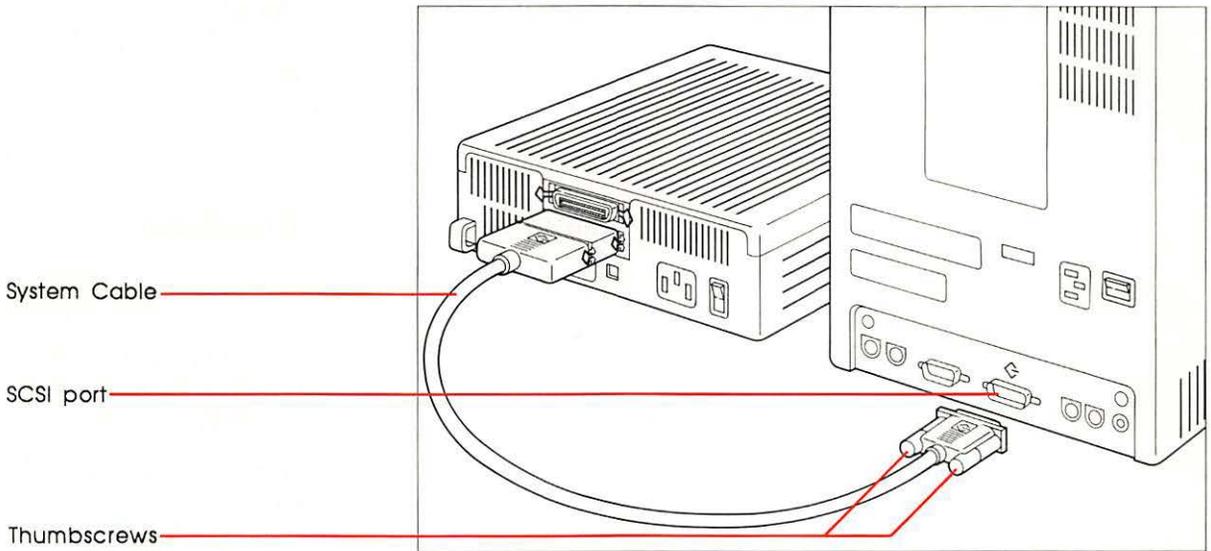


Figure 1-9
Connecting the System Cable to the Macintosh

8. Tighten the thumbscrews on the 25-pin connector.
9. With the Tape Backup 40SC connected to your Macintosh system and *all devices switched off*, attach the Tape Backup 40SC power cord to the Tape Backup 40SC, and plug the power cord into a grounded (three-prong) AC outlet.

Warning This equipment is intended to be electrically grounded.

Your Tape Backup 40SC is equipped with a three-wire grounding plug—a plug that has a third (grounding) pin. This plug will fit only a grounding-type AC outlet. This is a safety feature.

If you are unable to Attach the plug into the outlet, contact a licensed electrician to replace the outlet with a properly grounded outlet.

Do not defeat the purpose of the grounding plug!

Now skip to the section “Setting the Tape Backup 40SC Priority” in this chapter.

Macintosh system with an internal hard disk

If you have a Macintosh with an internal hard disk, use this section to connect your Tape Backup 40SC.

❖ *Note:* If you have any *external* SCSI devices connected to your Macintosh, use the section “Macintosh System With External SCSI Devices” to connect your Tape Backup 40SC.

You use the System Cable to connect the tape backup device to your Macintosh. The System Cable connects to the SCSI connector on the back of your Macintosh and a SCSI connector on the back of your Tape Backup 40SC. This cable enables the Macintosh to communicate with the Tape Backup 40SC. If you want more information on the SCSI chain, see *The Apple SCSI Cable System* manual.

You need a System Cable, a Cable Terminator, and the Tape Backup 40SC power cord. Follow these steps to connect your system:

1. Make sure your computer is plugged in and *switched off*.
2. Place the Tape Backup 40SC where you want it.

3. Touch any one of the metal connectors on the back of the computer.
Doing this discharges any static electricity on your body.
4. Attach the Cable Terminator to the large end (50-pin connector) of the System Cable.
5. Press the diamond-shaped wire clips toward the connector, snapping them into the clip brackets to secure the connection. See Figure 1-10.

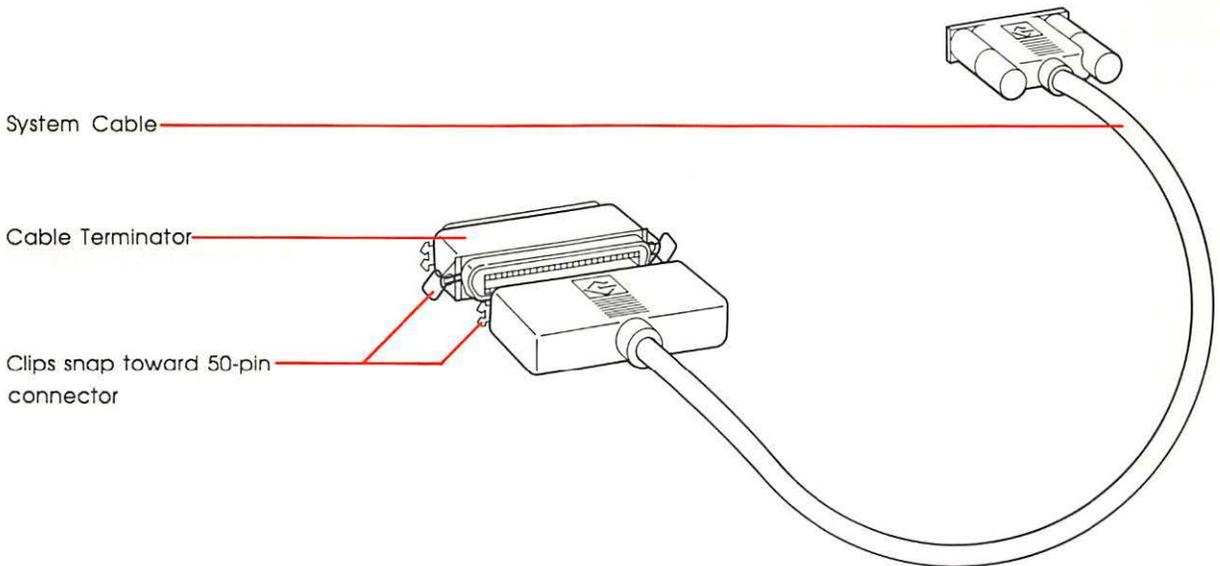


Figure 1-10
Connecting the Cable Terminator to the System Cable

6. Attach the Cable Terminator—already clipped to the large end of the System Cable—to either SCSI connector on the back of the Tape Backup 40SC. Snap the clips into the clip brackets to secure the connection.

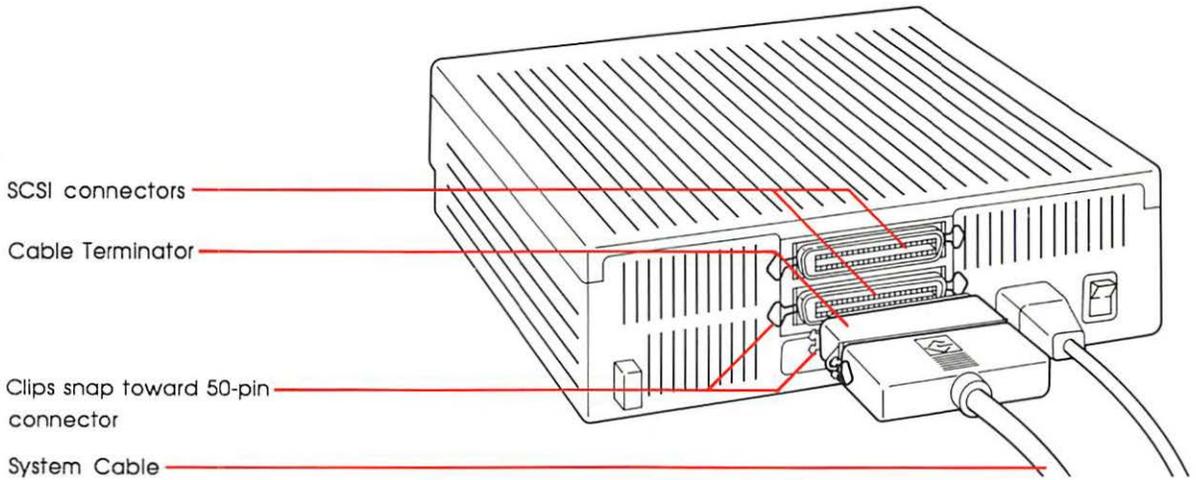
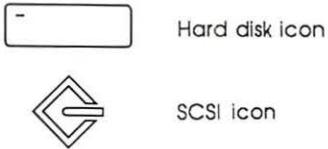


Figure 1-11
Connecting the System Cable to the Tape Backup 40SC



- Without touching the metal pins, attach the System Cable 25-pin connector to the SCSI connector on the computer. (The icon may be a SCSI or a hard disk icon.) See Figure 1-12.

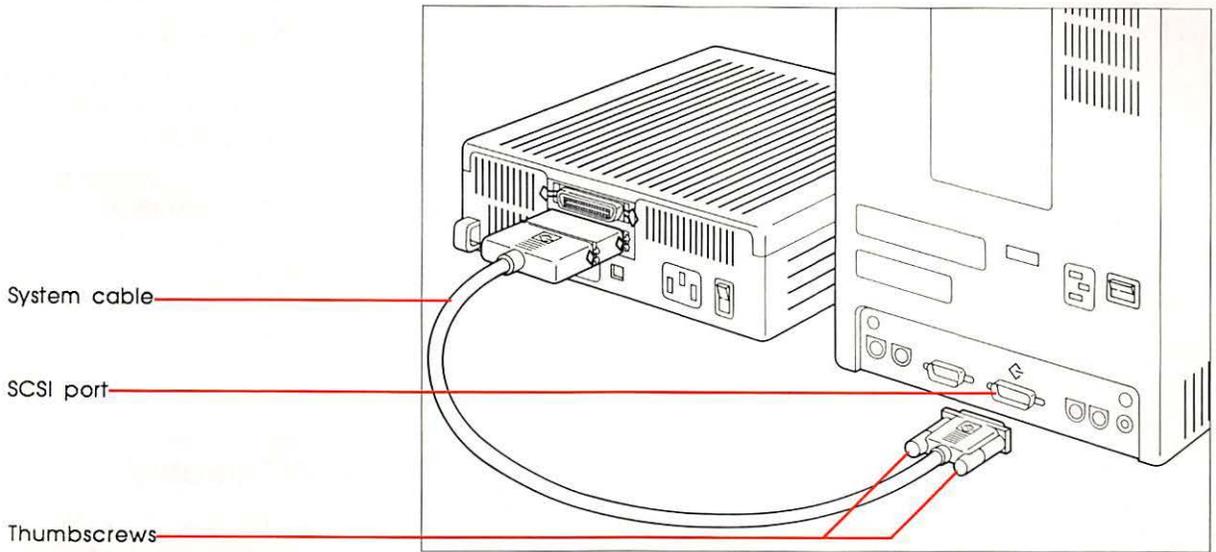


Figure 1-12
Connecting the System Cable to the Macintosh

8. Tighten the thumbscrews on the 25-pin connector.
9. With the Tape Backup 40SC connected to your Macintosh system and *all devices switched off*, attach the Tape Backup 40SC power cord to the Tape Backup 40SC, and plug the power cord into a grounded (three-prong) AC outlet.

Important Remember that the internal hard disk has a Cable Terminator. You need a Cable Terminator on or inside the last external SCSI device in your chain.

Warning This equipment is intended to be electrically grounded.

Your Tape Backup 40SC is equipped with a three-wire grounding plug—a plug that has a third (grounding) pin. This plug will fit only a grounding-type AC outlet. This is a safety feature.

If you are unable to insert the plug into the outlet, contact a licensed electrician to replace the outlet with a properly grounded outlet.

Do not defeat the purpose of the grounding plug!

Now go on to the “Setting the Tape Backup 40SC Priority” section.

Setting the Tape Backup 40SC priority

SCSI cables let you connect as many as seven SCSI devices together on one system with a Macintosh. The **priority number** determines the order in which devices send and receive information. Eight priority numbers—0 through 7—are available to SCSI device users; they operate in descending order. The Macintosh is always assigned number 7, so you can usually use 0 through 6 to organize your system. We recommend that you use priority #1 for the Tape Backup 40SC.

Important The built-in, internal hard disk in a Macintosh has ID #0. If you have a Macintosh with an internal hard disk, you can only use numbers 1 through 6 to organize your system.

You must assign a separate priority number to each peripheral device, thus making sure that you don't have two devices trying to send data at the same time.

The **priority switch** is located on the back panel of the Tape Backup 40SC.

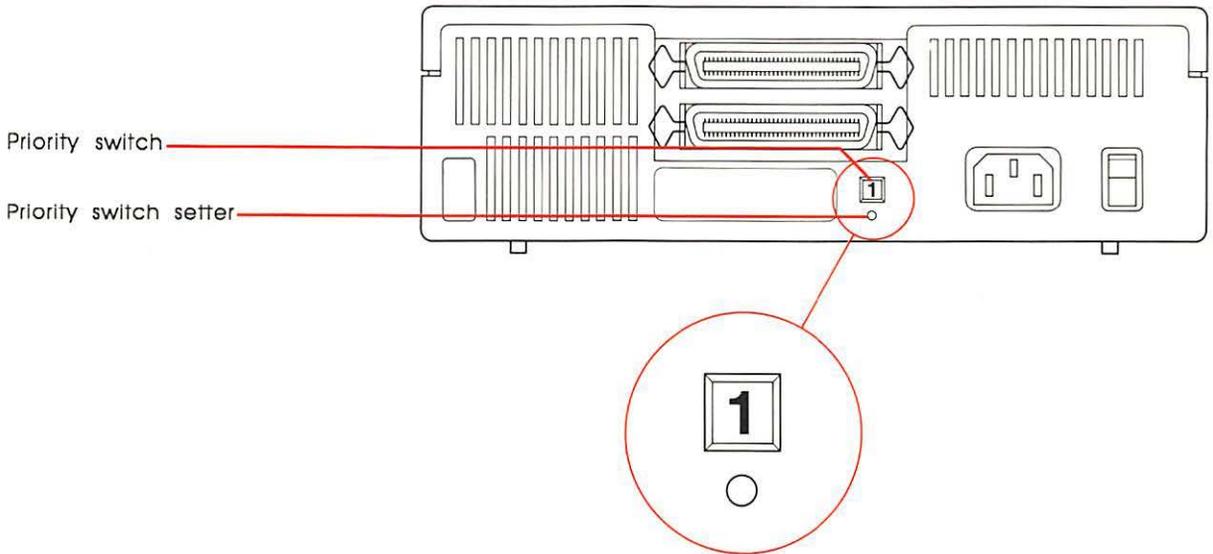


Figure 1-13
The Tape Backup 40SC priority switch

If you need to change the priority, follow these steps:

1. Make sure the Tape Backup 40SC is turned off.
2. Insert the point of a push pin or straightened paper clip into the hole below the priority switch (the priority switch setter).
3. Push gently.

The numbers increase.

4. If you go past the number you want, keep pushing until the numbers cycle around to your choice.

When you've set the priority switch, go on to Chapter 2 to learn how to start up your system.



