



**Red Line!**

**DISK UTILITIES**

**for Macintosh**

**Version 2.0**

**User's Guide**



# Red Line!

## User's Guide

Version 2.0

High Performance Disk Utilities  
with Removable Media Support  
for the Apple Macintosh

### ***Complete Support For:***

SCSI Hard Disk • Removable Hard Disk  
Magneto Optical Disk

System 7 Compatible • A/UX Compatible  
32 Bit Clean • Virtual Memory Compatible  
SCSI Manager 4.3 Savvy

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## **HELP!**

Red Line! is designed to be the most powerful and complete SCSI disk formatting application available on the Apple Macintosh.

If you find that you are encountering some difficulty, please first contact the dealer from whom you received this software. If the dealer is unable to provide you with technical support, then contact a Spirit support representative at the following address: Software Technical Support; Spirit Technologies, Incorporated; 375 Elliot Street; Newton Upper Falls, MA 02164-1126.

Please make sure that you provide your system configuration information; including Macintosh model, hard disk subsystem(s) make and model, tape device or removable media device type.

## **THANKS FROM SPIRIT TECHNOLOGIES**

We would like to thank you for choosing the Red Line! formatting utility by Spirit Technologies, Incorporated. Red Line! is a complete formatting utility featuring extensive diagnostics built into the application. We encourage you to use Red Line! to its fullest potential. We're sure you'll be pleased with its power to manage all of your storage systems from removable cartridge disks to the new high performance drives.

Sincerely yours,  
Spirit Technologies

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# Red Line!

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### **WELCOME TO RED LINE!**

Red Line! represents the latest in our efforts to provide our users with the most powerful and complete SCSI Disk formatting utility available for the Apple Macintosh today.

A new 'STI-Mount' utility has been added to allow the user to access partitions that are not currently mounted and to define what volumes will be mounted at startup time.

Finally, support for various disk mechanisms has been greatly expanded. Not only have we added support for several new disk drives, we have added support for newly released Magneto Optical Disk and Floptical Mechanisms.

Spirit's commitment to total system compatibility allows earlier drive mechanisms, which would otherwise be only System 6.0.x compatible, to operate under System 7 and future system versions as they become available from Apple Computer, Inc.

### **Some Important Notes:**

- **Red Line! works with Macintosh System Software Version 6.0.4 and later, including System 7 and the new System 7.1. Macintosh System 7 provides new features such as "Balloon Help" and virtual memory which are fully supported by Red Line!**
- **If you received a pre-formatted hard disk and do not wish to partition your drive, then you do not need to use this software to get the drive up and running.**
- **If you are using a removable media drive (such as a SyQuest drive), please read the "Removable Media Drives" section of Chapter 3.**

## **RED LINE! FEATURES**

Red Line! offers many features which allow you to manage large amounts of backup and storage data quickly and easily.

Red Line!:

- Is System 7 savvy.
- Supports Apple Events.
- Provides On-Line Balloon Help.
- Has performance improving volume caching.
- Is 32-Bit clean.
- Performs full diagnostics on your drive; including bad block remapping.
- Creates and manages volume caches for performance.
- Provides password protection and write protect on individual partitions.
- Can mount only specified partitions at startup.
- Allows selection of icons from Red Line! library.
- Allows custom interleave for older systems.
- Supports SyQuest and RICOH removable cartridge disks.
- Supports 3.5" and 5.25" Magneto Optical Disk.
- Supports almost every SCSI hard disk made.

## **RED LINE! REQUIREMENTS**

Red Line! is designed specifically for use with the CANON, EPSON, Fujitsu, RICOH, SONY, TEAC or MaxOptix magneto optical drives, the Insite Floptical mechanism and SyQuest, RICOH, and Y-E Data Flexceed removable disk drives and most SCSI interface Winchester disks in use today. Support for the new generation 2.5" hard disk is included as well.

### **MINIMUM REQUIREMENTS**

- Macintosh Plus running System 6.0.4 or later.
- 1 MB RAM.
- Hard Disk Drive (With built-in SCSI interface).

This manual will take you through each function of Red Line! and will explain its use in detail. The instructions and explanations in this guide assume that you have a clear understanding of the operation of your Apple Macintosh. You should know how to choose, select, open, and drag items by using the mouse.

You should also understand how the desktop, windows, dialog boxes, buttons, and files/folders work within the Macintosh operating system. For more information about these items, refer to your Apple Macintosh User's Guide.

### **RED LINE! OVERVIEW**

Red Line! is an important tool which will aid you in installing, testing and using your hard disk drive subsystem. More important to know is that Red Line! will allow you to upgrade your older hard disk drive for use with your System 7 upgrade; assuring total System 7 compatibility.

The Format operation allows you to perform a low-level format and map out bad blocks that may exist on your hard disk. **Formatting erases all data on the hard disk; make absolutely sure that you back up all data you want to save before starting this procedure.**

The Partition function allows you to divide your hard drive into "volumes," each of which then appears with a separate icon on your desktop. Without partitioning, you would be effectively limited to around 2,500 files on your hard disk, since this is the maximum number of files per volume that can be handled by the Macintosh System 6 Finder. (System 7, however, is not affected by this limitation). Partitioning will also speed data access time since generally less data needs to be searched. The average seek time is improved because there is less of the drive to seek across in those partitions and the directory size is smaller. Less surface area to seek over



The Red Line! Icon

and fewer files in the directory make for faster access to the data on the disk.

The Update command allows you to install new versions of the Red Line! Drivers without reformatting your hard disk drive.

The Password option allows you to protect your data. Any Macintosh partition may or may not be password protected, as you choose. Passwords cannot be assigned to A/UX or other non-Macintosh partitions.

The Tests menu items allow you to check the performance of your hard disk drive.

These and all the other useful features offered by Red Line! are described in the following pages; read them carefully and you will be able to use your hard disk drive most effectively.

## **PROGRAM COMPATIBILITY**

**Note:** Red Line! is designed to be compatible with all Macintosh applications. Should you encounter problems, contact Spirit Technologies as soon as possible.

Red Line! is compatible with Apple Macintosh System 7, including Balloon Help and Virtual Memory, and offers many useful new performance features.

Red Line! is optimized for use with most hard disks available today. Red Line! does not interfere with **other** disk drivers that may be installed on other hard disk drives. Special volume caching is performed so that your Red Line! formatted hard disks may seem to operate better than similar drives formatted by other utilities.

### FOR USERS THAT HATE TO READ

Even though you may be a seasoned Macintosh user, we highly recommend reading this manual. If you feel that you can work with the application without reading anything, at least take a look at this chapter.

Installing Red Line! onto your system is as easy as drag-copying the file on the floppy diskette to your boot volume. Drag the following files to your system as follows:

#### System 6 Quick Start

For System 6 environments, copy Red Line's files to your system as described below:

Copy the Red Line! INIT into the System Folder of the boot or start-up volume. Red Line! INIT is required if and only if you are using a removable media drive, such as a Magneto Optical Disk (MOD), CD-ROM drive, or a Floptical disk device.

Copy the STI-Mount utility to any convenient location. STI-Mount is used to mount Password protected partitions, or partitions that are not mounted at start-up time. If you frequently mount and dismount volumes, perhaps keeping STI-Mount on your desktop will be useful.

**Note:** Depending upon the configuration of Red Line!, STI-Mount, Red Line! INIT, or the CD support may not be included on your diskette.



Red Line! INIT icon.



STI-Mount icon.



Red Line! icon.

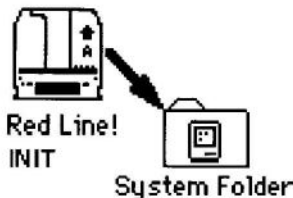


Figure 2.1: Move the Red Line! INIT to the System Folder

Copy the Red Line! utility to any easily accessible location on your hard disk. If you maintain a separate folder for utilities, place it there.

### **System 7 Quick Start**

For System 7 environments, copy Red Line's files to your system as follows:

Copy Red Line! INIT into your Extensions folder in the System Folder. Red Line! INIT is required if and only if you are using a removable media drive, such as a SyQuest drive, Magneto Optical Drive (MOD) or a Floptical™ mechanism.

Copy the STI-Mount utility into the Apple Menu Items folder in the System Folder. STI-Mount is used to mount Password protected partitions, or partitions that are not mounted at start-up time.

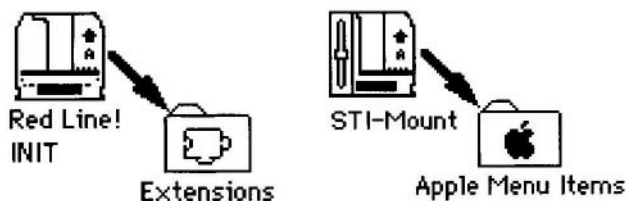


Figure 2.2: Move Red Line! INIT and STI-Mount to these folders.

Copy the Red Line! utility to any easily accessible location on your hard disk. If you maintain a separate folder for utilities, place it there.

### **Restart your computer**

After installation of Red Line! and its support utilities, it is important that you Restart your system. This will load the Red Line! INIT and STI-Mount into the system for use.

## **LAUNCHING RED LINE!**

Launch Red Line! by double-clicking on it's icon. Make sure that all SCSI devices that you may wish to work on are connected to the SCSI bus and are powered on. Red Line! cannot identify devices that are not ready for use.



The Red Line! Icon

### **Personalize Red Line!**

You will be presented with a dialog asking for your name and company name. Enter your name and company name as required. If you do not want a company name associated with Red Line!, clear this area BEFORE clicking on **OK**.

### **Select the SCSI Device to Work on**

Red Line! will then present you with a list of available devices. Click on the appropriate ID number, device icon or description of the device you would like to initialize.

If you have a removable media drive, insert the media before attempting to "look" at it by clicking on its ID. Red Line! will insert question marks for the capacity until that drive becomes ready for use.

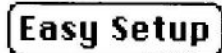
### **Pick your operation**

Red Line! will offer various command buttons and menu items for you to use. Pick and choose, but choose wisely.

### **Easy Setup**

Easy Setup is probably the most commonly used command in Red Line! This command will format your drive, prepare and configure any drive specific features for performance and create a single auto-mounting boot partition.

Answer the directions that Red Line! will ask of you and when Red Line! has finished its work, your newly prepared drive will be ready for immediate use.



The Easy Setup Button.

This section shows you how to begin using Red Line! If you are an experienced Macintosh user, the information in this section may be too elementary for you to handle. You may wish to proceed to the next section.

### **RED LINE! DISTRIBUTION DISKS**

The Red Line! Utility is distributed on one 3.5-inch diskette. This diskette is labeled **Red Line!** and contains the Red Line! application and Red Line! Additions: STI-Mount, and Red Line! INIT for removable media devices.

**Note:** Depending upon the configuration of Red Line!, STI-Mount, Red Line! INIT, or the CD support may not be included on your diskette.

The second diskette included in the full distribution package contains a minimal System 7 for EMERGENCY booting purposes. DO NOT use this diskette's system for day to day use. This minimal system is missing several important resources and can cause plenty of long term grief.

### **MAKING BACKUP COPIES**

Before running Red Line!, make a backup of the Red Line! distribution diskettes to use as your working copies. If you don't have the system resources to duplicate a floppy disk, make the backup copy after you install your hard drive.

### **INSTALLING YOUR 1ST HARD DISK**

If you are installing Red Line! and your hard disk onto a Macintosh that is not equipped with a hard disk, you will be required to run Red Line! from the floppy diskette. After successfully installing the hardware, please turn on all of your equipment and then insert the floppy diskette into the Macintosh. Red Line! will then be available for your use.

**Note:** Further discussion about volume partitioning and resizing is available in Chapter 7.

## **Planning Your System**

By planning what your system requirements are before starting out can save you many hours later on. Red Line! does allow you to re-size your volume any time; however, expanding that volume beyond its maximum allowable size (allocation block size requirements) may require you to perform re-initialization.

We ask you to take inventory of your system and your requirements when planning ideal volume sizes. For the most part, **Easy Setup** will be the choice for your system. There are, however, times that many smaller volumes, or partitions, will suit you the best. This is especially true when you are installing very large hard disks.

You may wish to review **Chapter 7** which discusses partitioning at length.

## **OPENING RED LINE! FOR THE FIRST TIME**

To get started with Red Line!, follow these steps:

1. Switch on any external SCSI devices, wait 10 seconds, and then turn on your Macintosh.
2. Boot the system from the Red Line! diskette.

The first time you launch Red Line!, you will be asked to enter your name and company name. Please enter the information in the boxes as requested below:

**Caution:** Once you enter your name, you will personalize your copy of Red Line!. This is permanent.

Once you have entered your name and company name, Red Line! will remember this information. You cannot change the "This Copy Belongs to:" information, so make sure you have entered in your name correctly.

If you do not wish to have a company name associated with your copy of Red Line!, please clear any text in the company name line. Make sure you clear the text before clicking on OK.

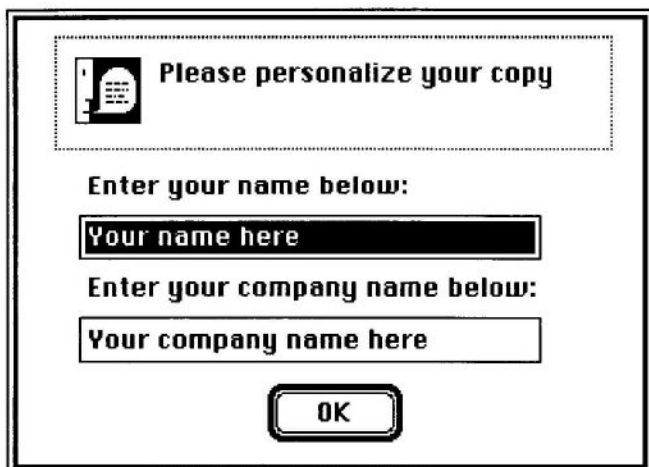


Figure 3.1: Personalizing Red Line!

### **OPENING RED LINE! LATER**

During subsequent launching of Red Line!, the Startup dialog will contain the user name and company name that you entered previously. Personalization makes this copy of Red Line! your very own.

**Note:** Click your mouse to make the Welcome Window disappear before the internal time-out removes it automatically.



Figure 3.2: Customized Welcome Window

To avoid waiting for the Welcome Window to clear itself, you may click the mouse on the Welcome Window to cause Red Line! to proceed to the main window.

Once again, please remember that when you personalize Red Line!, the change is permanent. You cannot make changes to the owner information later.

### **Use Easy Setup**

For most installations, **Easy Setup** will set up your drive for use with your system. If all you require is a single volume the size of the disk drive, **Easy Setup** will prepare your disk as one contiguous volume for you.

Once **Easy Setup** has finished its tasks, you can restart your system with your "System Software Installation Diskettes" from Apple Computer to install the operating system on your drive. For additional information, please see the Macintosh User's Guide which came with your computer.

Remember, you can re-size your volume at any time within certain limits. Your decisions are not necessarily cast in stone. You may, however, run into certain limitations when re-sizing a volume where block sizes are incompatible.

If this is the case you must re-initialize the drive to change partition sizes.

In any case, if you do choose to re-size your partition, please be sure to backup your data first.

## THE ACTUAL PROCESS

Using Red Line! is quite simple.

Click on the drive you wish to work on. In the case of the following example, SCSI ID 0 is the one we will work with.

