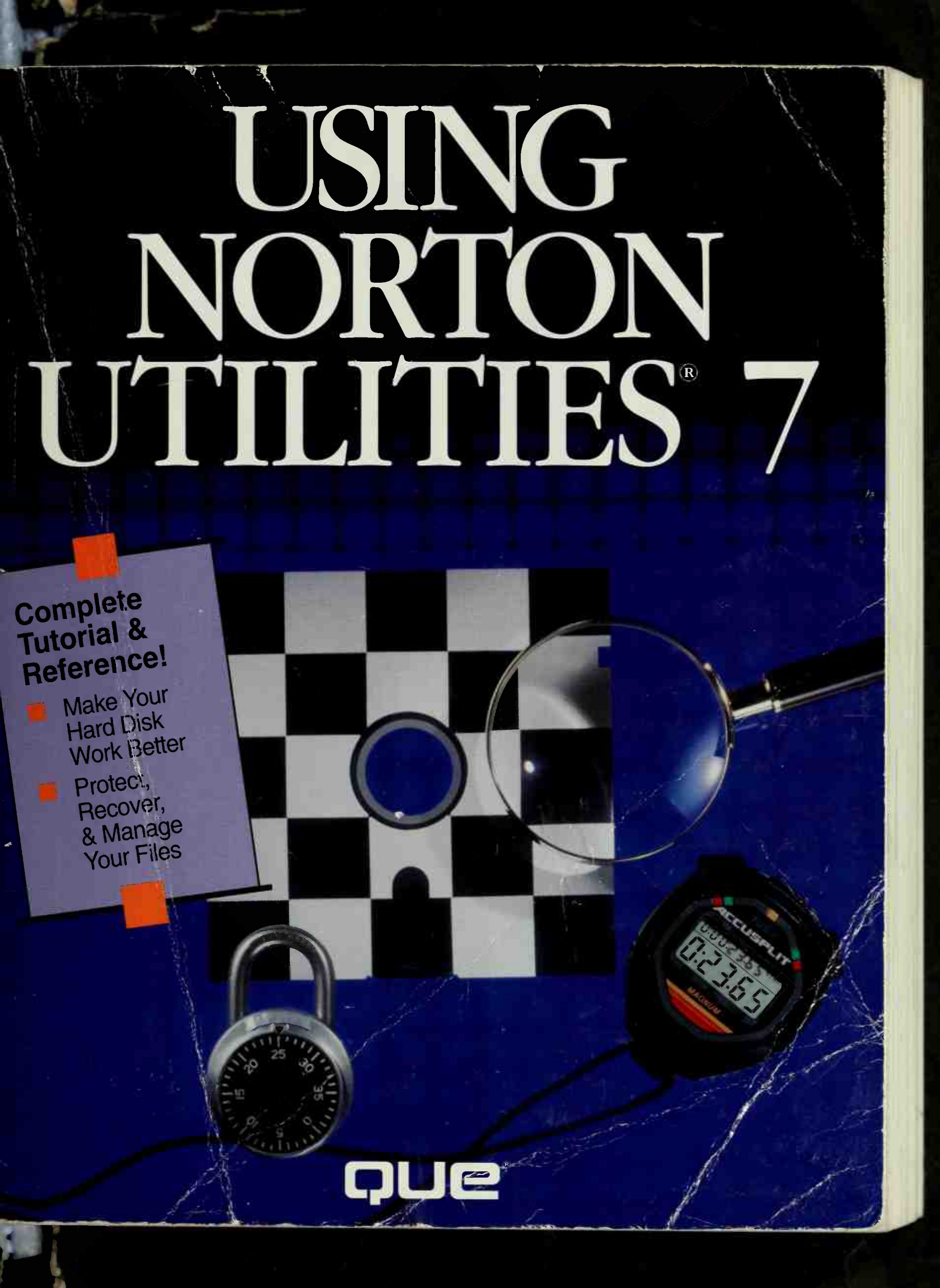
USING NORTON UTILITIES® 7

Complete Tutorial & Reference!

- Make Your Hard Disk Work Better
- Protect, Recover, & Manage Your Files



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In an emergency situation (erased files, computer that no longer starts, and so on), read the section(s) of this book designated in the following table *before* installing Norton Utilities or taking any other action that may affect the disk. Also see Appendix D, "Dealing with Disk-Related Problems."

Quick Troubleshooting Guide

Problem	Chapter	Section(s)
Computer doesn't start	13	Making a Disk Bootable Reviving a Defective Disk
	14	Restoring from the Rescue Disk
Corrupted application files	15	Fixing Database Files Fixing Spreadsheet Files Fixing WordPerfect Files
Disk access problems, read/write errors	12	Diagnosing a Disk Dealing with a Bad Diagnosis
Disk corrupted by DOS RECOVER	13	Recovering from DOS's RECOVER Command
Hard disk formatted accidentally	11	Recovering a Formatted Hard Disk
Slow disk access	19	Configuring the Speed Disk Program
	20	Calibrating Your Hard Disk
	21	Installing Norton Cache (NCACHE2)
Missing/altered system files	13	Making a Disk Bootable
	14	Restoring from the Rescue Disk
Missing data files	25	Searching for Files Searching for Information within Files
Recovering erased files and directories	10	Using UnErase Unerasing a Directory
	16	Unerasing Files Manually
Preventing unauthorized file access	7	Encrypting and Decrypting Files Creating a Diskreet NDisk
Viruses	11	Using UnFormat To Recover from a Virus Attack

Using Norton Utilities® 7

ALAN C. ELLIOTT
RON HOLMES

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Using Norton Utilities 7.

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To Leslie, Mary, and Evelyn.

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Introduction

Think of your PC as an automobile. A fine roadster can take you a lot of places in style. It can also occasionally get a flat tire or need a carburetor adjustment. There is nothing more frustrating than chugging down the highway bellowing smoke and overheating. If you depend on that roadster to get you where you want to go, you will spend a little time tuning it and checking the tires for potential problems. You will also want to keep a fully inflated spare tire in your trunk, just in case.

Your PC is much like that roadster. You don't want to go too long without a checkup, and if something does go wrong, you want a tool set that can help you quickly fix that flat tire or remedy other problems that might crop up from time to time. The PC's tune-up involves disk access; a flat tire is a lost file or an accidentally formatted disk. Norton Utilities is the toolbox that can fix (and prevent) many disk-related problems. The backup you create using the Norton Backup program is your spare tire. This book shows you how to use these tools effectively. Then you can drive your PC with confidence—and take a trip around the world of computing as if you were in a finely tuned and polished touring sedan.

Norton Utilities, Norton Backup, and Norton Commander are the best-known data-recovery and disk-management programs available for the IBM PC and compatible computers. This book has two goals:

- To help beginners understand and learn how to use these programs
- To help new and seasoned users gain insights into making information storage more reliable, safer, and better organized

Hard disks can be a blessing and a curse. They are a blessing because they can store a great deal of information. They are a curse when you have hundreds of unorganized files and can't find the one you need. The Norton Utilities programs for file management and computer management can help you manage your hard disk. This book shows you how to use these programs to organize your disk, find lost files, navigate through a maze of directories, and be more productive in the use of your hard disk.

Who Should Read *Using Norton Utilities 7*?

Computer users with some experience will tell you, "It's not *if* you will lose information on your computer—it's *when!*" You should read this book if you want to prevent that inevitable *when*, or if you have already experienced it and are looking for a way to make sure that it doesn't happen again. Perhaps you are in the middle of a crisis and are looking for some way to recover information that may be lost. This book contains the information that, along with Norton Utilities, can give you the best chance of data recovery and help you prevent many kinds of data loss in the future.

Using Norton Utilities 7 is for anyone who uses an IBM PC or a compatible computer with the PC DOS or MS-DOS operating system. Norton Utilities 7 and the companion program, Norton Backup, give you capabilities to protect, recover, and manage your computer's resources beyond what is available from standard DOS commands. This comprehensive book will help you get the most out of your computer and the Norton programs, whether you are a novice in using computers or you have used PCs for many years.

What Is Covered in This Book?

This book covers Norton Utilities 7.0, with references to Norton Utilities 6.0 and 5.0 and Norton Advanced Utilities 4.5. Covered also are Norton Backup 2.0 and Norton Commander 3.0.

The book is divided into seven parts and contains a Command Reference and four appendixes. The following sections describe the book's contents in detail.

Part I: Taking Charge of Your Computer

Part I provides an overview of Norton Utilities. Chapter 1 introduces the Norton main screen and shows you how to access Norton programs, interact with Norton dialog boxes, and access Help. Chapter 2 describes the Norton configuration program, accessed from the Norton main screen or the DOS prompt. The configuration program allows you to customize the Norton Utilities programs for your computer. Chapter 3 introduces disk drive concepts and terms that are used throughout the rest of the book. If you are new to computer use or data recovery, you may want to pay particular attention to Chapter 3 to learn about the workings of the disk drive.

Part II: Protecting Your Files

Part II describes how to use the Norton programs that are designed to protect your files from disaster. Although you may have been attracted to Norton Utilities because its programs can help you *recover* from information loss, it is perhaps more important to pay close attention to how the utilities can help you *prevent* loss. Your goal should be to use the recovery techniques rarely and use the prevention techniques consistently. Chapter 4 covers the Safe Format and Image utilities. These fundamental components of Norton Utilities enable you to protect floppy disks and hard disks against accidental formatting by storing on your disk a duplicate copy of important disk information that you can use to reconstruct a formatted disk.

Chapter 5 describes the SmartCan utility. The SmartCan name is a shortened version of a concept of a "smart" trash can. When you are using SmartCan to monitor your disk as files are erased, you can imagine the files being thrown into a nearby trash can. Actually, the files are still on disk, but the SmartCan program protects that area on disk to prevent the erased files from being overwritten. The files can be recovered (unerased) for a period of time (you can choose that period of time) just as you can pull a sheet of paper out of the nearby trash can. Finally, when the trash can is hauled off to the dump, the files are permanently lost. Thus, the SmartCan utility enables you to manage your erased files.

Chapter 6 describes the Disk Monitor utility. This program takes a different approach to protecting files against erasure. Unlike SmartCan, which allows files to be erased but "protects" them for a period of time, Disk Monitor watches the activity of the computer and will not let certain files be erased unless permission is granted. For example, a slip of the fingers could cause you to type DEL *.EXE instead of DIR *.EXE.

Without Disk Monitor, the files would be erased. If, for some reason, you did not discover the accident (maybe your eight-year-old did this and didn't know what had happened), the erased files could go undiscovered until it was too late for them to be unerased. With Disk Monitor in place and watching for this kind of erasure, the disaster could have been prevented. Disk Monitor contains two additional features: Disk Light and Disk Park. Disk Light enables you to simulate a hard disk access light on your monitor so that you can monitor disk access. Disk Park causes your disk drive components to "park" in a safe position, enabling you to move your computer with less chance of hard disk damage.

The Diskreet utility is covered in Chapter 7. With Diskreet, you can protect files by encrypting them (changing them into an unreadable code). You then can decrypt the files (recover them to their original state) with a password. Because most computers can be accessed by anyone (there is little or no built-in protection from DOS), Diskreet gives you the ability to store highly confidential files on your computer without fear that they will be read on purpose or accidentally by someone not authorized to view their contents. Diskreet lets you protect files in two ways. First, you can protect individual files or groups of files by encrypting each file. Second, you can create an NDisk, which is like a new disk on your computer (a logical disk, not physically a new drive). This new NDisk can be used just like a normal disk drive to store and retrieve files (from any program). To use the NDisk, however, you must open it with a password. If the drive is not opened, the files stored on the NDisk are encrypted and unreadable. When you close the NDisk, you have protected all files contained in the NDisk. Thus, Diskreet protects your files by keeping them away from unauthorized eyes.

Another utility to prevent files from being accessed by unauthorized users is WipeInfo, covered in Chapter 8. Normally, when you erase a file, its contents remain on disk for a time, until they are overwritten by another file. This means that confidential files, even though they are erased, can possibly be unerased from your disk drive and read by an unauthorized user. The WipeInfo utility erases a file (or a disk) more thoroughly than DOS erases it; WipeInfo overwrites the actual contents of the file or disk with other data. When you want to get rid of information for good, WipeInfo is the command to use.

Chapter 9 covers two Norton Commands—File Attributes and File Find—that can be used to set file attributes. These attributes control how a file can be accessed by users. By setting file attributes, you can cause a file to be read-only or hidden. A read-only file cannot be erased or overwritten. Thus, setting a file to read-only gives some protection against the file being accidentally erased or changed. The hidden attribute allows you to hide a file from normal view. The name of a

hidden file will not show up on a directory listing (when you use the DIR command) even though the file is on disk. Setting attributes for some files is a simple way to give those files some measure of protection against accidental destruction while still allowing them to be accessed by the user.

Part III: Basic Recovery Techniques

The chapters in Part III discuss how to use the automated Norton Utilities programs to recover lost information on your disks. (See Part IV for advanced recovery techniques.) This part of the book helps you recover from most types of disk disasters; you learn how to recover erased files, unformat disks, and correct file access problems on a disk. You should use the techniques in Part III before you attempt to use those in Part IV. For the most part, the techniques in Part III are automated. You need to know little about disk construction, sectors, clusters, and so on, because the smart people at Symantec have programmed their knowledge about data recovery into the programs. If the techniques covered in these chapters cannot recover your information, proceed to Part IV.

Chapter 10 describes how to unerase file and directories. The UnErase command is probably the most well known of the Norton Utilities programs. The recovery of one file can easily pay for the software program itself (as well as for this book) in terms of saved time and effort to reconstruct an important file.

Chapter 11 describes how to unformat a disk. The techniques discussed include recovery of formatted disks that contain Image (see Chapter 4) or MIRROR (DOS 5 and later) recovery information, as well as recovery of disks that do not contain this information.

Norton Disk Doctor (NDD), covered in Chapter 12, is a diagnostic tool for your disk. NDD examines the disk for defects and checks files for integrity. When a problem is found with the disk, NDD can often fix the problem on the spot. If the problem cannot be fixed, NDD will usually be able to tell you what files are affected by the disk defect. Although disks are very reliable, they can lose information over time and develop errors in file storage. Periodic use of NDD can locate and correct minor disk problems before they develop into major disasters.

Disk Tools, described in Chapter 13, can help you recover from four specific problems. The Make a Disk Bootable option enables you to place the needed files on a disk to make it a boot disk, whether or not the disk was originally a boot disk. The Recover from DOS's RECOVER option enables you to recover files that have been "lost" during use of

the DOS RECOVER command. With the Revive a Defective Disk option, you can place a fresh copy of the system information on a disk, enabling you to correct problems caused by damaged system information. The Mark a Cluster option allows you to mark as good or bad any cluster on a disk. Marking the cluster as bad means that it will no longer be used to store file information. Marking a cluster as good means that the cluster will be available to store file information.

A key component of your data recovery toolbox is Rescue Disk. Chapter 14 describes how to create a rescue disk and how to use it to perform a rescue on your hard disk. Basically, a rescue disk is an emergency boot disk that can be used to boot your computer if it will not boot from the hard drive. This disk also contains key Norton data-recovery programs (such as NDD, UnErase, and UnFormat) that can help you correct problems on your hard disk. It is essential that you create a rescue disk for your computer.

With the File Fix utility, described in Chapter 15, you can reconstruct some specific kinds of application program files, including database, spreadsheet, and word processing files. Occasionally, these kinds of files can sustain damage caused by the application program, power outages, or disk-related problems. File Fix can often reconstruct a file according to the application's specifications and recover some, if not all, of the lost information.

Part IV: Advanced Recovery Techniques

When possible, the automated recovery techniques covered in Part III should be used to recover data or fix problems with your disk. Some problems, however, require more advanced techniques. Part IV covers two features of Norton Utilities—Manual UnErase and Disk Editor—that allow you to examine and recover specific locations on a disk.

Chapter 16 describes the UnErase utility's Manual UnErase feature. This should be used when the automated UnErase technique cannot recover an erased file. Often the contents of the file are on disk, but the UnErase program cannot locate all the clusters that make up the file. With Manual UnErase, you can search the disk for the clusters needed to reconstruct the file, and recover as much of the file as you can locate.

Chapter 17 covers Norton Disk Editor. This set of routines enables you to explore the information on the disk down to the level of examining

each individual byte. With Disk Editor, you can display and edit information on a disk. This utility allows you to fix problems in programs and files and to recover all or portions of erased files.

Part V: Making Your Computer Work More Efficiently

Part V describes a number of Norton Utilities that can be used to fine-tune your computer so that it runs more efficiently. These utilities allow you to display important information about your system, rearrange files on your hard disk for quick access, calibrate your hard disk for optimal use, and optimize disk and memory access.

Chapter 18 describes the Norton System Info program. Although this program does not in itself change anything about your computer's setup, System Info is a valuable tool for comparing your computer's disk and processor speed with that of other computers, and for discovering what components are being used on your computer (such as monitor type, disk types, and BIOS date).

Chapter 19 describes the Speed Disk utility. Through constant use, your hard disk writes files to disk, erases files, copies files, and so on. Eventually, the files on your disk are no longer stored in contiguous areas—that is, the files become fragmented. Part of a file is stored in one place on disk, and another part of the file is stored on another part of the disk. DOS is usually able to keep track of the various parts of the files, but fragmentation can eventually cause the disk to have slower file access and may even cause loss of file information for extremely fragmented files. Speed Disk rearranges the location of files on your disk to unfragment the files, making disk access faster.

The Calibrate utility, described in Chapter 20, is used to analyze and optionally reset the way your hard disk stores data. Calibrate enables you to optimize the storage method for your disk type. Calibrate also is capable of performing a nondestructive low-level format on some disks, which allows you to check your disk's reliability without destroying any information on the disk.

The Norton Cache utility, covered in Chapter 21, allows you to use a disk cache to make disk access faster. A disk cache is a method of intelligently storing in your computer's RAM any information you are likely to read from disk. Reading information from RAM is much faster than reading directly from the disk, so disk access time is improved.

Part VI: Managing Your Computer's Resources

The chapters in Part VI describe the Norton programs that are designed to help you manage the resources on your computer. This includes setting certain computer features such as cursor size, colors, mouse options, time and date, and more. These chapters also include managing your directories (creating, changing, removing, and renaming them), creating batch files and menus, finding files on disk, diagnosing hardware problems, and other utilities.

Chapter 22 describes Norton Control Center. Using this program, you can change a number of settings on your computer, such as the size of the cursor, the monitor's colors, the number of lines displayed, and the date and time.

Chapter 23 describes the Norton Change Directory command (NCD). This command is an enhanced version of the DOS CD, MD, and RD directory commands, with additional features for renaming and deleting directories and for moving quickly between directories. With NCD, you can view your computer's directory structure on-screen and use several methods, including a mouse, to switch directories.

Norton Batch Enhancer is described in Chapter 24. This utility enables you to create batch files with more options than DOS batch files. Batch Enhancer includes the creation of custom menus; drawing borders on the screen; and executing commands according to dates, times, days of the week, and user input.

The Norton File Find command, described in Chapter 25, is helpful in locating files anywhere on any disk according to a file specification or the contents of the file. For example, if you remember creating a report about Alabama some time ago but forgot where the report was stored, you can search your disk for all files with a TXT extension that contain the word ALABAMA. Also described in Chapter 25 are the related commands Text Search (TS) and File Locate (FL).

Chapter 26 describes the command-line utilities File Date (FD), Duplicate Disk (DUPDISK), File Size (FS), Line Print (LP), and Directory Sort (DS). With File Date, you can change the date and time on files. You use Duplicate Disk to copy disks. With File Size, you can show the amount of file space taken up by one file or a group of files and determine

whether the file can be copied to a target disk. You use Line Print to print files to the printer. Finally, Directory Sort enables you to sort a disk directory listing.

Chapter 27 describes the Norton Diagnostics utility. Using Norton Diagnostics, you can run your computer through a battery of tests that will help you determine whether there are any problems with your computer's memory, video, serial or parallel ports, disks, keyboard, or mouse. Each of these components is examined by the program to see whether they are working properly.

Part VII: Using NDOS, Norton Backup, and Norton Commander

Part VII introduces NDOS and the Norton Utilities companion programs Norton Backup and Norton Commander. NDOS is a program that replaces many DOS commands with enhanced versions of the commands and introduces over 40 new commands. You continue to use DOS commands just as you have always used them, but with NDOS, you suddenly have a more powerful operating system. Chapter 28 introduces you to the power of NDOS and contains a reference to its commands, including the enhanced DOS commands and the new NDOS commands.

Chapter 29 covers the Norton Backup program. This program enables you to copy information from your hard disk to floppy disks or other backup media. Then, if your hard disk is damaged or you lose files that cannot be recovered, you can use the backup copies of your hard disk to retrieve that information. This chapter covers Version 2.0 of Norton Backup.

Chapter 30 describes Norton Commander 3.0. Commander enables you to customize your DOS environment so that you can enter commands from the DOS prompt or select DOS-like commands from pull-down menus. The Commander disk-management features assist you in copying, renaming, erasing, and finding files. Its viewing features enable you to view popular kinds of spreadsheet, database, and word processing programs and graphics at any time—without your having to use the program that created these special files. With Commander, you can link two computers so that you can share and transfer files; and you can use MCI Mail, which enables you to send and receive electronic mail, paper mail, and faxes.

Command Reference

The Norton Utilities 7 Command Reference is an alphabetical list of Norton Utilities 7 commands. Commands from previous versions of Norton Utilities (Versions 4.5, 5.0, and 6.0) are also listed, with reference to the current command that contains the function of the old command. Included in the list is the syntax to use when you type the command from the DOS prompt. For many of the commands, additional notes and examples of use are given. This reference section will be helpful to you if you are comfortable in using a command but simply need a reminder about its syntax. Browsing through this reference will give you an overview of the capabilities of Norton Utilities 7.

Appendixes

The four appendixes give you additional information and tips about using Norton Utilities, Norton Backup, and Norton Commander. If you are a computer beginner, be sure to read the review of PC DOS and MS-DOS in Appendix A. This appendix contains information about the basic DOS commands referred to in this book.

Appendix B provides a comparison of DOS and Norton commands. If you already know and use some of these DOS commands, this comparison shows you which Norton commands you can substitute for DOS commands and what additional features the Norton commands offer.

Appendix C includes installation instructions for Norton Utilities, Norton Backup, and Norton Commander. You may have already installed these programs, using the information in the original program manual. If not, Appendix C leads you through the installation process. It also gives you some information not covered in the Norton program manuals.

If you have a problem with your disk and don't know which Norton command to use, see Appendix D. This troubleshooting guide is divided into two parts. The first part offers solutions to common disk problems, including the following:

- The computer no longer boots from the hard disk.
- You cannot format the hard disk as a system disk.
- The computer is infected by a virus.
- You have continuing read and write problems on your hard disk that you can solve only with a low-level format.

The second part of Appendix D discusses responses to common DOS error messages that deal with disk problems. The appendix refers to DOS and Norton commands that can help you solve these problems.

What You Need To Know To Use This Book

To use this book, you need to have a PC-compatible computer that uses the MS-DOS or PC DOS operating system, Version 2.0 or later. Although many of the commands covered in this book will work on floppy disk systems, a significant amount of the book discusses hard disk management. You need a copy of Norton Utilities 7.0, Norton Backup 2.0, or Norton Commander 3.0. Because the book covers these programs separately, you can use this book for information on one or more of these programs. Some examples require you to attach a printer to your computer. You may also need a blank floppy disk for some examples.

Before you read this book, you should familiarize yourself with a text-editing program like DOS's Edlin editor or the DOS Editor, available in DOS 5.0 and 6.0. Any editor or word processor that can save files in text mode will do. If you already use a text-editing program or word processing program that can save files in text mode, you can use that program for the small amount of editing used in the examples in this book.

How To Use This Book

This book explains how to use Norton Utilities from a topical viewpoint and on a command-by-command basis.

Chapter 2 is a discussion of the Norton configuration procedures. This chapter explains how to set up options for running Norton Utilities. Depending on what options you chose to install during the installation, you may want to refer to Chapter 2 from time to time to change your Norton setup options.

If you are familiar with such terms as sectors, tracks, clusters and cylinders, you may want to skip Chapter 3. However, if you are interested in getting an overview of how disks work, Chapter 3 provides you with information that will be useful in understanding the workings of many of the Norton Utilities programs.

If you are a new user of Norton Utilities (or you want to refresh your knowledge of the Norton programs), read Parts II, III, V, and VI carefully. These parts cover the use of Norton commands. New users should pay particular attention to Part II because it covers features that can help you protect your data and eliminate the need to use some of the more difficult recovery procedures.

If you already know how to use a Norton command but need a reminder about the command syntax or options, refer to the Command Reference. This reference lists the commands alphabetically and briefly explains all options. You may want to look at this reference often, even after you learn the basics of Norton commands. To learn about using NDOS, refer to Chapter 28. You can use NDOS with or independent of the other Norton Utilities commands.

If you have a problem with a floppy disk or hard disk and you don't know which commands are appropriate for fixing the problem, refer to the troubleshooting guide in Appendix D. This appendix is useful also when you encounter a disk-related DOS error message. Appendix D contains a selection of alphabetically listed DOS error messages. Each message is described with possible causes and solutions.

What Is Not Covered in This Book?

Some problems related to information on your computer are beyond the scope of this book. If, for example, you lose information by accidentally erasing a range of cells in a Lotus 1-2-3 spreadsheet before saving it, this book (and Norton Utilities) cannot help you recover from the mistake. If you turn off the computer or lose power before saving a file to disk, the information is lost. These are instances when information is stored in the electronic memory of the computer and has not been placed on disk.

At times, software programs may contain bugs that make the information in a file useless. The logical nature of the file may be fine—that is, the file is OK according to DOS, but the information in the file has been scrambled or overwritten by the program. This kind of problem cannot be solved with Norton programs. If you overwrite a file on disk with a file having the same name, the original file cannot be recovered because its space on disk is now being used by different information. These are cases in which the file is stored properly on disk, but the information in the file is wrong.

Although Norton Utilities may be helpful for recovering from damage caused by some computer virus programs, these dangerous programs are getting more and more sophisticated in their capability to destroy data on a computer. There are simply too many ways that a virus can destroy data for all of them to be covered in this book. Appendix D gives you some help on this topic, however.

Physical damage to a hard disk or floppy disk can make data unrecoverable by the methods described in this book. In some cases, professional disk repair technicians can extract information from a physically damaged disk. Mechanical problems with a disk drive also can cause loss of information. These problems must be corrected by a technician before you can recover any information.

Conventions Used in This Book

Certain conventions are used in *Using Norton Utilities 7* to help you understand the techniques and features described in the text. This section provides examples of these conventions.

Words printed in uppercase include DOS commands (CHKDSK), Norton commands (DUPDISK), and file names (STATUS.DOC). Case is not important when you are actually entering commands, file names, or command options because DOS is not case-sensitive.

Note the special formatting used in this book:

Format	Use
Italics	Variables; emphasized text; new terms
Boldface	Hot keys for menu options; text the reader types
`Special typeface`	On-screen prompts and messages

In most cases, keys are represented as they appear on the keyboard. The arrow keys are indicated by name (for example, the up-arrow key) and occasionally with an arrow symbol (for example, ↑). The Print Screen key is abbreviated as PrtSc, Page Up is PgUp, Insert is Ins, and so on. On your keyboard, these key names may be spelled out or abbreviated differently.

Throughout the text, the term *Enter* instead of *Return* is used for the Enter key.

Alt+C indicates that you press the Alt key and hold it down while you press the C key. Other key combinations (such as Alt+Esc) are performed in the same manner. If key combinations are not indicated with a plus sign (+), don't hold down any of the keys; just press each key once in the order listed (for example, End Home).

When the word *type* is used in a phrase, such as "type C," it means that you should type the character *C* but not press the Enter key. When the word *enter* is used in a phrase, such as "enter **NORTON**," it means that you should type the word *norton* and press the Enter key.

When the word *choose* is used, it usually refers to choosing an option from a dialog box or menu. Often the names of these options include a highlighted character, such as **O**K. The phrase "choose **O**K" means that you should press Alt+O (press and hold down the Alt key and then press the O key) or click the **O**K option with the mouse pointer. You also may be able to highlight the specified option (by pressing the arrow keys or the Tab key) and then press Enter. The word *select* usually means to choose some item from a list, such as a list of file names. You select an item by using the arrow keys to highlight the item, or by pointing to the list with the mouse pointer and clicking.

Throughout this book, various Norton commands are also referred to as programs. Both descriptions are common usage.

PART

I

Taking Charge of Your Computer

OUTLINE

Norton Utilities Basics

Configuring Norton Utilities

Understanding How Disks Work

CHAPTER 1

Norton Utilities Basics

There is a big difference between driving a finely tuned car and one that's coughing, spewing smoke, and not firing on all cylinders. Which would you rather drive? You get farther and faster when your machine is tuned for maximum performance.

With periodic visits to the Norton Utilities "Tune-Up Shop," you will be able to keep your PC running like a finely tuned sports car. In this program, you will find a number of tools available to help you keep your machine running at peak performance and protecting your data from loss. And you don't have to be a master mechanic to be able to use these tools. With this book as a guideline, you will be able to use all the Norton Utilities programs—just like a pro.

This chapter provides an overview of the Norton Utilities 7 programs and refers you to the chapters in which you can find more specific information about these programs. If you are new to Norton Utilities, be sure to read through this chapter to get a bird's-eye view of the whole Norton Utilities 7 family of commands and programs and to gain a basic understanding of the Norton interface, keys, and dialog boxes.

Understanding Norton Utilities 7

Norton Utilities 7 consists of a number of utility programs (often called *Norton commands*) that provide you with tools to manage information on disk. These tools include programs to protect information, recover information, make your hard disk work more efficiently, and manage your computer resources.

If you have been using Norton Utilities 4.5, you will find that some of the Version 4.5 commands have been incorporated into the newer Versions 5.0, 6.0, and 7.0 commands. Some commands originally included in 4.5 were absent from 5.0, but have been reincorporated into 6.0 and 7.0. The Command Reference, which gives you an alphabetical listing of Norton commands, lists 4.5, 5.0, 6.0, and 7.0 commands.

The Norton Utilities 7.0 commands fall into six basic categories, which are reflected in the divisions of this book. Here are the categories:

Category	Function
Configuration	Enables you to configure Norton Utilities for use on your computer
Security	Protects the information on your disk
Recovery	Helps you automatically recover lost information
Advanced Recovery	Helps you recover lost information, using advanced procedures
Efficiency	Helps you fine-tune and manage the resources on your hard disk
Productivity	Helps you manage the information on your hard disk to make your work more efficient and productive

A new set of commands was introduced to the Norton family with the introduction of NDOS in Version 6.0 and has been enhanced in Version 7.0. NDOS is a Norton Utilities replacement program for the normal DOS command processor COMMAND.COM. NDOS transforms your command prompt (for example, `C:\>`) into a much more powerful command processor containing more commands than you normally have available with DOS. NDOS is described in Chapter 28, "Using NDOS."

The enhancements found in each new Norton Utilities version reflect changes in the MS-DOS operating system. Beginning with MS-DOS 5.0,

the operating system contains several commands related to information recovery. The relationships between the Norton commands and the new DOS commands—particularly MIRROR, UNDELETE, and UNFORMAT—are covered as part of the descriptions of the Norton commands Image (Chapter 4), UnFormat (Chapter 11), and UnErase (Chapter 10). Norton Utilities 7.0 is compatible with new features in DOS 6.0. Appendix B, "Comparing DOS and Norton Utilities Commands," compares some DOS commands with similar commands in Norton Utilities.

If you are already familiar with DOS commands, you will find that many of the Norton commands have a similar syntax and are therefore simple to learn and use. You can use some of the Norton commands as replacements for DOS commands. The replacement commands generally contain significant improvements over the normal DOS commands. The Norton Safe Format command, for example, not only formats a disk but also is designed to prevent you from accidentally formatting a disk. Moreover, you can use Norton commands by selecting options from a master command menu, so you don't have to remember all the options to include in the command given at the DOS prompt. (Later sections of this chapter provide details on how to issue Norton commands.)

The following sections describe categories of tools provided by the Norton Utilities commands and programs. Each category is broken into additional sections that briefly discuss the specific Norton tools applicable to that topic and indicate the chapters where you can find detailed information about that program or command.

File Protection

The Norton Utilities programs probably are most famous for recovering lost information, but they also are useful for *preventing* the loss of information—safeguarding your information on disk from damage.

A number of bad things can happen to information on your disk. *Physical problems* involve damage to the storage media and the mechanics of the disk drive. *Logical damage* involves the loss of magnetically stored information on disk. Norton Utilities cannot help you recover from physical damage to disks, but can help you prevent and recover from logical damage. Chapter 3, "Understanding How Disks Work," discusses the makeup, use, and care of disks.

Because information on a disk is stored as a magnetic image, this image can weaken until information is difficult or impossible to read. Loss of information on disk often results from accidental deletion of files or

accidental formatting of the disk. Logical damage to a disk occurs when DOS loses information about where the data is stored—that is, DOS "forgets" where a file is located on disk. With Norton Utilities, you may be able to fix (or prevent) damage related to logical problems, magnetic weaknesses, or accidental erasure or formatting of the disk. The following sections briefly describe specific Norton utilities that provide protection for data. For details on these utilities, see the referenced chapters.

Safe Format and Image

Probably the first thing you should do with Norton Utilities is to make sure that you are safe from the prospect of someone accidentally formatting your hard disk. Otherwise, you could lose weeks, months, or years of work in a matter of minutes. Prevent this disaster by using Safe Format (SFORMAT or SF), a Norton replacement for the DOS FORMAT command. Safe Format gives you an added layer of protection against accidental formatting because the user must go through a few more steps to initiate a format.

If you load Norton Utilities with the Install program that comes on disk, you can replace the DOS FORMAT command with the Norton Safe Format command (see Appendix C, "Installing Norton Programs"). If you do not choose this option during the installation, you still can perform that task manually (see Chapter 4, "Using Safe Format and Image").

Implementing the Image procedure protects you from accidental formatting of your disk (see Chapter 4). Each time you boot your computer, the Image program stores information about your files (a duplicate copy of DOS directory information) on disk. Then, if your disk is formatted accidentally, the UnFormat program can use this duplicate information to restore the formatted disk. Chapter 11, "Unformatting Disks," describes the UnFormat utility.

Disk Monitor, SmartCan, File Find, and File Attributes

Individual files on disk can be lost if you accidentally erase them or overwrite them with other files. The Norton Disk Monitor program enables you to protect information on your disk from being erased. If you have a number of files that you want to protect from accidental change, the Disk Monitor program can help. For more information, see Chapter 6, "Using Disk Monitor."

SmartCan also can be used to prevent accidental data loss. This program intercepts any command that erases files on your disk and places those files in a special place on disk so that they can be reliably unerased. Chapter 5, "Using SmartCan," covers this capability.

Finally, the Norton File Find (FILEFIND or FF) and File Attributes (FA) commands can help you use some of the features of DOS file storage to protect files from being erased or altered. With these commands, you can set a file to a read-only mode so that the file can be used but not altered. Also you can hide files and cause them to be backed up more often. These commands are described in Chapter 9, "Setting File Attributes."

Diskreet

Another way to protect information is to make sure that it does not fall into the wrong hands. One way to protect files is to encrypt the files (turn them into a secret code) so that they cannot be read by unauthorized persons. The Diskreet program was designed to perform this task. For details, see Chapter 7, "Using Diskreet."

WipeInfo

Formatting a disk does not *destroy* the information on the disk—it simply erases some of the file information. If you erase a file or format a disk, someone else can use a program such as Norton Utilities to recover that information; therefore, the data is not safely destroyed. This is a potential problem for anyone who places financial, personal, corporate, secret, or other valuable information on a disk. Norton provides alternatives to the DOS ERASE (DEL) and FORMAT commands. You can use the WipeInfo command to completely destroy information on a disk. Chapter 8, "Destroying Files Permanently with WipeInfo," provides complete details on this utility program.

Recovery Techniques

Files can be lost or damaged in a number of ways. You can format your disk accidentally. You can use the DEL or ERASE command and erase a whole batch of important files. Perhaps you erase a file because you think you have another copy of it elsewhere—only to find that the erased file was your only copy after all. Or you may intentionally format

your disk because you have a backup and then discover that the backup is no good.

Loss of information can also occur when the power shuts off for some reason before you save a file to your disk. Perhaps your program freezes, forcing you to perform a *warm boot* (pressing Ctrl+Alt+Del) before all information is written to a file. Your disk may become so full that DOS loses information about where the contents of a file are located. Bugs in software, hardware failures, and human errors are potential causes of damaged files.

In many cases, Norton Utilities can help you recover all or portions of damaged or lost files. The primary programs for recovery include UnErase, UnFormat, Norton Disk Doctor (NDD), Disk Tools, Rescue Disk, and File Fix. If you are an advanced user or you want to recover files that cannot be recovered with the automatic recovery techniques, you can use Manual UnErase and Disk Editor.

The following sections describe the Norton Utilities programs for recovering data automatically and for advanced (manual) recovery of data.

UnFormat and UnErase

When a disk is formatted, the actual data on the disk is not disturbed. The format clears out the file information in the disk's directory. With a duplicate copy of the information on disk, the UnFormat program can reconstruct the information needed to unformat the disk and get all the files back. Chapter 11, "Unformatting Disks," describes the UnFormat command, and Appendix B compares the Norton UnFormat command with the DOS UNFORMAT command (Versions 5.0 and later).

The UnErase program is useful for recovering files or directories you have erased (see Chapter 10, "Unerasing Files and Directories").

Norton Disk Doctor (NDD)

Problems relating to your hard disk can mount before you even realize that a problem exists. Norton Disk Doctor (NDD) closely examines all the information on your disk and determines whether problems exist that could cause information in a file to become lost. Examples are fragmented files and unclosed files from power outages. NDD optionally attempts to correct such problems when they are found. Chapter 12, "Diagnosing and Treating Disks with Disk Doctor," provides details on using this utility.

Disk Tools, Rescue Disk, and File Fix

Disk Tools is a collection of utilities that can help you restore a disk and make a disk bootable. Chapter 13, "Using Disk Tools," describes these utilities.

The Rescue Disk program enables you to create a rescue disk—a disk containing the key DOS and Norton programs you may need for recovering information from a logically damaged or formatted hard disk. Chapter 14, "Creating and Using a Rescue Disk," describes the process.

The File Fix program allows you to repair damaged database, spreadsheet, or word processing files created by major application programs such as dBASE, Lotus 1-2-3, and WordPerfect. Chapter 15, "Restoring Files with File Fix," provides details on this program.

Manual UnErase and Disk Editor

When the automatic recovery techniques cannot restore lost files, you can use other—more advanced—Norton techniques for file recovery. The Manual UnErase command allows you to search your disk for pieces of a file and put the pieces back together. Chapter 16, "Recovering Files with Manual UnErase," describes this process.

Norton Disk Editor enables you to "perform surgery" on the information on disk. By directly editing the inner workings of the disk, you can remove or replace bad or damaged information with good information. If, for example, the disk information that contains the addresses of files on disk is damaged, you may be able to transplant a new copy of this information to disk—making the information usable again. See Chapter 17, "Using Disk Editor," for details on using this program.

> **CAUTION:** Disk Editor is powerful *and* dangerous. Like the knife of a surgeon, Disk Editor can be helpful in the hands of someone who uses it with care and knowledge. If you accidentally change important disk information, you can destroy access to all the data on your disk.

Computer Efficiency

Keeping information on your disk safe is vital. As with an automobile, a few maintenance tasks can keep your machine running smoothly and at

top speed. You can use several Norton Utilities commands to perform these maintenance procedures, as described in the following sections.

System Info

The System Info (SYSINFO) command allows you to take a look into the inner workings of your computer to discover what components (microprocessor, BIOS, and so on) it uses and how fast it runs when compared to other standard computers. Chapter 18, "Using System Info," provides details.

Speed Disk

One of the problems with disks is that, after much use, files become overly entangled or fragmented. When DOS runs out of enough space for storing a file in one contiguous area on the disk, the operating system resorts to storing part of a file here, part there, and so on. This problem can become bad enough to cause DOS to lose information on some files. Furthermore, because DOS must look here and there to find a file, your access to the hard disk can be slowed considerably. The Norton Speed Disk (SPEEDISK) program can rearrange the files on your hard disk in such a way as to remove fragmentation and restore maximum speed to the disk. If you hear your disk grinding when a file is being read or saved, or if your disk seems to be slowing down, you may be able to regain speed with Speed Disk. See Chapter 19, "Making Your Disk Run Faster with Speed Disk," for more information.

Calibrate

Another command that can help your hard disk work more efficiently is Calibrate, described in Chapter 20, "Using Calibrate." You can use this command (entered as CALIBRAT) to adjust how much information DOS reads from your hard disk in one pass. Fine-tuning this adjustment can give your hard disk more speed. Calibrate can also perform a nondestructive low-level format of your hard disk to check the disk for reliability—without disturbing the information already on disk.

Norton Cache

The Norton Cache program can help you access your hard disk more efficiently, with the result of making many programs run faster. See Chapter 21, "Using Norton Cache," for details.

Resource Management

A number of commands in Norton Utilities can give you more control over your computer than you can have by using DOS commands alone. These Norton commands help you manage your hard disk more efficiently and enable you to choose certain setup parameters for your computer. The following sections describe the Norton commands for managing computer resources.

Norton Control Center

Norton Control Center (NCC) is a utility that enables you to make your computer do things you may never have thought possible. You can change the size of your cursor, for example. If you use a laptop with a hard-to-read monitor, making the cursor bigger makes it easier to find on-screen. Some PCs require that you use the DOS Setup program on the diagnostic disk to permanently set the date and time on the computer. You can now do that with Norton Control Center. Other settings available include monitor colors, how fast characters repeat when you hold down a key for more than a few seconds, how many lines are displayed on-screen, and settings for serial ports. Chapter 22, "Using Norton Control Center," provides details on using this program.

Norton Change Directory

As newer and more advanced hard disks come on the market, users must deal with keeping track of more information on disk. The Norton Change Directory (NCD) command enables you to navigate between directories much more easily than having to remember the full name of each directory on disk (see Chapter 23, "Using Norton Change Directory"). The NCD command replaces the functions of the DOS commands Change Directory (CD), Remove Directory (RD), and Make Directory (MD)—and offers more. With NCD, you can display the directory on-screen in a treelike graph that shows various relationships among the directories. Using the arrow keys or the mouse, you can highlight the directory you want to access. Not only can you make, change to, and remove directories as in DOS, but you can also rename directories and perform other directory management tasks.

Batch Enhancer

Batch files contain series of commands that you use repetitively. DOS has a number of commands that are used in batch files, such as the

PAUSE command and the ECHO command. Norton Utilities supplies some additional commands, called the Batch Enhancer commands, that enable you to create more sophisticated batch files. With these commands, you can do such tasks as draw boxes, prompt the user for input, and branch according to the user's answer. Read Chapter 24, "Creating and Using Batch Files," to learn more about this useful program.

File Find, File Locate, and Text Search

Within each directory on disk, you may have hundreds of files. Finding a particular file can be a nightmare. Often you know that you have a file on disk, but you cannot remember where you saw it. The Norton File Find, File Locate, and Text Search commands enable you to find a specific file no matter which directory holds it. The File Find and Text Search commands also can perform a text search to find a file by searching the text *inside* the file. File Find and Text Search can even search files you have erased. Chapter 25, "Finding Files," describes these utilities.

Command-Line Utilities

A series of command-line utilities have been a popular part of the Norton Utilities package for many years; Version 7 retains these utilities and adds another. The original utilities include Directory Sort (DS), File Size (FS), Line Print (LP), and File Date (FD). The added utility is Duplicate Disk (DUPDISK).

The following sections describe these command-line utilities. For details on using these programs, see Chapter 26, "Using Norton Command-Line Utilities."

Directory Sort (DS)

Have you ever spent time looking through a directory listing to find a particular file? Being able to list the files by the date they were created (or by size, name, or extension) would undoubtedly be helpful. With the Directory Sort (DS) command, you can sort files in a number of ways and then use the DIR command to list the sorted directories.

File Size (FS)

The File Size (FS) command allows you to find out how much disk space is taken by one or more files, and to determine whether there is enough space on a disk to copy a group of files (such as those in a

directory) to a disk. You can also use FS to determine how much of the disk is being used to store files and how much of the space is allocated for use but is not used.

Line Print (LP)

The Line Print (LP) command enables you to print an ASCII file to the printer without having to use a word processor. This command is more powerful and has more options than the DOS PRINT command. With Line Print, you can specify margins, type of printer, page numbering, and more.

Duplicate Disk (DUPDISK)

The Duplicate Disk (DUPDISK) program gives you a better alternative to the DOS DISKCOPY command. Not only can you copy from one disk to another with this command, but also you can use the command to quickly make multiple copies of the same disk.

File Date (FD)

With the File Date (FD) command, you can change the date and time for any or all files on a disk. For example, for support and identification purposes, you can change the dates and times of a group of files to specify when they were distributed to other users.

Norton Diagnostics

The Norton Diagnostics program allows you to put your computer through a treadmill of tests to check specific hardware components of your machine, such as memory, video, disk drives, and communication ports. See Chapter 27, "Using Norton Diagnostics," for more information.

The NDOS Command Processor

Norton's NDOS replaces the DOS command processor COMMAND.COM, giving you a larger number of "DOS" commands and enhancing the current set of DOS commands (such as DIR and COPY). For example, with NDOS you can include multiple commands on one line and recall commands that you have previously entered. The NDOS command processor is described in Chapter 28, "Using NDOS."

Norton Backup

The Norton Backup program, although not a part of the Norton Utilities Package, is a powerful backup routine that enables you to design backup procedures that you can store, use, and reuse to back up particular files on your hard disk. For example, you can design a series of backup procedures to be used daily, weekly, and monthly—allowing you to automate a complete backup protection plan for your computer. Devising and using a backup strategy is described in Chapter 29, "Backing Up and Restoring Files with Norton Backup."

Norton Commander

Norton Commander is an additional program that complements Norton Utilities. Commander is particularly helpful for working with directory structures; creating custom menus; using MCI Mail; and copying, moving, renaming, and deleting groups of files.

Running Norton Commands from the DOS Prompt

You can use most Norton Utilities commands as if they were DOS commands. In fact, Norton designed commands so that they operate with a syntax similar to DOS commands. To format a disk in drive A with the system switch (make the disk a bootable disk), you can enter the following familiar DOS command:

```
FORMAT A:/S
```

To format a disk in drive A with the Norton Safe Format command and the same option, enter this command:

```
SFORMAT A:/S
```

Notice that the syntax of the two commands is identical; only the names of the commands are different. Notice also that a command consists of distinct parts: the command (in this example, SFORMAT), any parameters (here, the disk drive), and switches. In the discussion of each command in this book, the appropriate syntax is explained.

Using the Norton Interface

If you do not remember how to enter a Norton command at the DOS prompt, you have another option. Norton Utilities provides you with an easy-to-use interface with which you can access the Norton commands. To use the Norton interface, you need to remember only one command: **NORTON**. The following sections describe how to use the Norton interface.

Specifying the Path

If you are not in the Norton directory, DOS cannot execute the NORTON command unless you have given a PATH command that includes the Norton directory (usually \NORTON or \NU7) in the DOS search path. The DOS search path typically is set up in the AUTOEXEC.BAT file, in a line similar to this:

```
PATH C:\;C:\DOS;C:\NORTON
```

With the \NORTON directory included in the path (in this example, the directory is on drive C), you can access the Norton interface and commands from any directory and drive on your computer. The Installation program optionally includes the proper command in the PATH statement in your AUTOEXEC.BAT file. However, if you did not allow this change, you can still change the path statement later by choosing the **S**tartup Programs option from the Norton **C**onfiguration menu, as described in Chapter 2.

Understanding the Norton Main Screen

After you type **NORTON** at the DOS prompt and press Enter, you see a screen similar to the one in figure 1.1.

At the top of the screen is the *menu bar*, listing the pull-down menus. On the left side of the screen is a *list box* containing the available Norton commands. In figure 1.1, Disk Doctor is highlighted in the list, and the command `NDD` (for Norton Disk Doctor) appears on the *input line*. To the right of the Commands list is a brief description of the highlighted command. In this case, the screen displays a description of Norton Disk Doctor, including the syntax of the NDD command and available switches.

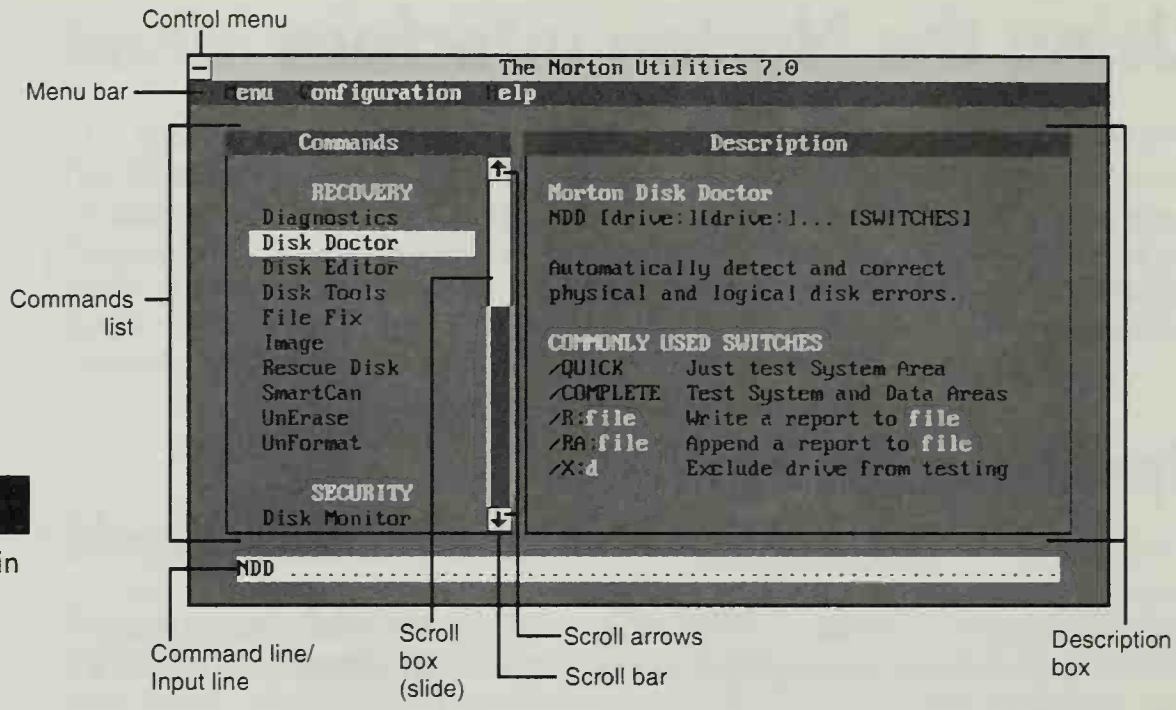


Fig. 1.1

The Norton main screen.

Not all commands are visible at one time in the Commands list. To see other commands, you can use the up- and down-arrow keys to display the commands. You can also press Home to go to the top of the list, and End to go to the bottom of the list.

You can list the commands by topic or alphabetically. For more information, see the section "The Menu Menu" later in this chapter.

To end Norton Utilities and return to the DOS prompt, press Esc or double-click the Control menu in the upper-left corner of the screen.

Choosing Commands

On the Norton main screen, you can point to the name of a command by using the direction keys on the cursor keypad to move the highlight up or down in the Commands list. After you *highlight* (point to) the command you want to use, press Enter to *run* (shoot) the command. This point-and-shoot method enables you to choose and run a command easily without having to remember the exact command name or options.

If your computer has a mouse attached, you will see a *pointer* (a block or an arrow) in the Norton screen. To choose a command with the mouse, move the mouse pointer to point to the command; then click

the left or right mouse button once. The command appears at the bottom of the screen, and you can type any appropriate switches or options and then press Enter to run the command.

To reveal commands not shown in the list, use one of the following methods:

- Place the mouse pointer on the up or down *scroll arrow* at the upper right or lower right of the Commands list. Press the mouse button to move the Commands list up or down.
- Point to the highlighted rectangle (*scroll box* or *slide*) in the *scroll bar* on the right side of the Commands list. Press and hold down a mouse button, and move the mouse pointer up or down to scroll through the list.
- Click the top, middle, or bottom of the scroll bar to move to the top, middle, or bottom of the list.

On a two-button mouse, pressing both buttons together is the same as pressing Esc on the keyboard.

Editing the Command Line

The input line at the bottom of the Norton main screen displays the *selected* command—the one to which you pointed. Your cursor is positioned after the command on the input line. Here you can type any options or switches before you press Enter to run the command.

Some command lines get complicated, and you may get to the end of a line before you realize that you have made an error at the beginning. You can use the Backspace key to erase all your work and start over, of course. If you use the built-in editing keys, however, you can save yourself some work. Table 1.1 lists these editing keys.

Table 1.1 Norton Command-Line Editing Keys

Key	Action
→	Moves cursor to the right
←	Moves cursor to the left
Ctrl+D	Moves cursor right one character
Ctrl+S	Moves cursor left one character
Ctrl+→ or Ctrl+F	Moves cursor right one word

continues

Table 1.1 Continued

Key	Action
Ctrl + ← or Ctrl+A	Moves cursor left one word
Backspace	Deletes character to the left
Del or Ctrl + G	Deletes character at cursor
Ctrl+T	Deletes word to the right
Ctrl+W	Deletes word to the left
Ctrl+Y	Deletes the line

Using the Menus

The menu bar displays the **M**enu, **C**onfiguration, and **H**elp options. **M**enu, **C**onfiguration, and **H**elp are *pull-down menus*. To open one of these menus, use one of the following methods:

- Press F10 to access the menu, and highlight the first menu item. Use the right- or left-arrow key to move the highlight to the menu you want to open; then press Enter.
- Hold down the Alt key and press the first letter of the menu name (for example, press Alt+M to select **M**enu). In this book, the highlighted letter of the menu name appears in boldface.
- Point to the menu item with the mouse and click once.

After you open one of the menus, you can move to another menu by pressing the right- or left-arrow key or by pointing to the menu bar, pressing and holding down the mouse button, and dragging the mouse to the left or right. To close a pulled-down menu, press Esc, click a blank area outside the menu, or click both mouse buttons.

Figure 1.2 shows the **M**enu pull-down menu.

To choose an item on a pull-down menu, use one of the following methods:

- Use the up- and down-arrow keys to highlight your choice; then press Enter.
- Point to your choice with the mouse and click.

- Use the *shortcut key* (or key combination) listed next to the menu item on the menu. The shortcut for Sort by **N**ame is Alt+N, and the shortcut for Sort by **T**opic is Alt+T. When you see shortcut keys like these listed in a pull-down menu, you can access those commands (without pulling down the menu) by pressing the key combination listed. For example, to sort commands by name even when the **M**enu menu is not pulled down, you just press Alt+N.
- Press the *hot key*. The hot key in a menu item is designated by a letter that is different in color from the rest of the letters in the item. When a menu is open, pressing the hot key selects that menu option.

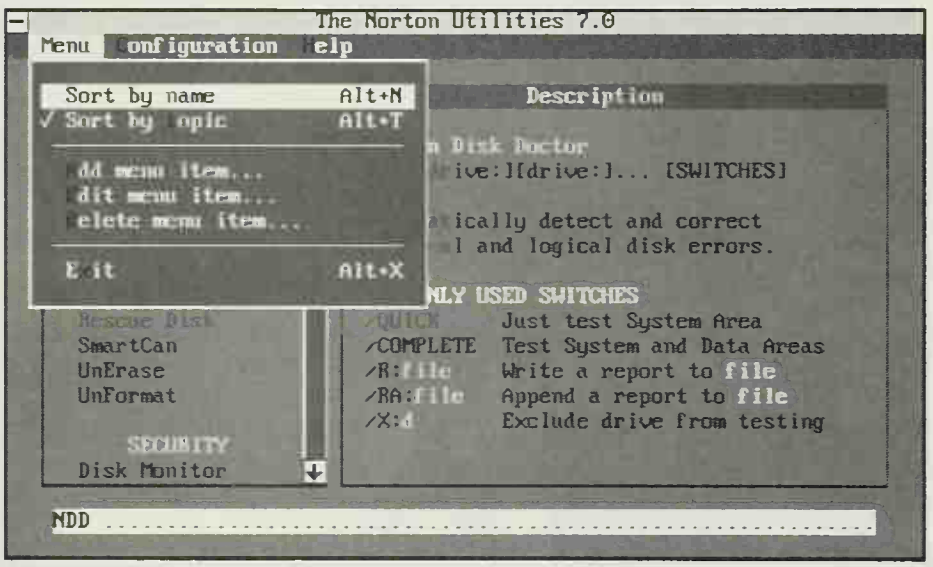


Fig. 1.2
The **M**enu menu.

The Menu Menu

The **M**enu menu contains six options. The first set of options includes Sort by **N**ame and Sort by **T**opic. These two options affect how commands are listed in the Commands list. By default, the commands in the Commands list are listed by topic. The topics are Recovery, Security, Speed, and Tools. Because the Commands list is longer than the box containing it, you can see only the Recovery and Security topics at the beginning of the Commands list. Within the topics, the commands are listed alphabetically. If you choose the Sort by **N**ame option from the **M**enu menu, the program immediately lists the commands together in alphabetical order by name (instead of by topic).

The next three options on the menu are **A**dd Menu Item, **E**dit Menu Item, and **D**elete Menu Item. You can use these three commands to

customize the Commands list; for example, you can add your own commands, edit how the commands are presented, or delete items from the list.

NOTE Each of these menu options is followed by an *ellipsis* (...). When you choose a menu option followed by an ellipsis, you will need to select or enter additional information before the command performs a task.

The Configuration Menu

When you choose the **C**onfiguration menu, it presents the following six options (see fig. 1.3):

- **V**ideo and Mouse enables you to control video and mouse options, including screen colors and mouse sensitivity.
- **P**rinter Setup adds, deletes, and configures printer options.
- **S**tartup Programs specifies which Norton programs are started automatically when you boot your computer.
- **A**lternate Names enables you to select alternative names for certain Norton programs. For example, you can choose either SYSINFO or SI for the System Info command.
- **P**asswords allows you to limit the use of certain programs (such as WipeInfo) by requiring that a password be given before the program will execute.
- **M**enu Editing controls which commands appear in the Norton menu.

The **C**onfiguration menu and the program NUCONFIG are discussed in detail in Chapter 2, "Configuring Norton Utilities."

The Help Menu

By selecting the **H**elp option from the Norton main screen, you can access a series of Norton Help screens that function like a minimanual for Norton Utilities. When you choose the **H**elp menu, you see the pull-down menu illustrated in figure 1.4.

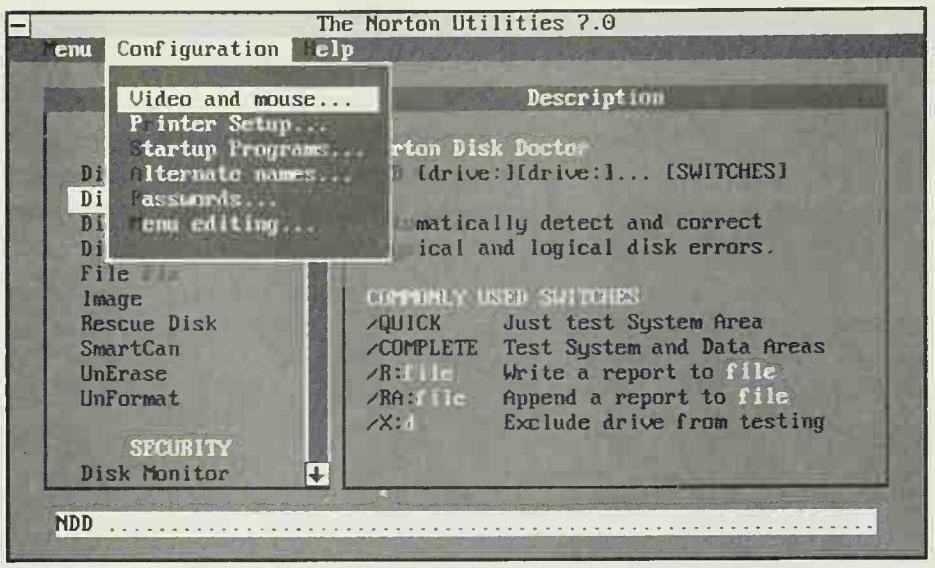


Fig. 1.3
The **C**onfiguration menu.

You also can select Help by pressing the F1 key on your keyboard. **T I P**

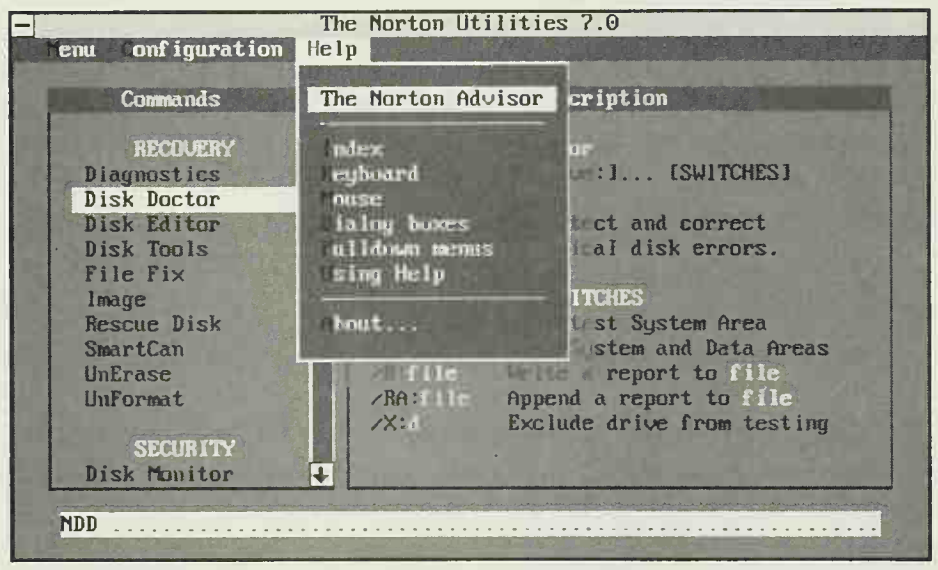


Fig. 1.4
The **H**elp menu.

When you choose The Norton Advisor from the **H**elp menu, seven options are revealed:

Option	Description
About the Norton Advisor	Describes the purpose of the remaining six options on the Advisor menu.
How to Use Advisor	Describes how to use the remaining five options on the Advisor menu.

continues

Option	Description
Common Disk Problems	Lists problems that commonly occur with disks. This option covers such problems as the computer no longer booting from a disk, problems in copying files, and other topics related to accessing information on your disk. See Appendix D, "Dealing with Disk-Related Problems," for a discussion of some common problems.
DOS Error Messages	Lists common DOS error messages and recommends solutions. For example, Norton Advisor recommends an action when you encounter the message `Bad command or file name`.
CHKDSK Error Messages	Lists messages displayed by the DOS CHKDSK command, such as errors in the file allocation table (FAT), and recommends an action for each message. See Appendix A, "A DOS Review," for more information about CHKDSK.
Application Error Messages	Lists common messages in popular application programs (such as WordPerfect, Lotus 1-2-3, and dBASE) and recommends an action for each message.
Search	Allows you to search for the meaning of an error message. You enter all or part of the error message, and the search will find error messages that match. If an error message is found, advice is displayed concerning what action might be taken.

The second part of the **H**elp menu enables you to display an **I**ndex to the Help system or to display information about these topics:

Keyboard

Mouse

Dialog Boxes

Pulldown Menus

Using Help

About displays copyright information about the Norton Utilities program.

If you choose the Index option, you will see the screen shown in figure 1.5. This screen describes how to use the Index. Choose the Index button at the bottom of the screen to see the main index for the Norton Help system.

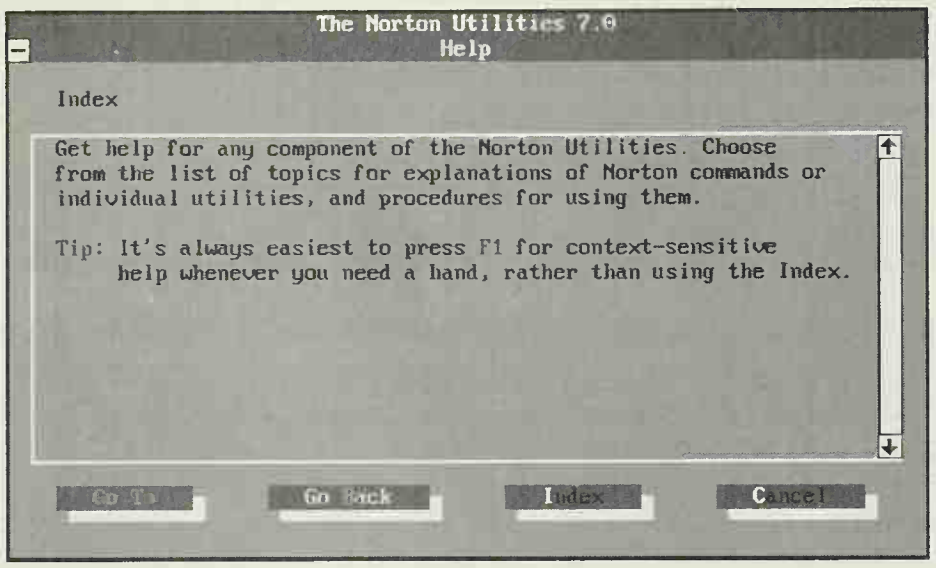


Fig. 1.5
The Norton Help Index screen.

To display more help on one of the topics in the Index listing, use the up- and down-arrow keys to highlight the topic and then choose **G**o To. Alternatively, double-click the topic. At the bottom of the Help screen, notice two other options: Go **B**ack and **C**ancel. After you have used **G**o To to see several screens, you can backtrack by choosing the Go **B**ack option. The **C**ancel option causes the Help program to end, and the Norton main screen appears again.

If, for example, you choose the How to Use Help option and then choose **G**o To, a screen like that shown in figure 1.6 is displayed.

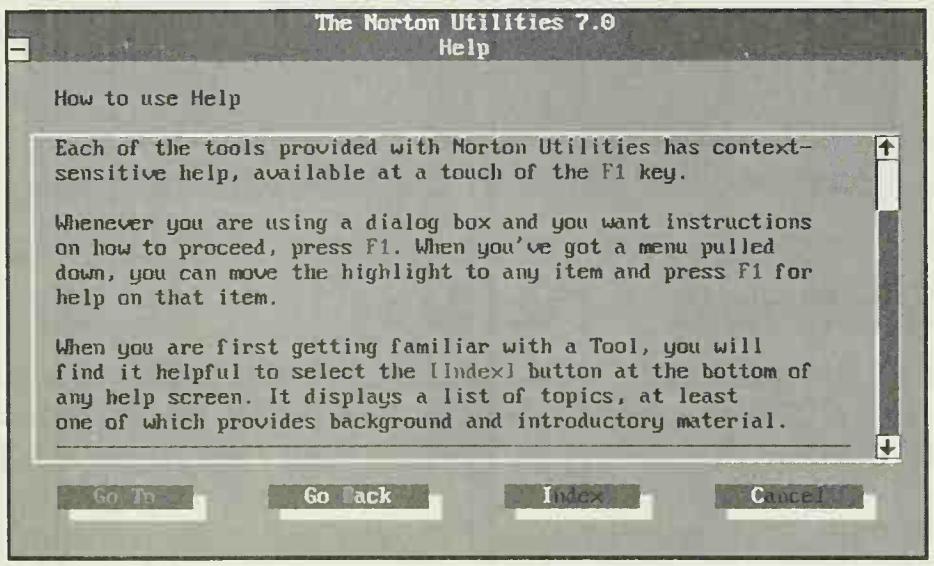


Fig. 1.6
A Norton Help screen.

When the information in the Help screen is too large for the screen, you can scroll the information by pressing the up- and down-arrow keys or by using the mouse and the scroll bar. The information in figure 1.6, for example, continues beyond the bottom line shown on the screen.

The Norton Help system is extensive and thorough. However, sometimes you just want to know what options are available for a particular command-line utility. For this kind of help, see the section "Getting Instant Help," later in this chapter.

Choosing Options from Dialog Boxes

In addition to using the keyboard or mouse to select options from the Norton main screen, you often need to choose options from other kinds of Norton menus, called *dialog boxes*. Basically, a dialog box is a screen that contains several options. You "dialogue" with this box by "telling" it what options you want to choose. To choose options, you can use the keyboard or the mouse, or both. Figure 1.7 shows the dialog box that appears when you choose Configuration and then choose Video and Mouse. This dialog box includes several kinds of options, as described in the following sections.

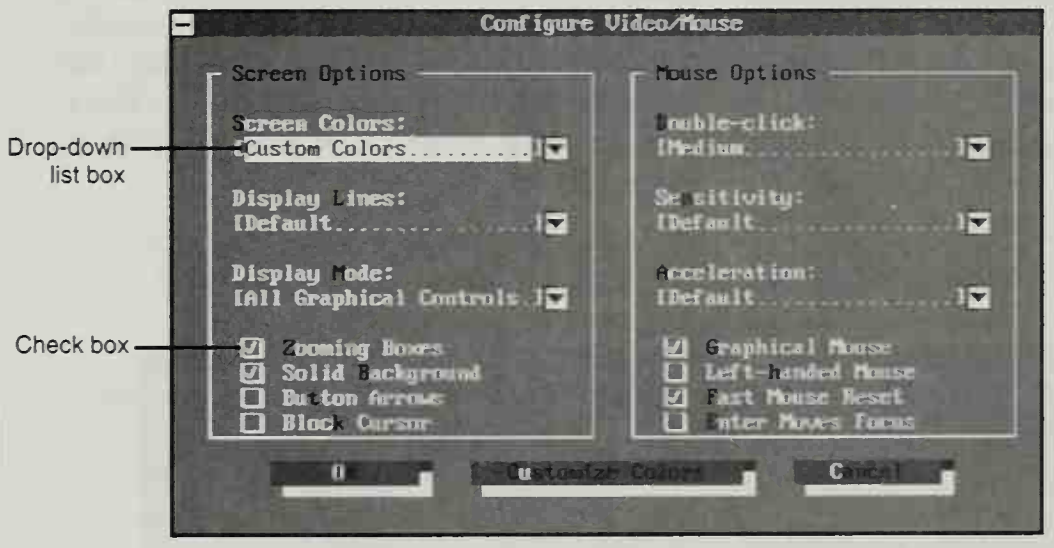


Fig. 1.7
A Norton dialog box.