Chapter 2



Starting Up

This chapter explains procedures for switching on your system, installing the *Tape Backup 40SC* disk, and formatting non-Apple cartridges.

Before you start up your Macintosh system with the Tape Backup 40SC connected, read the section "Switching On Your System," then install the software.

Switching on your system

Follow these steps each time you use the Tape Backup 40SC.

Switch on your system as described in your Macintosh owner's guide. Generally you switch on your devices in this order:

1. Your external hard disk(s) if you have them
2. Your Macintosh
3. Your Tape Backup 40SC (last)

Each time you switch on the Tape Backup 40SC, or the Macintosh recognizes the tape backup device, it calibrates any tape in the drive. This calibration process conditions the tape to ensure the proper tension for movement in the tape drive, and the reliability of the tape so it can be used interchangeably with other tape cartridges. The calibration lasts 60-120 seconds. If you turn on the Tape Backup 40SC and then the Macintosh, the tape backup device will calibrate and then restart the calibration when the Macintosh recognizes the device.

The Tape Backup 40SC has two lights on the front panel. A steady green light indicates that the power is on. A red light flashes to indicate activity.

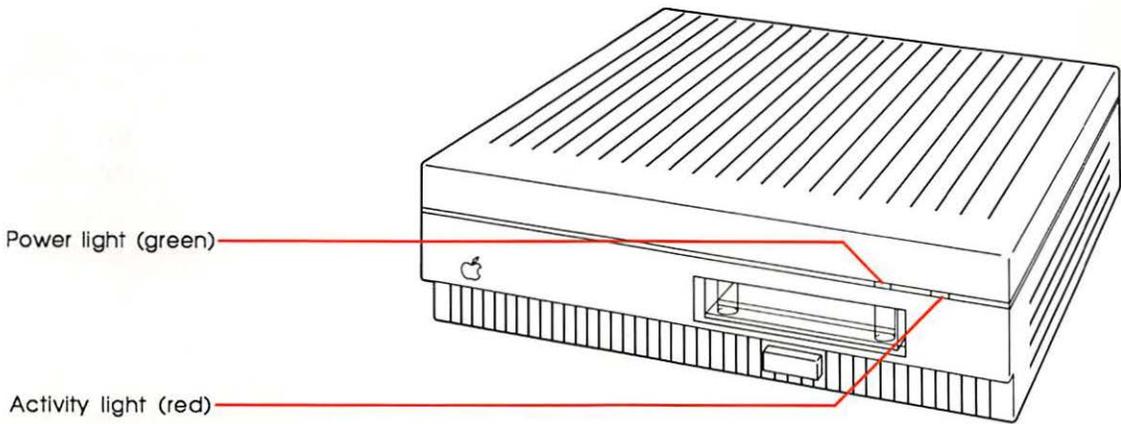


Figure 2-1
Tape Backup 40SC

Installing the Apple Tape Backup 40SC software

The Apple Tape Backup 40SC application software makes the Tape Backup 40SC work. You install the software onto your hard disk and run the application from the hard disk, except when you need to restore the tape cartridge copy of a hard disk (more on this later).

Here's how to install the software:

1. Make a **backup** copy of the *Tape Backup 40SC* disk before you begin. (Your Macintosh owner's guide tells you how.)
2. Insert the *Tape Backup 40SC* disk.

A disk icon appears on your **desktop**. See Figure 2-2.

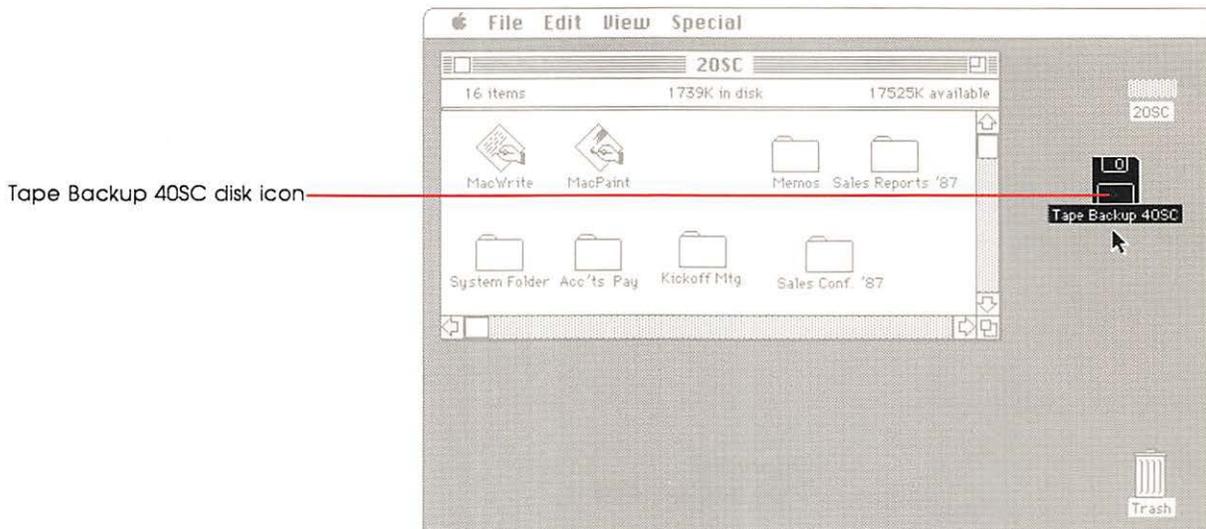


Figure 2-2
Tape Backup 40SC disk Icon on the desktop

3. Open the disk icon.

You'll see an application icon and a **System Folder**.

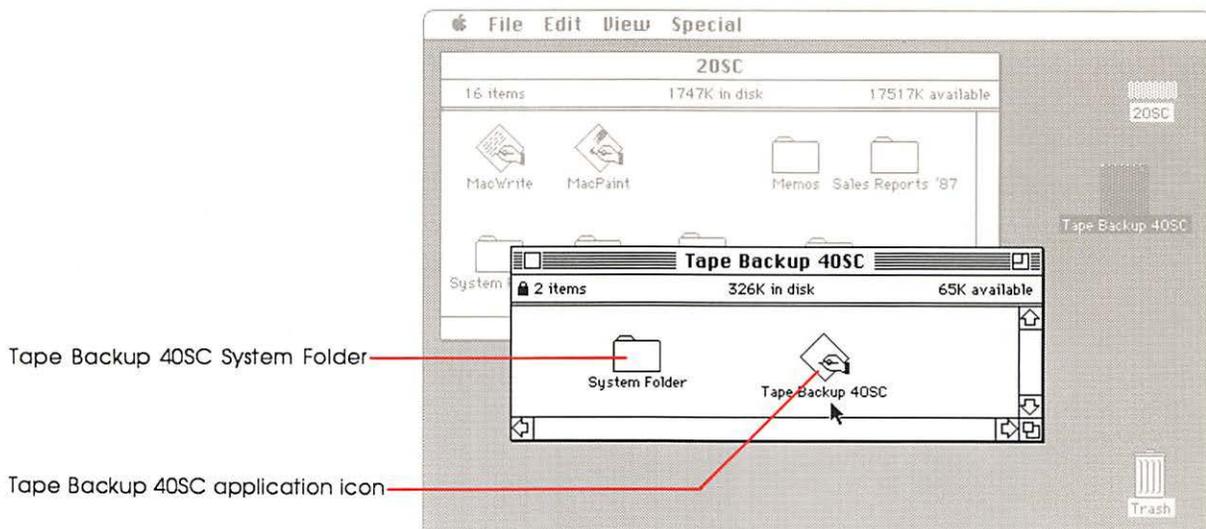


Figure 2-3
Tape Backup 40SC application folder

4. Drag the application icon to your hard disk.

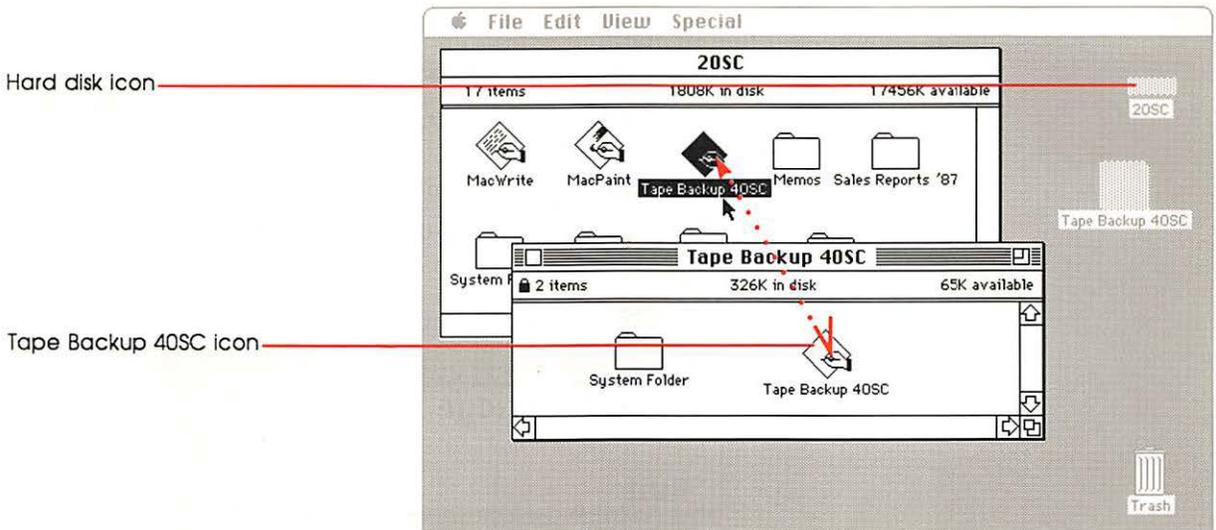


Figure 2-4
Installing the Tape Backup 40SC software

❖ *Note:* The *Tape Backup 40SC* disk has a System Folder. It's on the original because it's needed for the Restore operation. You don't need to copy this System Folder onto the hard disk.

If you're using Apple 40MB tape cartridges, they're already formatted. You're ready to use the Tape Backup 40SC; see Chapter 3.

If you're using non-Apple tape cartridges that are unformatted, you must format them. See the next section, "Formatting a Tape Cartridge."

Formatting a tape cartridge

Formatting a tape cartridge prepares it to receive, store, and transmit data. The process lasts about 40 minutes, and must not be interrupted.

Warning Never eject the tape cartridge while the activity light is flashing.

We recommend that you format all unformatted tape cartridges as soon as you purchase them. Each tape cartridge stores 38.5MB of data. You'll need more than one tape cartridge to back up a completely full 40MB hard disk.

To format a tape cartridge, follow these steps:

1. Open the Apple Tape Backup 40SC application from your hard disk.
2. Click in the Welcome message to get to the application desktop.
3. Choose Format from the pull-down File menu.



Figure 2-5
Choosing Format

4. Follow instructions in the **dialog boxes** to direct the Format Cartridge operation.

When you insert the tape cartridge, push firmly until it is inside the Tape Backup 40SC.

A dialog box remains on the screen during the formatting process and tells you at what time it will be complete.

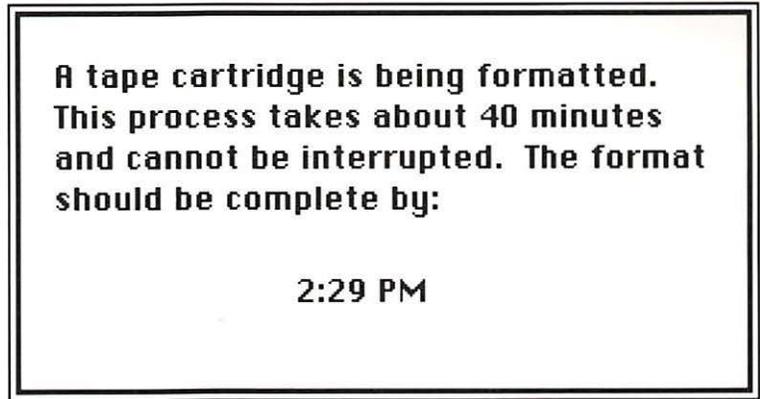
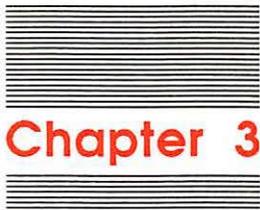


Figure 2-6
Progress box

Warning If you interrupt the formatting process, you will not be able to use the tape cartridge to back up or restore information. Turning off the machine may permanently damage the tape cartridge. You will need to start the formatting process again and complete it before you can use the tape.

5. When the formatting is complete, click the **OK button** in the Completion message to end the Format Cartridge operation.
6. Eject the tape cartridge by pushing the eject button.

You are now ready to back up information onto the tape cartridge. Chapter 3 tells you how to use the Tape Backup 40SC.



Chapter 3

Using the Apple Tape Backup 40SC

This chapter explains how to use the Tape Backup 40SC device to back up and restore a **volume** (the entire contents of your hard disk), and to back up and restore individual files. Read the sections on each backup and restore operation to learn how to use the Tape Backup 40SC application. Each of these sections contains recommendations about using the operation. Instructions for the other menu items and shutdown procedures follow at the end of the chapter.

Backing up the contents of your hard disk with the Tape Backup 40SC protects your work by copying the information to a tape cartridge. You have a safe copy of your work in case of a catastrophe that destroys the contents of your hard disk. You can then restore the contents to your hard disk from the tape cartridge.

General rules for using the Tape Backup 40SC

In general, you want to back up your hard disk every day, especially if you are working with large files or many different files. You can use the volume backup operation to back up the entire contents of a hard disk, or back up critical files daily, and make a volume backup once a week. Use the Tape Backup 40SC to meet your specific backup needs.

Each tape cartridge stores 38.5 MB of data. The number of tape cartridges you need for a backup depends on whether you back up a whole volume or individual files, and on how full your disk is. The file backup operation uses up more space on the tape cartridge than does the volume backup operation.

Follow these rules when you use the Tape Backup 40SC:

- Label your tape cartridges accurately. Volume Backup tape cartridges can be used only to restore entire disk volumes. File Backup tape cartridges can be used only to restore individual files.

- Don't turn on the Tape Backup 40SC with the tape cartridge in place. Turn on the machine and then insert the tape cartridge when the application asks for it.
- When you insert the tape cartridge, push firmly until it is inside the Tape Backup 40SC.
- You must manually eject the tape cartridge by pushing the eject button. Eject the tape cartridge each time you are done using the Tape Backup 40SC.

Warning Never eject the tape cartridge while the activity light is flashing.

Important Back up and restore to the same device. Don't back up one hard disk and restore to another. Consult your authorized Apple dealer.

Backup/Restore menu

The Backup/Restore menu commands run the backup and restore operations that drive the Tape Backup 40SC.

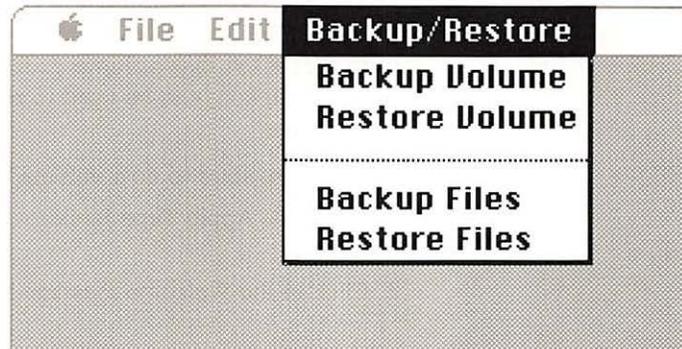


Figure 3-1
Backup/Restore menu commands

Each of the Backup/Restore menu commands prompts you with dialog boxes, like the one shown in Figure 3-2. A dialog box also alerts you if you're about to do something that could cause you to lose information, and will give you a chance to cancel what you were about to do.