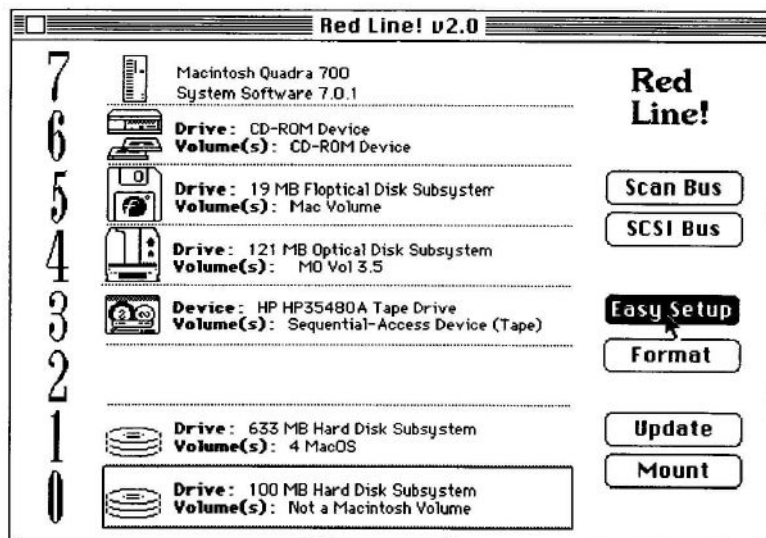


Figure 3.3: Red Line! Main Window

Please note that once the drive's info area is outlined, click on **Easy Setup**. Red Line! will then ask you if it is OK to proceed. Click on **OK** to continue or **Cancel** to abort.

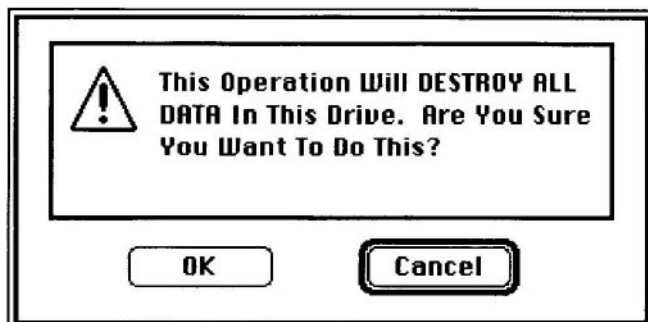


Figure 3.4: Format Warning

Once you have clicked on OK, you will then be asked to select an icon for the disk drive volume. Select an icon and click OK.

**Note:** You are not limited to the icons illustrated here. Please see Appendix B for custom icon instructions.



Figure 3.5: Red Line! icons

Red Line! will then proceed to format the drive, initialize it for use, create a single partition and install your icon. It will then be mounted on the desktop and be ready for use.

## **IF YOU ALREADY OWN A HARD DISK** **DISK**

If you already own a hard disk drive and it is currently installed on your Macintosh, you can install Red Line! onto your system as easy as drag-copying the file from the floppy diskette to your boot volume. Drag the following files to your Startup Volume as appropriate for your system version.:

### **Installation for System 6**

For System 6 environments, copy Red Line!'s files to your system as follows:

Copy the Red Line! INIT into the System Folder of the boot or start-up volume. Red Line! INIT is required if and only if you are using a removable media drive, such as a Magneto Optical Disk (MOD) or a Floptical device.

Copy the STI-Mount utility to any convenient location. STI-Mount is used to mount Password protected partitions, or partitions that are not mounted at startup time. If you frequently mount and dismount volumes, perhaps keeping STI-Mount on our desktop will be useful.

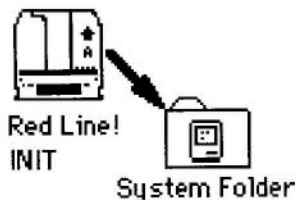


Figure 3.6: Move the Red Line! INIT to the System Folder

Copy the Red Line! utility to any easily accessible location on your hard disk. If you maintain a separate folder for utilities, place it there.

You should remove all other removable media INIT's from your System Folder. This way, Red Line! can support all of your removable media drives without potential for conflict.



Red Line! INIT icon.



STI-Mount icon.



Red Line! icon.

If Red Line! INIT detects that another INIT is supporting a SCSI device, Red Line! INIT will not allow itself to conflict with the pre-existing INIT. In other words, Red Line! INIT will not load support for the SCSI ID supported by the other INIT.

### **Installation for System 7**

For System 7 environments, copy Red Line's files to your system as follows:

Copy Red Line! INIT into your Extensions folder in the System Folder. Red Line! INIT is required if and only if you are using a removable media drive, such as a SyQuest drive, Magneto Optical Drive (MOD), CD-ROM, or a Floptical disk device.

Copy the STI-Mount utility into the Apple Menu Items folder in the System Folder. STI-Mount is used to mount Password protected partitions, or partitions that are not mounted at startup time.

Copy the Red Line! utility to any easily accessible location on your hard disk drive. If you maintain a separate folder for utilities, place it there.

The Red Line! utility should be copied to your hard disk to any location that you can easily gain access.

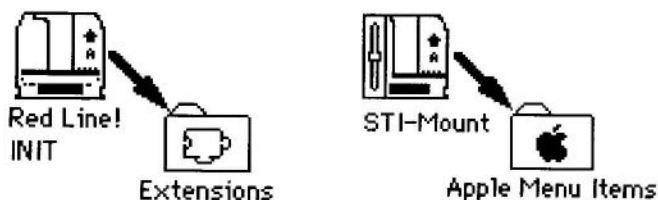


Figure 3.7: Move Red Line! INIT and STI-Mount to these folders.

## **REMOVABLE MEDIA DRIVES**

The Red Line! INIT file is provided for use with removable media drives, including removable hard disk drives, optical devices, floptical drives, and CD ROMs.

Red Line! INIT enables you to mount removable cartridges automatically, that is, without having to restart or launch Red Line! every time you change a cartridge.

The Red Line! INIT can be used only with Macintosh System 6.0.4 or higher.

If you currently have a removable disk subsystem installed (i.e.: MOD, SyQuest, RICOH or floptical), make sure that Red Line! INIT loads last in your INIT list. If you use a loader move the Red Line! INIT to the last position.

Red Line! INIT will check to see if any other removable media drivers are loaded and will not "take over" that disk drive's control if such a driver exists.

If you would prefer to use the Red Line! INIT for other removable drives, simply remove your old removable media driver and leave Red Line! INIT in your system.

The Red Line! INIT is proven to be compatible with Apple's CD ROM driver and will not conflict with its operation provided Red Line! INIT is loaded after the CD ROM driver.

The Red Line! INIT is capable of mounting virtually all other non-password protected removable media volumes. This means that you could easily replace competing removable media drivers in your system and retain total compatibility.

If Red Line! INIT cannot mount the foreign-formatted removable media, please make sure that Red Line! INIT loads after the INIT required to mount the volume.

## **USING STI-MOUNT**

The STI-Mount utility provides a quick and easy way to mount volumes that do not appear. STI-Mount can also be used to specify which volumes appear on the desktop at start-up. See Appendix A for details.

**Note:** If you are currently using a removable media driver for another brand of removable media drive, make sure that Red Line! INIT loads last or remove the other INIT.

---

# Red Line!

Space for Notes

---

---

# Red Line!

Space for Notes

---

### THE RED LINE! MAIN WINDOW

Once Red Line! has started, the user will be presented with the Main Window. The Main Window is laid out as follows:

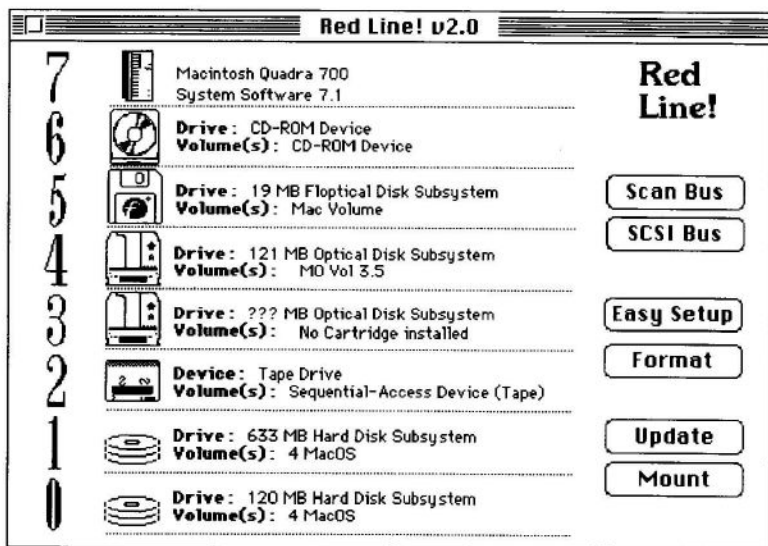


Figure 4.1: Red Line! Main Window.

Note that disk drives and removable media drives have their own icons. To work on a specific device, click on its SCSI ID at the left of the window.

If you have a removable media drive installed on your system and have not inserted media at the time you launched Red Line!, three question marks will appear in the space for the capacity of the drive.

When a piece of media is inserted into the drive, you can click on the **Scan Bus** button and Red Line! will attempt

to determine the total available capacity on that drive. You will not be able to issue any commands to that drive until a piece of media is inserted and the device becomes ready.

To use Red Line!, you may select a drive anywhere in the Drive's ICON area, descriptor area, or on the SCSI ID number itself.

Once you have selected a drive to work on, the buttons to the right of the device window become ready for use. Red Line's menu items will become available as well.

### **Identifying Your System Configuration**

Clicking on the Macintosh icon in the top of the main window will yield a dialog that explains your system's setup as it appears to Red Line! A sample of that dialog appears below:

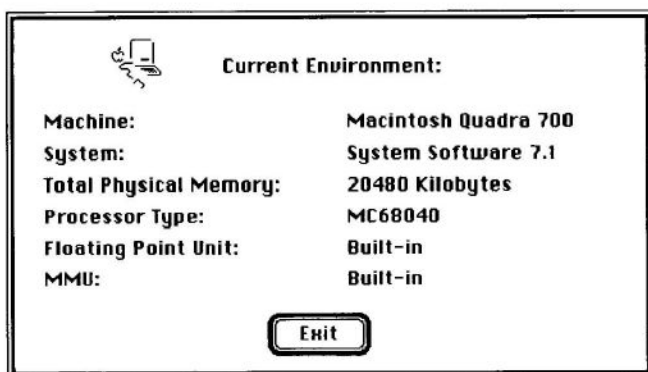


Figure 4.2: Macintosh Info Dialog.

## **HOW TO USE THE REST OF THIS MANUAL**

The next two chapters contain information about the individual buttons and menu items available in Red Line!. These basic descriptions should help you through the operation of Red Line!.

Certain menu items require more detailed descriptions. Those items will have a separate chapter discussing its operation. Hopefully, we have organized this manual to be simple, yet concise enough for you to take full advantage of Red Line!.

# Red Line! Chapter 5: Main Window Buttons

Chapters Five and Six provide detailed information on Red Line! operations. The illustration below will be referred to in these two chapters.

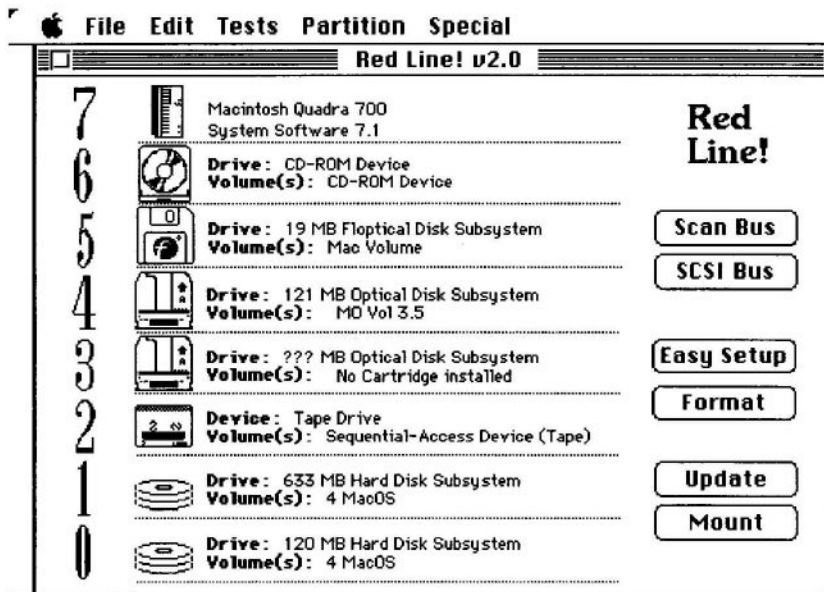


Figure 5.1: Red Line! Main Window with Menu Bar.

## Scan Bus

### SCANNING THE SCSI BUS

Whenever you launch Red Line!, all SCSI devices on your system are scanned to see if they are available for use. These devices are then listed in the Main Window. You can scan again for SCSI devices by clicking on the **Scan Bus** button. To select a drive to work on, click on the number for that drive.

In the event that you have a removable disk drive with no media present, Red Line! will display question marks in place of the volume size. When you have inserted a piece of media, you may click on its icon and Red Line! will check to see what space is available on that drive. You may also click on **Scan Bus** to refresh the display and see the volume size.

**Note:** Scan Bus+Option Key is useful for debugging your system.

#### Scan Bus + Option Key

By default, Red Line! will display the generic capacity information for each SCSI device on the chain. To gain more information regarding each device on the SCSI bus, you can click on the **Scan Bus** button while holding down the **Option Key** on the keyboard.

Also, you can hold down the **Option Key** and click on the **SCSI ID** in the Red Line! main window. Only the Detailed information for that SCSI ID will be displayed. To re-display the generic information for that device, click on its **SCSI ID** without the **Option Key**.

This feature is very useful when determining the drive manufacturer and model number information from the SCSI device's Inquiry string.

To display the generic information, click on the **Scan Bus** button without the **Option Key**.

## SCSI BUS STATUS

## SCSI Bus

Clicking on **SCSI Bus** will display the current status of the SCSI bus and the bus phase in a status box:

| SCSI BUS STATUS |          |
|-----------------|----------|
| Attention:      | 0        |
| Acknowledge:    | 0        |
| Reset:          | 0        |
| Busy:           | 0        |
| Request:        | 0        |
| Message:        | 0        |
| Control/Data:   | 0        |
| Input/Output:   | 0        |
| Select:         | 0        |
| Data Parity:    | 0        |
| Phase:          | Bus Free |

OK   Status   Reset

Figure 5.2: SCSI Bus Status Box.

All lines should be "0". If any line is not zero, you may have improper termination or a defective cable. Make sure all devices are connected and powered on. Click on **Reset** to check that the lines will clear to zero. If not, shut down your Macintosh and locate any possible problems or contact your authorized reseller for assistance.

## **Easy Setup**

### **EASY SETUP BUTTON**

**Easy Setup** provides a simple one-step method to prepare your disk volume. This button automatically formats the hard disk drive, maps out any defective blocks, creates a single partition, initializes the volume for use and mounts it on the desktop.

After using the **Easy Setup** command, you can always adjust the partition size after the setup operation has completed. If you wish to manually setup your system, click on the **Format** button instead. You may then use Red Line's extensive menu commands to prepare your media for use.

### **Easy Setup Button + Option Key**

Clicking on the **Easy Setup** Button with the **Option Key** held down will prepare the media for use without performing a low-level format of the volume.

This feature is very useful when preparing an older drive mechanism that does not support SCSI format commands. This is particularly true of some SCSI to ESDI disk controllers. Also, sometimes, you may wish to simply prepare and partition a hard disk drive. This feature can save hours of formatting time when preparing your disk for use with System 7.

## THE FORMAT BUTTON

**Format**

All devices (hard disk, optical disk, removable disk, etc...) must be formatted before they can be used. **Format** will completely erase the contents of your **ENTIRE** drive and automatically map out any defective blocks.

Most modern SCSI drives will perform media certification whereby the on-board controller will re-allocate, or "map out" any sectors that are marginal or unstable. This process, as time consuming as it may be, is very important to maintain data integrity.

The maximum number of defects that can be "mapped out" is determined on the drive itself. Maximum defect count is determined by its manufacturer, their engineering specifications, and overall quality, as well as environmental concerns.

Some factors to consider during the format process:

- After installing the drive, allow it to run idle for an hour until the temperature in the cabinet stabilizes.
- Do **not** disturb the drive in any way during the format operation.
- Do **not** change your mind and turn the power off while the process is taking place.

### Format Button + Option Key

Holding down the **Option Key** when you click on the **Format** button will force the drive into 1,024 byte per sector mode. By default all SCSI hard disk drives will format as 512 byte per sector devices.