Using a Drop-Down List Box

Notice the six options that have a triangle pointing down at the right of the option. These are called *drop-down list boxes*. The purpose of this kind of box is to enable you to choose from a list of options. The currently selected option is listed in the *option field*. After you open a *drop-down list*, the down triangle at the right of the option field changes

to an up triangle. Figure 1.8 shows the Custom Colors drop-down list box opened.

Table 1.2 lists the keyboard commands that you can use to access and work with a drop-down list.

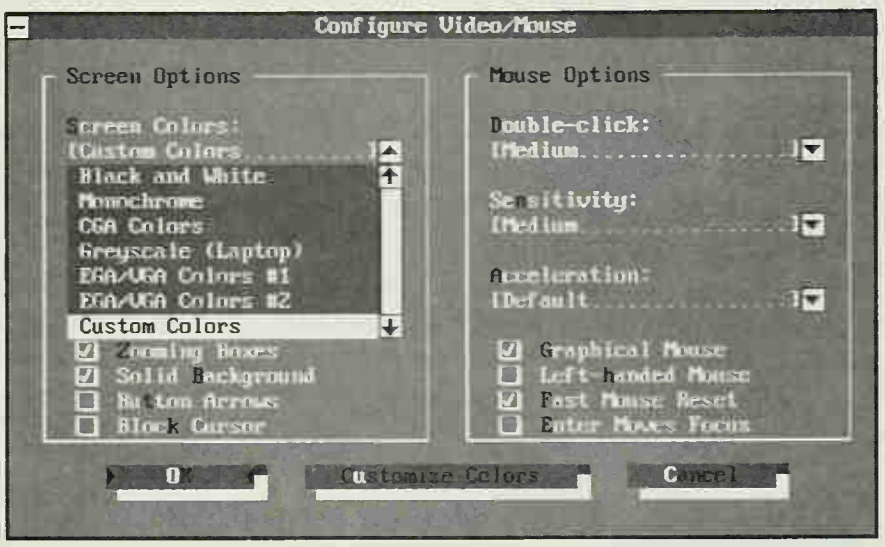


Fig. 1.8
A drop-down list box that is open.

Table 1.2 Drop-Down List Keys

Key	Action
Alt+highlighted letter	Highlights the list box. For example, press Alt+S to highlight the **S**creen Colors drop-down list box.
Ctrl+↓	Opens the drop-down list, displaying the list of options.
Ctrl+↑	Closes the drop-down list.
Arrow keys	Selects an option in the list.
Home	Moves to the first option in the list.
End	Moves to the last option in the list.
PgUp	Moves the list up one screen.
PgDn	Moves the list down one screen.
Space bar	Selects the currently highlighted item in the list.

To use a mouse with a drop-down list box, click the triangle to open the box. If the list box has a scroll bar, use the scroll bar or scroll arrows to move the list up or down. To select an item on the list, point to it with

the mouse pointer and click. To close the list box, click the triangle next to the option field or click elsewhere in the dialog box.

After you choose an item, the drop-down list box contracts, leaving only the item you have chosen displayed in the list box.

Using Check Boxes

Figure 1.8 contains a number of check boxes at the bottom of the dialog box. When an item is selected, a check mark appears in the box. When the item is not selected (*deselected*), no check mark appears. To select or deselect an item, press Alt plus the highlighted character of the option. In figure 1.8, for example, Alt+Z selects or deselects the **Z**ooming Boxes option. If you prefer, you can press Tab to move the highlight to the check box, and then press the space bar to select or deselect the option. If you are using a mouse, point to the option and click to select or deselect.

Using Radio Buttons

Another kind of selection item is the radio button. Figure 1.9 shows the Surface Test dialog box from Norton Disk Doctor. This dialog box contains a number of radio button options. A *radio button* appears as an empty circle if the option is deselected or as a circle enclosing a dot if the option is selected.

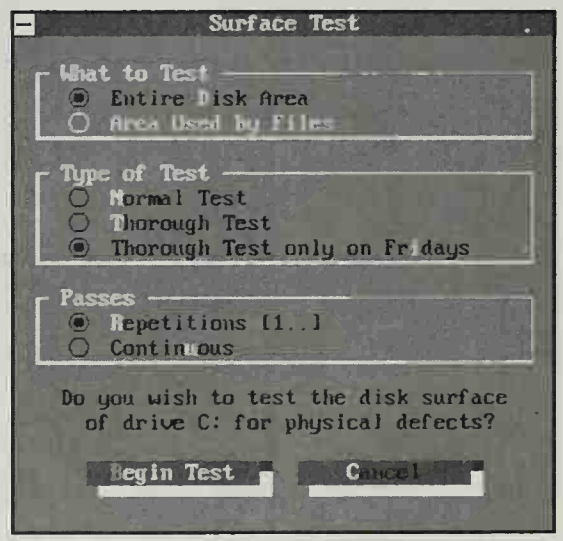


Fig. 1.9
A dialog box that includes radio buttons.

The name *radio button* came from the old-style car radios that allowed you to press a button to choose a radio station. When one button is

pressed, it turns off any other currently selected button. Thus, only one button (option) can be selected at any time. Figure 1.9 contains three sets of radio buttons. Notice that only one option is chosen in each of the three boxes. In the top box are two options. However, one of the buttons (Area Used by Files) is grayed, which means that the option cannot be selected at the present time. Sometimes radio buttons are unavailable, such as a network option when your computer is not on a network.

To select or deselect a radio button option, press Alt plus the letter of the option. If you prefer, you can use the Tab or arrow keys to move to an option, and press the space bar to select or deselect the option. If you are using a mouse, point to the radio button you want to select or deselect and then click.

Getting Instant Help

In addition to the information provided about commands in the Norton menu screen, you have another way to get on-screen help about Norton commands. If you enter at the DOS prompt a Norton command followed by a question mark, a Help screen appears. This screen lists the command's possible options and switches, and may give some sample uses of the command. For example, to get information on the File Date (FD) command, enter the following at the DOS prompt:

```
FD ?
```

Remember to include a space between the command (FD) and the question mark (?). Figure 1.10 shows the help information that appears on-screen for this example.

```
C:\NU7>fd ?

Change the file time and date information.

FD pathname [/D[date]] [/T[time]] [/P] [/S]

    /D[mm-dd-yy]  Set the date to [mm-dd-yy]
    /T[hh:mm:ss]  Set the time to [hour:minute:second].
    /P            Pause after each screen.
    /S            Include Subdirectories.

Running FD without /D and /T will stamp the current
date and time on all files matching the file specified.

C:\NU7>
```

Fig. 1.10
Help information for the FD command.

Summary

The information on your computer disk may not be safe. Accidental erasures, unintentional disk formatting, problems with computer programs, power outages, and other difficulties can compromise your data. Although DOS has a few options that can help you protect your data, more are needed. Norton Utilities gives you additional ways to build in preventive measures and protect the information on your computer disk. Then, if a loss occurs, you still may be able to recover some or all of your information by using Norton Utilities' recovery techniques.

This chapter provided an overview of the Norton Utilities 7 programs. In the next chapter, you continue your exploration of Norton Utilities by learning how to configure it for your computer.

2

CHAPTER

Configuring Norton Utilities

Automobiles come in a variety of colors and shapes and with different levels of power and finesse. Differences in people's tastes and in their ideas about how a car should perform account for this variety. A utility program should have no fewer options. In fact, Norton Utilities provides a number of options that enable you to customize the program so that it meets your expectations about color, power, speed, and ease of use.

As indicated in Chapter 1, you can access configuration options from the Norton main screen. You can also enter the NUCONFIG command from the DOS prompt to access the same Norton configuration options. This chapter shows you how to make choices from the **C**onfiguration menu and how to access the same configuration choices with the NUCONFIG command.

Setting Video and Mouse Options

You learned in Chapter 1 that the Norton Utilities main screen is displayed when you start Norton Utilities by entering **NORTON** at the DOS prompt (see fig. 2.1). To open the **C**onfiguration menu, press Alt+C

(the hot key for this option) or point to the Configuration menu with the mouse pointer and click. Figure 2.2 shows the Configuration menu options.

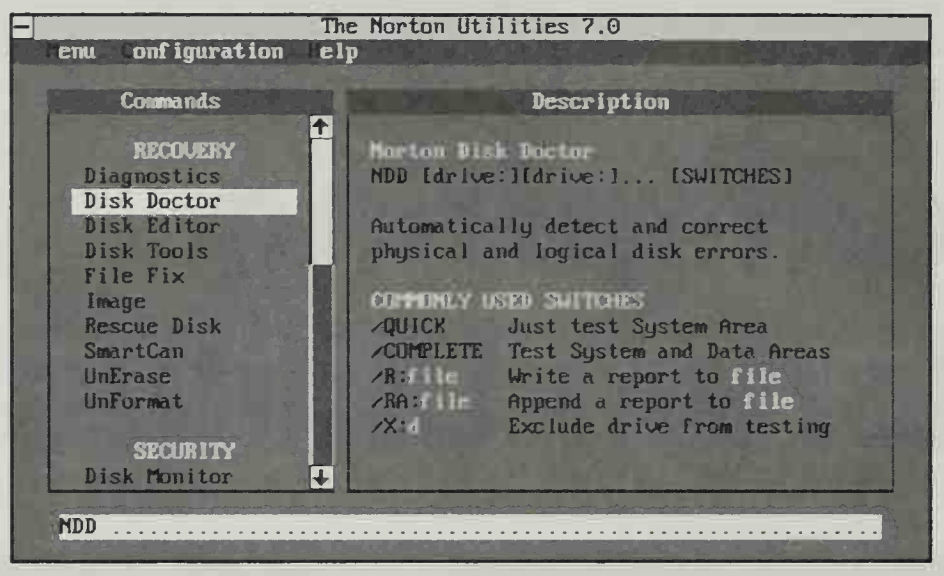


Fig. 2.1

The Norton Utilities main screen.

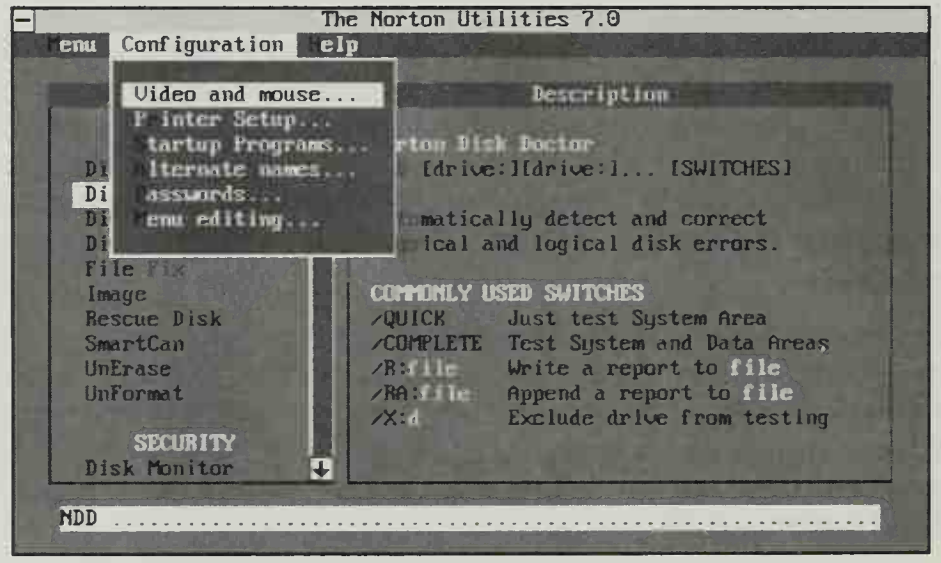


Fig. 2.2

The **C**onfiguration menu options.

The **V**ideo and Mouse option enables you to choose how the Norton main menu (and other Norton menus) appears on your monitor. After you choose this option, a screen similar to the one in figure 2.3 appears, showing the Configure Video/Mouse dialog box. With this dialog box, you can set the color, number of lines on-screen, video mode, and sensitivity for your mouse.

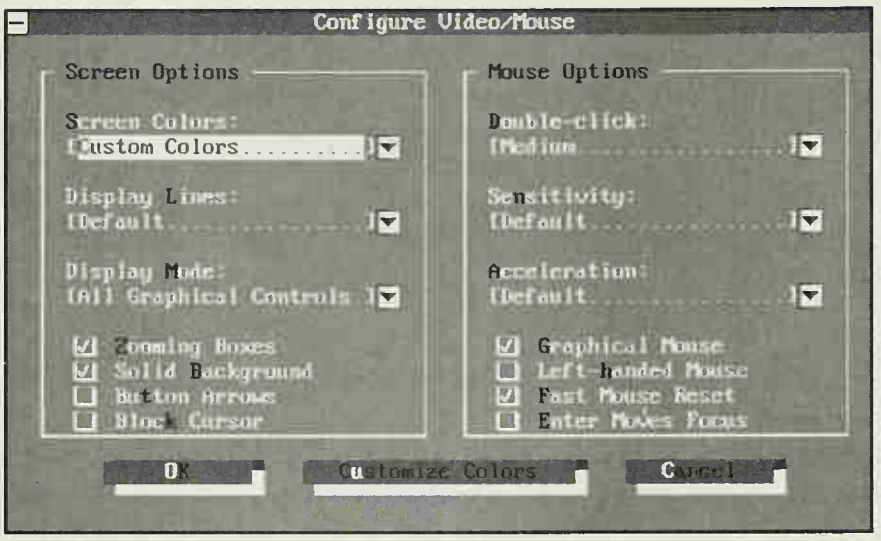


Fig. 2.3
The Configure Video/Mouse dialog box.

The Configure Video/Mouse dialog box is divided into two parts: one for screen settings (Screen Options) and one for mouse settings (Mouse Options). The following sections discuss the options available in both parts of this dialog box.

The first three options in each half of the Configure Video/Mouse dialog box are pull-down list boxes. To pull down a list box, click the triangle, press Tab to move the highlight to the option and then press PgDn, or press Alt plus the option's hot key (highlighted key). To choose an item in the list box, click the item you want and then press Enter, or use the arrow keys to choose the item and then press Enter. The pull-down list box contracts, leaving only the option you have chosen displayed in the list box.

For the rest of the options in the dialog box, press Tab to highlight the option, and then press the space bar to select or deselect the option. Alternatively, you can press Alt plus the appropriate hot key to choose an option, or you can just click the option.

Setting Screen Options

The first option in the Screen Options section is **S**creen Colors. The following color settings are available:

Option	Description
Black and White	Sets colors for composite black-and-white (often black-and-amber) monitors
Monochrome	Sets colors for monochrome monitors

continues

Option	Description
Grayscale (Laptop)	Sets colors for grayscale monitors and LCD (laptop) monitors
CGA Colors	Sets blue, yellow, and green colors for CGA monitors (sometimes called RGB monitors)
EGA/VGA Colors #1	Sets a blue background with red and yellow highlights
EGA/VGA Colors #2	Sets a gray background with blue and green highlights
Custom Colors	Enables you to choose the color combination

If you choose the **C**ustomize Colors option (button at bottom of screen), the Customize Colors dialog box appears (see fig. 2.4). From this dialog box, you can choose the color combination you want. The list box at the left enables you to choose items to color; the box at the right shows you an example of how the new color settings look.

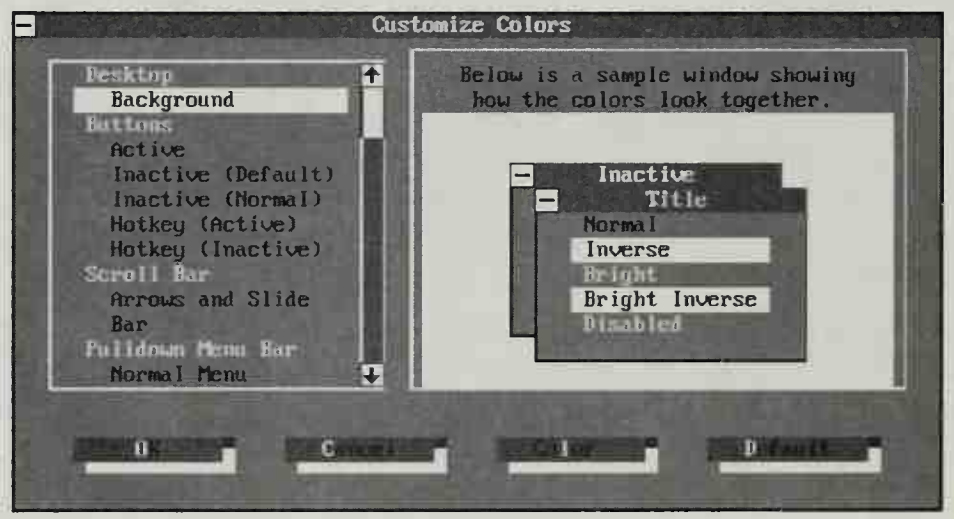


Fig. 2.4

The Customize Colors dialog box.

To set colors from the Customize Colors dialog box, follow these steps:

1. From the list box, highlight the item you want to color.
2. Choose the Color button at the bottom of the dialog box. The Colors dialog box appears (see fig. 2.5). The dialog box's title bar reflects the item that you selected to color in the Customize Colors dialog box.
3. Move back and forth between the **B**ackground and **F**oreground color bars by using the up- and down-arrow keys, the mouse, or the appropriate hot key. Use the left- and right-arrow keys to choose text colors, or simply click your color choices.

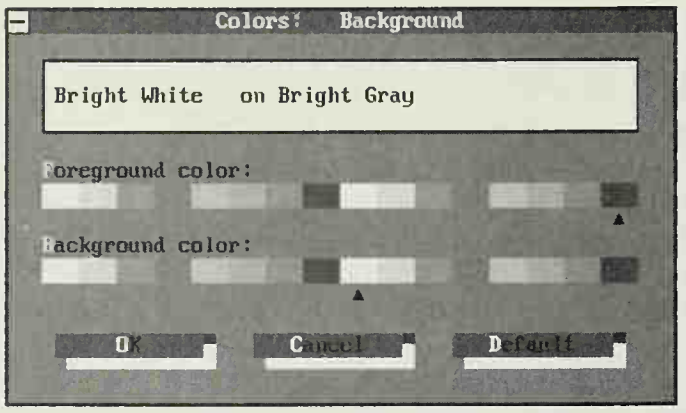


Fig. 2.5
The Colors dialog box.

4. Choose **OK** to save your changes and return to the Customize Colors dialog box.

   If you choose **C**ancel, you return to the Customize Colors dialog box without saving any color changes; if you choose **D**efault, the color settings return to their original default combinations.

5. Repeat steps 1 through 4 to color other items. Then choose **OK** in the Customize Colors dialog box to lock in your color choices and return to the Configure Video/Mouse dialog box.

   If you choose **C**ancel in the Customize Colors dialog box, you return to the Configure Video/Mouse dialog box without making any changes. If you choose **D**efault, all color choices revert to the default colors.

You can also specify in the Configure Video/Mouse dialog box how many lines of characters to display on your monitor. Choose the Display **L**ines option and then choose one of the following options (the default setting for this option is 25):

Option	Description
Default	Setting that defaults to the standard setup for your monitor
25	Setting most common for PC monitors
28	Setting for EGA- or VGA-compatible monitors only
43	Setting for VGA-compatible monitors only
50	Setting for VGA-compatible monitors only

The Display **M**ode option determines whether certain utilities use standard screen text characters or graphical symbols. The following options are available:

Standard

Some Graphical Controls

All Graphical Controls

You must have a graphics monitor (EGA or VGA) to use the Some Graphical Controls and All Graphical Controls options. Using the Standard option can make the program display information faster, but graphical displays are more aesthetic and more Windows-like.

At the bottom of the Screen Options section are four check boxes:

- The **Z**ooming Boxes option causes dialog boxes to appear to zoom (grow from small to large) into place on-screen. If you are using a slow computer, you may want to deselect this option in order to speed the display of dialog boxes. This option is selected by default.
- The Solid **B**ackground option causes the screen background to be a solid color rather than a textured pattern. This option is selected by default.
- The Button Arrows option turns on or off the triangles that appear on both sides of the selected command button. These triangles appear by default in grayscale (Laptop), black-and-white, and monochrome modes because no color exists to indicate which of the command buttons is active—that is, which button executes if you press Enter. If you are using a color setting, you can opt to turn the triangles off.
- The Bloc**k** Cursor option changes the underline cursor to a block. You may want to use this option on a laptop or when you have a hard time seeing the cursor on-screen. The cursor is present whenever you type text on-screen. By default, this option isn't selected.

Setting Mouse Options

From the Mouse Options section of the Configure Video/Mouse dialog box, you can choose settings to configure your mouse (refer to fig. 2.3).

The **D**ouble-Click setting regulates how fast you must click successively for the program to recognize two clicks as separate commands or as one command. You can choose Slow, Medium (default), or Fast. Choose the speed that is best for you.

The Se**n**sitivity setting controls the sensitivity of the mouse's movement. You can choose Default, Low, Medium, or High. If you choose

High sensitivity, moving the mouse a shorter distance on the mouse pad causes greater movement on-screen. Low sensitivity means you must move the mouse farther on the mouse pad to get the same movement on-screen. The sensitivity of your mouse depends on its type. You must experiment with these settings to see which is most comfortable for you to use.

The **A**cceleration setting controls the speed of the mouse—the faster you move the mouse, the greater the speed of the mouse pointer. You can choose Default, Low, Medium, or Fast acceleration. With acceleration set to Fast, moving the mouse quickly moves the pointer a greater distance than moving the mouse slowly over the same distance. The default acceleration for your mouse depends on the mouse type. You must experiment with these settings to see which is the most comfortable for you to use.

At the bottom of the Mouse Options section are four more check boxes:

- The **G**raphical Mouse option enables you to make the mouse pointer an arrow rather than a rectangle.
- The Left-**H**anded Mouse option reverses the function of the right and left buttons on the mouse.
- The **F**ast Mouse Reset option is provided for serial mouse users and for computers using PS/2 or COMPAQ mouse ports. To get optimal speed from your mouse, choose this option if your computer uses one of these ports.
- The **E**nter Moves Focus option enables you to decide how pressing Enter will be interpreted in a dialog box. When this option is checked, pressing Enter in a dialog box causes the highlight (focus) to move to the next option in the dialog box. When this option is unchecked, pressing Enter causes the same action as choosing the active button. For example, if the active button is OK (as in most cases), pressing Enter accepts the settings in the dialog box and closes it.

Setting Printer Options

The **P**rinter Setup option in the **C**onfiguration menu enables you to specify what kind of printer you are using and to choose other options, such as type of print (compressed or normal), margins, and header page size. When you choose the **P**rinter Setup option, the Configure Printer dialog box appears (see fig. 2.6). To exit the Configure Printer dialog box, choose Cl**o**se.

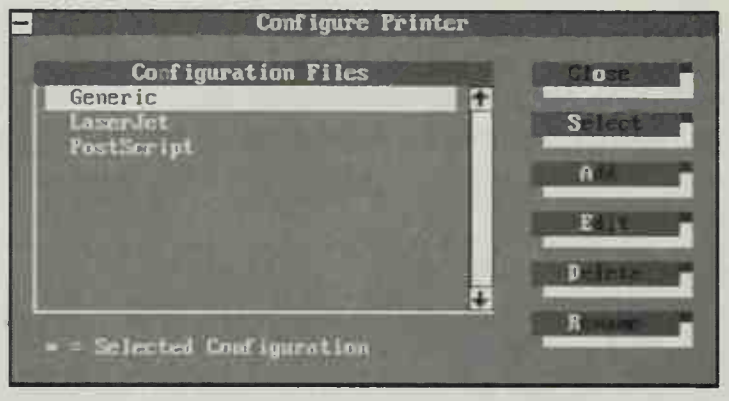


Fig. 2.6
The Configure Printer dialog box.

NOTE The options in the Configure Printer dialog box do not affect your printer settings or capabilities in other programs, such as WordPerfect or PageMaker.

The following sections describe how to select, add, edit, rename, and delete printer information.

Selecting a Printer

The Configure Printer dialog box contains a list of predefined printers from which to choose settings for generic printers, HP LaserJets, and PostScript printers. To specify which printer to use when printing information, highlight the name of the appropriate printer in the Configuration Files list box and then choose **S**elect. You can also double-click the printer name to select it. An asterisk appears next to the name of the selected printer.

Adding a Printer

To enter information about a printer, choose **A**dd. You are then prompted to enter a brief description of your printer. This description is only a personal description to help you remember information about the printer. For example, you could type **MYLaser**. The Printer Settings dialog box then appears, displaying in the title bar the name you typed for the printer (see fig. 2.7). This dialog box enables you to select a printer from the Printer **T**ype drop-down list box and add it to the list of predefined printers. You may also specify several settings for a new printer you are adding.

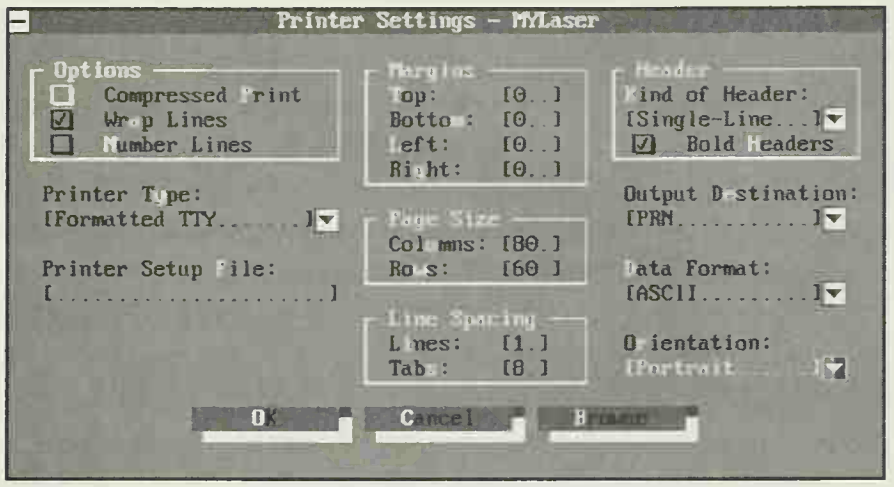


Fig. 2.7
The Printer Settings dialog box.

Usually, you must choose the kind of printer you have from the Printer Type drop-down list box. If you have a Hewlett-Packard LaserJet model, for example, choose the HP LaserJet option. The default type is Formatted TTY, a generic printer type.

If your printer isn't listed in the Printer Type drop-down list box, the printer may *emulate* one of the listed printers. In other words, it may use some of the same printer commands. For example, almost all dot-matrix printers emulate an Epson printer. Almost all laser printers emulate either an HP LaserJet printer or a PostScript printer. Look in your printer's manual for information on which common printers it may emulate. If you choose a printer type that is incorrect, your printer may print strange characters in a document or eject too many pages. Choosing incorrectly can even cause the printer to jam or freeze.

In the Options section of the dialog box, you can choose from Compressed **P**rint, Wr**a**p Lines, and **N**umber Lines. Compressed **P**rint instructs the printer to use a small type font when printing. Wr**a**p Lines causes the printer to wrap long lines of text to the next line; otherwise, a long line is truncated. **N**umber Lines causes the printout to have each line numbered, starting with a 1 for the first line.

The Printer Setup **F**ile text box enables you to specify the name of a file containing printer commands that are used to set up your printer. If your printer supports color printing, for example, you may want to place information in the setup file that will send a setup command to the printer to cause it to print in color. The setup file contains lines of setup commands. Each line contains information that is sent to the printer. For example, a file may contain this single line:

```
\027A
```

This line sends the command consisting of the Esc character (ASCII character number 27) followed by a capital A. Use the following formats for creating the command lines in the setup file:

Character	Description
nnn	*nnn* represents an ASCII code, such as 027 for the Esc character.
C	*C* is a control character you want to send. For example, \A stands for Ctrl+A.
C	*C* is a keyboard character you want to send. The line \027\015 in the setup file, for example, sends an Esc character followed by the ASCII character 15. The line \027A in the setup file sends an Esc character followed by the keyboard character A.

Printer control commands vary for different printers and usually appear in the appendix of printer manuals. Consult your printer manual to determine what commands you can or must use. Under normal circumstances, you do not have to use any commands; the printer will work fine with its default settings.

T I P If you don't remember the name of the printer setup file or the directory where it is located, choose the **B**rowse command button at the bottom of the dialog box. This command displays **D**irectories and **F**iles list boxes that you can use to locate the file name.

The Margins, Page Size, and Line Spacing sections in the middle of the Printer Settings dialog box enable you to choose settings for the top, bottom, left, and right margins; the number of columns and rows to put on a page; the line spacing to use; and the number of characters for a tab marker to represent. The defaults for these settings are shown in figure 2.7. To specify a setting, highlight the appropriate option and then type the value.

The options in the Header section of the dialog box enable you to choose the kind of header that appears on the printed page. The **K**ind of Header options include None, Single-Line (default), and Two-Line. You can print the heading in boldface type by choosing the Bold **H**eaders check box, which is checked by default.

With the Output **D**estination option, you can direct the output of the printer to a particular port. By default, the setting is PRN, but you can

choose LPT1, LPT2, LPT3, COM1, COM2, COM3, COM4, or Disk File. The Disk File option sends the printout to a file on your disk, rather than to the printer. The LPT options are for parallel (line printer) ports, and the COM options are for serial (communications) ports. Choose the port to which your printer is attached.

In the **D**ata Format area of the Printer Settings dialog box, you can specify the type of format to be used when printing to the printer. The following three options are available:

Option	Description
ASCII	Tells the program you are printing ASCII files
WordStar	Tells the program you are printing files formatted as a WordStar word processing file
EBCDIC	Refers to a mainframe format type that is different from the PC ASCII standard

The Orientation drop-down list box, which is available for some printers, contains options to choose Portrait (upright) orientation or Landscape (sideways) orientation.

After you set all printer options, choose **OK** to lock in the information. When you return to the Configure Printer dialog box, the name of the printer you added appears on the menu. If you choose **C**ancel, you return to the Configure Printer dialog box, canceling all printer changes.

Editing Printer Information

If something about your printer has changed, such as the output destination, you can edit the printer settings for that printer. In the Co**n**figuration Files list box in the Configure Printer dialog box, highlight the name of the printer you want to edit and then choose **E**dit.

The Printer Settings dialog box appears. This dialog box contains the information for the selected printer (refer to fig. 2.7). Edit the information in the dialog box, using the procedures described in the preceding section.

Renaming or Deleting a Printer

To rename one of the printer selections, highlight the name in the Co**n**figuration Files list box in the Configure Printer dialog box. Then choose **R**ename. Type the new name at the prompt and choose **OK** to lock in the new name.

If you no longer have access to a printer, you can remove it from the printer list. To delete a printer from the Configure Printer dialog box, highlight the name of the printer you want to omit. Then choose **D**elete. The printer name is removed from the printer list.

Setting Startup Program Options

Each time your computer is turned on or rebooted, you must initialize several of the Norton Utilities programs that are designed to protect the information on your computer (such as Image or SmartCan). The purpose of the **S**tartup Programs option on the **C**onfiguration menu is to allow you to choose which Norton programs you want to place in your computer's startup file (AUTOEXEC.BAT). If a program is in the startup file, the program executes every time you turn on your computer or reboot. When you choose the **S**tartup Programs option, the Startup Programs dialog box appears (see fig. 2.8).

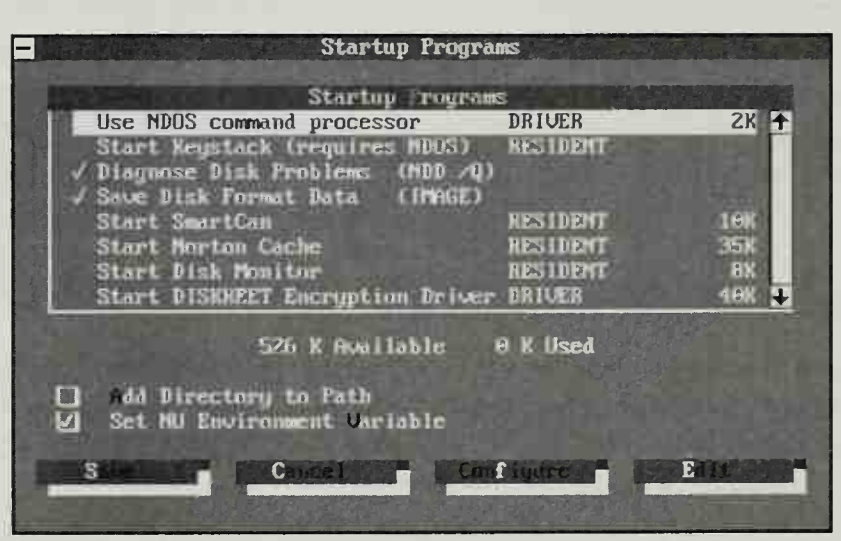


Fig. 2.8
The Startup Programs dialog box.

The options in the dialog box refer to Norton Utilities programs. (All of these programs are described in detail later in this book.) Each option in the dialog box and the chapter that covers the program for that option are listed in the following table:

Option	Description
Use NDOS Command Processor	Installs the NDOS command processor (see Chapter 28).
Start Keystack (requires NDOS)	Installs the NDOS Keystack program, which is used to create keystroke macros for DOS programs (see Chapter 28).
Diagnose Disk Problems (NDD/Q)	Installs the Norton Disk Doctor (NDD) in quick mode. This program provides a quick check for problems related to your disk drive (see Chapter 12).
Save Disk Format Data (IMAGE)	Installs the Image program, which saves a "snapshot" of your disk's system and directory areas. Use this snapshot to repair or unformat your disk (see Chapter 4).
Start SmartCan	Installs the SmartCan program, which protects deleted files from being overwritten. This program allows you to undelete more reliably any recently erased files (see Chapter 5).
Start Norton Cache	Installs the Norton Cache2 program, which gives you faster disk access (see Chapter 21).
Start Disk Monitor	Installs the Disk Monitor program, which provides you with an on-screen disk light and disk protection (see Chapter 6).
Start DISKREET Encryption Driver	Installs the Diskreet program, which provides a file encryption procedure to secure confidential files (see Chapter 7).

To choose a startup program, highlight the program and then press the space bar to select it. When a program is selected, a check mark appears to the left of the name (refer to fig. 2.8).

Several of the programs are *memory resident*, which means that they take up some of your computer's RAM (random-access memory) when loaded. To the right of the option name is the word DRIVER or RESIDENT. If no word is listed, the command is a program that is loaded (for example, NDD), performs a function, and is then released from

memory. A *driver*, however, is a set of instructions that remains on disk until needed by a program. A *resident program* (short for *terminate-and-stay-resident* or *TSR*) is loaded into RAM and remains there until you turn off the computer or until the program is unloaded. An option that is resident also displays a number indicating the program's memory requirement. For example, the SmartCan program requires 10K (10 kilobytes) of RAM. Below the Startup **P**rograms list box is a line indicating the current amount of memory on your computer (526K in fig. 2.8) and the amount of memory that will be used by the selected resident programs (0K in fig. 2.8). When you select a resident program from the list, the K Used item indicates the total amount of memory required to run the selected program.

> **CAUTION:** If you frequently run programs that require a large amount of memory, using resident programs may cause your application program to be unable to run. You must be careful not to choose so many resident programs that your other programs cannot function.

NOTE Many TSR programs are on the market. The amount of memory reported in the Startup Programs dialog box is only the amount of RAM that will be taken up by the Norton programs you have selected. If you are using other TSR programs, you must also add their memory requirements to find out the total amount of RAM used for your memory-resident programs.

After you have selected the programs you want installed at startup (and deselected the programs you don't want), choose the **S**ave button to place the required commands in your AUTOEXEC.BAT or CONFIG.SYS file. Depending on what option you have chosen, you may be prompted to enter additional information:

Program	Information Needed
Diagnose Disk Problems (NDD/Q)	Specify the appropriate disk drive
Save Disk Format Data (IMAGE)	Specify the appropriate disk drive
Start Norton Cache	Specify various options (see Chapter 21 for details)
Start Disk Monitor	Specify whether you want to monitor disk access or display disk light (or both)

NOTE If you choose to include the Norton Cache program, any current cache program in your AUTOEXEC.BAT or CONFIG.SYS file will be disabled.

You do not have to choose the **S**ave option in order to enter the information needed by a startup program. Instead, you can highlight the program option and then choose the Configure button. If additional information is needed, the appropriate dialog boxes appear.

To leave the Startup Programs dialog box without making any changes, choose **C**ancel.

If you choose the **E**dit option in the Startup Programs dialog box, you are able to edit manually your AUTOEXEC.BAT and CONFIG.SYS programs. Use this option only if you are familiar with the contents of these files and are comfortable editing this information.

If you check the **A**dd Directory to Path check box in the Startup Programs dialog box, the path to your Norton program is added to your PATH statement in your AUTOEXEC.BAT file. Usually, this addition was made when you ran the installation procedure.

You use the Set NU Environment **V**ariable check box to place a SET command in your AUTOEXEC.BAT file that allows DOS to find NU (Norton Utilities) files even when you are not running Norton programs from the Norton directory.

Selecting Alternate Names

The Alternate Names option in the Configuration menu displays the Alternate Program Names dialog box. In this dialog box, you can choose between two names for several Norton programs: a longer name and an abbreviated name (see fig. 2.9). If you have used Norton Utilities for a number of years, you may be more comfortable with the original short names (such as SI instead of SYSINFO). The length of the name, however, does not affect the way the program runs. You may prefer the short name for a program because it saves keystrokes, or the long name because it is easier to remember.

Here are the options in the Alternate Program Names dialog box:

Option/Program	Long Name	Short Name
Disk Editor	DISKEDIT	DE
File Find	FILEFIND	FF

continues

Option/Program	Long Name	Short Name
Safe Format	SFORMAT	SF or FORMAT
System Information	SYSINFO	SI
Disk Duplication	DUPDISK	DD or DISKCOPY
Speed Disk	SPEEDISK	SD

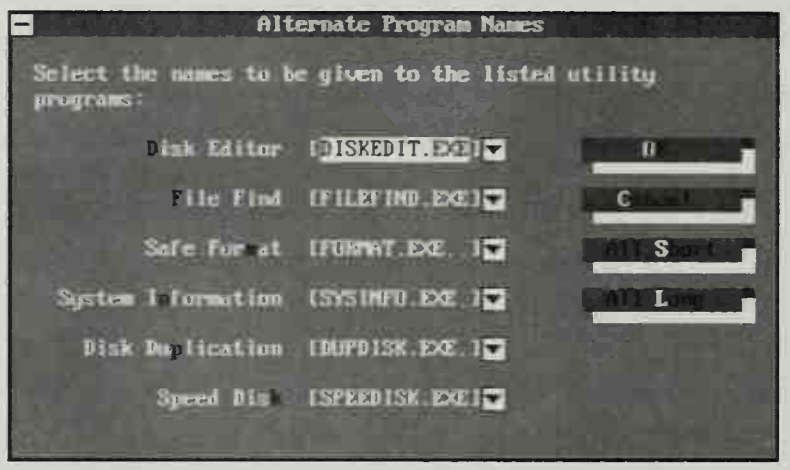


Fig. 2.9
The Alternate Program Names dialog box.

If you substitute FORMAT for SFORMAT or DISKCOPY for DUPDISK, when you execute a FORMAT or DISKCOPY command in the Norton Utilities directory, DOS uses the Norton Utilities versions of those commands. In other words, executing the FORMAT command runs a Safe Format operation instead of a DOS FORMAT operation.

The lists for each program are contained in the drop-down list boxes. You can choose names one at a time, or you can choose the All **S**hort button to make all the names short. Choose All **L**ong if you want all the names to be the original long names. When you have specified the names you want to use, choose **O**K to lock in your choices. If you want to exit the dialog box and cancel any changes you have made, choose **C**ancel.

Setting Passwords

Norton Utilities enables you to place password protection on several Norton programs to prevent their unauthorized use. When you choose the **P**asswords option from the **C**onfiguration menu, you can then specify or remove the password for any of the following programs (see fig. 2.10):

Calibrate
Disk Editor
Disk Tools
File Fix
Norton Disk Doctor
Diagnostics
Configuration
Safe Format
Speed Disk
UnErase
UnFormat
Wipe Information

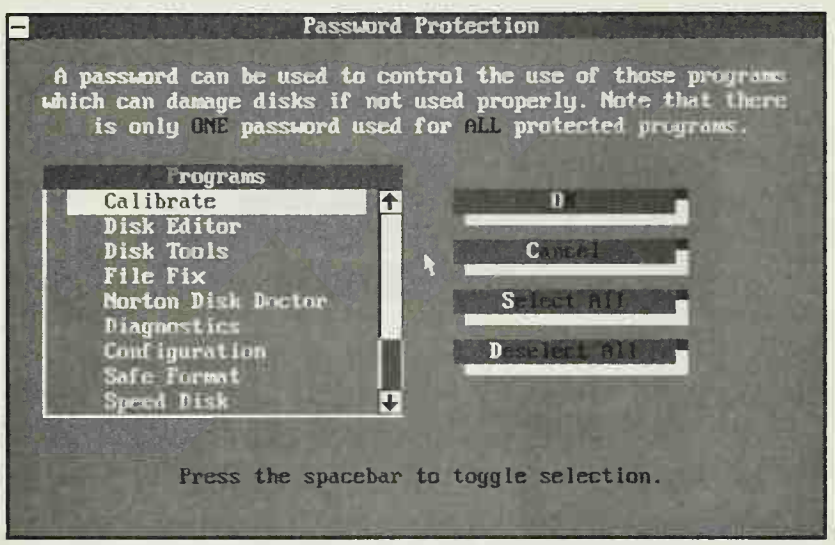


Fig. 2.10
The Password Protection dialog box.

To specify that a program is to be password-protected, highlight the command name and press the space bar, or double-click the command name to turn a check mark on or off to the left of the command name. When you have checked all programs you want to protect, press Enter or choose **O**K. To protect all programs in the list, choose **S**elect All. To remove protection from all programs, choose **D**eselect All. Finally, to exit the dialog box without changing any of the settings, choose **C**ancel.

The password you specify applies to all programs you choose to password-protect. After you choose the programs to be protected and specify a password, you are able to run those programs only after entering the password. When you set the password, you must enter it a second time as a verification.

CAUTION: Do not forget the password. You cannot run the protected program without it.

To set a new password, follow these steps:

1. In the Password Protection dialog box, select the programs for which you want to specify or change the password. (Remember that one password applies to all selected programs.) A check mark appears beside each selected program.
2. Choose **O**K or press **E**nter. The Password dialog box appears with the **N**ew Password text box highlighted (see fig. 2.11).

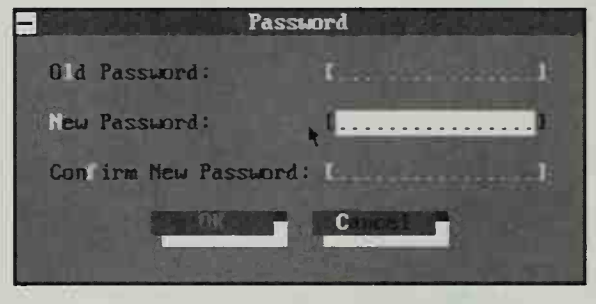


Fig. 2.11
The Password dialog box.

3. Type a password (up to 15 characters) in the **N**ew Password text box. Norton displays asterisks, rather than characters, as you type the password.

   After you finish typing the password, press Enter. The highlight moves to the Con**f**irm New Password text box.

4. In the Con**f**irm New Password text box, retype the password and press Enter. This step verifies the password.

   The password you type must be the same in both the **N**ew Password and the Con**f**irm New Password text boxes. When the passwords are identical, the **O**K button becomes active. Until the passwords match, the **O**K button is inactive, and the **C**ancel button is active. If you press Enter and the passwords don't match, Norton displays a dialog box with an error message and prompts you to retype the confirmation password.

5. Choose **O**K or press Enter.

To change the existing password to a new password, choose the **P**asswords option from the **C**onfiguration menu. Norton displays a dialog box that prompts you to enter the existing password.

NOTE If you press Enter or choose **OK** in this dialog box, the program just beeps. If you type the password incorrectly, the program displays an error box with the message `Incorrect`. From this message box, you return to the Norton main screen. Then you must enter the password correctly to continue with this procedure.

After you enter the password correctly, the Configure Password dialog box appears with the Old Password text box highlighted. Type the old password and press Enter. Then proceed as if you were entering a new password (see the preceding steps). To remove the password, press Enter in the New Password text box. The program prompts you to confirm that you want to remove the password.

For another method of removing the password, follow these steps in the Password Protection dialog box:

1. Deselect checked programs that you want to remove from password protection. Highlight the name and press the space bar, or double-click the name with the mouse pointer.
2. Choose **OK**.

Choosing Menu Editing

The **M**enu Editing option in the **C**onfiguration menu displays the Norton Menu Editing dialog box. In this dialog box, you can enable or disable the editing of the Norton menu (see fig. 2.12). Normally, you can add, delete, or change the contents of the Norton main menu. If you are not careful, however, you can alter the menu so that you can no longer access Norton programs from it. To prevent the menu from being changed, choose the **D**isable Editing option. To restore the default setting, choose **E**nable Editing.

Using the NUCONFIG Command

The previous sections describe how to use the configuration options from the **C**onfiguration menu in the Norton main screen. However, you do not have to be in the Norton main screen to set these configuration options. You can enter the NUCONFIG command at the DOS prompt, enabling you to choose Norton configuration options without having to go through the NORTON main screen.

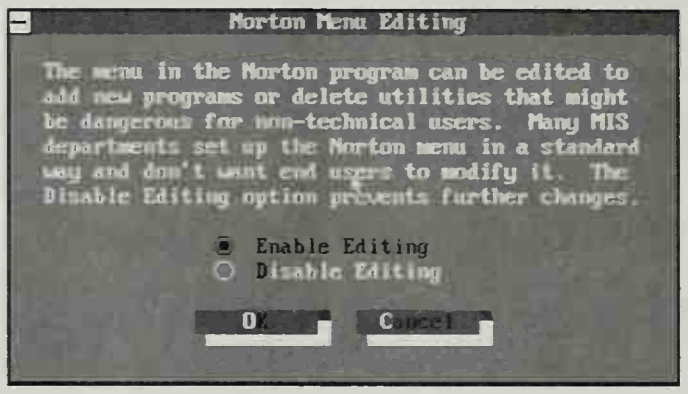


Fig. 2.12
The Norton Menu Editing dialog box.

At the DOS prompt, just enter the command **NUCONFIG**. The Configure Norton Utilities menu is displayed (see fig. 2.13). This menu contains the same options as the **C**onfiguration pull-down menu. To choose one of the options from the Configure Norton Utilities menu, press Alt plus the hot key for the appropriate menu item. You can also point to the menu item with the mouse pointer and click. To exit the menu, choose **Q**uit.

NOTE When you choose options from the Configure Norton Utilities menu, the dialog boxes for those options are exactly the same as the dialog boxes you access with the **C**onfiguration menu in the Norton main screen.

NOTE You also can access the Configure Norton Utilities menu from the Norton main screen. Choose Configuration from the Commands list.

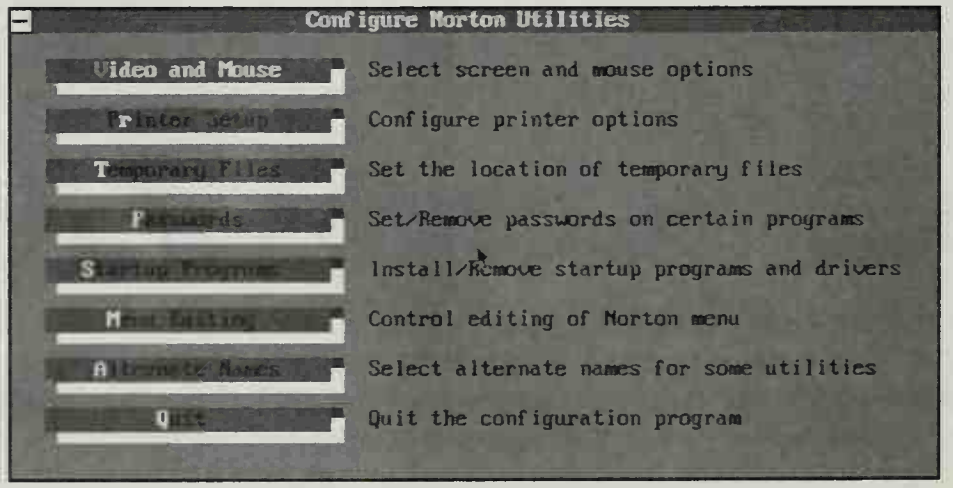


Fig. 2.13
The Configure Norton Utilities menu.

Summary

Norton Utilities 7 is an extremely flexible program. You can specify a number of options by using the Configuration menu in the Norton main screen or the NUCONFIG command from the DOS prompt. If you don't like an option you have chosen, you can access the option again and change it to your liking. This chapter described all the configuration options, giving you an idea of which ones you might use in customizing the Norton Utilities programs for your needs.

In the next chapter, you learn some basic information about how disks work. An understanding of this process is essential to using Norton Utilities with your computer.

CHAPTER 3

Understanding How Disks Work

When you drive your car, you can certainly do it without knowing where the carburetor is located. A little knowledge about your car, though, might help you notice and understand the noises and grinds your car develops. You can then take the car to a mechanic before something really goes wrong.

Norton Utilities enables you to perform a number of preventive, diagnostic, and corrective procedures on disks, and you don't even have to know all the ins and outs of how disks work. However, when you understand more about how disks work, you will be able to understand better how problems can arise, the symptoms of potential problems, and the terms used by DOS and Norton when they diagnose and fix problems associated with your disk. This chapter provides an overview of how disks work. It introduces you to terms you will see over and over again, such as *sectors*, *clusters*, and *tracks*. If you already understand how disks work and are comfortable with computing terms, you may want to skip this chapter.

Disks lose information in two basic ways: physical loss and logical loss. *Physical damage* to a floppy disk can result from spilled coffee, a bent disk, a disk left in a car on a hot day, or any number of other misuses. You should always store a floppy disk in its protective envelope and never expose the disk to heat, dust, or liquids. A hard disk can sustain physical damage if you move or bump the computer while it is operating. Even if you drop it only an inch, you can damage the hard disk.

Logical damage to a disk occurs when DOS loses information about where data is stored—that is, DOS "forgets" where a file is located. The data on a disk that is stored as a magnetic image can also weaken just by the process of aging, until that data is difficult or impossible to read. Logical data loss can result also from accidental deletion of files or accidental formatting of the disk, from sudden loss of power, or from a problem caused by a bug in a computer program (including bugs in DOS itself).

Usually, only a technician can repair physical damage to a disk or disk drive—and the technician may not always succeed. With Norton Utilities, you may be able to fix damage relating to logical problems, magnetic weaknesses, or accidental erasure or formatting of the disk.

Your goal, however, should be to safeguard your data on disk from the beginning. In fact, the adage "A stitch in time saves nine" is relevant. A little prevention now can save you much time later. Understanding how DOS manages the information on disk can give you a better understanding of what is happening in your computer, and you will be better prepared to protect the information on your computer by using Norton Utilities.

This chapter covers the fundamentals of data storage and should be sufficient knowledge for using competently most of the programs in the Norton arsenal. Additional information about data storage is covered in the discussions of Manual UnErase and Disk Editor in Chapters 16 and 17, respectively.

How Memory Works

Computers have a *binary* memory pattern. That is, the computer's memory consists of 0s (zeros) and 1s (ones). Each 0 or 1 in the computer's memory is called a *bit*. Information in the computer's RAM (random-access memory) is stored on this chip as an on or off signal; the on signal is 1, and the off signal is 0. Each RAM chip stores thousands of these 0s and 1s. When you create a word processing document, for example, RAM stores the entire document as a series of 0s

and 1s. You don't really see the 0s and 1s when you use the word processor because the computer interprets the patterns of 0s and 1s into information we can read. For example, the pattern 01000001 is the uppercase A.

To store computer information, therefore, you must have a way to store these 0s and 1s. Early computers used *punch cards*. A hole punched in the card was interpreted as a 1; no hole meant 0. Today, the popular way to store computer information is on magnetic media.

You may recall from elementary school when your science teacher placed some steel shavings on a sheet of paper and put a magnet under the paper. The shavings all pointed in one direction or another, according to the poles of the magnet. Recording media—such as that on a cassette tape, a VCR tape, or a floppy disk—is covered with a coat of iron oxide, which reacts to magnetism in a way similar to those steel shavings. On a cassette recorder, the recording head is an electric magnet that magnetizes the iron oxide on the tape as the tape goes by. The stronger the signal, the more the iron oxide reacts.

To store computer information on magnetic media, only two signals are needed: one strong and one weak. The computer interprets a strong magnetic signal as a 1 and a weak signal as a 0. Thus, a pattern of 1s and 0s can be written to and then read from magnetic media.

A computer disk is sort of a cross between a record and a cassette tape. Information on the disk is stored on magnetic tracks, which work like the magnetic coating on a cassette tape and the grooves on a record, except that you cannot see the tracks.

The magnetic media is coated on the top and bottom of floppy and hard disks. A small head similar to the recording head on a tape recorder rides just above the surface of the disk. This head places magnetic signals on the disk (patterns of 0s and 1s) and reads them back. The work of reading and writing to disk, however, is not done haphazardly but is a precise bit of mechanical and software engineering.

How Floppy and Hard Disks Evolved

Disk media has improved over time. When the IBM PC first appeared, the disk drive had a read/write head for only one side of the floppy disk. Thus, the only disk media was a single-sided floppy disk.

Shortly afterward, double-sided disks appeared in which the drive had a read/write head on both sides of the disk. This improvement to the drive was relatively straightforward. No new housing or motor was needed. The addition of a second head and some electronics doubled the disk's storage capacity.

Most improvements to disk storage have involved the storing of more information with great precision. The mechanical and electrical improvements have given disks this capability, and DOS has responded with the capability to handle the added capacity.

One problem in reading and writing data to a floppy disk is dust particles. Dust in the air can get on the disk, make the disk "dirty" (even though we cannot see the dirt), and limit the precision (smallness) of the information storage area on the disk. Another problem with floppy disks is that they are just that—floppy. (Even though 3 1/2-inch disks have a hard plastic cover, the actual disk inside the housing is "floppy.") When they spin around in the disk drive, some up-and-down movement occurs. Because of this movement, keeping the read/write head close enough to work but not close enough to scratch the surface of the disk is difficult. In fact, some floppy disks wear out because of contact with the read/write head.

Hard disks are housed in a dust-free compartment, and the magnetic media is coated onto a hard metal platter. These factors solved many of the problems of dust and movement associated with floppy disk drives, as well as the problem of not having enough room on a disk to store information. In summary, the hard disk has three important advantages:

- The hard disk has a greater storage capacity than the floppy disk.
- The hard disk is housed in a dust-free compartment, so dust is not a problem.
- The magnetic media is coated on a hard platter (hence the name *hard disk*), so there is less up-and-down movement as the disk turns.

These improvements enable the read/write head to be placed closer to the disk, to read and write with more precision, and to rotate faster, enabling data to be stored and retrieved more quickly than on a floppy disk.

How Disks Are Organized

A formatted floppy or hard disk contains specific areas on the disk where data is stored. Each disk contains a number of circular areas

called *tracks*. A standard 360K floppy disk (double-sided/double-density) has 40 tracks, numbered 0 to 39. The 1.2M 5 1/4-inch disks, the 720K 3 1/2-inch disks, and the 1.44M high-density disks all use 80 tracks. Each track consists of a number of pieces called *sectors*. On a 360K disk, each track has 9 sectors, numbered 1 through 9. Figure 3.1 illustrates the tracks and sectors on a typical 360K disk.

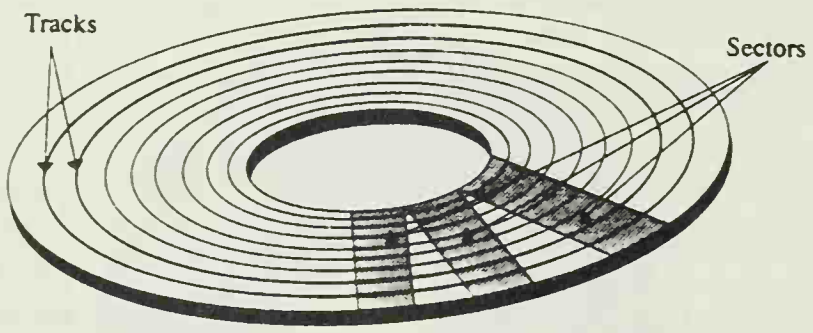


Fig. 3.1
A disk's tracks and sectors.

A pair of matching tracks, one on the top of the disk and the other on the bottom of the disk, is called a *cylinder*. Each track on a disk is divided into a number of sectors, and each sector holds 512 bytes of information. A *byte* is eight 0 and 1 signals. As noted earlier, each 0 or 1 signal is called a *bit*. Usually, each character stored on disk requires one byte of space. Thus, a byte often is referred to as one character of information. (The byte 01000011 is the character C.)

Although it may seem complicated at first, using this relationship for sides, tracks, clusters, sectors, bytes, and bits, DOS can keep track of the information on the disk. The next few sections explain in more detail how these pieces come together on the disk to make information storage possible.

Tracks

Tracks are concentric rings encoded onto a disk during the formatting process to which data can be written or from which data can be read. Floppy disks usually contain 40 or 80 tracks on each side, and hard disks contain from 100 to more than 1,000 tracks on each side. When the disk drive is manufactured, it is designed so that the reading and writing heads can move in and out across the surface of the disk as it rotates. The head assembly can stop at given places along the path of movement, and as the disk rotates under the head, it reads or writes information to the disk.

Each head assembly is designed so that the head stops at predetermined places on the disk. For example, a 360K 5 1/4-inch disk is designed to permit only 40 stopping points (tracks). These 40 stopping points are numbered from 0 to 39, as illustrated in figure 3.2. The track at the outer portion of the disk's recording area is assigned the number 0, and the track nearest the center of the disk is track number 39.

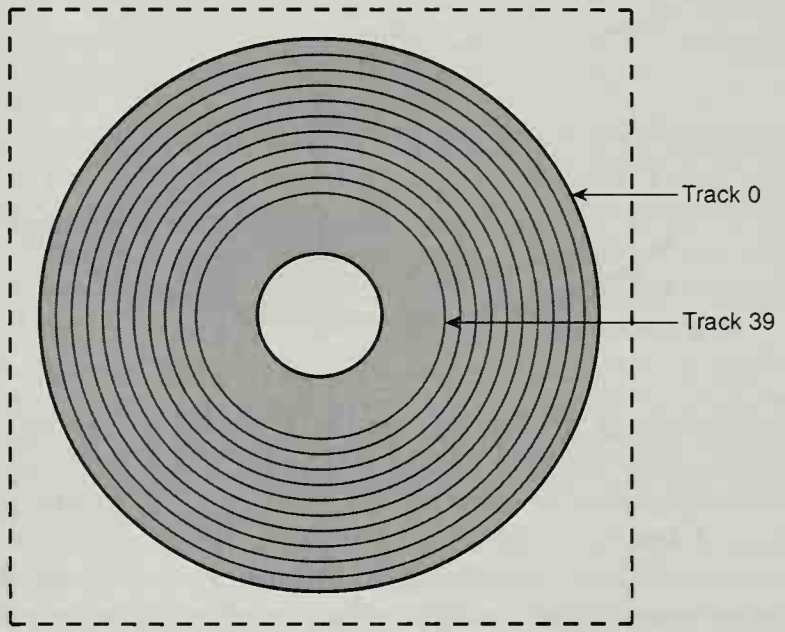


Fig. 3.2
Tracks on a 360K 5 1/4-inch disk.

These tracks are circular, concentric, and not connected in any way. A disk is not like a phonograph record, which has a single, spiraling groove. In a disk, the tracks are perfectly circular and do not touch each other.

NOTE Data can sometimes become unreadable on a disk if the read/write head on the disk drive becomes misaligned. This prevents the head from riding directly over the track where the data on the disk resides. When this occurs, it is a physical problem that must be corrected by a hardware technician. It is not generally correctable by a user.

Cylinders

A *cylinder* is a set of tracks that occupies one head position. A standard floppy disk drive has two heads: one head reads and writes to the top of the disk, and the other head reads and writes to the bottom. A hard

disk may have 2, 4, 8, or more heads. Each head is mounted on the same movement mechanism known as an *actuator*. The head actuator can move the heads to any given track position for reading and writing.

NOTE

The "seek" test performed by the Norton program System Info graphically shows the actuator moving in and out between tracks on the disk as it performs a speed test to determine how fast data can be written and read from the disk (see Chapter 18). The term *seek time* is the amount of time it takes for the disk head to move to the proper track (cylinder) that you want the disk head to read. *Average access time* is a measure of time (based on an average of seeks) that it takes to move the head to the position on disk where you want to read.

This multiple-head movement can cause confusion about the term *track*; track 35, for example, exists on the top as well as the bottom of a floppy disk. On a floppy disk, the term *cylinder* describes both tracks at a given position on the top and bottom of the disk. For example, cylinder 25 refers to the top and bottom surface at the 26th position from the outside of the disk. Thus, instead of discussing two track numbers 25, you can discuss the single cylinder 25 (and mean the same thing). On a hard disk, cylinder 25 refers to position 26 for all heads on the actuator.

On a floppy disk, the bottom track of the disk is called side 0, and the top track is called side 1. Cylinder 1 consists of both track 1, side 0 and track 1, side 1. Some hard disks have more than one platter, or disk. When two disks are included (as on a hard disk), the sides are numbered 0 and 1 on the first disk, and 2 and 3 on the second disk. The set of four matching tracks on the two disks is the cylinder.

Sectors

A *sector* is a portion of one of the concentric tracks on a disk. A disk's track is too large to be managed as a single piece of information. Therefore, each track is divided into a number of sectors. These sectors can be described as slices of a track. Different types of disks and disk drives split a track into different numbers of sectors. Floppy disk formats, for example, currently use between 8 and 18 sectors per track. Hard disks store data at a higher density and can use between 17 and 64 sectors per track. Sectors created by standard formatting procedures always have a 512-byte capacity. Figure 3.1, shown earlier, shows how a track is divided into sectors.

Sectors are numbered beginning with 1, unlike tracks or cylinders, which begin with 0. A 1.2M floppy disk, for example, contains 80 cylinders numbered from 0 to 79, and each track on each cylinder has 15 sectors numbered from 1 to 15.

Sectors are numbered sequentially (1 through 15) on floppy disks. On hard disks, however, sectors are often interleaved. *Interleaved* sectors are not numbered sequentially but in some intertwining manner. The interleaving is usually required because the disk spins so fast that after reading one sector, the disk controller is not yet ready to read the next sector that immediately follows. Thus, the next sector to be read is spaced several sectors away so that the controller can catch up.

NOTE The Norton utility called Calibrate can reset a hard disk's interleave to maximize the hard disk's access time (see Chapter 20).

When a disk is formatted, additional areas are created on the disk so that the disk controller can number sectors and identify the beginning and end of each sector. These areas precede and trail each sector's data area. This process accounts for some discrepancy in the differences between a disk's unformatted capacity and its formatted capacity. For example, an unformatted 2M 3 1/2-inch disk has a formatted capacity of only 1.44M. The "lost" space is used mostly for sector record keeping. Thus, although each sector stores 512K of data, the sector actually takes up 571K on the disk. To visualize how this works, examine the illustration in figure 3.3.

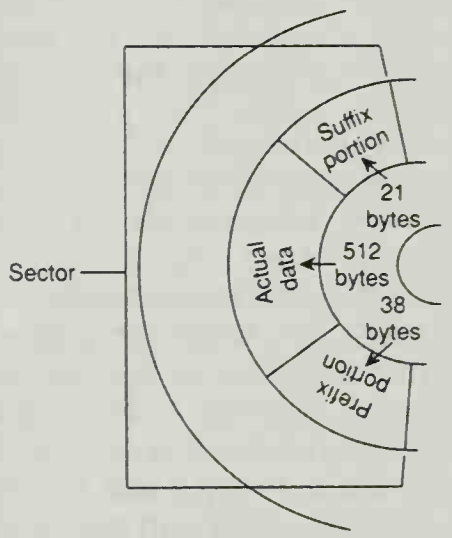


Fig. 3.3
Divisions of a sector.

You can think of a sector as being a book. The contents of the book are in the middle, but there is a table of contents at the beginning of the book and an index at the end of the book. When a disk is formatted, sectors are laid out on the magnetic media in this way. When information is written to a file (which uses the sector), data is written to the data portion of the sector. The information before and after the data in the sector is not altered. This information contains the sector number and a checksum code, which is a number used to check the integrity of the sector.

Clusters

A *cluster* is the amount of space that the disk can read or write at one time. This usually consists of several sectors. Thus, a cluster is a collection of two or more sectors. Although the disk is divided into sectors (usually 512 bytes each), keeping track of each sector is often too much overhead for the disk, so DOS often reads and writes multisector units (clusters) at a time. The number of sectors taken by disks are summarized in table 3.1.

Table 3.1 Cluster Sizes

Disk Size	Disk Type	Number of Sectors	Cluster Size
160K	5 1/4" single-sided/single-density	1	512K
180K	5 1/4" single-sided/double-density	1	512K
320K	5 1/4" double-sided/single-density	2	1024K
360K	5 1/4" double-sided/double-density	2	1024K
720K	3 1/2" double-sided/double-density	2	1024K
1.2M	5 1/4" high-density	1	512K
1.44M	3 1/2" high-density	1	512K
10M	Hard disk	8	4096K
Most other hard disks	Hard disk	4	2048K

Note: If a 20M or greater hard disk is formatted under DOS 2.x, the cluster size is 8,192 (16 sectors).

A file is stored in one or more clusters. Thus, if a cluster is 1024K, then even the smallest file will take up at least 1024K of disk space. (Even though a directory listing may say that the file is smaller, it still takes a minimum of a cluster to store.) For more information about how files and clusters are related, see the section "The File Allocation Table (FAT)" later in this chapter.

Because many files are longer than one cluster, portions of the file must be stored on a number of clusters. Often, these clusters are not stored on disk one after the other, but may be scattered all over the disk. How is all of this information managed? Keeping the information about where files are stored is one of the primary jobs of the Disk Operating System (DOS).

How DOS Manages Data

When a disk is formatted, the disk is divided into two major areas called the system area and the data area. Each area has a role to play in storing and managing the data on the disk.

The *system area* contains the boot record, the file allocation table (FAT), and the root directory. The system area is stored on track 0, the outermost track of the disk. Whenever DOS needs to know information about the files stored on a disk, DOS reads this information from the system area of the disk. When you enter a DIR command, for example, DOS first looks at the directory to get information on the files and displays this information on-screen. Every formatted disk contains a system area.

The *data area*, where the actual information in files is stored, immediately follows the system information on disk. The system area controls the contents of this data area. DOS references the information in the system area when it needs to know where to read and write the data.

The Boot Record

DOS reserves as the DOS boot record the first sector of the first track (track 0) of a disk. The *boot record* contains characteristics about the disk, such as the DOS version used to format the disk, the number of bytes per sector on disk, the number of heads, and other information. The boot record is written to every formatted disk, even if the disk does not have booting capabilities. When a computer is booted, it looks at the boot record of the startup disk (usually disk A: or C:). If the disk

is a bootable disk, this record gives the computer information on where to find the startup system information. When you access a disk in a disk drive (such as doing a directory listing on a floppy disk in drive A), DOS first looks at the boot record to determine what kind of disk is being accessed. This information tells DOS how to access file information for the disk.

The File Allocation Table (FAT)

The *file allocation table (FAT)* contains information about the status of each sector on the disk. The FAT tells DOS which clusters on the disk are in use, contain files, are available for use, or are bad and should not be used. When you must write a file to disk, DOS consults the FAT to find out where to store the information. If a file is large and cannot fit in one contiguous space on disk, DOS uses the FAT to find the next available space. If DOS cannot store a file in contiguous clusters, the result is a *fragmented file*—a file that is stored in pieces on disk.

Furthermore, because the FAT deals in clusters, a file may be allocated to a cluster that is not fully used. For example, if a cluster is 1,024 bytes, and a 200-byte file is stored, 824 bytes of unused space remain in the cluster. This space cannot be used by other files at the same time, so this area of disk space within this cluster is "wasted." This unused disk space is called *slack*. (You can determine the amount of slack on disk by using the Norton File Size utility, discussed in Chapter 26.)

Cluster sizes differ, so the slack space for a particular file on a floppy disk may be different from the slack for the same file on a hard disk. Although a floppy disk may have a 1,024-byte cluster, many hard disks have 2,048-byte clusters. The same 200-byte file has a slack space of 1,848 bytes on such a hard disk.

Slack space is of particular interest when you are protecting information on disk. If a cluster was previously used for a top secret file and is now only partially used to store a current file, the slack space may contain secret information that could be read with a program like Norton Disk Editor, discussed in Chapter 17. The Norton WipeInfo program, discussed in Chapter 8, gives you a way to erase the slack space on a disk to prevent these leftover pieces of files from being read or recovered.

Another consideration of slack space occurs when you have a bad sector that must be fixed. For example, when you run the Norton Disk Doctor (see Chapter 12), it may find a bad sector on disk. However, even though part of the cluster is bad, the file might be completely recovered if it is contained in a good portion of the cluster and if the

bad sector is in the slack space. When NDD finds a bad sector, it will attempt to copy the data from the associated cluster to a different unused cluster; and NDD may be able to make the file usable again if the data from the file can be recovered from the good portion of the cluster.

The Root Directory

The third part of the system information on disk is the *root directory*—the main directory (\) on any formatted disk. This disk space is allocated for storing information about the root directory's files. Subdirectories have their own areas where file information is stored. Subdirectories, like files, can be stored in the data area in no particular location. Table 3.2 shows the information that a directory reports for each file the directory contains.