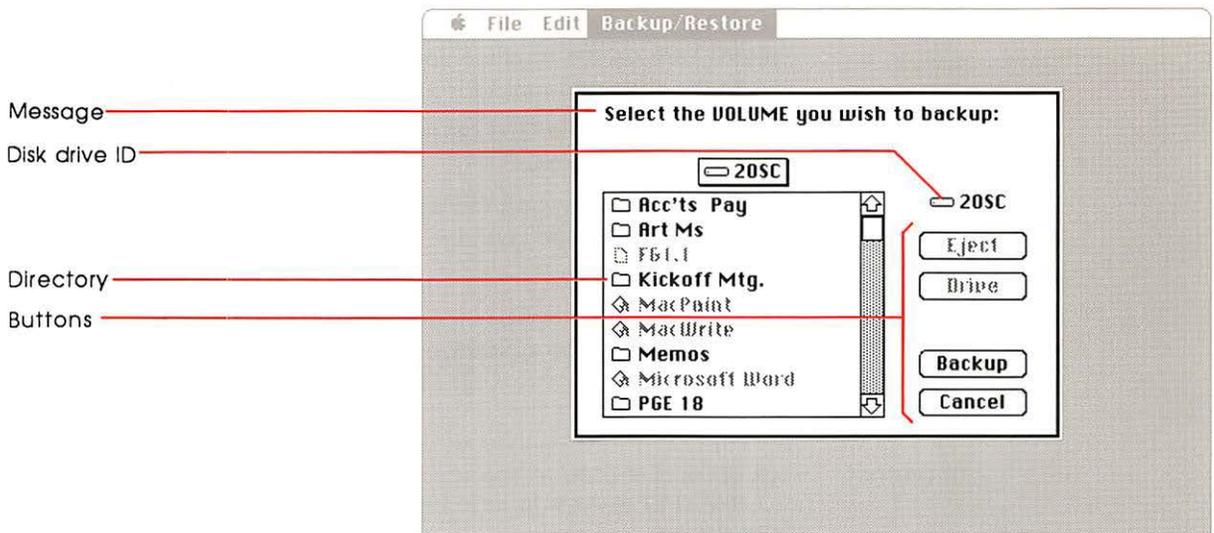


Figure 3-2
Dialog box

The following sections describe the operations in detail.

Backup Volume

The Backup Volume operation backs up an entire Hierarchical File System (HFS) hard disk volume to a tape cartridge (or to several cartridges if the disk volume exceeds 38.5 MB). This tape cartridge copy, or backup, can be used to restore the entire contents of the disk volume.

Follow these steps to do a volume backup:

1. Open the Apple Tape Backup 40SC application from your hard disk.
2. Click in the Welcome message to get to the application desktop.

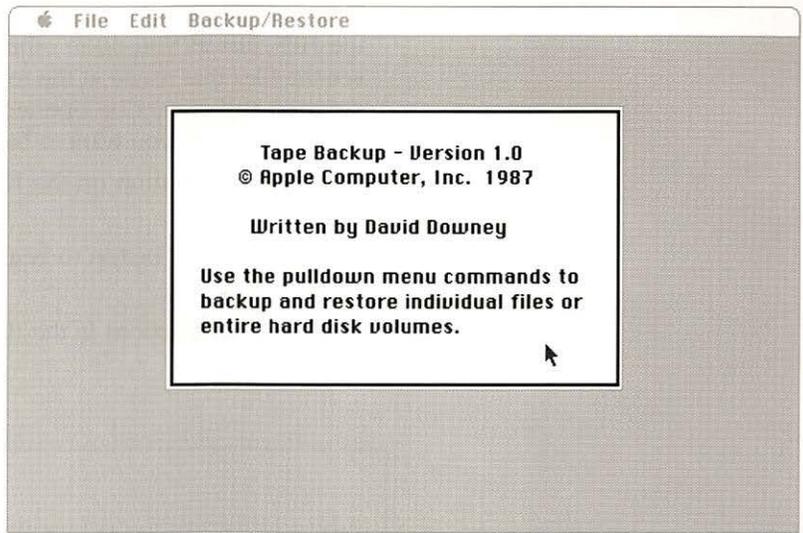


Figure 3-3
 Welcome message

3. Choose the Backup Volume command from the Backup/Restore menu.
 To select a different hard disk, click the drive button.

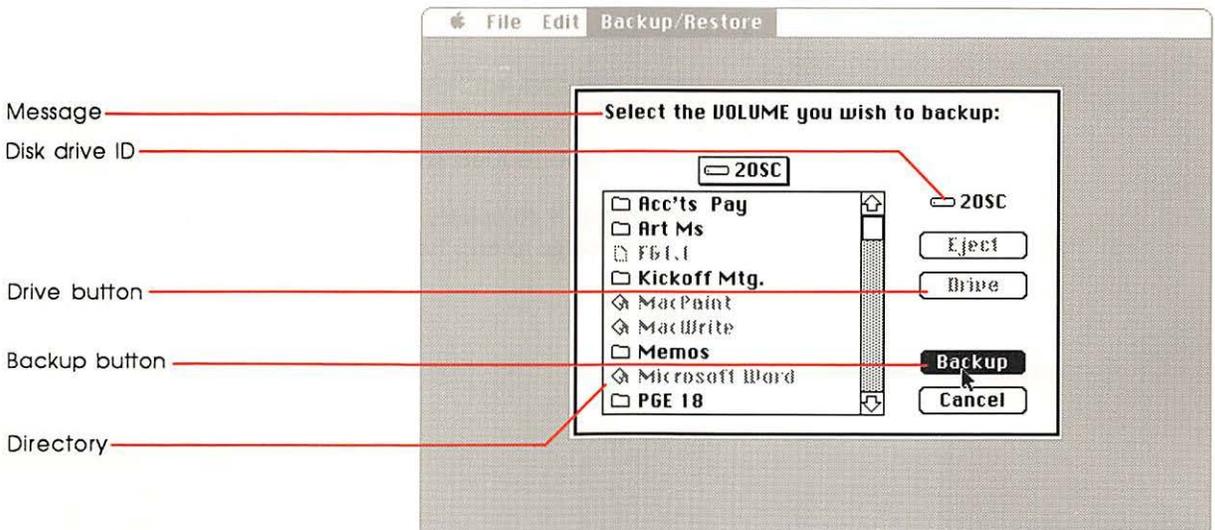


Figure 3-4
 Choosing a disk volume for backup

You can find out what is stored on a disk by looking at the levels of the HFS, just as you do in other Macintosh applications. You can see the files that reside at the top level of the disk, but they are dimmed and cannot be opened. You can open folders to check that the contents you want to back up are there.

For more information on the HFS, see your Macintosh owner's guide.

4. Click the Backup button to begin the backup operation. See Figure 3-4.
5. Follow the instructions in the dialog boxes to direct Backup Volume.

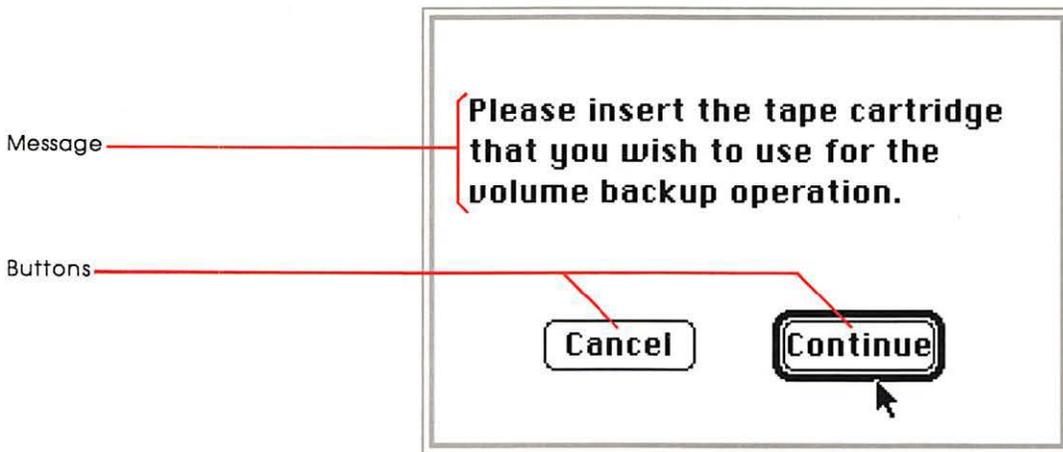


Figure 3-5
Backup Volume tape request message

6. When the backup is complete, click the OK button on the Completion message to end Backup Volume.

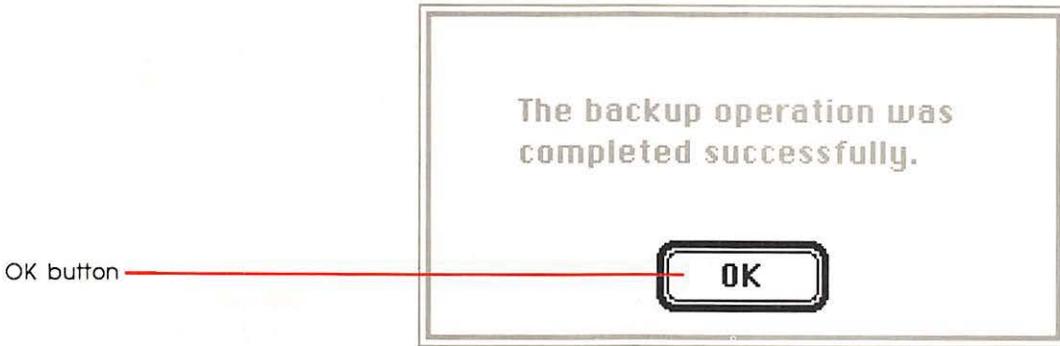


Figure 3-6
Backup Volume Completion message

7. Eject the tape cartridge.

- ❖ *Note:* Any time you insert a tape cartridge during the Backup Volume process, the application checks to see if the tape cartridge contains data. If the tape cartridge is not empty, a warning is posted, allowing you to switch the tape cartridge or cancel the operation.

You can cancel the Backup Volume operation in the middle, if necessary. The tape cartridge cannot be used for a restore if you cancel the backup before it is completed.

Backup Volume recommendations

Backup Volume is the fastest and easiest way to protect your work. Backup Volume copies the entire contents of your hard disk to a tape cartridge. We recommend that you use this operation most of the time.

If you decide to use the volume backup operation, it is optimal to have at least three tape cartridges. Use one to back up today's work, one for tomorrow's work, and one for the the next day's work. That way if something happens during a backup operation you have two other relatively current copies of your work to restore.

On the fourth day, begin to recycle the tapes. Use the oldest backup tape cartridge (the copy of the day before yesterday's work) to back up the current day's work. You don't need to clear (erase) the tape cartridge before reusing it.

Plan to start the backup operation when you won't need the computer for at least 30 minutes. You can set up the computer to do the backup while you eat lunch, or at night after you go home (as long as you don't need to insert more tape cartridges).

If your hard disk contains more than 38.5 MB of data, you'll need more than one cartridge.

Backing up a full Apple Hard Disk 20SC takes 18-19 minutes. Backing up a full Macintosh Hard Disk 20 takes about 22 minutes.

Information is stored on your hard disk in different places according to when you save the data. The Tape Backup 40SC searches through the hard disk and copies all of the stored information. Backup Volume is always the fastest way to make a backup copy of the contents of your hard disk.

Restore Volume

The Restore Volume operation restores (writes all the data) to your hard disk from an entire disk volume copied in a volume backup operation. You should restore a tape cartridge copy of a hard disk to a hard disk of the same capacity.

Warning

Be sure to start up from the **floppy disk** *Tape Backup 40SC* when you're planning to restore a volume. *Tape Backup 40SC* won't allow you to restore over the System file or application file in use on your startup disk.

The *Tape Backup 40SC* disk has a System Folder so that you can use it as a startup disk. Make sure you keep the System Folder on the original floppy disk.

Follow these steps to restore a volume:

1. Insert the *Tape Backup 40SC* floppy disk into the internal disk drive in your Macintosh.
2. Start up your Macintosh system.
3. Open the Apple Tape Backup 40SC application from the floppy disk icon.
4. Click in the Welcome message to get to the application desktop.

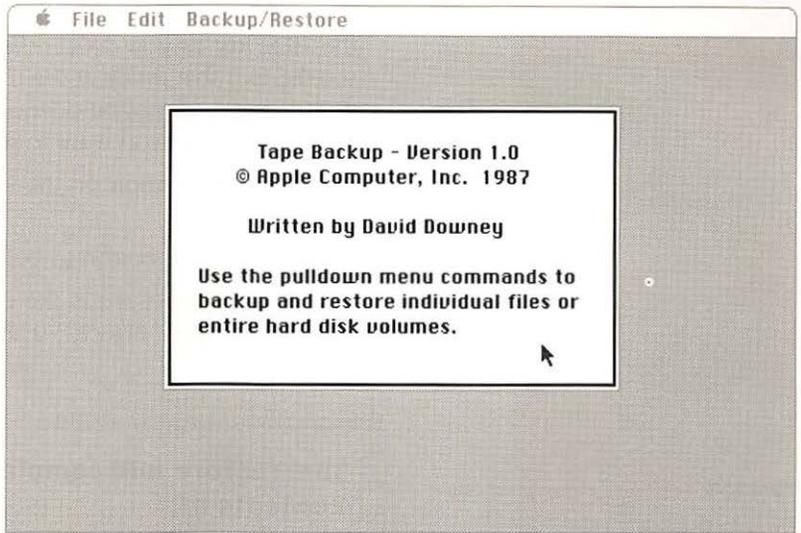


Figure 3-7
Welcome message

5. Choose the Restore Volume command from the Backup/Restore menu. To select a different hard disk, click the Drive button.

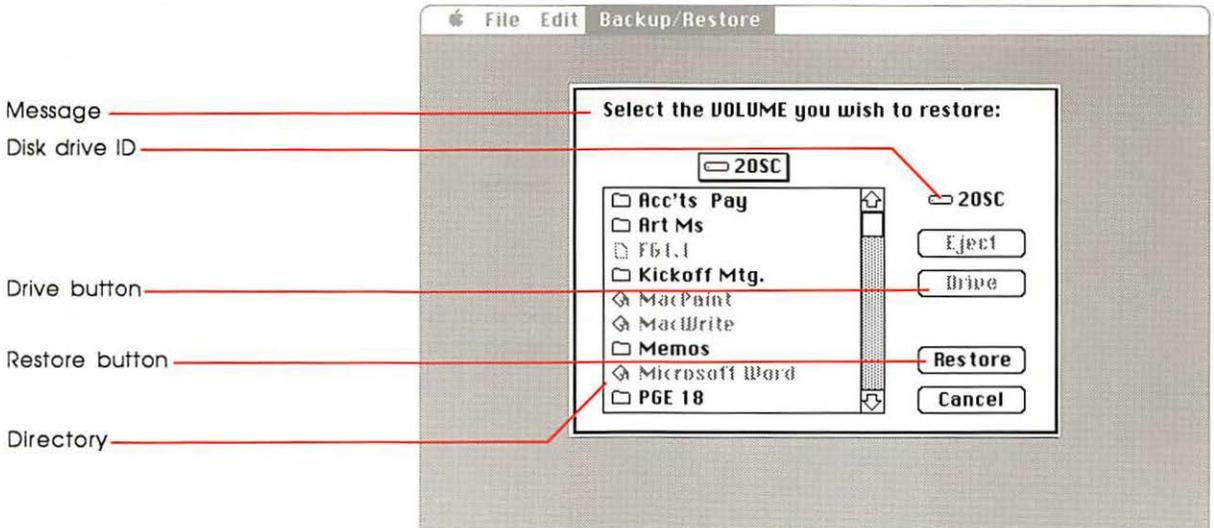


Figure 3-8
Choosing a disk volume for restore

You can find out what is stored on a disk by looking at the levels of the HFS, just as you do in other Macintosh applications. You can see the files that reside at the top level of the disk, but they are dimmed and cannot be opened. You can open folders to check that the contents you want to restore are there.