**Note:** 1,024 Byte/Sector mode can increase performance and capacity.

Sometimes, in the quest for performance, it can help to format the drive to 1,024 bytes per sector. Not only do you gain some read performance, but you will also gain more disk space. There are some serious considerations to note:

- 1) Not all hard disk drives can support 1,024 byte per sector mode. Most notably are the Maxtor LXT-213s and the Quantum LP-80s.

**Caution:** 1,024 Byte/Sector mode is not supported by all drives. Permanent damage may occur.

- 2) If your drive does not support this extended feature, irreparable damage may occur. USE AT YOUR OWN RISK!

**Note:** Using 1,024 Bytes per Sector media increases the storage capacity and the performance for little or no extra media cost.

### **1,024 Byte Per Sector Media in MOD Drives.**

In the event that you choose to use 1,024 byte per sector media in 5.25" Magneto Optical Disk Drives, you can expect to gain some advantages. The most notable is an approximate gain of 25 Megabytes of additional storage capacity on each side of the media. The other is a noticeable gain in read performance from the drive.

Typically 1,024 B/S media is offered for retail sale at or near the same price as its 512 B/S counterpart. For little or no incremental cost, you can enjoy the extra capacity and performance offered by 1,024 B/S media.

Drives that are known to support dual standard (512 B/S and 1,024 B/S media) are the SONY and RICOH 5.25" mechanisms. The CANON MOD drive is supported only in 1,024 B/S mode.

**Note:** **Option Key + Format Button** on RICOH 5.25" MOD drives will improve your continuous read performance.

### **Format Button + Option Key for RICOH MOD's**

Holding down the **Option Key** when you click on the **Format** button when you have selected the SCSI ID of a RICOH RO-5030E-II or RO-5031E drive, will force a format of the medium into thirty two (32) user zones.

This feature is very useful if you wish to keep overall head seeks down to a minimum when the drive encounters a medium defect. Some applications (audio or video playback) require continuous data transfer where long seeks to alternate sectors can interrupt the data flow.

This feature, however, will change the media into a format that does not follow the ISO Mode 3 (SONY default) format. Some drives may have a problem mounting volumes that have been prepared in this format.

For most installations that are exclusively RICOH in nature, this format option will not cause any problems. It has been tested extensively and may result in slightly better performance characteristics.

## UPDATING THE DRIVER

### Update

This command allows you to install new versions of Red Line! device drivers. When upgrading to future version of Red Line!, you may wish to update the drivers without changing your current partition definitions.

For example, if you were currently running your system with Red Line!, version 2.0 and Spirit Technologies releases version 2.1, you can update the driver on the hard disk by selecting the drive icon, and then clicking on the **Update** button.

Using Update will upgrade your system to the latest version. You only need use this command once with any drive volume. Updating the driver multiple times is not necessary, but it will not harm your system if you do so.

You should not attempt to update the driver on a volume not previously prepared by Red Line!. Red Line! will not allow you to replace existing drivers without first formatting the volume.

Some drive initialization programs allow “friendly takeover” of device drivers on disk volumes by replacing existing drivers with their own. Spirit Technologies feels that this practice is very dangerous and can result in lost data. For this reason, you should not try to simply replace the driver on your existing disk drives. Instead, back-up the data on all partitions of the existing drive, then reformat the drive with Red Line!

**Note:** “Friendly takeovers” of existing disk drivers is not such a good idea.

## MOUNTING VOLUMES

### Mount

The **Mount** command places the selected hard disk’s volume icon(s) on the desktop. If you have multiple partitions on the drive, all partitions will be mounted. If you have flagged the **Do Not Mount at Startup** checkbox for a partition on the disk drive (see **STI-Mount, page 60**), that partition will not be mounted.

To use the **Mount** command, simply click on the drive icon you want to mount and then click on the **Mount** button. A dialog box then appears to inform you that the volumes have been successfully mounted. If one or more volumes is password protected, a dialog box will appear asking for the appropriate passwords.

Mounting partitions may also be performed by using STI-Mount. You should have installed STI-Mount per the instructions in Chapter 3, Installing Red Line!.

## **BLIND WRITE SUPPORT**

“Blind” transfer support refers to the manner in which data is transferred to or from the Macintosh SCSI bus. The term “blind” implies that no software handshaking will be used.

When blind operation is selected, the Macintosh SCSI toolbox will rely upon the SCSI protocol controller to properly handshake each byte to and from the SCSI target. NoBlind means that each byte will be transferred “manually”; the Macintosh will send a byte and, in a software loop, wait for acknowledgment of the transfer.

The latter method is very reliable, but significantly slower than the former. Using blind writes will help your overall performance provided the SCSI device can support blind reads and writes.

By default, Red Line! will support Blind reads and blind writes to SCSI devices that are known to be able to handle the high transfer rates. Some SCSI devices cannot handle these higher speeds and are automatically configured to the appropriate read and write settings.

If you wish to bypass these default settings, you may do so by selecting the SCSI ID you wish to change, and then, while holding down the **Option Key**, click on the **Red Line!** logo in the top right of the **Main Window**.

You will be presented with a window as shown in Figure 5.3, which will allow you to change the settings.

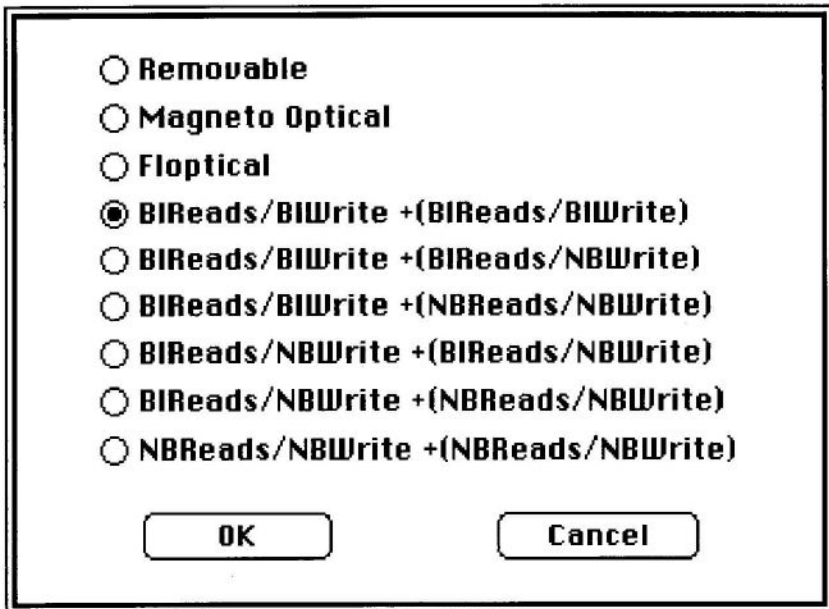


Figure 5.3: The Driver Customization Window.

The following settings are available:

#### Removable

This setting should be used for SyQuest and RICOH removable media hard disk drives.

#### Magneto Optical

This setting should be used for all Magneto Optical Disk drives. Use no other settings for MOD mechanisms.

#### Floptical

This setting should be used for all Floptical mechanisms. This includes those from Insite and IOMEGA.

#### BIReads/BIWrite +(BIReads/BIWrite)

This setting is the fastest of the available settings. It uses blind reads and blind writes on all machines, including the slower Macintosh Plus.

BIReads/BIWrite +(BIReads/NBWrite)

This setting will support Blind Reads and Blind Writes on all platforms except the Macintosh Plus. On the Macintosh Plus, Blind Reads are supported, but no Blind Writes will occur.

BIReads/BIWrite +(NBReads/NBWrite)

This setting offers Blind Reads and Blind Writes on all machines except the Macintosh Plus. Complete handshaking is used when this drive is attached to the Macintosh Plus.

BIReads/NBWrite +(BIReads/NBWrite)

On all machines, Blind Reads are supported. No Blind Writes will take place on any Macintosh model.

BIReads/NBWrite +(NBReads/NBWrite)

In this configuration, Blind Reads and No Blind Writes are supported on all Macintosh models except the Macintosh Plus. The Macintosh Plus will do No Blind Reads and No Blind Writes. Full software handshaking is used when this drive is attached to the Macintosh Plus.

NReads/NBWrites +(NBReads/NBWrites)

No Blind Reads and No Blind Writes will be used on any Macintosh model. Complete handshaking is used for all transfers on all models.

The Pull Down Menu Bar Functions are described in this chapter.

### ***THE FILE MENU***

The **File** menu item accesses the **Park**, **Eject Cartridge** and **Quit** Commands.



**Note:** The Park menu item will be grayed out if Red Line! determines that your drive does not require this function. The Park function is required only for a few older model hard disk drives.

Figure 6.1: The File Menu.

### **Park Your Heads**

**Park** will be dimmed out unless you have selected a drive that does **NOT** automatically park the heads. You will then be presented with the option to immediately shut down your computer. Please be aware that **ANY** access whatsoever of a parked drive will immediately un-park the heads.

The **Park** command “parks” the drive’s heads safely in the landing zone for transportation. Any vibration of the drive’s read/write heads, when parked will reduce the risk damage the disk surface while the drive is turned off. This is especially useful if you plan to move or ship the drive.

To park the selected drive’s heads, choose **Park** from

**Note:** Accessing a drive after parking the heads will instantly un-park the heads.

**Note:** Use Red Line!'s **Shutdown** command after you use the **Park** command. This will prevent the System from updating the Desktop file on that drive.

**Note:** If you are formatting multiple pieces of removable media in a single session, use **Eject Cartridge** to dismount the volume prior to ejecting the media.

| File            |    |
|-----------------|----|
| Park            | ⌘P |
| Eject Cartridge |    |
| Restart...      |    |
| ShutDown...     |    |
| Quit            | ⌘Q |

the **File** menu. A dialog box appears to let you know that the heads are successfully parked.

Most modern hard disk drives have auto-parking and head locking features and do not require the user to manually park the heads on the drive. If the selected drive has auto-parking heads, the **Park** command is automatically dimmed so you cannot access it. If the drive does not have auto-parking, the **Park** command is automatically active.

### Eject Cartridge

**Eject Cartridge** will enable you to format and remove multiple cartridges from removable media subsystems without exiting the utility. This is very useful when you are preparing several cartridges in one session.

The Eject Cartridge command is functionally equivalent to dragging the drive's icon(s) into the trash.

It will function properly with any number of partitions on the cartridge. If the Red Line! INIT is operating, the volume will be removed from the desktop.

### Restart and Shutdown

These commands are similar to the Restart or Shutdown items in the Finder's Special menu item. The biggest difference is the fact that Shutdown does not update certain files on your volumes so that drives that require you to park heads will not move their heads before you can remove power.

Shutdown in the Red Line! File Menu performs an immediate system shutdown. This is very important when you use the **Park** command in Red Line!

In order to view newly installed System 7 icons, you must restart your system. Use Red Line!'s restart if you want a shortcut.

### Quit Red Line!

**Quit** will close the Red Line! Utility and take you back to the Finder. There are three ways to quit Red Line!

1. The Command-Q keystroke combination.
2. Drag the File Menu down to the Quit command.
3. Click on the Close Box in the Main Window.

## THE TESTS MENU

The **Tests** accesses the **Verify Disk Blocks**, **Do Overnight Test**, **Seek Test**, **Direct SCSI Tests** and **Driver SCSI Tests** Commands.

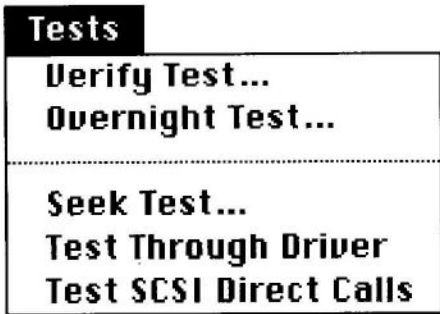


Figure 6.2: The Tests Menu.

### Verify Disk Blocks

The **Verify Test** is a quick way to determine the general condition of your disk drive. This test is **read only**. That is, it is non-destructive to data.

The **Verify Test** will not automatically reassign bad blocks, write data or perform any other destructive operations. When **Verify Disk Blocks** encounters an error, you will be prompted by **Red Line!** to reassign the block. You can then make the decision whether or not you reassign the defective block. You can use the **Verify Test** command as often as you like.

If you are experiencing excessive errors, or if you would like to test the condition of your disk under more rigorous conditions, we recommend you use **Overnight Test** for a more thorough test of your drive.

### Overnight Test

**Overnight Test** runs an intensive test of the selected hard disk. This test attempts to read, write, and read-verify every disk block 10 times in a pseudo-random sequence. For larger disks, each pass of this test may take several hours.

**Note:** For more information on the use of the **Verify Blocks** command, please see Chapter 8.

**Note:** For more information on the use of the **Overnight Test** command, please see Chapter 8.

## Tests

Verify Test...  
Overnight Test...

Seek Test...  
Test Through Driver  
Test SCSI Direct Calls

Since Overnight Test is a technological wonder in itself, please refer to Chapter 8 for complete details.

Overnight test reads a sector, writes it elsewhere for safe keeping, writes various data patterns to that sector, verifies that the data was written properly and then puts the original data back for your use.

Since the data is being moved around in that manner, please make absolutely sure that you have a backup of your data.

### Seek Test

**Seek Test** measures the time it takes for a drive to move its heads over the media surface prior to a read or write. This test is useful in comparing the performance of different devices.

This test can be used to determine your average seek time. Some drive manufacturers base their performance solely on seek times. **Seek Test** will provide you the seek rate of the drive. The time will be displayed in milliseconds.

### Test Through Driver

**Test Through Driver** is similar to the **Test SCSI Direct Calls** command, except that it also tests the drive's device driver in memory. This test will work with any desktop mounted volume. You can test the throughput of your network with this test.

If you suspect that data errors are occurring, or if you want to test the condition of your disk drive under more rigorous conditions, we recommend you try the "Overnight Test".

### Test SCSI Direct Calls

**Test SCSI Direct Calls** measures how quickly the drive is transferring data through your SCSI port. This makes calls directly to the Macintosh SCSI protocol controller via the Macintosh toolbox.

The transfer speeds returned by this function will give you an idea of the actual transfer rate across the SCSI channel. To determine the total overhead of the SCSI manager and the driver provided by Spirit Technologies or by other manufacturers, use Driver SCSI test.

## THE PARTITION MENU

**Partition** allows you to specify how your drive is to be set up. Seven “**Standard Setup**” configuration options are available for fast set up. For users wishing to have multiple Macintosh partitions, or some other configuration, the **Custom Partitioning** option is provided. For a more detailed explanation of partitioning, please see chapter 7.



Figure 6.3: The Partition Menu.

### Get Partition Info

Every partition has specific information associated with it that will allow your Macintosh to recognize its existence. **Get Partition Info** displays this important data.

| Partition  |
|--|
| Get Partition Info...  |
| Customize Partitions...  |
| Maximum Mac Setup...<br>50% Mac Setup...<br>Two 50% Mac Setup...<br>Minimum Mac Setup... |
| Maximum A/UX Setup...<br>50% A/UX Setup...<br>Minimum A/UX Setup...                      |
| Zone Partitions...   |

## Customizing Partitions

No utility would be complete unless the user had the ability to customize his partitions to meet his needs. Red Line! certainly offers one of the most flexible partitioning systems around.

Please refer to Chapter 7 for detailed information regarding the use of the Customize Partitions command.

### Maximum Mac Setup

Using the **Maximum Mac Setup** command of the Partition menu will create a partition the size of the physical volume. This means that a single partition of up to a maximum of 2.05 GigaBytes will be created on the hard disk and mounted on the desktop. The Macintosh Finder has a limitation which will not allow partitions with more than 2,048 Megabytes free space to be used.

Use this option to create a partition that uses as much space as possible. This is the default configuration for **Easy Setup**.

### 50% Mac Setup

This operation will set up one Macintosh partition equal to half of the physical volume size. This is handy if you only need half of your volume set up for the time being.