Table 3.2 File Information Stored in the Root Directory

Item	Size in bytes	Stored As
File name	8	ASCII characters
Extension	3	ASCII characters
Attributes	1	Bit values
Time	2	Coded time
Date	2	Coded date
Starting FAT entry	2	Word (a binary coded number)
File size	4	Long integer (size in bytes)

NOTE The root directory reserves 10 bytes for future use in case something else about a file must be stored.

Notice that the file name size is eight characters—the maximum length for a file name. The extension is allocated three characters. Attributes include read-only, archive, hidden, and system. (You can control the attributes with Norton File Find, discussed in Chapters 9 and 25.) The starting FAT entry tells DOS where to look in the FAT to find where the file is stored on disk. The date and time entries tell DOS when this file was last changed, and the file size entry tells DOS how much space the file takes in bytes. The information in the Stored As column of table 3.2 specifies the method used to store this information.

How Files Are Erased

When you store a file on disk, the information that the file contains is written to the disk's data area. The root directory (or a similar subdirectory) and the FAT store the information about where the file data is. When you erase a file with the DOS ERASE or DEL command, the first character of the entry in the directory that contains the file name is replaced with the ASCII sigma character number 229 (σ), the lowercase Greek letter sigma, and related entries in the FAT are zeroed out. DOS does not overwrite (unless you use WipeInfo, as explained in Chapters 4 and 8) or remove the information from the file. The ASCII character number 229 that DOS adds to the erased file's directory tells DOS that the file and the space the file occupied are now free to be used by other files.

If, for example, you erase a file named MYFILE, the "erased" name becomes σYFILE in the DOS directory. The erased name does not appear when you use the DIR command, but you can view the name with the Norton UnErase utility.

Because the ERASE and DEL commands do not touch the real information in the file, you may be able to recover an erased file if you have written no other files (or few files) to disk since erasing the file. The rest of this chapter discusses ways to recover files.

How Disks Are Formatted

The formatting process prepares disks to store information. The earlier portion of the chapter describes the specific areas of the disk—the system area, the data area, and how DOS manages data on a formatted disk. This section describes the process of formatting a new disk and reformatting a disk that already contains information.

Actually, there are two ways to format a disk: a physical format (also called low-level format) and a logical format (called high-level format). A low-level format divides the disk's tracks into a specific number of sectors. The sector header and trailer information is recorded, as well as other information. Each sector is filled with a 512-byte dummy value, usually the value F6 (in hexadecimal).

A high-level format places the disk structure needed by DOS for managing files and data. During this process, DOS places on the disk a volume boot sector, a file allocation table (FAT), and a root directory. DOS also checks the disk for integrity. Thus, to prepare a disk to hold data, both

types of formatting (low and high) must be performed. For a new, out-of-the-box floppy disk, DOS FORMAT (or Norton Safe Format) will perform both kinds of formatting at the same time—what is usually called formatting a disk. For a hard disk, the low-level format is a separate procedure (and usually not performed by the casual user). When a hard disk is formatted with DOS FORMAT or Norton Safe Format, a high-level format is performed. For a hard disk, an additional procedure is performed after the low-level format and before the high-level format (using the DOS FDISK command) to prepare a disk. This procedure is called *partitioning*.

The way a disk is formatted is important for data recovery. Because there are different kinds of formatting, and because floppy and hard disk formatting can be quite different, it is important to understand what is happening when you format a disk. The next two sections explain how the formatting process works for floppy disks and hard disks, and discusses how differences in formatting affect data recovery.

Formatting a Floppy Disk

The FORMAT command in early versions of DOS (before DOS 5.0) formats a floppy disk with both low- and high-level formats simultaneously. This means that when you format a disk, the sector information is reset to a dummy value (usually F6 in hexadecimal). When a floppy disk is formatted in this way, you cannot recover any information from the disk with an unformatting technique.

Beginning with DOS 5.0, DOS's default format for a floppy disk is a high-level format, enabling you to recover from the format, if needed. To perform a format that includes both low- and high-level formats, you can use the DOS FORMAT command with the /U (unconditional) switch.

Norton Utilities allows you to format a floppy disk with the Safe Format procedure. When you use this, a high-level format is performed on the floppy disk, and recovery information is stored on the disk. Because the data in the sectors is not overwritten in a high-level format, you may be able to recover the information from the disk by unformatting it with Norton UnFormat (see Chapter 11). Norton's Safe Format also allows two other format options. The Quick Format option, like the safe (high-level format) option, places new system information on the disk but does not perform byte-by-byte integrity testing. Therefore, Quick Format is much quicker than the normal format procedure. The Safe Format DOS option causes the disk to be formatted with the standard DOS-type format used in versions of DOS before 5.0. Use of this option completely erases all data, and you cannot recover information from a disk formatted in this way.

Formatting a Hard Disk

The complete formatting process for a hard disk consists of three steps:

1. A low-level format, usually performed at the factory
2. Partitioning with FDISK, usually performed only once on a new hard disk
3. A high-level format with FORMAT or Norton Safe Format

Usually, when you hear someone talk about formatting a hard disk, the person is referring to a high-level format with the DOS FORMAT command. For most computers that you purchase today, the hard disk is already formatted and normally contains a number of programs already copied to the disk. Therefore, it is possible that you will never have the opportunity (or the need) to format or partition a hard disk. For some occasions, however, you may still need to perform one or more of the formatting steps for a hard disk.

A low-level format, as described earlier, prepares a hard disk by laying out the sectors on the disk and filling them with dummy information. The process also performs an integrity test and places information in the headers of bad sectors, telling DOS not to use these sectors to store information. It is not uncommon to have some bad sectors on a hard disk. Usually, a low-level format is performed on a disk at the factory, and it may never need to be performed again on the disk. On rare occasions, your disk may develop problems that can be solved only by performing a low-level format. This cannot be performed by the normal FORMAT or Norton Safe Format command. Some hard disks have a built-in program that allows you to run a low-level format. See Appendix D for information on when and how to use this built-in low-level format program. When you run this low-level format, all information on your disk is destroyed. An alternative to this destructive low-level format is found in the Norton Calibrate program. Calibrate can perform a nondestructive low-level integrity check of your hard disk.

When you install a new hard disk in a computer, a low-level format has usually been performed on the drive. Some people go ahead and perform their own low-level format just to make sure that the disk is properly checked.

The next step after performing a low-level format is to partition the disk. In the DOS world, you can install more than one type of operating system on a drive. Thus, you may have both DOS and OS/2 (or some other operating system) on your drive. The DOS FDISK program allows you to prepare your hard disk to accept one or more operating systems. For information on using FDISK, see your DOS manual or *Using MS-DOS 6,* Special Edition from Que Corporation.

After a hard disk has been prepared by a low-level format and partitioned by FDISK, the disk is ready to receive a high-level format. When you format a hard disk with DOS FORMAT or Norton Safe Format, a new system area is written to the disk, and an integrity test is performed on the disk. The actual data in the disk sectors is not affected, however. Thus, it is possible for you to reconstruct the system information by using IMAGE or MIRROR information (see Chapter 4) and recover the information from the disk with an unformatting procedure.

Avoiding Problems Associated with Formatting Floppy Disks

As the PC has evolved, the disk types available have grown. Today, there are four common disk types: the 360K and 1.2M 5 1/4-inch disks, and the 720K and 1.44M 3 1/2-inch disks. The 360K and 720K disks are called "double-density," and the 1.2M and 1.44M disks are called "high-density." The way that each disk drive physically writes and reads information to and from the floppy disk is designed to work with a specific kind of disk. You can have severe data loss problems when using low-density disks formatted as high-density disks or when using high-density disks formatted as low-density disks. In each case, the improper format causes problems, as described in this section.

It has become popular with some computer users to save money by formatting 720K disks as 1.44M disks. The process is simple. On some machines (PS/2s, for example), you can easily format a 720K disk as 1.44M—in fact, just using the normal DOS FORMAT command will do it. For other computers, you must first punch a hole in the upper-left corner (looking at the disk with the label in front and the write-protect hole at the upper right). Some commercial tools allow you to punch this hole. When you format a disk in this way, you can store more information on the less-expensive 720K disk. However, this practice is a time bomb.

The 1.44M and 720K disks are constructed differently; the actual disk media that stores the magnetic image is made of different kinds of material. The recording heads for low- and high-density drives are also different. High-density drives use a higher current (signal strength) to write the magnetic image to the disk. The media used in a 720K disk is not designed to handle this signal permanently. Although the disk may work for a period of time (usually months), eventually the magnetic signal on the 720K disk formatted as a 1.44M will begin to fade, resulting in data loss. Many people who have placed important backup

information on these kinds of disk are sorely disappointed when they go back to them a year later to find that the disks are unreadable and unrecoverable.

Another common problem is the interchange of 360K disks and 1.2M disks. Although you may have some success in using 360K and 1.2M disks interchangeably in 360K and 1.2M drives, incompatibilities exist that may eventually result in data loss. Always use 360K disks in 360K drives and use 1.2M disks in 1.2M drives. You can read 360K disks from a 1.2M drive with no problem, but problems can occur if you write to a 360K disk on a 1.2M drive and then try to read it later on a 360K drive.

You can format a 360K disk in a 1.2M drive with DOS FORMAT or even Norton Safe Format. If the disk is a "virgin" disk (freshly formatted out of the box), you may then be able to use that disk in a 360K drive. However, a 360K drive and a 1.2M drive have read and write heads of different widths. The 1.2M drive's heads are smaller. Therefore, if you write to a 360K disk on a 1.2M drive, you may not completely overwrite any information already in a sector. When a 360K drive tries to read the information on the disk, it will be reading a wider path than was written by the 1.2M drive. This may result in the 360K drive reading unintentioned information and often means data loss on the disk.

CAUTION: Always use the correct disk size for the drive you are using. Although you may get by with using a wrong-density disk for a while, the ultimate result will be data loss.

Summary

This chapter introduced you to a number of terms and concepts in computer data storage, which are mentioned throughout the remaining chapters. You will see these concepts used by DOS and other programs. Although this chapter is not intended to make you a computer engineer, it should give you enough of a feel for how disks work. You can then use Norton Utilities more effectively and understand more easily the messages and other information displayed by various Norton and DOS programs.

The next chapter begins Part II of this book, in which you learn how to use several Norton utilities to protect your valuable data.

PART

II

Protecting Your Files

OUTLINE

Using Safe Format and Image

Using SmartCan

Using Disk Monitor

Using Diskreet

Destroying Files Permanently with WipeInfo

Setting File Attributes

CHAPTER 4

Using Safe Format and Image

Taking a little time to lock your car doors when you are out shopping can save you a lot of grief. Likewise, taking the added measure of using Norton's file-protection utilities will cost you little time but is well worth the effort. Although versions of DOS since 5.0 provide some protection commands for your files, the power of Norton Utilities can give you an extra measure of safety.

The information stored on your disk is subject to many potential dangers. You can accidentally erase a file; you (or a "friend") can accidentally format a disk containing valuable information; or a "foe" can search your disk and read private information in files, even if they have been erased. In large mainframe environments, operators and systems managers take great care in protecting the data stored on the computer. Usually, a PC owner must be both an operator and a systems manager. In those roles, you must take the initiative to protect your information in the following ways:

- Prevent information from being lost as a result of accidental formatting
- Prepare for possible accidental formatting

- Prevent important files from being erased or overwritten
- Permanently dispose of valuable or secret information

Part II of this book discusses the Norton Utilities 7 programs that can help you protect information on your disk in these ways. This chapter explains Safe Format (SFORMAT or SF) and Image (IMAGE). Chapter 5 covers SmartCan (SMARTCAN), which protects erased files. Disk Monitor (DISKMON), covered in Chapter 6, protects files from being erased. Chapter 7 explains Diskreet (DISKREET), which encrypts files. WipeInfo, covered in Chapter 8, gets rid of information for good. Finally, File Attributes (FA), which prevents files from being changed or erased, is discussed in Chapter 9.

Although you may not want to use all of these protection programs at once, each has its own special purpose and features. Begin with this chapter to find out about Safe Format and Image. These programs should be used by *every* computer user. The Safe Format (SFORMAT) program gives you protection against accidental formatting and provides protection and speed beyond that available with the DOS FORMAT command. Just in case your disk is reformatted accidentally, Norton provides the Image and UnFormat commands. (UnFormat is covered is Chapter 11.) After you have learned how to use Safe Format and Image, continue with Chapters 5 through 9 to determine which of the utilities in those chapters provide the kinds of data protection you need.

Using Safe Format

Formatting is the procedure that prepares a disk (a floppy disk or hard disk) to store information. If you format a disk that contains information (files), the information on the disk is often erased. This loss can be devastating if the disk contained important data that is hard to recover.

NOTE If you have not already done so, refer to Chapter 3 for specific information about how formatting prepares a disk to store data.

Computers are often so reliable that they are taken for granted. Even when important information is being stored on a computer, the user often gives no thought about losing the information—until it happens! Suppose, for example, that a new employee simply entered FORMAT at the `C:\>` prompt and then wondered what was happening. By the time you were called to look at the computer, the hard disk was fully formatted, and the damage was done. Just like all the king's horses and all the

king's men, you or your support staff must try to put the pieces back together again. The hard disk may have contained important research, financial, or organizational information—and it was not backed up regularly. You may have to reconstruct the information that had been on disk from letters, papers, and records dating back several years. This process may cost thousands of dollars in personnel time. In some cases, the original source of the information cannot be recovered. Few people are prepared in any way for this expensive problem. Presumably, because you are reading this now, you are interested in protecting your data. If you also supervise other people, you should take the responsibility to see that they also use data-protection procedures.

NOTE Although Norton Utilities does not provide a backup procedure, backing up information on disk should be a standard practice, and the first step in protecting your data. DOS provides the BACKUP command for making backup copies of your hard disk. You also can buy a backup program called Norton Backup, and a number of other software programs enable you to back up your hard disk onto floppy disks, tapes, or other media. The DOS BACKUP procedure is covered in Appendix A. See Chapter 29 for more information on using the Norton Backup program.

Depending on your version of DOS, it is easy to reformat a disk accidentally. Versions of DOS before 3.3 enable you to format the hard disk (drive C) simply by entering the following command:

```
FORMAT C:
```

(If you are at the `C:\>` prompt, you just enter **FORMAT**.) Then you press Enter in response to a prompt asking whether you are sure that your disk is in place. If you control any computers that are still using a version of DOS earlier than 3.3, one measure of protection you can take is to upgrade those computers to a new version of DOS.

Beginning with DOS 3.3, you must specify the volume name for the disk before the format proceeds if you are formatting a hard disk. This provides some added protection against accidental format. Whatever the cause, accidental formatting is a problem that continues to occur, even with the recent DOS safeguard of requiring a volume label with the FORMAT command. Norton Safe Format gives you additional levels of protection against accidental formatting. For example, Safe Format displays information about the impending format. Even after entering the Safe Format command, you must specifically choose an option that allows you to perform a hard disk format. To help prevent accidental formatting of floppy disks, Safe Format gives you a warning message if the disk (either hard disk or floppy disk) that you are about to format already contains files.

Furthermore, even if you choose to proceed with the format, Safe Format saves a copy of the old file information to a place on disk that can be recovered (unless you specifically choose an option not to save the unformat information). Because the formatting procedure essentially just erases all information about where files are stored on disk (but does not actually erase the contents of the files), you can use the file information saved by Safe Format to recover information on a formatted disk. Refer to Chapter 11 for a discussion of format recovery.

Starting Safe Format

You can begin the Safe Format program from either the Norton main screen or the DOS prompt. To begin Safe Format from the Norton main screen, begin Norton Utilities by typing **NORTON** at the DOS prompt and pressing Enter. The Norton Utilities main screen appears, as shown in figure 4.1. Use the down-arrow key or the mouse to scroll through the commands on the left until the Safe Format option is highlighted. Then press Enter or double-click the mouse to begin the Safe Format program.

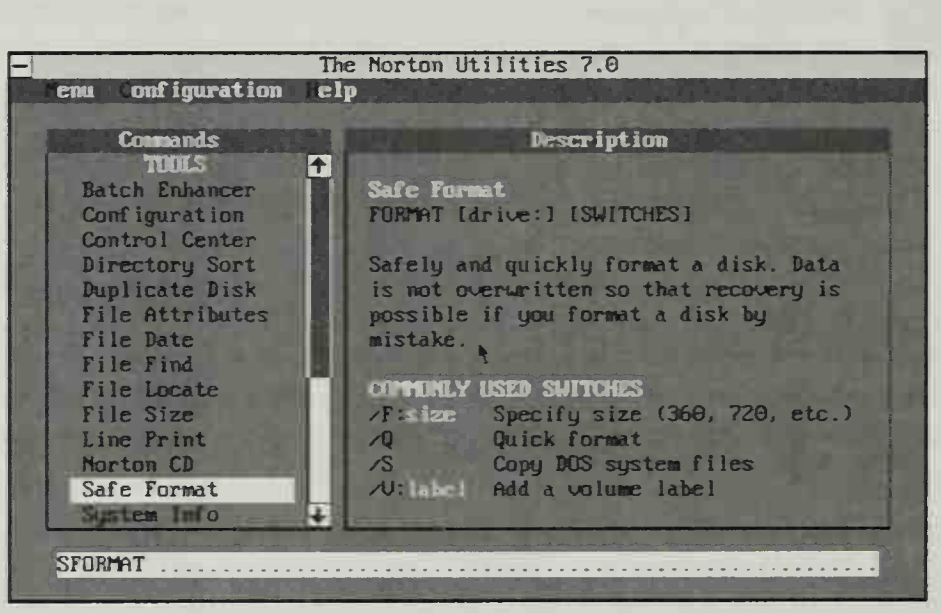


Fig. 4.1

The Norton Utilities main screen.

If you don't want to use this screen to run the command, you can start Safe Format from the DOS prompt by typing **SFORMAT** and pressing Enter.

With either method, you can begin Safe Format with one or more switches. If you enter the SFORMAT command without any switches, the Safe Format dialog box is displayed so that you can select options to use for the format process.

Using the Safe Format Dialog Box

Whether you use the Norton main screen or the SFORMAT command to start Safe Format, the Safe Format dialog box appears (see fig. 4.2). This dialog box enables you to choose a variety of formatting options. It contains all the options you could choose by using the DOS FORMAT command, and more. The following sections describe the Safe Format dialog box options.

Fig. 4.2
The Safe Format dialog box.

Specifying the Drive

The **D**rive option in the Safe Format dialog box specifies which disk is to be formatted. Depending on how you installed Norton Utilities, hard disk names may not appear in the list of drives to format. You cannot format network drives with Safe Format.

Indicating the Disk Size

You use the **S**ize option to indicate the size of the disk, such as 360K or 1.2M, to be formatted. The program detects the disk sizes that your computer supports, and lists them in the Size box. Norton Utilities 7 supports 2.88M disks, which are supported also by DOS 5.0 and 6.0. Note that even though your 3 1/2-inch disk is read by the program as a 1.44M disk, you can choose to format a 720K disk in that drive. You can choose also to format a 360K disk in a 1.2M 5 1/4-inch drive. Be aware, however, of potential problems in formatting a 360K disk in a 1.2M drive (for detailed information, see Chapter 3 on understanding how disks work).

Choosing the Format Type

The Format Type option sets the format type that will be used: Safe, Quick, or DOS. (These settings relate to the /Q and /D switches that you use when entering the command at the DOS prompt.) Here are the format types:

Format Type	Description
Safe	Formats the disk information but keeps file information on disk (similar to the Image information described later in this chapter) so that you can recover files.
Quick	Creates a new system area and does not overwrite any data areas. This mode is useful for formatting previously formatted floppy disks. By erasing the system area that contains the addresses of all files and directories on disk, this format is simply a quick way to erase all files and remove all directories from a disk. A Quick format can take about 5 seconds, whereas a normal format takes about 45 seconds. However, see the following caution about a potential danger in using this option.
DOS	Formats a disk, using the regular DOS procedure (before DOS 5.0). No recovery information is written to disk, and an UnFormat may not be able to recover any files.

CAUTION: You should be careful when using the Quick format option (or the /Q switch when using Safe format from the DOS prompt) to perform a format. Certain viruses (such as the pervasive "Stoned" virus) can attach themselves to the system area of a disk. Quick format does not clear out that area of the disk. Thus, if you format a disk infected with Stoned or a similar virus, the virus will remain on disk. If you format the disk by using the Safe or DOS format type, this kind of virus is overwritten and destroyed. Therefore, if you know the history of the disk (you know that it has not been subjected to any virus), you can use the Quick format without any problem. But if the disk you are about to format is from an unknown source, you should format it by using the Safe or DOS format.

Setting the System Files Option

The System Files option specifies whether the disk to be formatted will contain the system files or whether space will be reserved for system files. (These settings relate to the /S and /B switches used when you enter the command from the DOS prompt.) The options available in this drop-down list are None (the default), Put on Disk, and Leave Space. When you put the system files on a disk, the disk becomes a bootable disk. You would want to format a disk in this way if you intend to use the disk as a boot disk for a computer.

If you choose the None option, the system files are not placed on the disk, and no room is reserved for them. If you choose the Put on Disk option, all system files necessary to create a boot disk are placed on the newly formatted disk. If you choose the Leave Space option, the system files are not placed on the disk, but room is reserved on the disk to allow the system files to be put on the disk with the DOS SYS command. The Leave Space option is a relic of old DOS versions in which this was the only way to create a disk that could later have the DOS system files loaded. Using Norton's Disk Tools (see Chapter 13), you can easily place system files on a formatted disk even if it was not previously formatted with the Leave Space option. Usually, you want to choose the None option. This allows the disk to have the maximum amount of space available to store files.

Entering the Volume Label

The Volume Label option near the bottom of the Safe Format dialog box specifies which, if any, label will be given to the disk. A *volume label* is the name of the disk that appears at the top of a directory listing. Volume labels are a way to identify disks. For example, to establish ownership of the disk, you may want to use your name or initials as the volume label. You are not required to have a volume label on a disk (except recently for hard disks). To provide a volume label, press the Tab key until the Volume Label option is highlighted (or point to the option with the mouse pointer and click once). Then enter the label (maximum of 11 characters) you want to place on the formatted disk. (You can set this option also with the /V:*label* switch when you use Safe Format from the DOS prompt.)

Using the Save Image Info Option

The Save Image Info option, when checked, causes Safe Format to take a "snapshot" of the disk's system area so that you can unformat the disk if you discover that you formatted the wrong one. This is what the Image program does for your hard disk (see "Preparing for an Accidental Format" later in this chapter).

Saving the Safe Format Settings

The Save Settings on Exit option, when checked, causes Safe Format to remember all the changes you have made in the option boxes so that they will contain the same settings the next time you use the program. If the settings are not saved (that is, if this option is not checked), the options will return to the default state the next time you enter the Safe Format dialog box.

Specifying the Configuration To Format

The Configure button at the upper right of the Safe Format dialog box enables you to set additional options for Safe Format. If you choose Configure, the Configuration dialog box shown in figure 4.3 appears. You use the options on the left to choose the disk drive to configure. In this case, drive B is currently selected. You use the list on the right to indicate what kind of disk is normally used in the specified disk drive. (For a 3 1/2-inch disk, the disk size could be 720K, 1.44M, or 2.88M.) The headings of both lists change depending on the drive selected.

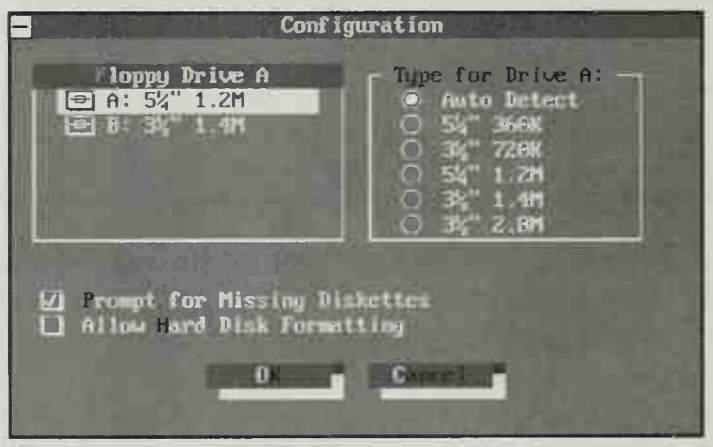


Fig. 4.3
The Configuration diolog box.

If you don't specify the disk configuration, Safe Format uses your computer's autodetect feature to determine the disk type automatically. (For example, it knows the difference between a 720K disk and a 1.44M disk because the 720K has only one hole at the bottom left of the disk casing, and the 1.44M disk has an additional hole at the bottom right of the disk casing.)

T I P If you choose Save Settings on Exit in the Safe Format dialog box, Safe Format will remember the drive type.

CAUTION: On some computers, primarily IBM PS/2 models, the autodetect feature will not detect the correct disk type. This is a hardware design problem. The specification for the 1.44M disk detect was established too late for the PS/2 design to take advantage of it. For example, if you place a 720K (double-density) disk into a PS/2 1.44M (high-density) drive, the computer will not be able to detect that the disk should be formatted as a 720K disk. Therefore, it is quite easy to format a 720K disk as a 1.44M disk on this machine. (See Chapter 3 concerning physical problems in formatting a 720K disk as a 1.44K disk.) Furthermore, if you attempt to read the resulting 1.44M formatted disk in a machine that *does* detect the correct disk capacity, it will try to read the disk as a 720K disk, and you will likely get an error message saying that the disk is unreadable.

The following sections describe the other options in the Configuration dialog box. After you finish setting the options in this dialog box, choose **O**K to return to the Safe Format dialog box. If you do not want to change the configuration settings, choose **C**ancel.

Prompting for Missing Disks

At the bottom of the Configuration dialog box are two check boxes. The **P**rompt for Missing Diskettes option causes Safe Format to display the following prompt when it finds no disk in the drive that has been chosen to be formatted:

```
The disk is missing from the drive
Please insert a disk
```

If you don't choose this option, Norton will try to begin formatting even if no disk is in the drive. If there is no disk in the drive, an error message is displayed.

Allowing Hard Disk Formatting

The Allow **H**ard Disk Formatting option is a safety feature. To format a hard disk, you have to choose this option. It is best to leave this option unchosen so that it is not possible to format your hard disk accidentally. If the option to allow hard disk formatting is not chosen, drive names for hard disks will not appear in the drive selection list.

Starting the Format Process

The Format option in the Safe Format dialog box initiates formatting with all the option settings you have chosen. After you choose this option, the Safe Format command attempts to read the disk to see whether you are attempting to format a disk that already contains data.

Figure 4.4 shows the warning that is given if information is found on a disk to be formatted. This safeguard prevents you from formatting a disk that contains important data. When you see this dialog box, pay attention to the list of files displayed. This list is a double check for you, telling you the names of the files on the disk about to be formatted. If you recognize the file names as files on a disk that you do *not* want to format, choose **N**o to cancel the format. If you choose not to proceed, you are returned to the Safe Format screen with the menu selections offered. If you choose **Y**es on the warning screen, the format process begins.

Fig. 4.4

The warning box that appears if you try to format a disk containing data.

After the format process begins, statistics and a display of progress appear on-screen (see fig. 4.5). The top section of the dialog box summarizes the choices, such as drive and disk size, that you made before the format operation began. The horizontal bar tells you how much of the disk has been formatted. During the format process, you will see the Cylinder count increase to the number of cylinders on the disk. The Head count will swap back and forth from 0 to 1. Heads and cylinders are explained in Chapter 3.

The section to the right of the horizontal bar contains statistics with which you can track the progress of the format. This box shows (in kilobytes) how much total space is available on disk, how much system space is used, and whether any bad spaces were found. Total Space is the total number of kilobytes available on the formatted disk. If you

have not requested that the system be placed on the disk, the System Space needed will be 0. If there are any flaws on the disk, they will appear as Bad Space. The Usable Space is the Total Space *minus* the System Space and Bad Space.

Fig. 4.5
Safe Format in progress.

If you press Esc during the format process, another dialog box appears, asking whether you want to cancel the current operation. If you selected the Save Image Info option or the Safe format type in the Safe Format dialog box, you may as well let the format finish, even if you mistakenly format the wrong disk. Then you can recover the information with the UnFormat command. If you are using the DOS format mode and discover that you are formatting the wrong disk, interrupt the format immediately and attempt to recover the original information on disk with the UnFormat command (see Chapter 11 for details).

T I P

Most floppy disks should have 0 (zero) bad spaces found during the formatting process. When a bad space is found, the format program marks that space (in the FAT) as unusable space, and DOS will not attempt to write information to the disk in that space. Therefore, even if the disk contains some bad spaces, it is still a usable disk. It simply has less space than a normal disk. However, many disk experts recommend that if bad spaces are found on a floppy disk during the format, it may be a signal that other spots on the disk are potentially "weak." That is, they may lose their magnetic signal. These experts will tell you to trash any floppy disk that does not format perfectly. You will have to judge for yourself whether your data is worth the small risk of using a not-so-perfect disk.

At the bottom of the screen shown in figure 4.5 is a box displaying estimated and elapsed time for the format process. Estimated Time shows about how long the total format will take. For the disk being formatted in this example, the time is about 54 seconds. Elapsed Time tells you how much actual time has elapsed during the format. These two numbers together (in this case, 54 seconds minus 16 seconds) tell you about how much time remains in the format process.

After the Safe Format procedure is complete, Norton displays a message telling you that the format was successful (see fig. 4.6). You can also read from the Safe Format dialog box how many, if any, bad sectors were found during the format. If the format is unsuccessful, a message telling you that the disk could not be formatted appears. When you choose **OK** in the successful or unsuccessful format message box, you return to the Safe Format dialog box. You can begin to format another disk, or choose **Exit** to return to the Norton main screen. If you began Safe Format from DOS, the DOS prompt appears when you end the program.

Fig. 4.6
A message telling you that the format was successful.

T I P Many people format an entire box of disks at once. This saves you some time and allows you to have formatted disks ready to be used without having to perform a format each time you need to use a new disk.

Replacing the DOS Format with Safe Format

Norton's Safe Format is safer and more intuitive to use than the DOS FORMAT command. For this reason, you may want to replace the FORMAT command on your hard disk with Safe Format. Then, when you or someone else tries to enter the DOS FORMAT command, the Norton Safe Format command will run.

CAUTION: When replacing the FORMAT command with the Safe Format command, make sure that you don't have another copy of FORMAT.COM or FORMAT.EXE located somewhere on a disk or directory that could be accessed before your Safe Format command. Use the File Find or File Locate command (see Chapter 25) to search your disk for any file named FORMAT.*. Erase or rename any version of FORMAT that you do not want accessed.

You can use one of three methods to change SFORMAT to FORMAT:

- The simplest way is to choose the **C**onfiguration option in the Norton main screen, as described in Chapter 2. From the **C**onfiguration menu, choose **A**lternate Names. In the Alternate Program Names dialog box, choose Safe For**m**at; then specify FORMAT.EXE as the name you want to use for the Safe Format command.
- Enter the NUCONFIG command at the DOS prompt. In the Configure Norton Utilities dialog box, choose **A**lternate Names. In the Alternate Program Names dialog box, choose Safe For**m**at and specify FORMAT.EXE as the new name for the Safe Format command.
- To replace your DOS FORMAT command manually, rename the DOS FORMAT.EXE file to something else (for example, XXFORMAT.EXE) and rename the Norton Safe Format SFORMAT.EXE file to FORMAT.EXE. For example, you can use the following commands:

  ```
  REN FORMAT.EXE XXFORMAT.EXE
  REN SFORMAT.EXE FORMAT.EXE
  ```

  Make sure that the new FORMAT program is located in a directory that is in the DOS path.

Using the Safe Format Switches

Whether you start the Safe Format command from the DOS prompt or the Norton main screen, you can use a number of switches to make the command more specific. If you are starting Safe Format from the command line in the Norton main screen, the switches that you type appear in the command line, just as if you were entering the command at the DOS prompt. Notice that the description of the command in the Norton main screen lists the syntax of the command and some of the commonly used switches (see fig. 4.7).

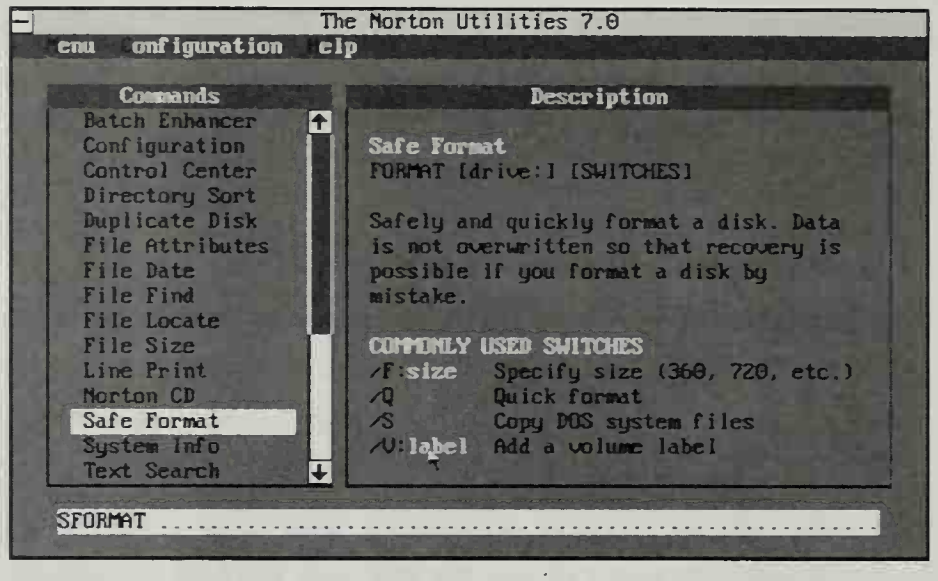


Fig. 4.7

The Norton main screen showing the switches you can use with the Safe Format command.

The syntax of the SFORMAT command (depending on which command name you have chosen) is one of the following:

SFORMAT [*d*:][*switches*]

FORMAT [*d*:][*switches*]

SF [*d*:][*switches*]

The *d*: option is the letter of the drive you want to format, and *switches* are the available switches you can use with Safe Format.

Use the SFORMAT syntax line if you have not chosen SF or FORMAT as an alternative name for Safe Format (see the preceding section for details on using alternative names for Safe Format). After you enter the options you want to use, press Enter to begin the Safe Format program.

NOTE

Throughout this book, when the syntax of a command is described, *optional parameters* are listed in brackets ([ ]). In the FORMAT command, the drive letter shown as [*d*:] is an optional parameter. It does not have to appear when you use the command. When you use items listed in brackets in the description, do not type the brackets on the DOS command line. If parameters are included in the description of a command and are not enclosed in brackets, those parameters are required.

Norton Safe Format has the same switches as the DOS FORMAT command, in addition to a few added by Norton. The Safe Format switches that are similar to DOS FORMAT switches are listed in table 4.1. The Safe Format switches unique to Norton are listed in table 4.2.

Table 4.1 Safe Format Switches Similar to DOS FORMAT Switches

Switch	Description
/B	Leaves space for system files
/S	Places system files on disk
/V:*label*	Places a volume label on disk
/1	Formats as single-sided
/4	Formats as 360K (in a 1.2M drive)
/8	Formats 8 sectors per track
/N:*n*	Specifies the number of sectors per track (*n* = 8, 9, 15, or 18)
/T:*n*	Specifies the number of tracks (*n* = 40 or 80)
/F:*size*	Specifies the size of floppy disk (*size* = 360, 720, 1.2, 1.44, or 2.88)

Table 4.2 Unique Safe Format Switches

Switch	Description
/A	Enables you to bypass choosing Format from the Norton Safe Format dialog box. The format begins without any response required from you. This switch is primarily for use in batch files, where you perform the same kind of format repetitively and you want to avoid having to answer prompts. Be careful when using this switch because it defeats some of the purposes of the Safe Format command. If you are sure, however, that the format you want to perform is selected properly, the /A switch can save you some time.
/D	Enables you to revert to the DOS FORMAT procedure. With this switch, the format is performed as if it were performed by the DOS FORMAT command—the system information is not saved for possible recovery. You may want to use the DOS version of FORMAT if the disk contains files that you do not want to be recovered easily (such as personnel records).
/Q	Enables you to perform a Quick format. This switch is useful for formatting disks you have formatted previously. Instead of checking the entire disk for bad sectors, as in a normal format, the command in Quick format mode merely replaces the system area of the disk with a new system area. This process is essentially the same as erasing all the files on the disk.
/*size*	Specifies the size of a floppy disk (*size* = 360, 720, 1.2, 1.44, or 2.88).

To format a disk in drive B as a system disk (for copying system files to the disk) and to place the volume label MYDISK on the disk, use this command:

```
FORMAT B:/S/V:MYDISK
```

Notice in this command that the drive name is represented as a single letter followed by a colon. If you provide no drive name, you must choose from the **D**rive list box (in the Safe Format dialog box) the drive letter of the disk to format.

If you have an old formatted floppy disk that you want to reformat, you don't have to wait 45 seconds (which is what a normal 360K disk takes). Entering the command

```
FORMAT B:/Q
```

performs a Quick format that takes only 10 to 15 seconds. This version of FORMAT is usable only on previously formatted disks.

Using the Image (IMAGE) Program

No matter how many precautions you take, you (or someone else) still may find a way to accidentally format a disk containing important information. With a little preventive medicine, however, you can handle this problem. The medicine is the Norton Image (IMAGE) program. The Image program allows you to prepare for the possibility of an accidental format; Image stores file information to a safe location on disk each time you boot.

The Image program creates a file named IMAGE.DAT on your hard disk. This file contains system and directory information about the files on your hard disk drive. When a hard disk is formatted, the system and directory information is changed to tell DOS that all file space is available on your disk. The actual contents of the files on disk are not changed. Therefore, the IMAGE.DAT file is able to provide an alternative copy of the information that DOS needs in order to "find" your files on disk—that same information which was destroyed with the hard disk format. Norton's UnFormat utility (see Chapter 11) can use this information to recover your system and directory information to its previous state, giving back to DOS the information needed to access your files on disk and thus performing an unformat.

Preparing for an Accidental Format

Norton Utilities does its best to help you recover from a hard disk format. Before Norton Utilities became available, an accidental format was an almost insurmountable disaster. Now, with Norton Utilities, you have a real chance of a full recovery.

The thoroughness of the recovery that Norton Utilities can perform, however, depends on how well you prepare your computer for this potential problem. There are three ways to protect your computer (and yourself) against accidental format of your hard disk:

- Perform a periodic backup of your hard disk. (Then you can recover by using the backup.)
- Use the Norton Safe Format command on your computer rather than the standard DOS FORMAT command (as described in the previous sections) to give you protection against accidental format.
- Use the Norton Image command, preferably from within your AUTOEXEC.BAT file, so that a backup image of your important system and directory information will be stored each time you boot your computer.

Because UnFormat can help recover only the files that were present the last time the Image command was run, you need to use Image periodically. For most people, a convenient method is to issue the command each time the computer is booted. The next section describes how to do that.

Running Image from the AUTOEXEC.BAT File

To run the Image command each time you boot your computer, you need to place that command in your AUTOEXEC.BAT file. (The AUTOEXEC.BAT file is a batch file containing a series of commands that executes each time you boot your computer.)

If you are familiar with the AUTOEXEC.BAT file and are comfortable using an ASCII editor, you can simply add the Image command to your existing AUTOEXEC.BAT file. If you stored Norton Utilities in a directory other than the root directory (such as NORTON), make

sure that a PATH command precedes the IMAGE command in the AUTOEXEC.BAT file. Your AUTOEXEC.BAT file, for example, may contain the lines

```
PATH C:\;C:\DOS;C:\NORTON
IMAGE
```

or

```
PATH C:\;C:DOS
C:\NORTON\IMAGE
```

The first version (PATH) sets up the DOS search path to look for commands first in the root directory, then in the DOS directory, and finally in the NORTON directory. The next line issues the Norton IMAGE command, which DOS now is able to find in the NORTON directory. In the second version, the NORTON directory is not in the path, so the IMAGE command must contain the C:\NORTON\ prefix to tell DOS where to find the IMAGE command. Now when you boot your computer, Norton issues the IMAGE command and creates the file IMAGE.DAT.

NOTE If you are not familiar with your AUTOEXEC.BAT file or you don't know how to use an ASCII editor to change the file, you can use the Configuration menu from the Norton main screen, or use the NUCONFIG command from the DOS prompt to place IMAGE in your AUTOEXEC.BAT file. (Chapter 2 discusses the Norton configuration procedure.)

If the IMAGE.DAT file is present, other Norton commands (for example, Disk Edit and UnErase) use that file automatically. These programs do not need the IMAGE.DAT file in order to work, but if the file is there, the programs work faster and more effectively.

NOTE When the IMAGE.DAT file is created, its read-only attribute is set on. This means that the information in the file can be read, but you cannot erase or change the file (without resetting the read-only attribute). This is a safety feature to help prevent accidental erasure of this file. For example, even if you perform an ERASE *.* in your root directory, the IMAGE.DAT file will not be erased. See Chapter 9 for more information about file attributes.

Running Image from the DOS Prompt

You do not have to run the Image program from the AUTOEXEC.BAT file. You can run the program at any time by entering the command at the DOS prompt. The syntax is

IMAGE [*switch*]

If IMAGE.DAT already exists, the old IMAGE.DAT is renamed IMAGE.BAK. The only switch for this command is /NOBACK. If you use the /NOBACK switch, the file IMAGE.BAK, which contains information from the preceding use of the IMAGE command, is not created.

If you enter the IMAGE command with no switches, the program creates a new copy of the IMAGE.DAT file on disk.

NOTE As an added safety measure, in case you accidentally format your hard disk, make sure that you have a bootable floppy disk—a rescue disk—that contains the UnFormat program. See Chapter 14 for information on creating and using this important disk.

NOTE Beginning with Version 5.0, DOS contains a command called MIRROR that is similar in function to the NORTON Image command. When you enter the MIRROR command at the DOS prompt, information is written to a file that contains a duplicate copy of your disk's system and file directory. If you have used the MIRROR command and your disk has been formatted, the Norton UnFormat command can read that information and use it to restore the formatted disk.

Running Image from the Norton Main Screen

You can also run the Image program from the Norton main screen. From this screen, scroll the Commands list until the Image option is highlighted; then press Enter or double-click with the mouse. The Image program will run just as it did when it was executed from the DOS prompt (see the preceding section).

Summary

Norton Utilities offers you a number of ways to protect your information on disk. Most of these safety measures, however, require that you do a little planning. Make sure that you set up your AUTOEXEC.BAT file to issue the Image command each time you boot. Make sure also that you are using the Safe Format command rather than the original DOS FORMAT command. If you accidentally format a disk, you can recover it if you have taken these precautions.

After you have made sure that you have taken the two primary precautions outlined in this chapter, read the remaining chapters in Part II to learn about other Norton programs that can help you safeguard your data. The next chapter, "Using SmartCan," describes a special Norton utility that helps you recover from accidentally deleting files you need to keep.

CHAPTER 5

Using SmartCan

When you erase a file, DOS does not actually destroy the contents of the file. DOS erases only some of the file's directory information. With the directory information erased, the disk space that the file occupied can now be used by other files. However, until that space is used, the contents of the erased file are actually still on disk. Thus, the Norton UnErase command can often find and unerase a file. When you erase a file, however, and DOS gets a message that the disk space used by that file is now available, a new file can overwrite the erased file at any time. As a result, you are not able to unerase the file that occupied that space.

The SmartCan command (called File Save and Erase Protect in earlier versions of Norton Utilities) moves the contents of unerased files to disk space that is not commonly used. Relocating the files reduces the chance of them being overwritten, and they remain unerasable longer. SmartCan is able to manage this erased space on disk. Using SmartCan options, you can tell the command how long to protect files, what kinds of files to protect, and when to stop protecting files (based on a set number of days and a set amount of space to use for the erased information). You must use the SmartCan command *before* erasing files so that it can keep the erased space from becoming lost.

Understanding SmartCan

Using SmartCan is like throwing something into a trash can (a "smart" trash can); you know that, for a while, you can retrieve the tossed-out item if you need to. After you empty the trash can and the garbage

person hauls it away, however, you no longer have access to the tossed-out item. In the same way, you can unerase an erased file for a while. But when SmartCan stops protecting the file, it is likely to be lost forever.

SmartCan is a memory-resident program. After you begin this type of program, it stays in the computer's memory, monitoring requests to erase files by other programs. You can run the SmartCan program interactively (in menu mode) or as a DOS-type command. At first, you need to run the program interactively in order to set the options you want, such as which drives to protect and how long to save files. Then you can activate the SmartCan command by placing it in your AUTOEXEC.BAT file so that the protection is turned on each time you boot your computer.

The following sections describe how to set up SmartCan's options and how to activate the program so that it protects your erased files.

Specifying the SmartCan Settings

To use SmartCan interactively, choose the SmartCan option from the Norton main screen or type **SMARTCAN** at the DOS prompt. The Configure SmartCan dialog box appears (see fig. 5.1). Using this dialog box, you can choose SmartCan options and activate the program to begin protecting files. You can specify which files and drives to protect, set limits to protecting files, and purge protected files from the protection list.

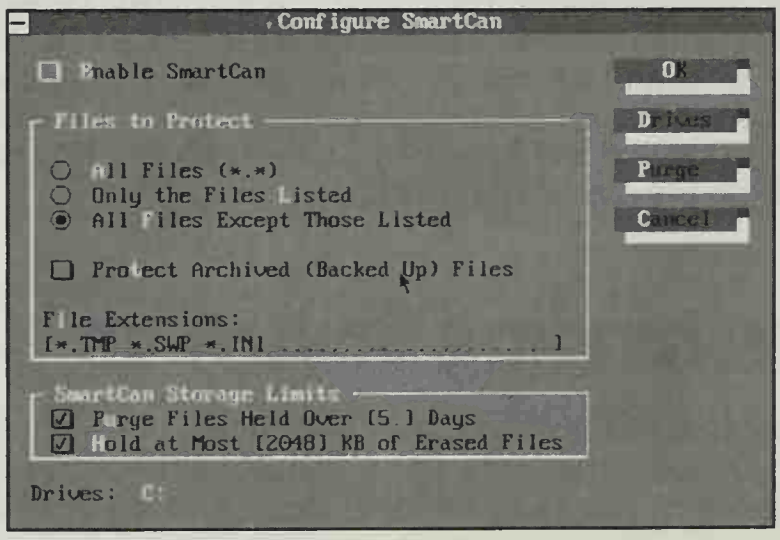


Fig. 5.1

The Configure SmartCan dialog box.

Selecting the Drives To Protect

The **D**rives option at the right of the dialog box enables you to specify which drives to protect. If you choose the **D**rives option, you are prompted to choose the appropriate disk drives (see fig. 5.2). SmartCan monitors files being erased on only the disks you specify.

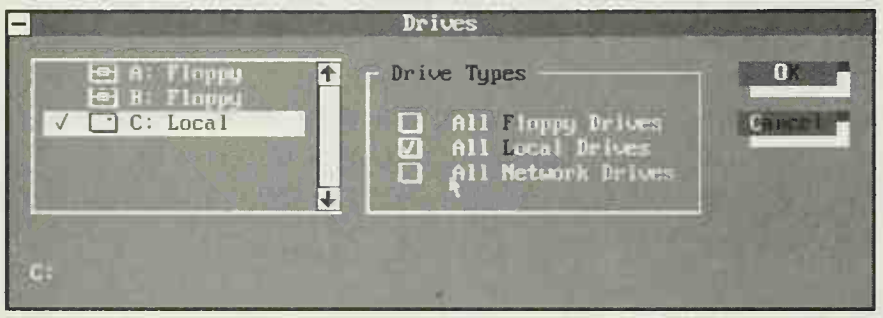


Fig. 5.2
The Drives dialog box.

In the Drives dialog box, you can choose one or more of the drives from the Drive list box on the left. A selected drive is designated by a check mark to the left of its name. In figure 5.2, drive C (the hard disk) is the only drive selected. To choose a drive, press Tab or the arrow keys to move the highlight to the Drive list box; then use the up- and down-arrow keys to highlight the drive you want to mark for protection. Press the space bar to select or deselect a drive. You also can double-click the drive name with the mouse to select or deselect that drive.

You use the Drive Types section to specify what drive types to protect. Drive types include floppy, local (hard disks), and network drives. To choose one of the three options in the Drive Types section, press Alt plus the highlighted letter for the appropriate drive type (for example, Alt+F for All **F**loppy Drives). Or point to the option with the mouse pointer and click to select or deselect the check box. If you chose the All **F**loppy Drives option, all floppy drives in the Drive list are selected. The All **N**etwork Drives option is usable only when you have network drives available.

After you make your selections, choose **O**K to exit the dialog box and save your changes; choose **C**ancel to exit without saving changes.

Selecting the Files To Protect

In the Configure SmartCan dialog box (refer to fig. 5.1), you use the Files to Protect section to specify which files to protect when they are erased. You can choose one of the following options: **A**ll Files (*.*),

Only the Files **L**isted (in the **F**ile Extensions text box), or All **F**iles Except Those Listed (in the **F**ile Extensions text box). Because these options are presented as radio buttons, you can choose only one of them at a time. For example, you can choose to protect the files listed in the **F**ile Extensions text box or to protect all files *except* those listed in that text box—but not both.

You can choose also whether to protect archived files. These are files that have been backed up. Because they have been backed up, they should have copies of themselves to recover if you need them. Therefore, you may choose not to protect those files. Usually, a limited amount of space is available on your disk to protect erased files; eliminating the protection of archived files allows more unarchived files to be protected before this space becomes too full. Choose or click **P**rotect Archived (Backed Up) Files to select or deselect this option.

NOTE The computer knows that a file has been archived because the archive attribute is set when the file is backed up. See Chapter 9 concerning setting file attributes.

Whether you choose to protect or exclude listed files, you must first make a list, of course. Type your list in the **F**ile Extensions text box at the bottom of the Files to Protect section. Notice that this text box lists the *.TMP, *.SWP, and *.INI files by default. Norton uses these files to store temporary information. Because the All **F**iles Except Those Listed option is chosen in figure 5.1, all files except the *.TMP, *.SWP, and *.INI files are protected.

To add more files to the list, use the Tab key, the arrow keys, or the mouse to highlight the **F**ile Extensions text box. Then type the extensions of the files you want to exclude or include. You may choose to exclude *.EXE and *.COM files, for example, because you probably have copies of these files on original disks. However, you may want to include *.DBF and *.WK3 files because they are important data files. You can choose to exclude or include, but you cannot do both.

Here are the common files that you may want to exclude from protection:

File Extension	File Type
*.TMP	A temporary file used by Norton Utilities
*.SWP	A temporary file used by Norton Utilities
*.INI	A temporary file used by Norton Utilities
*.EXE	Program files that you should have on original disks

File Extension	File Type
*.COM	Program files that you should have on original disks
*.SYS	Program support files that you should have on original disks
*.OVL	Program overlay files that you should have on original disks

Here are the common files that you may want to include for protection:

File Extension	File Type
.WP	Word processing files
.WK	Spreadsheet files
*.DBF	Database data files

You may want to exclude or include other file types depending on the program applications you use.

Specifying Storage Limits

The SmartCan Storage Limits options are located at the bottom of the Configure SmartCan dialog box. These options enable you to choose how long SmartCan holds a file before that file is no longer protected and how much disk space is allocated to hold erased files.

As you can see in figure 5.1, the **P**urge Files Held option holds files five days by default before the files are no longer protected. To choose this option, press Alt+U or click the option to select or deselect it. If you want to change the default setting, press Tab or use the mouse to move to the number-of-days field (maximum of 99 days); then type the number of days you want.

The **H**old at Most option enables you to specify how much disk space to use to protect erased files. Its default value depends on how much space is available on your disk. In figure 5.1, you can see that the amount listed is 2,048 kilobytes. Press Alt+H to choose the **H**old at Most option, or click the option to select or deselect it. If you choose the option, press Tab or use the mouse to move to the amount-of-space field; then type a new value.

Enabling SmartCan

SmartCan does not begin protecting files until it is enabled. You can enable SmartCan from the Configure SmartCan dialog box by choosing the **E**nable SmartCan option at the top of the dialog box (refer to fig. 5.1).

After you choose **O**K to quit SmartCan, the options you chose are saved, and you return to DOS (or the Norton menu). If you chose **E**nable SmartCan, the SmartCan program is then active. At this time, whether you begin the program from the DOS prompt or from your AUTOEXEC.BAT file, SmartCan uses the settings you chose in the Configure SmartCan dialog box to protect the files you specified. If, however, you choose the **C**ancel option in the dialog box, all settings that you changed are lost, and you return to DOS or the Norton menu.
To set up your AUTOEXEC.BAT file to run SmartCan each time you boot, use the **C**onfiguration option in the Norton main screen (see Chapter 2).

Purging Protected Files

As you create and erase files, SmartCan (when enabled) is protecting the erased files by holding them on disk. This storage takes up some of your disk's space. If you need more disk space on your computer, you can choose to *purge* (stop protecting) currently protected files.

To purge files, you must display the Configure SmartCan dialog box by choosing the SmartCan option from the Norton main screen or by typing **SMARTCAN** at the DOS prompt. The Configure SmartCan dialog box appears (refer to fig. 5.1). Choose the **P**urge button to display the Purge Deleted Files dialog box (see fig. 5.3). This dialog box contains a list of the files that have been erased and are currently being protected. This list is called the *held list.*

You can use the arrow keys or the mouse to move up and down the held list. Below the list box is additional information about the file currently highlighted, including the deleted file's full path name (which shows the directory where the file was located) and the date and time the file was deleted. This information may be helpful if you have more than one erased file by the same name.

If SmartCan is protecting more than one drive, you can display the appropriate drive's held files by choosing the **D**rive button at the bottom of the dialog box. When you choose **D**rive, Norton displays the Select Drive dialog box, which you can use to specify which drive's protected files to list (see fig. 5.4). Select the drive you want; then choose **O**K.

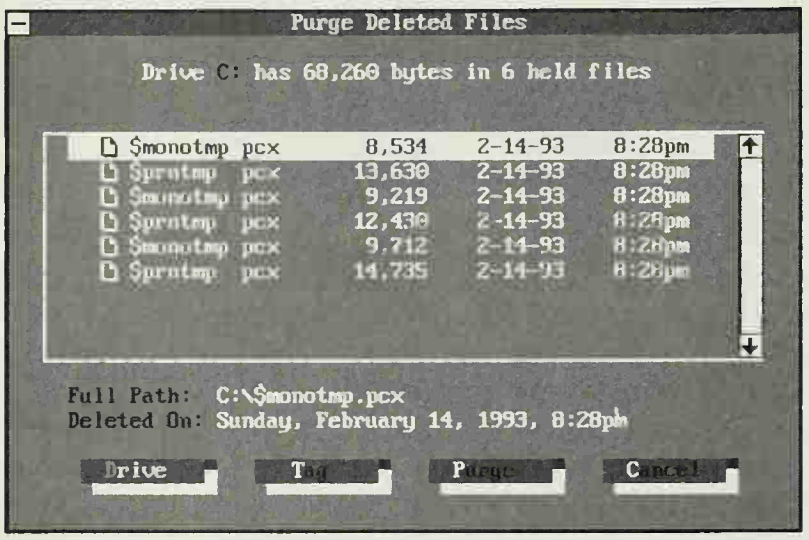


Fig. 5.3

The Purge Deleted Files dialog box.

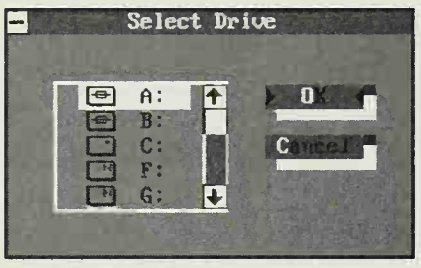


Fig. 5.4

The Smartcan Select Drive dialog box.

Before you can purge files, you must mark them. You can mark files in two ways: by file type (such as all DBF files) or as individual files.

To mark a group of files according to a file specification, choose the **T**ag button. A dialog box like the one in figure 5.5 appears. This screen contains the prompt `Tag the files` and a text box where you can type a file specification. Enter a file specification (such as *.WKS) indicating which file names you want to remove from the held list. After you type the specification, choose **OK**. To exit this box without specifying a tag, choose **C**ancel. When you exit the Tag dialog box, all files that match the specification are tagged with a triangle on each side of the file's description line. You can repeat the tag option to tag other kinds of files.

T I P

You can use the standard DOS wild-card characters—the question mark (?) and the asterisk (*)—in the text box after the `Tag the files` prompt. The file specification *.WPW, for example, indicates that you want to mark all files that have a WPW extension. You can use *.* to mark *all* the file names.

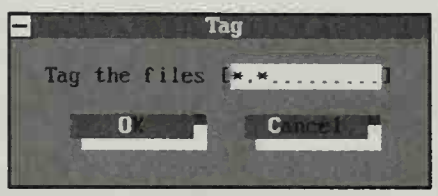


Fig. 5.5
The Tag dialog box.

You can also tag (or untag) files one at a time. Highlight the file name in the held list; then press the space bar to tag or untag the file. Alternatively, point to a file name with the mouse pointer and double-click. The Purge Deleted Files dialog box may have more files than those you see listed. To see more file names, press the up- and down-arrow keys to scroll the held list, or use the scroll bar and the mouse to move the list up and down.

T I P To tag most of the files that meet a certain file specification, use the tag option to mark all the files (such as all *.WKS files). Then untag individually the few you do not want removed from the held list.

After you mark the individual files to purge, a triangle appears on both sides of the file's description in the held list in the Purge Deleted Files dialog box.

After you have marked all the files you want to remove from the held list, choose the **P**urge button. The marked files are removed from the purge list. Choose **O**K to close the Purge Deleted Files dialog box and return to the Configure SmartCan dialog box.

Using SMARTCAN from the DOS Prompt

The SMARTCAN command is usually included in the AUTOEXEC.BAT file so that it is in effect when any files are deleted. The Norton configure procedure can place the correct command in your AUTOEXEC.BAT file (see the section "Setting Startup Program Options" in Chapter 2). You also can place the SMARTCAN command in the AUTOEXEC.BAT file yourself; choose the command from the Norton main screen or type the command at the DOS prompt. Note the syntax of this command:

SMARTCAN [*switches*]

Here are the available switches for the SMARTCAN command:

Switch	Description
/OFF	Disables the SMARTCAN command so that deleted files are not affected. SMARTCAN remains in memory but does not function unless it is turned on by the /ON switch.
/ON	Enables SMARTCAN to move deleted files to a safe area.
/SKIPHIGH	Stores the SmartCan program in low memory. (SmartCan is stored in high memory by default.)
/STATUS	Displays the status of the SMARTCAN command.
/UNINSTALL	Removes the SMARTCAN command from memory if the command was the last memory-resident (TSR) command loaded.
/CONVERT	Converts information from old Erase Protect trash cans.

The /OFF switch allows you to temporarily suspend SmartCan's protection. The SmartCan program remains in memory but no longer protects erased files. If you want to erase some files and do not want SmartCan to hold these files for protection, enter **SMARTCAN /OFF** at the DOS prompt, erase the files, and then enter **SMARTCAN /ON** to turn file protection back on.

The /SKIPHIGH switch refers to the use of your computer's RAM memory. The initial 640K RAM memory in your computer is referred to as low memory. Memory above 640K is called high memory. When a program is stored in high memory (as SmartCan is by default, if high memory is available), you have more low memory to be used by your applications programs. If you are using a memory manager (or DOS 5.0 or later) that uses your high memory, use the /SKIPHIGH option to store the SmartCan program in low memory.

The /STATUS switch displays a brief report about the current status of the SmartCan program on-screen. The report may contain information similar to this:

```
SmartCan Status:          Enabled
Drives Protected:         C: (SmartCan contains 528K
                          in 21 files)
Files Protected:          All files except those
                          with these extensions
                          TMP, SWP, INI
Archive Files:            Not protected
Files Deleted After:      5 days
```

The /UNINSTALL switch removes the SmartCan program from memory, deactivating file erase protection. When you end SmartCan with this option, you must reactivate the program by typing **SMARTCAN** again. If you attempt to run a program and receive a message indicating that not enough memory is available, you might try uninstalling SmartCan (or other TSR programs) to free up enough memory so that the application program does run.

The /CONVERT switch converts old trash cans created under the Erase Protect program into SmartCan trash cans. Usually, this conversion is performed when you install the Norton Utilities program. If it was not, you can enter **SMARTCAN /CONVERT** to perform the conversion on your old trash cans.

Using SmartCan on a Network

SmartCan enables you to protect erased files on a network. When you run the command the first time on a network, SmartCan creates a directory, TRASHCAN, that branches off the root directory. The network manager should make this directory available to all users of the network.

To run SmartCan properly on a network, initiate the command after the network driver and shell are loaded.

Summary

You learned in this chapter that the SmartCan program is like a "smart" trash can. When you erase a file (throw it away), the file remains in the trash can for a few days, depending on the amount of time you specify. As long as the trash collector has not emptied the trash can, you can retrieve (unerase) the file. SmartCan is also selective about what erased files it protects. You can choose to exclude or include certain types of files.

SmartCan allows you to erase files, but it protects those erased files for a period of time. The next chapter describes Disk Monitor, which takes a different approach to file protection. Disk Monitor provides protection that prevents certain kinds of files from being erased in the first place.

CHAPTER 6

Using Disk Monitor

The preceding chapter discussed Norton Utilities SmartCan. SmartCan protects files that have been erased for a period of time, giving them a better chance of being unerased if needed. Another aspect of protecting files, however, is to make sure that they don't get erased in the first place. This task is the primary responsibility of Norton Disk Monitor. You can use Disk Monitor to protect information on disk from accidental or unauthorized destruction, including a measure of protection against a virus infection.

Understanding Disk Monitor

Files can be erased in a number of ways. You can use the DOS DEL or ERASE command to erase a file, or you can erase a file by overwriting it with another file (such as copying one file to another file whose name already exists). Programs can also erase files "in the background" without your knowing what is being done. Most normal programs do not erase or overwrite files without your permission, but some malicious or unstable programs can do this kind of damage. To stop important files from being erased or overwritten, you need a file monitor that carefully watches DOS to see whether it is getting ready to overwrite an important file. This program is Norton Disk Monitor.

Before you or another user can access a protected file (including writing to, changing, or erasing it), Disk Monitor checks to see whether you have given permission for the file to be altered in this way. If the file is protected from change, Disk Monitor does not allow you or another user (or program) to alter the file. When a program that tries to alter a protected file is run—a spreadsheet program, for example—a message appears telling you that a protected file is about to be altered. You can choose to allow the change to proceed, stop the change from happening, or cancel the protection.

Disk Monitor can also save your important files from virus programs. These programs may try to alter critical files such as COMMAND.COM, AUTOEXEC.BAT, and CONFIG.SYS—the ones most often attacked by a virus program.

Another form of disk protection offered by Disk Monitor is given to you in the form of visual help—the Disk Light. Some computers have a hard disk light at the front of the computer. This light flashes when the disk is being accessed. If you notice that the disk is being accessed excessively, even when nothing is supposed to be happening to the disk, it may be a warning that a malicious program is doing something to your disk. Seeing such access might help you put a stop to it before all your data is scrambled.

However, some hard disks do not have such a light (usually add-on hard disks that are not factory installed). Also, if you are attached to a network, you have no light to tell you when you are accessing the network's drive. The Disk Monitor Disk Light allows you to place a "disk light" on your monitor. When the disk is being accessed, a blinking light appears on the screen, enabling you to monitor the activity of the drive.

Finally, Disk Monitor allows you to park your disk. *Parking* the disk is a safety measure that is important to perform before you move your computer. If the hard disk is not parked, the disk read and write heads may be stationed over a critical area of the disk. Then, if the computer is moved, a bump could cause serious damage to the disk platter, and files stored on the disk could be permanently lost.

You can use Disk Monitor interactively or like a DOS command. The next few sections cover the use of Disk Monitor for file protection. They also discuss how to set up Disk Light and how to park the disk using both the interactive and DOS prompt methods.

Setting Up Disk Monitor

The Disk Monitor command is a memory-resident program. Thus, when you begin the program, Disk Monitor stays in the computer's memory to monitor what is going on while you run other programs. You can use the Disk Monitor command interactively or from the DOS prompt. The first time you use Disk Monitor, however, you must use it interactively to choose its initial settings. To begin Disk Monitor, choose Disk Monitor from the Norton main screen or type **DISKMON** at the DOS prompt. A dialog box similar to the one in figure 6.1 appears.

Fig. 6.1
The Disk Monitor dialog box.

You can choose an option in the dialog box by pressing Alt plus the highlighted character in the option's name or by clicking the option name. When you choose **Q**uit, the settings you chose are stored in a file named DISKMON.INI.

After you have saved initial settings for Disk Monitor, the settings in the DISKMON.INI file are activated when you enter the DISKMON command at the DOS prompt, as discussed later in this chapter.

The next few sections explain the options in the Disk Monitor dialog box.

Protecting the Disk

The **D**isk Protect option in the Disk Monitor dialog box enables you to turn protection on and off and to specify which files you want to protect. After you choose the **D**isk Protect option, a dialog box similar to the one in figure 6.2 appears.

Fig. 6.2
The Disk Protect dialog box.

In the Disk Protect dialog box, you can choose one of the following radio button options:

Option	Description
System Areas	Specifies protection for the system area on your disk. This area includes the partition table, the boot record, and the system files.
Files	Specifies protection for files listed in the Files box. This protection excludes all files listed in the Exceptions box.
System Areas and Files	Specifies protection of system files and other files as indicated in the Files and Exceptions list boxes.
Entire Disk	Specifies protection for the entire disk.

In a group of radio button options, you can use only one of the options at a time. To choose an option, press Alt plus the highlighted option key or just click the option name.

The System Areas option provides protection for the areas of the disk that contain the partition table, the boot record, and the system files. These areas are of critical importance to the health of your computer and are often the target of malicious programs.

NOTE The data area of your disk is where your files are stored. Chapter 3 discusses the difference between the system area and the data area.

If you are using the computer with programs that might contain a virus or other malicious program, you need to protect your system area. Programs that are being developed and are unstable may also require you to protect your system area. For instance, they might write to the disk unexpectedly or incorrectly.

When an attempt is made to write information to the disk in a protected area, you are warned with an on-screen message (except for some instances described later in this chapter). You can then respond to the message to allow write access or prevent it. If you choose too much protection, normal use of the computer could become bothersome because of the constant need to respond to warning messages. For that reason, choose the combination of system and file protection that gives you the level of safety you want for your disk. You might want to experiment with levels of protection to see which level makes you feel secure without being too stringent.

Below the radio buttons in the Disk Protect dialog box is a check box option called **A**llow Floppy Access. If you check this option, Disk Monitor enables you (or a program) to format floppy disks without asking for your permission. If your work involves a lot of floppy disk formatting, you might want to select this option. However, if you have had an experience of formatting the wrong floppy disk, you may want to leave this option deselected as a warning to double check the disk before formatting. To select this option, press Alt+A or click the check box.

The two list boxes at the right side of the Disk Protect dialog box are used to specify the kinds of files to protect and not to protect. The Files list box specifies the kinds of files (according to file extension) that you want to protect (assuming that you have chosen to protect files). To change, add to, or delete file specifications from this list, press Tab until the highlight is in the list box, or click a file specification in the list. To add to the list, scroll to the end of it. A blank field is at the end of the list, where you can type a new specification (such as *.CAI). Press the down-arrow key, and another blank field opens. Add as many specifications as you need. To delete a specification, place the highlight on the appropriate specification and then press the space bar.

Working with the Exceptions list is similar to working with the Files list. When you change, add to, or delete from the Exceptions list, however, you must use full file names. You cannot use the wild-card characters ? and *. You can enter up to 20 file names in this list. You can use the list, for instance, when you want to protect all the EXE files except the ones on which you are currently working (editing, compiling, and so on).

After you type or choose all the options you want for Disk Protect, choose **O**n. This choice saves all the options you have chosen, activates disk protection, and takes you out of the Disk Protect dialog box. If you choose O**f**f, the settings you have chosen are saved, and you exit the dialog box. However, Disk Protect is turned off. If you choose **C**ancel, you exit the dialog box, and all changes are discarded.

Handling Disk Protect Warning Messages

After you choose the files to protect and you enter **DISKMON** at the DOS prompt, Disk Monitor runs in the background, monitoring messages to the operating system to determine whether a protected file is about to be altered. If, for example, a protected file is about to be erased, a warning message appears. Figure 6.3 shows a warning message displayed when the protected file, TESTFILE.MON, was about to be erased.

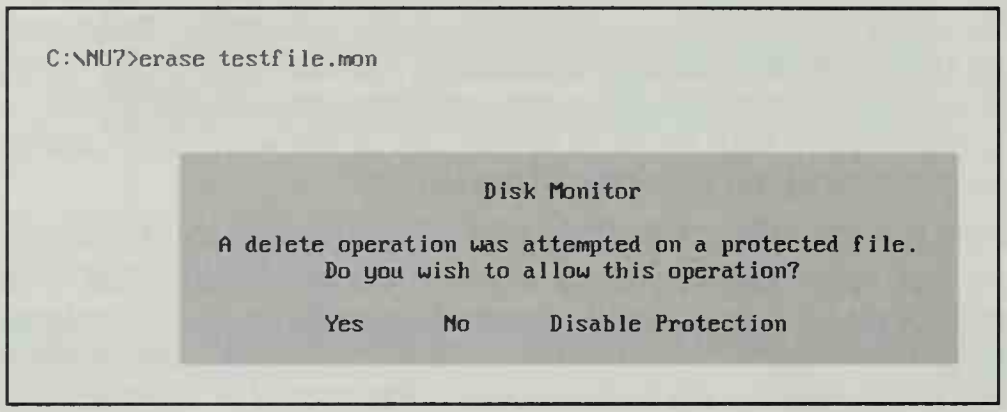


Fig. 6.3
A Disk Monitor warning message.

When such a warning message is displayed, you can choose **Y**es to allow the alteration to happen, **N**o to tell Disk Monitor to protect the file, or **D**isable Protection to turn file protection off.