For more information on the HFS, see your Macintosh owner's guide.

6. Click the Restore button to begin the restore operation.
7. Follow the instructions in the dialog boxes to direct the volume restore operation. Figure 3-9 shows one dialog box you might see.

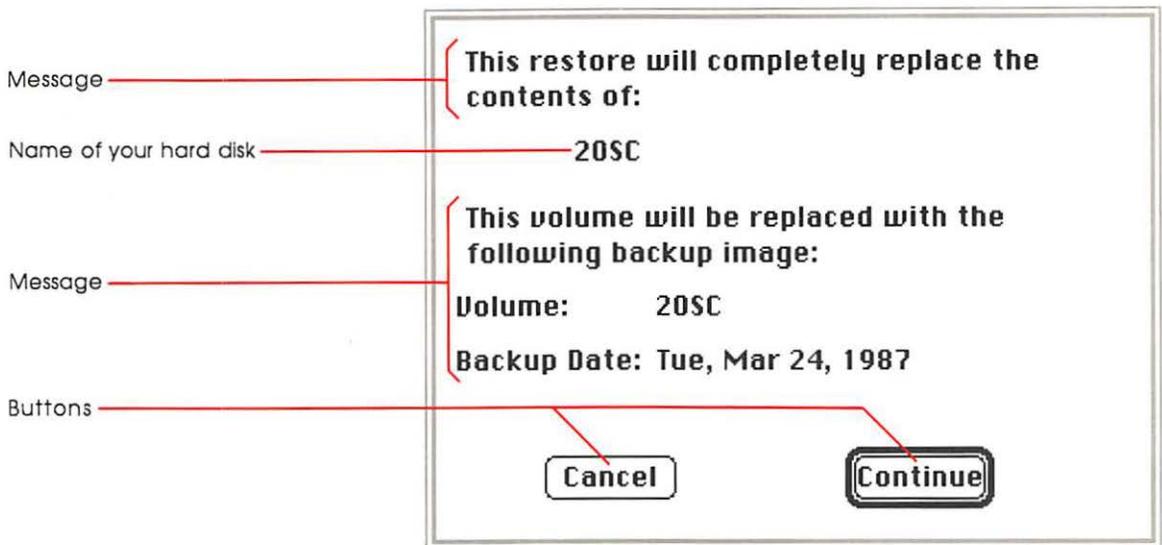


Figure 3-9
Restore warning

8. When the restore operation is complete, click the OK button in the Completion message to end the volume restore operation.



Figure 3-10
Restore Volume Completion message

9. Eject the tape cartridge.

You can cancel Restore Volume in the middle, if necessary. When you cancel the Restore Volume, the disk volume on the hard disk becomes useless. You may have to reinitialize the hard disk and try Restore Volume again.

Restore Volume recommendations

Use the restore operation to reconstruct your hard disk if you have a catastrophe that ruins the data on your hard disk (and your day). Restore Volume writes the contents of a hard disk from a tape cartridge back onto a hard disk.

If your hard disk crashes, you may need to reinitialize the hard disk and then start up from the Apple Tape Backup 40SC floppy disk to perform the restore operation. See your hard disk owner's guide for more information.

During a volume restore, the Tape Backup 40SC device reads from the tape cartridge and then writes data onto the hard disk. Restoring a full Apple Hard Disk 20SC takes about 22 minutes. Restoring a full Macintosh Hard Disk 20 takes about 32 minutes. Other 20MB hard disks may vary within this range.

Important Don't restore a smaller-capacity tape cartridge copy of a hard disk to a larger-capacity hard disk (a 20MB copy to a 40MB hard disk). Restore Volume makes the larger capacity hard disk appear (to your Macintosh) as the smaller restored copy, limiting the disk's storage capacity.

You can't use a tape cartridge copy of an entire volume copied with Backup Volume to restore individual files.

The volume restore operation writes over any data that is currently on the hard disk. Dialog boxes warn you of the potential data loss and give you a chance to cancel the operation.

Backup Files

The Backup Files operation backs up to a tape cartridge, individual files, or folders you select. The file backup operation copies files independent of their source locations (the place they came from on your hard disk), so you can back up files from several hard disks onto the same tape cartridge.

With the Backup Files operation you select folders or files from one level of the HFS at a time. You can select whole folders, groups of folders, individual files, groups of files within a folder, or a combination of folders and files that reside on the same level of the HFS.

You cannot select individual files nested in different folders to back up at the same time. You back up selected files from one folder, then go on to another folder.

You can also choose to back up only the files that have changed since the last Backup Files operation.

Follow these steps to back up files:

1. Open the Apple Tape Backup 40SC application from your hard disk.
2. Click in the Welcome message to get to the application desktop.

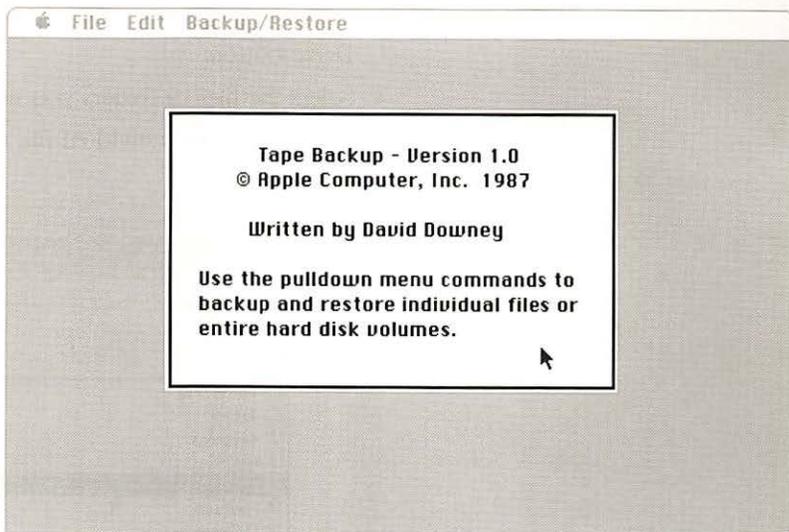


Figure 3-11
Welcome message

3. Choose the Backup Files command from the Backup/Restore menu.

A dialog box like the one in Figure 3-12 appears, showing you the contents of the selected hard disk.

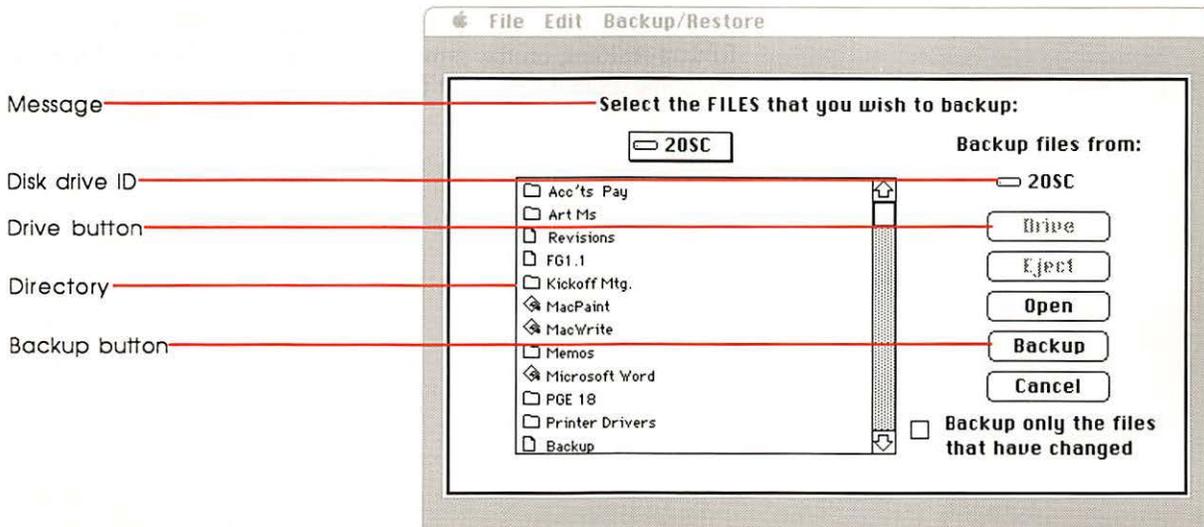


Figure 3-12
File/Source Volume selection

To select a different disk from which to back up files, click the Drive button.

4. Select the files or folders you want to back up.
 - To select an individual file or folder, click on its name.

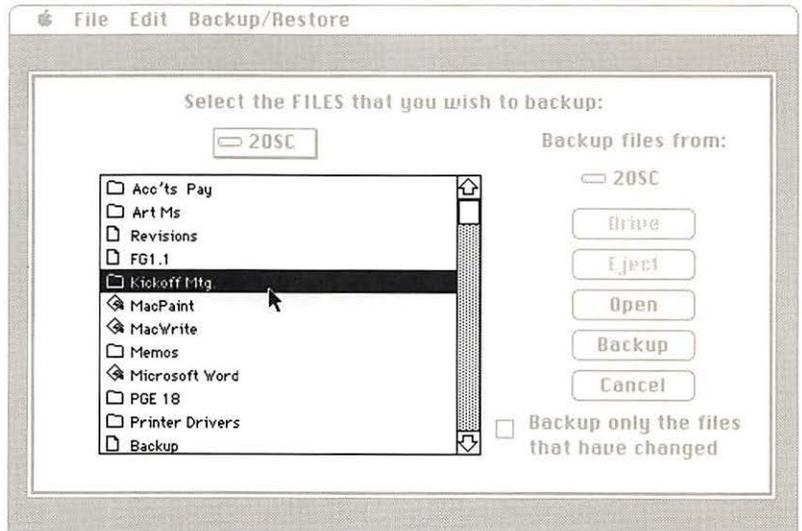


Figure 3-13
Selecting an individual item for a file backup

- To select a contiguous group of files, folders, or files and folders residing on the same level, drag down the list of names including all that you want to back up. See Figure 3-14.

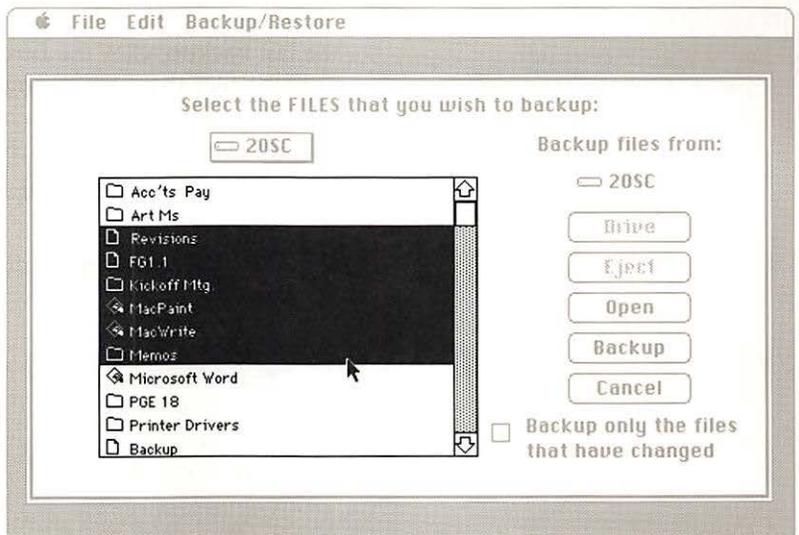


Figure 3-14
 Selecting contiguous items for a file backup

- To select files, folders, or files and folders on one level that are not contiguous, hold down the Shift key and click on the names of files and folders that you want to back up.

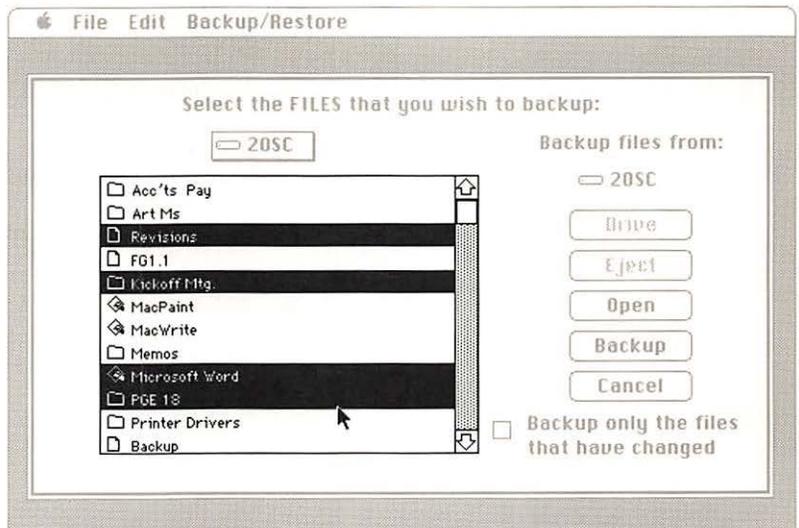


Figure 3-15
 Selecting noncontiguous items for a file backup

- To select only the files that you have edited and created since the last backup, click the box next to the command “Backup only the files that have changed.” The Tape Backup 40SC will search through the selected hard disk volume and copy the changed files and any files created since the last backup.
5. Click the Backup button to begin the backup operation. See Figure 3-11.
 6. Follow the instructions in the dialog boxes to direct the Backup Files operation.

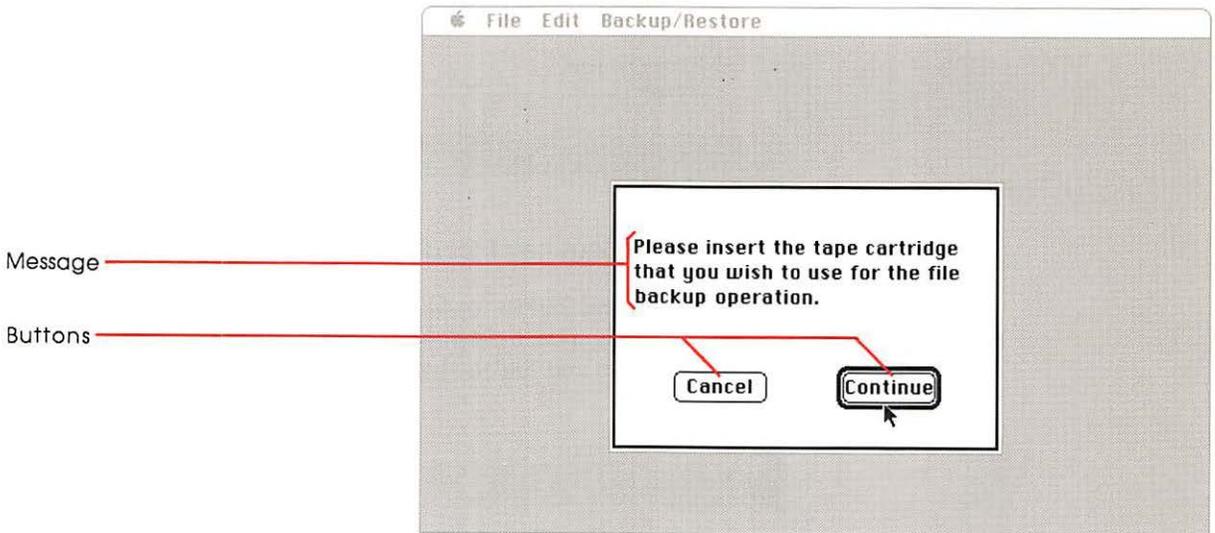


Figure 3-16
Backup Files tape request message

7. Click the OK button in the Completion message to end Backup Files.



Figure 3-17
Backup Files Completion message

To select more files to back up, reselect Backup Files from the menu.