### Two 50% Mac Setup

This command will create two partitions of equal size on the disk drive. This configuration is especially useful if you want part of your drive available for general use and the other half for private or secure data that you don't want others to see.

### Minimum Mac Setup

This operation will create a partition on the drive that meets the minimum requirements for use as a system boot (startup) volume on the Macintosh. This is very handy if you want to have a small boot (startup) partition and to save the rest of the drive for other use.

### Maximum A/UX Setup

This command creates a volume on the disk drive for use specifically with A/UX. It is compatible with all versions of A/UX. All partition segments for Eschatology, Root and User, etc... are created and initialized.

### **50% A/UX Setup**

This command sets up half of the volume for use with A/UX. You are then free to initialize the remainder of the drive for other requirements.

### **Minimum A/UX Setup**

Here you can setup your drive to meet the minimum requirements for installing A/UX. This option is useful when you just want a small boot partition for A/UX. You can then prepare the balance of the drive for "USER" space or some other use.

## **ZONE PARTITIONS**

This feature allows you to partition your disk drive into volumes that are separated at the logical zone boundaries on your ZBR disk drive.

### **A Brief Introduction**

Most modern disk drive support what is called Zone Bit Recording (ZBR) to pack more data into the drive that would be possible using the standard 'fixed' sector technique. These ZBR drives will have more sectors per tracks on the outer cylinders than on the inner cylinders.

Since the media can support the same flux density over the entire surface, more sectors can be assigned on the outer cylinders. It is a very convenient way of using every last bit of the recording density of the media.

The drive is divided into a vendor-determined number of zones. Each zone identifies the range of cylinders where the number of sectors per track are the same in that zone.

With more contiguous sectors that can be read in one revolution of the media, we can also expect to find better read/write performance in the outer cylinders. To allow the user to squeeze out every last bit of performance from the hard disk is why we made the Zone partition feature available.

Zone Partitioning will work on most modern disk drives. Some drives, however, have a problem returning the proper 'hunk size' after Red Line! issues the setup commands.



## Zone Partition Setup

Be warned that this operation is destructive. You should have a backup of the drive before you use this command.

- 1) Select the SCSIID of the drive you wish to partition.
- 2) Using the Partition Menu, select Zone Partitions...

Red Line! will automatically attempt to configure the drive and partition it on zone boundaries. If you have a drive with more than eight zones, Red Line! will divide the partitions up along a greatest common factor boundary. This will prevent a drive from being partitioned into, say, 230 partitions. Something of a waste.

If for some reason the zone partition operation fails, Red Line! will prompt you with the following dialog, asking you to re-partition the drive using a different method.

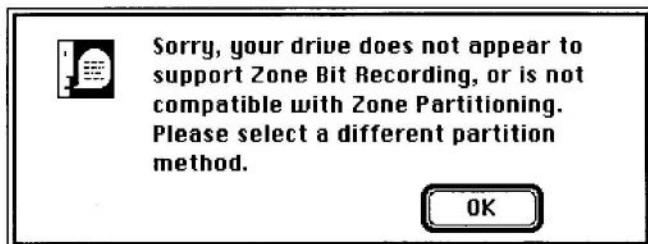


Figure 6.4: The Zone Partitioning incompatibility warning dialog box.

## **THE SPECIAL MENU**

The Special Menu includes commands that implement several special features of Red Line! The features of Red Line's special menu are typically not used on a regular basis, except when fine-tuning your system for peak performance or installing color icons for use with System 7.

When you pull down on the **Special** menu, the following will appear:

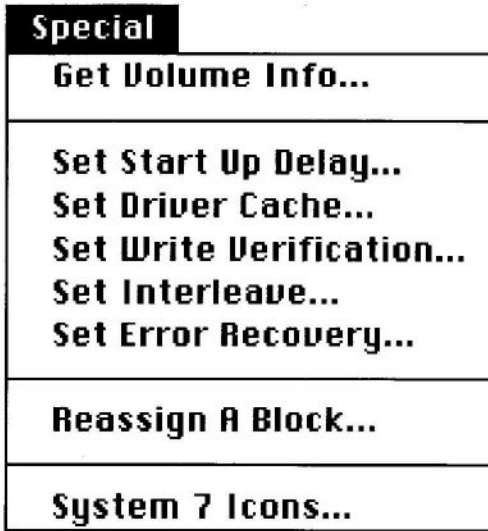


Figure 6.5: The Special Menu.

### **Get Volume Info...**

**Get Volume Info** displays the volume and allocation information, number of files and folders, and when **Show Map** is selected, a partition map is displayed.

The map shows space used on the volume. By periodically checking this feature, you can visualize data fragmentation on your disk volume. If the volume is extensively fragmented, you can use a disk grooming application to de-fragment the allocation space on your volume.

If you choose to use a disk grooming utility of any kind, please make a backup of your volume first.

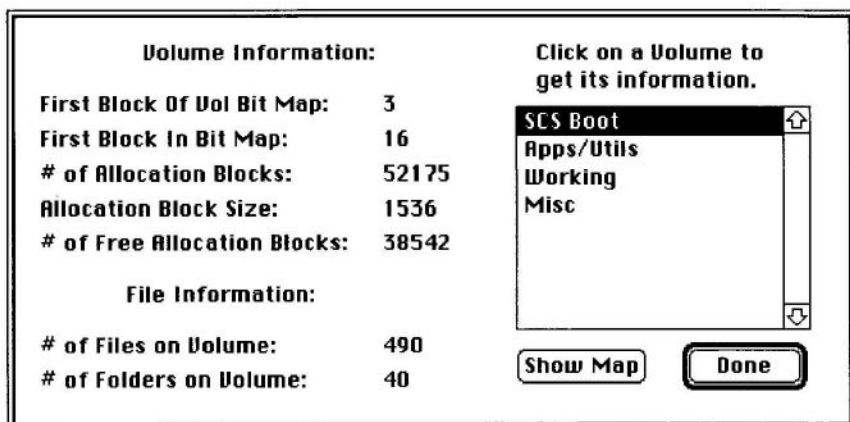


Figure 6.6: The Get Volume Info Dialog.

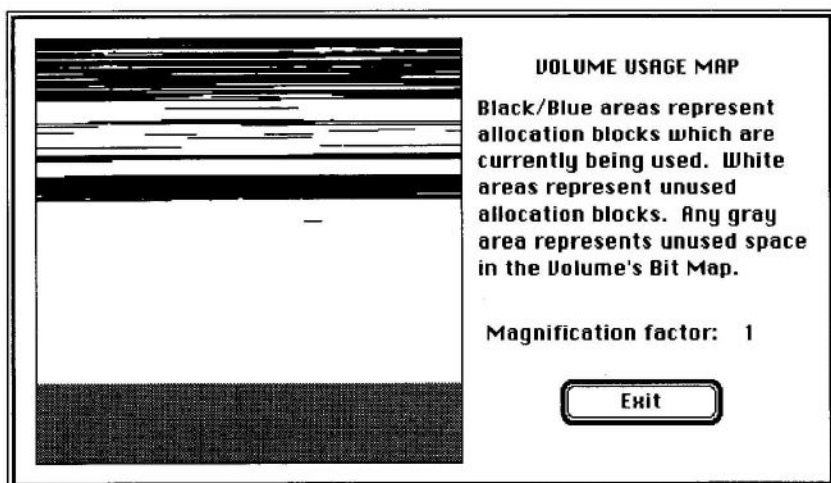


Figure 6.7: Volume Usage Map.

## Set Startup Delay

**Set Startup Delay** is available on Macintosh computers developed after the Mac Plus. The Set Startup Delay dialog box can be used to tell your Macintosh how many seconds to wait for a hard drive at SCSI ID location 0 to come ready before beginning the boot procedure. You can select a value from one to thirty-one seconds. The default startup delay period is fifteen seconds.

If you have a drive at SCSI ID 0 (usually an internal drive) and it sometimes does not appear on the desktop when you power up the computer, try increasing the start-up delay time.

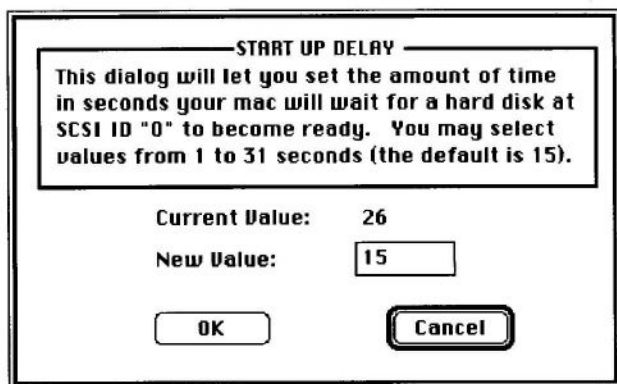


Figure 6.8: Set Startup Delay Dialog.

In the above illustration, the startup delay is being reduced from 26 seconds to 15 seconds. Clicking on OK will install the changes to your system. The new startup delay will become effective next time you boot your system.

## Set Write Verification

Set Write Verification is used for all disk drives including MOD drives. This option allows you to select the normal operating parameters for the mechanism you are using.

Since most drives will support Write Verification options, it is important to know what drives can and cannot support this feature. If you are unsure which drives can or cannot use this function, Red Line! may be able to let you know. If it cannot support this feature, an error message will be displayed to let you know the driver configuration change has failed.

To use the Set Write Verification menu item, select the SCSI ID of your disk drive. Then select the Set Write Verification command under the Special Menu.

The following dialog will be displayed:

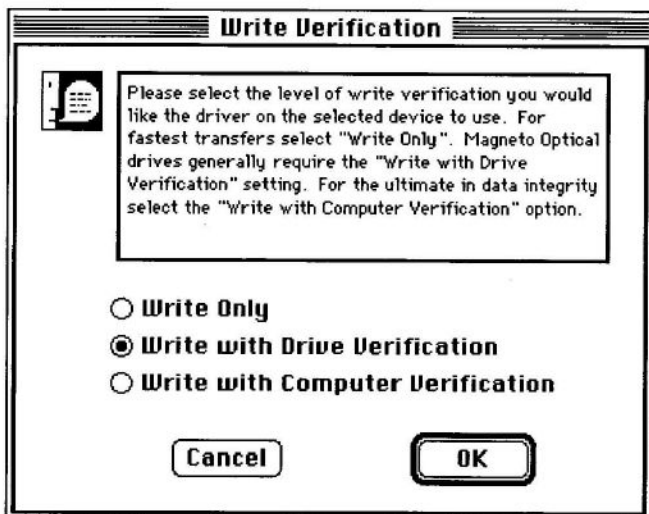


Figure 6.9: Set Write Verification Dialog.

### Write Only

Write Only is the fastest method of writing data to the disk drive. It will transfer data to the drive without any checking for integrity. This option assumes that the disk drive can recover from any errors it detects.

This option is suitable with most drives. It performs a write, but relies upon the disk drive's ECC circuitry to be able to detect and recover any data errors that may be present. For most instances this setting will provide the best performance with good data security.

At this level, the Red Line! driver will report any system or drive error which occurred during the write operation.

### Write With Drive Verification

Write with Drive Verification implies that the disk drive will perform a verify operation immediately after writing data to the drive.

This method is fairly reliable because the drive will report any compare errors immediately after the write operation and report it in a dialog similar to any other medium write errors.

This method is the second slowest because once the data is transferred to the drive, the media must rotate three complete revolutions to verify the data. First erase the block, then write and then verify the data.

### Write with Computer Verification

If you do not trust the verify function of the disk drive, you can select this option. This is the most reliable of the three write options; it is also inherently the slowest.

This method will write the data to the drive, wait until the drive has verified the data, and then read the data back and compare it to the information in the host's buffer. In effect, this method will take four passes to write data to the drive.

This method is not necessary unless you are operating in a hostile environment. It's use is not suggested in general day to day use.

This recording method will not be offered on drives that use 1,024 B/S formatting. The transfer rate will be impaired severely. This is because up to five passes may be required to verify the recorded data.

**Note:** MOD users! This method of writing to MOD drives is the fastest, however, since no error reporting takes place, it can be dangerous for critical data. Use at your own risk.

**Note:** This method is the default and should provide long term reliability.

**Note:** This option will not be offered on drives formatted to 1,024 B/S.

**Special**

|                           |
|---------------------------|
| Get Volume Info...        |
| Set Start Up Delay...     |
| Set Driver Cache...       |
| Set Write Verification... |
| Set Interleave...         |
| Set Error Recovery...     |
| Reassign A Block...       |
| System 7 Icons...         |

## Set Driver Cache

One of the features that sets Red Line! apart is the ability to maintain a cache buffer for the disk volume.

**Set Driver Cache** is used to change the default size of the cache maintained by Red Line!. The cache may be set to any value between 0 Kilobytes and 64 Kilobytes. For best all-around performance on most Macintoshes, we have found that a 64 Kilobyte cache works best for opening and copying files.

**Note:** 64 KB is the maximum cache size for each SCSI ID.

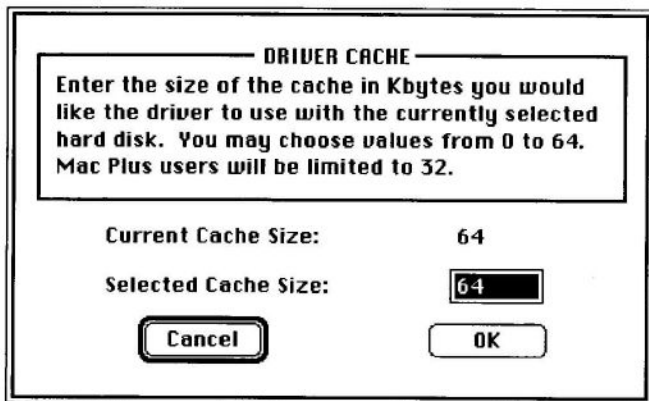


Figure 6.10: Set Driver Cache Dialog.

**Note:** You can easily eat up memory with large driver cache sizes! i.e.: 6 drives @ 64 KB each is 384 KB of system memory.

However, you may need to change this value in order to optimize the cache for your particular needs. Cache efficiency is a combination of your Mac's SCSI port speed, the drive's seek and throughput rates, and your file accessing patterns. Unfortunately, there is no way of knowing in advance the best cache size for your particular system.

**Note:** If you are using a removable media drive, it must be up and running at boot time for a cache buffer to be allocated to the drive.

If you are using a removable media drive, it must be up and spinning at boot time for a cache to be allocated.

You must restart your computer to implement any changes made to the cache size. **If you do not restart after making a change, the cache size displayed in the Cache Change Dialog Box will simply reflect the new setting, not the actual cache size.** You can view the actual cache size while in the Finder by selecting **Get Info** for the appropriate drive. If there was insufficient memory for the cache size you selected, no cache will be

allocated and the cache size will be displayed as 0 KB; try reducing the cache size.

### Set Interleave

**Set Interleave** is only of use with 68000 based Macintosh systems (Mac Plus, etc...) which are using third party accelerator cards with certain drive models. If you are not using an accelerator, you do not need to use this function since Red Line! automatically configures drives

**Note:** Do not change the Interleave factor unless you really know what you are doing. You may impede your system's performance.

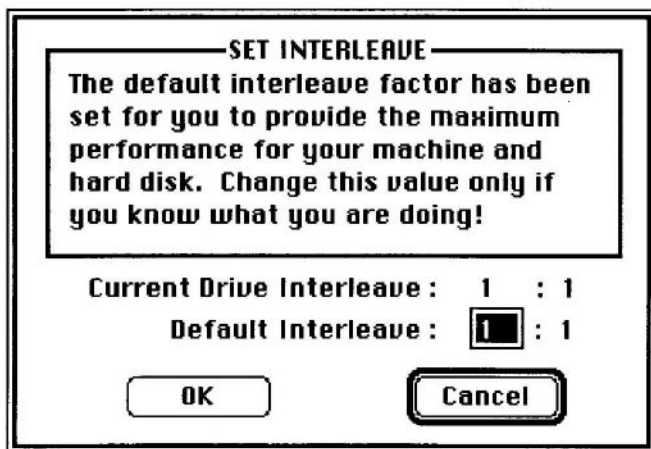


Figure 6.11: Set Interleave Dialog.

for the appropriate system.