If you choose **Y**es or **D**isable Protection, the file is deleted. If you choose **N**o, the file is not deleted, and the program you are running must then deal with the inability to perform its function. This inability may cause a warning or error message to appear. In the TESTFILE.MON case, when the erase was attempted with the DOS ERASE command and then not allowed, DOS responded with the message `File not found`.

Depending on the application you are running, you may have to respond to the warning message several times when the application writes to the file. If the process becomes too cumbersome, choose to discontinue protection.

Controlling Warning Messages for Graphics Mode

When you are running a graphics program such as Microsoft Windows, Disk Monitor cannot display the warning message on-screen. Instead, if the file is protected, the disk write (writing information to a protected file or erasing a protected file) is rejected. As a result, a warning or error message, such as `Access denied` or `Write protect error`, may appear in the graphics program.

If you are running a graphics application while using Disk Monitor, turning protection off while the graphics program is running is best. Then turn Disk Monitor back on when you exit the program. Because you might forget, an easy way to handle this situation is to write a batch program that turns protection off while the program is running, and then turns it back on when you exit the graphics program. Here is a sample batch program that runs the Windows program:

```
DISKMON \PROTECT-
WIN
DISKMON \PROTECT+
```

When you execute this batch file, disk protection is turned off, and the WIN (Windows) program is then run. When you exit Windows, disk protection is resumed. Disk Monitor command-line switches are discussed in the section "Using Disk Monitor from the DOS Prompt."

Adding a Disk Light

If you choose Disk Light from the Disk Monitor dialog box, the Disk Light dialog box appears (see fig. 6.4). From this box, you can turn the Disk Light feature on (**O**n) or off (**O**ff) or cancel any changes (**C**ancel).

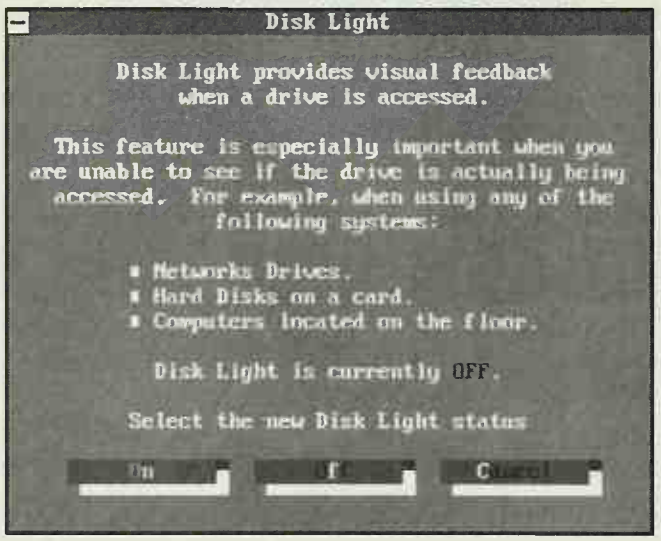


Fig. 6.4
The Disk Light dialog box.

After you turn on the Disk Light feature, a blinking light in the upper-right corner of your monitor tells you when the hard disk is being accessed.

This light is helpful if you cannot easily see the disk light on your hard disk. The light also shows you when information is being written to a network drive. Being able to see when your disk is being accessed is

important so that you can monitor this activity visually. If you notice a program accessing a disk when it should not be using the disk, you may want to test that program for possible virus infection.

Parking the Disk

The Disk **P**ark option in the Disk Monitor dialog box enables you to move the heads on your disk drive to a safe place; then you can move the computer without destroying data. On many new computers, the heads park automatically when you turn off the computer. If you do not know whether the heads park automatically, use Disk **P**ark before you move your computer.

When you select Disk **P**ark, the Disk Park dialog box appears (see fig. 6.5). Two beeps signal that the disk heads have been parked. Turn off the computer's power after you hear the two beeps. Or press Enter or choose **C**ancel to cancel the disk park and return to the Disk Monitor dialog box.

Fig. 6.5
The Disk Park dialog box.

Using Disk Monitor from the DOS Prompt

After you run the Disk Monitor program and choose options, you can begin the program by entering **DISKMON** at the DOS prompt. Or you can set or change options by typing the options on the command line. You use the following syntax:

DISKMON [*switches*]

Here are the available switches for the Disk Monitor command:

Switch	Description
/LIGHT+ or /LIGHT-	Turns the Disk Light feature on (+) or off (-).
/PARK	Parks all drives.
/PROTECT+ or /PROTECT-	Turns the Disk Protect feature on (+) or off (-). When this feature is turned on, protection is set to your selections, which were stored in DISKMON.INI when you ran the command interactively. If you have not made previous selections (that is, you do not have a DISKMON.INI file), the system files are protected by default.
/SKIPHIGH	Tells the program that you do not want Disk Monitor loaded into high memory.
/STATUS	Displays a summary of the Disk Monitor status on-screen.
/UNINSTALL	Uninstalls Disk Monitor from memory if it was the last TSR (memory-resident program) loaded into memory.

The /LIGHT option controls the Disk Light feature; this option is the same as the Disk Light option in the Disk Monitor dialog box. You can use the /PARK option to control the Disk Park feature. Use the /PROTECT option to turn disk protection on or off. The /STATUS option allows you to display information about what portions of Disk Monitor are currently active. For example, if you enter **DISKMON /STATUS** when you have file protection and the Disk Light feature is activated, the program responds with the following messages:

```
Disk Light ON
Disk Protect ON, Files protected
```

The /SKIPHIGH option refers to the use of your computer's RAM (random-access memory). The initial 640K RAM in your computer is referred to as low memory. Memory above 640K is called high memory. When a program is stored in high memory (as DISKMON is by default, if space is available), you have more low memory to be used by your

applications programs. If you are using a memory manager (or DOS 5.0 or later) that uses your high memory, use /SKIPHIGH to store the DISKMON program in low memory.

The /UNINSTALL option removes the DISKMON program from memory, deactivating disk protection. When you end DISKMON by using this option, you can reactivate it by issuing the DISKMON command again. If you attempt to run a large application program and you get a message that not enough memory is available, you might try uninstalling DISKMON (or other TSR programs) to free up enough memory so that the application program can run.

Using Disk Monitor on a Network

Disk Monitor can work on a network to prevent the modification of some files on your local or network drives. The command is not designed, however, to protect the system area of a network server. Usually, the server contains its own protection capabilities. The Disk **L**ight option enables you to "see" the network disk as it is accessed. This feature often gives you a better feel for network usage. Disk **P**ark does not park network heads.

Summary

Disk Monitor provides a "seeing eye" that watches your computer, making sure that important files do not get erased or altered without your permission. It is an invaluable feature in your arsenal against data loss. The Disk Light feature helps you have a better feel for disk access on local and network drives. Finally, Disk Park protects your disk when it is being moved.

Sometimes data protection is more than just protecting files against being erased or altered; it may involve protecting data in other ways. Turn to the next chapter to discover how Norton Utilities can protect your data from unauthorized use.

CHAPTER 7

Using Diskreet

When only large mainframe computers stored computer information, computer systems personnel took great pains to protect the information from unauthorized use. All the data was housed in vaultlike rooms, and access to the computer was protected by one or more passwords.

With more than 100 million personal computers used today, most containing readily accessible information, data safety has plummeted. Corporations, organizations, governments, and individuals have some need to protect their data from unauthorized use. In many cases, anyone (such as the person cleaning up your room at night, a corporate spy, or another office worker) could turn on a computer and access information in any file—such as personnel, financial, medical, legal, corporate, or strategy papers—that should not fall into the wrong hands. The Norton Utilities solution to this problem is called Diskreet.

The Norton Diskreet utility enables you to protect files so that users cannot access the files without permission. Users must know a password before they can access files. The Diskreet command provides much more protection than the Disk Monitor command or file attributes. Files stored by Diskreet are encrypted so that they are unreadable, even by the Disk Editor program. You can protect files individually or by group with a pseudodisk called an *NDisk*.

An NDisk operates as a disk drive does, but Diskreet automatically encrypts files stored on this drive, and only users who know the password can access the files. If you try to access an NDisk, you are prompted to enter a password. If you do not know the password, you cannot type, read, or otherwise access the files on that "disk" successfully. After you supply the correct password and open an NDisk, you can access these files, which are decrypted as you access them. When you close the NDisk, the files become inaccessible again.

You can regulate access to an NDisk interactively or from a DOS prompt. You can regulate the automatic closing of an NDisk after it has been inactive for a certain period, or you can create a hot key that quickly closes an NDisk. In addition, you can audit access to an NDisk to determine whether someone has tried to access your information without permission.

You can choose between two versions of NDisk encrypting: fast encryption (a Norton proprietary method) and Government Standard DES (data encryption standard). The fast encryption option is effective but not quite as secure as the DES method. That is, the fast method can be more easily deciphered than the DES method because the fast method's algorithm for encoding is not as complex as the DES scheme. The DES method is slow but secure; you probably will want to use it only if the protected information is as top secret as the Manhattan Project.

When you store information in an NDisk, the data is secure. If you forget your password, even Norton cannot help you unscramble your files.

Installing Diskreet

The Diskreet program is a terminate-and-stay-resident (TSR) program—when the program loads, it stays in memory and monitors the computer as you run other programs. You can install the Diskreet program during installation (see Appendix C). You can install the program also by changing the Norton configuration (see Chapter 2), or you can install Diskreet manually. This section describes how to install Diskreet manually.

Before you use the Diskreet program, you must add the following line to your CONFIG.SYS file:

DEVICE=*path*\DISKREET.SYS

The *path* is the name of the directory in which your Norton files are stored. If your Norton Utilities programs are stored in the directory named NORTON, you use this command:

DEVICE=\NORTON\DISKREET.SYS

Here are the switches that you can use with DISKREET:

Switch	Description
/A20ON	If you experience problems on a network drive or lose characters during serial communication, use this switch. It causes communications to be handled differently and usually solves the problem.
/NOHMA	Tells the command not to use the high memory area. Use this switch when you are running Windows.
/Q	Tells the command to operate in *quiet mode*; that is, it disables the warning message that appears when you run Windows.
/SKIPHIGH	Tells the command not to load into an upper memory block. Use this switch when you are running Windows or when you are using a memory manager such as QEMM or 386MAX.

When you boot the computer, the Diskreet DEVICE command tells DOS to make the Diskreet driver available for use. The first time you boot with the Diskreet device driver installed, you see a screen similar to that in figure 7.1. This screen gives you information about the Diskreet program, including all the default settings. Diskreet creates a file named DISKREET.INI, which contains the settings for the program. When you boot again, you see only the copyright notice for Diskreet.

```
DISKREET(tm)      Norton Utilties 7.0
Copyright 1992 by Symantec Corporation

No DISKREET config file to read (DISKREET.INI).
DISKREET's Main Password has been cleared.
Instant close keys have been reset to LEFT + RIGHT shift keys.
AUTO-CLOSE TIME-OUT interval has been set to five minutes and DISABLED.
Keyboard lock & screen blank has been DISABLED.
NDISK drive count set to one.

**************      PRESS  ANY  KEY  TO  CONTINUE      *****************
DISKREET's logical drive is D.

C:\>
```

Fig. 7.1

The message that appears the first time you use Diskreet.

When you run Diskreet under Windows in standard or enhanced mode, a message appears, advising you that some Diskreet features (Auto-Open, Quick-Close, and Auto-Close Timeout) are disabled while you are in Windows. To prevent this message from displaying, place a /Q switch at the end of the DEVICE statement in your CONFIG.SYS file. For example, use this command:

```
DEVICE=\NORTON\DISKREET.SYS /Q
```

The Diskreet driver takes up some of the RAM in your computer. If your computer has extended memory (over 640K), save some space for your program to use by placing the HIMEM.SYS driver (or PCSHADOW.SYS for COMPAQ computers) in your CONFIG.SYS file.

For example, to place the HIMEM.SYS driver (in the NORTON directory) in the CONFIG.SYS file, use the following command:

```
DEVICE=\NORTON\HIMEM.SYS
```

Place this DEVICE command before the command DEVICE=\NORTON\DISKREET.SYS in your CONFIG.SYS file. If you are using an 80386-based computer, you can use an alternative memory manager such as QEMM or 386MAX in place of HIMEM.SYS.

Using Passwords

Information stored with Diskreet is only as safe as your password. Choose it with care. The more important your information, the more careful you should be about choosing and protecting your password. Diskreet requires passwords of six or more characters.

For a password, do *not* use your name, names of relatives, names of pets, license plate numbers, or any other kind of name or number associated with you or your company. When attempting to access your information, someone would try these combinations first.

The most effective passwords are random characters, such as ZTLFEWBDD, but these passwords are hard to remember. You could pick a strange word out of the dictionary, but a real hacker may even use some method of trying every word in the dictionary (spelled forward and backward) to get to your files. A compromise is to combine two easy-to-remember words that have no real meaning. Examples are LAUGH.BOOK, TREE/COMPUTER, and WHITE:RING. If you write down your password, place it in a protected area, such as a safe or a locked drawer.

In Diskreet, you can use three kinds of passwords. The *master* password protects the Diskreet settings and affects all NDisks. The *disk* password protects a specific NDisk or group of files. The *file* password protects an individual file.

Running Diskreet

To enter the Diskreet command, choose Diskreet from the Norton main screen or enter **DISKREET** at the DOS prompt. If you are using Diskreet for the first time or have not defined any NDisks, you see the dialog box shown in figure 7.2.

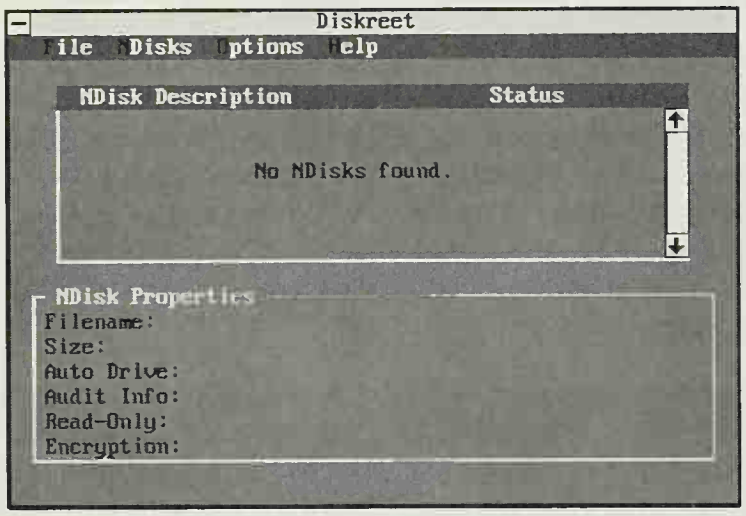


Fig. 7.2
The Diskreet dialog box.

From this dialog box, you can access the **F**ile, **N**Disks, **O**ptions, and **H**elp menus and then choose from a number of options located in these menus. The **H**elp option accesses the Norton Help screens; the other menus are described in the following sections.

Encrypting and Decrypting Files

If you choose the **E**ncrypt option from the **F**ile menu, a dialog box similar to the one in figure 7.3 appears. From this dialog box, you can choose which file to encrypt. Notice that the current path listed just above the **D**irectories box is C:\NU. This tells you that the files in the **F**iles list box are those contained in the C:\NU directory. This dialog box is similar to others in Norton Utilities; it is a "browse" dialog box, which means that you can look for the file or files you want to select for a particular task. In this case, the task is encrypting.

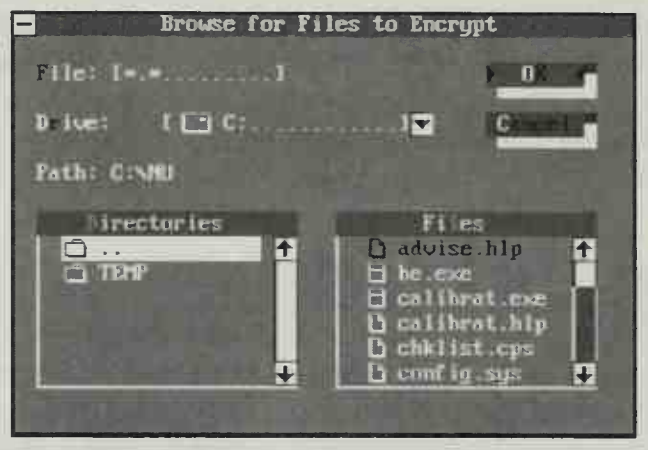


Fig. 7.3
The Browse for Files to Encrypt dialog box.

Specifying the Files To Encrypt

You can use the **D**irectories list box to look for a directory. To browse for files in a directory other than the current directory (C:\NU), select the . . entry in the **D**irectories box by pressing Alt+D. Press Enter or double-click . . . The **D**irectories list box displays a list of the sub-directories of that parent directory. With this list box displayed, you can then select a directory name with the arrow keys or the mouse pointer. When you select a directory name, the files in that directory appear in the Fi**l**es list box.

T I P To quickly locate a directory name in the **D**irectories list box or to find a file name in the Fi**l**es list box, you can press the first character of the directory or file name. The highlight in the list box jumps to the first name (alphabetically) in the list beginning with the character you typed. Then you can scroll to find the specific directory or file name.

To select a file in the Fi**l**es list box, highlight the file name and press the space bar, or just double-click the name with the mouse. When you click or press the space bar, a check mark appears beside the highlighted name, which means that the file is selected. Select as many files as you want to encrypt.

To choose files on a different drive, select a new drive name from the D**r**ive drop-down list. To see this list, highlight the list and press PgDn, or point to the triangle to the right of the D**r**ive field and click. A list of available drives appears. Select the drive you want to browse.

> To avoid selecting a drive and directory, enter the DISKREET command from the drive and directory that contain the files you want to encrypt or decrypt.
>
> **T I P**

If you encrypt a single file or a group of files that can be easily described with the DOS wild-card characters ? and *, you can enter a file specification in the File field. For example, you can enter a single file name, such as MYFILE.TXT, or a file specification that includes a number of files, such as *.TXT.

After you define the files to encrypt, choose **OK** or press Enter to begin the encryption process. To exit the Browse for File to Encrypt dialog box without encrypting files, choose Cancel.

Specifying the File Name and Password

After you choose to encrypt the selected file or files, another dialog box appears (see fig. 7.4). This Encrypt a File dialog box enables you to specify the file in which the encrypted information is stored, and prompts you to enter the password for the encryption.

Fig. 7.4
The Encrypt a File dialog box.

If the **T**o file name is acceptable, enter the password. To change the name of the file that contains the encrypted information, enter the new file name in the **T**o Field.

Passwords must contain a minimum of 6 characters and a maximum of 40 characters. Each encrypted file can be protected with a different password, or you can enter the same password for each file. The encryption password must be entered twice. Type the password the first time in the Enter **P**assword field. To verify that the password is accurate, you must then reenter the password in the **R**e-Enter Password field.

CAUTION: Remember the password. You cannot recover the encrypted information without it.

To proceed with the encryption, choose **O**K or press Enter. To exit the dialog box without encrypting the file, choose **C**ancel.

When the file has been encrypted, a message is displayed telling you that the file encryption was successful. After you press Enter, another message is displayed asking whether you want to permanently delete the original files (see fig. 7.5). If you choose **D**elete, the original file or files you encrypted are wiped from the disk (as with WipeInfo, discussed in Chapter 8). That is, after the file is deleted, it *cannot* be unerased. If you choose **C**ancel to cancel the message (not delete the file), the original files remain on disk. If you choose the **D**isable This Message option, this question no longer appears when you have encrypted a file.

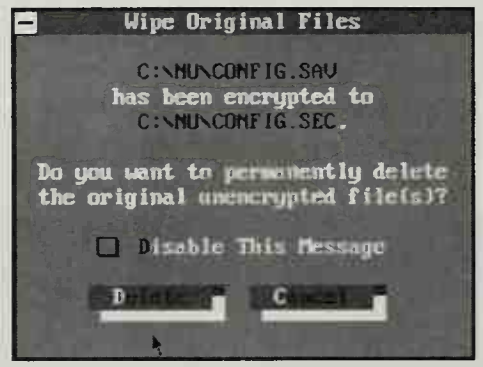


Fig. 7.5
Diskreet asking whether you want to delete the original file permanently.

T I P If you allow a file to remain on disk after you encrypt it, you do not have protection from someone who might look at the contents of the file. The DOS DEL or ERASE command does not protect you, because the file can be unerased. The *only* way to get rid of the contents of the unencrypted file is to allow Diskreet to permanently delete it, or to delete it with the WipeInfo command (see Chapter 8).

Decrypting the File

After the file is encrypted, it looks like gibberish when you try to read it. To get the file back to normal, you must decrypt it. To decrypt a file, choose the **D**ecrypt option from the Diskreet **F**ile menu. You see a file-selection dialog box like the one you use for choosing a file to encrypt

(see fig. 7.6). The encrypted file may actually contain several encrypted files. After you choose the file to decrypt, you are asked for the password. If you enter the correct password, the file is decrypted. If you do not enter the correct password, the file is not decrypted. A message appears telling you that the password was incorrect, and the Diskreet main dialog box is displayed again.

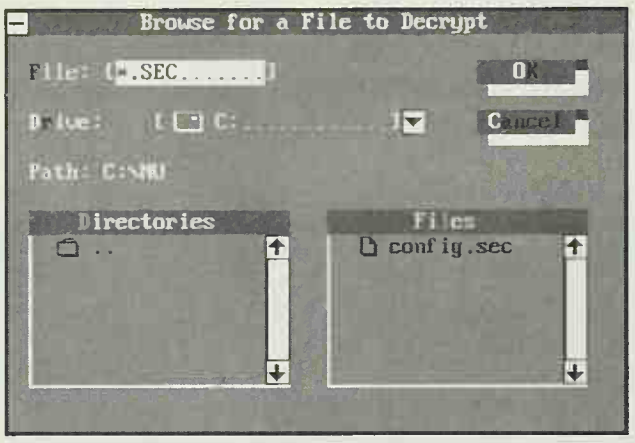


Fig. 7.6
Selecting a file to decrypt.

If a file with the same name as the file being decrypted already exists, a dialog box like the one in figure 7.7 appears. You can choose **O**verwrite, **S**kip, or **C**ancel. **O**verwrite overwrites the existing file with the one being decrypted. **S**kip causes Diskreet to skip decrypting the named file. **C**ancel terminates the decryption, and you return to the Diskreet menu.

Fig. 7.7
The dialog box for overwriting an existing file.

Creating a Diskreet NDisk

A Diskreet NDisk provides a method for automatically encrypting and decrypting all files that are written to or read from disk. When you first use Diskreet, the message `No NDisks found` appears. As noted earlier, an NDisk is a Norton encrypted disk; it is not a physical disk, but a portion of your hard disk set aside to behave as a separate disk. When you create an NDisk, you can use it as you would use any other disk (D:, E:, and so on). You can write and read files from this disk and use them in any program. When you close the NDisk (using Diskreet), however, all information on the disk is protected by encryption and cannot be read until you open the NDisk again with Diskreet and the correct password.

Before you can use an NDisk, you must create one. The following sections lead you through the creation of an NDisk.

Specifying NDisk Options

To begin the process of creating an NDisk, open the **N**Disks menu in the Diskreet dialog box. The first time you choose this option, you see a menu like the one in figure 7.8. To create an NDisk, you must choose the **C**reate option from this menu. You then see the Create an NDisk dialog box (see fig. 7.9).

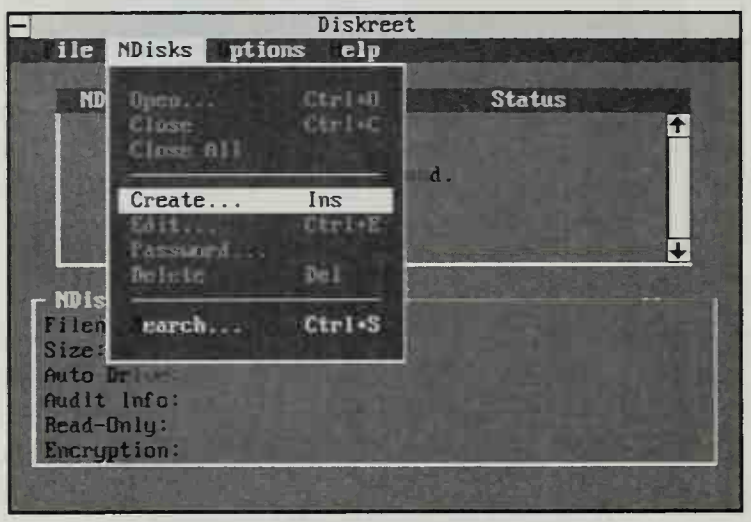


Fig. 7.8

The Diskreet **N**Disks menu.

Fig. 7.9

The Create an NDisk dialog box.

This dialog box contains options that enable you to specify how you want the NDisk created. Here are the available options:

- **N**ame specifies the name of your NDisk. You can type a name up to eight characters in length. The name must obey standard file-naming conventions for DOS.
- **L**ocation indicates the disk that is to store the NDisk. To change the current disk, click the triangle or press PgDn and select the disk from the list of disk drives.
- **D**escription enables you to type a brief description of the NDisk. (The program requires a description for each NDisk you create.) This description (up to 30 characters) can be any words that fit into the field. Use a description that helps you remember the purpose of the NDisk.
- **S**ize sets the size of the NDisk. If you do not like the default size, choose **S**ize and specify a different disk size. The default size given depends on your disk's free space, but it is usually 5120K (the size of a 5M hard disk), if you have that much space available. Choose a size that reflects the amount of data you plan to store in the NDisk.
- **E**ncryption Method specifies which encryption method is used to store the information. The options in the list are Fast Proprietary Method and Government Standard (DES). As mentioned earlier, the fast method is fairly secure and fast. The second method is slower (meeting government standards) but more secure.
- Show **A**udit Info indicates whether you want audit information shown when an NDisk is opened. This information shows you how many successful and unsuccessful attempts have been made to open your disk. A check mark means that this option is chosen.

After you choose your settings, choose **O**K. If you choose **C**ancel, all the settings revert to their previous states, and the dialog box closes.

Setting the Password and Drive

After you specify the NDisk options in the Create an NDisk dialog box and choose **O**K, the Set Password dialog box shown in figure 7.10 appears. At the top of the box is the Assigned **D**rive Letter option. Next to this is the default drive letter (usually the next available drive letter) that will be assigned to this NDisk. In this case, it is drive D. To make the NDisk a different drive, select the drive from the drop-down list of available drives.

Fig. 7.10
The Set Password dialog box.

To set the password for this NDisk, choose the Enter **P**assword option. Then type a password containing at least six characters. Enter the same password in the **R**e-Enter Password field to verify the spelling. These passwords must match exactly (but uppercase and lowercase do not have to match because case is not checked). If the passwords do not match, you must reenter both.

When you have chosen a drive letter and set the password for the NDisk, choose **O**K to close this dialog box and save the information about the new NDisk. To cancel this dialog box without setting a password, choose **C**ancel.

The Diskreet dialog box is again displayed. If you created an NDisk, it now appears in the NDisk Description list box, as shown in figure 7.11. The next section discusses opening, closing, and managing NDisks.

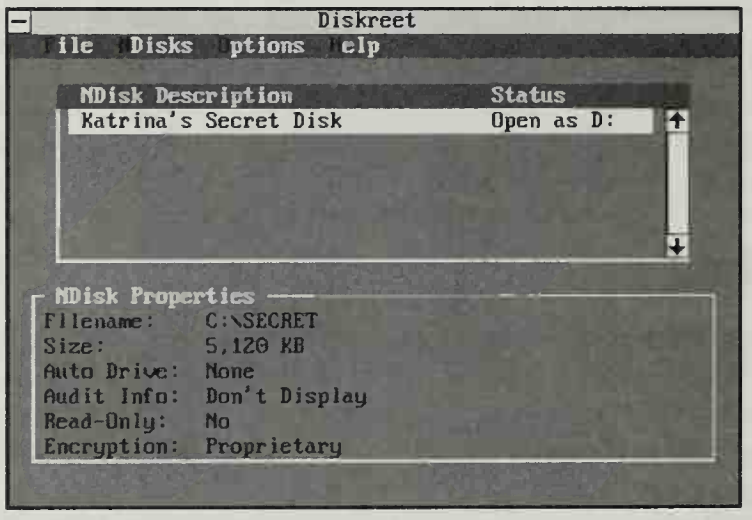


Fig. 7.11
The current list of NDisks, displayed in the Diskreet dialog box.

Managing NDisks

After you create one or more NDisks, the names appear in the Diskreet NDisk Description list in the Diskreet dialog box. To open, close, or perform other management tasks on these NDisks, use the **N**Disks menu. Before you open the NDisks menu, highlight the particular NDisk you want to manage by using the up- and down-arrow keys, or just click the name. If you compare the resulting menu in figure 7.12 with the menu in figure 7.8, you notice that the NDisk options now are available.

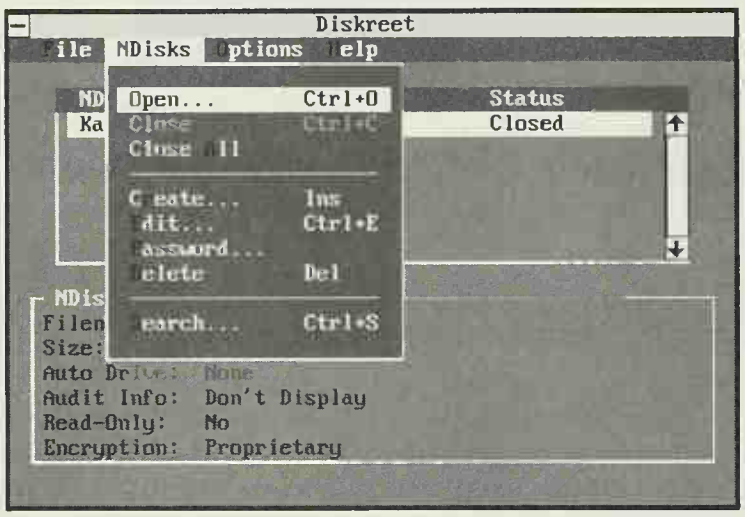


Fig. 7.12
The **N**Disks menu with active options.

NOTE When an option is in parentheses or grayed (dimmed), you cannot currently choose that option. In figure 7.12, the **C**lose option is not available because no NDisks are currently open. To choose an item when the menu is not pulled down, use the shortcut keys. When the menu is pulled down, choose an item by pressing the hot key or clicking the item.

The following sections describe the options in the **N**Disks menu.

Opening and Closing an NDisk

The **O**pen option in the **N**Disks menu enables you to open an NDisk; you can open multiple NDisks simultaneously. First highlight the name of the NDisk to open from the Diskreet NDisk Description list (refer to fig. 7.11); then choose the **O**pen option. Or you can double-click an NDisk description from the Diskreet dialog box.

When you attempt to open an NDisk, you are prompted to enter the password for that NDisk. If you enter the password correctly, the NDisk is opened and becomes available. If you do not enter the correct password, the message `Password Incorrect` appears, and the NDisk does not open.

If you chose to display audit information (refer to fig. 7.9), the program displays the following information:

Audit Information	Meaning
Last opened	The date and time the NDisk was last opened
Last password change	The date and time the password was last changed
Total failed attempts	The number of failed attempts to open the NDisk
Total open attempts	The number of successful attempts to open the NDisk

This audit information can be valuable when you want to determine whether someone attempted to open this NDisk. If you notice a large number of failed attempts, for example, someone may be trying to guess your password.

To close an NDisk, highlight the currently opened NDisk in the Diskreet NDisk Description list and then choose the **C**lose option from the **N**Disks menu. This closes the NDisk so that files cannot be written or read from it. The Close **A**ll option in the **N**Disks menu can be used to close all currently opened NDisks.

Editing an NDisk

The **E**dit option in the **N**Disks menu enables you to change information about the currently highlighted NDisk, such as what drive name will be used and when you are prompted to enter the password. Before you choose the **E**dit option, highlight the NDisk with the information that you want to edit. (Note that the NDisk must be closed for you to edit it. To close an NDisk, choose **C**lose from the **N**Disks menu. To close multiple NDisks, choose Close **A**ll from the **N**Disks menu. If you attempt to open an NDisk, Diskreet displays a warning message; choose C**l**ose to close the selected NDisk.) Then choose **E**dit from the **N**Disks menu or press Ctrl+E. The Edit an NDisk dialog box is displayed (see fig. 7.13).

Fig. 7.13
The Edit an NDisk dialog box.

There are three drop-down lists in the Edit an NDisk dialog box: **A**uto Drive, **P**rompt, and Pro**m**pt At. The A**u**to Drive list contains possible drive names to be used for the NDisk.

The **P**rompt list contains the options Pop-Up, Automatic (the default setting), and Beep. The Pro**m**pt At list contains the options Boot and First Access (the default setting). These options enable you to choose when you are prompted for the password to use an NDisk—either when you boot your computer or when you first try to access the disk.

The **D**escription field enables you to change the brief description of the NDisk. In the **S**ize field, you can change the size currently allocated for the NDisk. You cannot make the size smaller than the current size of the files in that NDisk. If you anticipate storing more information in an NDisk, you might want to increase its size. The Show **A**udit Info check box allows you to specify that information about the disk's usage be displayed when you open the NDisk. (See the earlier section "Opening and Closing an NDisk" for more information on the audit information.) The **R**ead-Only check box allows you to set the file attribute of the NDisk as read-only. This means that the information in the NDisk can be read, but not written to or changed. You might want to check this option if the NDisk contains information that should not be altered.

Changing the NDisk Password and Encryption Method

The **P**assword option in the **N**Disks menu enables you to change the password for an NDisk. Before you choose this option, highlight an NDisk name in the NDisk Description list in the Diskreet dialog box.

Then choose **P**assword from the **N**Disks menu. The Set Password dialog box appears, as shown in figure 7.14. This dialog box enables you to change the current password. You must first enter the current password in the Enter Old **P**assword text box and then enter a new password in the Enter **N**ew Password text box. Verify the new password by entering the identical new password again in the **R**e-Enter New Password text box.

From this dialog box, you can also choose to change the encryption method with either the Secure or Quick option from the Re-**E**ncryption Type list box.

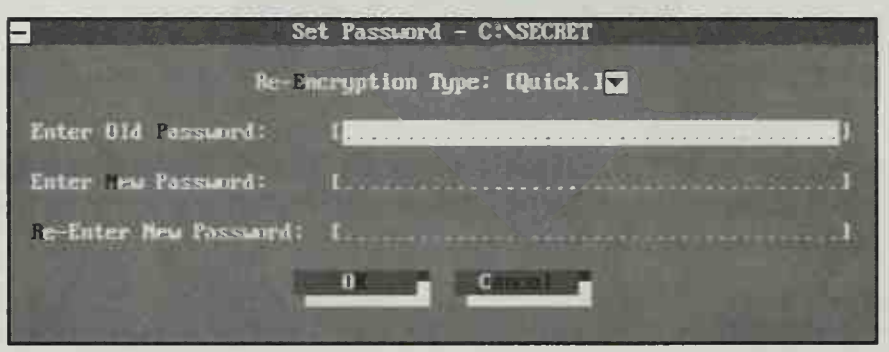


Fig. 7.14
The Set Password dialog box.

Deleting NDisks

To delete an NDisk, choose **D**elete from the **N**Disks menu. Diskreet displays a warning message, as shown in figure 7.15, and requires you to type the password for the selected NDisk before you can delete it. If you don't want to delete the NDisk, choose **C**ancel or press Esc. To delete the NDisk, type the password; then choose **D**elete (pressing Enter doesn't work). If the password you type is incorrect or if you fail to type a password, Diskreet just returns to the Diskreet dialog box without deleting the NDisk.

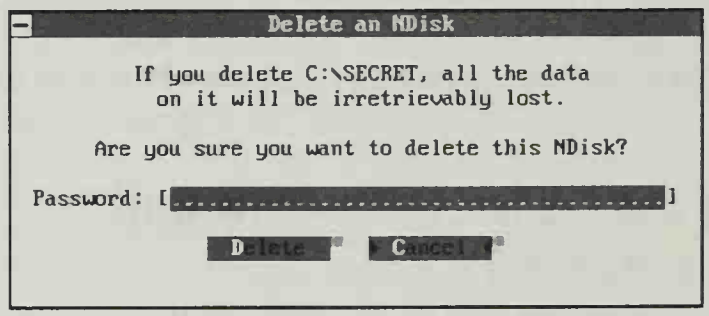


Fig. 7.15
The Delete an NDisk dialog box.

Searching for NDisks

The **S**earch option in the **N**Disks menu enables you to search disks on your computer for an NDisk. This option can help if your NDisk is

stored on a disk other than your default drive, or if you have NDisks on several disks or disk partitions. When you choose the **S**earch option, the dialog box shown in figure 7.16 appears. The Drives list on the left side of the dialog box contains a list of all the disks known to Diskreet. To select a disk to search, highlight that disk name and press the space bar; a check mark appears beside the disk name. Or double-click a disk name. Choose as many disks as you want from the Drives list.

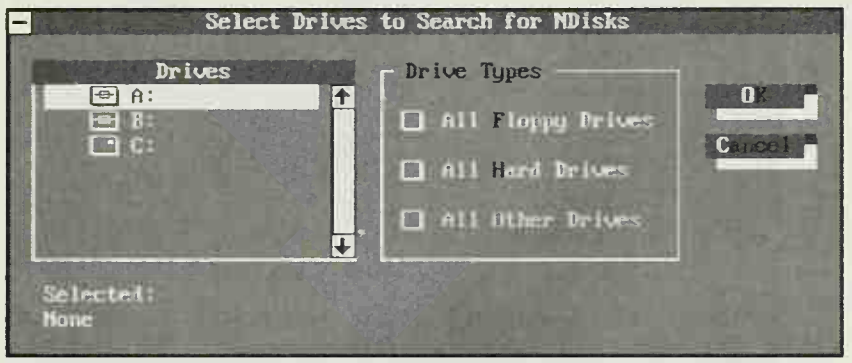


Fig. 7.16
Specifying drives to search for NDisks.

Three other selection options appear on the right side of the dialog box. Instead of selecting floppy disk drives manually from the Drives list, choose the All **F**loppy Drives option, which selects all floppy drives. Select all hard drives in the same way, by choosing All **H**ard Drives. The **A**ll Other Drives option is available only if you have other drives, such as network drives.

T I P

If you just placed a floppy disk in a disk drive, Diskreet does not know that the disk is there until you choose the All **F**loppy Drives option. Notice that you can press Ctrl+S at any time in the Diskreet program to run the **S**earch option.

After you choose the drives you want to search, choose **O**K to begin searching. The NDisks in the Diskreet Description list reflect those found on the drives you chose to search. To cancel this box without choosing drives to search, choose **C**ancel.

The **N**Disks menu enables you to manage how your NDisks are named and accessed. The next Diskreet menu, **O**ptions, enables you to set options for file and disk access.

Specifying Diskreet Options

The Diskreet **O**ptions menu enables you to choose a number of options that deal with how your NDisks operate. The options on this menu are described in the following sections (see fig. 7.17).

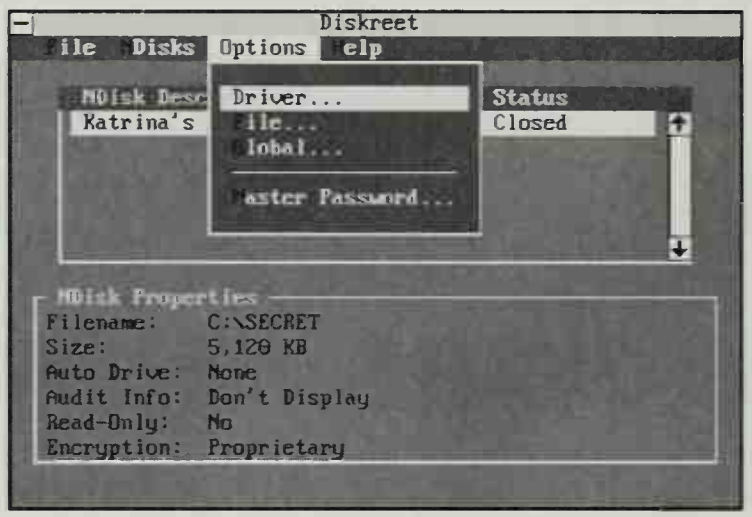


Fig. 7.17
The Diskreet **O**ptions menu.

Driver Options

When you choose the **D**river option in the **O**ptions menu, Diskreet displays the Driver Options dialog box (see fig. 7.18). This dialog box enables you to specify the number of drive letters to reserve for use with NDisks. You can choose from 1 to 5, according to the number of drives you want to have available. If, for example, your computer already uses up to disk D: and you choose three drive letters to reserve, the drives E:, F:, and G: are available for use as NDisks.

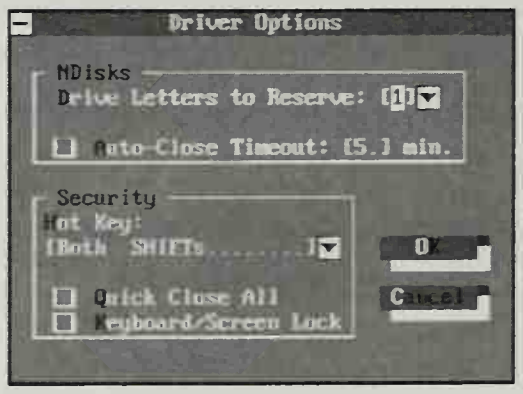


Fig. 7.18
The Driver Options dialog box.

When chosen, the **A**uto-Close Timeout option enables you to specify that an NDisk will automatically close after the NDisk has not been used for a certain amount of time. The default time is five minutes. This option enables you to protect yourself if you happen to leave your computer unexpectedly without closing your NDisk. When the system calculates that you have been gone the selected amount of time, the NDisk is automatically closed.

In the Security section of the dialog box, you can choose **H**ot Key for keystroke options that quickly close your NDisks. Choose from the following options:

Both SHIFTs

Both SHIFTs+CTRL

Left SHIFT+CTRL

Right SHIFT+CTRL

Both SHIFTs+ALT

Left SHIFT+ALT

Right SHIFT+ALT

CTRL+ALT

Other options in the Security section are **Q**uick Close All and **K**eyboard/Screen Lock. When checked, the **Q**uick Close All option causes all NDisks to close when you press the Security hot keys. If this box is not checked, the keystrokes do not close your NDisks. By default, the **Q**uick Close All option is selected.

If the **K**eyboard/Screen Lock option is checked, your keyboard locks, and your screen clears (you are unable to access the keyboard or screen) after you press the Security hot key. To regain use of the computer, you must enter the main password. Because your screen is blank, you are not prompted to enter the password. You must enter it on the keyboard. Nothing appears on-screen until you correctly enter the password; then the screen again becomes visible. Your only other alternative is to reboot the computer.

When you have chosen and saved a Security hot key and you have one or more NDisks opened, you can quickly close the NDisks by pressing the hot keys. Several versions of the hot keys are available because some terminate-and-stay-resident (TSR) programs that you use may already use one of these hot key combinations. In that case, choose one of the combinations not used by any TSR program you are using.

Choose **OK** when you have chosen the options you want from the Driver Options dialog box. If you choose **C**ancel, any options you chose are canceled.

File Encryption Options

When you choose the **F**ile option from the Diskreet **O**ptions menu, the File Encryption Options dialog box appears (see fig. 7.19).

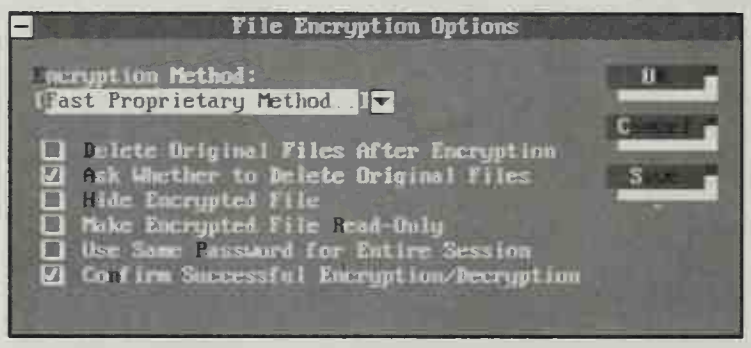


Fig. 7.19
The File Encryption Options dialog box.

From this dialog box, you can choose the following options:

- **E**ncryption Method specifies the encryption method used to encrypt files: Fast Proprietary Method or Government Standard (DES). The fast method is fairly secure and fast. The second method is slower (meeting government standards) but more secure, as described earlier.
- **D**elete Original Files After Encryption deletes the original files that you encrypted. Then only the encrypted files remain on your disk. This option is deselected by default. If you do not choose this option, your old file remains unprotected on disk.
- With **A**sk Whether To Delete Original Files, you are asked whether you want to delete the original file each time a file is encrypted. This option is selected by default. If you choose this option, an overwrite warning message appears after each encryption (refer to fig. 7.7).
- **H**ide Encrypted File sets the hidden file attribute on the encrypted file so that the file does not appear in a directory listing. This option is deselected by default.
- Make Encrypted File **R**ead-Only sets the read-only file attribute on the encrypted file so that the file cannot be deleted or altered. This option is deselected by default. Making an encrypted file hidden or read-only refers to setting the file attribute of the encrypted file, as described in Chapter 9.

- With Use Same **P**assword for Entire Session, you use just one password as long as you are in Diskreet and have not returned to the DOS prompt or the Norton main screen. That way, you do not have to enter a password each time to encrypt or decrypt a file. When this option is selected, you are prompted only once during an entire session for the password. By default, this option is deselected.
- With Co**n**firm Successful Encryption/Decryption, a confirmation dialog box tells you whether an encryption or decryption has been successful. This option is selected by default.

After you choose settings on-screen, choose **S**ave to save this information to disk. If you choose **O**K or press Enter, these options are available only until you reboot the computer. To exit this dialog box, choose **O**K or press Enter. To cancel all changes you made and exit the screen, choose **C**ancel.

Global Options

When you choose the **G**lobal option from the **O**ptions menu, the Global Options dialog box appears (see fig. 7.20). From this dialog box, you can choose which method to use for clearing data (erasing files) when Diskreet deletes the original files after encrypting a file. The options for data clearing are None, Overwrite Once, and Government Wipe (DOD Spec). Wiping techniques are described in Chapter 8.

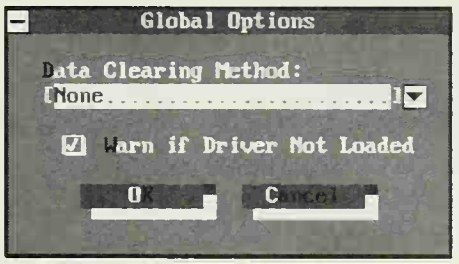


Fig. 7.20
The Global Options dialog box.

The **W**arn if Driver Not Loaded option enables you to decide whether a warning box is displayed when you start Diskreet and the Diskreet driver is not loaded. By default, this option is selected. If the drive is not loaded, the following message appears:

```
The Diskreet Driver (DISKREET.SYS) has not been loaded. It
must be running for you to work with NDISKS.
```

If the Diskreet driver is not loaded on your computer, see the section "Installing Diskreet," earlier in this chapter.

After you choose options in the Global Options dialog box, choose **O**K to exit the dialog box. If you choose **C**ancel, any options you chose are canceled.

Master Password Option

When you choose the **M**aster Password option from the **O**ptions menu, the Change Master Password dialog box appears. From this box, you can change the master Diskreet password. You must enter the current old password, if any, and then enter a new password twice to set the new password. To exit with the password reset, choose **O**K; or choose **C**ancel to exit and not reset the password.

Controlling Diskreet from the DOS Prompt

Many items that you can control through the Diskreet dialog boxes may also be controlled with the DISKREET command from the DOS prompt. You use this syntax:

DISKREET [*switches*]

The following switches are available with DISKREET:

Switch	Description
/CLOSE	Closes all NDisks
/D:*filespec*	Decrypts the specified file
/E:*filespec*	Encrypts the specified file
/T:*filespec*	Specifies the target file for encryption (use with the /E switch)
/HIDE[:*d*]	Hides the specified drive (NDisk)
/OFF	Disables use of the Diskreet driver
/ON	Enables the Diskreet driver
/P:*password*	Tells Diskreet which password to use for encryption or decryption of a file
/SHOW[:*d*]	Shows hidden drives (NDisks) being used to store files

You cannot use both /D and /E in the same command. The switches /CLOSE, /HIDE, /ON, /OFF, and /SHOW must be used alone, without any other options on the command line.

When encrypting a file from the DOS prompt, use this command:

DISKREET /E:*filespec* /T:*filespec* /P:*password*

The first *filespec* is the name of the file to be encrypted; the second *filespec* is the name of the target file for encryption.

When decrypting a file from the DOS prompt, use the following command:

DISKREET /D:*filespec* /P:*password*

For an example of using DISKREET to encrypt and decrypt files, see the upcoming section "Transferring Encrypted Files to Other Computers."

Using Diskreet on a Network

Diskreet NDisks are not designed to work as network drives. You can back up your NDisks, however, by copying them to a network drive. To read information from the network disk, you need to copy the information back onto your local computer's drive. With the DISKREET command, you can encrypt and decrypt individual files on a network drive. If you are on a Novell network, the NetWare command MAP attempts to locate any NDisks on your computer and prompts you for a password. To disable this prompt, enter the following commands at the DOS prompt or create a batch file to issue these commands:

```
C:\NORTON\DISKREET /OFF
MAP
C:\NORTON\DISKREET /ON
```

Transferring Encrypted Files to Other Computers

When a file or files are encrypted with Diskreet, the result is another file. This file, which contains encrypted information, cannot be read or used by your word processor or any other application program because the information contained in the file looks like gibberish. A user can access the information in the file only by decrypting the file with Diskreet. Because the file is protected by the Diskreet encryption,

you can safely send this file to other people without worrying that the file will be intercepted and deciphered on its way. The following sections explain how to transfer the encrypted files.

NOTE If you transfer highly sensitive information, you may not want to telephone and tell the password to the recipient if the telephone might be tapped. Your encrypted file is only as protected as the password.

Transferring Encrypted Files by Disk

To transfer an encrypted file from one computer to another by disk, copy the file to a floppy disk, take that disk to another computer, read the file onto the new computer, and decrypt the file with Diskreet. Because the information on the disk is protected, you can be comfortable sending the information by courier or mail. If the disk is intercepted, the information cannot be read unless the person intercepting it knows your Diskreet password. Therefore, it is important for the password to be protected. For example, do not send the disk and the password together in the same package.

To transfer important information from one computer to another with Diskreet encryption, follow these steps:

1. Encrypt the file (or files) you want to send with a password known to the person who is receiving the disk. (Make sure that the password is transferred with a safe method.) For example, you can encrypt a file named MYFILE.ENC into a file named MYFILE.SEC with the following command at the DOS prompt:

   DISKREET /E:MYFILE.ENC /T:MYFILE.SEC /P:ITSIMPORTANT

2. Copy the encrypted file to a floppy disk. If your encrypted file is named MYFILE.ENC, you can copy that file to a disk in drive A with this DOS command:

   COPY MYFILE.SEC A:

3. Send the disk to the recipient.

4. When the disk arrives at the destination computer, the recipient copies the file onto the computer. The following command copies the file MYFILE.ENC from a floppy disk in drive A to drive C:

   COPY A:MYFILE.SEC C:

5. The recipient decrypts the file with Diskreet and the password provided for the file. The following command decrypts the file MYFILE.SEC with the DISKREET command at the DOS prompt:

```
DISKREET /D:MYFILE.SEC /P:ITSIMPORTANT
```

The decrypted file is named MYFILE.ENC—its original name—because DISKREET remembers the name of the original file. After the file is decrypted, it can be read and used by the application program for which it was intended.

Transferring Encrypted Files by Modem

Transferring encrypted files by modem is not really different from transferring nonencrypted files by modem; however, your information is protected from being read by others. Transferring files by modem enables you to send information quickly from your computer to any computer in the world with a modem and telephone hookup. If you are not familiar with the process, please refer to a book such as Que's *Using PROCOMM PLUS*.

Before you send a file by modem, encrypt the file with Diskreet. Even if the file is intercepted when you send it, the interceptor will not be able to read it unless that person knows the password. Be sure that you protect the password. Do not e-mail it to the recipient, for example. If a person can intercept your file, that person can also intercept your e-mail, and e-mail is not often protected by encryption. After the file has been transferred, the recipient can decrypt the file with Diskreet.

Transferring the information from your computer to the recipient's computer requires the same steps as those described in the preceding section, but instead you call the computer where you want to send the file and then send the file by modem, using your agreed-on transfer method. If you use PROCOMM PLUS, for example, you might transfer the file, using the ZMODEM transfer protocol.

Summary

The Norton Diskreet program allows you to protect important and confidential data from people who do not have authorized access (by way of a password). With Diskreet, you can encrypt and decrypt individual files. You can also create one or more pseudodisks, called NDisks, that can be used just like real disk drives—except that the information stored on an NDisk is protected by a password.

Another way to protect important information is to completely destroy it when it should no longer be on your disk. The WipeInfo command, described in the next chapter, can perform this task.

CHAPTER 8

Destroying Files Permanently with WipeInfo

Because Norton Utilities and other programs offer the capability to bring back files after disks have been formatted, you may wonder how to get rid of files permanently. Amazingly, some people do not know or even think about this problem. A recent magazine story reported that a Fortune 100 company (a computer company, no less) auctioned off thousands of outdated PCs. Some were purchased by reporters who were able to unformat the hard disks and discover a great deal of important information.

How could this happen? The PC is particularly ornery about getting rid of information on disk permanently—it's harder than it seems. After you erase a file with the DOS ERASE or DELETE command, only one character in the disk directory changes. This character tells DOS that the file is deleted. The actual contents of the file are not changed, and most of the information about the file is still intact. When you format a disk, the system information and information in the root directory are erased, but most files' contents remain intact. For more information about how disks store files, see Chapter 3.

Even when a file is overwritten, parts of the disk may still contain file fragments. In fact, information that has appeared on your screen, which you have *never* saved to a file, may be written to your disk and could possibly be read by someone else. If you deal with very important data that must be protected from unauthorized use, you need to be aware of these potentially damaging situations. Here is how these problems arise.

Chapter 3 discussed how a file is saved on disk. If a file is less than a cluster in length, a portion of the cluster is not used for storing the file. This can be a cause for concern. Two kinds of information can be found in the remaining space assigned to a file but not actually used.

First, when DOS writes a file to be saved, it writes at least a sector of information. If the file saved is less than a sector long, DOS pads the remaining portion of the sector with whatever happens to be in RAM memory. This could be any of the following:

- A portion of a subdirectory
- Pieces of previously run programs
- Pieces of data used in previously run programs
- Other information in RAM

For example, suppose that you are a CIA agent. You write a memo to the President, send it by e-mail, and never save the e-mail for security reasons. Then you save another small file to disk. Information from the secret message may linger in RAM. When the small file is written to disk, DOS uses portions of RAM to pad out the remaining portion of the sector not used by the file. A critical portion of your secret message may have then been written to disk in that file!

Second, most disks store clusters more than one sector long. The preceding scenario just covers information padding out the rest of the last sector used to store a file. What if more sectors are left in the cluster? This unused cluster may contain information from a file that previously occupied that space. That leftover piece of a file could contain confidential information.

The following illustration shows what a disk may contain. The disk uses 2-sector clusters (1,024 bytes). Each sector is 512 bytes long. The first few bytes contain a file with the following memo:

```
Dave, let's meet for lunch at 11:30 this Friday — Al
```

This file is 54 bytes long. Therefore, the first sector of this file contains 512 minus 54 bytes (458 bytes) of unused space. The second sector of the cluster (512 bytes) is not needed to store any information from the file.

```
Bytes      Sector   Contents
1-64       1        Dave, let's meet for lunch at 11:30 this Friday — AlXXXXXXXXX
65-128              XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
129-192             XXXXOOPS, SOME SECRET INFORMATIONXXXXXXXXXXXXXXXXXXXXXXXXXX
193-256             XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXMORE!!!XXXXXXXXXXX
257-320             XXXXXXTHIS SPACE PADDED BY DOS WHEN FILE WAS WRITTENXXXXXXXXX
321-384             XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
385-448             XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
449-512             XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
513-576    2        ................................................................
577-640             .........THIS PORTION OF THE CLUSTER MAY CONTAIN LEFTOVERS....
641-704             ................................................................
705-768             .........OOPS, HERE IS SALARY INFORMATION!!.....................
769-832             .........FROM AN OLD REPORT.....................................
833-896             ................................................................
897-960             ................................................................
961-1024            ................................................................
```

The first sector (bytes 1–512) contains the file in bytes 1–54 and then padding from byte 55 through byte 512. Padded space in the first sector is shown in the graph as Xs. Bytes 513–1024 (the second sector in the cluster) contain whatever was left from the previous file. The second sector space is shown in the graph as dots. Notice that the first sector could contain in the padded area some information that happened to be in RAM at the time the file was saved. The second sector contains a piece of a file left from when that space stored a file that has now been deleted.

Of course, it is a problem that this secret information is on disk, but how could you read this "erased" information? You can read these areas with a disk editor such as Norton Disk Editor (see Chapter 17). A disk editor enables you to view the contents of a disk on a byte-by-byte basis (or even bit by bit). With a disk editor, you can read the information in the file slack space, as well as information in other areas of the disk.

Understanding WipeInfo

To give users a way to prevent important information from being seen by unauthorized eyes, Norton Utilities provides the WipeInfo command. This command *permanently* deletes files and disks by physically overwriting the contents of the disk, not just modifying the directory information. If you have information that should not fall into the wrong hands, WipeInfo should be an essential part of your information protection plan.

TIP If you demonstrate software, you should wipe program files instead of just deleting them. When you finish a demo, you might delete the files, but the files can easily be unerased and the program restored to the hard disk, which is, of course, illegal.

Before you use WipeInfo to delete important files permanently, you need a thorough understanding of this command and the way files are erased. WipeInfo overwrites the information on disk with several writes of random data. Unused areas of the disk are wiped clear so that they no longer contain residual files that were previously erased.

WARNING: Be careful when you use the Wipeinfo command. Its results cannot be reversed.

WipeInfo includes a Government Wipe option that overwrites the information on a disk according to Department of Defense (DOD) specifications. These specifications call for a 1/0 pattern (a pattern of 1s and 0s) to be written to the disk three times, a random number to be written to the disk, and the last number written to the disk to be read back from the disk for verification (DOD 5220.22-M). The government adopted these specifications because a single erasure of magnetic information may not be enough. A faint magnetic "fingerprint" may remain on a disk after a single erasure.

NOTE A Government Wipe of a file can take a few seconds or minutes (depending on the file size). A Government Wipe of a 1.44M disk can take two hours, and a wipe of a hard disk can last most of the day.

You can use WipeInfo interactively or as a command from the DOS prompt. The following sections describe how to use WipeInfo.

Using the WipeInfo Dialog Box

To use WipeInfo, choose WipeInfo from the Norton main screen or enter **WIPEINFO** at the DOS prompt. The WipeInfo dialog box appears, as shown in figure 8.1.

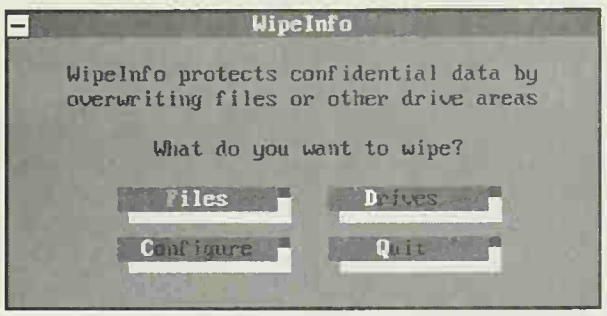


Fig. 8.1
The WipeInfo dialog box.

The WipeInfo dialog box gives you four options. The **Q**uit option returns to the DOS prompt or the Norton main screen. The following sections describe the other options.

Specifying Files

If you choose **F**iles from the WipeInfo dialog box, Norton displays the Wipe Files dialog box (see fig. 8.2). In this dialog box, you can enter the names of the files to be wiped. To specify multiple files, use the * and ? wild-card characters.

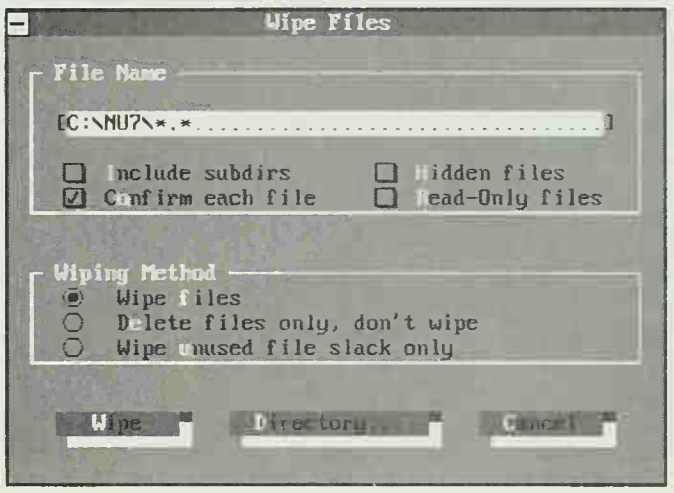


Fig. 8.2
The Wipe Files dialog box.

The following options are available in the File Name section of the dialog box:

- To wipe files with matching file specifications in subdirectories, choose **I**nclude Subdirs.
- To have the program prompt you before it wipes each file, choose **C**onfirm Each File.
- To wipe hidden files or read-only files that match the file specification, choose **H**idden Files or **R**ead-Only Files.

In the Wiping Method section of the Wipe Files dialog box, you can specify whether you want to wipe the file or just delete it (as you would with DOS DELETE). The Wipe **U**nused File Slack Only option causes WipeInfo to wipe just those portions of the disk that are allocated to a file but unused. This process does not affect the file itself but wipes only the information in the slack space of the file. After you choose your options, choose the **W**ipe command button at the bottom of the dialog box to begin the wiping procedure; choose **C**ancel to cancel the wipe.

The **D**irectory option at the bottom of the dialog box enables you to change the current default directory. When you choose the option, a dialog box like the one in figure 8.3 appears. From the Change Directory dialog box, you can enter a new path, choose a new drive from a drop-down list box, or choose a new directory from the **S**ubdirectories list box. To display directories in the **S**ubdirectories list box, highlight the root directory symbol (\) and press Enter, or double-click the root directory. To choose a subdirectory, highlight the directory name in the **S**ubdirectories list and press Enter, or double-click. That directory name appears in the **P**ath field. To exit this dialog box and change to the specified directory, choose **O**K. Choose **C**ancel to exit without changing to another directory or drive.

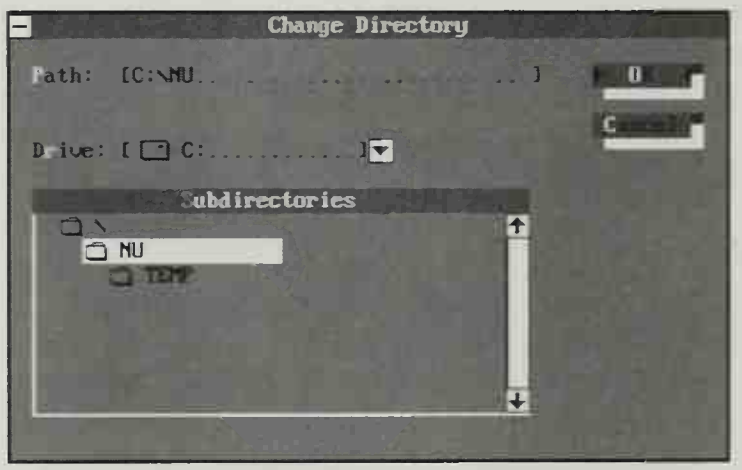


Fig. 8.3
The WipeInfo Change Directory dialog box.

Specifying Drives

The **D**rives option in the WipeInfo dialog box displays the Select Drives To Wipe dialog box (see fig. 8.4). From this dialog box, you can select which drives to wipe. You can also choose to wipe the entire disk (Wipe **E**ntire Drive) or just the unused portions of the disk (Wipe **U**nused Areas Only). Wiping the unused portion of the disk gets rid of any erased files that someone could restore to see important information. After you choose the options in this menu, choose **O**K to begin wiping or **C**ancel to cancel the wipe.

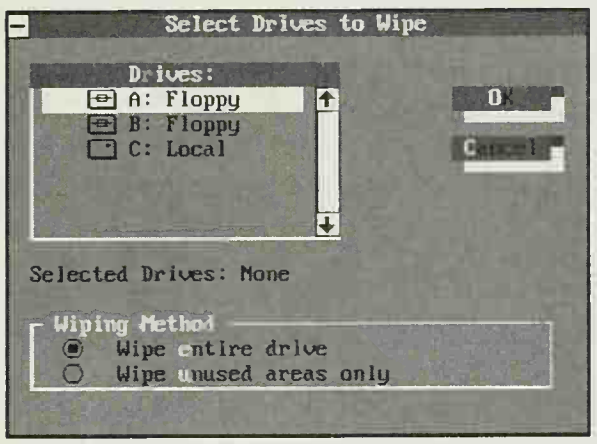


Fig. 8.4
The Select Drives To Wipe dialog box.

Configuring the Wipe Process

The Configure option in the WipeInfo dialog box displays the Wipe Configuration dialog box, enabling you to determine how information is wiped from the disk (see fig. 8.5). From this dialog box, choose the **F**ast Wipe (default) or **G**overnment Wipe option.

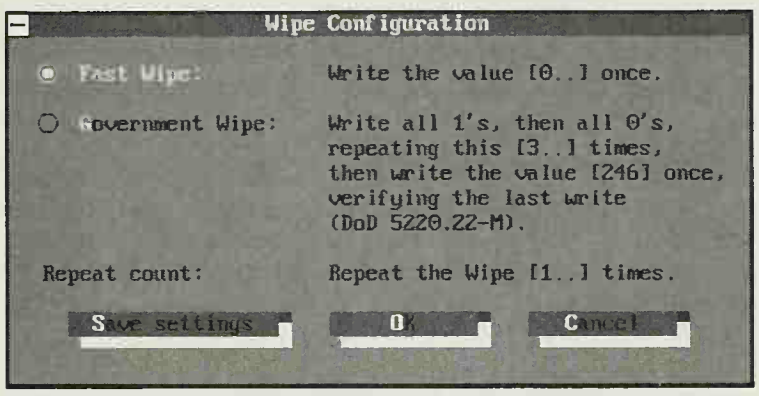


Fig. 8.5
The Wipe Configuration dialog box.

You can change several of the numbers in the options. Use the arrow keys, Tab, or mouse to move to those fields to change the numbers. The following list describes the changes you can make:

- For the **F**ast Wipe option, you can change the write value from 0 to another number (from 1 to 255).
- For the **G**overnment Wipe option, you can change the number of times the write is repeated (1s and 0s are written) from 3 to another number, such as 5. You can also change the final value written (the default is ASCII 246). This change enables you to provide an even more thorough wipe than the regular government standard.
- You can change the Repeat Count setting from 1 to another number.

After you choose these settings, choose **S**ave Settings and then choose **O**K to return to the WipeInfo dialog box.

Using WipeInfo from the DOS Prompt

The WipeInfo command overwrites information on disk so that the information cannot be recovered. This process includes wiping individual files or an entire disk. The syntax for the WipeInfo command is

WIPEINFO d:[/E] [/GOV*n*] [/R*n*] [/V*n*] [/BATCH]

or

WIPEINFO [*filespec*][/N][[/K][/S][/GOV*n*][/R*n*}[/V*n*][/BATCH]

The first version of the command is used to wipe information from disks. The second command is used to wipe files. Use only those switches listed for each version of the command. Here are descriptions of the switches available:

Switch	Description
/E	Causes the command to overwrite only information that is currently unused or is in "erased" files—files marked for erase by the DOS ERASE command but otherwise recoverable.
/K	Wipes out a file and any slack space allocated to it. (For more information on slack space, see Chapter 3.)
/N	Uses "no wipe" mode, which causes the WipeInfo command to behave like the ERASE command. The file is marked as erased but is not overwritten.
/S	Wipes out files that match the file specification in the current directory and all subdirectories.
/GOV*n*	Uses a government-standard overwriting procedure. The default for *n* (number of overwrites) is 3. The value written to disk is ASCII value 246.
/R*n*	Overwrites the disk *n* times. The default is 1.
/V*n*	Selects the value to be used to overwrite information on the disk. The *n* value can be from 0 to 255. Although the default is 0, the /GOV*n* switch overrides this default.
/BATCH	Executes the command without any prompts. This switch is helpful when the command is used in batch files. You can also use it from the DOS prompt, however. If you do use this switch, make sure that you know what you are doing, because the program begins wiping information without giving any chance to verify the correctness of the command.

CAUTION: A few software products store copy-protection information in the slack space of a file. If you wipe out the slack space with the /K option, you may cause a program to lose its capability to run. Although this storage practice is not common, if you use software with protection schemes, you may want to check with the software manufacturer to see whether wiping the slack space affects the program's capability to run.

To wipe D: disk by using the government standard, enter the following command:

```
WIPEINFO D:/GOV
```

WipeInfo is a convenient way to erase files throughout your hard disk. To "clean up" your hard disk, get rid of unnecessary files, and provide more space on the disk, you could use WipeInfo to erase all files (using the DOS style of erase) on your C: disk that match the specification TMP*.*. You would use the following command:

```
WIPEINFO C:\TMP*.* /S /N
```

When you enter this command, you are prompted by a warning message (see fig. 8.6). To continue with the deletion, choose **D**elete. To cancel, press Enter or choose **C**ancel. If you choose to continue with the delete, WipeInfo identifies all the files that match the delete criteria and displays them in the Wiping Files dialog box (see fig. 8.7).

Fig. 8.6
The message box that appears when you delete files with WipeInfo.