8. Eject the tape cartridge.

Backup Files copies files onto the tape cartridge and creates a catalog on the cartridge identifying each session (each time you use Backup Files) with a backup date and time. The Tape Backup 40SC application directs the Tape Backup 40SC device to copy files onto the tape cartridge, adding files until all selected files are backed up or the tape cartridge fills up. A dialog box alerts you when the files selected won't fit on the current tape cartridge, and allows you to switch tapes or quit.

You can cancel the Backup Files operation in the middle, if necessary. The Apple Tape Backup 40SC application gives you the option of canceling the backup of the current file only, or the current file and all the rest of the files you selected. All the files backed up before you canceled the operation remain copied onto the tape cartridge and can be restored to the hard disk.

Backup Files recommendations

Backup Files copies the individual files that you select for backing up to your Tape Backup 40SC. When you have a small set of files that you want safely archived or individual files that are too large to back up onto a 800K 3.5-inch floppy disk, we recommend backing up these files daily and making a volume backup once a week. Small individual files can be backed up on floppy disks faster than they can with the Tape Backup 40SC application and device. See your Macintosh owner's guide for information on how to copy data onto floppy disks.

For Backup Files you need at least two tape cartridges so you have one for storing files when the first tape cartridge is full and you don't want to clear the first tape cartridge. You may also want to make two copies of files so that you have a second copy to rely on.

The length of time needed for the Backup Files operation varies depending on how the files are distributed on the hard disk. You need to be present throughout this operation. It may require extra tape cartridges or choices. The backup session ends when the tape cartridge fills up. You must start a new backup session with a new tape cartridge to back up more files.

Restore Files

The Restore Files operation restores files to your hard disk from a tape cartridge copy created during a Backup Files operation.

You can restore files saved with Backup Files on a tape cartridge to any hard disk. The Apple Tape Backup 40SC application doesn't remember the previous location of the file (the hard disk or folder it resided in) on the hard disk.

Follow these steps to do a file restore:

1. Open the Tape Backup 40SC application from your hard disk.
2. Click in the Welcome message to get to the application desktop.

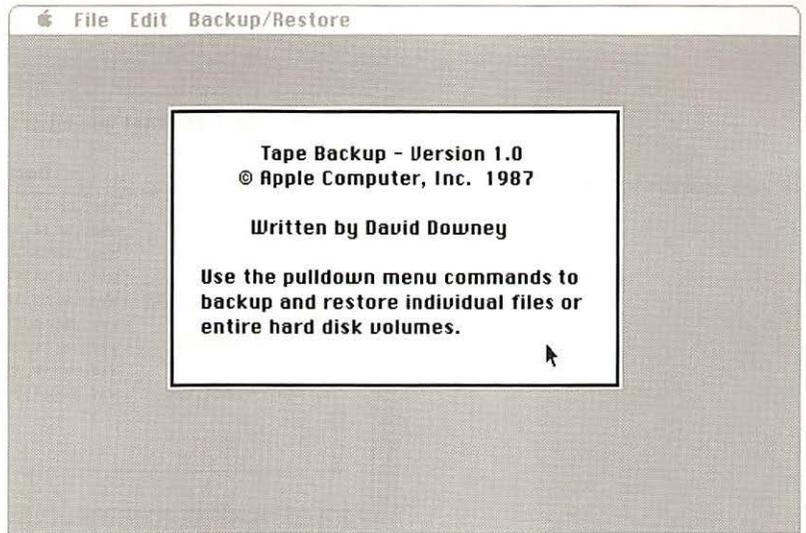


Figure 3-18
Welcome message

3. Choose the Restore Files command from the Backup/Restore menu.
4. Insert a tape cartridge containing files you want to restore into the Tape Backup 40SC device.

A dialog box appears showing you an alphabetical list of the files backed up in the most recent backup session. See Figure 3-19.

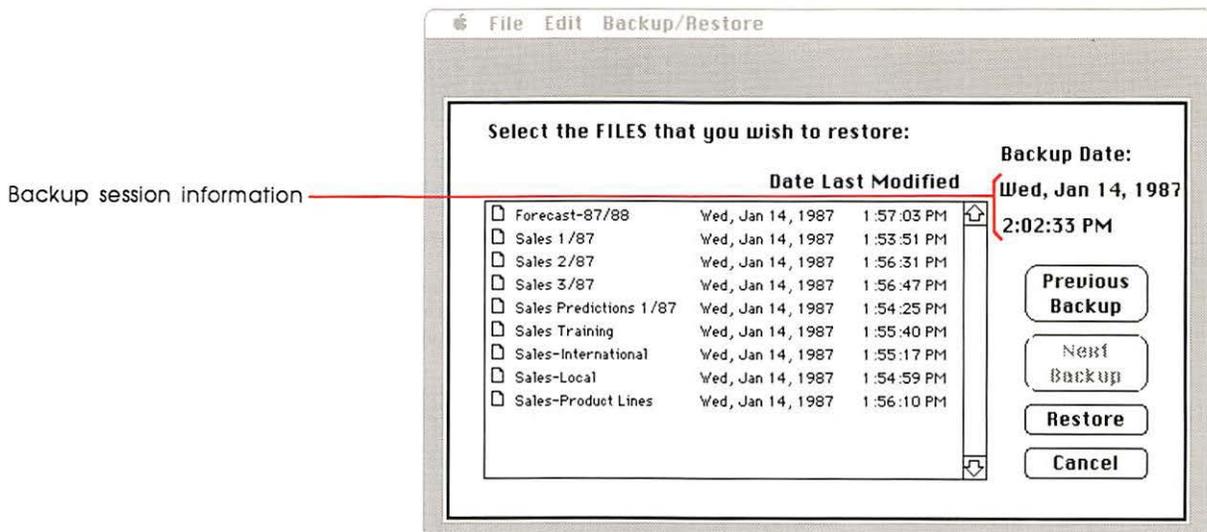


Figure 3-19
File selection dialog box

- To select a different backup session, click the appropriate button.
5. Select the files you want to restore.
 - To select an individual file, click on its name.

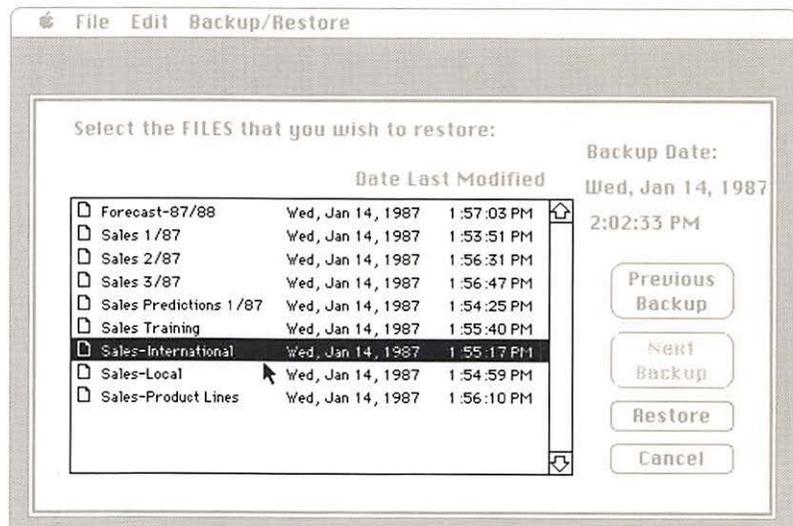


Figure 3-20
Selecting an individual Item for Restore Files

- To select a contiguous group of files, drag down the list of names including all that you want to restore.

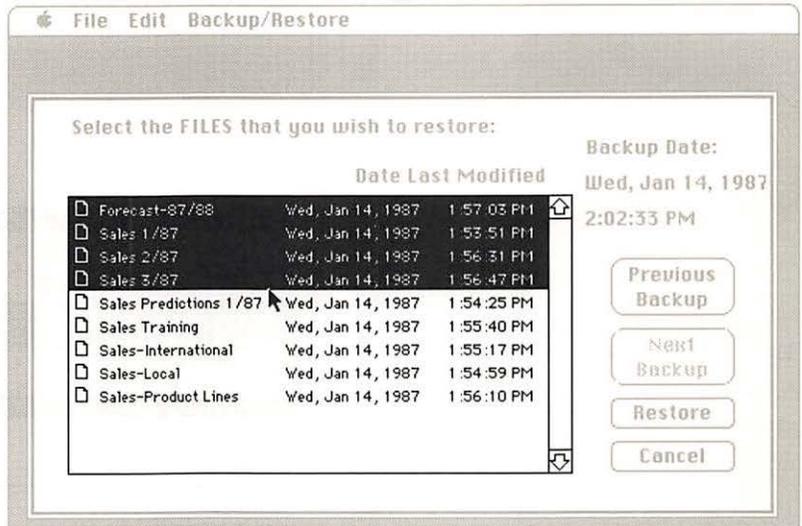


Figure 3-21
Selecting contiguous items for Restore Files

- To select files that are not contiguous, hold down the Shift key and click on the names of files that you want to restore. See Figure 3-22.

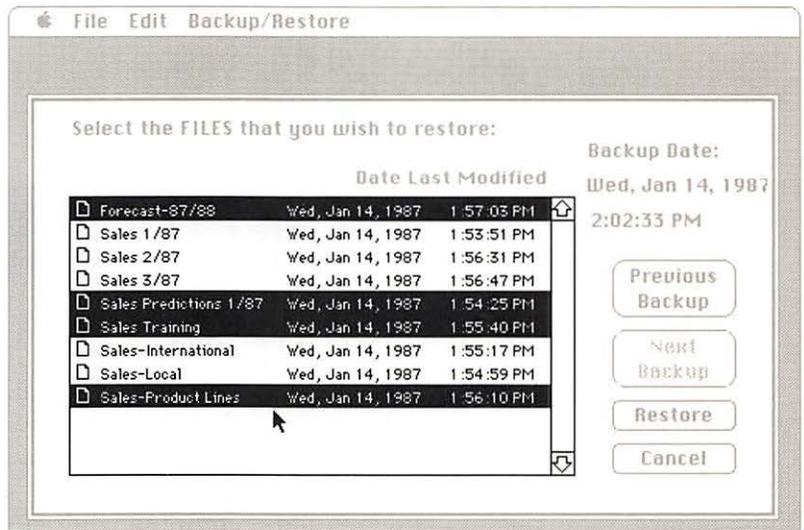


Figure 3-22
Selecting noncontiguous Items for Restore Files

6. Select a volume and folder in which to restore the files.

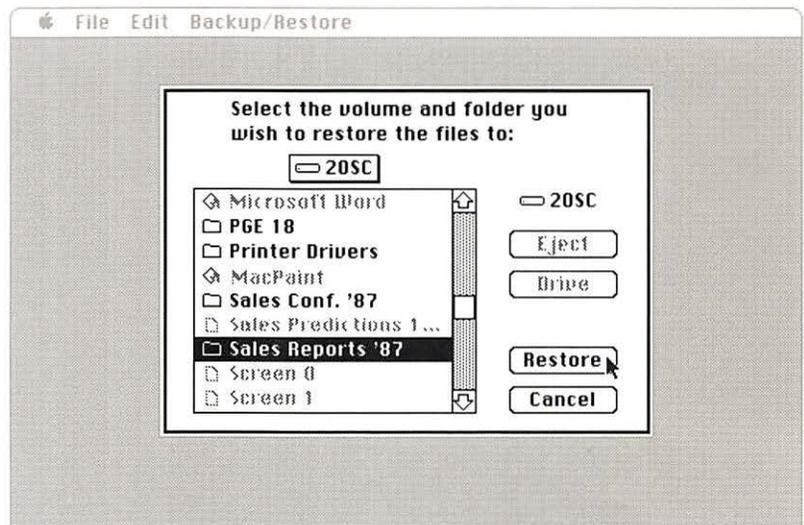


Figure 3-23
Destination Volume/Folder selection

7. Click the Restore button to begin the restore operation. See Figure 3-23.
8. Follow the instructions in the dialog boxes to direct the Restore Files operation.

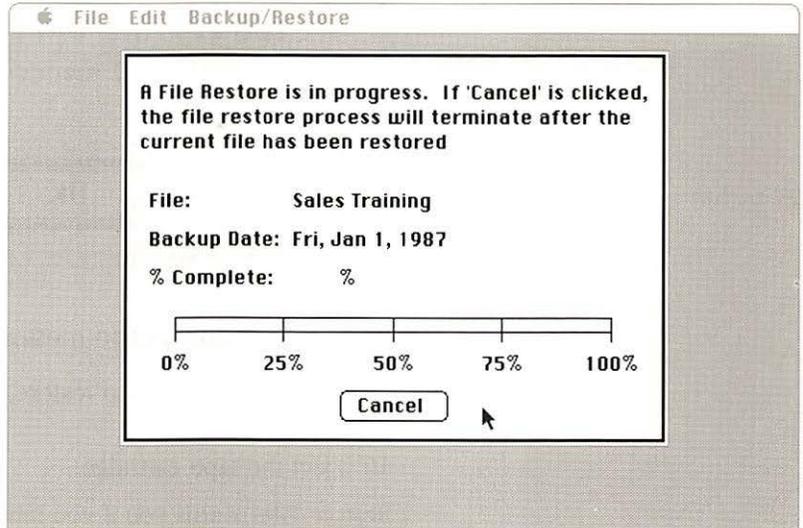


Figure 3-24
Restore Files In Progress status

9. When the restore is complete, click the OK button in the Completion message to end the file restore operation.



Figure 3-25
Restore Files Completion message

To select more files to restore, reselect Restore Files from the menu.

10. Eject the tape cartridge.

Restore Files warns you if you have selected a file to restore that has the same name as a file currently on your hard disk. Click Cancel or Continue as appropriate.

Important The Tape Backup 40SC application won't allow you to restore a System File over the System File currently driving the Macintosh.

You also can't restore the Apple Tape Backup 40SC application over the Apple Tape Backup 40SC application in use.

You can cancel the Restore Files operation in the middle. The **Cancel button** doesn't cancel the currently restoring file, just the selected files that haven't yet been restored. Apple Tape Backup 40SC completes the restore of the file it is processing when you click Cancel.

Restore Files recommendations

Once you have copied files from your hard disk onto a tape cartridge, Restore Files writes the files from the tape cartridge onto a hard disk. If you lose files, delete files accidentally, or lose access to part of your hard disk, use the Restore Files operation to replace the backed up files onto your hard disk.