The **Set Interleave** command enables you to override the default interleave assigned to the drive.

### What Interleave Should I Use?

To find out whether interleaving your drive applies to your accelerated Macintosh, follow these steps:

1. Click on the drive in question.
2. Look in the lower left corner of the Interleave Dialog Box where it says "Default Interleave:"
3. If the number following is **not** "1", then it **may** be advisable to change your interleave.

The optimum interleave factor is automatically assigned by Red Line! during the **Format** operation based on the machine type that will use the drive. Changing the interleave can drastically reduce the performance of

**Note:** Macintosh Plus should use Interleave 2. All other Macintosh models should use Interleave 1.

**Note:** Remember, Interleave will affect your performance.

the drive. **DO NOT** change the interleave unless you have a complete understanding of the potential consequences.

**Note:** When you change your interleave, you must format the hard disk. Make a backup **FIRST!**

### **Set Interleave (cont...)**

Installing the wrong interleave can cause a drive to “miss interleave”, causing severe performance problems.

If you need to change the disk interleave, choose the **Set Interleave** command from the **Special** menu. The dialog box shown in Figure 6.9 appears, displaying the current interleave value as read from the drive and the intended interleave to be used when the drive is reformatted. To change the value, simply type the new number and click **OK**.

Before the new interleave can take effect, you must reformat the selected drive. The interleave number you enter (Figure 6.9) will become the default interleave during reformatting.

**Note:** If you format your drive with the wrong interleave factor, you can always reset it.

### **What if my new setting doesn't work so well?**

If your new setting does not work so well, you can always reset the interleave value at any time. You must reformat your drive each time you change the interleave for it to come into effect.

If you are still experiencing poor performance from a drive that should otherwise be a screamer, check the **Option Key + Red Line!** logo command for **Blind Write** support. For more information, please see the section on **Blind Write Support** in chapter 5.

## Set Error Recovery

Set Error Recovery, by default, is enabled. When enabled, it forces up to eight (8) retries when reading a marginal or defective sector.

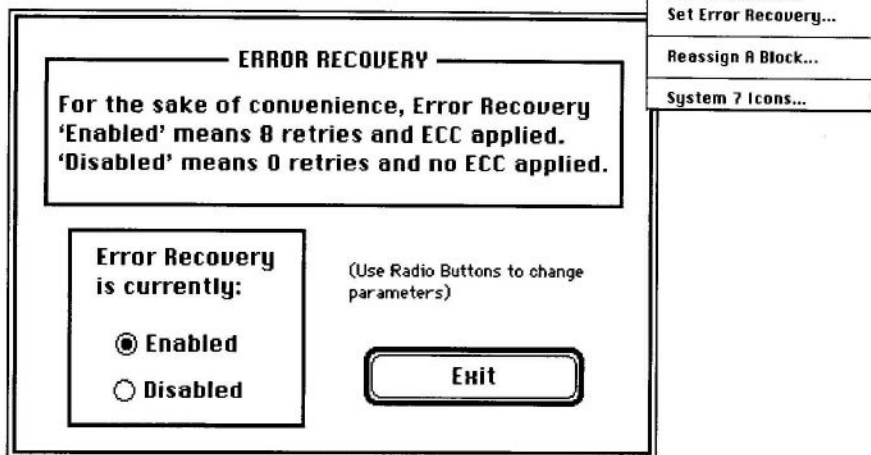


Figure 6.12: Set Error Recovery Dialog.

If a drive misses a read or write command, it will simply try again, up to eight times; if not successful, it will use complex error recovery methods to read/write the data. Also, on most drives, you can disable error recovery only until the drive is powered on the next time. This is done to help protect you in case you accidentally leave your Error Recovery disabled.

**Special**

|                           |
|---------------------------|
| Get Volume Info...        |
| Set Start Up Delay...     |
| Set Driver Cache...       |
| Set Write Verification... |
| Set Interleave...         |
| Set Error Recovery...     |
| Reassign A Block...       |
| System 7 Icons...         |

**Caution:** Make a backup before using this command.

## Reassign a Block

Reassign a block is a very powerful drive maintenance feature. You should reassign bad blocks when Red Line's **Overnight Test** or **Verify Blocks** test reports that a bad block has been detected.

Be warned that reassigning a bad block will reassign the block, but not move the data that was associated with that block. For this reason, you should do a complete backup of your disk drive before performing this operation.

When attempting to reassign a block, Red Line! requires that all partitions for that disk drive be dismounted before attempting to re-assign that block.

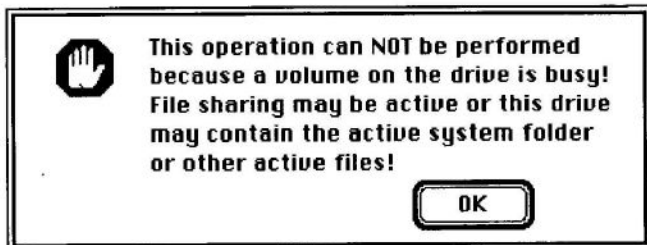


Figure 6.13: The Volumes Mounted Alert.

If the volume is busy when attempting this operation, the following dialog will appear:

**Caution:** Make a backup before using this command.

You should close all applications, make sure that your active system folder is **not** on the drive you are working on. If you wish, you may dismount all volumes associated with that disk drive by dragging them to the trash can. If you are working on a Magneto Optical Drive, you can leave it mounted on the desktop while using `reassign` a block.

**CAUTION:** Again, be warned that using **Reassign Blocks** can prove to be hazardous to your data. Do not use this command unless you do a complete backup of your disk drive.

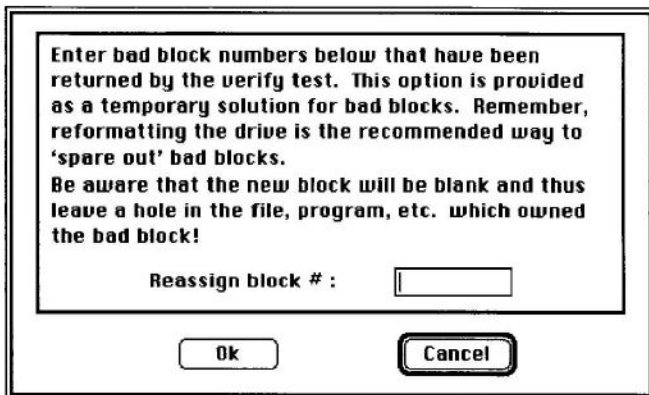


Figure 6.14: Reassign Bad Block Dialog.

Once you have dismounted all mounted volumes associated with the suspect drive, you can try the command again. You will then see the following dialog:

Type in the block number(s) that were reported by Overnight Test or Verify Blocks and click on **Ok**. Make absolutely certain that the numbers you are entering are 100% correct.

Quote for the day:  
One backup is worth a thousand tears...



### **PARTITION, DRIVE OR VOLUME?**

As used in this manual, the word “drive”, “disk drive”, “mechanism”, or Winchester Drive” refers to the physical storage device. The word “volume”, refers to the logical storage device that is represented by the Drive Icon on the Desktop. The volume may represent the entire disk drive or only a portion of it.

### **Why Partition a Drive?**

There are several reasons for partitioning a drive. Partitioning provides a means for organizing your applications and data. Partitioning can speed access to your data because data is spread over only a portion of a drive improving seek times. Information can be accessed faster on a partitioned drive because there will be fewer files to look through to find desired data. Partitioning can provide security of data through password protection of specified partitions.

Perhaps the most important benefit of partitioning is that it allows management of allocation block size.

### **What Is An Allocation Block?**

Apple’s Macintosh Operating System allocates space for files in units called allocation blocks. The allocation block size is the smallest unit available to the operating system in which to store data.

The smallest allocation block under the Macintosh Operating System is 512 bytes. The maximum number of allocations blocks allowed is 65,535 for any single volume. If the entire drive (or partition) cannot be allocated with 512 byte blocks, the Macintosh Finder will group together 512 byte blocks to form the smallest acceptable allocation block. The smallest possible allocation block size will be selected by the Finder to make available the greatest number of allocation blocks without exceeding the 65,535 block count limit.

The following table shows the relationship between block size and partition size. The table can be read as follows: If your partition size is less than 32 megabytes of 32,768K, the block size will be 512 bytes. If your partition size is between 32 megabytes and 64 megabytes, the block size will be 1024 bytes, etc. If you create a 100 megabyte partition, the allocation block size will be 2048 bytes. In this case, you might consider creating the partition as 96 megabytes instead, reducing the allocation block size to 1,536 bytes.

| Maximum Available Allocation Blocks = 65535 |  |                                      |                            |   |
|---|--|--------------------------------------|----------------------------|---|
| Partition Size<br>in Megabytes<br>(MB's)    | Partition Size<br>in Apple "K's"<br>(1,024 * MB) | Allocation<br>Block Size<br>in Bytes | Partition Size<br>in Bytes | No. of 512<br>Byte Blocks<br>per Alloc U. |
| 32  | 32,768   | 512                                  | 33,553,920                 | 1   |
| 64  | 65,535   | 1,024                                | 67,107,840                 | 2   |
| 96  | 98,303   | 1,536                                | 100,661,760                | 3   |
| 128   | 131,070  | 2,048                                | 134,215,680                | 4   |
| 160   | 163,838  | 2,560                                | 167,769,600                | 5   |
| 192   | 196,605  | 3,072                                | 201,323,520                | 6   |
| 224   | 229,373  | 3,584                                | 234,877,440                | 7   |
| 256   | 262,140  | 4,096                                | 268,431,360                | 8   |
| 288   | 294,908  | 4,608                                | 301,985,280                | 9   |
| 320   | 327,675  | 5,120                                | 335,539,200                | 10  |
| 352   | 360,443  | 5,632                                | 369,093,120                | 11  |
| 384   | 393,210  | 6,144                                | 402,647,040                | 12  |
| 416   | 425,978  | 6,656                                | 436,200,960                | 13  |
| 448   | 458,745  | 7,168                                | 469,754,880                | 14  |
| 480   | 491,513  | 7,680                                | 503,308,800                | 15  |
| 512   | 524,280  | 8,192                                | 536,862,720                | 16  |
| 544   | 557,048  | 8,704                                | 570,416,640                | 17  |
| 576   | 589,815  | 9,216                                | 603,970,560                | 18  |
| 608   | 622,583  | 9,728                                | 637,524,480                | 19  |
| 640   | 655,350  | 10,240                               | 671,078,400                | 20  |
| 672   | 688,118  | 10,752                               | 704,632,320                | 21  |
| 704   | 720,885  | 11,264                               | 738,186,240                | 22  |
| 736   | 753,653  | 11,776                               | 771,740,160                | 23  |
| 768   | 786,420  | 12,288                               | 805,294,080                | 24  |
| 800   | 819,188  | 12,800                               | 838,848,000                | 25  |
| 832   | 851,955  | 13,312                               | 872,401,920                | 26  |
| 864   | 884,723  | 13,824                               | 905,955,840                | 27  |
| 896   | 917,490  | 14,336                               | 939,509,760                | 28  |

Figure 7.1: Allocation Block Table.

Maximum Available Allocation Blocks = 65535

| Partition Size<br>in Megabytes<br>(MB's) | Partition Size<br>in Apple "K's"<br>(1,024 * MB) | Allocation<br>Block Size<br>in Bytes | Partition Size<br>in Bytes | No. of 512<br>Byte Blocks<br>per Alloc Unit |
|--|--|--------------------------------------|----------------------------|---|
| 928                                      | 950,258  | 14,848                               | 973,063,680                | 29  |
| 960                                      | 983,025  | 15,360                               | 1,006,617,600              | 30  |
| 992                                      | 1,015,793  | 15,872                               | 1,040,171,520              | 31  |
| 1,024                                    | 1,048,560  | 16,384                               | 1,073,725,440              | 32  |
| 1,056                                    | 1,081,328  | 16,896                               | 1,107,279,360              | 33  |
| 1,088                                    | 1,114,095  | 17,408                               | 1,140,833,280              | 34  |
| 1,120                                    | 1,146,863  | 17,920                               | 1,174,387,200              | 35  |
| 1,152                                    | 1,179,630  | 18,432                               | 1,207,941,120              | 36  |
| 1,184                                    | 1,212,398  | 18,944                               | 1,241,495,040              | 37  |
| 1,216                                    | 1,245,165  | 19,456                               | 1,275,048,960              | 38  |
| 1,248                                    | 1,277,933  | 19,968                               | 1,308,602,880              | 39  |
| 1,280                                    | 1,310,700  | 20,480                               | 1,342,156,800              | 40  |
| 1,312                                    | 1,343,468  | 20,992                               | 1,375,710,720              | 41  |
| 1,344                                    | 1,376,235  | 21,504                               | 1,409,264,640              | 42  |
| 1,376                                    | 1,409,003  | 22,016                               | 1,442,818,560              | 43  |
| 1,408                                    | 1,441,770  | 22,528                               | 1,476,372,480              | 44  |
| 1,440                                    | 1,474,538  | 23,040                               | 1,509,926,400              | 45  |
| 1,472                                    | 1,507,305  | 23,552                               | 1,543,480,320              | 46  |
| 1,504                                    | 1,540,073  | 24,064                               | 1,577,034,240              | 47  |
| 1,536                                    | 1,572,840  | 24,576                               | 1,610,588,160              | 48  |
| 1,568                                    | 1,605,608  | 25,088                               | 1,644,142,080              | 49  |
| 1,600                                    | 1,638,375  | 25,600                               | 1,677,696,000              | 50  |
| 1,632                                    | 1,671,143  | 26,112                               | 1,711,249,920              | 51  |
| 1,664                                    | 1,703,910  | 26,624                               | 1,744,803,840              | 52  |
| 1,696                                    | 1,736,678  | 27,136                               | 1,778,357,760              | 53  |
| 1,728                                    | 1,769,445  | 27,648                               | 1,811,911,680              | 54  |
| 1,760                                    | 1,802,213  | 28,160                               | 1,845,465,600              | 55  |
| 1,792                                    | 1,834,980  | 28,672                               | 1,879,019,520              | 56  |
| 1,824                                    | 1,867,748  | 29,184                               | 1,912,573,440              | 57  |
| 1,856                                    | 1,900,515  | 29,696                               | 1,946,127,360              | 58  |
| 1,888                                    | 1,933,283  | 30,208                               | 1,979,681,280              | 59  |
| 1,920                                    | 1,966,050  | 30,720                               | 2,013,235,200              | 60  |
| 1,952                                    | 1,998,818  | 31,232                               | 2,046,789,120              | 61  |
| 1,984                                    | 2,031,585  | 31,744                               | 2,080,343,040              | 62  |
| 2,016                                    | 2,064,353  | 32,256                               | 2,113,896,960              | 63  |
| 2,048                                    | 2,097,120  | 32,768                               | 2,147,450,880              | 64  |

Although Red Line! can prepare a volume of tremendous size, an undocumented feature of the Finder will limit you to a maximum of 2,048 Megabytes per logical volume. There is a work around for this anomaly.

**Note:** Sometimes, smaller really is better.

### **Why are Small Allocation Blocks so Important?**

Very simply, if you have large block sizes, and small file sizes, you can waste tremendous amounts of storage space. As an example, if you partition a 2,048 megabyte drive as a single partition, and you have a file size of one byte, the operating system will use one allocation block to store the file resulting in the use of 32 Kilobytes! On the other hand, if you have very large file sizes, for instance 10 megabytes each, you would lose only a very small percentage of the storage space due to the allocation — far less than one percent.

### **How Should I Partition My Drive?**

This can only be answered by what your strategies are with respect to drive organization, access time optimization, and your specific storage requirements. Generally, with a drive size of 96 megabytes or more, partitioning the drive will result in more optimum storage utilization, unless you work with all very large file sizes.

Partitioning is also application dependent. Some applications will create smaller, more compact data files, while some page layout applications consume hundreds of Kilobytes at a time.