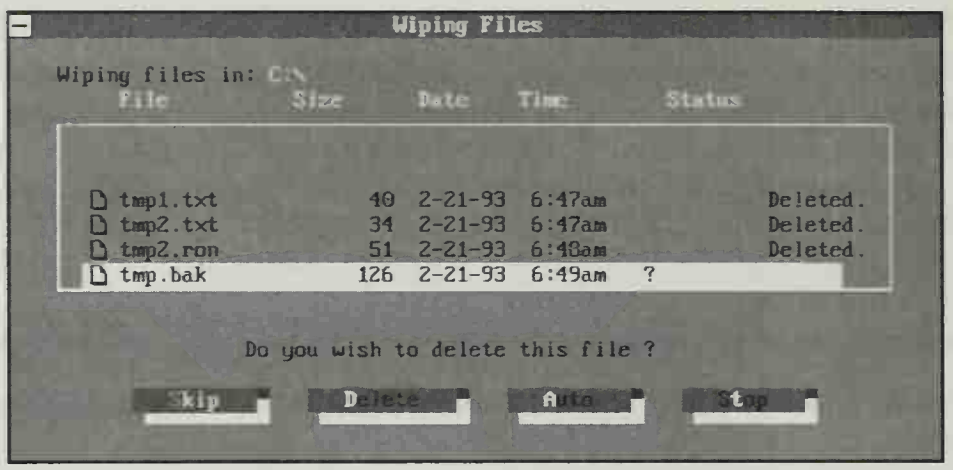


Fig. 8.7
The Wiping Files dialog box.

The Wiping Files dialog box shows four files that have been listed thus far. As each file is highlighted on the list, you can choose **S**kip to skip that file (or **D**elete if you have chosen the delete mode rather than the wipe mode). Or you can choose the **A**uto option, which tells the program to continue deleting the rest of the files without prompting. Choose the **S**top option to cancel any further deletions.

To skip the dialog boxes shown in figures 8.6 and 8.7 when entering the WipeInfo command at the DOS prompt, you place the /BATCH switch on the command line. For example, here is the same command used earlier, with the option to skip the warning and file list screens:

```
WIPEINFO C:\TMP*.* /S /N /BATCH
```

Be careful when you use the /BATCH switch because you do not get a second chance to stop the wipe. However, even if you go ahead and begin WipeInfo and suddenly have a change of heart or discover that you are wiping out the wrong disk, you can interrupt the process by pressing Ctrl+Break. If the operation has not proceeded too far, you may be able to recover some information on the disk. In fact, Norton designed WipeInfo so that it destroys the most unused part of the disk first; if you stop the procedure quickly, you have a good chance of being able to use some of the information on disk. Furthermore, if you use the /N switch, the files deleted are erased with the DOS erase procedure and are probably uneraseable with UnErase (see Chapter 10).

T I P

If you give a computer with a hard disk to another person and that computer contains information the recipient should not see, use WipeInfo. To wipe out only data files but leave programs intact on a computer, first erase all the confidential files and then use WipeInfo with the /E switch to wipe out all the erased files. The programs are left intact.

Summary

Norton Utilities offers you a number of ways to protect your information on disk. When protecting information means making sure that it does not get into the wrong hands, use WipeInfo to do an effective job of getting rid of information on disk. This command is more thorough than the DOS ERASE, DELETE, and FORMAT commands.

One final chapter in Part II covers ways to prevent files from being erased or changed. For information about setting file attributes, turn to Chapter 9.

CHAPTER 9

Setting File Attributes

The last several chapters covered Norton programs that enable you to protect your data on disk in a number of ways. This chapter rounds out the protection schemes by covering two Norton Utilities commands that use file attributes to protect files: File Attributes and File Find. *File attributes* are pieces of information about a file that tell DOS how to manage the file. This chapter presents information about these attributes and shows how they can be used to protect your data.

The value of this method of protection is that it takes no overhead to protect the files. Unlike Diskreet and SmartCan, the File Attributes and File Find commands are built into DOS and do not require any memory-resident program to be active for files to be protected.

Understanding File Attributes

To protect your important files, prevent them from being erased or overwritten. Overwriting a file is different from erasing a file—and more destructive. When a file is overwritten, the information in the file is permanently replaced by the contents of the new file. Suppose that you have a valuable Lotus 1-2-3 worksheet named ABLE.WK3. Overwriting that file from 1-2-3 is possible (and sometimes easy). If you overwrite the file, you cannot recover the old file with the UnErase command because all or at least some of the information in the old file is gone. In particular, you want to protect certain files from erasure or change.

Examples are COMMAND.COM, AUTOEXEC.BAT, CONFIG.SYS, WIN.INI, SYSTEM.INI, and other configuration and system files for various application programs.

When one person gives a friend a floppy disk containing a program, a common problem can occur. The friend, who knows only enough about the COPY command to make himself dangerous, copies the program from the floppy disk to the hard disk with a command such as COPY A:*.* C:.

With this command, some files on the floppy disk may overwrite files on the hard disk, particularly COMMAND.COM. When you reboot the computer, the version of COMMAND.COM copied from the floppy disk may conflict with the other system files, so the computer may refuse to reboot. To recover from this problem, you can use Rescue Disk (see Chapter 14). Other important files, such as AUTOEXEC.BAT and CONFIG.SYS, may also have been overwritten on your hard disk's root directory. If you did not back up this information to your rescue disk or another disk, you may have to reconstruct these files.

Of course, it is ill-advised to copy a floppy disk onto the root directory of your hard disk without knowing much about the contents of the floppy. To protect against this kind of problem if it does occur, you can set attributes for important files in the root directory on the hard disk. Then if you copy a floppy disk that you do not know much about, you do not overwrite your original files.

Specifying File Attributes

When you create a file on disk, DOS stores the name of the file as well as other pieces of vital information. When you enter the DOS DIR command, you see some of this information—the size of the file, the date and time the file was created, and so on. DOS also stores four other pieces of information that you usually do not see. You can toggle on or off these four pieces of information, called *attributes* (see table 9.1).

Table 9.1 File Attributes

Attribute	Description
Archive	When the archive attribute is set (turned on), the file has not been backed up. When you create a file, DOS turns on the archive attribute. When you perform the backup procedure, the archive attribute is turned off.

Attribute	Description
Hidden	When the hidden attribute is set, the file does not appear in a directory when you perform the DIR command. On a bootable disk, the DOS files named IBMBIOS.COM and IBMDOS.COM usually are hidden files. When you perform a CHKDSK command, you may notice a report of hidden files.
Read-only	When the read-only attribute is set, the information in a file can be read or used by a program, but DOS prevents the file from being changed or erased.
System	System files are similar to hidden files. When the system attribute is set, DOS considers the file a system file and does not display it in a directory when you issue a DIR command.

With the commands File Attributes (FA) and File Find (FILEFIND or FF), you can control these attributes and protect important files from accidental change or erasure.

Protecting Files with File Attributes

The read-only attribute helps protect a file from accidental change. The hidden attribute helps hide files from normal view, preventing that file from being used or altered. The archive attribute can be reset to back up files a number of times, which gives you added protection. Specifically, here is how you can use the File Find and File Attributes commands to protect your files:

- *You can make all important files read-only.* When a file is read-only, you cannot change or erase that file. Be aware, however, that some files to which programs write should not be set to read-only. You should make at least the important files in the root directory read-only (including COMMAND.COM, AUTOEXEC.BAT, and CONFIG.SYS). You may have other critical files in your application programs, which should also be set to read-only. To change any of these files, turn off the read-only attribute temporarily.
- *You can hide valuable files.* You can prevent other people from accessing your secret information by hiding files. (This method is not foolproof. If other users know how to reset attributes, they

can change the attribute back.) In fact, on most computers, two DOS files (IBMBIOS.COM and IBMDOS.COM) are hidden. Those files make up two-thirds of the information required to be on your disk in order for your computer to boot (the other third is supplied by COMMAND.COM). IBM and Microsoft chose to hide these files to help prevent their unauthorized use.

- *For extra protection, you can turn off the archive attribute for some important files.* If you regularly back up your computer with incremental backups (backups of only those files that were changed since the last backup), those files are not backed up again. If you turn on the archive attribute for certain files, however, those files are included in the next backup, even if they were not changed since the last backup. You may want to take this step so that you have a duplicate copy of the backup in case one copy is damaged or lost.

NOTE The File Find command can do more than set attributes. A number of other features of the File Find command are not covered in this chapter. See Chapter 25 for more information about this command.

The next two sections discuss how to set file attributes with File Attributes and File Find. The File Attributes command is designed to be used as a DOS command-line utility. The File Find command enables you to set attributes interactively from a menu.

Setting Attributes from the DOS Prompt with the FA Command

The FA (File Attributes) command is similar to the DOS ATTRIB command. FA enables you to set file attributes from the DOS prompt. The syntax for this command is

FA [*filespec*][*attribute switches*][*other switches*]

or

FA [*filespec*] /DIR[+|–]

where *filespec* represents the specific files or directory to display or change, *attribute switches* represent the attributes you want to change,

and *other switches* represent the other available switches you can use with file attributes. You can choose from the following attribute switches:

Switch	Description
/A	Sets the archive attribute
/DIR	Sets the hidden attribute for directories
/HID	Sets the hidden attribute for files
/R	Sets the read-only attribute
/SYS	Sets the system attribute

To use the FA command to set an attribute, follow the attribute switch with a plus (+) or minus (–). A plus sign turns on the attribute, and a minus sign turns off the attribute. To set the file COMMAND.COM to read-only, for example, you use this command:

```
FA COMMAND.COM /R+
```

Additional switches are available for the FA command:

Switch	Description
/CLEAR	Clears (removes) all attributes. In other words, this command sets all attributes to the default condition, which is off (–).
/P	Pauses after each screen is displayed. This option is useful when you are displaying a list of files and attributes that is longer than the screen can display.
/S	Includes files in subdirectories. Use this option when you are setting attributes for files in the current directory and all subdirectories.
/T	Reports totals (number of files whose attributes have changed) only. Use this option when you are setting attributes but do not want a listing of the files that are changed. This option causes FA to report only how many files have been changed as a result of the command.
/U	Reports unusual files (with at least one attribute set).

To display a list of all files in the current directory with at least one attribute set, enter this command:

FA /U

The results of this command appear in figure 9.1. This listing is from a hard disk's root directory. Notice that several files are set to hidden, read-only, and system. These include key files for DOS (IO.SYS and MSDOS.SYS) and Norton Diskreet Ndisks (SECRET.@#!), as well as a copy of the file created by the Norton IMAGE command (IMAGE.IDX). Most of the other files are set to the Archive status, which means that those files have not yet been backed up.

```
C:\
     io.sys             Archive Hidden Read-only System
     msdos.sys          Archive Hidden Read-only System
     command.com        Archive
     config1.npc        Archive
     config.old         Archive
     wina20.386         Archive
     descript.ion       Archive Hidden
     config.doc         Archive
     treeinfo.ncd       Archive
     treeinfo.dt        Archive
     treeinfo.idx       Archive
     secret.@#!                 Hidden Read-only System
     arrdesk.wbm        Archive
     autoexec.nd0       Archive
     config.nd0         Archive
     autoexec.ndw       Archive
     config.ndw         Archive
     smartcan.ini       Archive
     image.idx          Archive Hidden Read-only System
     image.doc          Archive        Read-only
Paused:  ENTER=Scroll line, SPACE=Scroll screen, ESC=Quit, Any other key=Resume
```

Fig. 9.1

A list of files and their attributes.

To clear (turn off) all attribute settings for all files in a directory, use the following command:

FA /CLEAR

To set all COM files to read-only, including those in subdirectories of the current directory, use the following command:

FA *.COM /R+ /S

The FA command is a quick and easy way to display or change attributes from the DOS prompt. You have to remember the command options, however. If you prefer to set attributes interactively, you can do so with the File Find command, as described in the next section.

Changing Attributes with File Find

Like the FA command, the File Find command contains options that enable you to examine and change file attributes. With File Find, you set these attributes interactively from a menu. This section describes how to use File Find to set file attributes. For more information on File Find, see Chapter 25 on finding files.

When you enter FILEFIND from the DOS prompt or the Norton main screen, the File Find dialog box appears (see fig. 9.2).

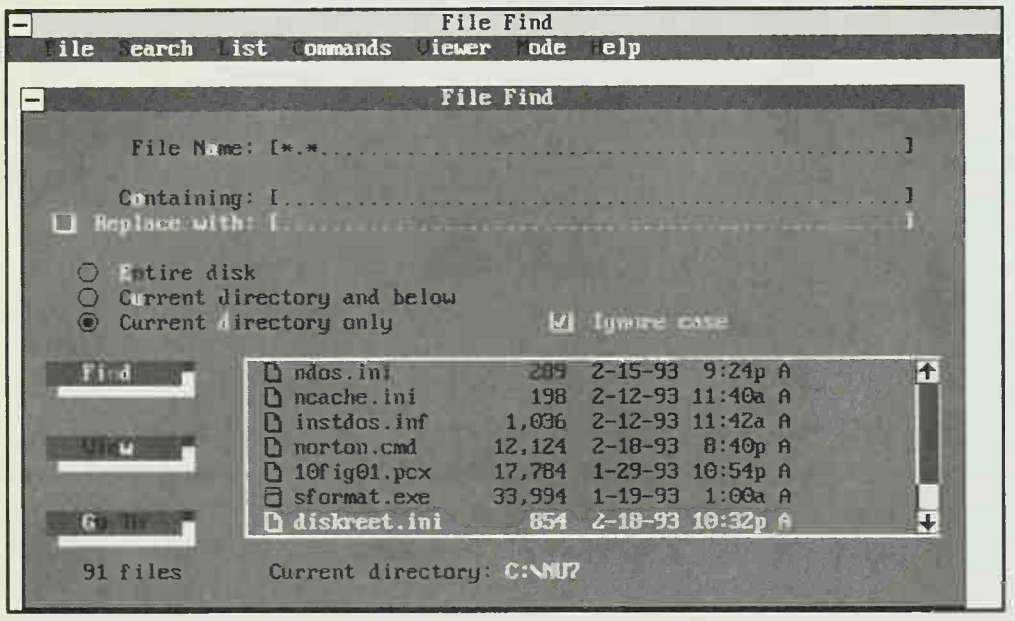


Fig. 9.2
The File Find dialog box.

This screen contains several areas in which to enter information on setting file attributes. You enter in the File Name text box the files you want to affect. If, for example, you want to set attributes for all files named *.COM, enter the file specification ***.COM** in the File Name field.

When you set file attributes, you do not place any information in the Containing field or Replace With field. You use the radio buttons beneath Replace With to specify whether the files to be set are on the Entire Disk, the Current Directory and Below, or the Current Directory Only. The Ignore Case option is not relevant for setting file attributes.

To display the files that will be affected, select Find, which begins the search process. The Find button then changes to Stop. If you have a slow computer and a large hard disk, a search of the entire disk may take a long time. As files that match criteria are found, those files are listed in the file list box. To stop a search, choose Stop.

NOTE

The way that the program displays the files in the list box of the File Find dialog box is controlled by the **S**et List Display option, accessed from the **L**ist pull-down menu in the menu bar at the top of the screen. To display the format shown in figure 9.2, choose the **L**ist option from the menu bar and then choose the **S**et List Display option or press Ctrl+F to access the List Display dialog box. Then select Name, Size, **D**ate and Attributes.

The List Display dialog box is shown in figure 9.3. At the top of this dialog box are five List Format options. These options allow you to choose what information about the displayed files will be listed. The following options are available:

Name, Size, **D**ate and Attributes

Name and Date/**T**ime

Name and **S**ize

Name and **A**ttributes

Name

When you choose the Name and **A**ttributes option and then choose **O**K, the files in the list box will be displayed showing name and attributes. At the bottom of the List Display dialog box, you can also choose the order in which files will appear in the list box. Sort Criterion enables you to choose from the following options:

Unsorted

Na**m**e

E**x**tension

Dat**e** & Time

Si**z**e

You can also choose whether the sorted files should be listed in Ascend**i**ng or Descend**i**ng order.

To specify attributes for a particular file, first highlight that file name in the list box by using the Tab key and the up- and down-arrow keys, or by clicking on the file name. Then open the **C**ommands pull-down menu. From this menu, choose the Set **A**ttributes option. The Change Attributes dialog box appears (see fig. 9.4). In this box, choose **F**or *filename* to set the attributes for the highlighted file in the file list (in this example, DISKREET.INI). To set the attributes for the entire list of files that match the search criteria, select For **E**ntire File List.

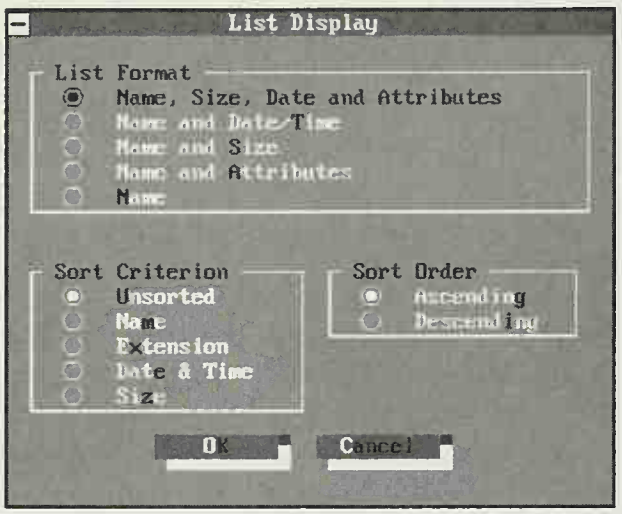


Fig. 9.3
The List Display dialog box.

Fig. 9.4
The Change Attributes dialog box.

The bottom half of the Change Attributes dialog box contains four options: **A**rchive, **R**ead Only, **H**idden, and **S**ystem. These options refer to the four attributes you can set for a file. A dark box next to the attribute name means that nothing is set, a white box means that the attribute is cleared, and a check indicates that the attribute is set. You can specify the attributes with any of the following methods:

- Use the hot key to select the attribute (**A**rchive, **R**ead Only, **H**idden, and/or **S**ystem).
- Use the arrow keys to highlight your choice; then press the space bar to lock in your choice.
- If you are using a mouse, point to the attribute and click to set it.

Choose **OK** to save your changes; to cancel your changes, choose **C**ancel. After you make all your selections and choose **OK**, another dialog box appears, informing you that the requested attributes are set.

If you chose to set attributes only for the single matching file and you choose the **S**et Attributes option again, the single file name listed in the Change Attributes dialog box will be the next file that matches the search criteria.

The File Find command contains a number of other options not described in this chapter. For more information about File Find, see Chapter 25.

Summary

If you set file attributes with the File Attributes (FA) or File Find command, you can protect your files from being accidentally erased or overwritten. Either method is a simple and easy way to protect files. Neither of these file-protection schemes requires any memory-resident program to be active to protect the files, because both schemes are built into DOS.

This chapter concludes Part II of this book. These chapters form the core of a protection plan for your data (along with a backup plan). If you use the information contained in Part II, you decrease the need for the recovery techniques described in the following chapters. However, Murphy's Law seems to reign, so no matter how hard you try, there may be a time when you must recover information that was accidentally or maliciously erased or lost. To learn how Norton Utilities has provided state-of-the-art recovery techniques, turn to Part III, "Basic Recovery Techniques." The first chapter of Part III explores strategies for using the UnErase command.

PART

III

Basic Recovery Techniques

OUTLINE

Unerasing Files and Directories

Unformatting Disks

Diagnosing and Treating Disks with Disk Doctor

Using Disk Tools

Creating and Using a Rescue Disk

Restoring Files with File Fix

CHAPTER 10

Unerasing Files and Directories

The inevitable happens! You implemented procedures to protect your files, as described in Part II. Then you accidentally erased some important files. Or, for some reason, a file on your hard disk cannot be read. Who you gonna call? File Busters?

You may not need a professional file-recovery specialist. With the information in this chapter and Norton Utilities 7, the prospects are good that you can recover erased or damaged files from your disk by yourself.

Part II, "Protecting Your Files," covered preventive measures for protecting the information on your disk. At times, however, the best prevention does not work. For example, on a floppy disk that was not protected by SmartCan, you might use the DEL command accidentally, when you meant to use DIR. The consequences of these commands are quite different. The DIR command displays a list of files, and the DEL command deletes files.

The most common way to lose files is probably through accidental erasing. Accidental formatting is another common cause of information loss. Some information losses, however, are hard to control. You can lose files, for example, through excessive fragmentation on disk. Furthermore, the magnetic image on your disk can be damaged if the magnetic field weakens.

Part III shows you how to recover lost information and describes Norton UnErase (unerases files or directories), UnFormat (recovers disks that were formatted), Norton Disk Doctor (searches for and corrects file problems on disk), Disk Tools (fixes various disk problems), Rescue Disk (creates a rescue disk containing important recovery information and programs), and File Fix (fixes dBASE, 1-2-3, WordPerfect, Symphony, and compatible application program files). If these automatic techniques are not sufficient to recover your data, Part IV includes information on advanced techniques for data recovery, such as Manual UnErase techniques and Disk Editor. Before you learn how to use these Norton data-recovery commands, however, you may want to review the information in Chapter 3, "Understanding How Disks Work."

This chapter describes one of the most widely known Norton programs, the UnErase utility. This utility has likely saved computer users worldwide millions of dollars in time and energy that would have been used to recover files and directories manually.

Using UnErase

When a file is erased on your disk, only the information in the disk's directory is actually deleted (see Chapter 3). The contents of the file still remain on disk for a while—until that area of the disk is reused by another file. If the file space used by an erased file has not been used by a subsequent write to disk, you can usually recover the file with the UnErase command. Because an erased file can have its contents overwritten at any time, you must decide as soon as possible that a file must be unerased. You should have no problem unerasing a file immediately after the file has been erased. If you create one or more files after erasing a file, however, the original file may no longer be unerasable.

T I P To protect an unerased file for a period of time, use the SmartCan utility described in Chapter 5. To prevent certain important files from being erased, use the Disk Monitor utility, covered in Chapter 6.

To use the UnErase utility, choose UnErase from the Commands list in the Norton main screen or enter **UNERASE** at the DOS prompt. When you begin UnErase, the program searches in the current directory for all files that can be unerased. If the program finds erased files, the file names (as far as UnErase can figure out, without the first character) are

displayed. If, for example, the file README.BAT has been erased, the UnErase program reports that the file ?EADME.BAT can be recovered. Figure 10.1 shows the UnErase menu and a list of erased files that are candidates for unerasing.

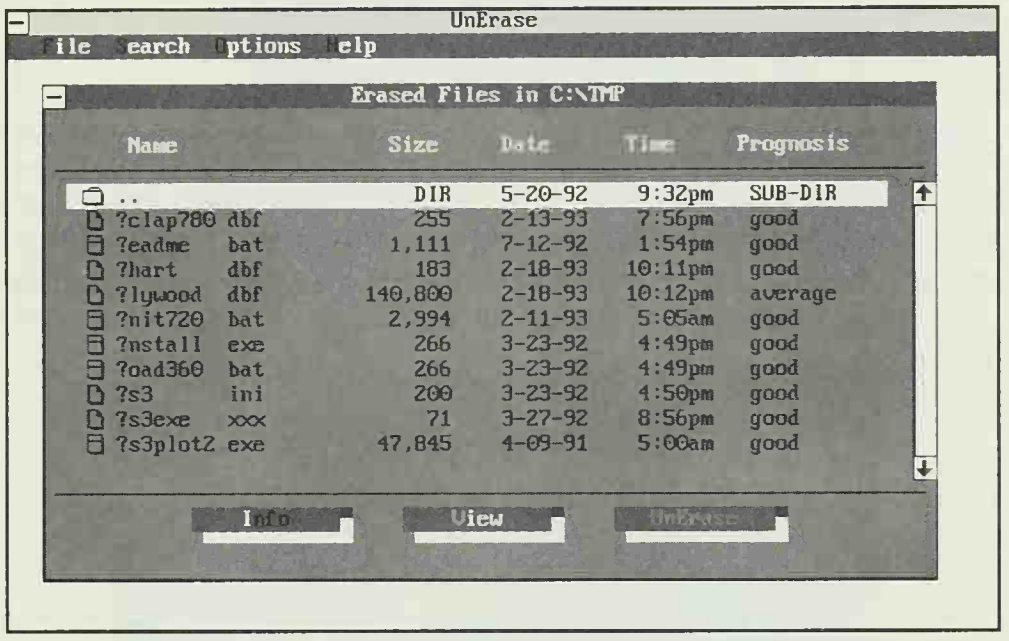


Fig. 10.1
Listing potential files to unerase.

UnErase provides a prognosis of the likelihood that these files can be unerased successfully. The possible prognoses are excellent, good, average, and poor.

T I P

To give UnErase a good chance of recovering files, particularly those that were in existence when you booted your computer, make sure that you place the IMAGE command in your AUTOEXEC.BAT file. For more information about the Image program, see Chapter 4.

To choose which file to unerase, highlight the file name and choose UnErase. If you choose to unerase the file ?EADME.BAT, for example, you see the dialog box in figure 10.2, which asks you for the first letter in the file's name.

To complete the process, press R to unerase the file README.BAT. You return to the screen shown in figure 10.1, where you can choose other files to unerase.

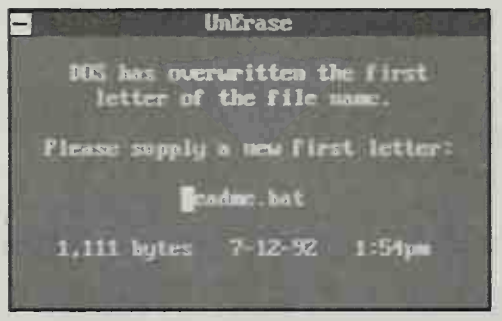


Fig. 10.2

Supplying the first letter of an erased file's name.

If a file cannot be unerased automatically, you see a message like the one in figure 10.3. In this case, you can use the Search For Lost Names option (see the section "The UnErase Search Menu" later in this chapter), or you may need to use the Manual UnErase procedure discussed in Chapter 16.

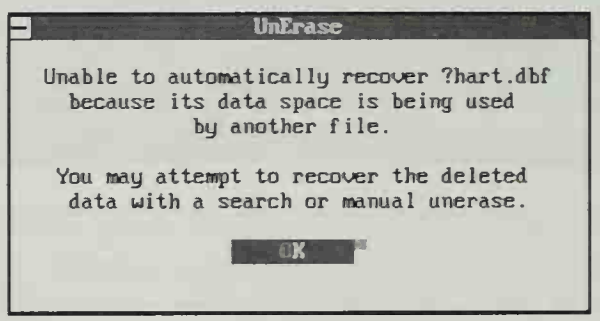


Fig. 10.3

A message telling you that a file cannot be unerased.

To locate files in other directories, you can go to another directory from the current directory by using the following procedure. The first entry listed in figure 10.1 is directory information. If you highlight the parent directory listing (shown on-screen as . .) and press Enter or double-click, you go to the preceding directory—in this example, the root directory—where a list of all directories appears. Then you can highlight another directory name, press Enter (or click), and go to another directory to look for more files to unerase. As you see in the next section, you can use UnErase to recover directories also.

T I P If a file or directory cannot be unerased or is unerased only partially, you still may be able to recover portions of the file or directory by using Disk Editor (see Chapter 17). Always try to use the automatic UnErase techniques to erase files and directories before resorting to the more complicated DISKEDIT command. Your chance of successfully unerasing a directory or file depends mostly on whether you have created files that have overwritten the disk space used by the directory or file.

The Info option in the Erased Files dialog box (refer to fig. 10.1) enables you to display information about the currently highlighted file. For example, figure 10.4 shows information about the file ?hart.dbf. This information includes the time and date the file was created or last changed, the file's size, and the file's attributes. For example, the file in figure 10.4 was created on February 13, 1993, at 7:56 p.m. Its size was 255 bytes, and it had the archive attribute set. (See Chapter 9 for information about file attributes.) The Information dialog box also gives you information about the likelihood that an unerase for this file will be successful. In this case, the prognosis for unerasing is poor. If you cannot unerase the file by using the automatic UnErase technique, the information about the starting cluster and the clusters needed can be helpful in manual unerasing (see Chapter 16).

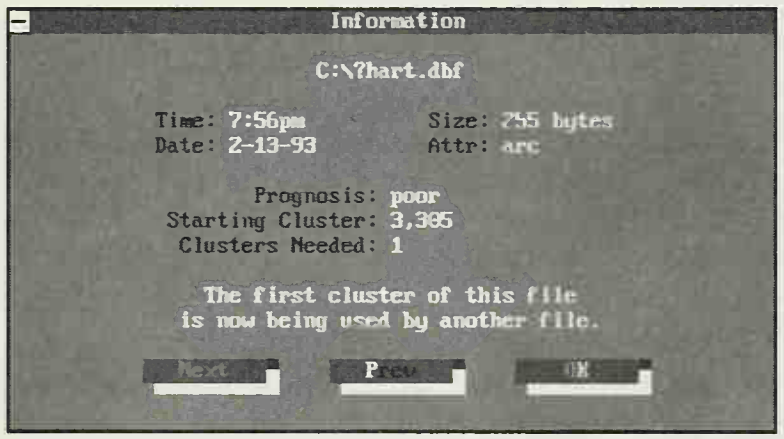


Fig. 10.4
The Information dialog box.

As you view an Information dialog box for an erased file, you can go to the dialog box for the next erased file in the list by choosing **N**ext. Or you can go to the dialog box for the previous file in the list by choosing **P**rev. You exit the dialog box by choosing **O**K.

The **V**iew option in the Erased Files dialog box enables you to view the contents of the highlighted file (see fig. 10.5). If you are not sure what a file contains—for example, if you are not sure whether it is the specific file you want to unerase, or if you can't tell by its name what kind of file it is—you can use the viewer to examine the contents of the file to determine whether you want to unerase it. For example, you can tell by the contents of the current file being viewed that this is obviously an AUTOEXEC.BAT file.

If the file being viewed is a program file (such as an EXE file or a COM file), the contents may look like gibberish. If the file is a program application file, such as a 1-2-3 file or WordPerfect file, the file may look as though it contains a number of strange characters, as well as some phrases you can recognize. The purpose of the viewer is to help you find something in the file that can help you decide what kind of file it is and what the original file name was.

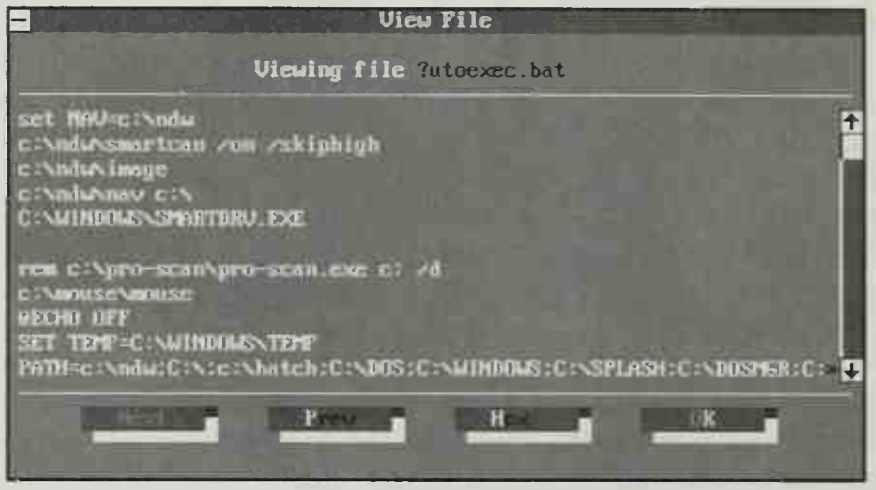


Fig. 10.5

Viewing an erased file.

For some files, particularly program files, it may make sense to view them in hexadecimal format by choosing **H**ex in the View File dialog box. This format displays the contents of the file as hexadecimal numbers—numbers whose digits range from 0 to F. Although a display of hexadecimal numbers may not seem useful to the average person, certain patterns of these numbers can give clues that reveal the source of the file to a programmer. While you view the file, you go to the next or previous file in the erased file list by choosing **N**ext or **P**rev. Choose **O**K to exit the viewer and return to the erased file list.

Unerasing a Directory

Along with erased files, erased directories show in the UnErase list (if any exist), but instead of a number appearing in the Size column, the word `DIR` appears. Figure 10.6 contains information about an erased directory named TEMP. Its name in the list is ?EMP, and under the Size column, the directory is listed as DIR. To unerase this directory, highlight its name and choose the **U**nErase option.

If the directory can be unerased, you are prompted to enter the first letter of its name. After the directory is unerased, you can go to that directory by clicking its name to see whether the directory contains any files that can be unerased. Unerasing the directory does not automatically unerase files which were in that directory. You must specifically unerase files in the directory after you have unerased the directory itself.

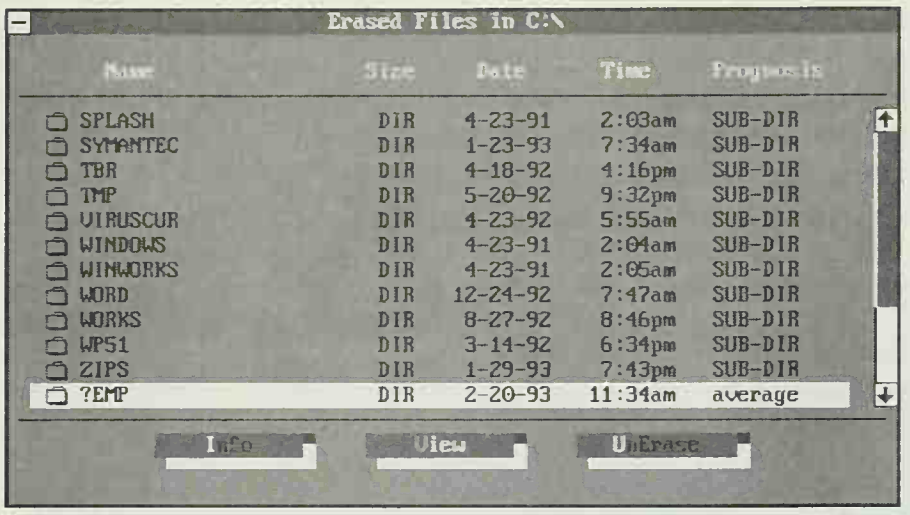


Fig. 10.6
Selecting a directory to unerase.

T I P

After recovering a directory, you should run Norton Disk Doctor (NDD), as described in Chapter 12, to make sure that your disk does not contain any lost clusters or other logical problems.

Using the UnErase Menus

As mentioned in previous sections, you can use the UnErase command to erase files displayed in the Erased Files dialog box. Notice a menu bar at the top of the UnErase screen. This menu bar gives you a number of other options to use when you unerase files. To display one of the pull-down menus, press Alt plus the first letter of the menu name (such as Alt+F for **F**ile), or just click the menu name.

The **H**elp menu accesses the Norton Help system, which was described in Chapter 1. The following sections cover the other menu selections.

The UnErase File Menu

The **F**ile menu at the top of the UnErase screen provides options for listing, selecting, and naming files (see fig. 10.7). Notice the shortcut keys beside some of the options. You can choose the corresponding option from the UnErase screen without opening the **F**ile menu. To choose the View **C**urrent Directory option, for example, press Alt+C.

You cannot choose options when they appear in parentheses or grayed (dimmed). In figure 10.7, the Rename option appears grayed because no file to be unerased has been chosen yet. If you highlight a file name for a restored (unerased) file, Rename becomes available and appears on the list either without parentheses or in the normal color for menu items.

Fig. 10.7

The UnErase File menu.

The following sections describe the File menu options.

Specifying the Drive and Directory

The View Current Directory option in the File menu displays a list of all erased files in the current directory. This list includes the file name (with a question mark as the first character), date, time, and prognosis for recovery. Use this option when you want to find a file in the directory to unerase.

The View All Directories option displays a list of all erased files in all directories on the current disk. Erased files are listed by directory in the UnErase list. You can highlight and unerase files in this list. Use this option if you want to unerase files in a number of directories, or when you are not sure which directory contains the files you want to unerase.

Choose Change Drive to display a list of erased files on another drive. This option also displays a list of available drives, from which you can choose the drive to view. To display the erased files in another directory, choose Change Directory. A list of directories is displayed, from which you can choose the directory you want to view.

Selecting Files and Groups

To select an individual file to unerase, highlight the file name and choose the **S**elect option from the **F**ile menu. You can choose **S**elect only if a file name is highlighted in the UnErase list. The file name otherwise appears in parentheses or grayed, which means that you cannot choose the file then. Another way to select an individual file is to highlight the file name and press the space bar. After you select a file, triangles appear on both sides of the file name in the UnErase list of files.

Sometimes you may want to unerase a group of files simultaneously. For this purpose, choose Select **G**roup from the **F**ile menu. You are prompted to enter a file specification for the files to select. If you type ***.G***, for example, you select all files with extensions beginning with the letter G. Triangles appear on each side of each selected file name. You also can press the gray + key (on your numeric keypad) to invoke the Select **G**roup option. After you select the files to unerase, choose the **U**nErase option. You then are prompted to enter the first character of each file name in your selection list.

If the group you selected includes some files that you don't want to unerase, you can unselect the group by choosing the **U**nselect Group option from the **F**ile menu or by pressing the gray – key on your numeric keypad. You then are prompted to enter a file specification. If you type ***.GBK**, for example, all files now selected with the extension GBK are unselected, and the triangles at the sides of those names disappear.

Changing the Name of an Unerased File

If a file in the UnErase list is recovered, you can rename that file by highlighting its file name and choosing the Re**n**ame option. You are prompted to enter a new name for the file.

Specifying the Target Location for the Unerased File

The UnErase **T**o option on the **F**ile menu unerases and saves files to another disk drive. After you choose UnErase **T**o, you are prompted to choose the drive name where you want the file to be copied as the file is unerased. To activate the UnErase **T**o option, you must highlight a file name that can be unerased.

If you want to append additional, unerased information to a recovered or existing file, you can use the A**p**pend To option. First unerase a file and then choose A**p**pend To. The Manual UnErase dialog box appears.

In this dialog box, the file you just unerased is designated as the starting point for any other clusters you might want to add with the Manual UnErase features. See Chapter 16 for specific information about using Manual UnErase.

Advanced Unerasing

Two options are available for files that require special unerasing treatment. The **M**anual UnErase option in the **F**ile menu unerases a file that you cannot unerase automatically with the UnErase program. Usually, files with a poor prognosis cannot be recovered automatically (see Chapters 16 and 17 for advanced recovery techniques). Create **F**ile creates a new file by searching for erased clusters and building a new file from unerased material on disk. This process is similar to a Manual UnErase (see Chapter 16) except that it creates a new file instead of simply unerasing erased space.

The UnErase Search Menu

With the UnErase **S**earch menu, you can specify criteria to use in searching for erased files (see fig. 10.8). You can search for the kind of file (text, dBASE, 1-2-3, Symphony, and so on), for files containing a text string, or for file names that may not appear on the UnErase list, such as files in erased subdirectories. You can also specify searches within a range of clusters on the disk.

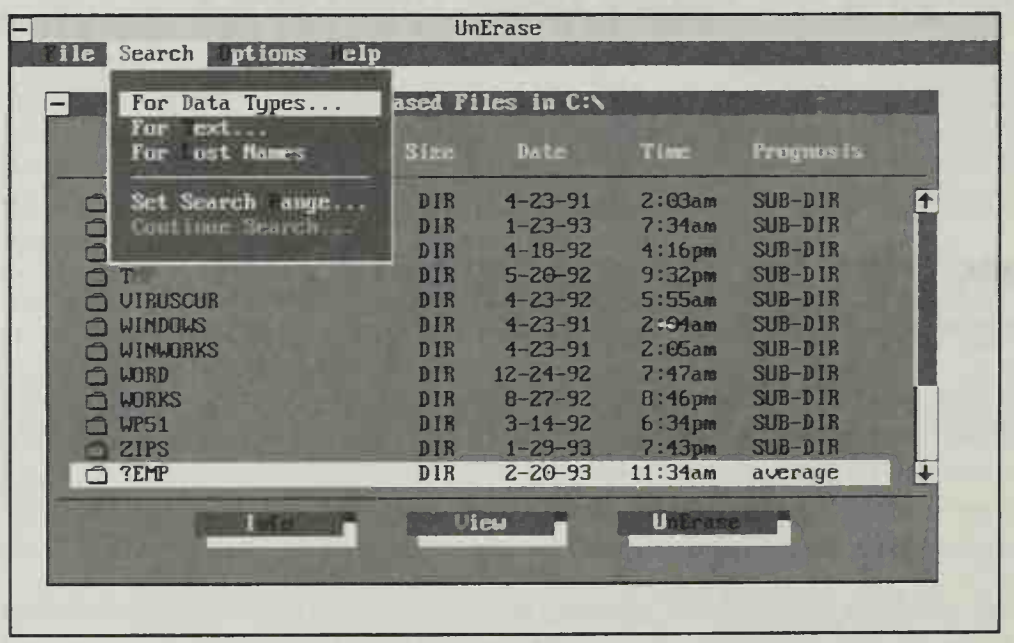


Fig. 10.8

The UnErase **S**earch menu.

The UnErase **S**earch menu options are described in the following sections.

Searching for Specific Data Types

You use the For **D**ata Types option in the **S**earch menu to search the disk for normal ASCII text files, dBASE-type files, Lotus 1-2-3-type files, or Symphony-type files. After you choose the For **D**ata Types option, UnErase displays the Search for Data Types dialog box. In this dialog box, you specify which file types you want to find. Choose **N**ormal Text, **L**otus 1-2-3 and Symphony, **d**BASE, or Othe**r** Data. Then choose **O**K or **C**ancel. After you finish the search, the files listed in the UnErase list are the types you selected.

A text search can find erased files containing a certain *string* of characters. When you choose For **T**ext in the **S**earch menu, UnErase displays the Search for Text dialog box, where you can specify the text you want to find. If, for instance, you are looking for files that contain information about the 1992 budget, type **1992 Budget** as your text string and press Enter. Choose the **I**gnore Case check box option if you want to find this text in uppercase, lowercase, or any combination of uppercase and lowercase (the default). To match the case of the text that you typed in the dialog box, deselect the **I**gnore Case check box option.

After the program finishes the search, the files listed in the UnErase list are those that contain the text you specified.

Finding Lost Names

The For **L**ost Names option in the **S**earch menu searches for file names that usually don't appear in the UnErase list, such as erased files that have been part of an erased directory. If these lost file names are listed in the UnErase list, you can unerase them, as you can any other files. When you choose this option, UnErase immediately begins a search of the specified drives and directories and puts in the UnErase list any names that are found.

Specifying the Search Range

You can tell UnErase which clusters to search by choosing Set Search **R**ange from the **S**earch menu. You are asked to enter the beginning and ending cluster number. This procedure may save time if you have a large disk.

Continuing an Interrupted Search

If you stopped a search by pressing Esc—for example, when searching the entire disk for lost names—you can continue searching from the point where you stopped. Choose **C**ontinue Search from the **S**earch menu to continue the search.

The UnErase Options Menu

The UnErase **O**ptions menu enables you to choose a sort order to use for the file names in the UnErase list. You may choose also to include nonerased (all) files in the list. Figure 10.9 shows the **O**ptions menu.

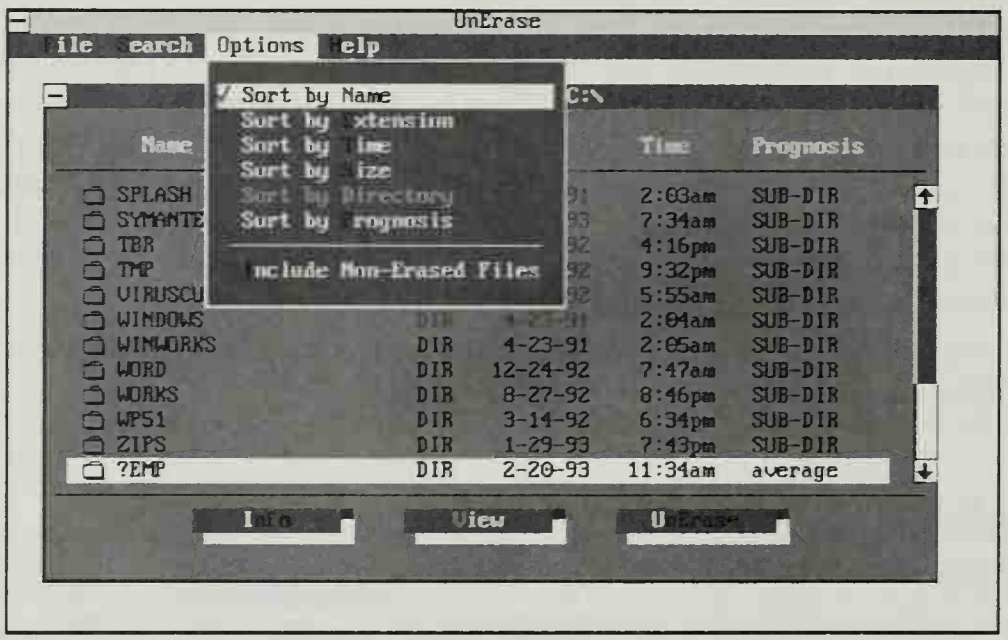


Fig. 10.9

The UnErase **O**ptions menu.

From the list of options, you may choose to list files in sorted order by file name (default), extension, time, size, or prognosis. You can use the Sort by **D**irectory option only if you chose earlier the View **A**ll Directories option from the UnErase **F**ile menu. You may choose also to include nonerased files in the list. You may want to have these files listed for using the Re**n**ame or A**p**pend To option from the **F**ile menu.

Summary

This chapter described how to use Norton UnErase to recover files and directories that have been erased. Usually, if the file space on disk has not been overwritten, the UnErase command can automatically recover the erased file or directory. If, for some reason, you cannot unerase a file with this program, you need to move to Part IV, which covers advanced recovery techniques.

CHAPTER 11

Unformatting Disks

It is about the scariest disaster that can happen to your hard disk—it has been accidentally formatted! All your data is in danger of being lost; your programs, reports, databases, and spreadsheets are in a never-never land, the purgatory of bits and bytes. Like a paramedic, Norton Utilities can almost magically bring your files and programs back to life. If you took precautions to keep your disk healthy by using some of the measures outlined in Part II of this book, your hard disk has a good chance of being revived.

This chapter describes techniques for recovering a hard disk when the IMAGE (or MIRROR) file has been created (see Chapter 4), as well as techniques to use when the IMAGE or MIRROR files have not been created.

Recovering a Formatted Hard Disk

If you planned ahead and issued the Image command recently, you will have a much easier time recovering your data. However, even if you formatted your hard disk and do not have an IMAGE.DAT file, you may be able to recover the data.

> **CAUTION:** If your hard disk has just been formatted, proceed with care. Do not write new information to the hard disk before you attempt to perform a recovery.

To recover data from a formatted hard disk, follow these steps:

1. Boot the computer from a floppy disk, using the same version of DOS that was on the hard disk before it was formatted.
2. If your boot floppy disk does not contain the UnFormat command, place a disk containing that command in the floppy disk drive.
3. From the disk containing the UnFormat command (drive A, for example), enter the following command:

   UNFORMAT *d*:

   The *d*: parameter is the name of the disk to unformat. If you know that you used the Image command to create a recovery information file, use this command:

   UNFORMAT *d*: /IMAGE

   If you know that you used the MIRROR command (a command similar to Norton's Image command and available in DOS 5.0 and later versions) to create a recovery information file, enter this command:

   UNFORMAT *d*: /MIRROR

An explanation of the UnFormat procedure appears on-screen (see fig. 11.1). Choose **Q**uit if you want to cancel the procedure. If you choose **C**ontinue, you are prompted to select the drive to unformat (see fig. 11.2). Use the arrow keys or the mouse to select the drive and then choose **O**K to continue. If you don't want to unformat, choose **C**ancel.

You are then asked whether the disk to be unformatted used the program IMAGE.EXE or MIRROR.COM to save recovery information (see fig. 11.3). Choose **Y**es if you know that IMAGE.DAT or MIRROR.FIL was saved or if you are not sure. (If you choose **Y**es but the program does not find either of these files, the UnFormat process that occurs is the one described in the section "Unformatting without IMAGE or MIRROR Information" later in this chapter.) The next section describes the UnFormat process that occurs if IMAGE or MIRROR information is available.

If you know for sure that no IMAGE.DAT file is on the disk, choose **N**o. If you choose **N**o, see the section "Unformatting without Image or MIRROR Information" for instructions on completing the UnFormat process.

Fig. 11.1
The UnFormat dialog box.

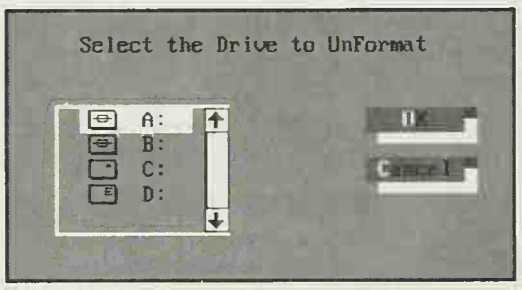


Fig. 11.2
Selecting the drive to unformat.

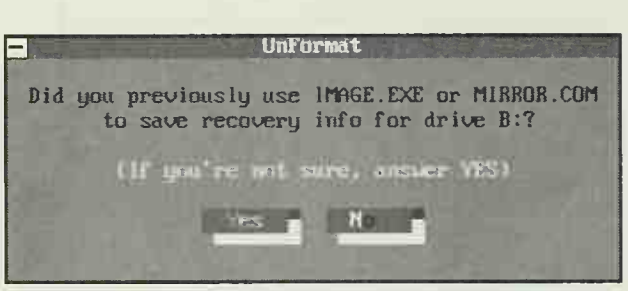


Fig. 11.3
The dialog box where you indicate whether IMAGE or MIRROR information exists.

Recovering with IMAGE or MIRROR Information

At this point in the recovery procedure, Norton gives you another chance to cancel the UnFormat command (see fig. 11.4). If you answer **Y**es in this verification dialog box, the unformatting process begins.

The UnFormat program begins to look for the IMAGE.DAT and IMAGE.BAK (or MIRROR.FIL or MIRROR.BAK) information on the disk. A graphic may appear on-screen with the following message:

```
Searching for IMAGE info...
```

When the IMAGE information is found, a message appears like the one shown in figure 11.5. If two versions of the IMAGE or MIRROR information (one named IMAGE.BAK or MIRROR.BAK) are found, as in this example, a message tells you that two versions have been found. You may

choose to use the most recent version (choose **R**ecent) or the previous version (choose **P**revious). If the most recent IMAGE.DAT (or MIRROR.FIL) information is not usable (perhaps you ran the Image program after the disk had been formatted), you may want to use the previous version—the IMAGE.BAK (or MIRROR.BAK) information. If you decide not to continue the UnFormat process, choose **C**ancel.

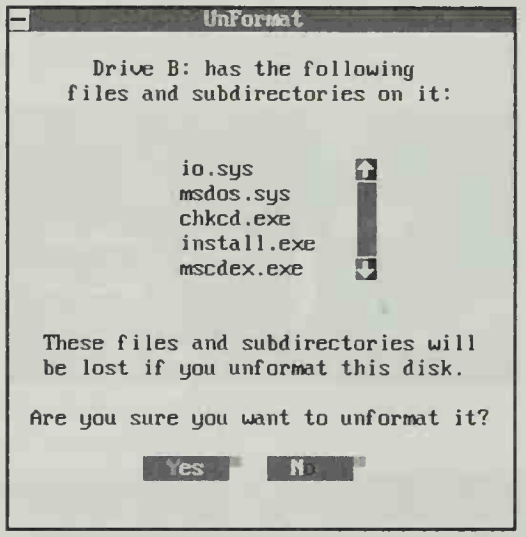


Fig. 11.4
The UnFormat verification box.

Fig. 11.5
The message displayed after UnFormat finds IMAGE.DAT.

After you select the IMAGE version you want, another message asks whether you are sure that you want to restore the recovery information (see fig. 11.6). Answer **Y**es to continue or **N**o to cancel. If you choose **Y**es, you are prompted to choose between a full or partial restoration. Choosing **P**artial restores only parts of the system area, including the boot record and the file allocation table. Usually, you choose **F**ull (see fig. 11.7).

CAUTION: Use the Partial restore option only when you use the UnFormat command to restore a damaged portion of your disk, such as the boot record. This is an uncommon option to use, and it is made available primarily for persons with a great deal of experience with the disk structure.

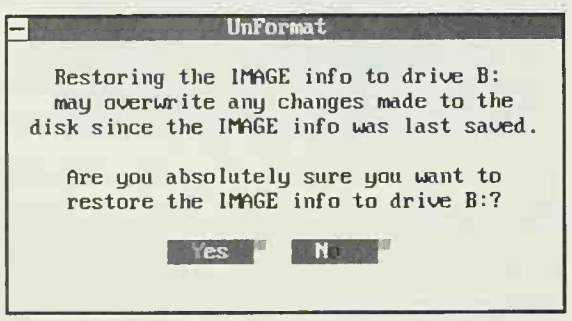


Fig. 11.6
Choosing to restore the recovery information.

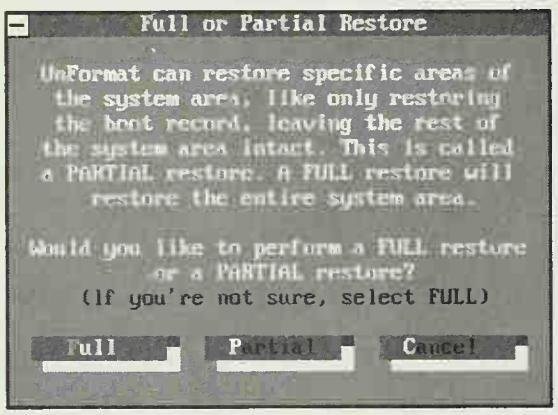


Fig. 11.7
Selecting full or partial recovery.

Finally, the restoration begins. The drive may "churn" as the information is recovered. The recovery process generally takes only a few minutes. When the recovery is finished, a message tells you that the drive has been restored successfully to its previous state (see fig. 11.8).

After the recovery finishes, you still may have some problems with a few files—those that were changed since you issued the last Image command. If so, UnFormat suggests that you run Norton Disk Doctor (NDD) to clear up any additional problems. These problems may include sectors that remain unallocated to files. The NDD command often can sort out these problems and recover the remaining files. To run Norton Disk Doctor, enter this command at the DOS prompt:

NDD *d*: /QUICK

Fig. 11.8
The message indicating a successful recovery.

Here *d*: is the drive name of the disk just restored. If the recovery was performed on the disk from which your computer boots, reboot your computer after running NDD. See Chapter 12 for more information on Norton Disk Doctor.

T I P The best way to learn how to use UnFormat is on a practice disk—when all you have to lose is some time. Place several files on a formatted disk. You may even want to include a few subdirectories. Now reformat the disk, using the Save Image Info option from the Safe Format dialog box (see Chapter 4). After you format the test disk, run the UnFormat program and see how it can restore the disk. This procedure gives you some experience and confidence for the time when you really may need to restore your disk.

You can run the UnFormat command from a network to unformat a disk on your local computer, but UnFormat will not unformat a network drive.

Unformatting without IMAGE or MIRROR Information

If you didn't prepare the disk to be unformatted—that is, you did not use Norton's Image command, the DOS MIRROR command, or Norton's Safe Format command—Norton Utilities may be able to help, but the recovery requires more work.

NOTE The UnFormat command often can help you recover files from a hard disk that has been formatted. You cannot, however, use UnFormat to restore a floppy disk that has been reformatted using a regular DOS format. When a hard disk is reformatted, only the system area is overwritten, not the entire disk. When a floppy disk is formatted with DOS FORMAT, the entire disk is overwritten.

Begin the UnFormat program, as described earlier in this chapter. If any chance exists that IMAGE.DAT or MIRROR.FIL is on disk, allow the UnFormat command to search for it. If you cannot find IMAGE.DAT or MIRROR.FIL, you must attempt to recover your data without it.

The UnFormat command attempts to recover as many files as possible. First the program must search the disk, looking for directory and file names. This search may take some time.

UnFormat usually can recover all directories and all files in those directories except for the files in the root directory. Some versions of DOS (COMPAQ 3.1 and AT&T 2.11) overwrite information thoroughly with a format, and recovery is not possible.

When the UnFormat command finishes what it can do, your disk should contain directories named DIR0000, DIR0001, DIR0002, and so on. The original names of the directories are lost, but files are grouped in the new directories as they were in the original directories. All Lotus 1-2-3 files are in one directory, for example, and all WordPerfect files are in another directory. If you have many kinds of files in one directory, the recovery process can be more difficult because it may not be easy to identify the original file name.

NOTE Only upper-level directory names are lost. If you have a subdirectory, its name will be recovered.

You can retrieve the original names of the directories in one of two ways. If you are using a version of DOS earlier than 3.0, you need to make new directories, copy the files from each recovered directory into each new directory, and then delete the old directories and files.

If you are working with DOS 3.0 or a later version, you can use a second, much easier method. This technique uses the Norton Change Directory (NCD) command (see Chapter 23). Use the NCD command to change the name of the directories.

To decide what to name your directories, look at the files contained in the directory. If, for instance, you see that the 1-2-3-type files are in a directory, you can easily conclude that this directory should be LOTUS.

After you decide what the names of the directories should be (for example, DIR0000 is WP51, DIR0001 is LOTUS, and so on), you can change the directory names.

After you rename the upper-level directories on your disk, run Norton Disk Doctor (NDD) to clear up problems with the recovered files (see Chapter 12 for more about NDD). These problems usually are unallocated sectors—portions of the disk that have not been assigned properly to a file or free space. Use the following command to run the NDD program:

```
NDD C:/QUICK
```

The /QUICK switch tells NDD to test the system area of the disk only—not the entire disk. (The system area is where the unallocated sectors' information is located.)

If your disk is supposed to be bootable but is not, use Norton Disk Doctor to make the disk bootable. See the section "Making a Disk Bootable" in Chapter 13.

The UnFormat command is not perfect, but it restores all the information that was not erased during the formatting process. One of the major problems is that all the files in the root directory, such as the AUTOEXEC.BAT and CONFIG.SYS files, are lost. You must reconstruct these files. If you do not have backup copies of the files, you must rebuild them in a text editor.

Using UnFormat To Recover from a Virus Attack

The UnFormat command can also help you recover from some versions of destruction brought about by a computer virus. If your disk has become unusable because of a virus attack, use the UnFormat command to attempt recovery, just as if the disk had been formatted. If you have a recent copy of IMAGE.DAT or MIRROR.FIL on your disk, your chances for recovery are good.

Summary

Norton Utilities has turned a frightening experience into a simple procedure. Working together, the Image and UnFormat commands can help you protect your disks against accidental formatting. Even if you

have not used Image or DOS MIRROR to help protect your disk, Norton is often still able to recover most or all information from your formatted disk. This chapter described the techniques used for recovering disks in both situations.

The next chapter shows a different sort of recovery technique, one that can help correct problems with the way files are stored on disk, and can help detect and correct other problems with your disk before it becomes too late. Turn to Chapter 12 to learn about Norton Disk Doctor.

CHAPTER 12

Diagnosing and Treating Disks with Disk Doctor

Information stored on disk is dependent on the reliability of the physical disk to hold magnetic signals; these signals contain the 0s and 1s that make up the bits used to store the file. Information storage also relies on DOS's system area to keep track of where all the bits and pieces of all the files on disk are stored.

Maintaining the integrity of the data on disk is a Herculean task. How millions (sometimes billions) of pieces of information can be reliably stored on a disk is a real mystery to most people.

Unfortunately, problems sometimes occur. A small flaw may be on the disk where the magnetic coating is not thick enough. Information stored in this location is OK for a while, but eventually the disk loses some of its magnetic image. Files may also be broken into so many pieces on disk (called fragmentation) that the file allocation table (FAT) somehow loses information about what cluster belongs to what file.

The FAT may think that the same cluster is being used by two files at the same time. Unstable software that does not properly close files or that manipulates file information outside the standard DOS guidelines can sometimes cause this situation.

When these kinds of problems begin to happen, they can often be easily solved if they are caught in time. Fortunately, Norton Disk Doctor can help locate and correct such problems.

Using detailed knowledge about the structure of the boot record, the file allocation table, and the system area, Norton Disk Doctor can often figure out where problems exist on a disk and what can be done to eliminate those problems. Whenever any problem related to reading or writing files to disk occurs (for example, you get a DOS message that indicates `Unable to read disk in drive A`), you can use Disk Doctor to diagnose the problem and usually restore the disk to health.

Diagnosing and Doctoring Disks

You can begin Norton Disk Doctor (NDD) from the Norton main screen or by entering **NDD** at the DOS prompt. (For details on using the Norton main screen, see Chapter 1, "Norton Utilities Basics.") To begin from the main screen, use the up- and down-arrow keys to highlight Disk Doctor in the Commands list and press Enter, or point to Disk Doctor and click twice. The Norton Disk Doctor menu appears (see fig. 12.1).

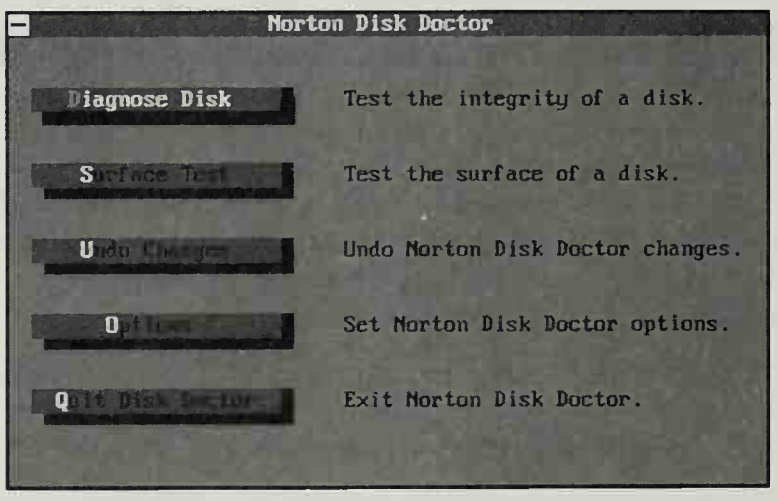


Fig. 12.1
The Norton Disk Doctor menu.

The menu contains the following choices:

Option	Description
Diagnose Disk	Examines your disk to check the integrity of the information stored on it
Surface Test	Tests the surface of the disk for existing or potential read/write problems
Undo Changes	Undoes any changes made by NDD and returns your disk to its original state
Options	Sets certain options for the program
Quit Disk Doctor	Ends the NDD program

If you enter the NDD command with no switches, the command operates in interactive mode; you choose the options you want from the menu. Or you can use this command syntax from the DOS prompt:

NDD [*d*:][*d*:][*switches*]

The *d*: designations are disk drive names; you can specify more than one drive. (Norton does not mention any limit.)

The following switches may be used with NDD:

Switch	Description
/COMPLETE or /C	Tests for bad cylinders on the disk and tests the partition table, boot record, root directory, and lost clusters.
/QUICK or /Q	Omits the test for bad cylinders but tests the partition table, boot record, root directory, and lost clusters.
/R:*file*	Instructs NDD to write to the designated *file* a report about the results of NDD's testing. Use with /QUICK or /COMPLETE.
/RA:*file*	Instructs NDD to write a report about the results of NDD's testing and append the report to a designated *file* (instead of making a new file). Use with /QUICK or /COMPLETE.
/REBUILD	Tells NDD to try to rebuild the entire disk.
/X:*d*	Excludes drive *d* from examination.
/UNDELETE	Tells NDD to undelete a DOS partition detected in an earlier run but not undeleted at that time. When you run NDD and find an old DOS partition, for example, NDD asks whether you want to undelete the partition. If you answer no, the /UNDELETE switch enables you to try to undelete the partition later.

Details about the first four NDD options in the Norton Disk Doctor menu are covered in the next few sections.

Performing a Quick Disk Test

Disk Doctor is designed to perform a quick disk test or a series of more extensive tests. For example, to run a quick test on drive C from the DOS prompt, enter **NDD C: /Q**. This command causes Disk Doctor to examine your disk's system area for flaws in the disk's directory and file structure and to examine the disk for lost clusters. For more information on how disks are organized and how they manage data, see Chapter 3.

Using the **C**onfiguration option in the Norton main screen (see Chapter 2), you can place the quick Disk Doctor command in your AUTOEXEC.BAT file so that your disk is examined each time your computer is booted. The process usually takes less than a minute. If you do not choose to place this command in your AUTOEXEC.BAT file, you may want to perform this quick test only occasionally, or the more extensive tests discussed in the following section.

Diagnosing a Disk

The Disk Doctor **D**iagnose Disk option performs various tests on your disk to check whether you can access the stored information properly. Use **D**iagnose Disk occasionally as preventive maintenance on your hard disk. If your disk access becomes erratic—for example, you experience trouble trying to read a file or your computer no longer boots properly—use this option to diagnose the problem. **D**iagnose Disk performs more than 100 tests to analyze your disk.

NOTE If you have never used NDD on your hard disk, you may want to perform a full test so that you can find and resolve any problems or potential problems. Afterward, using the quick test (/Q) may be enough to find most file problems. Under normal disk operation, use the NDD diagnosis about once a month.

Problems on a disk usually result from corrupted information being placed on the disk or from bad spots on the disk that cause information to be unreadable. Loss of the magnetic signal (image), for instance, can cause a bad spot. NDD tries to read information from all parts of the

disk. If part of the disk cannot be read and no file is using the bad part, the problem is simple to fix. NDD marks that area as bad, and DOS then knows not to use the area.

If the bad spot is located where a file is stored, however, NDD must try to read as much of the file as possible and move the file to a safe location on disk. Then NDD marks the bad area so that it is not used again.

NOTE Often when NDD finds a problem on disk, a prompt asks whether you want the problem to be fixed or ignored. Unless you have a specific reason not to fix a problem, let NDD try to correct it.

After you choose the **D**iagnose Disk option from the NDD menu, you see a list of possible disk drives to test (see fig. 12.2). Specify the disk drive to test by highlighting the disk drive of your choice and pressing the space bar, or by clicking with the mouse pointer. A check mark appears next to your choice. You can then choose any other disk drive to test. After you make your selections, press Enter or choose **D**iagnose to begin the test procedures. Choose **C**ancel if you don't want to diagnose the disk drives.

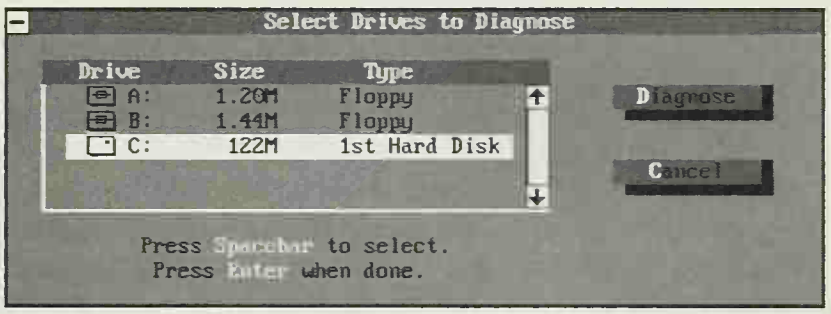


Fig. 12.2
Specifying the drives to diagnose.

Figure 12.3 shows the first test screen during a test of the hard disk. Notice the six-part test list, titled `Diagnosing drive C:`, at the top of the screen. This list contains only five parts if you are diagnosing a floppy disk, because the partition table test is not performed. As each part of the test progresses, the corresponding description for that test area is highlighted on-screen, and a blinking dot appears before the description name. When a test for an area is complete, a check mark appears next to the test description.

Information about the progress of the current test being performed appears at the bottom of the screen. In figure 12.3, a test of the file allocation tables is in progress. You can stop the test at any time by pressing Esc.

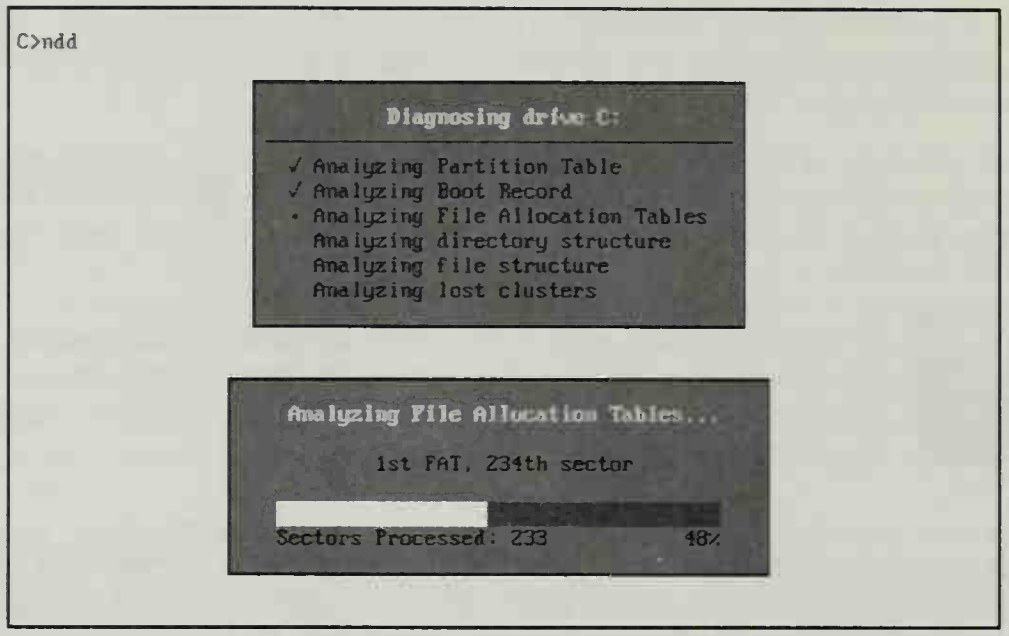


Fig. 12.3
The NDD test in progress.

Norton Disk Doctor first tests to see whether bad information is located in the system area or data area of the disk. If your hard disk is partitioned into several disks (C and D, for example), the NDD partition table checks to see whether the allocation of space is properly accounted for on the drive being tested.

The tests of the boot record, file allocation table (FAT), and directory structure examine the integrity of the system information on disk. NDD determines whether the system information can be read from disk and whether the system information makes sense. In the system area of the disk, NDD reads the information and compares what has been read from disk to what should be on the disk; the process is like looking at a manuscript to see whether all the parts—the title, contents, body, and index—are there. If NDD finds that something is missing, wrong, or out of place, the program usually knows how to fix the problem. While NDD is going through the list of diagnostic tests, it may detect a problem on the disk. See the section "Dealing with a Bad Diagnosis" later in this chapter.