Restore Files reads from the tape first and then writes data onto the hard disk. The Restore Files operation takes different amounts of time depending on the length of the files and in how many pieces they were stored on the hard disk when they were copied.

You can restore only files copied with the Backup Files procedure.

File menu

The File menu commands let you format and clear tape cartridges or quit the application.

Format Cartridge

The Format Cartridge operation is explained in Chapter 2. You must format all unformatted non-Apple tapes before you can use them for volume and file backups. If you need to format a non-Apple tape cartridge, see Chapter 2.

Clear Cartridge

The Clear Cartridge command clears the **directory** information from the tape cartridge. Then the tape cartridge forgets it contains information and you can use it for a new backup.

Use this command when you want to clear a tape cartridge of copies of files you no longer need. The Clear Cartridge operation clears the entire tape cartridge.

Follow these steps to clear a cartridge:

1. Open the Apple Tape Backup 40SC application from your hard disk.
2. Click in the Welcome message to get to the application desktop.

3. Choose the Clear Cartridge command from the File menu.
You see an alert message telling you what is on the tape cartridge.

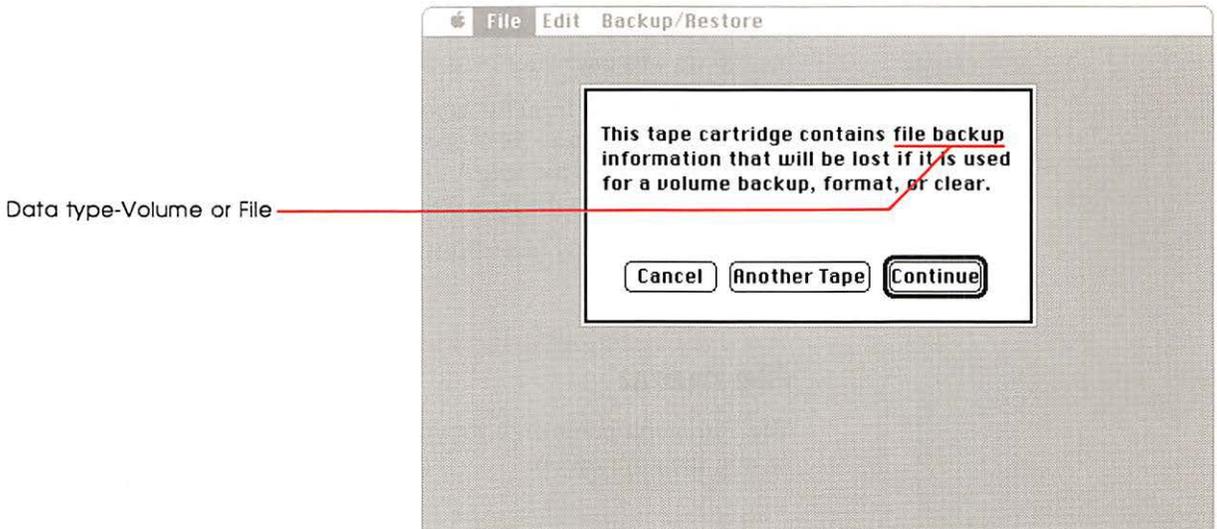


Figure 3-26
Tape Contents Lost warning

4. Click the Continue button to clear the tape cartridge.
5. When the Clear Cartridge operation is complete, click the OK button to exit the Clear Cartridge operation.

Quit

The Quit command lets you leave the Apple Tape Backup 40SC application and return to the desktop.

Follow these steps to quit:

1. Choose Quit from the File menu.
2. Push the eject button on the Tape Backup 40SC to remove the tape cartridge.

Eject button

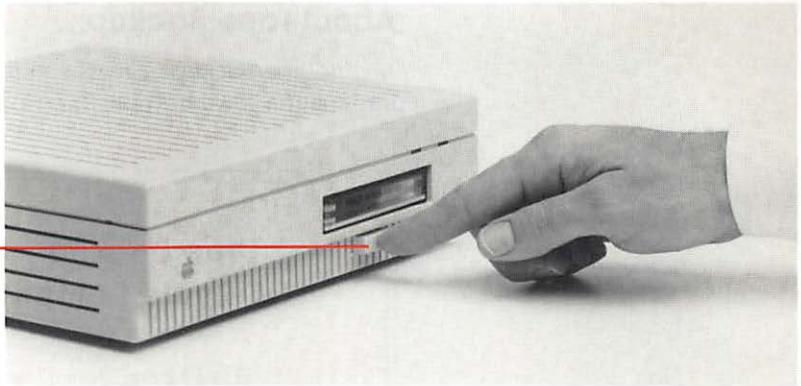


Figure 3-27
Tape Backup 40SC

Warning Don't store the tape cartridge in the Tape Backup 40SC. You risk losing data if you turn the machine on and off with the tape cartridge inserted. You can also wear down the tape drive heads.

3. Turn off the Tape Backup 40SC.

❖ *Note:* You can leave the Tape Backup 40SC on and unused for several days; it draws very little power.

Apple menu

The Apple menu always contains the **desk accessories** that are installed in the **System file** on the current startup disk. It also contains commands specific to the application.

Desk accessories

The commands on the Apple menu give you access to desk accessories like the Calculator and the Clock.

See your Macintosh owner's guide or other manuals, as appropriate, for information on the other desk accessories you have installed on your startup disk.

About Tape Backup...

About Tape Backup... gives you the version and copyright information for the Apple Tape Backup 40SC program.



Figure 3-28
About Tape Backup...display

Edit menu

The Edit menu supports the desk accessories. The Edit commands are dimmed and can't be chosen when you work with the File and Backup/Restore menus. For information on the Edit commands, see your Macintosh owner's guide.



Chapter 4



Troubleshooting and Maintenance

This chapter explains some of the problems you might have while using the Tape Backup 40SC device and the Tape Backup 40SC application, and suggests some possible solutions. This chapter also tells you how to take care of your Tape Backup 40SC.

Troubleshooting

This section presents the most common problems people have while using the Tape Backup 40SC and steps you can take that will usually correct them. If after following the steps in this section you are still having difficulties, contact your authorized Apple dealer for assistance.

Warning *Never* try to remove the cover from the main unit. The Tape Backup 40SC contains high-voltage components that retain an electrical charge, even after the unit is switched off.

Equipment problems and solutions

Your Tape Backup 40SC doesn't switch on.

If you don't see the green power light when you switch on the Tape Backup 40SC, make sure all the cables are properly connected, power cords are plugged in, and power switches are turned on. If your Tape Backup 40SC still will not switch on, see your authorized Apple dealer. (See Appendix C, "Service and Support.")

A dialog box appears telling you the tape drive is not connected.

The Macintosh isn't recognizing the tape backup device.

Try the following actions:

1. Check all cable and cord connections without leaving the application.

2. Click the OK button in the dialog box.

The Tape Backup 40SC application looks for a tape in the tape drive, but will continue through the program without one if you click OK.

3. Switch off the Tape Backup 40SC and switch it on again.
4. Switch off both the Macintosh and the Tape Backup 40SC and switch them on again.

You lost the contents of a tape cartridge.

Several things can cause the loss of data from a tape cartridge. You may have used a Backup Volume tape cartridge to complete a file backup. You may have overwritten the contents of the cartridge accidentally. The cartridge might have been damaged by magnetic interference or by having been left in the Tape Backup 40SC.

Take the following precautions:

- Label your tape cartridges accurately.
- Remove the tape cartridge from the Tape Backup 40SC after any operation.
- Store the tape cartridges in their containers.

A tape cartridge won't back up and the Macintosh won't respond.

If you switched off the tape backup device during the Format operation, this may have interfered with the proper functioning of the SCSI connector. The computer must be restarted.

Restart the Macintosh and start the Tape Backup 40SC application again.

Your hard disk crashes during a Restore operation.

The restore operation was canceled by you or by an internal error.

Try the following steps to reconstruct your hard disk:

1. Reinitialize your hard disk by using the Special menu on the Macintosh Finder.
2. Start up the Macintosh with the *Tape Backup 40SC* disk.
3. Choose Restore from the Backup/Restore menu and follow the steps to restore.

You can't back up files onto a tape cartridge.

The Tape Backup 40SC application will back up files only from an HFS disk. Your files may be from a 400K initialized floppy disk or from a hard disk that doesn't use HFS.

Select files from an HFS (Hierarchical File System) disk only.

Application problems and solutions

The *Tape Backup 40SC* disk doesn't appear correctly on the desktop.

When you insert the *Tape Backup 40SC* disk, you should see a disk icon in the upper-right corner of the desktop. If none appears or if the disk is ejected from the disk drive, then the disk is damaged. If it's an original disk, it must be replaced by your authorized Apple dealer.

The *Tape Backup 40SC* application doesn't work from your hard disk.

The System file on your hard disk isn't the latest version. You need System file version 3.2 dated June 4, 1986 or a later version; and Finder version 5.3 dated June 4, 1986 or a later version.

Install an updated version by using the Installer on your hard-disk installation disk.

The *Tape Backup 40SC* application won't continue through a Backup Volume.

The tape cartridge you are using is either blank or unformatted.

Format the tape cartridge you are using.

The Restore Volume operation was unsuccessful.

A disk volume copied during a Backup Volume operation must be restored to a hard disk with the same storage capacity.

Select a hard disk with a storage capacity that's equivalent to the tape cartridge copy you want to restore.

You can't select a volume to restore in Restore Volume.

You are trying to restore over the volume on which the Tape Backup 40SC application and system software is installed. Doing this can ruin the data on your hard disk.

Restart the Macintosh with the *Tape Backup 40SC* disk in the Macintosh internal disk drive.

You can't restore from a tape cartridge copy of a volume backup.

The Backup Volume operation was canceled by you or by an internal error. The cancellation clears the tape header information and then the Tape Backup 40SC application can't identify the tape cartridge or read any information from the tape cartridge.

Use another tape cartridge copy of the volume backup for the restore operation.

You can't back up all the files you need onto a tape cartridge at the same time.

Select files from one level of the Hierarchical File System at a time.

Click the "Backup only the files that have changed" box if you want to back up all the changed files on your hard disk, but don't want to search through the disk for them.

Maintenance

This section explains how to care for your Tape Backup 40SC, the Tape Backup 40SC application disk, and tape cartridges.

Care and handling of the Tape Backup 40SC

Your Tape Backup 40SC is a mechanical device with moving parts. Treat your tape backup device as you would a stereo tape deck. You can carry it around; just be careful. Rough handling, such as dropping the Tape Backup 40SC, jarring or bumping it (especially while it is running), or allowing heavy objects to drop on it, can cause a malfunction or damage the information on the tape cartridge.

Warning *Never* try to remove the cover from the main unit. The Tape Backup 40SC contains high-voltage components that retain an electrical charge, even after the unit is switched off.

The operating environment

Your Tape Backup 40SC can operate effectively in about the same temperature and humidity as you can: 50 to 104 degrees Fahrenheit and 20 to 80 percent relative humidity.

Be careful to protect the Tape Backup 40SC from spilled liquids and hazardous vapors. Spilling any liquid inside, or allowing the tape backup device to be exposed to chemical or solvent fumes (including steam from a coffee maker), can harm it.

Cleaning

To clean the outside of the Tape Backup 40SC, just wipe it with a soft, damp cloth. To remove stains or dirt, add a drop of liquid detergent to the cloth and wipe the surface of the tape backup device.

Clean the tape drive magnetic head with a cotton swab soaked in 99% isopropyl alcohol to remove debris and materials rubbed off from the tape surface.

Caution *Never* clean the magnetic head with any head cleaner that contains active or abrasive ingredients.

Care of the *Tape Backup 40SC* disk

Although your *Tape Backup 40SC* disk is quite tough, it does have a few modest physical requirements—about the same as those of audio cassettes. Your *Tape Backup 40SC* disk should be kept

- dry
- away from extreme temperatures (don't put it on top of your Macintosh or store it on the seat of your car)
- out of direct sunlight
- out of range of anything that contains a magnet, like a telephone or monitor

When the disk is inserted into the disk drive, the metal covering on the disk case slides to the left so the Macintosh can get information from the disk. When the disk is out of the disk drive, the metal covering closes by spring action to protect the disk underneath it. Never touch the exposed disk under the metal covering.

Other than that, you don't have to treat the disk with special care. You can carry it around in your briefcase or coat pocket.

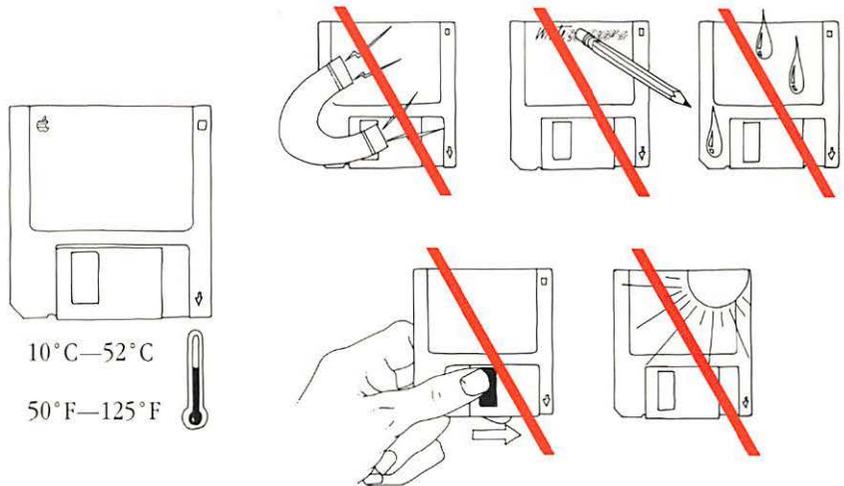


Figure 4-1
Disk do's and don'ts

Care of the tape cartridge

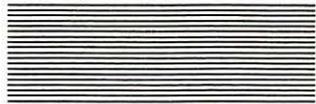
Follow these guidelines to protect your tape cartridges.

- Remove the tape cartridge when the Tape Backup 40SC is not in use.
- Don't store the cartridge in the the tape drive or leave it unattended in the Tape Backup 40SC for more than a day.
- You may leave the Tape Backup 40SC on overnight if you have set it up to complete a backup or restore operation.

- Don't turn on the Tape Backup 40SC with the tape cartridge inserted.

Turn on the Tape Backup 40SC and then insert the tape cartridge.

- Manually eject the tape cartridge by pushing the eject button after each backup or restore operation.
- Allow the tape cartridge to acclimate to your operating environment for eight hours, or for the amount of time it has been exposed to dissimilar conditions—whichever is less.
- Use the tape cartridge in a clean environment.



Appendix A



Operating Specifications

The Apple Tape Backup 40SC is a Small Computer System Interface (SCSI) block-type device providing data storage on removable 40MB magnetic tape cartridges. The unit contains all of the electrical and mechanical subsystems required to support a 0.25-inch tape drive and provide an intelligent SCSI port. This appendix provides the general, mechanical, and electrical specifications of the Tape Backup 40SC. Appendix B provides an operational overview of the Tape Backup 40SC.