Referring to the preceding table, and considering your drive organization strategy will provide guidance on developing a scheme for determining the size and quantity of partitions that are best for you.

## **Calculating Partition Efficiency**

When planning your disk drive's partition configuration, there are some ways to calculate how well you will be able to store data on that drive. This may be important if you have several small files that you want to store on a particular volume, or want to work with the largest possible volumes.

Perhaps the best way to decide what partition size best meets your requirements, you will need to assess what your average file size is going to be. If you average files that are 10 KB in size, you could readily use a partition size of 672 MB without much wasted space.

If however, you are using files that average 2 KB, you may experience only 20% efficiency on that volume by allocating 10 KB. This is because for each 2 KB file, you are actually allocating 10 KB for each file.

A simple formula is to take your average file size and divide it by two. Use the table in Figure 7.1 to find the partition size that fits the result. Use this partition size for your volume. If all of your files meet your average size, you will have close to 100% storage efficiency.

To calculate average storage efficiency:

$$AE\% = \frac{FS}{FS + (AS/2)}$$

Where:

FS = Average File Size

AS = Allocation Unit Size

AE = Allocation Efficiency

Figure 7.2: Storage Efficiency Formula.

In the above formula, if we based our assumptions on average files of 3 KB (3 x 1,024 = 3,072) with an allocation unit size of 10,240 bytes (640 MB disk volume), we can see that we will achieve 38% average storage efficiency---we would be wasting nearly two thirds of the disk drive!

On the other hand, if we averaged files of 3 KB on a 98 MB partition (1,536 byte allocation units), we would achieve a tolerable efficiency rating of 80%.

## **CUSTOMIZING PARTITIONS**

If you were not able to find a partition scheme that would be best suited for your needs, you may wish to use **Customize Partitions...** to create partitions of your own.

To access the **Customize Partitions...** command, select the volume you would like to work on by clicking on its icon. Select **Customize Partitions...** menu item.

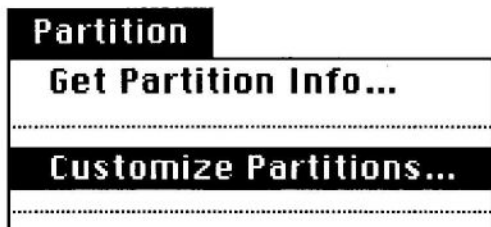


Figure 7.3: Customize Partitions Menu Item.

You will then be presented with the following window:

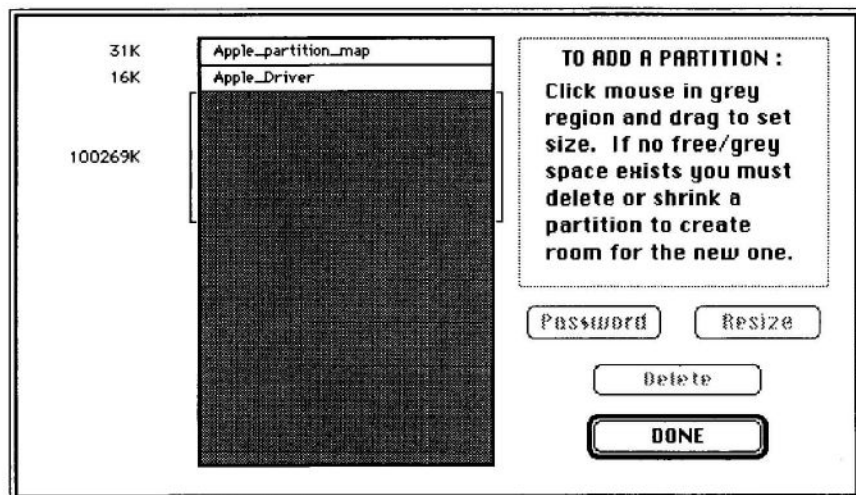


Figure 7.4: Customize Partitions Window.

To create a new partition, click on the gray area representing total free space on the disk drive. Drag the mouse up and down in the area until you have set the size of the volume you wish to create. In figure 7.2, you will note that a small partition of 102,384K has been selected.

Once you release the mouse button, Red Line! will present you with the following dialog to request the partition type you wish to create.

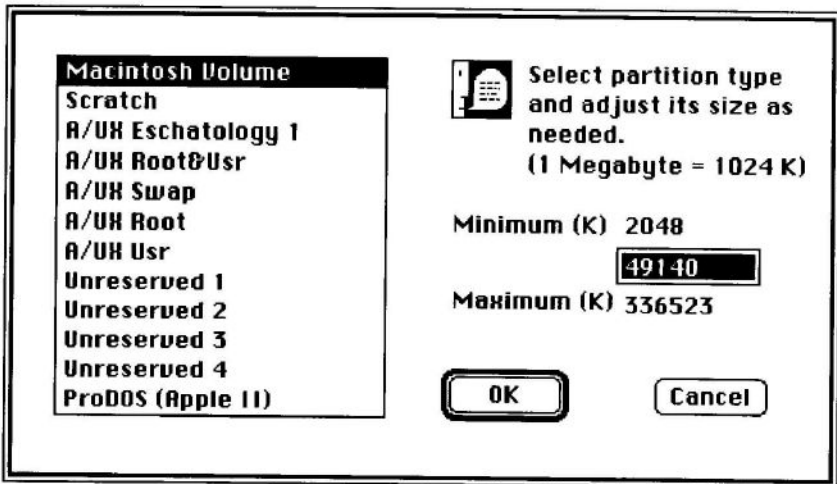


Figure 7.5: Defining the Partition Type.

At this point, you may manually adjust the size of your partition by entering the size of the volume you want (in KB) in the text area between the Minimum and Maximum volume sizes. In the above example we have changed this size from the 102,384 KB we previously selected to 49,140 KB.

Once you have selected the right size and type for your new volume, click on **OK**. Red Line! will then ask you for a volume name. Enter your new name and click on **OK**. When you have finished sizing up all of your partitions, click on **Done** in the Partition dialog (figure 7.2).

Red Line! will then create the directory information required for your selected operating systems. You are now ready to use your customized partitions.

### **Resizing Partitions.**

Red Line! is capable of resizing partitions at any time. Your partition size is not cast in concrete; however, there are some limitations and considerations.

- 1) You may not create a partition that is smaller than two (2) Megabytes in size.
- 2) You may not shrink a volume smaller than the last used block on that volume (high water mark).

If Red Line! will not allow you to shrink the volume below a certain limit, any you believe that your used space on the volume is smaller, you may have a fragmented volume. You may wish to use some readily available disk grooming utility to compact your used space.

After you optimize your volume, try Red Line's Resize function again. You should be able to shrink your volume to a size equal to the amount of used space on that volume.

### **Limitations of Enlarging a Volume**

Red Line! is capable of "growing" a volume provided that the partition and the disk drive meet certain criteria before enlarging can take place. The considerations are:

- 1) The free space available on the drive.
- 2) The limitation of the "allocation block size" and the allocation table.

For every volume on the system, the Macintosh operating system will create a size-matched allocation block table for that volume. Since the allocation table cannot be modified once it has been initialized, you cannot grow a volume past the maximum capacity of the table.

As an example, you have created a volume somewhere between 8,193 Kilobytes and 10,240 Kilobytes. You cannot grow your volume beyond the 10,240 Kilobyte mark.

If you created a volume of 10,240 Kilobytes to start by, you cannot enlarge that volume. This is because you specified a volume that would fit in the allocation block size for volumes up to 10,240 KB and all allocation blocks are mapped for use. (see table on next page).

**What to Expect**

Approximate growth sizes based upon various volume configurations. (i.e.: If I start with a volume of X, how large can I grow it?)

32,769 KB (32 Megabytes) expandable by 4 MB (12.5%)

67,586 KB (66 Megabytes) expandable by 6 MB (9.1%)

98,306 KB (96 Megabytes) expandable by 8 MB (8.3%)

133,123 KB (130 Megabytes) expandable by 10 MB (7.7%)

172,035 KB (168 Megabytes) expandable by 12 MB (7.1%)

200,708 KB (196 Megabytes) expandable by 14 MB (7.1%)

**Note:** You can never, ever, have more than 2,048 MB free space on one volume.

## **HOW TO GO BEYOND 2.05 GB PER VOLUME.**

Even though it is possible to do so, growing a volume beyond 2,048 Megabytes is not very practical. If you wish to try this, follow the following instructions:

- 1) Use Red Line! to create ONE GIANT partition using the **Maximum Mac Setup** menu command item.
- 2) Initialize the Volume. Allow Red Line! to continue initializing the volume. This will create the volume bitmap that the operating system and Red Line! Resizing function will require.
- 3) Resize the partition using the **Resize** command in the **Customize Partitions** menu command so that you have no more than 2.05 GigaBytes available in the partition.
- 4) Do not use the remaining partition space if you plan to grow the volume later.
- 5) When you need more space, you can grow the volume by resizing the volume later.

### **Rules to remember:**

- 1) Do not use this feature unless you need it. This scheme is very inefficient. The allocation block sizes are too big for practical use.
- 2) Do not allow the volume to have more than 2,048 MB of free space at any one time. If you do, you will get Finder write errors. If you do get these errors, resize the volume to below the 2,048 MB free space mark.
- 3) We have tested this feature to 3.2 GB. If you use this feature on a larger drive, please let us know.

### **WHAT IS DEFECT MANAGEMENT?**

Defect Management implies that you want to manage your media defects. It is inevitable that your hard disk drive or removable media will develop defects on the media either as brand new product or over time with age.

To manage those defects means that you will “map out” those defects so that you will not inadvertently record data to areas of the storage medium that may be marginal. By mapping out the defects, you prevent the operating system from placing data in an area that may become lost over time.

Weak and marginal blocks on your storage medium is usually mapped out during the format and initial certification pass. Hard disk drives typically come from the factory “certified” where all defects have been mapped out by the manufacturer.

### **HOW DO I DO IT?**

Red Line! offers two levels of testing for defect management; a simple verify pass and the overnight test. For both tests, you must select the SCSI ID of the disk drive you would like to work on and then select the command from the Tests menu.

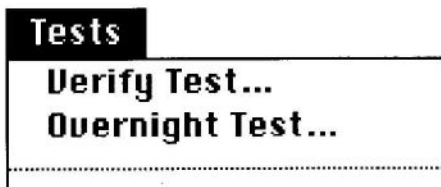


Figure 8.1: The Tests Menu.

## VERIFY TEST

The **Verify Test** command in the **Tests** menu performs a simple read-only test of the entire disk drive that you have selected for test. This test is a passive test; it is non-destructive and only reads each and every block on the disk drive to confirm reliability.

Verify test is a simple and short test that you can do. It is generally the first test you may wish to run to verify that you have good data transfer from the hard disk to the computer.

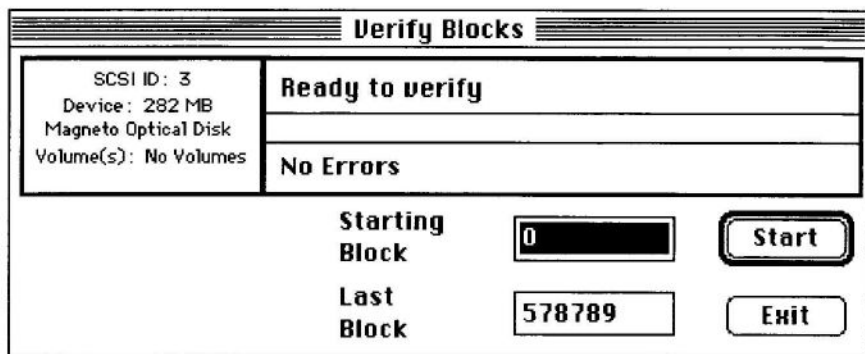


Figure 8.2: The Verify Test Dialog.

To use the Verify Test command, you must select the SCSI ID of the disk drive you want to test. Then, when you choose the Verify Test command, you will see a dialog as below:

If you wish to change the default test range, enter your range choice in the areas labeled **Starting Block** and **Last Block** in the dialog. Click on the **Start** button to start the test.

To cancel the test, click on **Pause** and then on **Exit**.

### Verify Test Can Run in Background

**Note:** Verify Test can run in background mode.

The **Verify Test** can run in background mode. This is very useful if you wish to test your drive while working on other projects.

You can launch multiple copies of Red Line! and have all of them running the **Verify Test**. The only limit is available System Memory.

**Note:** Make a Backup!

## **OVERNIGHT TEST**

The **Overnight Test** command in the **Tests** menu performs a rigorous test of the disk drive that you have selected for test. This test will read the data block to preserve the data that was in that block, write a number of “worst case” patterns to that sector and attempt to verify the write. If a failure occurs, Overnight Test will “map out” the suspect block (if you have allowed it to do so). If for some reason the data in that block could not be read, you may have a file with a “hole” in it.

**Note:** Make a Backup!

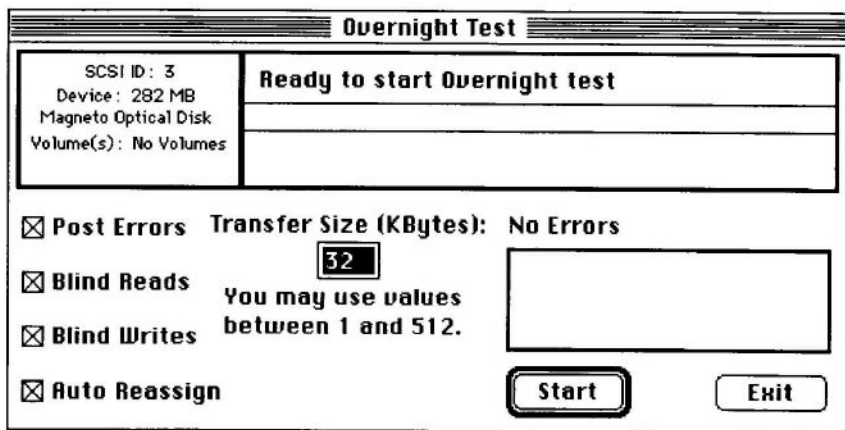


Figure 8.3: The Overnight Test Dialog.

It is strongly advisable to have a backup of your disk drive before you attempt this operation.

To use the Overnight Test command, you must select the SCSI ID of the disk drive you want to test. Then, when you choose the Overnight Test command, you will see a dialog as below:

You may alter the operating parameters for Overnight test from their default parameters to your liking. Spirit Technologies recommends that you leave the default

settings for your test.

Running **Overnight Test** in its default state will perform a complete system diagnostic on your disk drive and map out any defects for you automatically.

Click on **Exit** to abort this function.

### **Overnight Test Can Run in Background**

The **Overnight Test** can run in background mode. This can be very useful if you wish to work on other projects while the test is in progress.

- Post Errors**
- Blind Reads**
- Blind Writes**
- Auto Reassign**

Figure 8.4: Settings for Blind Write Test.

Since the test will work with blocks that are not marked as locked by the system, it is perfectly safe to operate your system with **Overnight Test** running in the background.

We do not recommend running **Overnight Test** in the background, however, if you need to do disk intensive work. This is because of the overhead required for **Overnight Test**. Everything will appear to work in slow mode.

### **Test Your System for Blind Write Support**

You can use the four check boxes to test different aspects of your system. If you wish to test your system to verify that it can support blind writes, you should set the parameters as follows:

You may then start the **Overnight Test**. Let the test run overnight and look for the results in the morning.

### Test and Reassign Bad Blocks

By leaving all of the check boxes selected, you may test and automatically reassign any defective blocks on your system. This test, when complete will assure your system's data transfer reliability. If you experience any problems, it may be necessary to alter you system configuration or termination. Please refer to Appendix C for more information about the SCSI bus.

### **SEEK TEST**

The **Seek Test** will report to you the calculated seek performance of your SCSI disk drive. The result of this test is in milliseconds. Ten Thousand random seeks are performed across the entire surface of the disk drive.

**Note:** Once you have pressed the return key to start the test, **DO NOT TOUCH ANYTHING.**

#### Start the Seek Test.

To start the test, click on the SCSI ID of the device to be tested and select the **Seek Test** item from the **Tests Menu Item**. Once the Seek Test dialog is displayed, let go of the mouse and press the *return* key. The test will start.