When testing the file allocation table, NDD analyzes the FAT to see whether available space on disk is accounted for as space being used by a file, as sectors marked as bad spots on the disk, or as free space. Space on a disk may be unaccounted for when a file is not properly saved to disk. This unaccounted space appears in the FAT as a *lost cluster*, a place on disk reserved for use by a file but never used. Lost clusters can occur when you turn off the computer or reboot it, or when the power fails while a file is open. A series of lost clusters related to one file is called a *chain*.

The file structure test examines how your files are stored on disk to make sure that the file allocation is OK. The lost clusters test looks for information about files not stored properly—a problem sometimes caused by programs that are abruptly stopped, as in a power outage.

The surface test checks for physical defects on your disk. When the list of diagnostic tests is completed, the Surface Test dialog box automatically appears (see fig. 12.4). From this dialog box, you can choose several options that determine how the test for physical defects is performed. Specify the options you want for the test (the following sections describe the options). Then press Enter or choose the **B**egin Test option to begin the test. To end the operation without testing, choose **C**ancel. To exit the test while in progress, press Esc and then select **C**ancel. To resume after pressing Esc, select **R**esume.

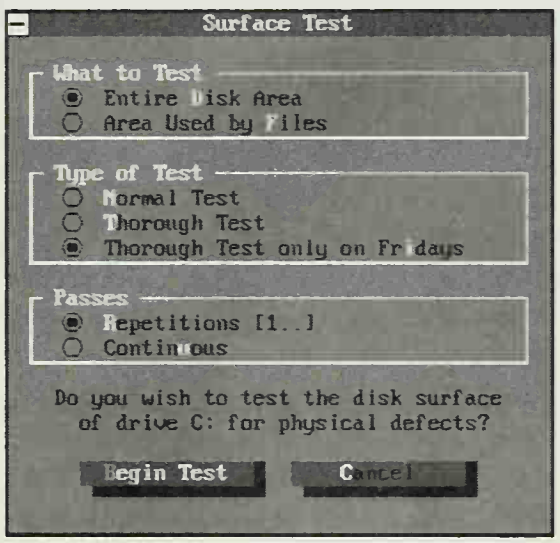


Fig. 12.4
The Surface Test dialog box.

Choosing Which Test To Run

The testing options in the What to Test section of the Surface Test dialog box tell Disk Doctor to look at the surface of the entire disk (Entire **D**isk Test) or to test only the portions of the disk occupied by files (Area Used by **F**iles). The Areas Used by **F**iles option is faster, but Entire **D**isk Test is more thorough.

Specifying the Type of Test

You can choose from three types of tests in the Type of Test section of the Surface Test dialog box. **N**ormal Test performs a quick scan of the disk. **T**horough Test tests the disk more thoroughly than the **N**ormal Test but takes twice the time. Thorough Test Only on **F**ridays combines elements of the two other tests and takes a little longer than the **N**ormal Test. The default test is Thorough Test Only on Fridays.

Selecting the Number of Passes

The Passes options specify how often to repeat the test or to perform the test until you press Esc. Usually, one repetition (the default) is sufficient. If intermittent problems exist, however, you may want to run the test for a number of repetitions or continuously (testing continues indefinitely until you press Esc) to try to locate the problem. To specify the number of repetitions, choose **R**epetitions and indicate a number in the field (from 1 to 999). To run the test continuously, choose Continu**o**us. To begin the tests, choose **B**egin Test; to cancel NDD, choose **C**ancel.

Figure 12.5 shows the screen that is displayed while a surface test is in progress. The Time section tells you the estimated amount of time that it takes to perform the test and the current amount of elapsed time. The Sector section tells you what sector is currently being tested and how many clusters are on the disk.

You can see a blinking box on the disk map that occupies one block of the map. As the box progresses, it shows you which block is being tested. The Legend section tells you what the boxes on the disk map mean. For example, if the disk has a bad block, a `B` appears on the disk map in the location of the bad block. At the bottom of the Legend section is an indication of the size of a block. For this disk, a block is 232 sectors.

The progress graph at the bottom left shows you how much of the test has been completed. This graph also has an indicator, such as `Pass 1 of 1`, that tells you the number of times the test will be performed. The test in progress in figure 12.5 will be performed only once. If you had requested 10 tests, the indicator would read `Pass 1 of 10`, then `Pass 2 of 10`, and so on; it would continue until 10 different surface tests had registered.

After the test is finished, you are given the chance to print a report. See the section "Creating a Disk Doctor Report" later in this chapter. If Disk Doctor finds a problem during the surface test and you have indicated that you want NDD to prompt you before making repairs, the program gives you an opportunity to correct the problem. See the next section for more information.

Dealing with a Bad Diagnosis

While diagnosing a disk or running a surface test, NDD tells you when and if any problems are found. Usually, a report of an error on the disk includes a description of the error and a recommendation. This section illustrates some of the disk errors you may encounter while running Disk Doctor.

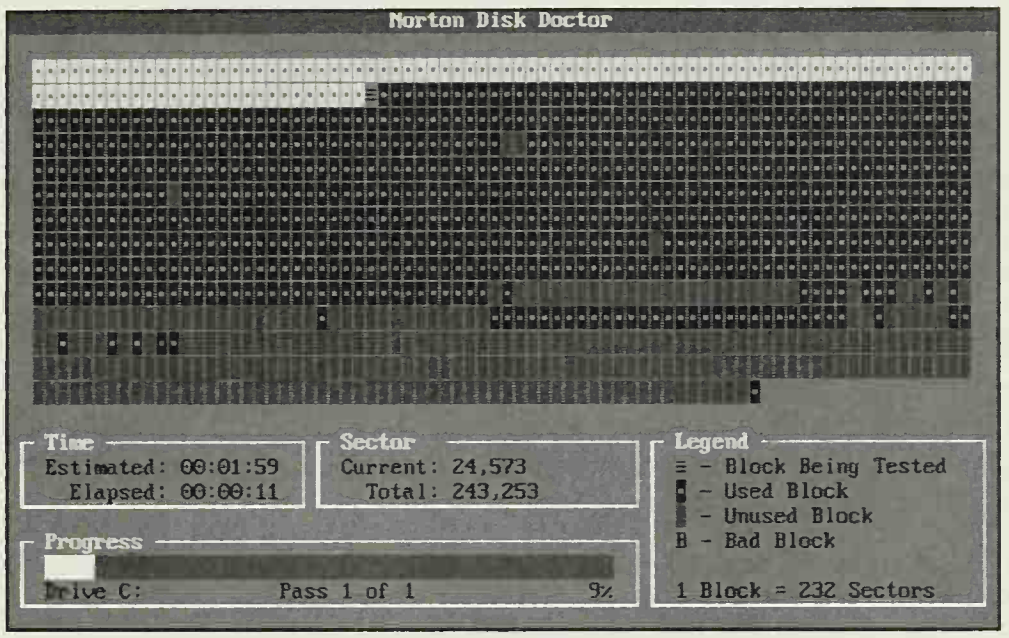


Fig. 12.5

The progress screen for the surface test.

Figure 12.6 shows an error involving the file allocation table that occurred during a diagnosis of drive B. This report tells you that the FAT copies are not the same. If you remember from Chapter 3, a physical error occurs when a physical problem with the disk exists, such as a bad spot on the disk caused by age, liquids, or some other physical damage. This physical problem is in contrast to a logical problem, which means that the disk may be physically OK but the information stored is bad. Note the error message in figure 12.6, the description of what caused the error, and the recommendation for action.

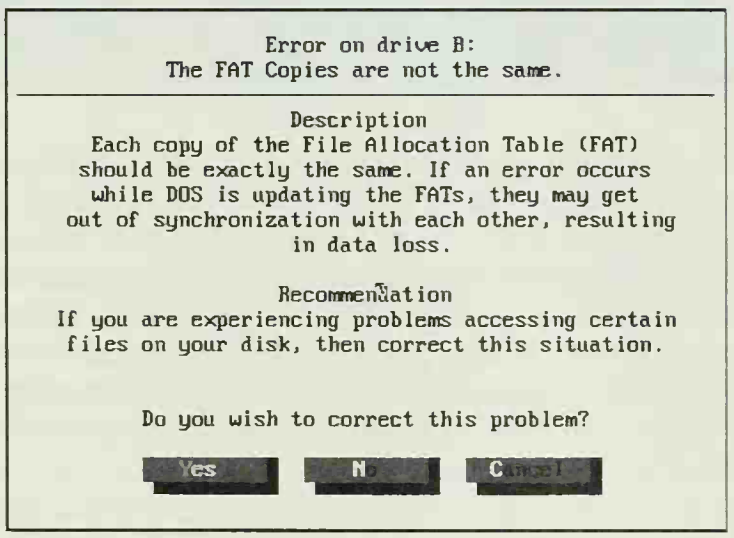


Fig. 12.6

An error message reporting a problem with the FAT.

If you encounter a physical error on the disk, first end NDD by pressing Esc or choosing **C**ancel, and return to the DOS prompt. Then attempt to copy all the files from the floppy disk containing the error to another disk. DO NOT WRITE ANY INFORMATION TO THE BAD DISK; writing information may make the situation worse. If you can copy all the files from the disk, you should trash or reformat the bad disk.

If you cannot copy all the files from the bad disk, run NDD again on the disk and have the program attempt to correct the problem with the FAT. If NDD is successful in correcting the disk, immediately copy all files from the disk and then trash the disk or reformat it. Do not continue to use the disk as is—even if NDD was successful in fixing it. The evidence of this problem means that the disk may be susceptible to the same problem in the future.

If NDD cannot solve the problem and you cannot copy files from the disk, turn to Part IV, "Advanced Recovery Techniques."

When NDD finds an error on a disk and you choose to allow the program to attempt a fix, NDD first gives you the option of creating an Undo file (see fig. 12.7).

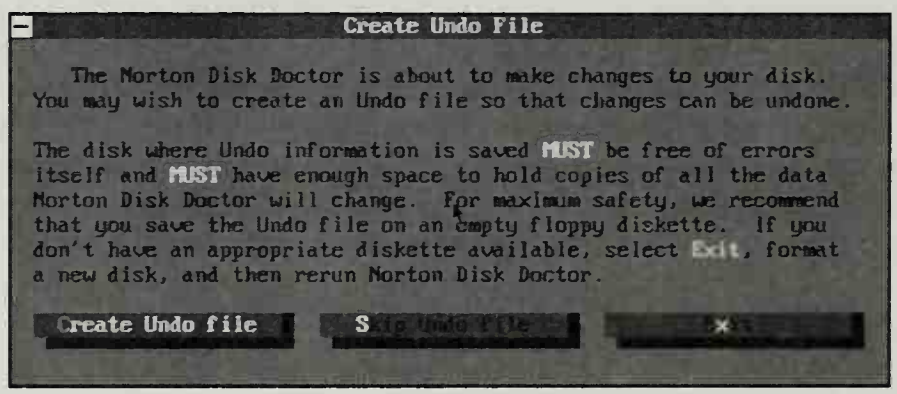


Fig. 12.7

The NDD Create Undo File dialog box.

An *Undo file* is a file that contains information about changes that NDD has made to a disk. When you create an Undo file, it allows you to return a disk to its original state in case something goes wrong during the time NDD is attempting to fix the disk. The Undo file must be written to a different disk from the one currently being checked. Thus, when you choose the option **C**reate Undo File, you are prompted to choose the drive where you want to save the Undo information (see fig. 12.8). If you choose **S**kip Undo File, no undo information is stored. If you choose **E**xit, the NDD diagnosis ends.

When a severe problem occurs, like the error shown in figure 12.6, and you choose **Y**es to correct the problem, NDD may present a solution (see fig. 12.9). The message in figure 12.9 indicates that NDD cannot fix the problem and that you should run Disk Tools to correct the problem. The Disk Tools program is described in Chapter 13.

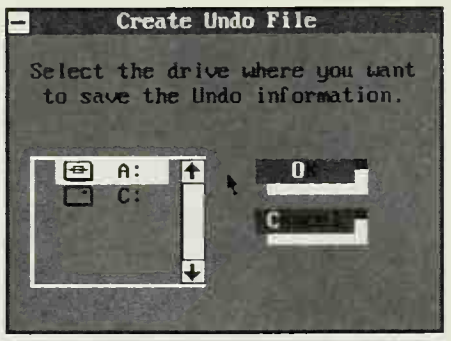


Fig. 12.8

The prompt for the drive where the Undo file will be stored.

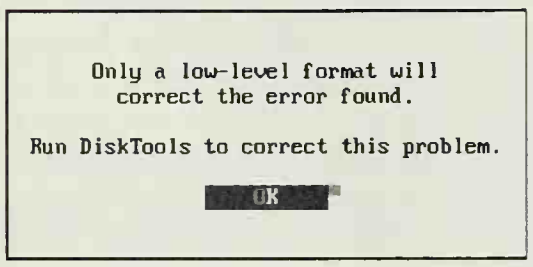


Fig. 12.9

An NDD message telling you to perform a low-level format on the defective disk.

Another solution to a FAT problem that may be reported is shown in figure 12.10. In this case, NDD recommends that the Calibrate program be run on the disk. Calibrate is discussed in Chapter 20.

Fig. 12.10

NDD recommending that you run the Calibrate program on a defective disk.

Figure 12.11 shows an error message reported by NDD as it attempts to read the root directory. If you recall, the root directory of a disk is the area where top-level file names and directory names are stored. If the root directory cannot be read, you cannot read or access any of the files on the disk. Figure 12.11 shows that NDD can attempt to correct this problem. As in figure 12.6, you can allow NDD to attempt to correct the problem by choosing **Yes** (again, you are given the opportunity to create an Undo file). If you choose **No**, no attempt is made to correct the error, and diagnosing continues. If you choose **Cancel**, the NDD program ends without correcting this problem.

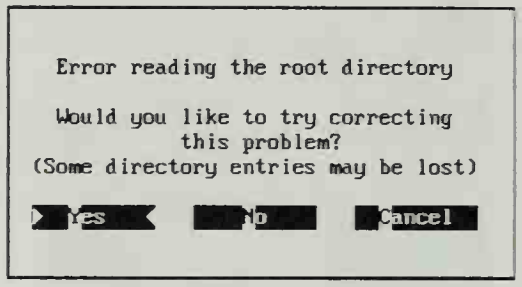


Fig. 12.11
Disk Doctor reporting an error when reading the root directory.

If the error is so severe that NDD cannot correct the problem, a message similar to the one in figure 12.12 appears. In this case, you are not even given the opportunity to tell NDD to fix the problem. You will probably not be able to read anything from a disk as severely damaged as the one that caused this error. You do not need to give up, however. You can try the Revive a Defective Diskette option in Disk Tools, as described in Chapter 13; or you can use the techniques for recovering files described in Part IV, "Advanced Recovery Techniques."

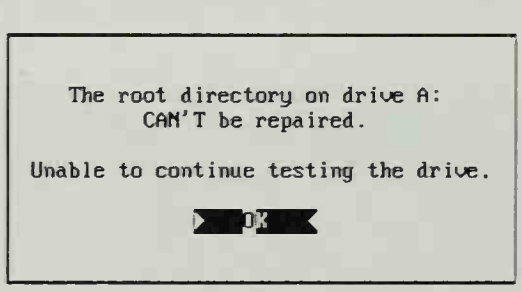


Fig. 12.12
A Disk Doctor message telling you that the disk can't be repaired.

The problems previously discussed were all related to a disk diagnosis. Disk Doctor may also encounter errors when running a surface test. During the surface test, Disk Doctor reads and writes information to every sector on the disk, testing the disk's memory. This process is somewhat comparable to what happens during a format, except that the information on the disk is not destroyed. If the surface test locates an area on disk where information cannot be reliably read and written, a report like the one in figure 12.13 is generated.

In this case, cluster 137 is found to contain a bad sector. You can choose to move the data in this cluster to a safe location. Moving the data means that you can no longer use the cluster; however, the data in the file will be moved to a good cluster. Notice the message that says

```
This cluster is in use by UNKNOWN.
```

This message means that the bad cluster is being used to store the file. It does not necessarily mean that the file is damaged. The bad sector may be in slack space. Still, you want to allow NDD to move this cluster to a safe location; then check to see whether the file is OK. If this

cluster does not contain data used in a file, NDD marks, rather than moves, the cluster. Moving the data in the cluster (using **M**ove) places the file information in a new cluster that is good, enabling you to try to save the file information. Marking the cluster as bad prevents new information from being written to that cluster. If you choose the **S**kip option, the cluster is not affected. If you choose **A**uto, this sector and all subsequent bad sectors found in this test are marked or moved. Choose **C**ancel to end the test.

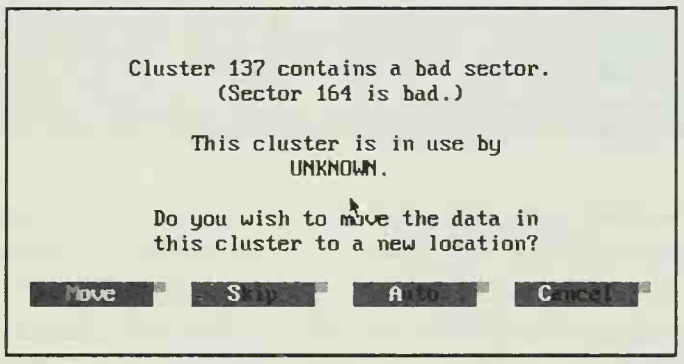


Fig. 12.13
A message telling you that a bad sector has been found.

T I P

Always check any file for which NDD finds a problem. First let NDD attempt to fix the file; then use the file to verify that it is OK. For example, if the file is a word processing file, examine it in your word processor; if the file is a spreadsheet file, look at it with your spreadsheet program.

After you have used Disk Doctor to correct problems on the disk, you are given an opportunity to create a report that summarizes information about the disk and tells what fixes were performed. The next section describes how to create and interpret a report.

Creating a Disk Doctor Report

When the disk analysis is complete, a brief summary appears on-screen (see fig. 12.14). The test results tell you that no problems were found during most of the tests, but a problem was fixed as a result of the boot record test.

You may want to produce a report about the disk test, particularly if disk problems are found. To produce a report, press Enter or choose **R**eport. To end without producing a report, choose **D**one. Figure 12.15 is a sample report. Keep these reports as a record of your disk problems.

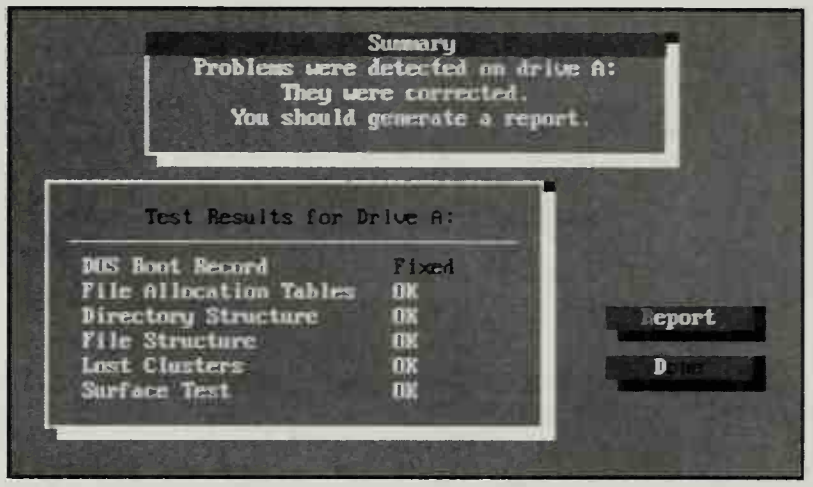


Fig. 12.14
A brief NDD report following a disk diagnosis.

The report's header provides the date and time of the analysis. The Disk Totals section tells about the disk's storage capacity. The Total Disk Space is the number of bytes of information the disk can hold. The User Files entry describes the file on the disk. Bad sectors are places on disk that have been found (usually by the format procedure) to be unsuitable for storing information. If you subtract from the total the number of bytes taken up by the user files and bad sectors, you get the number of bytes available on the disk.

The Logical Disk Information section of the report describes the logical parameters used to store information on the disk. The Media Descriptor gives a code for what kind of disk is used. Note the possible codes:

Code	Description
F0	1.4M 3 1/2-inch disk
F8	Hard disk
F9	1.2M 5 1/4-inch disk or 720K 3 1/2-inch disk
FD	360K 5 1/4-inch disk
FE	160K 5 1/4-inch disk
FF	320K 5 1/4-inch disk

In the example in figure 12.15, the analyzed disk is a 360K 5 1/4-inch disk. The media descriptor of FD is a hexadecimal number code.

The Physical Disk Information section includes information about how the data is physically on disk. The Drive Number tells you which drive the disk is in when analyzed. Drive number 0 refers to drive A, drive number 1 refers to drive B, and so on. In figure 12.15, the disk is analyzed in drive A (drive number 0).

```
                Norton Disk Doctor
               Norton Utilities 7.0
              April  21, 1993 5:07pm

             **************************
             *  Report for Drive A:   *
             **************************

                    DISK TOTALS
-----------------------------------------------
    362,496 bytes Total Disk Space
    349,184 bytes in 22 User Files
      2,048 bytes in Bad Sectors
     11,264 bytes Available on the Disk


          LOGICAL DISK INFORMATION
-----------------------------------------------
   Media Descriptor:  FD
    Large Partition:  No
           FAT Type:  12-bit
      Total Sectors:  720
     Total Clusters:  354
   Bytes Per Sector:  512
Sectors Per Cluster:  2
  Bytes Per Cluster:  1,024
     Number of FATs:  2
First Sector of FAT:  1
Number of Sectors Per FAT:  2
 First Sector of Root Dir:  5
Number of Sectors in Root Dir:  7
Maximum Root Dir File Entries:  112
    First Sector of Data Area:  12


                PHYSICAL DISK INFORMATION
-----------------------------------------------
          Drive Number:  0
                 Heads:  2
             Cylinders:  40
  Sectors Per Track:  9
      Starting Head:  0
  Starting Cylinder:  0
    Starting Sector:  1
        Ending Head:  1
    Ending Cylinder:  39
      Ending Sector:  9


                SYSTEM AREA STATUS
-----------------------------------------------
    Invalid signature in Boot Record
           Status: Corrected
```

Fig. 12.15

A report generated by Norton Disk Doctor.

```
                FILE STRUCTURE STATUS
-----------------------------------------
        No errors in the file structure


                SURFACE TEST STATUS
-----------------------------------------
                  Test Settings
              ----------------------
                    Test:  Disk Test
                Test Type:  Daily
          Repair Setting:  Prompt before Repairing
        Passes Requested:  1
        Passes Completed:  1
            Elapsed Time:  1 minute, 34 seconds

 Error reading sector 629 in cluster 310
  Cluster 310 was used by \wamprpts.cai
    Contents relocated to cluster 344
Status: Corrected and marked as unusable

 Error reading sector 683 in cluster 337
     Cluster in use by \nu70305.pcx
     Status: NOT Corrected. Skipped.
```

Fig. 12.15
Continued

The System Area Status section reports any problems found in the system area or the file structure. This section provides information on what problems exist and how (and whether) they are fixed. Figure 12.15 shows that the boot record was invalid but has been corrected.

Problems reported in the File Structure Status section are fixes related to cleaning up files that are cross-linked or that contain lost chains. Both conditions refer to a misallocation of clusters to a file.

The material provided in the Surface Test Status section of the report shows any problems found on the disk during the scan. Figure 12.15 shows that error reading sectors were in clusters 629 and 683. The first cluster contained information about a file; the cluster was corrected and marked as unusable. The second cluster was not corrected; the **S**kip option was chosen.

If a bad cluster is found but no information exists in that area, the cluster is marked as bad, and no file information is damaged. If the cluster contains information, as in this example, NDD tries to move as much good information as possible to a good cluster and reports that the files are moved but that they may not be fully recovered or usable.

If you discover by reading the report that NDD moved some of your files, examine those files to see whether they contain any damaged areas. You can examine word processing files in your word processor. If NDD moved program files (EXE or COM files, for example), recopy them from the original source to the disk to guarantee that the contents of the file are OK.

Performing a Surface Test Only

Instead of performing the entire suite of NDD tests, you can choose to perform only the surface test. You may want to skip the earlier tests, for instance, if you have already performed them and simply want to repeat the surface test. From the Norton Disk Doctor menu (refer to fig. 12.1), you can choose the **S**urface Test option. When you choose **S**urface Test, the Surface Test dialog box appears (refer to fig. 12.4). Choose the options you want and then begin the test. The test runs exactly as described earlier, and errors that are detected during the test are handled in the same way as previously described.

Undoing Changes

You may want to reverse any changes made after running the NDD program on your disk. For example, you can no longer use a moved file, and you want to try some other way, such as using Disk Editor, to recover the file. As NDD makes changes to your disk, the program stores the information about those changes in a file called NDDUNDO.DAT. If you choose the **U**ndo Changes option from the NDD menu, the disk is restored to its original condition.

Setting Disk Doctor Options

If you choose **O**ptions from the NDD menu, you see the Norton Disk Doctor Options dialog box (see fig. 12.16). Using this dialog box, you can specify settings for the surface test and create a custom error message.

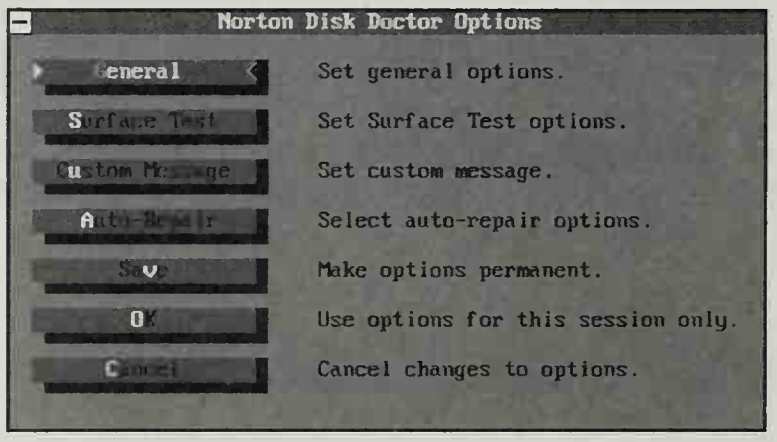


Fig. 12.16
The Norton Disk Doctor Options dialog box.

The Norton Disk Doctor Options dialog box contains several options:

- The **G**eneral option displays the General Options dialog box (see fig. 12.17). This dialog box offers radio button options for handling surface tests (Prompt **B**efore Surface Test, **N**ever Perform Surface Test, and **A**lways Perform Surface Test). Five check box options for skipping tests are also provided (Skip **P**artition Tests, Skip C**M**OS Tests, Skip Comp**r**ession Tests, Skip **H**ost Drive Test, and Only **1** Hard Disk). You usually need these skip options if your computer is not 100-percent compatible with IBM PCs. In this dialog box, you may also include a list of Drives to E**x**clude.

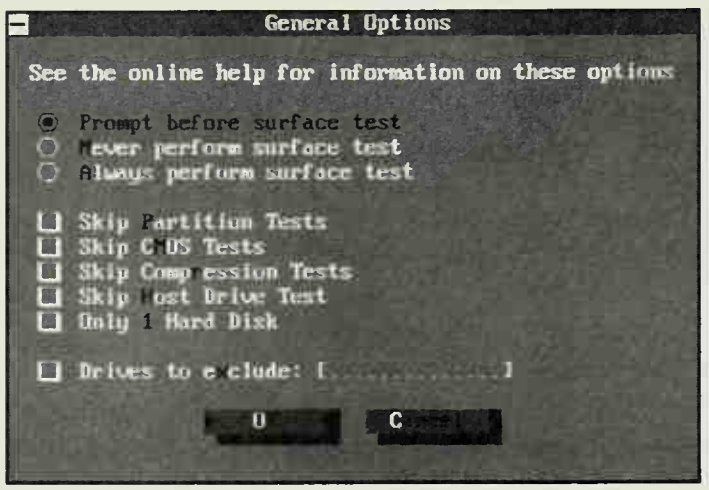


Fig. 12.17
The General Options dialog box.

- The **S**urface Test option displays the Surface Test dialog box (refer to fig. 12.4). You can use the options in this dialog box to change the default settings for the surface test, and then save this information to disk. When NDD is used again interactively or as a command from the DOS prompt, your new defaults are used.
- The C**u**stom Message option allows you to customize the message that appears on-screen when NDD encounters an error in the system area test. The Set Custom Message dialog box is shown in figure 12.18. Suppose that you have placed the NDD command on several computers in your company, but you do not want inexperienced users to make corrections on their disks without the company computer-support team knowing about the problem. In this case, you can create a custom message. With the Set Custom Message dialog box displayed, type a message such as the one shown in the box in figure 12.18. Select the **P**rompt with Custom Message option to cause that message to be displayed when an error is found. Choose O**K** to exit the box. Then, if NDD finds a system area problem, this message appears on-screen.

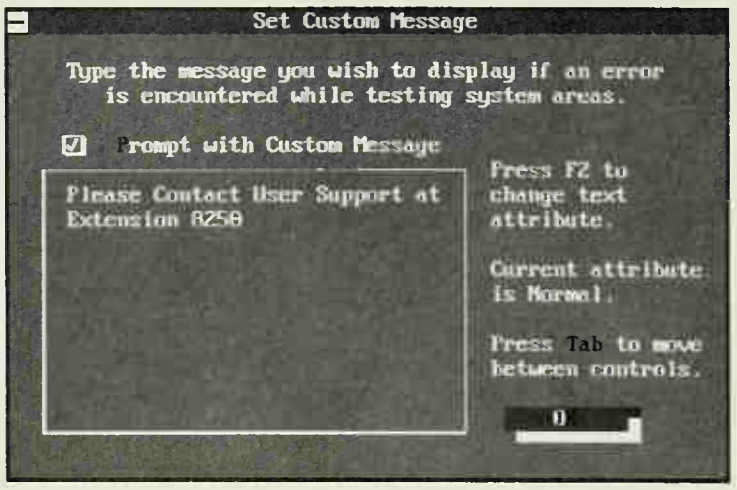


Fig. 12.18
Creating an NDD custom error message.

- The Auto-Repair option enables you to choose how NDD will respond to problems (see fig. 12.19). Each of the options describes a kind of problem that NDD might encounter, and each problem description contains three radio button options: Prompt, Auto, and Never. If you choose the Prompt option (the default for all repair options), NDD will prompt you with a question before repairing a problem. If you choose Auto, NDD will attempt to repair the problem but will not prompt you before doing so. (The repair will be noted in the NDD report.) If you choose the Never option, the problem will not be repaired but will be noted in the report. Two other radio button options in this dialog box are Save Lost Clusters as Files (the default) and Delete Lost Clusters. These two options are activated when you select the Auto option for one or more of the items to be repaired by NDD.

Fig. 12.19

The Automatic Repair Options dialog box.

After you make selections from the Surface Test, Set Custom Message, and Automatic Repair Options dialog boxes, choose Save from the Norton Disk Doctor Options dialog box to save this information permanently to disk. The new settings take effect immediately. To use the new settings for the current session only, choose OK or press Enter. If you don't want to save your changes, choose Cancel.

Summary

This chapter covered the Norton Disk Doctor utility. If your disk has problems, such as not enabling you to read files from a disk that used to work, try Disk Doctor to cure what ails the disk. It performs a battery of more than 100 tests on your disk, creates a report showing the current condition of your disk, and attempts to correct problems relating to file allocation or disk storage.

Sometimes Disk Doctor is unable to revive a disk. Often the NDD program recommends that you use the utilities in the Disk Tools program. Now turn to the next chapter to find out how to use Disk Tools.

CHAPTER 13

Using Disk Tools

The Disk Tools utility in Norton Utilities 7 contains several recovery programs that don't seem to fit in any of the other major utilities. Actually, several of the Disk Tools functions were in Norton Disk Doctor in earlier versions of Norton Utilities. The Disk Tools program in Version 6 also included Rescue Disk options, which are now offered as a separate command (described in Chapter 14).

This chapter explores the four disk tools (procedures) included with Norton Utilities 7:

- *Make a Disk Bootable.* This procedure enables you to turn any disk (hard disk or floppy disk) into a bootable disk—even if the disk has not been formatted with the /S (System) option. The disk must have sufficient room on it to hold the DOS files.
- *Recover from DOS's Recover.* The inappropriate use of the DOS RECOVER command can cause you to lose all the files on a disk. This procedure helps you recover your files after such a disaster.
- *Revive a Defective Diskette.* The system area of a floppy disk may become unreadable or be damaged in some other way. This procedure revives a disk and restores it to usability.
- *Mark a Cluster.* At times, the FORMAT command misses marking a cluster that is bad. If you discover that a cluster on a disk is having problems, you can use this procedure to mark the cluster so that it is no longer used to store files.

Running Disk Tools

To begin Disk Tools, choose the Disk Tools option from the Norton main screen or enter **DISKTOOL** at the DOS prompt. The Disk Tools dialog box appears (see fig. 13.1). The options in this dialog box are described in the following sections.

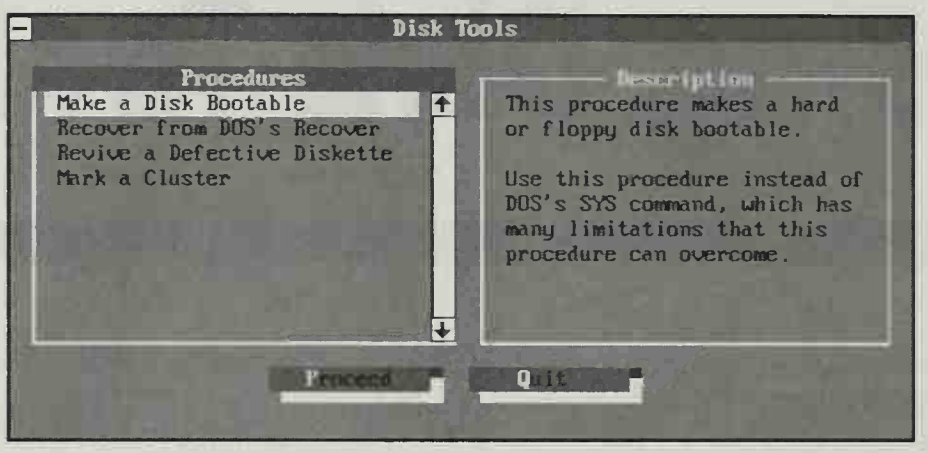


Fig. 13.1
The Disk Tools dialog box.

Making a Disk Bootable

Sometimes you may want to give an unbootable disk booting capabilities. This feature may be of particular importance for a hard disk. A disk can lose its booting capability if the magnetic signal on the boot record becomes weak or if the low-level format loses alignment with the read/write head. In addition, software programs may accidentally overwrite important system information required for booting. The Make a Disk Bootable option can place a fresh copy of the system information on the disk, making the disk bootable again.

Sometimes a disk may not have been set up properly as a bootable disk. If the disk was originally formatted as a nonbootable disk, DOS cannot make the disk bootable. Although DOS has a SYS command that should copy the system files to a nonbootable disk, the command works only if you told the format procedure to leave room on the disk to receive the system files. Otherwise, DOS writes data to the area of the disk reserved for the system information so that the SYS command cannot work for that disk. Disk Tools, however, can move files around, copy system information to the disk, and make the disk bootable.

Using Disk Tools to make a disk bootable can save you a great deal of time. Without Disk Tools, you must copy all files off the disk, reformat the disk with the /S switch, and copy files back to the disk. This process can take several minutes to a few hours; the Disk Tools procedure takes only a few minutes.

When you choose the Make a Disk Bootable option from the Disk Tools dialog box, you are prompted by the program to select the disk drive that contains the disk to make bootable (see fig. 13.2). Make sure that the correct disk is in the drive; then select the drive and either choose **OK** or press Enter.

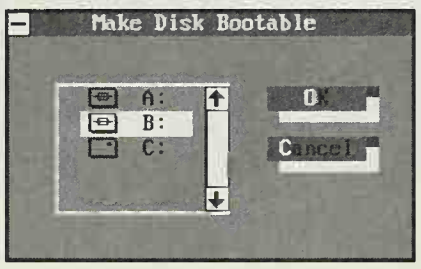


Fig. 13.2
The Make Disk Bootable dialog box.

The program first makes sure that you have enough free space on the disk to make the disk bootable. To make a disk bootable, the program must copy three files to the disk: COMMAND.COM and two hidden files. In PC DOS, two system files that contain part of DOS are stored on the disk as hidden files and do not appear when you use the DIR command. If the disk does not have enough room to accept the files, you see a message telling you that not enough room is available. To make this disk bootable, erase some files from the disk and try the procedure again.

During the procedure, you see messages that the files COMMAND.COM, IBMBIOS.COM, and IBMDOS.COM are being copied to the disk. These files are the DOS system files. When they have been successfully copied, the disk becomes a bootable disk, and you can use it to boot your computer. Figure 13.3 shows one of the messages that appears while the disk is being made bootable.

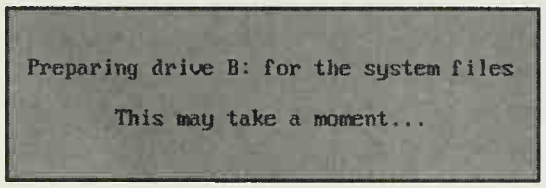


Fig. 13.3
Disk Tools indicating that it is preparing the disk to receive the system files.

T I P

If you have a hard disk that no longer boots from drive C, you can often recover from this problem by booting the computer with the rescue disk (see Chapter 14) or your original DOS disk. Then run the Make A Disk Bootable option on the hard disk. However, first check the hard disk by running Disk Doctor on the disk (see Chapter 12).

T I P If you are using a one-disk computer (a desktop or laptop) that boots from a floppy disk, often you must first boot the computer with your DOS disk and then place your program disk (for example, a word processor) in the disk drive and begin that program. Making your application disk a bootable disk may be simpler. Then you can boot from the disk and begin your application program without having to change disks. The drawback of this procedure is that placing DOS on the disk (making it bootable) can take up about 100K of the disk's space.

Recovering from DOS's RECOVER Command

Many people see the poorly named DOS RECOVER command and assume that it can recover lost files or turn bad files into good files. You actually use the DOS RECOVER command to recover files with a defective sector. This DOS command is primitive, though, compared with what you can do in Norton Utilities.

The DOS manual states that the RECOVER command "recovers a disk with a bad sector." The recovery process used by DOS, however, eliminates all subdirectories on your disk and renames all your files with obscure names. Trying to find the contents of each file can take hours, and for some files, the task may be nearly impossible. If you use Norton Utilities, you should never have a reason to use the DOS RECOVER command.

If you have used the RECOVER command by accident or because you thought the command recovered damaged files, you can use Norton Disk Doctor to place files back into their proper directories—as long as you have not written other files to the disk. You must rename files in the root directory and subdirectories.

The next few paragraphs illustrate how the DOS RECOVER command affects your disk and how you can revive it with Disk Tools. Suppose that you have a disk containing a root directory and three subdirectories.

The files in the root directory:

```
COMMAND     COM          47845      01-08-92      6:00p
AUTOEXEC    BAT            641      12-11-92     11:04p
IMAGE       DAT          12800      12-22-92     11:03a
WP                      <DIR>      12-22-92     11:00a
123                     <DIR>      12-22-92     11:00a
DB3                     <DIR>      12-22-92     11:00a
```

The files in the WP directory:

```
LETTER      WP            5799       11-08-93     3:09p
REPORT      WP            7012       11-08-93     3:09p
```

The files in the 123 directory:

```
SALES       WK1           6185       11-30-93    10:19p
BUDGET      WK1           7623       11-30-93    10:20p
```

The files in the DB3 directory:

```
SALES       DBF          37376       03-24-93     9:56p
CUSTOM      DBF           5158       02-23-93     8:14p
```

After the DOS RECOVER command has been run on this disk, the contents look like this:

```
FILE0001 REC       1024 12-22-93   11:04a
FILE0002 REC        512 12-22-93   11:04a
FILE0003 REC        512 12-22-93   11:04a
FILE0004 REC        512 12-22-93   11:04a
FILE0005 REC      37376 12-22-93   11:04a
FILE0006 REC      33792 12-22-93   11:04a
FILE0007 REC      37888 12-22-93   11:04a
FILE0008 REC      48128 12-22-93   11:04a
FILE0009 REC       5632 12-22-93   11:04a
FILE0010 REC       6656 12-22-93   11:04a
FILE0011 REC       7680 12-22-93   11:04a
FILE0012 REC       6144 12-22-93   11:04a
FILE0013 REC       7168 12-22-93   11:04a
FILE0014 REC      12800 12-22-93   11:04a
FILE0015 REC        512 12-22-93   11:04a
```

Notice that all the directories are gone, and all file names have been changed to FILE00??.REC. If you have only 15 files, as illustrated here, you might be able to determine quickly what these files were and rename them appropriately. However, with more files, the task becomes quite formidable. Fortunately, Disk Tools' Recover from DOS's Recover option can help.

T I P If you are recovering a floppy disk, make a copy of that disk with the DUPDISK command in case something goes wrong during the recovery (see Chapter 26). Then you still have the original disk that can be used for another attempt at recovering the files.

If you choose the Recover from DOS's Recover option from the Disk Tools dialog box, you see the message shown in figure 13.4. If you choose **O**K when this message is displayed, you are asked to select the drive name of the disk you want to recover (see fig. 13.5).

A warning message then reminds you that you should use this procedure *only* if you have run DOS's RECOVER command or your root directory is destroyed (see fig. 13.6). To proceed with the recovery, choose **Y**es; to cancel the recovery, choose **N**o. If you choose to proceed, a final message is displayed before the actual recovery begins (see fig. 13.7).

Fig. 13.4

A message displayed when you choose the Recover from DOS's Recover option.

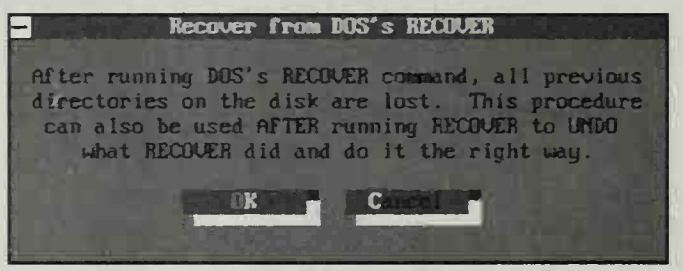


Fig. 13.5

Specifying what disk to recover.

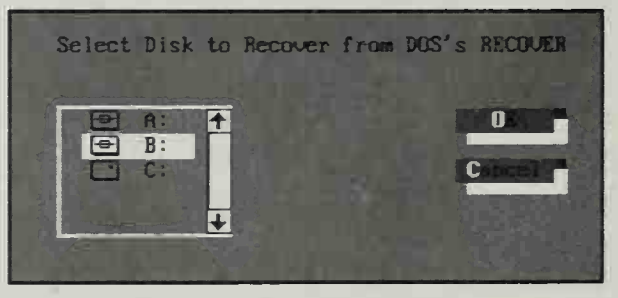
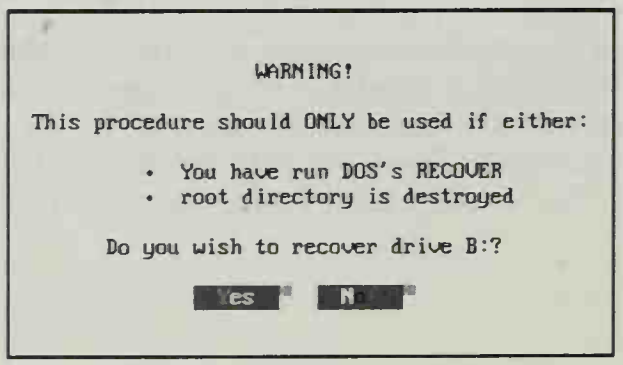


Fig. 13.6

A warning message.



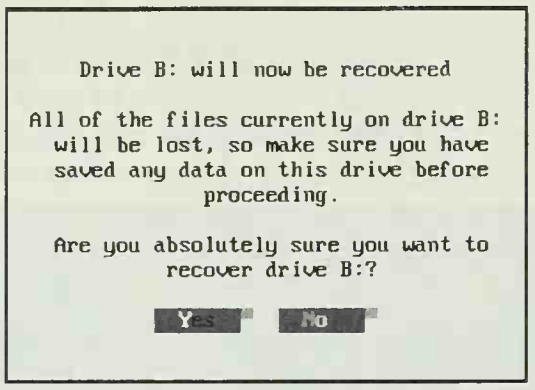


Fig. 13.7
Last warning message before recovering the specified disk.

Answer **No** to cancel the recovery procedure. If you answer **Yes** to have the program proceed, a screen appears showing you the progress of the recovery (see fig. 13.8).

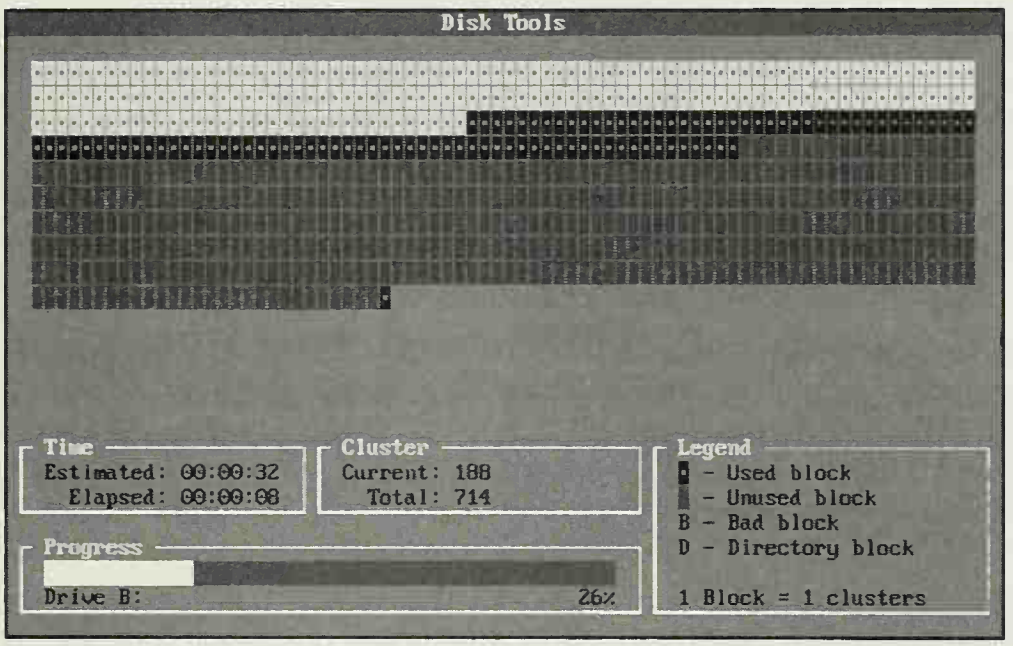


Fig. 13.8
A progress screen for disk recovery.

When the recovery is complete, you see a final message (see fig. 13.9). You are told that Disk Tools has recovered the directories and named them DIR0000, DIR0001, and so on. Most files in the root directory are named FILE0000.*???*, FILE0001.*???*, and so on. Any files in directories other than the root directory are recovered with their full names intact.

After the recovery is finished, the files in the root directory are the following:

```
DIR0000      <DIR>          12-22-92   11:00a
DIR0001      <DIR>          12-22-92   11:00a
DIR0002      <DIR>          12-22-92   11:00a
FILE0003            1024    12-22-92   11:10a
```

```
FILE0004 COM      33792 12-22-92   11:10a
FILE0005 COM      37888 12-22-92   11:10a
FILE0006 COM      48128 12-22-92   11:10a
IMAGE    DAT      12800 12-22-92   11:10a
```

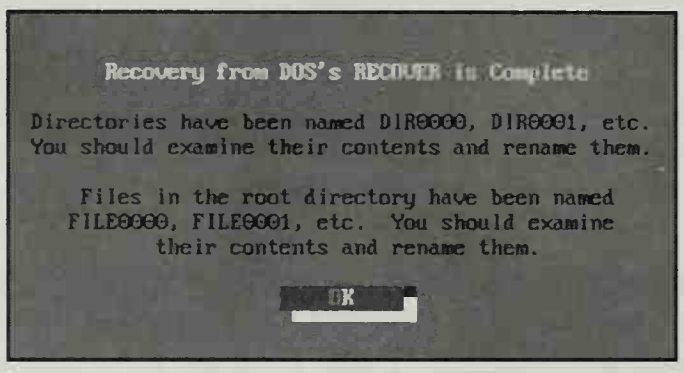


Fig. 13.9

The message telling you that the recovery is complete.

Notice that Norton recognized the file IMAGE.DAT and recovered its name in the root directory. The other files are called FILE000?.COM. You must examine the files to determine their contents. One way to examine them is to use Norton Disk Editor (see Chapter 17). In this case, FILE0003 is the AUTOEXEC.BAT file. You can use the RENAME command to rename that file:

```
RENAME FILE0003 AUTOEXEC.BAT
```

The file named FILE0006.COM is COMMAND.COM. The other two files do not match any files in the original directory. They are the hidden files IBMBIOS.COM and IBMDOS.COM, which make up the DOS system. After you recover IBMBIOS.COM and IBMDOS.COM, use the FA command to set their attributes to read-only, system, and hidden (see Chapter 9).

Although the directory names have been lost, the files in the directories are intact. For example, a directory listing of DIR0000 reveals the following files:

```
LETTER     WP        5799          11-08-93      3:09p
REPORT     WP        7012          11-08-93      3:09p
```

You can recognize these files as being from the original WP directory. To rename the directories, use the Norton Change Directory (NCD) command (see Chapter 23). After you have renamed files and directories, the disk is back to its original state.

Reviving a Defective Disk

The next option in the Disk Tools dialog box is the Revive a Defective Diskette option. This option mainly puts fresh format information on the disk. The procedure can be helpful if a disk has become difficult or impossible to read, which may happen if you use a floppy disk often. Sometimes the disk begins to wear out, the software program overwrites the system area, the disk becomes scratched, or other problems cause the disk to lose some information. If you have accessed the FAT so often that its information has begun to wear thin, the Revive a Defective Diskette option can place a new copy on disk for you.

When you choose Revive a Defective Diskette, you are first asked to specify the drive where the disk to be revived is located (see fig. 13.10).

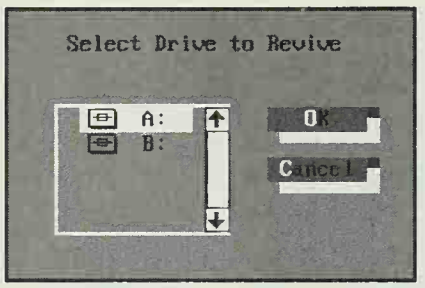


Fig. 13.10
Selecting the disk that you want to revive.

During a normal format procedure, a disk is checked for bad spots. If found, these spots are marked and not used to store information. A disk, however, can develop bad places after the original format has taken place. At times, the magnetic signal that stores information on disk may become weak and unreadable.

Furthermore, on some parts of a hard disk, the magnetic coating may be thin in spots and wear out over an extended period of use. If this problem occurs, you can use Disk Tools to mark bad spots and move data to safe areas on the disk.

These bad areas in the magnetic media can limit access to data in a particular file or can sometimes make a disk completely unreadable. Such problems often show up as read errors when you try to access information on a disk. You may get the following message while trying to read a disk that you know was readable earlier:

```
Abort, Retry, Ignore, Fail?
```

The Disk Tools program can try to recover information from this kind of disk. Disk Tools may perform a type of reformatting of certain areas of the disk. This formatting does not destroy information as normal formatting does. Instead, it re-creates certain vital parts of the disk to

make the disk readable again. Disk Tools performs various tests on the disk to see whether the program can recover questionable information and rework defective areas to make the disk usable again.

A dialog box reports the progress of the procedure (see fig. 13.11). When the process is finished, you see a message that the floppy disk has been revived (see fig. 13.12). Diagnose the disk with Disk Doctor to check that the system information is not lost.

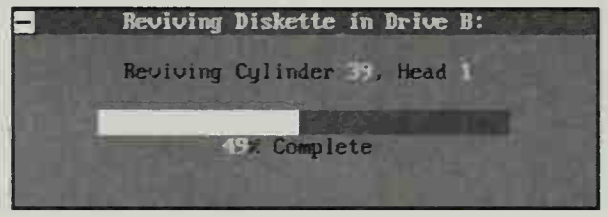


Fig. 13.11

A progress report from Revive a Defective Diskette.

Fig. 13.12

The final message from Revive a Defective Diskette, telling you to run NDD on the revived disk.

If you have problems with a disk and have revived or recovered it with Disk Tools, copy the information from the original floppy disk to another disk. If the first disk is one that you use frequently and it may be wearing out, copy the information to a new floppy disk and use that one.

If you cannot revive a disk with Disk Tools, the prognosis of recovery is bad. The NDD program may be able to fix bad information in the FAT and recover lost clusters. Your last possible choice is to use Disk Editor to attempt to recover portions of the disk (see Chapter 17).

T I P If you have problems with a hard disk, make sure that you keep backups. In fact, always keep backup copies of all important files even before you have problems with a hard disk.

Marking a Cluster

The Mark a Cluster option in the Disk Tools dialog box enables you to mark any cluster on a disk as bad or good. You may want to mark a cluster as bad—meaning that you can no longer use the cluster to store file information—if you discover that the cluster has intermittent problems. By running NDD or other programs, you may find specific clusters that are bad (the cluster number is reported to you on-screen or in a report). You may run NDD, for example, to generate a list of bad clusters; then you can use Disk Tools to mark the clusters as bad. (Of course, you can allow NDD to automatically mark the bad clusters.) You can also mark a cluster as bad if you want to hide and protect information; the information in that cluster is not overwritten as long as the cluster remains bad. When you choose this option from Disk Tools, an information message appears (see fig. 13.13). This message explains that when a cluster is marked as good, DOS can use it to store file information. If a cluster is marked as bad, DOS does not use it.

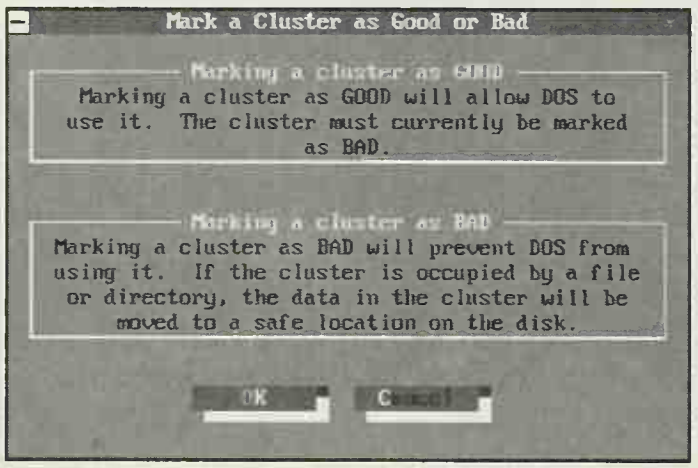


Fig. 13.13
The information message from Mark a Cluster.

To cancel the Mark a Cluster procedure, choose **C**ancel. If you choose **O**K, you are prompted to choose the drive on which to mark a cluster (see fig. 13.14).

Fig. 13.14
Mark a Cluster prompting you to choose what drive to use.

If you mark a cluster being used by a file as bad, the information in that cluster is copied to a safe location on disk so that the information in the file remains intact. Marking a cluster as good means that the cluster is available to store file information. You can also use Mark a Cluster to bring back clusters you have marked as bad. You mark a cluster as bad to protect new information from being written to that bad spot.

After you tell which disk drive you plan to use (such as drive A, B, or C), you are prompted to type the number of the cluster that you want to mark and whether you want to mark the cluster as bad or good (see fig. 13.15). The Mark Cluster dialog box tells you the range of clusters you can mark. Type a cluster number in the Cluster number field; then choose the Good or Bad radio button, according to your intention.

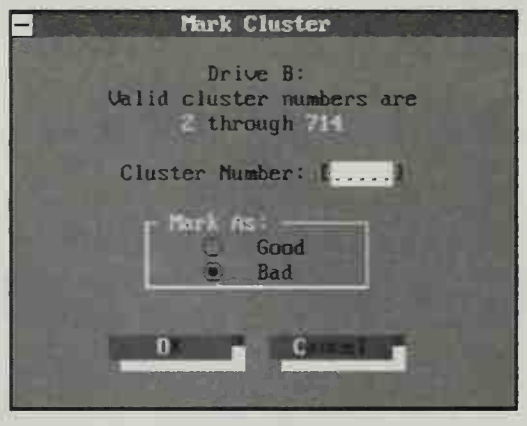


Fig. 13.15

The Mark Cluster dialog box where you mark clusters as bad or good.

You can mark as many clusters as you want. After you enter your choices, choose **O**K to mark the cluster or choose **C**ancel to end the program and return to the Disk Tools dialog box.

Using the DISKTOOL Command from the DOS Prompt

When you enter **DISKTOOL** at the DOS prompt without any command-line options or you choose Disk Tools from the Norton main screen, the program runs interactively, as described in the previous sections. You can also run the program from the DOS prompt by using command-line options and bypassing the Disk Tools dialog box.

Here are four versions of this command's syntax:

DISKTOOL [/MAKEBOOT] [/SKIPHIGH]

DISKTOOL [/DOSRECOVER] [/SKIPHIGH]

DISKTOOL [/REVIVE] [/SKIPHIGH]

DISKTOOL [/MARKCLUSTER] [/SKIPHIGH]

The following switches are available for use with DISKTOOL:

Switch	Description
/DOSRECOVER	Skips the Disk Tools dialog box and goes to the Recover from DOS's Recover option.
/MAKEBOOT	Skips the Disk Tools dialog box and goes to the Make a Disk Bootable option.
/REVIVE	Skips the Disk Tools dialog box and goes to the Revive a Defective Diskette option.
/MARKCLUSTER	Marks a cluster.
/SKIPHIGH	Tells the program that you do not want Disk Tools loaded into high memory. Use this option if you are using a memory manager that is already using DOS high memory.

The Disk Tools program is primarily designed for interactive use. However, you can select which tool to use and tell the program not to use DOS high memory by including one or more switches on the command line. When you begin the program from the DOS prompt and use /DOSRECOVER, /MAKEBOOT, /REVIVE, or /MARKCLUSTER, the opening Disk Tools dialog box is bypassed, and the dialog box associated with the chosen tool is displayed exactly as if you had arrived there by way of the Procedure list box in the Disk Tools dialog box.

NOTE Previous versions of the Disk Tools command included Rescue Disk options. To create or use a rescue disk in Version 7, use the RESCUE command (see Chapter 14).

Summary

This chapter described four important Disk Tools procedures that can help you revive or restore a disk, make a disk bootable, and manually mark clusters as good or bad. Disk Tools is a valuable part of your rescue arsenal and should be on your rescue disk. To learn how to make and use a rescue disk, turn to the next chapter.

14

CHAPTER

Creating and Using a Rescue Disk

When your hard disk is having access problems or has been accidentally formatted, you cannot use the hard disk to help you correct the problem. That is the purpose of the rescue disk—a disk that contains information about your hard disk, plus important programs that can help you recover, revive, or unformat the hard disk. If you have not yet made a rescue disk for your computer, do so now! This chapter shows you how to create and use a rescue disk.

Understanding How the Rescue Disk Works

Your disk contains a number of pieces of information that could take much time and effort to re-create if they happen to be lost or corrupted (perhaps by a virus). They include your setup information (CMOS),

information about how your hard disk boots (the DOS boot program), and information about how your hard disk is partitioned (for example, into disks C and D). Norton Utilities provides a way to keep a separate copy of this information on a disk called a *rescue disk*.

As noted, a rescue disk contains information about your disk, including information about your partition tables, boot records, and setup values (CMOS data). When you create a rescue disk, this information is written to a disk (usually a floppy disk) and stored in three files: PARTINFO.DAT, BOOTINFO.DAT, and CMOSINFO.DAT.

The *partition information* tells how your hard disk was set up originally, when you used the FDISK command to inform DOS how the hard disk was to be used (one drive, two drives, the size of the drives, and so on). The *boot information* tells how your disk is formatted (under which version of DOS) and includes other system information.

The *CMOS setup information* stored in RAM is kept active by a battery. The PC AT was the first computer to use this kind of setup. Many new computers no longer store information in CMOS. If you must run the setup program to configure your computer, your computer has CMOS. If your battery dies, your computer loses its CMOS settings.

You can create a rescue disk by choosing the Rescue Disk command from the Norton main menu or by entering **RESCUE** at the DOS prompt. With either method, you see the Rescue Disk dialog box shown in figure 14.1.

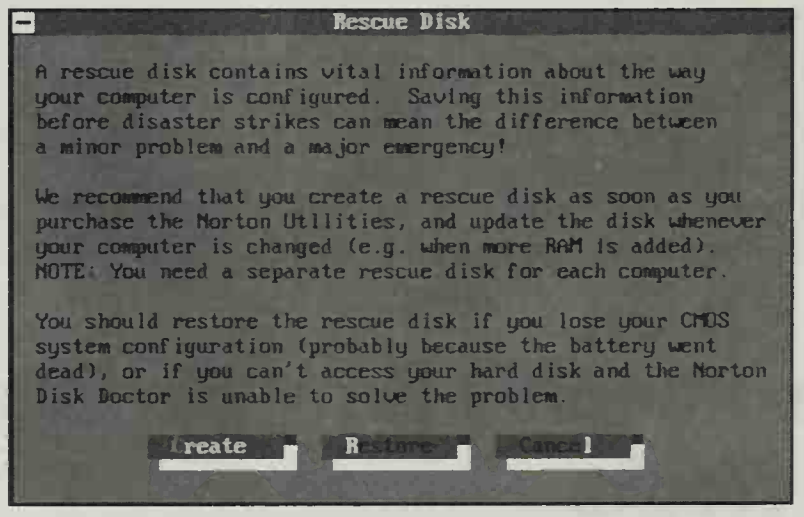


Fig. 14.1
The Rescue Disk dialog box.

NOTE

You may have created a rescue disk when you installed Norton Utilities. If you did, you do not have to do that again. If you have not created a rescue disk, it is important to do so now!

NOTE You must create a rescue disk for each computer. The information on a rescue disk for one computer may not work on another computer.

Specifying the Contents of the Rescue Disk

After you choose **C**reate from the Rescue Disk dialog box, the Create Rescue Disk dialog box appears (see fig. 14.2). This dialog box enables you to specify where to create the disk and what files will be included. At the top of the dialog box is the **S**ave Rescue Information To field. Here you specify the disk drive where you want the information saved. Usually, this will be drive A. You can specify another drive, however, by selecting a drive name from the drop-down list box. Choose the drive that contains the floppy disk to be used as your rescue disk; then specify the disk size in the Rescue **D**iskette Type field. Usually, the disk size in this field is the appropriate size, but sometimes you may need to change it. If, for example, you have a high-density (1.44M) 3 1/2-inch drive but your floppy disk is a double-density (720K) 3 1/2-inch disk, you should change this setting from 1.2M to 720K.

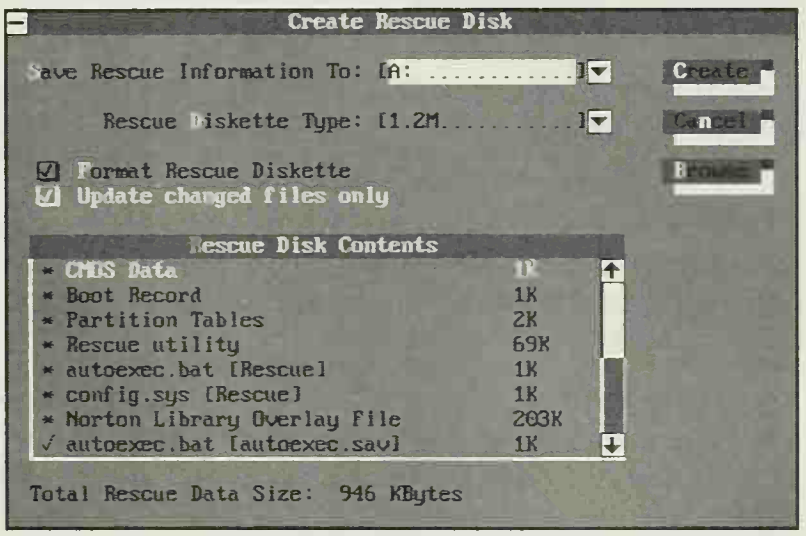


Fig. 14.2
The Create Rescue Disk dialog box.

The **F**ormat Rescue Diskette option allows you to decide whether the diskette that will be used will be formatted before the rescue information is stored on it. This option is selected by default. Usually, it is preferable to format the rescue disk so that it will contain the current DOS system information. That way, you can boot your computer from the rescue disk, if needed.

The **U**pdate Changed Files Only option is available only if the **F**ormat Rescue Diskette option is deselected. Choose this option if you have made changes to your computer (such as added more RAM) and you want to update your current rescue disk without starting over from scratch. When you choose this option, only updated information is copied to the rescue disk.

The **R**escue Disk Contents list box contains the information that will be saved to the rescue disk. Usually, you will want to use this list as is, neither adding nor deleting from the list. On occasion, though, you may want to add or delete information from this list. The information that has an asterisk (*) on the left is always saved; you cannot deselect those items. Items that have a check mark next to their names can be deselected. Normally, these are the items that you can select or deselect to save to the rescue disk:

AUTOEXEC.BAT (the startup batch file)
CONFIG.SYS (the startup configuration file)
Norton Disk Doctor
Norton Safe Format
UnErase
UnFormat
FDISK (a disk-partitioning program)
Norton Diagnostics

This list box may include other startup programs, such as your mouse and DISKREET programs or drivers, which appear in your AUTOEXEC.BAT or CONFIG.SYS file.

To select or deselect information in the list, highlight the item (such as Norton Safe Format) and press the space bar to select or deselect the item.

If you want to locate other files on the drive to add to the **R**escue Disk Contents list, choose the **B**rowse option. The Browse For Files To Add dialog box appears, as shown in figure 14.3. In this box, you can choose additional files to add to the rescue disk.

To select a group of files, type a file specification in the **F**ile text box (for example, type ***.EXE**). This causes all files that meet the specification to be selected in the Fi**l**es list box at the lower right of the dialog box. To select or deselect individual files, highlight the file name in the Fi**l**es list box and press the space bar. (A check mark appears to the left of selected file names.)

To change drives, specify the drive you want in the D**r**ive drop-down list box. To change directories, use the **D**irectories list box. To list additional directories, highlight the parent directory (. .) and press Enter, or click the parent directory. If you are several directories deep, you

may have to choose . . more than once before arriving at the root directory. The **D**irectories list box then displays a list of all directories at the root level. To locate a directory, use the up- and down-arrow keys, use the scroll bar to move the highlight, or begin entering the name of the directory. The highlight will move to the directory name that matches the letters you type. Then press Enter. After you have highlighted the directory you want, press Enter or double-click the directory. This causes the Files list box to display the file names in the selected directory.

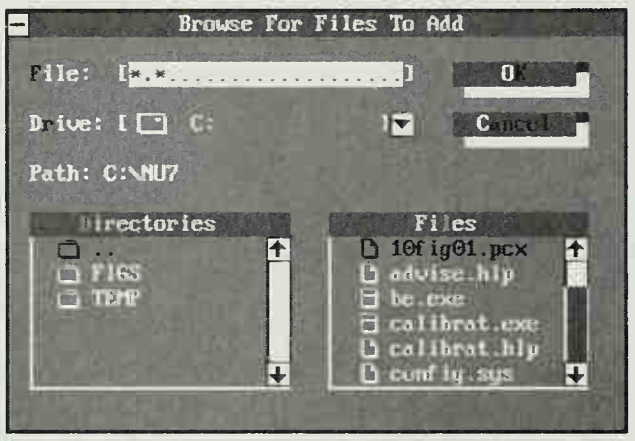


Fig. 14.3
The Browse For Files To Add dialog box.

After you have selected files to add to the rescue disk, choose **OK**. If you want to cancel the Browse For Files To Add dialog box, choose **C**ancel. Be careful not to choose more files than can fit on the rescue disk.

Once the **R**escue Disk Contents list contains all the files you want included on the rescue disk, you can begin to create the rescue disk by choosing **C**reate in the Create Rescue Disk dialog box. To cancel the creation of a rescue disk, choose Ca**n**cel.

Creating the Rescue Disk

When you choose **C**reate in the Create Rescue Disk dialog box to begin the creation process, a warning message appears, telling you that information currently on this disk will be lost (see fig. 14.4). Choose **OK** to proceed or choose **C**ancel to stop the process.

If you proceed and you chose to format the disk that will be the rescue disk, the format begins. You then see a progress dialog box, as shown in figure 14.5. Notice in this dialog box that the disk being formatted will contain system files (see the System Mode entry at the upper right of the dialog box). This means that the rescue disk will be bootable.

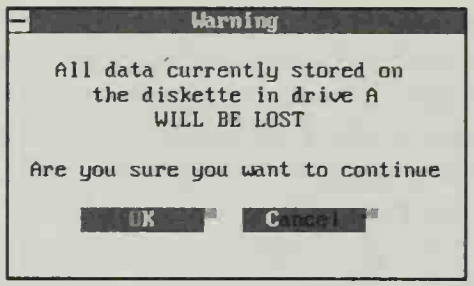


Fig. 14.4

A Rescue Disk Warning box, indicating that files on the disk will be destroyed.

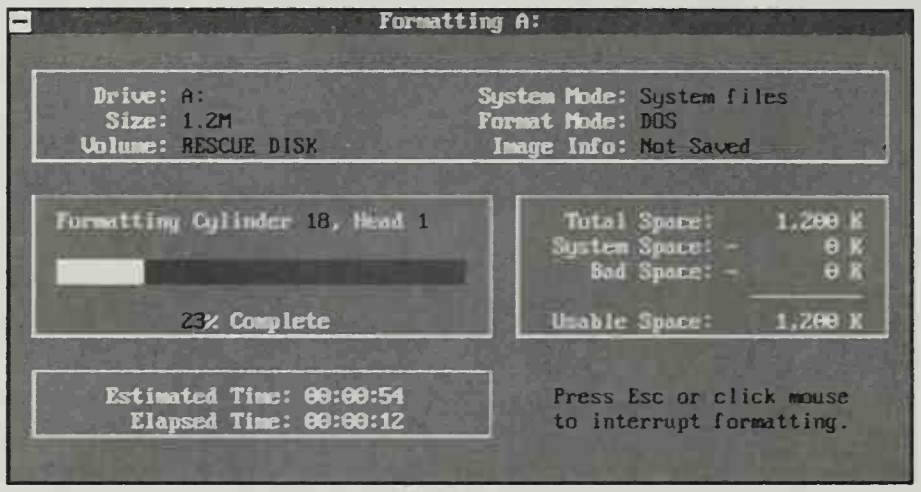


Fig. 14.5

Formatting the rescue disk.