Table A-1
General specifications

Storage media

Type	0.25-inch magnetic tape cartridge
Length	205 ft. (62.5 meters)
Width	0.25 inches (6.35 mm)

Data Capacity

Total capacity	38.5 MB
Encoding method	Group Code Recording (GCR)
Flux density	12,500 fpi
Bit density	10,000 bpi (GCR)
Block size	8192 bytes (8320 w/ 128 bytes of system data appended)

Data Capacity (continued)

Number of tracks	24 serpentine
Track width	8 mils (.020 mm) write 5 mils (.0125 mm) read 10 mils (.025 mm) spacing

Speed and timing

Tape speed	60 ips R/W 90 ips search/rewind
Drive data transfer rate	uncorrected raw: 600 Kb/s non-interleaved fully corrected: 400 Kb/s non-interleaved
SCSI data transfer rate	average for continuous tape motion: 21.3 Kb/s corrected, non-interleaved maximum burst rate (8 Kb): 500 Kb/s
Rewind time	27 seconds, end-to-end (nominal)
Start/Stop time	150 milliseconds (nominal)
R/W head positioning time	250 milliseconds track-to-track

Table A-2
Mechanical specifications

Dimensions

Height	3.07 in. (78 mm)
Width	9.7 in. (246 mm)
Depth	10.5 in. (266 mm)
Weight	7.3 lbs. (3.3 Kg)

Temperature

Operating	5° to 45°C (cartridge limited)
Shipping/Storage	-40° to +65°C (hardware only)

Humidity

Operating	20% to 80% relative, noncondensing 80°F maximum dew point/wet bulb (cartridge limited)
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Altitude

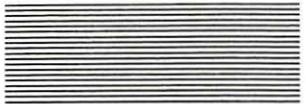
Operating	tested to 15,000 ft.
Non-operating	tested to 50,000 ft.

Table A-3
Electrical specifications

Input power

Line voltage	85 to 270 VAC, 47 to 64 Hz.
Power dissipation	15 W

Data interface SCSI, 50-conductor cable



Appendix B



Operational Overview

About this appendix

This appendix is written for those who want to know more about the operation of their Apple Tape Backup 40SC.

The next section describes the general operation of the Apple Tape Backup 40SC. It breaks the Tape Backup 40SC electronics into functional blocks and describes the content and task of each block.

In the “Tape Transport” section you’ll find information on the tape transport and Read/Write (R/W) head. At the end of this appendix are references for further information.

How the Tape Backup 40SC works

The operation of the Apple Tape Backup 40SC is controlled by the electrical subsystem. The electrical subsystem consists of the drive module, R/W module, and the controller module. The following sections describe the general operation of the Tape Backup 40SC as it relates to these three modules.

The Tape Backup 40SC is a block-type device, which means that it works in much the same way as a disk drive or memory expansion card. Data is written to and read from the tape cartridge in blocks. The controller module provides all of the data handling functions for SCSI bus transfers and tape cartridge R/W operations. The drive module controls the tape transport and the R/W module controls R/W head positioning, end sense, and analog-to-digital, digital-to-analog (ADC/DAC) signal conversion for the tape cartridge. The drive and Read/Write (R/W) modules perform their functions under the direction of the controller module.

Writing to the Tape Backup 40SC

Writing to the Tape Backup 40SC begins with a command issued by the user to back up a storage device, such as a hard disk. Backup utility software loaded into the Macintosh receives this command and begins transferring data from the storage device to a range of Macintosh main memory. The software then turns control over to the Macintosh SCSI firmware. The address in main memory of the data being transferred (buffer address) is passed to the SCSI firmware when control is turned over.

To write to the Tape Backup 40SC, the SCSI firmware passes the controller module the logical address to which to write the incoming block, using the standard SCSI commands. The controller module translates the logical address to a physical address on the tape cartridge and sends the R/W and drive modules the commands to position the R/W head and activate the tape transport. The incoming data blocks are buffered in the controller module during the translation process, then passed to the R/W module for writing through the control module interface. The R/W module then performs the actual write operation according to the commands sent it by the controller module. The controller module acknowledges correct or faulty execution of the write operation to the Macintosh software through the standard SCSI protocol.

Reading from the Tape Backup 40SC

Reading from the Tape Backup 40SC begins when the user issues a command to recover a backup file. The backup utility software receives this command and sets up a range of Macintosh main memory (a buffer) to receive the incoming file. The software then turns control over to the Macintosh SCSI firmware. The buffer address in main memory is passed to the SCSI firmware when control is turned over.

To read from the Tape Backup 40SC, the Macintosh SCSI firmware sends the controller module the logical address of the target block, using the standard SCSI commands. The controller module translates the logical address to a physical address on the tape cartridge and sends the R/W and drive modules the commands to position the R/W head and activate the tape transport. The outgoing data blocks are passed to the controller module through the control module interface. They are buffered in the controller module and then passed to the SCSI controller for output onto the SCSI bus. The controller module acknowledges correct or faulty execution of the read operation to the Macintosh software through the standard SCSI protocol.

The SCSI firmware in the Macintosh receives the data sent by the controller module and writes it into the previously allocated buffer. The controller module, however, will acknowledge correct operation as soon as it has successfully passed the data blocks onto the SCSI bus, regardless of the success or failure of the SCSI firmware's side of the exchange.

Drive module

The drive module contains all of the electronics required to control the tape transport. The drive module consists of a microcontroller and two motor controllers. Figure B-1 is a block diagram of the drive module. The subsequent paragraphs describe the function of each block shown in Figure B-1.

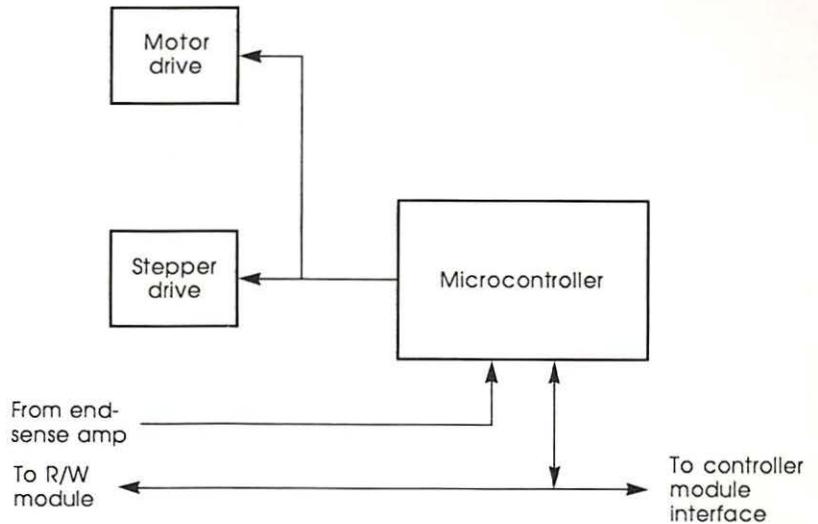


Figure B-1
Drive module block diagram

Microcontroller

The microcontroller is an 8051 integrated circuit (IC). It is essentially a hardware controller, since its sole responsibility is managing the various components that control the mechanical subsystem units. The microcontroller executes all R/W operations, including controlling tape speed, track position, and R/W amplifier gain, according to the commands sent to it by the controller module microprocessor across the control module interface.

Drive motor controller

The drive motor controller provides the electrical interface between the drive motor and the microcontroller.

Stepper motor controller

The stepper motor controller provides the electrical interface between the R/W head subassembly and the microcontroller.

Read/Write (R/W) module

The R/W module contains all of the electronics required to control R/W head positioning, data conversion, and end sense. The R/W module consists of a R/W amplifier and an end-sense amplifier. Figure B-2 is a block diagram of the drive module. The subsequent paragraphs describe the function of each block shown in Figure B-2.

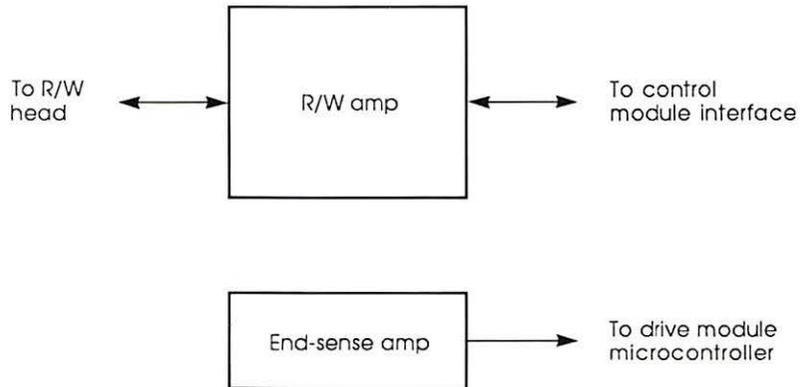


Figure B-2
R/W module block diagram

R/W amplifier

The R/W amplifier is a custom IC that provides the electrical interface between the R/W head and the control module interface. During a write operation, the R/W amp converts incoming digital data to analog data for recording on the tape cartridge. For a read operation, the R/W amp converts the analog data coming from the tape cartridge to digital data for transmission to the controller module via the control module interface.

End-sense amplifier

The end-sense amplifier is a photocell IC that provides end-of-tape detection for the microcontroller.

Controller module

The controller module contains all of the firmware and electronics required to manage the Tape Backup 40SC and its SCSI connector. Figure B-3 is a block diagram of the controller module. The subsequent paragraphs describe the function of each block shown in Figure B-3.

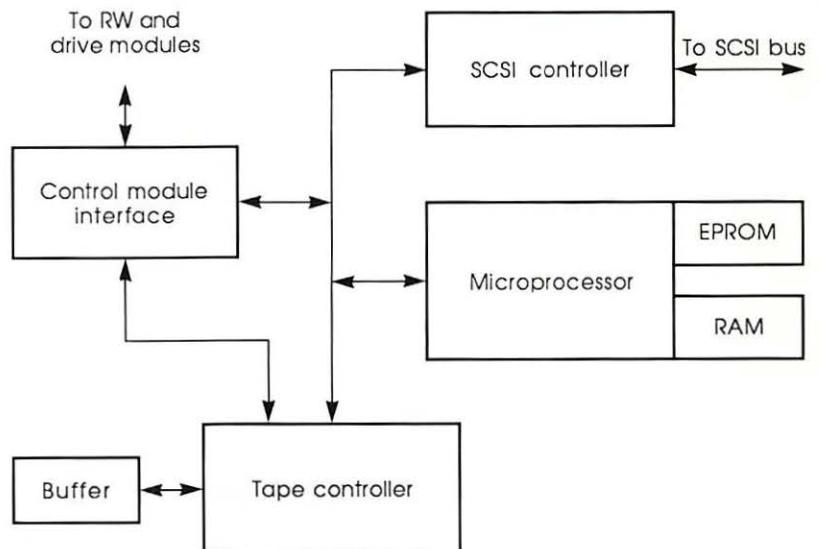


Figure B-3
Controller module block diagram

Microprocessor

The microprocessor is an Intel 80188 supported by a 16Kx8 EPROM and 12K of RAM. The microprocessor is responsible for controlling the operation of the tape controller, the SCSI IC, the R/W module, and the drive module. Data interchange with the host is accomplished through the use of a retry algorithm stored in the microprocessor EPROM and Error Correction Circuitry (ECC) mounted on the controller module PC board.

Controller bus

The controller bus provides the control and data signal interface between the microprocessor and the circuits it manages. It is a standard Intel 80188 microprocessor bus.

Control module interface

The control module interface is a gate array that provides the electrical interface between the controller module microprocessor and the drive and R/W modules. The modules are connected to the gate array by a 40-conductor cable. All odd-numbered pins are connected to signal ground.

The interface is a TTL-level signal exchange involving 20 signal lines: 13 lines originating at the controller module and 7 lines originating at the R/W and drive modules. The interface operates in two modes, Normal Mode and Command Mode. Table B-1 defines the controller module signals and Table B-2 defines the R/W and drive module signals. Command Mode signal definitions are provided in Table B-3.

Table B-1
Controller module Interface signals

Pin #	Signal	Description
2	/GO	Go signal to tape drive motor in drive module
4	/REV	Direction control for tape drive motor
6	/HSD	Selects high-speed operation
8	/TR4	Track select bit 4
10	/TR3	Track select bit 3
12	/TR2	Track select bit 2
14	/TR1	Track select bit 1
16	/TR0	Track select bit 0
18	/RST	Reset
20	/CMD	Set interface to Command Mode
34	/WDA	Write data signal
38	/WEN	Write enable signal
40	/DS0	Drive 0 select control

Table B-2
R/W and drive module signals

Pin #	Signal	Description
22	/UTH	Upper tape position code
24	/LTH	Lower tape position code
26	/SLD	Acknowledgment from drive module after it has been selected
28	/CIN	Cartridge in place
30	/USF	Unsafe-file protect mechanism in the Record position
32	/BSY	Drive busy
36	/RDP	Read pulse output—one pulse per flux transition

Table B-3
Command Mode interface signals

Pin #	Signal	From	Description
2	/CMD7	CM*	Command bit 7
4	/CMD6	CM	Command bit 6
6	/CMD5	CM	Command bit 5
8	/CMD4	CM	Command bit 4
10	/CMD3	CM	Command bit 3
12	/CMD2	CM	Command bit 2
14	/CMD1	CM	Command bit 1
16	/CMD0	CM	Command bit 0
22	/ST0	DM	Status bit 0
24	/ST1	DM	Status bit 1
28	/ST2	DM	Status bit 2
30	/ST3	DM	Status bit 3

*CM indicates that the controller module originated the signal and DM indicates that the drive module originated the signal.

Tape controller and R/W buffer

The tape controller provides 40-bit Cyclic Redundancy Checking (CRC), Group Code Recording (GCR) error detection, serial-to-parallel data conversion, and clocking for all read/write operations to the tape cartridge. Read/Write operations are executed via a RAM buffer. The tape controller is a Very Large Scale Integration (VLSI) IC and the buffer is an 8Kx8 RAM IC. The controller is managed by the microprocessor across the Intel data bus and is connected to the R/W module via the control module interface.

SCSI controller

The SCSI controller is a NCR 5380 SCSI IC. It provides all of the device protocol and bus control required for a full SCSI bus. The SCSI controller is the physical I/O point for all data operation to and from the Tape Backup 40SC. The SCSI controller is connected to the Apple SCSI bus via the Apple SCSI System Cable.

Tape transport

The tape transport subsystem of the Tape Backup 40SC consists of the drive unit chassis, Read/Write head, and tape drive motor. The following sections describe the mechanical subsystem. Figure B-4 is an exploded view of the mechanical subsystem.

Drive unit chassis

The drive unit chassis mounts the tape drive motor, the R/W head stepper motor, and the mechanical supports for the tape cartridge.

The tape drive motor is pivot-mounted to provide maximum engagement with the tape cartridge.

The R/W head stepper motor is mounted onto the chassis baseplate. The R/W head is mounted to the stepper motor via a lead screw assembly. The resultant compactness and stability of the subassembly provides reliable operation in conditions up to 5 G shock and vibration.

The tape cartridge is held in place with rollers that push the cartridge up against steel pins set into the chassis.