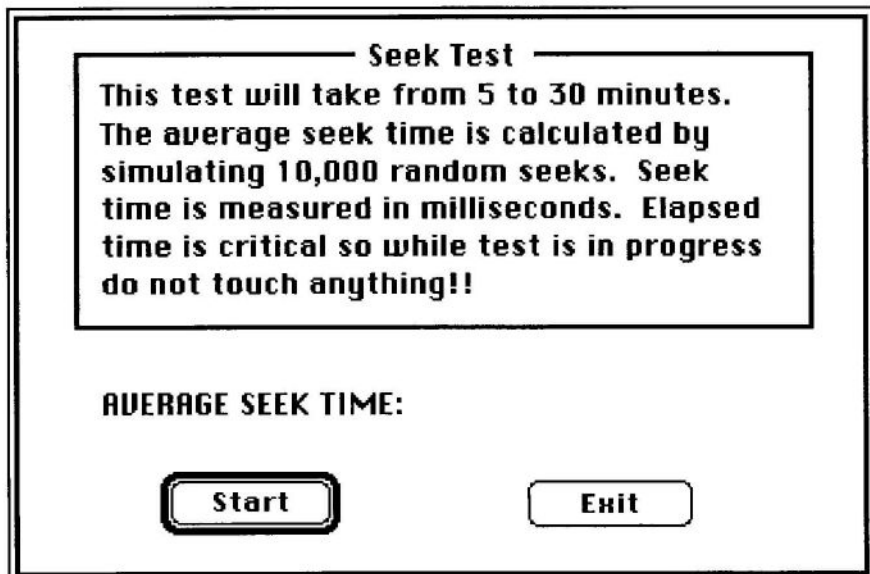


Figure 8.5: Seek Test Dialog.

## How Do We Calculate Seek Time?

To calculate the average seek time, the total time to complete the test is divided by 10,000 (total number of seek commands issued) and the resulting number is reported.

This test may take several minutes to complete. It is very important that you do not touch anything on the Macintosh during the testing process; otherwise the results may be unintentionally mis-represented.

## TEST THROUGH DRIVER

The Test Through Driver function will test the average throughput on any desktop mounted volume. This test is useful for testing not only the transfer rate to your hard disk drive, but also your networked volumes.

To start the test, pull down on the **Tests Menu Item** and drag down to the **Test Through Driver** item. The following dialog will be displayed:

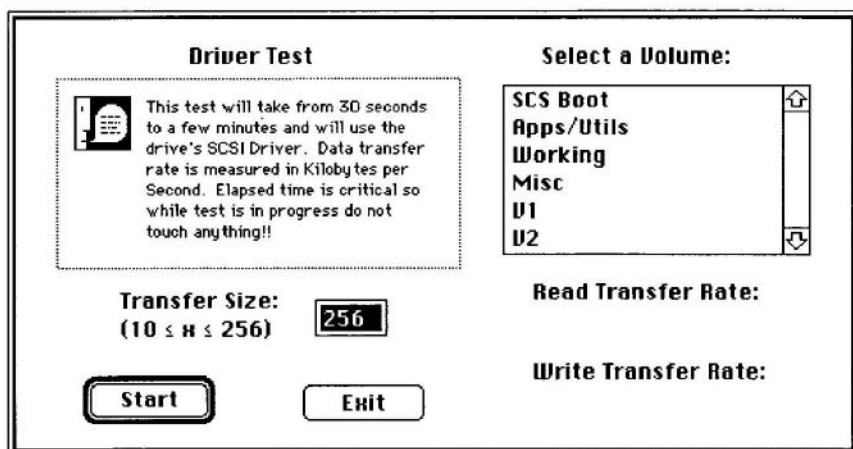


Figure 8.6: The Test through Driver dialog.

Click on the volume name you wish to test. This volume may be a locally mounted hard disk drive, removable media drive, or a networked volume.

Optionally, you can change the size of the transfer. The number in the "Transfer Size" edit field represents the transfer size in Kilobytes. You can transfer as few as 10 KB or as much as 256 KB. You may adjust this number to get an idea of how your system will perform under different operating parameters.

Once you have selected the volume to test, and the transfer size, press the return key on your keyboard.

Do not touch anything, including your mouse, or you will contaminate the test data. The utility will notify you if you have moved anything or interrupted the test.

The results will be displayed for both Read and Write transfers.

# Appendices



The STI-Mount  
Icon

**NOTE:** Hard disks that are not set up (Formatted) with Red Line! will be grayed out on the STI-MOUNT Dialog Box screen (see Figure A.1)

### USING STI-MOUNT

STI-Mount is a SCSI hard drive mounting utility that is very useful as a Apple Menu Item for System 7 users and as a stand-alone utility for System 6 users.

STI-Mount can be used to mount volumes (partitions) and troubleshoot SCSI ID conflicts, to specify which volume(s) are mounted at startup, and to mount a device which did not appear on the desktop after startup. STI-Mount can also be used instead of restarting your Macintosh to remount hard drive volumes that have been dismounted.

In order for a volume to be mountable with STI-Mount, the drive must have been formatted with Red Line!.

If you are running System 7, you may wish to have STI-Mount appear as an Apple Menu Item. Please refer to Chapter 2 for instructions on how to install STI-Mount on your hard drive.

## HOW TO USE STI-MOUNT

Follow the steps below to use STI-Mount:

1. Select **STI-Mount** under the Apple menu if you are running System 7, or double click on the **STI-Mount** icon if you are running System 6. The **STI-Mount** Dialog Box shown in Figure A.1 will appear:

**STI-Mount** will automatically scan the SCSI bus to locate all SCSI devices which are attached to your Macintosh, provided of course, if they are turned on. The SCSI bus will be scanned again whenever you click the **Re-Scan For Drives** button.

The SCSI devices attached to your computer are listed next to the radio buttons at the left of the screen, as shown in **Figure A.1**.

**Caution:** Internally terminated SCSI devices must be powered on or the bus will not function properly.

**NOTE:** Externally terminated devices may not work properly if some of the SCSI devices on the bus are not turned on.

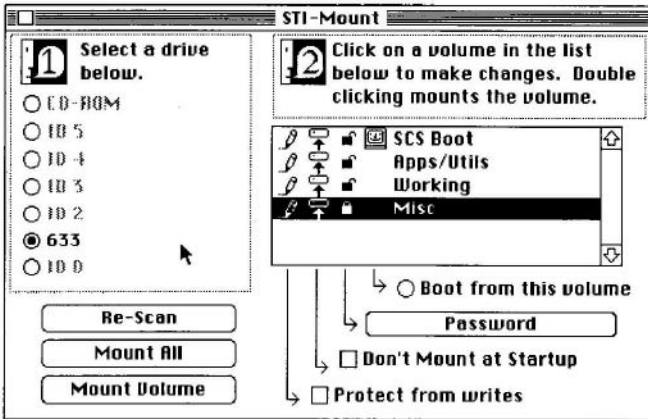


Figure A.1: STI-Mount Window with Drive Selected

If a SCSI device attached to your computer is not mountable, its name will be shown in grey in the STI-Mount Dialog Box, e.g., "Tape".

2. To select a SCSI device, click on its name or radio button; the window area labeled '2' will list all available partitions (volumes) on that drive.

3. To mount a volume, click on its name in the dialog box and then click **Mount**, or double-click on the Volume name.
4. To mount all volumes, click on the **Mount All Volumes** button.
5. If you do not want a volume to mount at startup, click in the check box labeled **Don't Mount At Startup**.
6. When you have made all the desired changes, select **Quit** from the File menu or click on the close box in the upper left corner of the dialog.

**NOTE:** If your boot volume is checked to not mount at startup time, the system will continuously search for a bootable volume until the flashing "Question Mark in Floppy" icon appears.

**Warning:** If you make the mistake of not selecting a bootable partition, the Macintosh will cycle through all available volumes on the system until a bootable volume is located. If no bootable volume is located, the flashing "Question Mark in Floppy" icon will appear on your screen.

If you encounter this icon, it means that no bootable volumes were found. Insert a floppy diskette (or the Red Line! Emergency Booter floppy) to start your system. Use STI-Mount when the volumes mount at startup to regain access to the boot volume.

## Assign a Password from STI-Mount

STI-Mount also allows you to assign or change a password to a partition. This is handy if you do not want to launch Red Line! to change your password.

You may assign a password to a partition by simply clicking on the volume name and then clicking on the **Password** button in the STI-Mount main window.

The following dialog will be displayed and you can add, change, or remove passwords at will:



Figure A.2: STI-Mount Password Window.

Click on **OK** to continue with the operation of your choice. If you wish to change or delete a password from a volume, you must have the originally assigned password to continue.

STI-Mount will guide you through the rest of the process to manipulate the password assigned to your volume.

**Caution:** Once you have assigned a password, **DO NOT FORGET IT!** We offer no "back doors" into the partition.

### **Backgrounding and STI-Mount**

If you are running System 7, or System 6 with MultiFinder, you can cause STI-Mount to operate in background. By clicking on another window to change active windows, STI-Mount will automatically background.

When STI-Mount goes into the background mode, you will observe a small window as shown below:

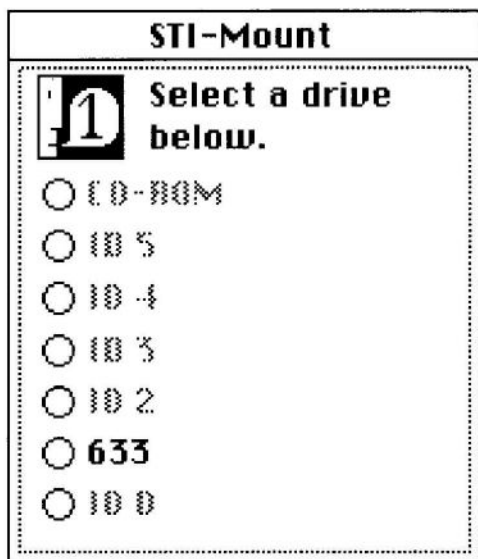


Figure A.3: STI-Mount in a Background State.

Please note that disk drive names will be reduced to their capacity in Megabytes. In the above example, a single 633 MB disk drive is visible to STI-Mount.

You can bring STI-Mount to an active state by simply clicking on the window or by selecting the application in the Mac Menu Item at the top right of your screen.

If you find an icon that you prefer, you can use this simple procedure to install an icon without the use of Red Line!:

**Note:** This section applies to System 7 users ONLY.

- 1) Find a file or application with the icon you want.
- 2) Use File-Get Info (command-I).
- 3) Click once on the icon in the top left of the window.
- 4) Use Edit-Copy (command-C) to copy the icon.
- 5) Click once on the drive icon.
- 6) Use File-Get Info (command-I).
- 7) Click once on the icon in the top left of the window.
- 8) Use Edit-Paste (command-V) to install the icon.

That's all there is to it. An interesting note; any application that looks at the volume's driver for the icon will get the driver icon and not the System 7 icon.

You could conceivably design your own icon in a color paint program and use this installation method as well. Just make sure that your icon does not exceed 32 x 32 pixels and uses the 256 system colors that are available. Just select the area, copy and paste your own icon in. That's all there is to it!

The Small Computer System Interface (SCSI) is a protocol defined by international standards for communications between small computers and their peripheral devices (like disk drives, tape drives, printers, etc.). Peripherals using this type of interface are called SCSI devices.

Up to seven SCSI devices can be connected to your Macintosh computer. Depending on the type of computer you own, you can have internal or external SCSI devices. Internal devices are attached to a SCSI connector on the logic board. External devices are attached to your computer's external SCSI port.

**Note:** The Macintosh reserves SCSI ID 7 for its own use.

### **SCSI ID NUMBER**

Each SCSI device in a system is identified by a unique ID number. Eight ID's are available (0-7). The Macintosh reserves SCSI ID 7 for itself and must not be used by any other device on the SCSI chain. If you have an Apple internal hard disk, it is usually assigned ID 0, leaving ID's 1 through 6 for other external SCSI devices.

**Note:** Remember, all SCSI devices must have a unique ID all of its own.

When installing a drive internally to your Macintosh, you may wish to set that drive's SCSI ID to 0. It is a standard practice to set your internal disk drive's SCSI ID to 0.

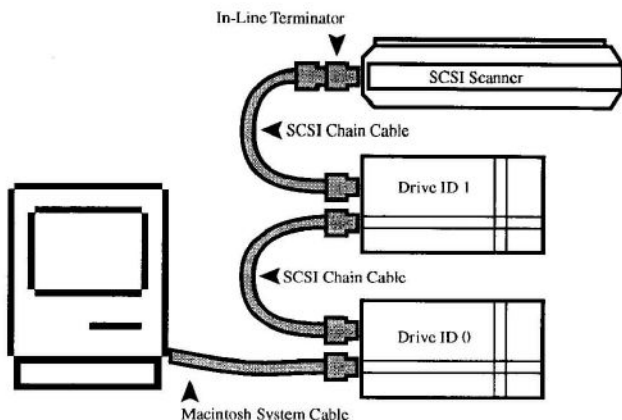


Figure C.1: Typical SCSI Daisy Chain.

**Note:** The combined length of all SCSI cables in a daisy chain may not exceed 20 feet (6 meters).

### **WHAT'S A DAISY CHAIN?**

All Macintosh computers support up to seven SCSI devices. (In addition, all Macintosh computers except the Plus support a single internal SCSI device.)

When you connect more than one external SCSI device to your Macintosh, you are creating a "Daisy Chain". The above illustration shows a sample arrangement of two external SCSI hard disk drives, one internal disk drive and a scanner on a typical SCSI daisy chain.

To create a daisy chain, attach the first SCSI device to the SCSI port of your Macintosh computer. Then, using additional peripheral cables, connect the other devices as shown above.

**Caution:** Removing internal termination on external cabinets should be performed by qualified technicians only!

### **SCSI TERMINATION**

Most SCSI Subsystems are shipped with external termination modules with them. If your drive subsystem has internal termination make absolutely certain that unit is either the first or the last drive in the SCSI chain. Termination should not be removed from the drive if it is the first or last drive installed in the SCSI chain.

If you are installing three or more drives, only the first and last drive should be terminated. If you have an internal drive plus two or more external devices, leave termination on the internal device and the last external device. If you do not have an internal device, leave termination on the first and last external devices only.

**Note:** You should never remove the terminators from the disk drive installed internally to your Macintosh

### **NOT ALWAYS THE RULE**

Installing SCSI systems on the Macintosh can be something of a challenge at times. There are many factors involved when installing products from different manufacturers.

It was previously believed that a terminator at each end of the SCSI chain was the only rule to abide by. This belief is not necessarily the rule any more.

Some *experts* suggest: if you are using an apple scanner, you might need to experiment by adding or removing a terminator; and for very long chains you might need to use three terminators, one on each end and one in approximately the middle.

For this reason, it may be necessary for you to configure your system, run overnight test, and then re-configure until you find the most reliable setup for you.

### FLOPTICAL TECHNOLOGY

The Floptical disk drive technology has been a concept that has been bantered about for several years. Only recently has the technology been offered in a price range that is acceptable to the general marketplace. There are several important considerations and conditions of use when you have a floptical mechanism connected to the Macintosh.

#### **Floptical Media and Formatting**

The Floptical media is shipped in a pre-formatted state. This special low-level format includes medium certification for data reliability. You should never have to low-level format this media. In the event of accidental erasure, Red Line! will allow you to perform the low level format function.

To low-level format the media, click on the SCSI ID in the main window of Red Line! where the Floptical icon is displayed. Make sure that the un-formatted or damaged media is inserted in the Floptical disk drive. Click on the **Format** button. The format process will take about 22 minutes to complete.

During the format process, the Floptical disk drive will low-level format the media and perform a medium certification process to map out any defective or marginal data blocks. The process is thorough and irreversible. Do not interrupt this process by manually ejecting the media or by removing the system power. If you do interrupt the process, unexpected results may occur.