After the disk is formatted, the Rescue Disk program begins to copy information to the rescue disk. Another progress dialog box appears (see fig. 14.6). This dialog box tells you how much (a percentage) of the rescue information has been copied to the rescue disk.

When all the information has been successfully copied to the rescue disk, a final message tells you that all the rescue information was saved (see fig. 14.7).

T I P Store your rescue disk in a safe place. It should be accessible in case you need it for restoring information to your computer.

Restoring from the Rescue Disk

If your computer develops problems that prevent you from booting from its hard disk, the Rescue Disk program can help solve the problem. Here is the procedure for using Rescue Disk:

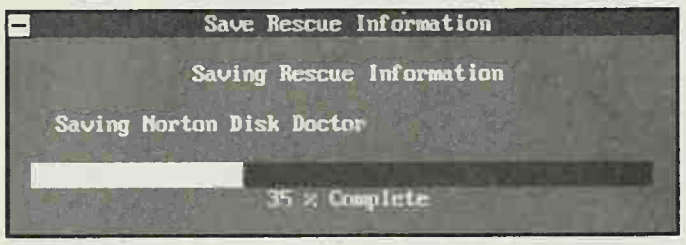


Fig 14.6

A Rescue Disk progress dialog box.

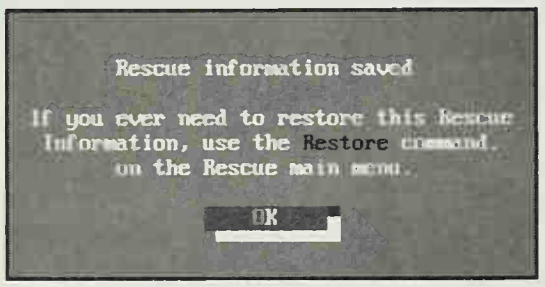


Fig. 14.7

The message that appears when the rescue disk is complete.

1. Place the rescue disk in the boot drive of your computer (usually drive A) and turn on the computer.
2. After the computer boots, enter **RESCUE** at the DOS prompt. The Restore Rescue Information dialog box appears (see fig. 14.8).
3. In this dialog box, you can choose the items you want to restore (**C**MOS Information, **B**oot Records, and **P**artition Tables). A selected option has a check mark in its box. Choose **C**MOS Information if your computer has lost information about disk drive sizes and types. This loss may occur if your computer's CMOS battery has run down or been replaced. Choose **B**oot Records if your hard disk will not boot. Choose **P**artition Tables if your computer has lost information about your hard disk partitions. If your rescue disk information is in a drive or path other than the one shown in the Restore Information **F**rom field, you can choose **N**ew Path, which displays a dialog box enabling you to choose another drive or path.
4. After making your selections, choose the **R**estore option. The information will be restored to your disk. If you change your mind, choose Cance**l**.
5. End the Rescue Disk program by pressing Esc and reboot your computer.

If you continue to have problems, reboot with the rescue disk and run Norton Disk Doctor on your hard disk to see whether it can detect problems with your disk (see Chapter 12). You also might try the Make a Disk Bootable option in the Disk Tools utility (discussed in Chapter 13) if your computer will not boot from its hard disk.

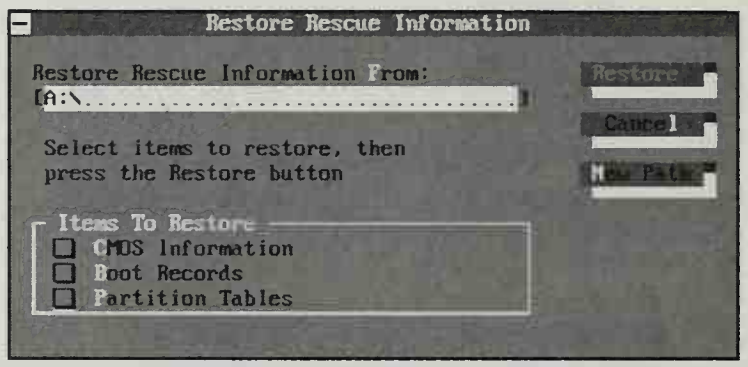


Fig. 14.8

Using the rescue disk to restore information to your disk.

Summary

The rescue disk is an important tool in the medicine bag for your computer. It contains a number of utility programs, plus information about your computer that can help you restore, revive, or unformat your hard disk. This chapter explained how to create and use a rescue disk. If you have not created one for each of your computers, do so now. Then store the disk in a safe but accessible place so that it will be there when you need it.

Now turn to Chapter 15 on restoring files with File Fix, the final chapter in Part III of this book.

CHAPTER 15

Restoring Files with File Fix

The File Fix program recovers corrupted database, spreadsheet, and word processing files. These files can become corrupted when the power is turned off abruptly, when a program accesses a file incorrectly, or when the information stored on disk is damaged because of a bad spot on the disk. Specifically, File Fix is designed to fix the following types of files:

Database files	dBASE (II, III Plus, and IV) Clipper
Spreadsheet files	Lotus 1-2-3 (through Version 3.1) Symphony (Versions 1.0 and 1.1) Quattro Pro (Version 3.0) Excel (Versions 2.0 through 4.0)
Word processing files	WordPerfect (Version 5.1)

You can use File Fix also to fix files that are created by other programs but are compatible with one of these file formats. For example, some database programs create DBF (dBASE-type) files. Sometimes these "compatible" files are not quite compatible and may cause problems when you use them. File Fix often can take these marginally compatible files and turn them into fully compatible files.

Furthermore, if you have erased all records in a dBASE database, File Fix sometimes can recover those records. File Fix uses knowledge about how these files are created to try to recover the file information. Even if all information in the file cannot be recovered, File Fix may be capable of recovering some information.

Starting the File Fix Program

Begin File Fix by choosing the File Fix option from the Norton main menu or entering **FILEFIX** at the DOS prompt. Figure 15.1 shows the File Fix dialog box. From this dialog box, you can choose to fix files for Lotus 1-2-3, Symphony (spreadsheet files only), Quattro Pro (spreadsheet), Excel (spreadsheet), dBASE and Clipper (and similar formats), and WordPerfect.

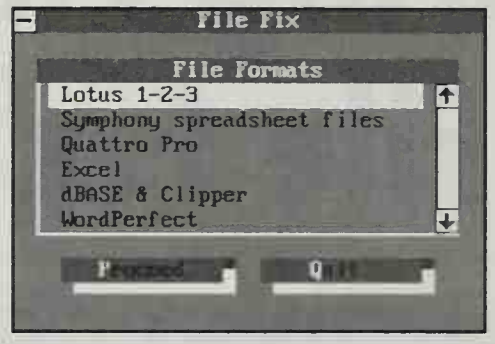


Fig. 15.1
The File Fix dialog box.

To fix a file, highlight the file type in the File Formats list box and choose **P**roceed. To cancel or end the procedure, choose **Q**uit. If you choose **Q**uit, you return to the Norton main screen or to DOS, depending on where you began the program. After you choose **P**roceed, you see the Choose File To Repair dialog box (see fig. 15.2).

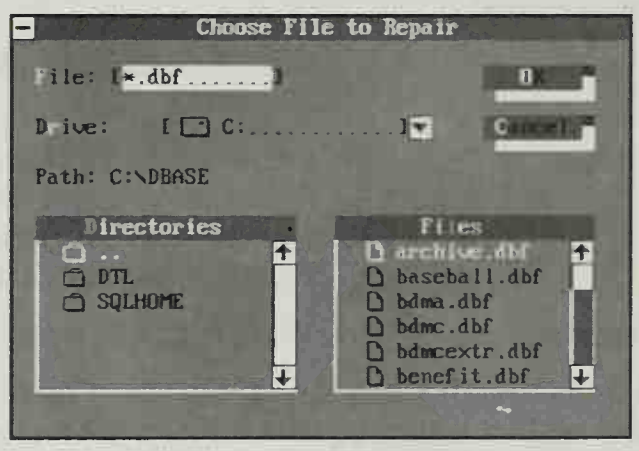


Fig. 15.2
Selecting a file to fix.

This dialog box is similar to others in Norton Utilities in that you can use it to browse for the file (or files) you want to select for a particular task. If you want to choose files on a different drive, you can select a new drive name from the D**r**ive drop-down list box. You use the **D**irectories list box to look for a directory. If, for example, you want to browse for files in a directory other than the current directory, you can

select the parent directory (. .) entry in the **D**irectories list and then press Enter, or just double-click the entry. If you are several directories deep, you will have to do this several times before getting to the root directory. Once you are in the root directory, the **D**irectories list displays all directories off the root directory on the current drive. With this list displayed, you can then select a directory name by using the arrow keys or mouse. When you select a directory name, the files in that directory appear in the Fi**l**es list box.

T I P

Another way to quickly locate a directory name in the **D**irectories list box or a file name in the Fi**l**es list box is to move to the list box and type the first character of the directory or file name you want. The highlight in the list box jumps to the first name (alphabetically) in the list beginning with the character you typed. Then you can scroll to find the specific directory or file name.

To select a file in the Fi**l**es list box, use the up- and down-arrow keys to highlight the file name. To begin the repair process, press Enter, choose **O**K, or double-click the file name.

T I P

To avoid having to select a drive and directory, enter **FILEFIX** from the drive and directory that contain the files you want to fix.

After you specify the file type and the file you want to fix, the File Fix procedure varies, depending on the type of file you are fixing. The following sections describe the procedures for repairing database, spreadsheet, and WordPerfect word processing files.

Fixing Database Files

File Fix can often fix damaged database files that are compatible with the dBASE and Clipper standard database formats. These programs include dBASE II, dBASE III Plus, dBASE IV, FoxBASE, Clipper, Wampum, Kwikstat, and any other programs that create standard DBF format files.

If you specified the dBASE & Clipper file type in the File Fix dialog box, after you specify the file to be repaired, File Fix displays the first Repair dBASE File dialog box. This dialog box gives you several options for fixing the file (see fig. 15.3).

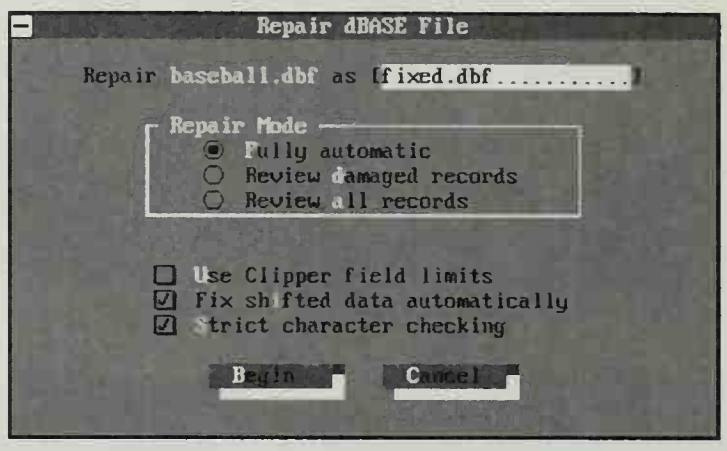


Fig. 15.3
Selecting dBASE file fix options.

At the top of the dialog box, you see that the selected DBF file will be repaired as a file named FIXED.DBF. If you want to change the name of the repaired file, enter a new name in the Repair As field.

Before you choose a repair mode, notice the options at the bottom of the dialog box. To select or deselect an option (a check mark in the box means that the option is selected), press Alt plus the highlighted letter in the option name, or just click the option's check box.

You should choose the first option, **U**se Clipper Field Limits, if your DBF file was created by Clipper. The other two options, Fix Sh**i**fted Data Automatically and **S**trict Character Checking, are selected by default. Sometimes when dBASE files are damaged, the information in the database is shifted and not aligned properly in the fields. In that case, choose Fix Sh**i**fted Data Automatically. If this option does not work, you must correct the shifting manually. The **S**trict Character Checking option means that only characters which are usually allowed in records should be allowed. A few programs, such as the SBT Accounting series, enable special graphics characters in the record. If you use such a program, deselect the **S**trict Character Checking option.

In the Repair Mode section of the dialog box, you indicate the method with which you want to try to repair the file. If this attempt is your first pass at fixing the file, choose **F**ully Automatic. If that method does not work, choose Review **D**amaged Records, which enables you to look at only those records that are corrupted. If the database is extremely corrupted, choose Review **A**ll Records.

After you set all the options for the repair process, choose **B**egin. When you begin the fix, File Fix lets you choose whether you want to review the fields in the database file (see fig. 15.4). It is a good idea to review the fields to see whether all the field names and specifications are OK, as far as you know. To review the fields, choose **R**eview Fields. If you don't want to review the fields, choose **S**kip Review to continue with the repair process.

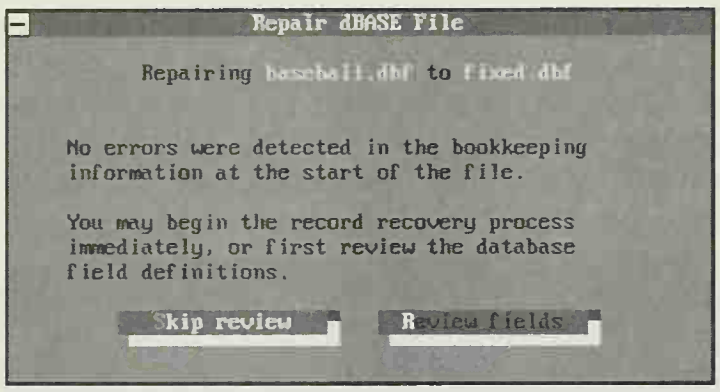


Fig. 15.4
File Fix asking whether you want to review the fields.

If you choose fully automatic mode, Norton proceeds with the repair without further prompts. If you choose to review the dBASE file, you see the dialog box shown in figure 15.5. This dialog box lists the structure of the database as far as File Fix can determine. If this data has been corrupted, you can revise this information by choosing **R**evise. Otherwise, choose **A**ccept. If you choose **R**evise, another dialog box is displayed, enabling you to correct information about the file's database structure (see fig. 15.6). You can choose to import a database structure from another file, edit the structure, or cancel this repair. Choose **I**mport if you have another dBASE file with the same structure (same field names, types, and widths) as that of the database file you are repairing. File Fix can graft the good database structure onto the damaged file. If you are not able to import a structure, choose **E**dit.

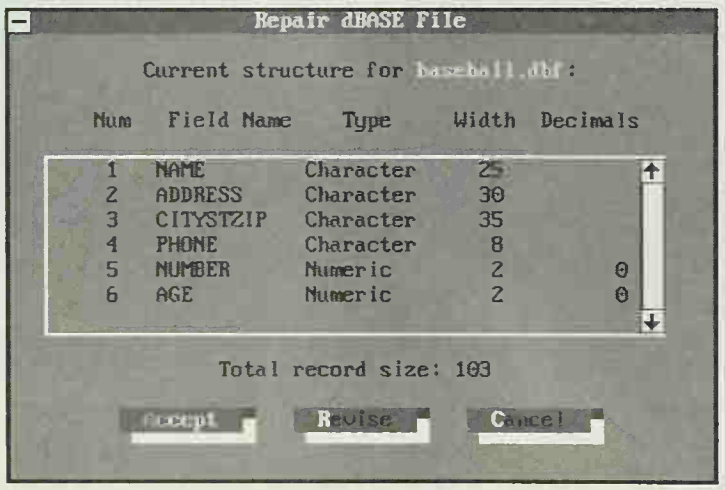


Fig. 15.5
The structure of the file that is being fixed.

When you choose **E**dit, you see a dialog box similar to that shown in figure 15.7. The purpose of this dialog box is to allow you to locate the first of the data fields in the damaged database. The box in the middle of the dialog box shows the data in the database. You want the first record in the database to begin at the top line on the left side of the

box. When you press the right- or left-arrow key, the information in the box moves to the right or left. Move the information in this box until the information in the first record begins at the top line on the left side of the box, or change the file position at the bottom of the dialog box. Choose **OK** to continue with the repair or choose **C**ancel to cancel it.

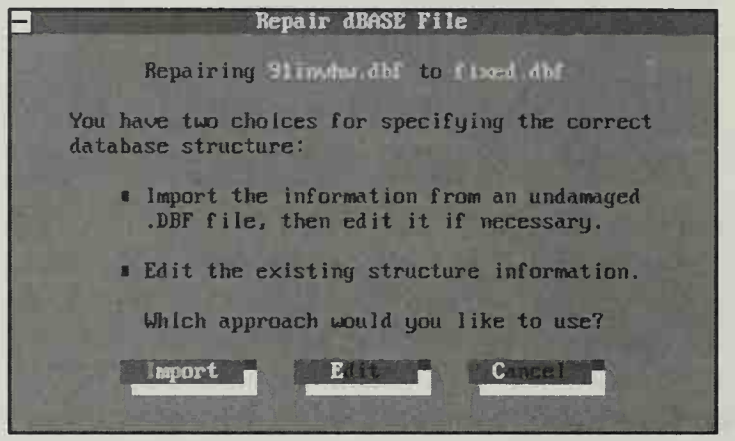


Fig. 15.6

Specifying the file's database structure.

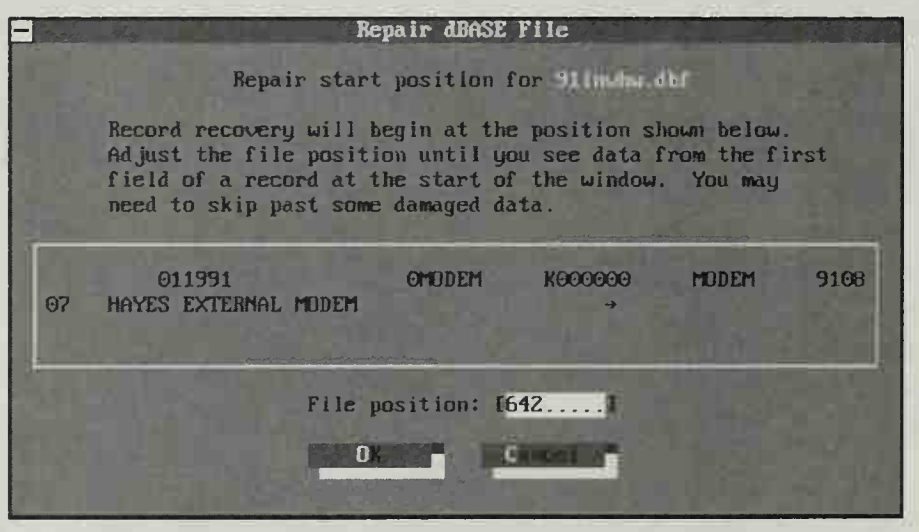


Fig. 15.7

Adjusting the starting point for data in the database file being repaired.

When you choose **OK** after adjusting the starting point, another dialog box appears (see fig. 15.8). The purpose of this dialog box is to enable you to line up the database fields. Figure 15.8 shows fields that are lined up correctly, with each field making a column of data. If the fields in the box are not lined up in columns, change the record size. Then choose **OK** to continue with the repair or choose **C**ancel to cancel it.

When you choose **OK** after lining up the fields, the dialog box shown in figure 15.9 is displayed. In this dialog box, you can adjust the width of each database field. The name of each field is listed at the left side of the dialog box, and the data in that field is shown in the File Data area.

If the data matches the field widths, the data in the File Data area should fit correctly into the field widths. If the data does not fit, you can adjust the width of one or more fields. Highlight the field name and press the right- or left-arrow key to make the field wider or narrower. The data in the record is adjusted to fit the new field width. You can adjust as many fields as you want to make the data fit correctly.

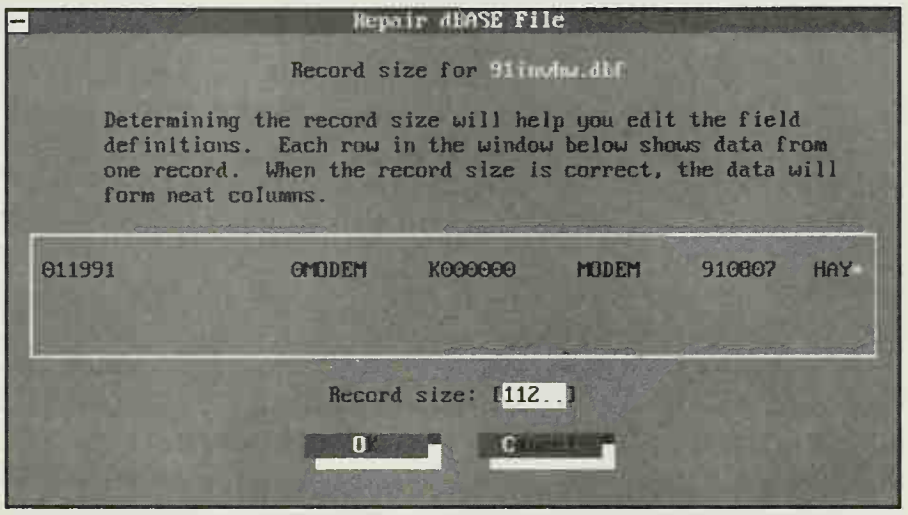


Fig. 15.8
Lining up fields in the database being repaired.

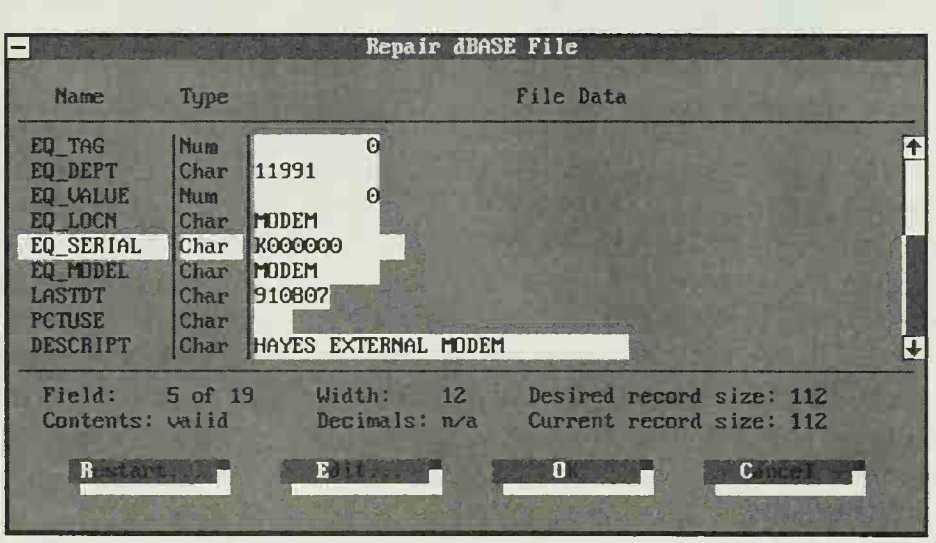


Fig. 15.9
Adjusting the field widths in the database being repaired.

You can edit other information about a highlighted field by choosing **Edit** at the bottom of this dialog box. When you choose **Edit**, the dialog box shown in figure 15.10 is displayed. In this dialog box, you can change the name of the field and its type, width, and decimals. Choose **OK** to exit the dialog box. The changes you made are then applied to the highlighted field.

Fig. 15.10
Editing the structure of a field.

When you have adjusted the widths of fields and made any other edits to the field specifications, you choose **O**K in the Repair dBASE dialog box shown in figure 15.9 to continue with the repair process. If you choose **R**estart, you return to the database file as it was before any of the adjustments were made, and you can begin making new adjustments. You could choose this option if you royally messed up the adjustments and want to begin again. Choose **C**ancel to exit this dialog box without applying any of the changes you have made. After you have made the necessary adjustments, the current structure is displayed again, as shown in figure 15.5.

After you accept the database structure, you see the dialog box shown in figure 15.11, displaying the contents of a record. If the record looks OK, choose **A**ccept, and the next record is displayed. If the data does not line up in the fields, you can shift the data by choosing **S**hift. When you choose this option, you can then use the right- and left-arrow keys to move the information in the record until the information lines up with the fields. If you want to reject a record, choose **R**eject. If you reject a record, it is not written to the fixed file. If you want to return to fully automatic mode for the rest of the records, choose **M**ode and then choose **F**ully Automatic. Choose **C**ancel to cancel the fix.

After a file is fixed, File Fix tells you how much of the file is accepted and how much is rejected (see fig. 15.12). If a large number of bytes are rejected, it may mean that some of the file was lost. Always examine carefully the file in the program for which the file is intended before making a decision to recover the information fully. In this case, use dBASE to browse through the fixed file to determine whether all the records have been properly fixed.

At this point, you must decide what to do with the fixed file. If you choose **N**o Report, File Fix ends. If you choose **P**rinter or **F**ile, a report summarizing the repair is generated and sent to a file (you specify the name) or to the printer. The report summarizes all the options you

chose in fixing the file and contains information on how many records were unchanged and how many were fixed. A sample report is shown in figure 15.13.

Fig. 15.11
Viewing a dBASE record in File Fix.

Fig. 15.12
The results of a file fix.

Fixing Spreadsheet Files

File Fix can fix several types of spreadsheet files, including Lotus 1-2-3, Symphony, Microsoft Excel, and Quattro Pro files. After you specify the file format—Lotus 1-2-3, Symphony spreadsheet files, Excel, or Quattro Pro—in the File Fix dialog box (refer to fig. 15.1), you specify the file to fix in the Choose File To Repair dialog box (refer to fig. 15.2).

When you specify the file you want to fix (in this case, a 1-2-3 file), File Fix displays the Repair Lotus 1-2-3 File dialog box (see fig. 15.14). At the top of the box is a message that the selected WK1 file will be repaired as the file named FIXED.WK1. If you want to change the name of the repaired file, enter a new name in the Repair As field. Then choose one of two repair modes. The default setting is **A**ttempt Recovery of All Data (which includes formulas, macros, and so on). Usually, you choose to recover all data. If this option does not work, however, use the alternative option, **R**ecover Cell Data Only.

```
                    File Fix dBASE Repair
                 Wednesday, February 17, 1993 4:45pm

                ****************************************
                *  Report for File C:\DB3\91invhw.dbf  *
                ****************************************

                          Repair mode: Fully automatic
                Use Clipper field limits: Off
           Fix shifted data automatically: On
                Strict character checking: On
                          Corrected file: fixed.dbf


                            No problems found in header

          Physical records (based on file size):       911

                     Records recovered unchanged:       901
                   Records recovered with repairs:         0
                                                   -----------
                         Total records recovered:       901


                                  Recovered bytes:   163,983
                                    Replaced bytes:         0
                                Unrecovered bytes:     1,820
                              Unrecovered sections:        10

  File      Physical    Recovered     Recovery     Number of
 Location   Record      Record        Action       Bytes        File Data
 --------   ---------   ---------     -----------  ---------    ---------------------
      641           1                 discarded          182    .106642000156.......6
      823           2                 discarded          182    .106679000241.......7
    1,005           3             1   saved recs       1,092
    2,097           9                 discarded          182    .107403000101......26
    2,279          10                 discarded          182    .108748000101......27
    2,461          11                 discarded          182    .107729000102......27
    2,643          12                 discarded          182    .107730000102......27
    2,825          13             7   saved recs       1,274
    4,099          20                 discarded          182    .107655000121......26
    4,281          21                 discarded          182    .107656000121......26
    4,463          22                 discarded          182    .108540000126......30
    4,645          23                 discarded          182    .108541000126......30
    4,827          24            14   saved recs     161,616
```

Fig. 15.13

A File Fix report for a dBASE file.

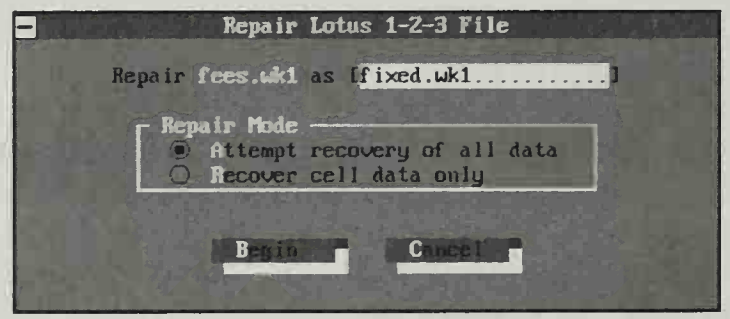


Fig. 15.14

The Repair Lotus 1-2-3 File dialog box.

To begin the recovery process, choose **B**egin. To stop the process, choose **C**ancel. While the recovery is in progress, File Fix displays a summary dialog box (similar to the one in fig. 15.12) that indicates how much of the file is recovered. For other spreadsheet types, the process is similar to the 1-2-3 method described here.

Fixing WordPerfect Files

File Fix can fix WordPerfect word processing files that have been damaged. For example, you may have unerased a WordPerfect file, but all of the file was not able to be unerased. WordPerfect may not be able to recognize or import the damaged file. File Fix may be able to fix the rest of the file so that you can then use it in WordPerfect. The procedures and options are similar to those used in the dBASE file fix described earlier. After you select the WordPerfect format from the File Fix dialog box, you choose the file to fix from a dialog box like the one in figure 15.2. Then the Repair WordPerfect File dialog box appears, offering two Repair Mode options (see fig. 15.15).

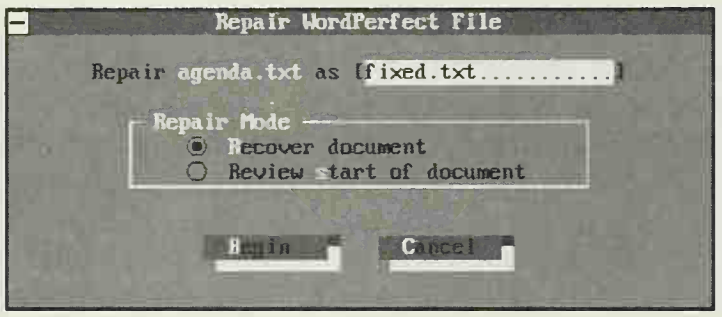


Fig. 15.15
WordPerfect Repair Mode options.

At the top of the box, you see that the file selected will be repaired as the file named FIXED.*ext* (for this example, the extension is TXT). If you want to change the name of the repaired file, enter a new name in the Repair As field.

From this dialog box, you can choose to recover the document (**R**ecover Document, which is the default setting) or review the start of the document (Review **S**tart of Document). If the document is damaged, you may need to tell File Fix where the document starts. If you choose Review **S**tart of Document, you see the dialog box shown in figure 15.16.

Usually, WordPerfect documents begin with a series of codes that tell WordPerfect what printer is being used, what fonts are being used, and so on. The document shown in figure 15.16 is not damaged. Therefore, you can see what the beginning of the document should look like. Notice that the first three letters in the document are .WPC, indicating to WordPerfect that the document is indeed a WordPerfect file. If you are repairing a WordPerfect file, it would be a good idea to look first at a similar nondamaged file to see what the start of the file should look like.

Fig. 15.16

Reviewing the start of a WordPerfect document.

Options in the Repair WordPerfect Prefix dialog box include **R**epair Document Offset, Build **S**imple File Prefix, and **I**mport File Prefix. A WordPerfect prefix is information in the file that tells WordPerfect the version of the file, the printer used, and other settings for the file. If you choose the **R**epair Document Offset option, File Fix creates a minimal prefix for the file. The Build **S**imple File Prefix option tells File Fix to construct from the current prefix a new file prefix that is not damaged. This version of a prefix repair should retain more information than the **R**epair Document Offset option. The **I**mport File Prefix option enables you to graft a good file prefix from another WordPerfect file. For example, if you have another WordPerfect file that you know is OK, your best option may be to copy its file prefix onto the damaged file. When you choose this option, a dialog box similar to that shown in figure 15.2 appears. You can choose the name of the file from which to copy the file prefix.

Once you have repaired the file prefix, FileFix proceeds to write the fixed document into the file name chosen for the fixed file. You should examine the fixed document in WordPerfect to verify that it has been recovered. If it is still damaged, you might run File Fix again and choose a different method of repairing the prefix to the file.

Summary

The chapters in Part III covered the core of Norton Utilities' automatic file-recovery options, beginning with the easiest and quickest way to unerase a file—using the UnErase command. This command should always be your first choice when trying to unerase a file. If your disk has other problems, such as not enabling you to read files from a disk

that used to work, try Norton Disk Doctor to cure what ails the disk. To recover a defective disk or make a disk bootable, use Disk Tools. To recover database, spreadsheet, or WordPerfect files, use the File Fix command, as described in this Chapter.

If you need to do some real "surgery" on your disk to recover a file or to correct information on your disk, proceed to Part IV, "Advanced Recovery Techniques."

PART

IV

Advanced Recovery Techniques

OUTLINE

Recovering Files with Manual UnErase

Using Disk Editor

16

CHAPTER

Recovering Files with Manual UnErase

The chapters in Part III described the automatic Norton Utilities file-recovery programs, which you should always use first when attempting to recover data. For difficult problems that the automatic methods cannot correct, Norton provides the **M**anual UnErase option, discussed in this chapter. Disk Editor, described in the next chapter, is designed for more delicate data fixes. Because Disk Editor can change information directly on the disk, you can use it to re-create missing sections of the data or system area.

This chapter and the next one require more knowledge of computers than the rest of the book requires. To understand the descriptions and instructions in these chapters, you need to know how clusters and sectors work to store files on disk. Some knowledge of the structure of system files is also helpful. For more information on clusters, see Chapter 3, "Understanding How Disks Work," or refer to *Que's Guide to Data Recovery*.

Unerasing Files Manually

When you cannot unerase a file automatically with UnErase, you can try to assemble the file manually with the **M**anual UnErase or Create **F**ile procedure. Start UnErase by entering **UNERASE** at the DOS prompt or choosing UnErase from the Norton main screen. The UnErase screen appears, displaying a list of erased files in the Erased Files dialog box. To use the **M**anual UnErase procedure on one of the files, highlight the file name and then choose **F**ile to access the UnErase **F**ile menu (see fig. 16.1).

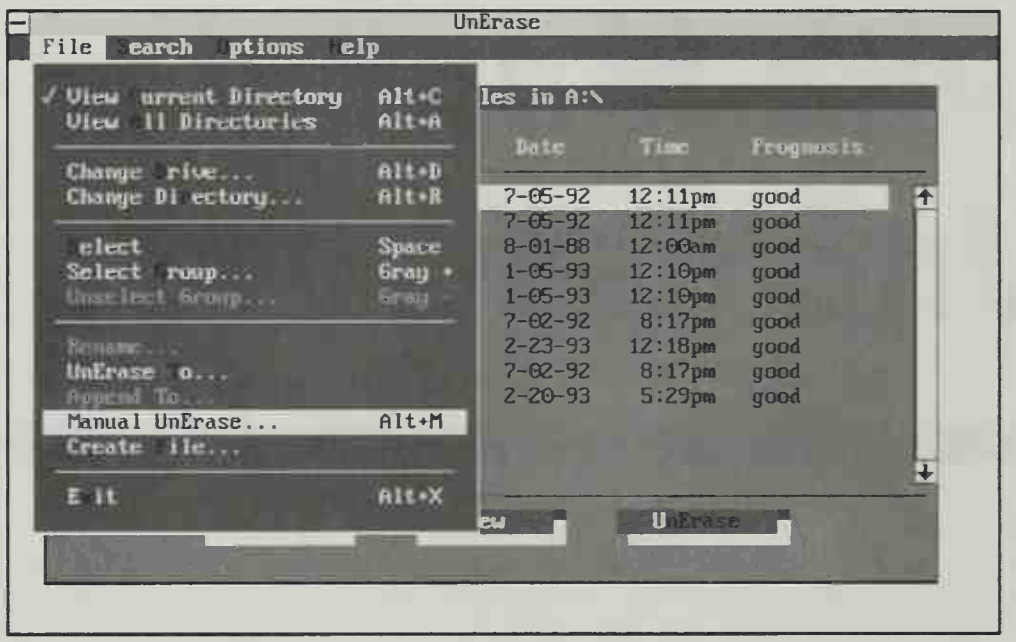


Fig. 16.1

The UnErase **F**ile menu.

Choose the **M**anual UnErase option from the **F**ile menu. The program then prompts you to enter the first character of the name of the erased file, as shown in figure 16.2.

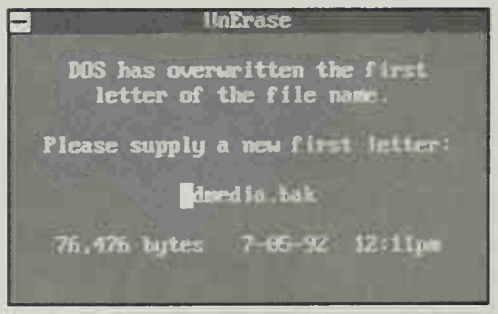


Fig. 16.2

Entering the first character of the erased file's name.

When you type the missing character, the program displays the corrected file name in the Manual UnErase dialog box, along with information about the file's attributes, the first cluster in the file, the file size, and other information (see fig. 16.3). The process of manually unerasing files is somewhat like solving a mystery—you must find all the clusters that make up the file (if possible) and place those clusters in order. If you know how many clusters are needed to make up the file, you know when you have completed the task of finding all the clusters in a file.

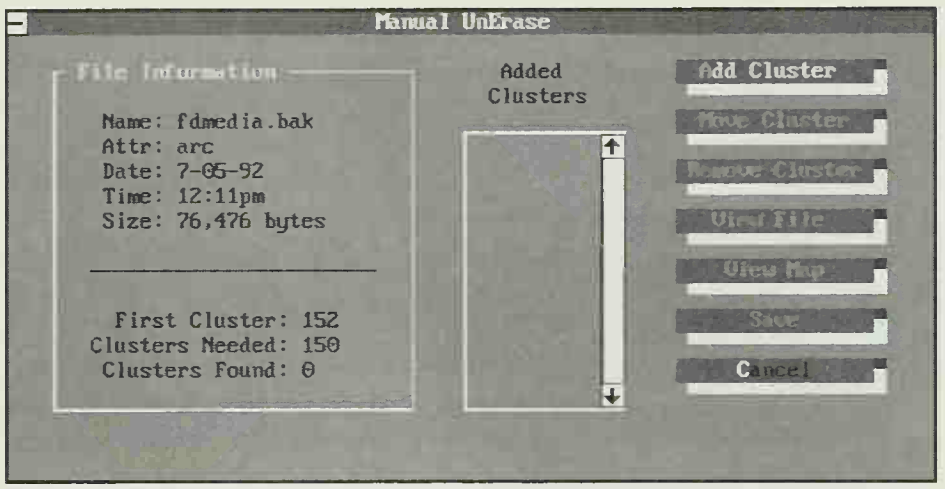


Fig. 16.3
The Manual UnErase dialog box.

The options on the right side of the Manual UnErase dialog box help you piece together the file to unerase. The Added Clusters list box shows which clusters have been located and added to the recovered file to make up the unerased file.

NOTE If you cannot recover the file with **M**anual UnErase, you still may be able to recover all or parts of the file with Norton Disk Editor. See Chapter 17 for more information on that program.

The following sections describe the processes involved in assembling the clusters of the file, viewing the file, correcting the file, and completing the manual unerase procedure. To cancel this procedure without saving, choose the **C**ancel option or press Esc. UnErase displays the following message in a dialog box:

```
Do you wish to abandon the work in progress?
```

To return to unerasing the file, choose **N**o or press Enter. To stop the unerase process, choose **Y**es; the program returns to the Erased Files dialog box.

Adding Clusters

To begin the process of restoring a file, choose the **A**dd Cluster option from the Manual UnErase dialog box. The Add Clusters dialog box appears (see fig. 16.4). Choose **A**ll Clusters first to try to restore the erased file. When you use this option, the program finds all clusters that probably belong to the file and displays them in the Added Clusters list box in the Manual UnErase dialog box. If you need to choose other clusters and add them to the file individually, refer to the next section.

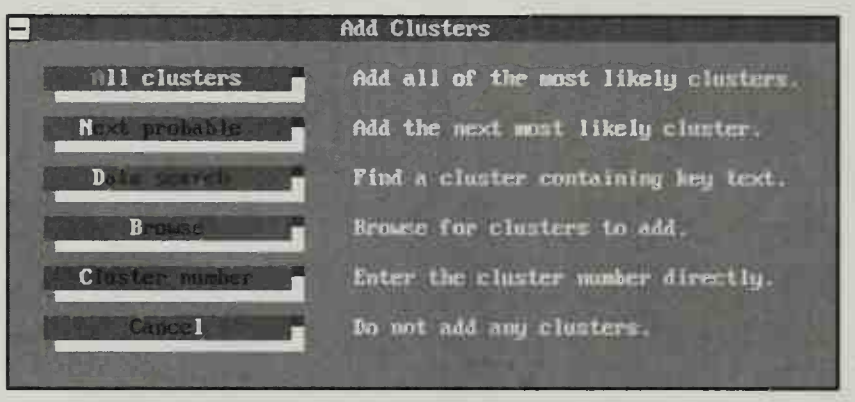


Fig. 16.4
The Add Clusters dialog box.

Finding Missing Clusters

Generally, the **A**ll Clusters option in the Add Clusters dialog box can assemble the entire file. If viewing the unerased file reveals that some parts of the file are still missing after you use this option, you must use a different technique to locate the missing information. The following sections describe three techniques for finding missing clusters.

Adding the Next Probable Cluster

The **N**ext Probable option in the Add Clusters dialog box adds to the file the cluster that the program determines is the next probable cluster belonging to the file. After you add such a cluster, choose the View **F**ile option in the Manual UnErase dialog box to look at the file's contents. If the cluster you added belongs to the file but is in the wrong order, you can change the order of the clusters as described in the section "Moving and Deleting Clusters" later in this chapter.

Searching for Data in the File

Use the **D**ata Search option if **N**ext Probable cannot locate the next cluster. First view the file and determine what is missing from it. If you are unerasing a report with seven sections, for example, and you find sections labeled I through VI, you may want to search for the text *VII* to find the next cluster. In other words, you must be familiar with the text of the file you are unerasing in order to use the **D**ata Search option effectively.

When you choose **D**ata Search, the Data Search dialog box appears (see fig. 16.5). You can enter the search text in ASCII or hexadecimal code (hex), but ASCII is generally easier. When you enter search text in ASCII, the text also appears in hex. Type the text in the appropriate text box (**A**SCII or **H**ex) for the format you want to use. If you want the search to be case-sensitive, deselect the **I**gnore Case option. If you want to begin the search at a particular sector location on disk, choose the **S**earch at Specified Sector Offset option. This option is helpful if you suspect that the data for which you are searching is toward the end of the disk; you can speed up the search by starting the search at some sector later in the disk instead of starting the search at sector 0 (which is the default).

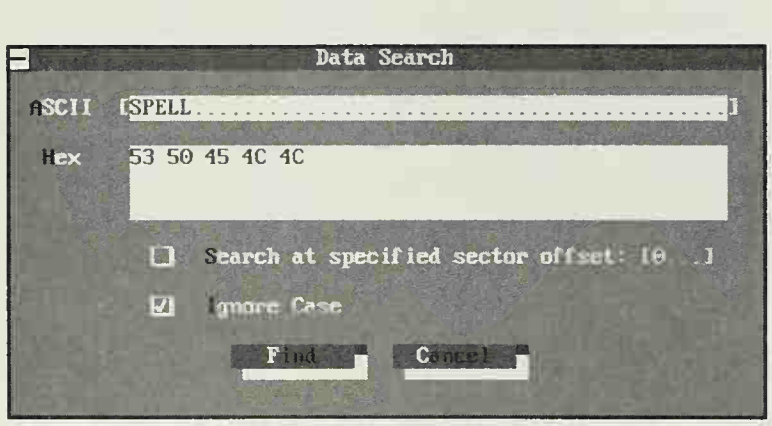


Fig. 16.5

Entering search text in the Data Search dialog box.

After you enter your search text, choose **F**ind. A search for the text begins. If the search text is found, a few lines of the cluster appear in the View File dialog box. You can then choose any of the following options:

Option	Description
Add Cluster	Adds this cluster to the list
Find Next	Continues search for next matching text
Hex	Displays the find in hexadecimal format (if currently in text mode)

continues

Option	Description
Text	Displays the find in text mode (if currently in hexadecimal mode)
Done	Stops the search

In the View File dialog box, the **H**ex option is provided if you have searched in text mode. If you have searched for hexadecimal characters, the dialog box provides the **T**ext option. When you choose the **H**ex option, the program redisplays the text file in hexadecimal characters with text characters in the right side of the dialog box. If the file is displayed in hexadecimal characters and you choose **T**ext, the program switches the view to text characters.

Continue the search until you find the right cluster to add.

Searching for a Numbered Cluster

The **C**luster Number option in the Add Clusters dialog box allows you to add one or more clusters to the list of clusters in the file. When you choose this option, you see a dialog box similar to the one shown in figure 16.6. In this dialog box, you can specify **S**tarting and **E**nding Cluster numbers for adding clusters in the file being unerased. In some cases, you may know the number of the cluster or clusters you want to add to the file. Perhaps you intentionally placed clusters in particular locations on the disk to hide them for a special reason (for more on clusters, see Chapter 13 on Disk Tools). Or you may have located a cluster by using a technique other than UnErase. Specify the clusters to add here, and then choose **O**K to add those cluster numbers to the Added Clusters list box in the Manual UnErase dialog box, or choose **C**ancel to exit this dialog box without adding any clusters.

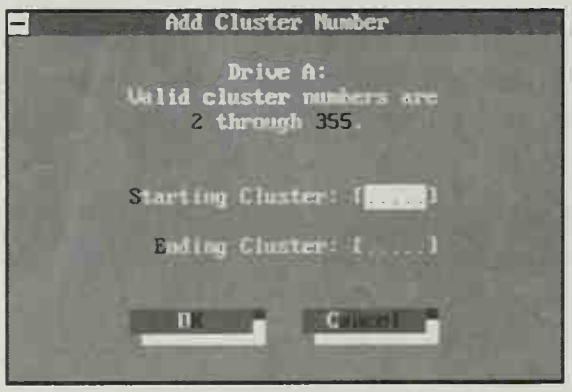


Fig. 16.6
The Add Cluster Number dialog box.

Viewing the File

From the Manual UnErase dialog box, you can view the unerased file as you assemble it from clusters, or you can view a map of the file. Viewing the file enables you to verify that all clusters have been found and are in correct order. For database, text, or word processing files, this verification is fairly easy if you are familiar with the information in the file. For files whose information is stored in cryptic codes, such as some spreadsheet files or program files, determining whether the file is intact may be more difficult.

Choose View **F**ile from the Manual UnErase dialog box to see the file in progress. Figure 16.7 shows the file SPELL.TXT being viewed. You can use the up- and down-arrow keys or the mouse and scroll bar to scroll through the entire file to determine whether it is complete.

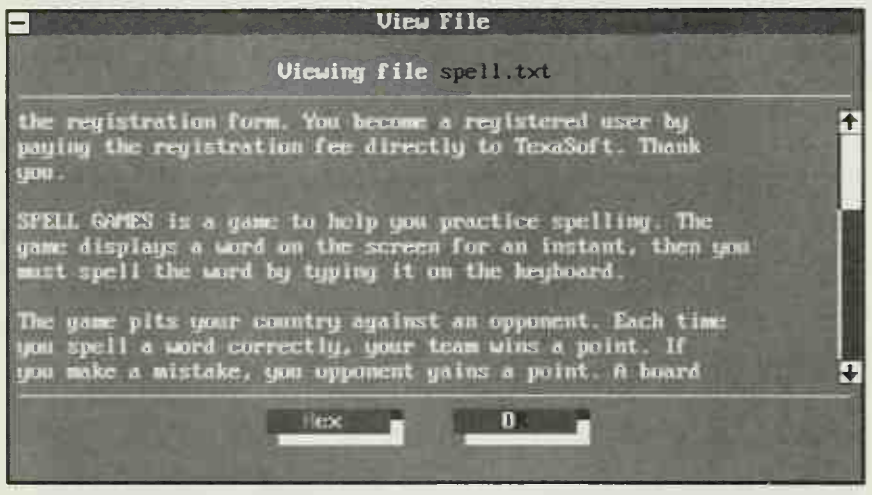


Fig. 16.7
Viewing a file in the Manual UnErase viewer.

At the bottom of the viewer, you can choose the **H**ex option to cause the viewer to switch to hexadecimal format mode. For some files, you may know of markers in the file that are documented in hexadecimal format; looking for these codes in hexadecimal format may be easier than looking for them in ASCII. Figure 16.8 shows the same file in hex mode.

Notice in the hex viewer that the ASCII version of the text appears at the far right of the dialog box, with the equivalent hex codes at the left of the dialog box. To switch back to text mode, choose the **T**ext button. To end the viewer, choose **O**K.

You may want to know the location of the file in relation to the rest of the disk—for example, whether the file is in one location or fragmented. If the file is fragmented, finding the pieces may be more difficult. Knowing that the file is fragmented, however, may give you some clues as to where to look on the disk for file fragments. Choose View **M**ap from the

Manual UnErase dialog box to see a map of your hard disk, showing where found clusters are located relative to one another (see fig. 16.9). The F in the upper portion of the map locates the portion of the current file being unerased. For large or fragmented files, the F marker may appear at more than one location on the map.

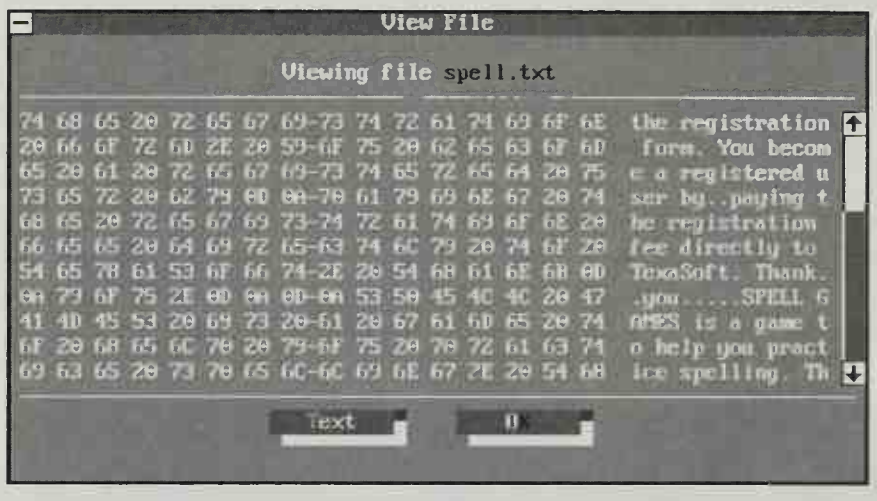


Fig. 16.8

Viewing a file in hexadecimal mode.

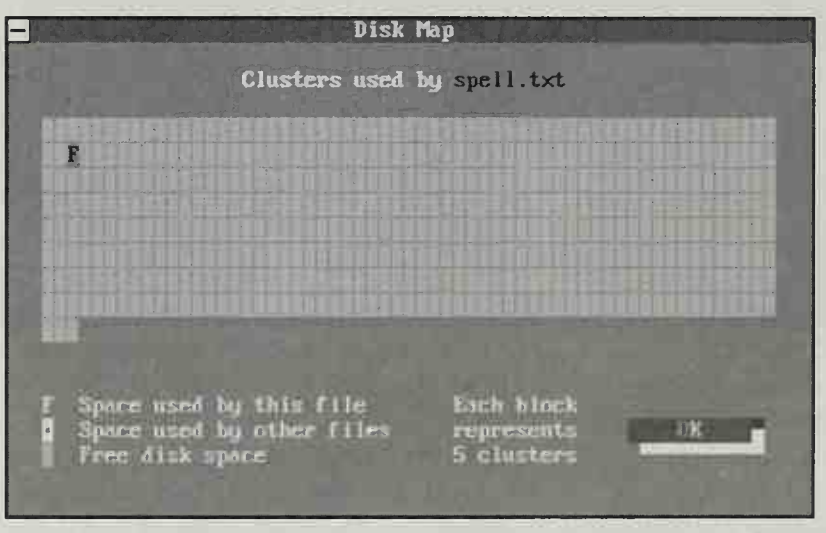


Fig. 16.9

A map of clusters known to be used by the file being unerased.

Moving and Deleting Clusters

Whether you add clusters automatically or individually as you recover clusters of a file, you may find that some of the clusters are out of order in the Added Clusters list box. To move a cluster to another location in the cluster list, use the arrow keys or the mouse to highlight the cluster you want to move. Press the space bar or choose Move Cluster to select the cluster. Triangles will appear to the left and right of the selected cluster. Use the up- and down-arrow keys to move the cluster to a new location in the list. Press the space bar again or choose End Move to anchor the cluster.

If you determine that a cluster does not belong to the file you are trying to unerase, use the arrow keys (or mouse) and the space bar to select that cluster. Then press Del or choose **R**emove Cluster to delete it from the Added Clusters list box.

Saving the Restored File

When you have found all the clusters and placed them in the correct order, choose **S**ave from the Manual UnErase dialog box to save the file to disk and end the manual unerase procedure. The program returns to the Erased Files dialog box and displays the word RECOVERED next to the file. If all the file's clusters were not recovered, a dialog box appears with the following message:

```
You have selected less data than the erased file originally held.
```

If you have specified too many clusters in the Added Clusters list box, the following message appears:

```
You have selected more data than the erased file originally held.
```

Choose **S**ave Anyway if you want to save the file with the information that you restored. Choose **R**esume to return to the Manual UnErase dialog box and continue the unerase process.

On occasion, you may want to create a new file rather than unerase an existing file. For this process, refer to the next section.

Creating a New File from Clusters

The Create **F**ile option in the UnErase **F**ile menu is similar to the **M**anual UnErase option. The difference is that you create an entirely new file rather than restore the pieces of an unerased file. You can use this option to create a new file from file particles that are on disk but may not necessarily be part of an unerased file as detected by the UnErase procedure. This situation may occur, for example, with a file that has been erased for a period of time so that its initial directory information has been overwritten by another file.

To create a new file, you must start with a new name. When you choose the Create **F**ile option from the UnErase **F**ile menu, you are prompted to enter the name of the new file, as shown in figure 16.10.

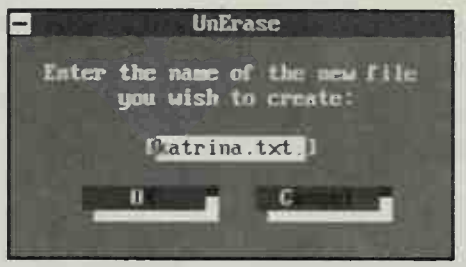


Fig. 16.10
Entering a name for the file to create.

When you enter the new file name, the Manual UnErase dialog box is displayed (refer to fig. 16.3). At this point, you can use the search procedures already described to locate clusters to form a file. After you have added all the clusters you want to use in the new file, choose the **S**ave option. The file is stored to disk under the name you have indicated.

Summary

The **M**anual UnErase and Create **F**ile procedures enable you to search the clusters of your disk for file fragments and then piece them together to re-create an erased file or to recover portions of files. This chapter described how to locate all the clusters known to belong to a file and how to use search techniques to search for clusters that belong to the file but could not be found automatically by the UnErase program. The chapter also showed you how to view a file to determine whether all its pieces have been found. When you have found as much of a file as possible, you can then save the file back to disk.

The **M**anual UnErase command enables you to view your disk one cluster at a time. To learn how you can obtain an even more detailed look at your disk, turn to the next chapter, which discusses Norton Disk Editor.

CHAPTER 17

Using Disk Editor

UnErase and Norton Disk Doctor (NDD) are powerful programs, but sometimes even these programs cannot solve your problem. If you first tried UnErase (including Manual UnErase) and NDD to recover some information from a disk but still have important data to recover, your next step is Norton Disk Editor.

Disk Editor is a set of routines that enables you to explore the information on the disk, down to the level of examining each individual byte. With Disk Editor, you can display and directly edit information on a disk, including system areas. You can search for lost data, try to fix problems in programs, and recover some or all portions of erased files.

NOTE Data recovery at this level is beyond the scope of this book. This chapter provides an overview of just the essentials of the Disk Editor program. For details on the program, consult the *Norton Utilities 7 User's Guide*.

To use Disk Editor, you need more knowledge about the way the disk works and the way the information is stored than you need for the NDD and UnErase commands. The Disk Editor program is not as easy to use or as automated as UnErase and NDD. To learn to use the Disk Editor program effectively, you may need a significant amount of time. If you

try to recover some information that takes only an hour to re-create, using Disk Editor to get the data back may not be worth the trouble—you may just want to retype the information.

> **WARNING:** Unless you are very knowledgeable about the structure of a disk, using Disk Editor for all but simple fixes can cause data to become unusable and unrecoverable. To benefit from this discussion of Disk Editor, you should know disk storage terms, such as *cluster*, *sector*, *partition table*, and *FAT*. The Disk Editor program enables you to recover disk information as well as destroy it. The program is powerful enough that you could destroy your entire disk. For more information, see Chapter 3, "Understanding How Disks Work," or *Que's Guide to Data Recovery*.

Running Disk Editor

To begin Disk Editor, choose the Disk Editor option from the Norton main menu or enter **DISKEDIT** at the DOS prompt. Note the syntax of this command:

DISKEDIT [*d*:][*path*][*filespec*][*switches*]

The following switches are available:

Switch	Description
/M	Selects maintenance mode, which means that Norton Utilities bypasses the DOS logical organization. If a disk is badly damaged, you may need to use this mode. If Norton does not begin to analyze a disk when you run the command, try the /M switch to see whether that helps. You cannot work with files or unerase files in maintenance mode.
/X:*d*	Excludes certain drives from absolute sector processing. Use this switch if you have nonexistent drives allocated. The letter *d* represents the list of drives to exclude. For example, DEF excludes drives D, E, and F from absolute sector processing.
/W	Enables the write mode for Disk Editor (turns off read-only mode). You can also turn write mode off with the Configuration option in the Tools pull-down menu.

When Disk Editor begins, you will likely see the screen shown in figure 17.1, indicating that you are in read-only mode. This screen tells you that you can safely explore your disk without worrying about changing important information.

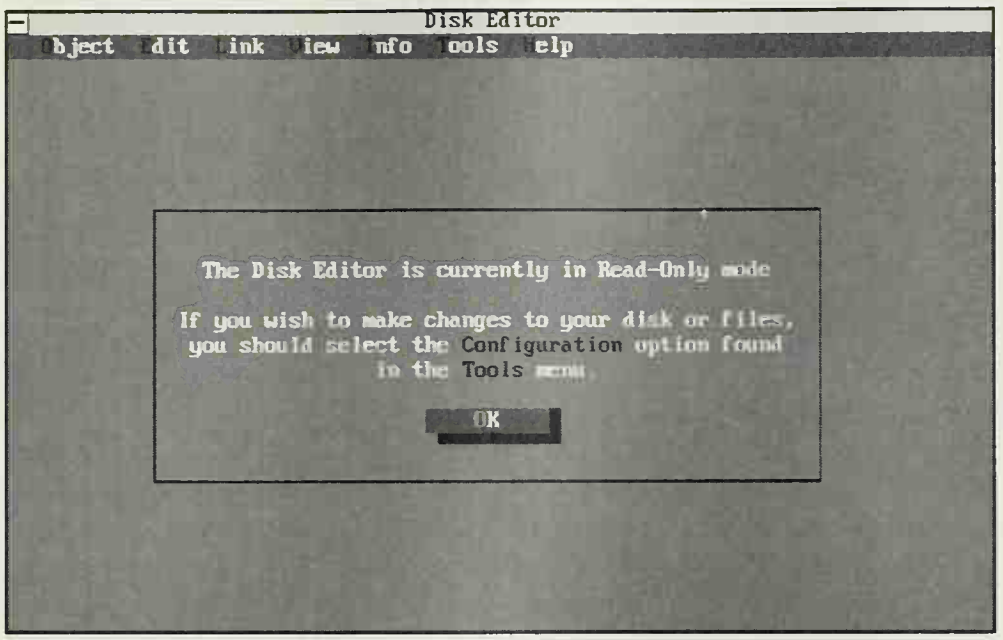


Fig. 17.1
The initial Disk Editor message that tells you the editor is in read-only mode.

In read-only mode, you can use the editor to examine your disk, but you cannot write anything to your disk. Later in this chapter, the procedure to change the mode is discussed. When you first begin to use Disk Editor, it is a good idea to keep it in read-only mode to protect yourself against accidental writes to the disk.

When you choose **OK** in the message screen or press Enter, the Disk Editor main screen appears (see fig. 17.2).

This screen displays the files found on the disk, listing file specification, size, date, time, the cluster where the file begins, and attributes now set. The Disk Editor menu bar is at the top of the screen. To open the pull-down menus, press Alt plus the highlighted letter of the menu item, point to the menu name and click, or press the shortcut key combination shown on the menu for that item. Generally, you use the options on this menu to find something on disk that you want to change, you make the change, and you write the change back to disk.

Suppose that you have a directory which cannot be erased with the DOS or Norton Remove Directory command. This situation can occur if a file or subdirectory has been corrupted and does not erase properly. DOS does not erase the directory because the operating system thinks the directory still contains information. To erase this directory manually, you must locate the directory name in the Disk Editor main screen

and replace the first character of the name with the hexadecimal number E5, which is the symbol DOS uses to denote an erased file. The easiest way to replace the first character is to display the directory in hex mode (choose the As **H**ex option in the **V**iew menu); then change the first character of the subdirectory name to E5.

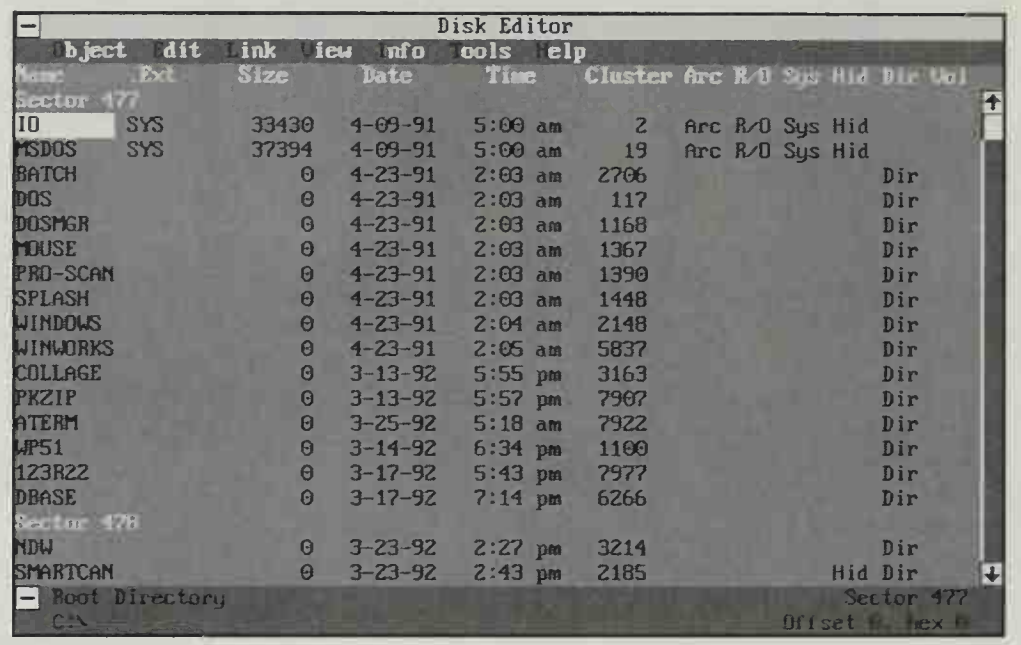


Fig. 17.2
The Disk Editor main screen.

With Disk Editor, you can locate the directory name, change the first character, and then write the change back to disk. (In this example, you also run the CHKDSK /F command or NDD to clean up any lost clusters caused by the change.)

Using the Object Menu

Generally, before you do any editing on the disk, you choose which object to edit. You choose the object with the **O**bject menu (see fig. 17.3). The objects that you can choose include the drive, directory, file, cluster, sector, physical sector, partition table, boot record, and copies of the file allocation table (FAT).

The **C**lipboard option enables you to store (in the clipboard) a block of information from the disk and later place that block elsewhere on disk. With the **M**emory Dump option, you can view, search, and copy information from RAM. RAM may contain information not on disk if an application crashes before your information has been written to disk.

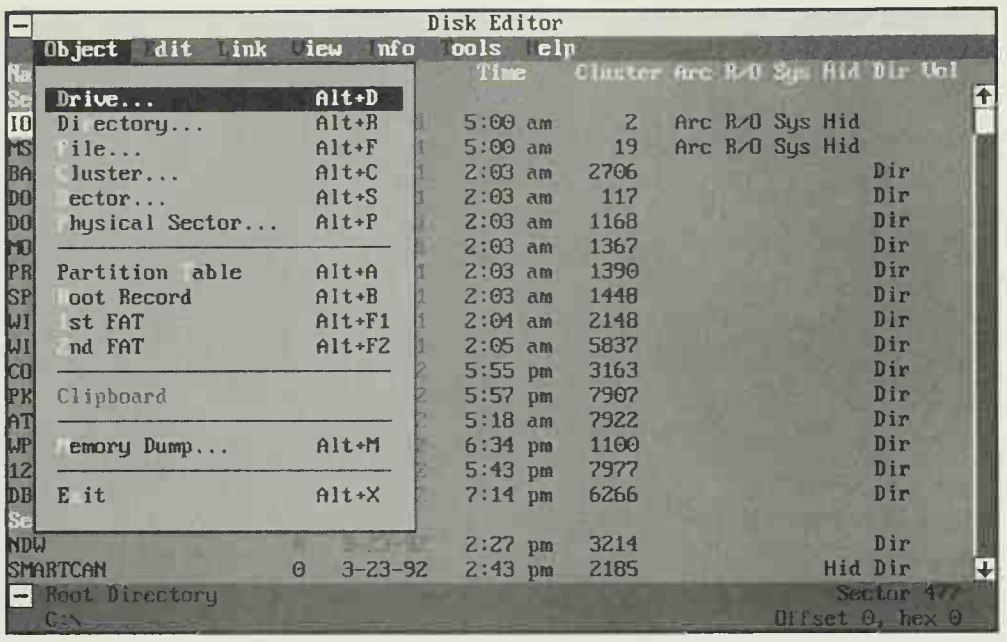


Fig. 17.3
The Disk Editor **O**bject menu.

WARNING: Use Memory Dump with care. This option may cause some computers to lock up, and then require a boot, which causes you to lose information in RAM (in this case, the information you currently have in the clipboard). This problem is particularly true of PS/2 computers.

Using the Edit Menu

The **E**dit menu enables you to edit information on disk (see fig. 17.4). The **U**ndo option in the menu enables you to undo the last items you edited. Undo remembers 512 bytes of information and undoes items in the reverse order of how you edited them. Undo, however, undoes items only within a sector boundary. If you have moved to another sector, Undo undoes items just in the current sector. If parentheses appear around this command or it appears grayed, you have nothing to undo.

The **M**ark, **C**opy, **P**aste Over, and **F**ill options enable you to manipulate information on the disk. You use **M**ark to capture data from the disk and place the data in the clipboard so that it can be copied elsewhere.

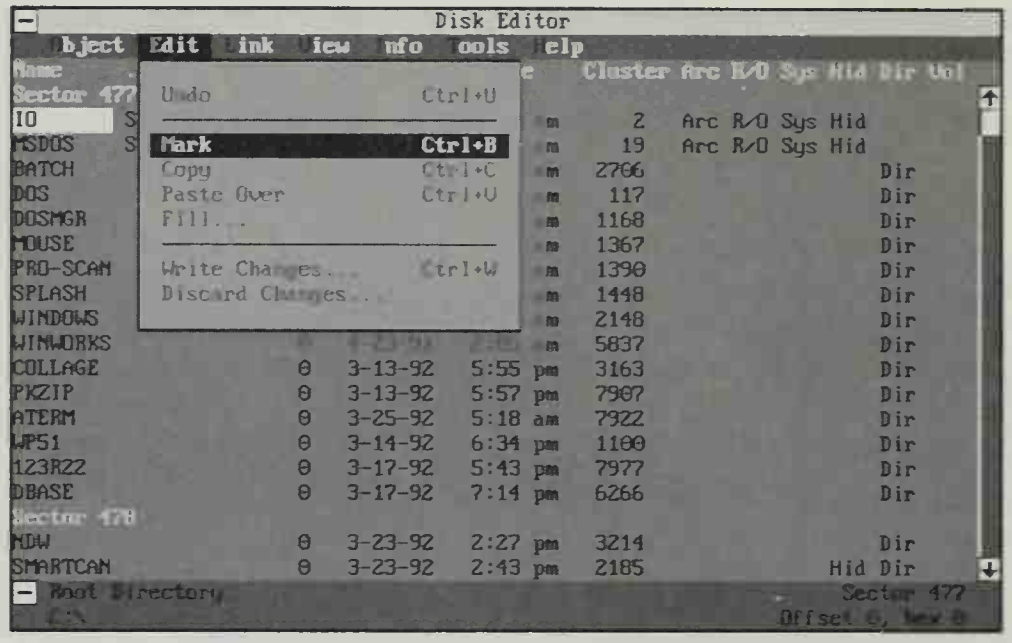


Fig. 17.4
The Disk Editor **E**dit menu.

While viewing a portion of the disk in Disk Editor (viewing is usually easiest in hex mode), you can copy information by placing the cursor at the beginning of the block you want to copy. Choose **M**ark from the **E**dit menu and move the cursor to the end of the block. If you use a mouse, set the mouse pointer at the beginning of the block, press the mouse button, and drag the mouse pointer to the end of the block. To place the information in the clipboard, select **C**opy from the **E**dit menu.