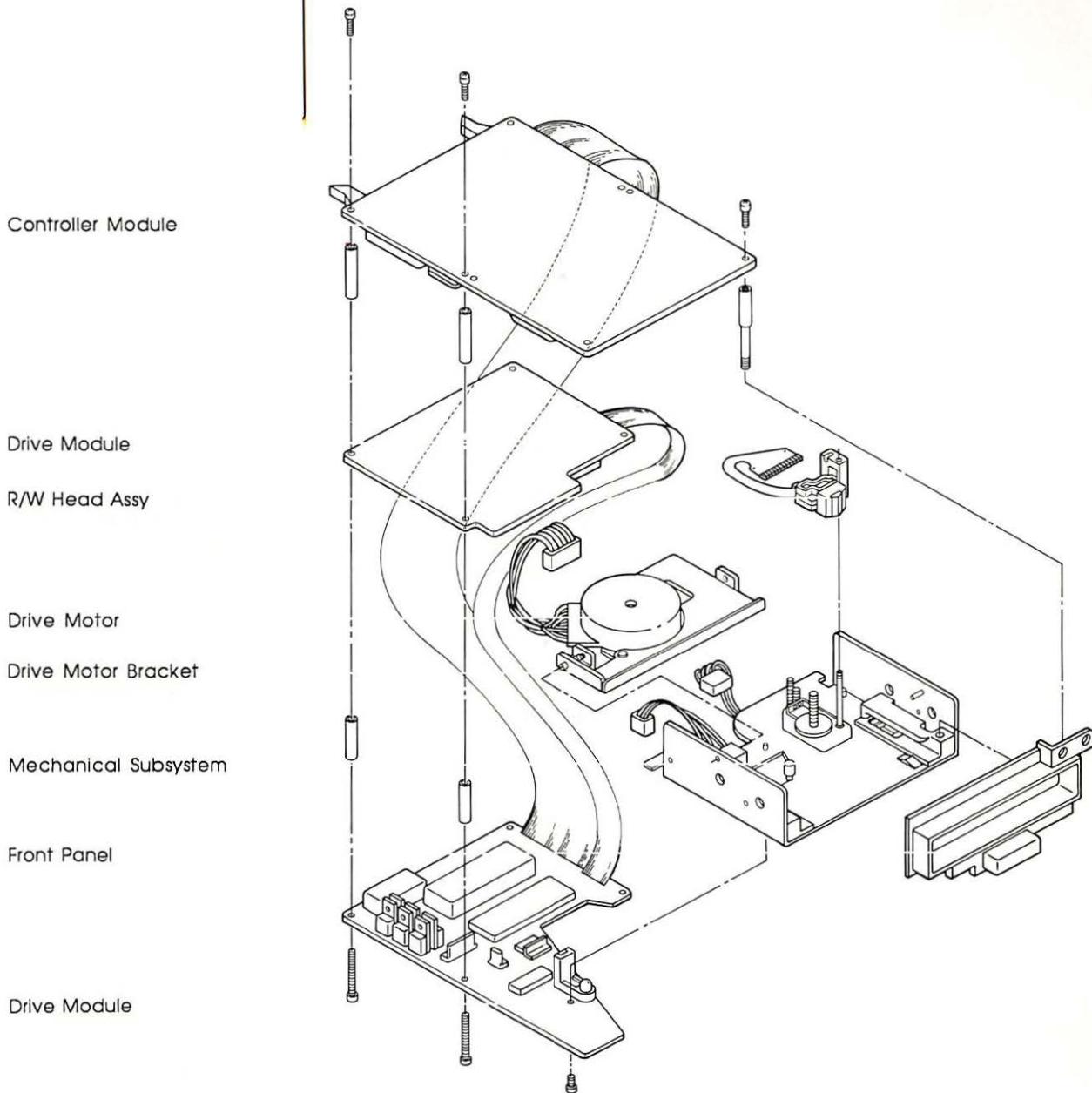


Figure B-4
Tape Backup 40SC mechanical subsystem

Read/Write (R/W) head

The R/W head is a subassembly consisting of the head stepper motor, the lead screw assembly, and the R/W head itself. The R/W head is a single track, dual gap, wide write/narrow read device. The head is constructed of ferrite and ceramic with complete glass bonding for stability.

The read head is 0.005 inches wide. The write head is 0.008 inches wide. Each core has a dedicated gap to optimize its particular function. The two cores are magnetically isolated by a double-lapped ferrite/ceramic I-bar spacer. The I-bar spacer also ensures perfect alignment between the two cores.

Tape drive motor

The tape drive motor is a high-torque, brushless DC motor mounted on a spring-loaded pivot plate. The motor shaft is capped with a rubber puck that mates to the tape cartridge roller. Motor speed is controlled by an IC under the direction of the drive controller.

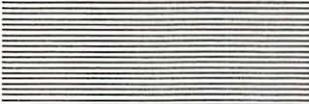
For more information

The documents listed below contain information on the SCSI standard used by the Tape Backup 40SC:

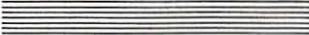
- *SCSI American National Standard for Information Systems (ANSI X3T9.282-2)*
- *Apple II SCSI Card Technical Reference*

In addition to these documents, the Apple Programmer's and Developer's Association (APDA) is an excellent source for technical information on a wide variety of Apple products, including the Tape Backup 40SC. APDA has programming tools, technical notes, and reference manuals all available through membership in the association. To find out more about APDA, contact them at this address and phone number:

APDA
290 SW 43rd Street
Renton, Wa. 98055
Telephone: (206)-251-6548



Appendix C



Service and Support

To help you get the best performance from your system, Apple Computer, Inc. has established a worldwide network of full-support authorized Apple dealers. If you need answers to technical questions or information about product updates, your authorized Apple dealer can help you. Apple's Technical Support organization backs each dealer and international technical support group via the AppleLink[®] system, a state-of-the-art on-line electronic information service, to ensure prompt, reliable assistance.

Your dealer has the latest information on new hardware and software products as well as product updates. If you wish to upgrade your system, your dealer can help you select compatible components.

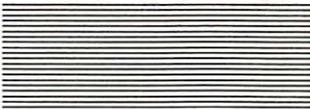
If your product requires service, your local authorized Apple dealer is trained and ready to support you. Apple provides factory-quality parts and the latest available diagnostic equipment to the more than three thousand authorized Apple service centers throughout the world. Apple guarantees parts and warranty labor. (Regulations in each country determine the length of warranty. Some restrictions may apply, depending on the country of original purchase.)

If for some reason you cannot return to the authorized dealer from whom you purchased your system, go to the nearest service location. For the location nearest you, in the United States, call (800) 538-9696; in Canada, call (800) 268-7796 or (800) 268-7637. For locations in other countries, either call the Apple headquarters in your country or write to

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Cupertino, California 95014
USA

Apple also offers service options designed to meet your needs. One of these is the *AppleCare*[®] Service Agreement (available in the United States, Canada, and Australia only), which extends full warranty coverage up to three years. Your *AppleCare* contract will be honored at any participating authorized Apple dealer within the country of purchase—an added benefit if you relocate. Local service means time saved in getting your Apple system back to work.

You can purchase *AppleCare* at any time, but it's a good idea to purchase it with your system, or at least before your warranty has expired, to avoid an owner-paid inspection.



Appendix D



Safety Information

For your own safety and the safety of your equipment, follow these important safety instructions.

Warning This equipment is intended to be electrically grounded.

Your Apple Tape Backup 40SC is equipped with a three-wire grounding plug—a plug that has a third (grounding) pin. This plug will fit only a grounding-type AC outlet. This is a safety feature.

If you are unable to insert the plug into the outlet, contact a licensed electrician to replace the outlet with a properly grounded outlet.

Do not defeat the purpose of the grounding plug!

Be sure the power plug is disconnected (disconnect by pulling the plug, not the cord):

- If the power cord or plug is frayed or otherwise damaged.
- If you spill anything into the case.
- If your equipment is exposed to rain or any other excess moisture.
- If it has been dropped or if the case has been otherwise damaged.
- If you suspect that your computer needs servicing or repair.
- Whenever you clean the case (use only the recommended procedure given below).

Be sure that you always do the following:

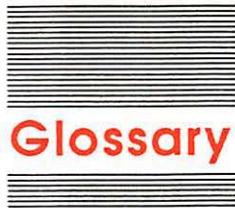
- ❑ Keep your equipment away from sources of liquids, such as wash basins, bathtubs, shower stalls, and so on.
- ❑ Keep it protected from dampness or wet weather, such as rain, snow, and so on.
- ❑ Read all the installation instructions carefully before you plug the product in to a wall socket.
- ❑ Keep these instructions handy for reference by you and others.
- ❑ Follow all instructions and warnings dealing with your system.

Warning

Electrical equipment may be hazardous if misused. Operation of this product, or similar products, must always be supervised by an adult. Do not allow children access to the interior of any electrical product and do not permit them to handle any cables.

To clean the case, do the following:

1. Disconnect the power plug. (Pull the plug, not the cord.)
2. Wipe the surfaces lightly with a water-damp, clean, soft cloth.



Glossary

application program: A program written for some specific purpose, such as word processing, data base management, graphics, or telecommunication. Compare **system program**.

back up: (v.) To make a spare copy of a disk or of a file on a disk. Backing up your files and disks ensures that you won't lose information if the original is lost or damaged.

backup: (n.) A copy of a disk or file. It's a good idea to make backups of all your important disks and to use the copies for everyday work, keeping the originals in a safe place. (Some program or startup disks cannot be copied.)

buttons: The pushbutton-like images in dialog boxes where you click to designate, confirm, or cancel an action.

cable: An insulated bundle of wires with connectors on the ends.

Cancel button: A button that appears in dialog boxes after you select certain commands. Clicking this button cancels the command.

check box: A small box or circle associated with an option in a dialog box. When you click the check box, you may change the option or affect related options.

crash: To unexpectedly cease to operate, possibly destroying information in the process.

data: Information, especially information used or operated on by a program. The smallest unit of information a computer can understand is a bit.

desk accessories: "Mini-applications" that are available from the Apple menu regardless of which application you're using—for example, the Calculator, Alarm Clock, or Puzzle.

desktop: In Macintosh, the computer's working environment—the menu bar and the gray area on the screen. You can have a number of documents on the desktop at the same time.

device: Frequently used as a short form of **peripheral device**.

dialog box: A box that contains a message requesting more information from you. Sometimes the message warns you that you're asking your computer to do something it can't do or that you're about to destroy some of your information. In these cases the message is often accompanied by a beep.

directory: A pictorial, alphabetical, or chronological list of the contents of a folder or a disk.

disk: An information-storage medium consisting of a flat, circular, magnetic surface on which information can be recorded in the form of small magnetized spots, in a manner similar to the way sounds are recorded on tape. See **floppy disk**, **hard disk**.

floppy disk: A **disk** made of flexible plastic, as compared to a **hard disk**, which is made of metal.

format: (v.) To divide a disk or tape cartridge into tracks and sectors where information can be stored.

hard disk: A disk made of metal and sealed into a drive or cartridge. A hard disk can store very large amounts of information compared to a **floppy disk**.

hard disk drive: A device that holds a hard disk, retrieves information from it, and saves information to it. Hard disks made for microprocessors are permanently sealed into the drives.

icon: An image that graphically represents an object, a concept, or a message.

megabyte (MB): A unit of measurement equal to 1024 kilobytes, or 1,048,576 bytes.

menu: A list of choices presented by a program, from which you can select an action.

peripheral device: A piece of hardware—such as a video monitor, disk drive, printer, or modem—used in conjunction with a computer and under the computer's control. Peripheral devices are often (but not necessarily) physically separate from the computer and connected to it by wires, cables, or some other form of interface.

port: The metal sockets on the back of your computer into which you plug connector cables such as the SCSI Peripheral Interface Cable.

priority number: A number that you set on the priority switch at the back of the Tape Backup 40SC. The number tells the computer to which device to give priority when sending and receiving data.

priority switch: The indicator that shows the priority number of a device. For the Tape Backup 40SC, the switch is located on the back.

Small Computer System Interface (SCSI): A specification of mechanical, electrical, and functional standards for connecting intelligent peripherals such as hard disks, printers, and optical disks to small computers.

system: A coordinated collection of interrelated and interacting parts organized to perform some function or achieve some purpose—for example, a computer system comprising a processor, keyboard, monitor, disk drive, and tape backup device.

System file: A file Macintosh computers use to start up and to provide system-wide information. The System file contains system programs.

System Folder: A Macintosh folder that contains files for desk accessories, fonts, System files, and other basic information for general use by the Finder and other applications.

system program: A program that makes the resources and capabilities of the computer available for general purposes, such as an operating system. Compare **application program**.

3.5-inch disk: A flexible, plastic **disk** measuring 3.5 inches in diameter and in a hard plastic jacket.

volume: A general term referring to a storage device; a source of or a destination for information. A volume has a name and a volume directory with the same name. Its information is organized into files.



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Return Address: _____

Place
First Class
Postage
Here

Apple Computer, Inc.
P.O. Box 1143
Cupertino, CA 95014
USA

 Tape Backup

.Tape Backup 4OSC

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10. 1 2 3 4 5 6

11. 1 2 3 4 5 6

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13. 1 2

14. _____

15. _____

16. _____



Tell Apple About Your

- Please contact your authorized Apple dealer when you have questions about your Apple products. Dealers are trained by Apple Computer and are given the resources to handle service and support for all Apple products. If you need the name of an authorized Apple dealer in your area, call toll-free: 800-538-9696.

- Would you like to tell Apple what you think about this product? After you have had an opportunity to use this product, we would like to hear from you. You can help us to improve our products by responding to the questionnaire below and marking the appropriate boxes on the card at the right with a #2 lead pencil. If you have more than one response to a question, mark all the boxes that apply. Please detach the card and mail it to Apple. Include additional pages of comments if you wish.
 1. How would you rate the Tape Backup 40SC overall? (**1**=poor. . . **6**=excellent)
 2. Where did you purchase your Tape Backup 40SC? (**1**=dealer, **2**=corporate purchase, **3**=teacher purchase, **4**=other)
 3. Where are you using your Tape Backup 40SC? (**1**=work, **2**=school, **3**=home, **4**=other)
 4. Which computer are you using with the Tape Backup 40SC? (**1**=Macintosh Plus, **2**=Macintosh II, **3**=Macintosh SE, **4**=Apple IIe, **5**=Apple IIgs, **6**=other)
 5. Which hard disk drive are you using with your Tape Backup SC? (**1**=Hard Disk 20SC, **2**=Hard Disk 40SC, **3**=Hard Disk 80SC, **4**=Hard Disk 20, **5**=other)
 6. Where is your hard disk drive located? (**1**=outside my computer, **2**=inside my computer)
 7. Which factors contributed to your buying the Tape Backup 40SC? (**1**=the dealer's display, **2**=the dealer's recommendation, **3**=more convenient than floppy disk backup, **4**=hardware compatibility, **5**=an Apple product)
 8. How many SCSI peripheral devices are on your SCSI cable system? (**1**=1, **2**=2, **3**=3, **4**=4 or more)
 9. Did you consult the manual before connecting your Tape Backup 40SC? (**1**=no, **2**=yes)
 10. How would you rate the *Tape Backup 40SC Owner's Guide* overall? (**1**=poor. . . **6**=excellent)
 11. How easy was the manual to read and understand? (**1**=difficult. . . **6**=very easy)
 12. Did the manual contain the information you needed? (**1**=no, **2**=yes)
 13. Were the illustrations useful? (**1**=no, **2**=yes)
 14. Which topics, if any, were confusing to you?
 15. Please describe any errors or inconsistencies you may have found in the manual. (Page numbers would be helpful.)
 16. What suggestions do you have for improving the Tape Backup 40SC?

Thanks for your time and effort.

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Tuck end flap inside back cover when using manual.



Apple

Tape Backup 40SC Owner's Guide

THE APPLE PUBLISHING SYSTEM

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