## Alternate Media Support

The Floptical mechanism is capable of reading and writing to floppy diskette media as well. Please refer to this small chart when using floppy diskette media in your Floptical media:

| Media Type       |        | Format Type |     | Notes:  |
|------------------|--------|-------------|-----|---------|
|                  |        | DOS         | Mac |         |
| <b>DS/DD</b>     | 800KB  | OK          | NO  | 1,2,3,5 |
| <b>DS/HD</b>     | 1.44MB | OK          | OK  | 3,5     |
| <b>Floptical</b> | 21MB   | OK          | OK  | 3,4,5   |

### Notes:

- 1) Mac formatted 800KB media will not mount on the desktop when inserted into Floptical Drive. You will be asked to format it. **Do not insert Mac 800KB media**
- 2) If DOS formatted (720KB) media is inserted, the INIT will queue up the drive, but not mount it.
- 3) Use of DOS formatted media should only be used in conjunction with Apple File Exchange or another similar application.
- 4) Macintosh formatted media may be used in the Floptical disk drive.
- 5) The media should be ejected by using the **Command-Y** keystroke (Put Away) or by dragging the volume icon to the trash can. Eject will not be available.

## **DRIVER CACHE FOR THE FLOPTICAL**

RedLine's driver cache supports the Floptical subsystem. If you choose to enable the driver cache, you should click on the Floptical drive's SCSI ID and select the **Set Driver Cache** function in the Special Menu.

You can update the maximum amount of driver cache memory allocated to the floptical drive to a maximum of 64KB. This driver cache setting is configured for the piece of media that is currently in the disk drive. If you wish for this number to be constant across all of your Floptical media, you will need to repeat this operation for all pieces of Floptical media.

**Note:** Make sure you startup your system with the Floptical media inserted in the disk drive to allocate the driver cache.

### **Install the Driver Cache**

To allow the system to allocate the driver cache, you must startup your Macintosh with the Floptical media inserted in the Floptical disk drive. If you start your system without the media inserted in the disk drive, the Red Line! INIT will load, but not allocate any driver cache for the system.

### **Pro's and Con's of the Driver Cache**

The Red Line! INIT driver cache is designed to improve performance when reading from removable media drives. What this means is a slight delay when initially mounting the volume to the desktop. This is because Red Line! INIT will read the directory information and keep it cached for faster read access.

Also, you may encounter a small performance hit when writing to a Floptical volume because of the look-up operations in the read cache. If read performance is more important, you may wish to enable the system cache. If write performance is more important to you, we recommend against installing the driver cache.

### **WHAT IS SCSI MANAGER 4.3?**

All Macintosh Models, excluding the AV series and the new Power PC platforms have SCSI manager drivers in ROM that are direct descendants of the Macintosh Plus. This has kept the overall performance of the Macintosh slower than it really should be. Especially since the Mac was busy handling the SCSI data transfers when it could have been doing other more productive tasks.

SCSI Manager 4.3 was first introduced in the Macintosh Quadra AV series machines. This new SCSI manager was designed to support asynchronous transfers, disconnect and reconnect and other more complex features. To support this new SCSI manager, Red Line's drivers had to be re-written.

When you install the Red Line! (v2.0) drivers to your hard disk by either initializing the volume, or using the UPDATE feature, your system will be automatically setup to handle the SCSI Manager 4.3 that is present in the AV series machines.

The Red Line! drivers are 100% compatible with the normal Macintosh SCSI managers and may be used on any Macintosh 68000 based machine.

### **Warnings**

If you are running on a non-AV Macintosh, we strongly recommend against the use of the SCSI Manager 4.3 extension in your system. This extension was provided for development and testing purposes only. You will have very little to gain in performance and will run the risk of frequent system crashes.

Please do not use the SCSI Manager 4.3 extension unless you are developing a product that is directly related to its use.

**Note:** Do NOT use the SCSI Mgr 4.3 extension for day to day work.

### **Note (Caveat Emptor)**

Our implementation of the SCSI Manager 4.3 savvy support does not use the newly defined Driver\_43 signature that is required to use the new startup routines. If Red Line! were to use this new signature, and you have password protected partitions, chances are you would have extreme difficulty trying gain access to those partitions again.

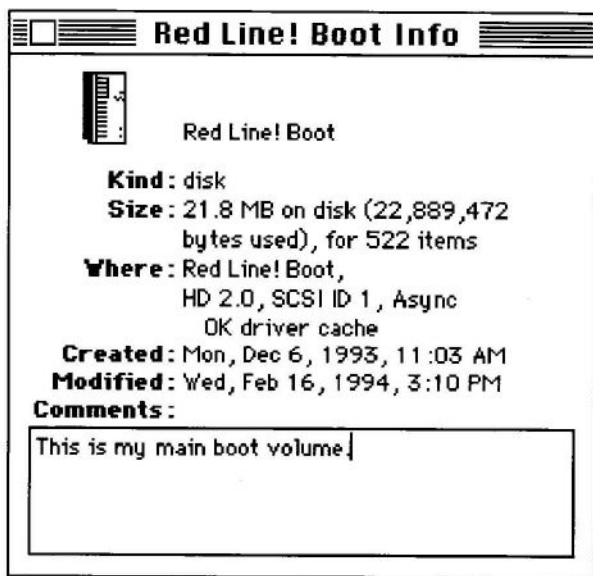
**Note:** Red Line!'s STI-Mount helps you work around the lost partition problem.

Another problem is multiple partitions on a hard disk. If for some reason, the boot partition was anything other than the first partition on the hard disk, and the Driver\_43 signature was installed, chances are the first partitions would not mount to the desktop at startup time.

Red Line! is shipped with a utility called STI-Mount that will allow you to set a startup volume other than the first partition. USE STI-Mount in conjunction with the Startup Disk control panel to select the proper startup volume. The rest of the partitions on the disk should mount up properly.

### **What driver where?**

To confirm what version of Red Line!'s drivers are being used at the time, simply use the File-Get Info... command on any Red Line! prepared volume. If you are running in a SCSI Manager 4.3 environment, you will see the following:



**Figure E.1:** Get Info with SCSI Mgr 4.3 present.

If you are running in a standard Macintosh environment you will see the following:

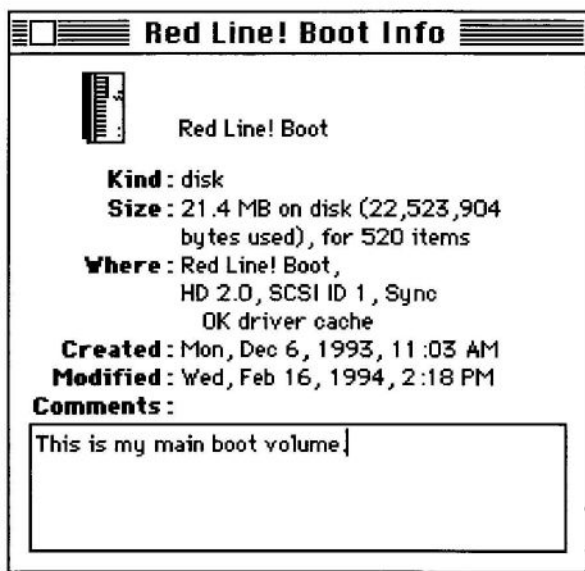


Figure E.2: Get Info without SCSI Mgr 4.3 present.

- Alert:** A warning or report of an error in the form of an alert box, a sound from the computer's speaker, or both. See also **alert box**.
- Alert box:** A box that appears on the screen to give a warning or to report an error message. Its appearance is usually accompanied by a sound warning such as a beep.
- Apple Menu Item:** The menu farthest to the left in the menu bar, indicated by an Apple symbol, from which you choose **desk accessories**.
- Backup:** (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.
- Background Activity:** A program or process that runs while the user is engaged with another application.
- Background Processing:** In multi-tasking environments, the operating system's ability to process lower-priority tasks while you perform other work on the computer.
- Balloon Help:** A part of Apple System 7, Balloon Help provides "pop-up" on-line help.
- Block:** See disk block.
- Block Device:** A device that reads and writes blocks of bytes at a time. A block device can read from or write to any accessible block on demand. Disk drives are block devices.
- Boot:** Another way to say *start up*. A computer boots by loading a program into memory from an external storage medium such as a disk. The program is said to "pull itself up by its own bootstraps"—hence the term *bootstrapping* or *booting*.

- Button:** A push-button-like image in dialog boxes where you click to designate, confirm, or cancel an action. You can “press” a button by moving the mouse pointer to it and clicking. Clicking or pressing an action button performs the action described by the button’s label.
- Byte:** A unit of information consisting of a fixed number of **bits**. In the case of the Macintosh, one byte consists of a series of eight bits and can take any value between 0 and 255 (\$00 and \$FF hexadecimal). The value can represent an instruction, number, character, or logical state. See also **kilobyte**, **megabyte**.
- CD-ROM:** Acronym for *compact disc read-only memory*; a compact disc 120 mm (4.72 inches) in diameter that can store 550 MB of information. The information is designated as *read-only memory* because a CD drive can read the information but cannot record new information.
- Compact Disc:** A metal-and-plastic disk in which information is stored digitally in the form of pits burned into the surface with a laser beam. Compact discs containing music are widely available, but this medium can also be used to store other kinds of data, such as text and images. See also **CD-ROM**.
- Choose:** To pick a command by dragging through a menu and releasing the mouse button when the command is highlighted.
- Check Box:** A box that acts like a toggle on/off switch. Check boxes appearing together in a given context are independent of each other, that is, any number of them can be on or off (compare to Radio button).
- Click:** To press and release the mouse button.
- Command:** A word or phrase in a menu or on a button that describes an action for the computer to perform.
- Compatibility:** The condition under which devices can work with each other.

|                        |  |
|------------------------|--|
| <b>Configuration:</b>  | (1) A general-purpose computer term that can refer to the way you have your computer set up. (2) The total combination of hardware components—central processing unit, video display device, keyboard, and peripheral devices—that make up a computer system. (3) The software settings that allow various hardware components of a computer system to communicate with one another. |
| <b>Configure:</b>      | To change software or hardware actions by changing settings. For example, you give software the necessary settings for communicating with a printer. You can configure hardware (a printer or interface card) by resetting physical elements like DIP switches or jumper blocks. Configurations can also be set or reset in software.  |
| <b>Daisy Chain:</b>    | (n.) A colloquial term for a group of devices connected to a host device, where the first device in the “chain” is connected to the host, the second device is connected to the first, the third device is connected to the second, and so on. (v.) To link together sequentially.   |
| <b>Desk accessory:</b> | A small application program that can be accessed at any time, even from within another application. Desk accessories are accessed from the Apple Menu Item.  |
| <b>Dialog box:</b>     | A window-like screen that elicits responses from the user; the Dialog box usually contains a message and action buttons, check boxes and radio buttons.  |
| <b>Dimmed command:</b> | A non-active command. Red Line! has determined that this command should not be made available to the user.   |
| <b>Disk:</b>           | A magnetic medium that the computer uses to store information. Macintosh computers use 3.5-inch diskettes and hard disks.  |
| <b>Disk block:</b>     | A 512-byte or 1,024-byte grouping of data that can be accessed from any point on the disk. The disk block is the smallest unit of data on the hard disk.   |

|                       |   |
|-----------------------|---|
| <b>Disk Drive:</b>    | The device that holds a disk, retrieves information from it, and saves information to it.   |
| <b>Disk Driver:</b>   | The device driver that controls data storage and retrieval on a disk drive.   |
| <b>Double-click:</b>  | To press the mouse button two times in rapid succession.  |
| <b>Device Driver:</b> | A software program that translates commands between the computer and the hard drive.  |
| <b>ECC:</b>           | A complex error correction method used to overcome hard drive read and write errors.  |
| <b>File:</b>          | Any named, ordered collection of information stored on a disk. Application programs and operating systems on disks are examples of files. You make a file when you create text or graphics, give the material a name, and save it to disk; in this sense, <i>file</i> is synonymous with <b>document</b> . A Macintosh file consists of a <b>data fork</b> and a <b>resource fork</b> . |
| <b>File menu:</b>     | A menu in mouse-based applications that lists commands that affect whole documents—commands like Save, Print, and Quit.   |
| <b>File System:</b>   | A logical device (such as a disk partition) that contains the data structures that implement all or part of the <b>directory hierarchy</b> .  |
| <b>Finder:</b>        | The application that maintains the Macintosh desktop and starts up other programs at the request of the user. You use the Finder to manage documents and applications, and to get information to and from disks. You see the desktop upon starting up your computer, unless you have specified a different startup application.   |
| <b>Folder:</b>        | A directory or sub-directory containing files or other folders.   |
| <b>Gigabyte (GB):</b> | A unit of measurement equal to 1024(2 <sup>10</sup> ) megabytes. Compare <b>byte</b> , <b>kilobyte</b> , <b>megabyte</b> .  |
| <b>Hard disk:</b>     | A disk made of metal and sealed into a drive or cartridge. A hard disk can store very large amounts of information compared to 3.5-inch or 5.25-inch disks. See also <b>compact disc</b> .  |

|                         |   |
|-------------------------|---|
| <b>Hard Disk Drive:</b> | 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.  |
| <b>INIT:</b>            | Initialization resource. A program that modifies the Macintosh operating system to support a particular operation.  |
| <b>Interleave:</b>      | The factor by which disk blocks in each track on the disk are organized. A 1:1 interleave means that disk blocks are numbered consecutively on the track. A 2:1 interleave means that every other block on the track is numbered consecutively to give a slower system more time to read each block in order.   |
| <b>Logical Block:</b>   | (1) Volume space composed of 512 consecutive bytes of standard information and an additional number of bytes of information specific to the Disk Driver. (2) A block on a device that can be used by software to store data. Logical blocks on a device are numbered consecutively from 0, but may not directly correspond to their physical block number because of block sparing conducted during initialization of the device. |
| <b>Logical Disk:</b>    | A disk partition that is treated by the operating system as a separate disk. See also <b>partition</b> .  |
| <b>Kilobyte (K):</b>    | A unit of measurement consisting of 1024 ( $2^{10}$ ) bytes. Thus, 64K memory equals 65,536 bytes. The abbreviation <i>K</i> can also stand for the number 1024, in which case <i>Kbyte</i> is used for kilobyte. See also <b>megabyte</b> .  |
| <b>Megabyte (MB):</b>   | A unit of measurement equal to 1024 kilobytes, or 1,048,576 bytes. See also <b>kilobyte</b> .   |
| <b>Menu:</b>            | A list of choices presented by a program, from which you can select an action. In the desktop interface, menus appear when you point to and press menu titles in the <b>menu bar</b> . Dragging through the menu and releasing the mouse button while a command is highlighted chooses that command.  |

|                       |  |
|-----------------------|--|
| <b>Menu bar:</b>      | The horizontal strip at the top of the screen that contains the menu titles.   |
| <b>Open</b>           | To make available. You open files or documents in order to work with them. A file may not be read from or written to until it is open. In the desktop interface, opening an icon causes a window with the contents of that icon to come into view. You may then perform further actions in the window when it's active.. |
| <b>SCSI</b>           | (pronounced SKUH-zee): Small Computer System Interface. A standard communication convention between the computer and certain peripheral devices like SCSI hard disks. All Apple Macintosh computers come with built-in connectors for SCSI peripheral devices.   |
| <b>Select:</b>        | To highlight a screen object by clicking it one time with the mouse.   |
| <b>Start-up disk:</b> | A disk containing a system folder with files that the computer needs to get itself started. A start-up disk can be a 3.5-inch diskette or a hard disk.   |
| <b>System folder:</b> | A folder containing important files the computer needs during start-up. As a minimum, a system folder must contain System and Finder files.  |
| <b>Terminator:</b>    | A device attached to the first and last SCSI device connected to your computer to maintain signal integrity.   |
| <b>Window:</b>        | A frame for viewing something on the desktop as determined by the application. A Window contains a title bar, close box, zoom box, scroll bars, and scroll arrows.   |

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# Red Line!

Space for Notes

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# SPIRIT

T E C H N O L O G I E S

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