The clipboard can hold up to 4,096 bytes (characters) of information. The information remains in the clipboard until replaced with other information. To copy the information from the clipboard to somewhere else on the disk, go to that location, place the cursor where you want the information to begin, and choose **P**aste Over from the **E**dit menu.

NOTE The paste-over procedure overwrites information now in that location; no insert mode is available.

Use the **F**ill option to fill a block of space with a single character. Mark a block, as described in the copy procedure. After you choose **F**ill from the **E**dit menu, you are prompted to select the character with which to fill the block. You can choose an ASCII character from a list box, and that character fills the entire marked region. This method erases sensitive information from disks.

After you change a disk by copying or filling, these changes are not actually written to the disk until you choose the **W**rite Changes option from the **E**dit menu. To choose not to make these changes, use **D**isregard Changes.

Using the Link Menu

Each file on disk is related to a directory and a FAT entry. When you edit the contents of the file, you may need to reference information in the directory or file allocation table (FAT). How can you locate on disk the directory related to the file, or how can you locate in the FAT table the information associated with the file? The answer is the **L**ink menu.

The **L**ink menu enables you to travel back and forth to areas related to a particular file (see fig. 17.5). If you choose the **D**irectory option from the **L**ink menu (while you examine a file), Disk Editor takes you to the place on disk that contains the directory entry related to that file, and places you in the appropriate directory viewer. Similarly, choosing the **C**luster Chain (FAT) option takes you to the place in the FAT related to that file. If you choose the **F**ile option, you are returned to the actual contents of the file.

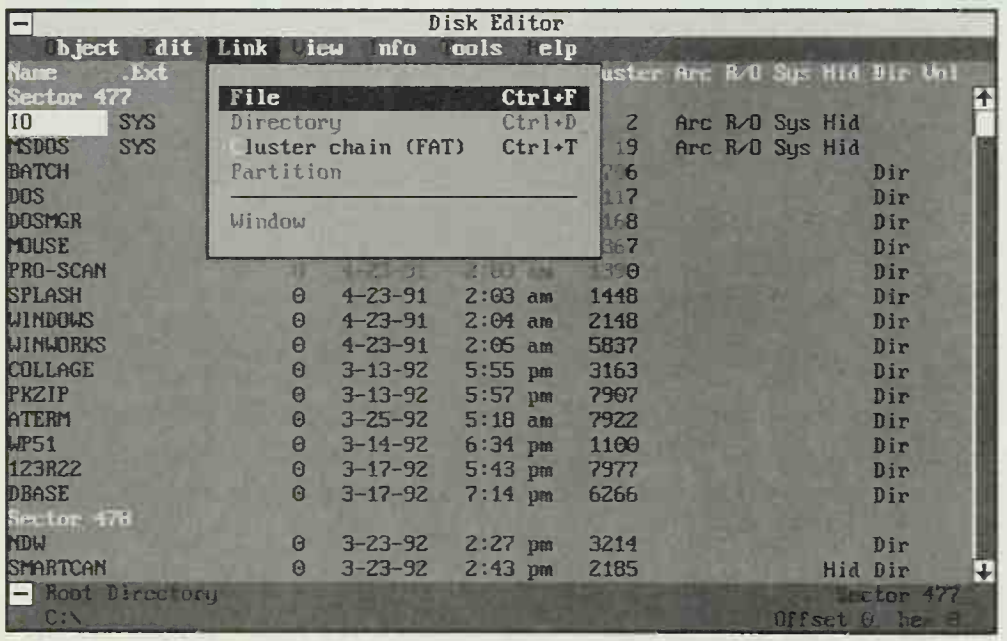


Fig. 17.5
The Disk Editor **L**ink menu.

If you edit a partition rather than a file, the **L**ink menu enables you to link to the partition table or boot record. In each case, the allowable links are noted by **L**ink menu options not surrounded by parentheses or grayed.

The **W**indow option in the **L**ink menu enables you to look at the FAT table in one half of the screen as you examine the contents of a file in the other half. To use this option, you must first be viewing a copy of the FAT. To view the 1st or 2nd FAT, choose the appropriate FAT

option from the **O**bject menu. To split the screen, press Shift+F5 (or choose **S**plit Window from the **V**iew menu). To link the screens, choose the **W**indow option from the **L**ink menu. You then see a screen similar to the one in figure 17.6.

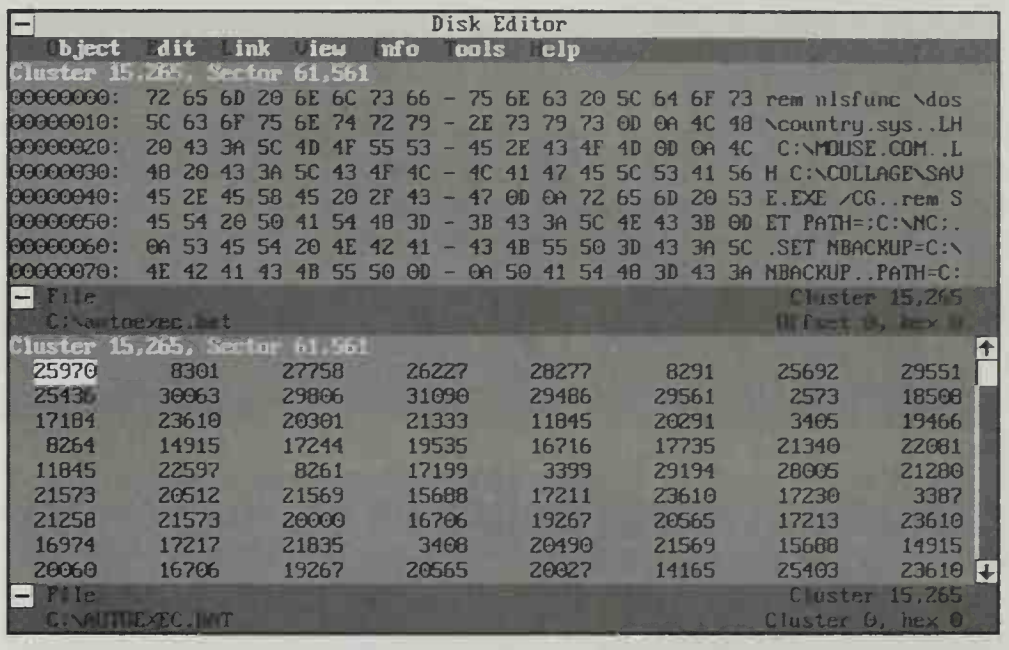


Fig. 17.6

Split window in Disk Editor.

Using the View Menu

The **V**iew menu enables you to choose various options when viewing information on disk (see fig. 17.7). The As **H**ex and As **T**ext options enable you to see the information on-screen as hexadecimal code and ASCII text, respectively. Text files usually are viewed in text mode. Programs or coded files may be viewed in hex format. The other modes enable you to see data appropriate to what you are viewing. If you look at the FAT, for example, you usually choose the As **F**AT option.

The window options in the **V**iew menu enable you to split the screen and view two items simultaneously. You can split the screen with **S**plit Window (Shift+F5), switch from window to window with S**w**itch Windows (Shift+F8), and adjust the size of the window with **G**row Window (Shift+F6) or Sh**r**ink Window (Shift+F7).

Using the Info Menu

The **I**nfo menu enables you to display information about the object or drive you are viewing, or to look at a map of the object (a graphic display that shows the object in relation to all the clusters on disk).

The **I**nfo menu is shown in figure 17.8. To look at a map of the IMAGE.DAT file created by the Norton Image program, select the **F**ile option from the **O**bject menu and then select the file IMAGE.DAT from the list of files. Choose the **M**ap of Object option from the **I**nfo menu, and a dialog box similar to the one in figure 17.9 appears. Notice the Fs on the map. These Fs show where within the disk space the selected object is stored.

The FF at the upper right of the map shows the location of this file on the disk.

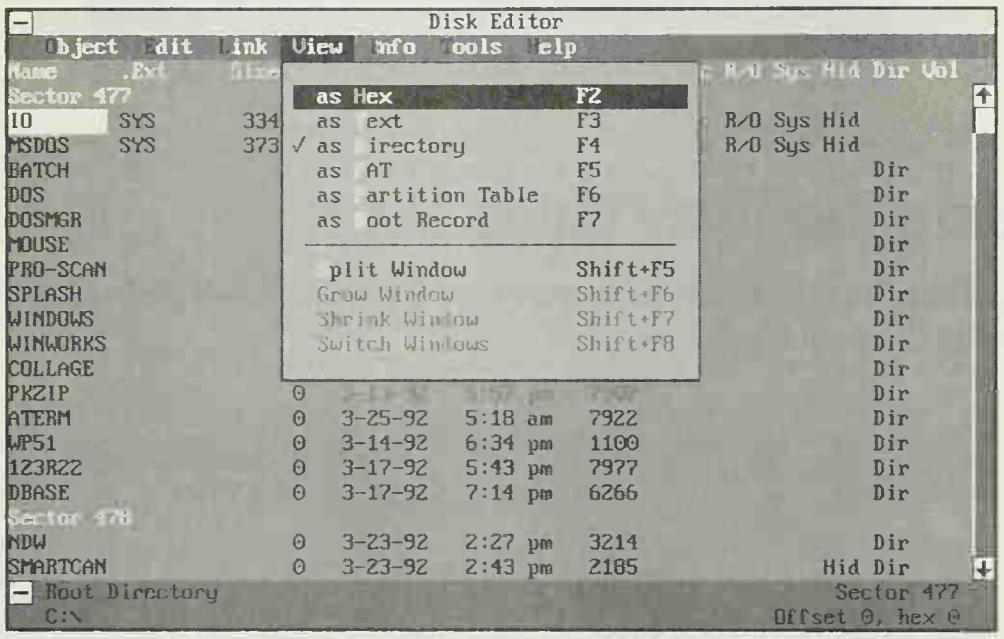


Fig. 17.7

The Disk Editor **V**iew menu.

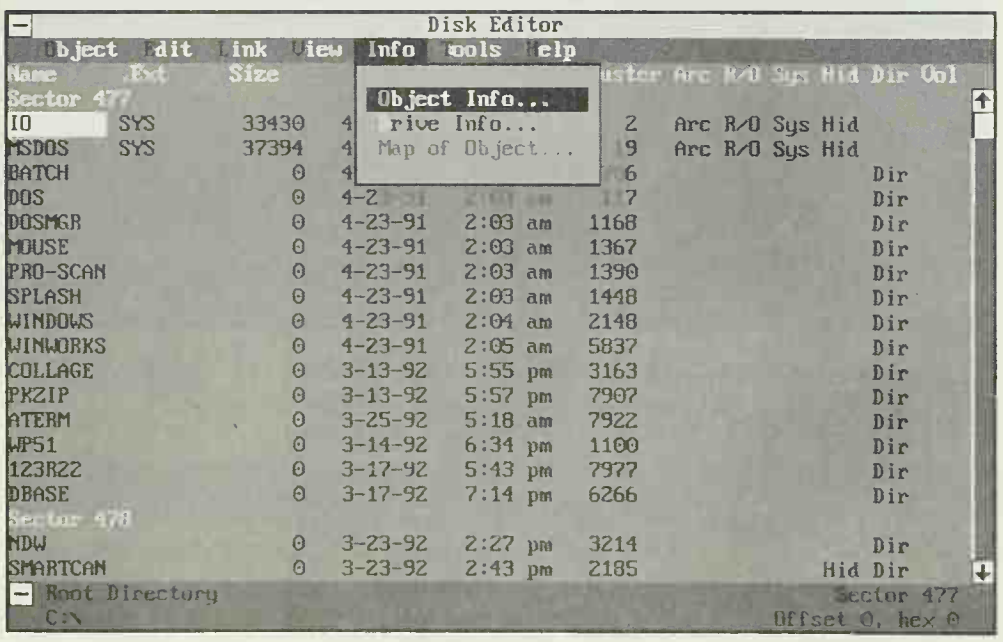


Fig. 17.8

The Disk Editor **I**nfo menu.

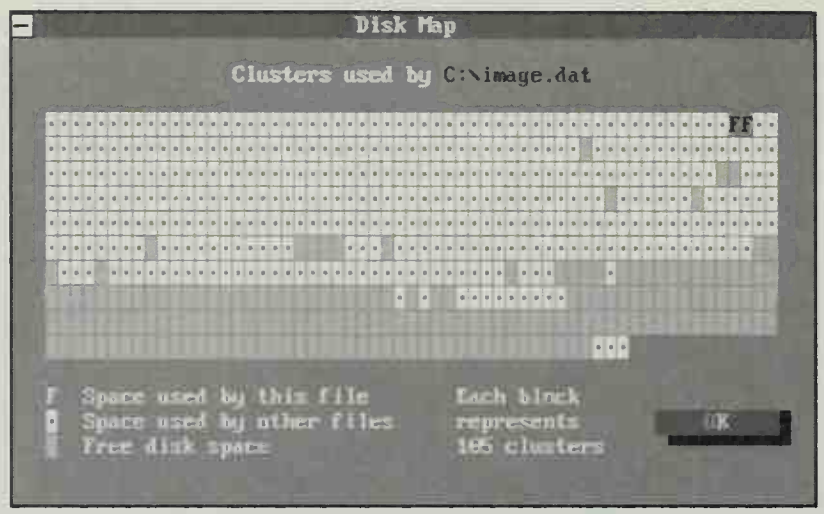


Fig. 17.9
The Disk Editor Disk Map.

Using the Tools Menu

The Tools menu, shown in figure 17.10, gives you several tools for exploring the contents of a disk.

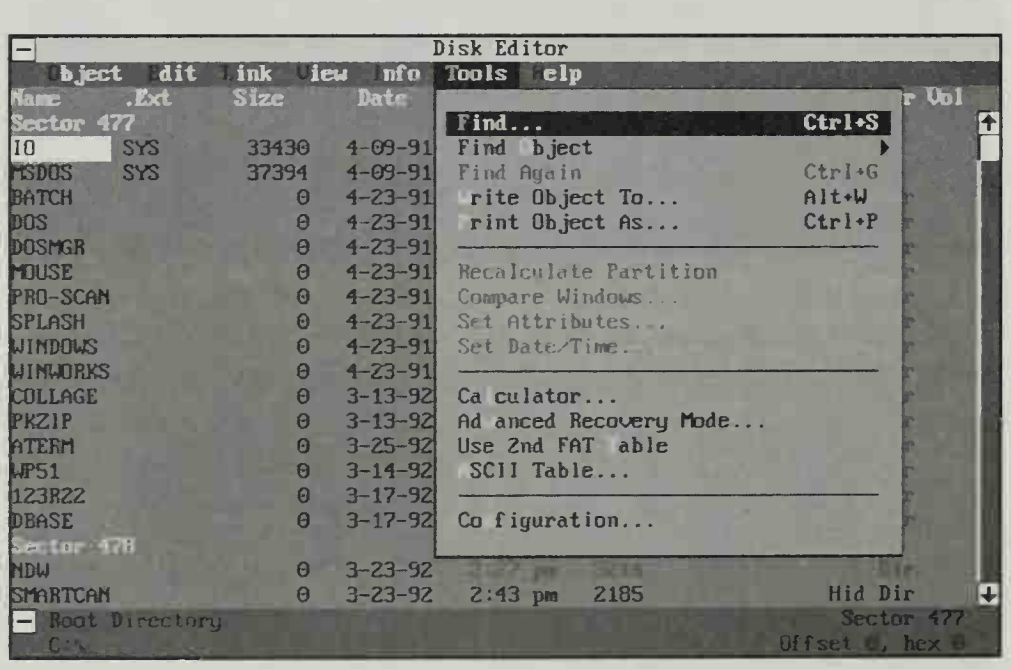


Fig. 17.10
The Disk Editor **T**ools menu.

Here are the options in the **T**ools menu:

Option	Description
Find	Searches for a string of text on a disk. **F**ind can be helpful if you are looking for information on disk but do not know which file (or erased space) contains the information.

Option	Description
Find Object	Allows you to specify a search for a partition or boot record, a FAT, or a subdirectory.
Find Again	Repeats the last Find command.
Write Object To	Writes the object you are currently editing to disk. You are asked to specify a file name, starting cluster number, or sector number. With this option, you can find pieces of an erased file and write out the information to disk. The Write Object To option is a way to recover information that you cannot recover with UnErase or Disk Tools.
Print Object As	Prints the object you are currently editing to the printer. You can choose to print the information in hexadecimal, directory, FAT, boot sector, or partition table format.
Recalculate Partition	Calculates two items (available when you are in partition table view): the relative sector number from the starting sector coordinates, and the number of sectors from the starting and ending sector coordinates.
Compare Windows	Compares two windows and places the cursor at the first point where the information in the two windows disagrees.
Set Attributes	Changes the attributes for a group of files (available when a directory object is displayed and when one or more entries are highlighted).
Set Date/Time	Changes the date and time for a group of files (available when a directory object is displayed and when one or more entries are highlighted).
Calculator	Enables you to perform arithmetic with binary, hexadecimal, or decimal numbers.
Advanced Recovery Mode	Allows you to specify and test settings for the hard disk, including physical characteristics and partition settings.
Use 2nd FAT Table	Uses the second FAT table information rather than the first table. Use this option when the information in the first FAT table is corrupted.
ASCII Table	Displays the ASCII character set and gives the decimal and hexadecimal value for each character.
Configuration	Sets several options for using Disk Editor.

If you choose the Configuration option from the Tools menu, the program displays the Configuration dialog box (see fig. 17.11) in which you can set additional options for using Disk Editor.

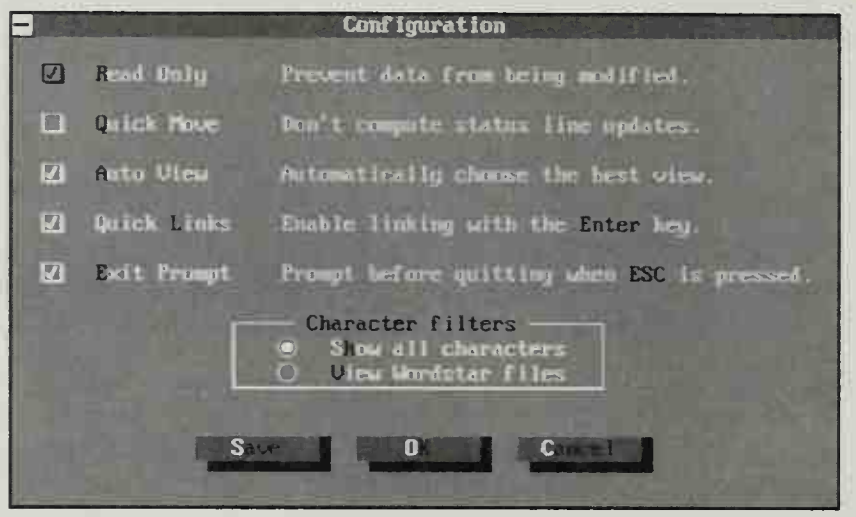


Fig. 17.11
The Disk Editor Configuration dialog box.

The following Configuration options are available in Disk Editor:

Option	Description
Read Only	Prevents you from writing changed information to disk. You can change the default setting of read-only to enable users to write changed information to disk.
Quick Move	Speeds up response time by omitting the rewriting of file names in the status bar of the Disk Editor main screen.
Auto View	Tells Disk Editor to choose the most appropriate view to be used.
Quick Links	Links from one object to a related object when you press Enter or click the mouse.
Exit Prompt	Tells Disk Editor to display a warning prompt when you press Esc to exit the program.
Show All Characters	Shows all characters as stored in the object. (This is a character filter that tells the program how to display text.)
View WordStar Files	Specifies that the text being viewed is stored in WordStar format. Thus, the characters shown are converted from WordStar codes to readable characters.

Option	Description
Save	Saves configuration selections to the file NU.INI.
OK	Uses the current settings for the current session only; these settings are not saved to disk as default settings.
Cancel	Exits the Configuration dialog box without making any changes.

Summary

Norton Disk Editor enables you to make real changes on the disk drive—viewing and changing information directly on the disk for files and disk system areas. With Disk Editor, you can change information on the disk that cannot otherwise be changed.

Disk Editor is both a powerful and a dangerous tool. The best way to learn to use it is by practicing on a floppy disk—particularly one that has been formatted with the System Files option in Safe Format or with the /S option in the DOS FORMAT command. With this practice disk, you can explore all of Disk Editor's options and become comfortable with using them before you edit a "live" disk. This chapter concludes Part IV on advanced recovery techniques. Part V deals with Norton commands that can help you fine-tune your computer to make it run more efficiently. Turn now to Chapter 18 to learn about the System Info command.

PART

V

Making Your Computer Work More Efficiently

OUTLINE

Using System Info

Making Your Disk Run Faster with Speed Disk

Using Calibrate

Using Norton Cache

CHAPTER 18

Using System Info

Norton Utilities provides you with ways to safeguard the data in your computer and to use your computer more efficiently. The gold in Fort Knox is safe but not very accessible. The data in your computer should be both safe and efficient to use.

Part V of this book, "Making Your Computer Work More Efficiently," helps you understand your computer's capabilities better and shows you how to fine-tune your computer to run faster and more efficiently. This first chapter in Part V discusses the System Info (SYSINFO) utility. System Info is like a stethoscope, giving you information about what is going on inside your computer.

This information is valuable in several ways. Some programs, for example, cannot run on computers with older ROM BIOS chips (which contain basic system programming). With System Info, you can determine quickly the date of the current ROM BIOS chip on your computer. If you are going to upgrade or replace hardware, such as a modem card, you should know what kind of bus you have. Because the DOS CHKDSK command does not report any memory over 640K, System Info is valuable in finding out how much memory your computer has and what kinds of memory you have (that is, main, extended, and expanded memory). These pieces of information and much more are revealed through the System Info program.

You can use all the utilities discussed in Part V to make hard disk access faster and more efficient and to compare your computer's speed

and efficiency with those of other computers. These utilities—System Info, Speed Disk, Calibrate, and Norton Cache—not only make your programs run faster, but also reduce wear and tear on your hard disk (and may prolong its life).

Understanding System Info

The old saying "Know thyself" often is quoted to emphasize the fact that before you can do much with your life, you must know your capabilities and limitations. A new saying should be "Know thy computer." If you are to get the most out of your computer, you should know it well. True to form, Norton Utilities provides you with a way to know your computer well: the System Info utility. System Info enables you to look into the heart of your computer and to discover how powerful (or weak) it is, compared with other computers. System Info also shows you what is contained in your computer's memory and what key devices (such as disk drives) are available for its use.

With the Norton System Info (SYSINFO) command, you can compare your computer with other computers in terms of processing and disk speeds. The System Info test compares the performance of your computer with that of the following computers:

- A standard IBM PC XT using the Intel 8088 microprocessor and running at 4.77 MHz
- An IBM PC AT using the Intel 80286 microprocessor and running at 8 MHz
- A COMPAQ 486 computer using the Intel 80486 microprocessor and running at 33 MHz

The System Info command also gives you fast access to vital information about a computer. If you help other people with their computers (as a user-support technician, for example), the System Info command can help you discover information about a computer that you have never used before. You may be interested in the existence of a math coprocessor, the type of video display being used, the existence of parallel and serial ports, the amount of memory available and used, and other items described by the System Info command.

When you run the System Info command from the Norton main screen or from the DOS prompt with no switches, the program presents about 20 different dialog boxes (depending on your computer's configuration). These dialog boxes and their contents are described in the following sections.

Starting System Info

You can begin the System Info program by choosing it from the Norton main screen or by entering **SYSINFO** at the DOS prompt. You use the following syntax at the DOS prompt:

SYSINFO [*d*:] [*switches*]

The *d*: option is the letter of the hard disk drive that you want to test. The available *switches* for the System Info command are the following:

Switch	Description
/AUTO:*n*	Tells the command to operate in automatic mode. In this mode, the system information is shown dialog box by dialog box, with a pause of *n* seconds between dialog boxes. If you do not specify *n* in the switch, the pause between dialog boxes is five seconds.
/DEMO	Causes System Info to operate in demo mode and to scroll continuously through four dialog boxes: System Summary, CPU Benchmark, Disk Speed Benchmark, and Overall Performance. You can use this switch to see how the performance of your computer measures up to that of other well-known computers.
/DI	Produces only the Drive Information summary dialog box.
/N	Skips the live-memory probe. In some computers, the live-memory probe forces you to reboot after the System Info test. Use the /N switch to get around this problem. This switch is necessary if your computer is not a 100-percent-compatible IBM clone. If the System Info command causes your computer to freeze, use the /N switch to avert this problem in the future.
/REP:*file1*	Causes a report to be printed to the file specified by *file1*.
/SPEC:*file2*	Causes the report to use settings stored in the file named *file2*.
/SOUND	Beeps between CPU tests.
/SUMMARY	Displays information about a specific drive.
/TSR	Shows all TSR (terminate-and-stay-resident) programs in memory.

Viewing the System Summary Dialog Box

A System Info test on drive C of a 386SX/10 computer with a 122M hard disk was used to create these dialog boxes. The first dialog box that appears when you issue the System Info command is the System Summary dialog box (see fig. 18.1).

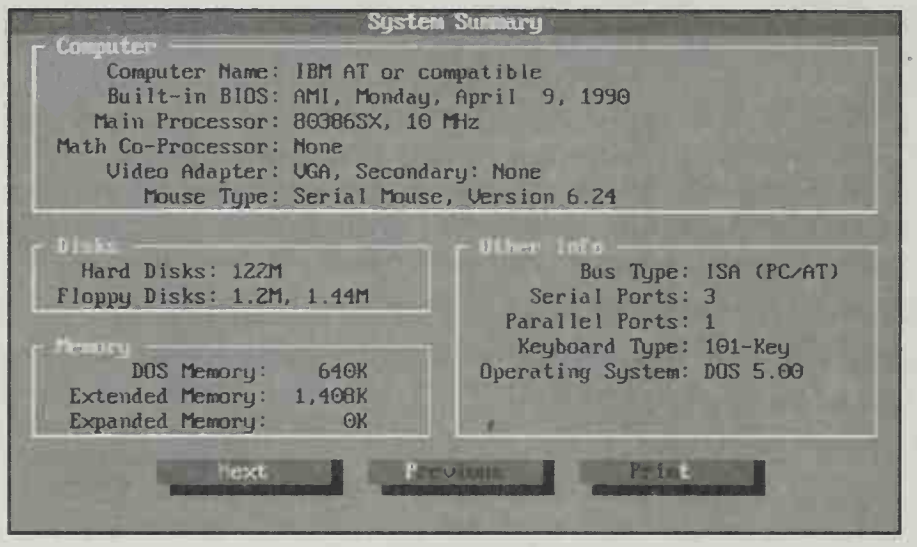


Fig. 18.1
The System Summary dialog box for a 386SX/10.

Notice the three options at the bottom of the dialog box: **N**ext, **P**revious, and Prin**t**. To scroll through the dialog boxes, you can use the mouse or arrow keys to choose **N**ext or **P**revious. Choose Prin**t** to print a summary of the information to the printer.

To exit the current dialog box and return to DOS or the Norton main screen, press Esc or double-click the control box in the upper-left corner of the System Information main screen.

NOTE

A menu bar appears at the top of the System Information main screen. You can use this menu bar to display any of the dialog boxes that are available in System Info. For information on how to use this menu, see "Using the Menu Bar and Printing Reports" later in this chapter.

Computer Processor Information

The System Summary dialog box displays information about the computer being tested in four areas: Computer, Disks, Memory, and Other Info. The first item in the Computer section is the Computer Name. In this case, the program gives the name as an IBM AT or compatible. The computer being tested (a 386SX/10) is an AT-compatible computer because it uses the ISA bus type (discussed in the following section).

The Built-in BIOS information tells you the date of the BIOS (basic input/output system). The BIOS contains an essential set of software—sometimes called *firmware*—in ROM (read-only memory) that you can access when you turn on your computer. This BIOS software tells the computer how to initiate a system boot. In this case, the BIOS is an AMI type, with a date of Monday, April 9, 1990. This date can be important because some newer software programs will not run with older versions of the BIOS.

A surprising number of versions of BIOS exist. IBM has used more than 20 versions in its computers, ranging from the original PC to the current PS/2 and PS/1 lines. Other third-party companies manufacture "clone" BIOSs—one reason why so many IBM-compatible computers have been sold.

If you need to call your computer manufacturer's support line, you may want to supply the date of the BIOS you are using. Like software, older BIOSs may contain bugs, and the date will tell the support representative whether the problem you are having could be related to a buggy BIOS. Providing the date and type of BIOS that you are using is helpful when you are calling for support on software or a peripheral device (for example, a disk drive, audio card, network card, or backup tape system). For example, to install a 1.44M disk drive in an older PC, you must upgrade the BIOS to a version that supports that kind of drive.

NOTE The BIOS is contained in a small ROM chip in your system board. If you are comfortable working inside the computer box, you can update your ROM BIOS chip fairly easily by pulling off the old chip and replacing it with a newer chip. (Be certain that you replace the chip with one that is compatible with your computer.) If you decide to upgrade the chip yourself, purchase the chip from a dealer who is familiar with your brand of computer, or buy the chip from your computer's manufacturer.

The Main Processor reported for this computer is an 80386SX, 10 MHz. Several Intel microprocessors, however, can be reported. Some of the most common microprocessors are listed in table 18.1.

NOTE Some processors come in more than one variety. One version of the 80386 microprocessor, for example, is the 80386SX (which was used to capture the figures in this chapter). This chip has all the characteristics of the normal 80386 chip except that it has a 16-bit external data bus structure instead of the 32-bit structure used by the 80386 chip. Machines built around the SX chips are less expensive.

Table 18.1 Intel Microprocessor Chips and Math Coprocessors

Chip Name	Computer	Math Coprocessor	Common Speeds	Internal/External Processor Bits
8086	PC	8087	4.77, 8, 10 MHz	16/16
8088	PC	8087	4.77, 8, 10 MHz	16/8
80286	IBM AT class	80287	6, 8, 10, 12 MHz	16/16
80386SL	Wide variety	80387	16, 20, 25 MHz	32/16
80386SX	Wide variety	80387SX	16, 20 MHz	32/16
80386DX	Wide variety	80387	16, 20, 25, 33 MHz	32/32
80486	Wide variety	Built-in	20, 25 MHz	32/32
80486SX	Wide variety	80486 Overdrive	16, 20, 25, 33 MHz	32/32
80486DX	Wide variety	Built-in	25, 33, 50 MHz	32/32
80486DX2	Wide variety	Built-in	50, 66 MHz	32/32
Pentium (80586)	Wide variety	Built-in		

Another factor in the functionality of the microprocessor is its speed. Table 18.1 shows common speeds (in megahertz) for the processors listed. Speed alone, however, does not determine the power of a

processor. A 25 MHz 80486, for example, is more powerful than a 25 MHz 80386 because the 80486 chip can do more in the same amount of time. Therefore, you should not use clock speed alone as a measure of system power.

Other factors influence the power of a computer, so two computers, each using a 50 MHz 80486DX, may have different actual processing speeds. See "Viewing the Overall Performance Index Dialog Box" later in this chapter for more information on how to compare the processing power of two computers.

The DX2 version of the 80486 uses a process called *clock doubling* to achieve higher speed. Thus, the 80486DX2 running at 50 MHz actually is a 25 MHz chip with its speed doubled. The Overdrive-SX chip is an upgrade of the 486SX chip that doubles the chip's speed. A 486SX running at 16 MHz with Overdrive, for example, runs at 32 MHz.

Some processors come in low-power versions. The 80C88 and 80C286 processors, for example, use less power than the 8088 and 80286 use. These chips often are used in laptop computers because of the power limitation of batteries.

The math coprocessor is a "sister" microcomputer processor that gives the computer the capability to perform mathematical calculations faster. For many number-intensive tasks, a math coprocessor can cut processing time dramatically. A sophisticated statistical analysis such as a multiple regression, for example, may take 30 seconds to perform on a computer with an 80286 processor. Add an 80287 coprocessor, and the same calculation may take only 1 to 3 seconds.

Beginning with some versions of the 80486 chip, the math coprocessor was built into the main processor chip. The Overdrive-SX chip is an upgrade of the 486SX chip that doubles the chip's speed. A 486SX running at 16 MHz with Overdrive, for example, runs at 32MHz.

The Video Adapter entry in the System Summary dialog box shows what kind of computer monitor is attached to your computer and whether a secondary monitor is available. (For detailed information about various video adapters, see "Viewing the Video Summary Dialog Box" later in this chapter.) For this report, the adapter is listed as a VGA (Video Graphics Array) adapter. No secondary adapter is listed.

Also reported in the Computer section is the Mouse Type (if any) that you are using. Common mouse types are Microsoft, Microsoft-compatible, and PS/2. If available, a version number is reported also. For this computer, the mouse type reported is a Serial Mouse, Version 6.24.

Disk Drives, Memory, and Other Information

The Disks section tells you the size of your hard disk(s) and floppy disk(s). For this computer, the disks reported are a 122M hard disk and two floppy disks: a 1.2M 5 1/4-inch disk and a 1.44M 3 1/2-inch disk. (For more information about disks, see "Viewing the Disk Characteristics Dialog Box" later in this chapter.)

The Memory section tells you how much DOS memory you have and how much (if any) extended or expanded memory you have. (The various kinds of memory are discussed in "Viewing the Memory Summary Dialog Box" later in this chapter.)

The Other Info section contains information about other characteristics of your computer. The Bus Type entry refers to one of the following buses:

Bus	Description
ISA	Standard bus for IBM PCs and compatibles and for AT-type computers
MCA	Microchannel bus; used in most IBM PS/2s
EISA	Extended Industry Standard Architecture bus (similar in capability to the newer MCA bus but still compatible with the older ISA bus)

The *bus* is the internal pathway along which electronic signals are sent from one part of the computer to another part. For example, the bus carries information from the microprocessor to the memory chips and back.

The type of bus that your computer uses determines the type of expansion cards you can install. The ISA bus accepts only standard PC/AT-type expansion cards. The MCA bus accepts only MCA cards. The EISA bus accepts EISA or ISA cards. As indicated in figure 18.1, this computer contains an ISA (PC/AT) bus.

The Serial Ports entry in the Other Info section shows how many serial ports are available to the computer. These ports generally are used for communications—for example, hooking up a modem. Some mice also connect to serial ports.

A serial port sends a stream of data, bit after bit, over two wires (like a telephone wire) to the connected device in a process called *asynchronous communication*. Serial cables can extend hundreds of feet from the

computer to the connecting device. The computer described in figure 18.1 contains three serial ports.

The Parallel Ports entry shows how many parallel ports are available to the computer. You usually use parallel ports to communicate with a printer, although some other devices (such as backup tape drives) can connect to a parallel port. Parallel ports send eight parallel data bits through eight wires—one bit per wire—simultaneously. This process is called *synchronous communication*. Usually, parallel communications are limited to cables no more than 15 feet long. The computer described in figure 18.1 has one parallel port.

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Information can be sent through a parallel port connection faster than through a serial port connection. Data travels through a serial connection the way cars travel on a one-lane highway: in single file. A parallel connection is like an eight-lane highway with eight cars (pieces of information) running side by side. Thus, a parallel connection can send much more information in the same amount of time than a serial connection can. Some printers can connect to the computer through either a serial port or a parallel port. If you have this option and if your printer is less than 15 feet away from the computer, choose the parallel-port hookup.

The Keyboard Type entry shows the type of keyboard you are using. The computer described in figure 18.1 has a 101-key keyboard, which currently is the standard. For earlier computers, such as the PC, the standard was an 84-key keyboard. The main difference between the keyboards is that the old 84-key PC keyboard does not contain the function keys F11 and F12 or a separate cursor-movement keypad.

The Operating System entry shows what version of DOS you are using. The computer described in figure 18.1 is using DOS 5. DOS versions currently range from 1 to 6.

Viewing the Video Summary Dialog Box

If you press Enter or choose Next in the System Summary dialog box, the Video Summary dialog box appears (see fig. 18.2).

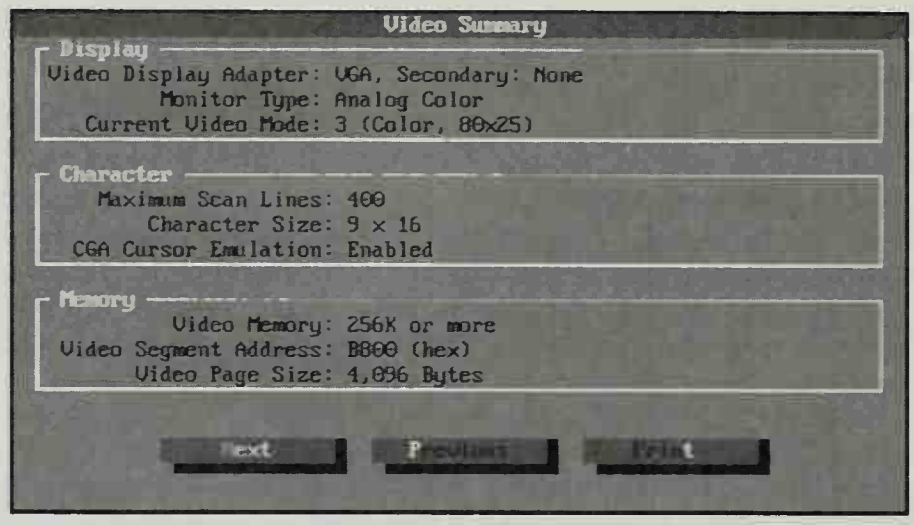

Fig. 18.2
The Video Summary dialog box.

The Video Summary dialog box displays information about the type of monitor you are using. The Display section provides information about your computer's display adapter and monitor. The Character section displays information about the resolution of characters on-screen. Finally, the Memory section shows how much memory is available to your video adapter. The following sections describe the items in each of these three areas of the dialog box.

Video Display Features

The Display section in the Video Summary dialog box tells you which type of display adapter is attached to the computer, the monitor type, and the current video mode. The computer that produced the dialog box shown in figure 18.2 uses a VGA video display adapter.

The Secondary entry shows the type of alternative video adapter that is attached to the computer (if any). The computer described in figure 18.2 has no secondary adapter.

Table 18.2 summarizes several kinds of video adapters. The Resolution column lists the number of dots, or *pixels*, that appear on-screen. The more pixels, the greater the clarity of the screen image.

Table 18.2 Common Video Adapters for IBM-Compatible Computers

Adapter Type	Resolution
Monochrome (text only)	720 x 350
Color Graphics Monitor (CGA)	320 x 200 color mode 640 x 200 single-color mode

Adapter Type	Resolution
Enhanced Graphics (EGA)	640 x 350
Multicolor Graphics (MCGA)	640 x 350, 64 shades of gray or 16 colors
Video Graphics (VGA)	640 x 480, 256 colors
Super VGA	800 x 600 and 1,024 x 768

The Monochrome Display Adapter (MDA) is a single-color adapter that was used mostly for early PCs. This adapter displays text only; no graphics are supported. The resolution of the monochrome adapter is 720 pixels by 350 pixels, and characters are created in a 7-by-9 pixel matrix.

The Color Graphics Adapter (CGA) supports up to four colors simultaneously and has a resolution of 320 by 200 pixels. When only one color is displayed, the adapter has a resolution of 640 by 200 pixels. This adapter supports single-color composite and RBG (red-blue-green) monitors. Its text resolution is inferior to that of the monochrome adapter.

The Enhanced Graphics Adapter (EGA) supports up to 16 colors simultaneously and has a resolution of 640 by 350 pixels. EGA was a transition standard between the CGA and VGA adapters. Although EGA and VGA adapters cost about the same amount of money, the VGA monitor is preferable because it preserves the aspect ratio of graphics. *Aspect ratio* means that certain graphics, such as pie charts, retain their correct aspect (round) instead of being distorted (egg-shaped).

The Multicolor Graphics Array (MCGA) adapter supports up to 64 gray-scale shades in CGA mode and supports up to 16 colors in EGA mode with a resolution of 640 x 350 pixels.

The Video Graphics Array (VGA) adapter, introduced in 1987, supports up to 256 colors simultaneously with a resolution of 640 by 480 pixels. The VGA standard has been pushed to higher levels of resolution (800 x 600 and 1,024 x 768) in Super VGA adapters. VGA became the standard for displays in the late 1980s and continues to be the most common type of display in the early 1990s. The VGA display can also display information for programs that use the older MDA, CGA, and EGA monitor modes.

Video Character and Memory Features

The Character section in the Video Summary dialog box tells you the number of scan lines on-screen, the number of pixels used to create a

character (the computer described in this chapter has 400 scan lines, and the character size is 9 x 16 pixels), and the CGA cursor emulation. The more scan lines, the better the clarity of graphics. The more pixels used to display a character, the better the clarity of text. If CGA Cursor Emulation is enabled, EGA or VGA monitors can respond to cursor-sizing calls in the same manner as CGA monitors. (Cursor sizing is discussed in Chapter 22.)

The Memory section contains information about how much memory is allocated to your display and how that memory is used. The Video Segment Address entry tells you where the video memory begins. This information may be important if you are writing a computer program to take advantage of the features of a particular video adapter or if you have a program that requires a particular level of video features. The Video Page Size entry shows how many bytes of information are required to hold one screen's worth of information in the current video mode.

Viewing the Hardware Interrupts Dialog Box

Pressing Enter or choosing Next in the Video Summary dialog box brings you to the Hardware Interrupts dialog box (see fig. 18.3).

Fig. 18.3

The Hardware Interrupts dialog box.

A *hardware interrupt* is a way for hardware devices to request service from the computer. Notice that the devices listed in the Name column of the Hardware Interrupts dialog box include the keyboard, communication ports, and disks. When one of these devices wants to convey

information to the computer or to request service from DOS, the device sends an interrupt signal to the computer. Each device is assigned a unique interrupt signal so that the computer knows which device is requesting service. The interrupt names are designated as IRQ numbers. The IRQ number for the keyboard, for example, is 01.

Occasionally, when you add a new device to the computer, you are asked to set its interrupt (IRQ number) to one that currently is not being used. Check the Number, Name, and Owner columns of the Hardware Interrupts dialog box to find out which interrupts are available. If the Name associated with the interrupt is Reserved, the interrupt is not associated with a device now and is therefore available for use. To see interrupts other than the ones listed, use the arrow keys to scroll the list, or click the down arrow on the scroll bar.

Viewing the Software Interrupts Dialog Box

Pressing Enter or choosing Next in the Hardware Interrupts dialog box displays the Software Interrupts dialog box (see fig. 18.4).

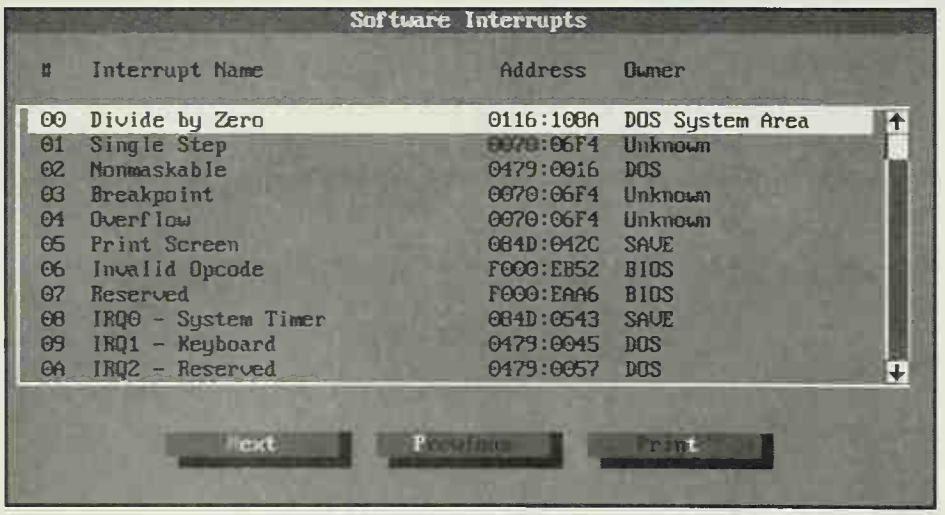

Fig. 18.4

The Software Interrupts dialog box.

Software interrupts are similar to hardware interrupts except that a software program is requesting service. The interrupts listed in this dialog box may be useful if you are writing software programs that must take advantage of these interrupts. If, for example, you were writing a software program that needed to communicate with the keyboard, you know that the interrupt associated with the keyboard is IRQ1. To see interrupts other than the ones listed, use the arrow keys to scroll the list, or click the down arrow on the scroll bar.

Viewing the Network Information Dialog Box

If your computer is part of a network, pressing Enter or choosing Next in the Software Interrupts dialog box brings you to the Network Information dialog box. Only information for Novell NetWare networks is supported.

The information displayed about the network user includes the user ID, log-in date, and log-in time. Information displayed about the network includes the default server name, vendor, software, revision date, and copyright. You can find this information useful for software support because different software programs require certain versions of NetWare in order to run properly. If your computer is not part of a network, the CMOS Values dialog box appears (described in the following section).

Viewing the CMOS Values Dialog Box

Pressing Enter or choosing Next in the Network Information dialog box (or in the Software Interrupts dialog box, if your computer is not part of a network) brings you to the CMOS Values dialog box, which contains information about the way your computer is configured (see fig. 18.5).

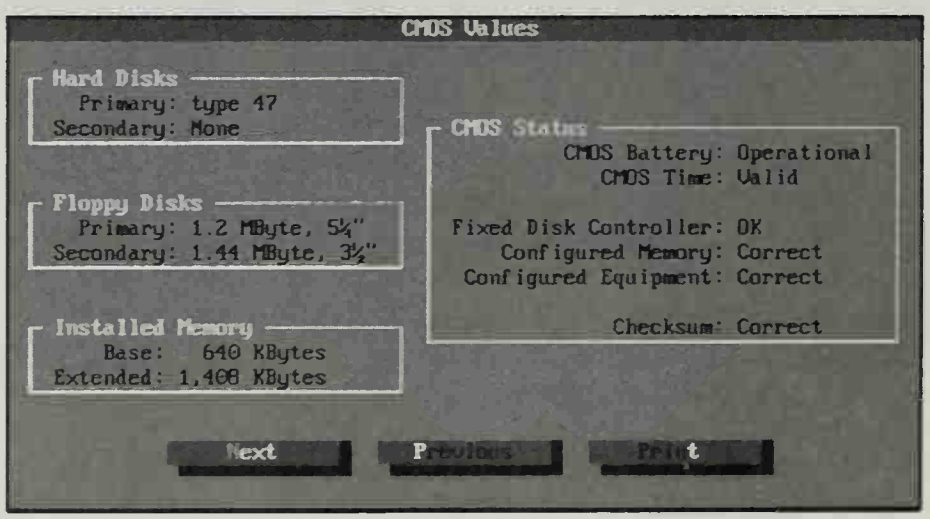

Fig. 18.5
The CMOS Values dialog box.

CMOS (complementary metal-oxide semiconductor) is a chip that stores important setup information about your computer, such as the hard disk type, how many floppy disk drives it has, and how much memory it has. If System Info determines that any of these entries are incorrect, the incorrect values will appear in red or boldfaced.

An important piece of information in this dialog box is the CMOS Battery entry. If your computer begins to operate erratically (if, for example, you are losing time and date information and having problems finding your disks), check this dialog box to see whether the battery is listed as operational. If the battery is not listed as operational, the computer may have lost information about its configuration. (See Chapter 14 for information on Rescue Disk.)

T I P

Computers that retain setup information in CMOS have a battery that causes the chip to remember the setup information when the computer is turned off. If the battery loses its charge, the computer loses its setup information. Most CMOS batteries are attached to a battery holder on the inside back panel of the computer. To change batteries, simply unplug the old battery and plug in a new one. (Make sure that the replacement battery is the correct type.) After you replace the battery, you have to run the setup program for your computer or use Rescue Disk (see Chapter 14) to restore your CMOS values.

The Hard Disks section in the CMOS Values dialog box reports the drive types for your hard disks. For the computer described in this chapter, the hard drive is type 47. Some PCs, however, don't need this information, and the field may contain `None` even if you have a hard disk.

The Floppy Disks section reports the sizes of your floppy disk drives. The Installed Memory section reports the CMOS values for base and extended memory. The CMOS Status section reports on your computer's current CMOS values. If any of these fields contains `Error`, you may need to run your computer's setup program and/or replace your battery.

Viewing the Disk Summary Dialog Box

Pressing Enter or choosing Next in the CMOS Values dialog box takes you to the Disk Summary dialog box (see fig. 18.6).

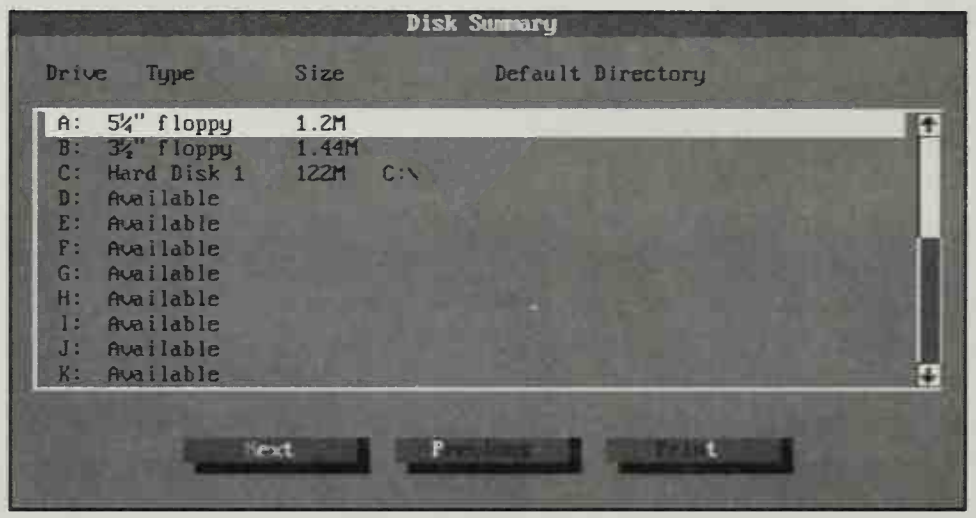

Fig. 18.6
The Disk Summary dialog box.

The Disk Summary dialog box tells you how many disk drives the computer can use and which drives are available. In figure 18.6, drives A, B, and C are being used. Drives A and B are floppy disk drives, and drive C is a hard disk. The hard disk is currently using the root directory (C:\). The other drives, listed as available, are currently not being used.

Viewing the Disk Characteristics Dialog Box

Pressing Enter or choosing Next in the Disk Summary dialog box brings you to the Disk Characteristics dialog box, which provides information about the current disk (see fig. 18.7).

A list of available disks appears in the box at the upper-right corner of the dialog box. You can change to another disk to see information about that disk. Use the up- and down-arrow keys to highlight a disk name in this list, or click a disk name (A:, for example) in the list. This way, you change the information in the dialog box to reflect information about the selected disk drive.

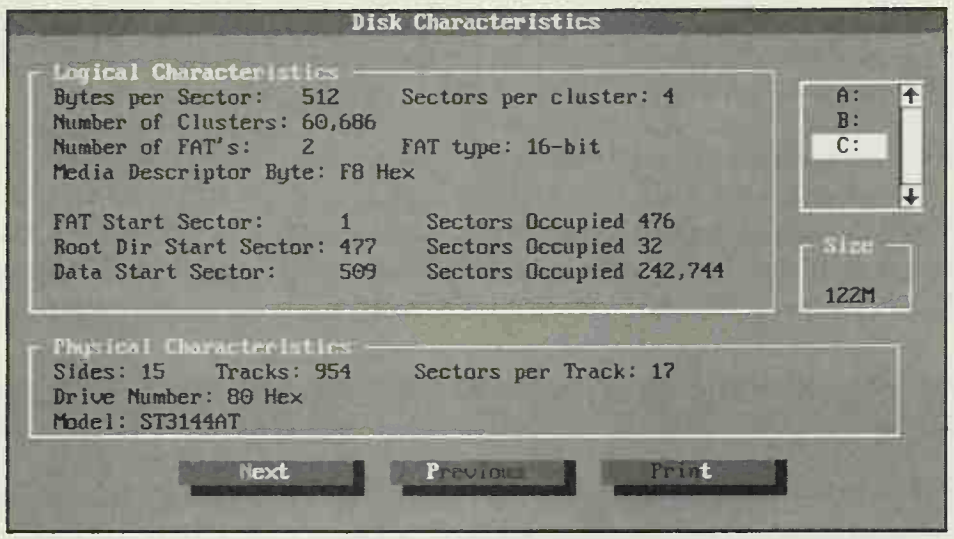

Fig. 18.7
The Disk Characteristics dialog box.

The Logical Characteristics section contains information about how magnetic information is stored on the disk. The number of bytes per sector is usually 512—that is, when a track on a disk is broken into sectors, each sector holds 512 bytes of information.

DOS reads a certain minimum amount of information from a disk at a time. That amount is called a *cluster*. Usually, the number of sectors per cluster is two for floppy disks and four or more for hard disks. The size of the cluster often determines how much wasted space (*slack space*) is on disk. The computer described in this chapter has four sectors per cluster, meaning that the smallest amount of space that a single file will occupy is 2,048 bytes (4×512). All files will take up space that is a multiple of 2,048. Space not used by the file, but in the cluster used to store the file, is slack space.

NOTE

The difference in cluster size accounts for the difference in space required to store a file on the hard disk compared with a floppy disk. For the computer described in this chapter, a 500-byte file would take up 2,048 bytes on the hard disk. If you copy the file to a floppy disk that uses two sectors per cluster, however, the file takes up only 1,024 bytes. The Norton File Size (FS) command can help you determine whether a group of files from a hard disk will fit on a floppy disk. For more information about the FS command, see Chapter 26.

The number of FATs (file allocation tables) almost always is 2 except in the case of RAM disks (memory disks), which may have only one copy of the FAT. On a disk with more than 20,740 sectors (such as the disk

used by the computer described in this chapter, which has 60,686 × 4 sectors), DOS uses a 16-bit FAT. If the disk has 20,740 or fewer sectors, DOS creates a 12-bit FAT.

The Media Descriptor Byte entry tells you what kind or size of disk has been formatted. Table 18.3 interprets the Media Descriptor Byte codes displayed in the Disk Characteristics dialog box. Thus, the disk shown here is a hard disk (code F8 Hex). *Hex* refers to the fact that this number (F8) is in hexadecimal format.

Table 18.3 Media Descriptor Byte Codes

Reported Code	Disk Represented
F0	1.44M 3 1/2-inch floppy disk
F8	Hard disk
F9	1.2M 5 1/4-inch floppy disk or 720K 3 1/2-inch floppy disk
FD	360K 5 1/4-inch floppy disk
FE	160K 5 1/4-inch floppy disk
FF	320K 5 1/4-inch floppy disk

The remaining technical information listed in the Disk Characteristics dialog box is useful if you are editing or rebuilding the system area of a disk with a program such as Norton Disk Editor (see Chapter 17). The FAT Start Sector entry tells you which sector on disk is the starting point for the file allocation table. In this case, the FAT begins in sector 1. The Sectors Occupied entry (in this case, 476) tells you how long the FAT is. The dialog box also lists information about the starting location and length of the root directory area and about the data area on disk.

The Physical Characteristics section describes the inner workings of the disk. In this case, the hard disk has 15 sides (8 platters). Actually, the disk has 16 sides, but one side of one platter is used as a map that guides the actuator to the correct tracks on the other platters. Therefore, the disk has 15 sides that actually hold information. This box also reports the number of sectors per track, the drive number, and the model number of the disk drive (if available).

NOTE Some hard disk drives use one side of a disk for an actuator guide; some do not. If your hard disk shows an even number of sides, it probably does not use an actuator disk map.

Viewing the Partition Tables Dialog Box

Pressing Enter or choosing Next in the Disk Characteristics dialog box displays the Partition Tables dialog box, which provides information about the partitions in your hard disk (see fig. 18.8).

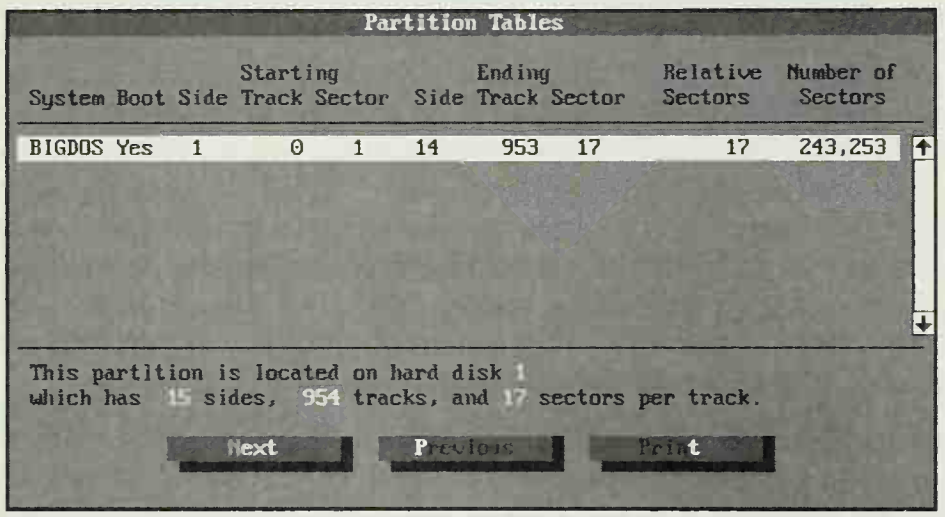

Fig. 18.8
The Partition Tables dialog box.

In this case, only one hard disk exists. If you use the FDISK command to partition your hard disk into more than one drive (for example, drives C and D), each drive shows up as a partition. You can use this information to determine the number and size of partitions in the hard disk(s) and to find out where the sectors start and end.

Viewing the Memory Summary Dialog Box

Pressing Enter or choosing Next in the Partition Tables dialog box brings you to the Memory Summary dialog box, which reports how your computer uses memory (see fig. 18.9).

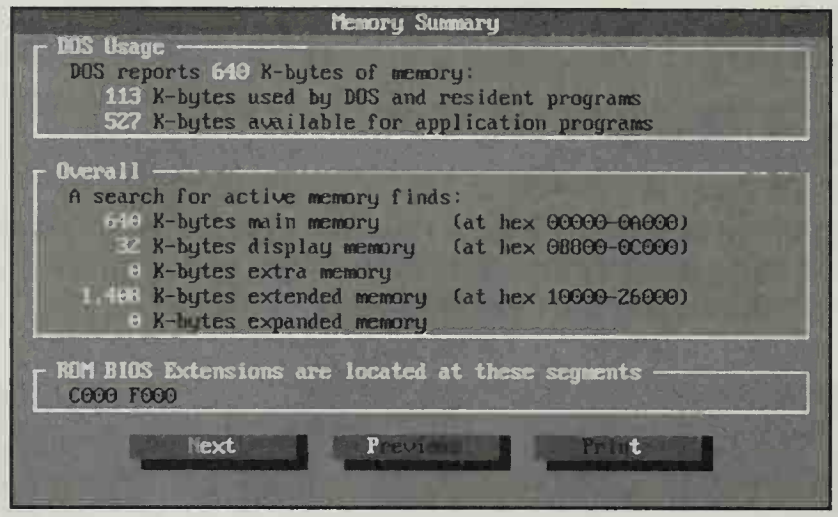

Fig. 18.9

The Memory Summary dialog box.

The Norton System Info command looks at the computer's RAM (random-access memory) in two ways. The first section of the dialog box is DOS Usage. In figure 18.9, DOS reports 640K of available RAM, which is divided into two parts: 113K is being used by DOS and resident programs, and 527K is available for use by other applications.

The reason for this 113K/527K split of the 640K of main memory is that when you boot your computer, the computer reads DOS information on the boot disk and moves some of that information into RAM so that the information is available when needed. DOS information, therefore, takes up some of your RAM. If you have loaded any RAM-resident programs (pop-up, terminate-and-stay-resident, and so on), those programs also are loaded into a portion of RAM when you boot your computer. If memory-resident programs occupy too much of your RAM, you may have a hard time running large programs such as Microsoft Windows or Aldus PageMaker.

The Overall section in the Memory Summary dialog box provides an overall report on the computer's memory locations. The report includes the following kinds of memory:

Memory	Description
Main memory	About the same as the total memory reported by the DOS method.
Display memory	RAM located in the display adapter card and used by the monitor.
Extra memory	Any read/write memory between 640K and 1M.
Extended memory	Memory beyond 1M (available only in 286-class and newer computers). To use this memory, you must have an XMS memory manager, such as MS-DOS's HIMEM.SYS.

Memory	Description
Expanded memory	Add-on memory available to certain programs that subscribe to a special way of using memory developed by Lotus, Microsoft, Intel, and AST. Many programs, such as Lotus 1-2-3, use this memory to work with large amounts of data (spreadsheets, databases, and so on) at one time.

The ROM BIOS extended memory, if present, is located in add-in boards (such as video display boards) or hard disks but is not a part of normal RAM. (The location of any ROM BIOS extensions is reported in the ROM BIOS Extensions section in the Memory Summary dialog box.) Allocation of memory is important in running such programs as Lotus 1-2-3 and in networking. Some programs, such as QEMM, enable you to reallocate memory among the memory areas for the purpose of providing enough memory for certain tasks.

Viewing the Extended (XMS) and Expanded (EMS) Memory Dialog Boxes

Pressing Enter or choosing Next in the Memory Summary dialog box takes you to the Extended Memory dialog box (see fig. 18.10).

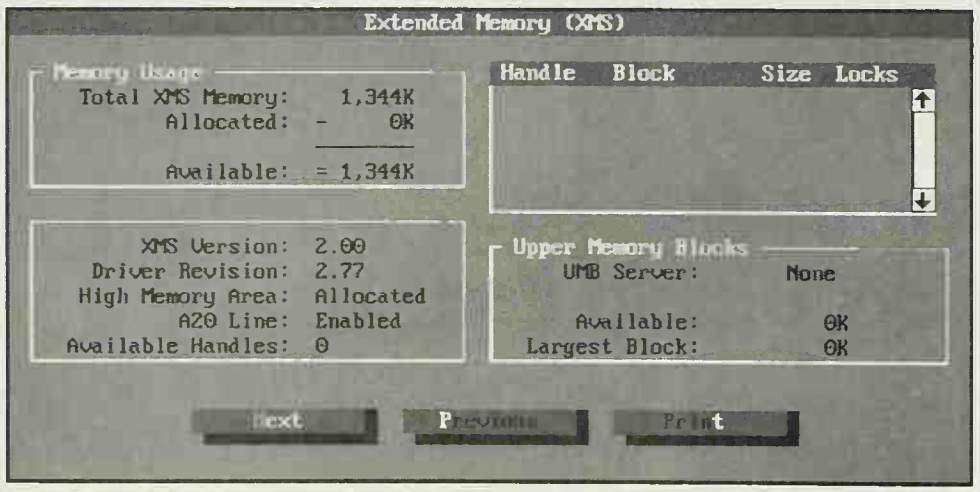

Fig. 18.10
The Extended Memory (XMS) dialog box.

If you are using an extended memory manager, information about the manager's allocation of memory appears in this dialog box. The most commonly used memory manager is Microsoft's HIMEM.SYS, which may be preloaded on your computer, particularly if the computer came preloaded with Windows. An extended memory manager enables you to allocate a block of memory for use by a program.

In the Extended Memory dialog box, the amount of allocated memory appears in the Memory Usage section. The box to the right of that section lists information about the XMS memory handle. Unlike DOS memory that is allocated to a specific address, extended memory's location is indicated by a *handle* (a pointer) to a memory block where the extended memory resides. Memory may be locked when you are running under a multitasking environment such as Windows or DesqView.

The Upper Memory Blocks section reports on your system's use of upper memory blocks (UMBs). UMBs are "holes" in memory between 640K and 1M; a memory manager can fill these holes with memory. Usually, memory between 640K and 1M is used only in 386-class and later computers and is managed by programs such as QEMM/386. DOS 5 and 6 also use UMBs.

If your system has expanded memory (EMS), that memory will be reported in a dialog box similar to the one shown in figure 18.10. EMS memory is not allocated like DOS memory (by size); EMS memory is specified by pages. Thus, the EMS address is a pointer to an EMS block of memory that consists of one or more pages. The standard LIM page size is 16K. (LIM stands for Lotus, Intel, and Microsoft—the companies that set the standards for EMS memory.)

The Expanded Memory (EMS) dialog box shows information about each EMS block that currently is allocated. This dialog box also reports the number of pages controlled by a handle and the size of each block (in bytes).

Viewing the DOS Memory Blocks Dialog Box

Pressing Enter or choosing Next in the Extended Memory or Expanded Memory dialog box brings you to the DOS Memory Blocks dialog box (see fig. 18.11).

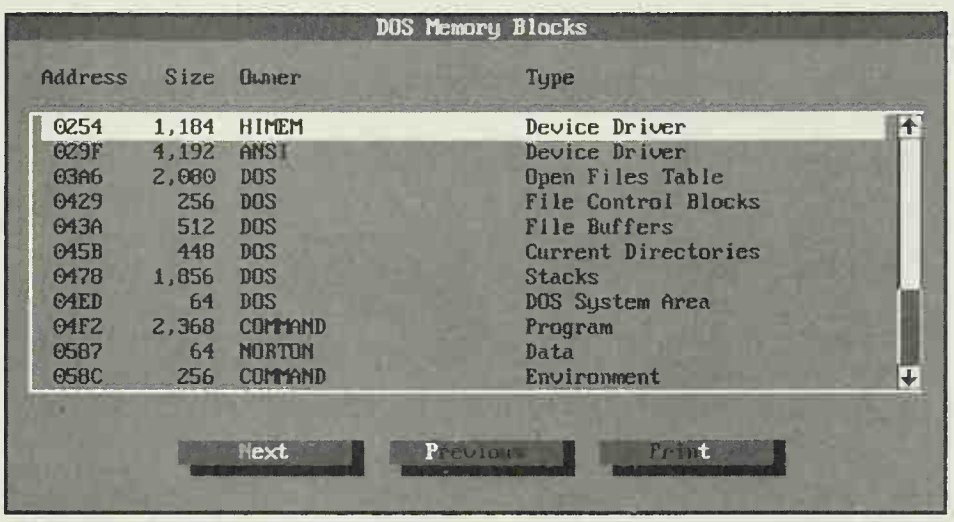

Fig. 18.11
The DOS Memory Blocks dialog box.

This dialog box lists the memory locations for various components of the DOS system. (You can scroll through this list by pressing the arrow keys or clicking the scroll bar.) In figure 18.11, the COMMAND program (COMMAND.COM) is stored in memory beginning at memory address 04F2 and is 2,368 bytes long. The information in this list can be helpful if you are diagnosing system problems related to DOS operation. If your system is infected with a virus program, for example, that virus may appear in this list. If you know what this list should look like (if you have a hard copy of the report on file), the presence of an unknown program or the change in size of a program (such as COMMAND.COM) may indicate the presence of a virus.

Examining the DOS memory blocks can help you find out how your memory is being allocated. You might be particularly interested in "free" memory. This memory—a gap in the allocation of DOS memory—usually cannot be used. Free memory sometimes is caused by the execution of a TSR (terminate-and-stay-resident program) and its subsequent removal. Free memory may reduce the amount of memory available for running programs.

Viewing the TSR Programs Dialog Box

Pressing Enter or choosing **Next** in the DOS Memory Blocks dialog box brings you to the TSR Programs dialog box (see fig. 18.12).

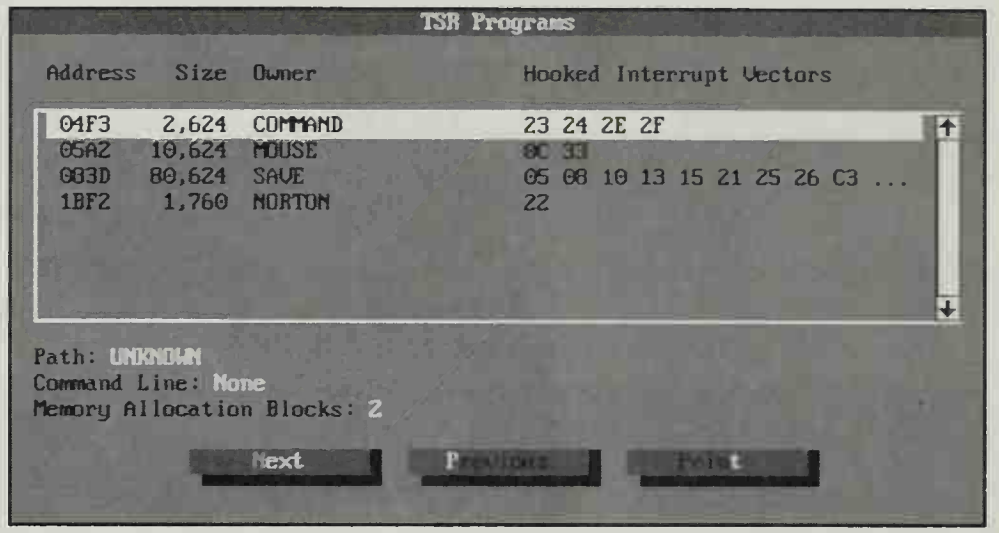

Fig. 18.12
The TSR Programs dialog box.

TSR (terminate-and-stay-resident) programs—also called *memory-resident programs*—are programs that, when begun, stay in the computer's RAM while other programs are running. By staying in memory, these programs are using some of the RAM, making the memory unusable by other programs. Therefore, you need to be aware of how much space TSR programs are using. The TSR Programs dialog box lists the TSR programs and their sizes, owners, and hooked interrupt vectors (the interrupt vector used by the software program to communicate with DOS).

In the dialog box shown in figure 18.12, the COMMAND program (COMMAND.COM)—a portion of the operating system (DOS)—is in memory. The MOUSE program tells DOS how to use a mouse, and the SAVE program is a program used to capture this screen image. Because each of these programs takes up memory and because large programs will not run if not enough memory is available, you may be interested in knowing precisely how much of your memory each program is using.

You may be interested also in the order of these memory-resident programs because some programs can be uninstalled only if they are the last program loaded into memory. This dialog box shows you which programs are in memory as well as the order of the programs.

If you use the Norton Disk Monitor program (a TSR program), for example, and then want to uninstall the program, you can enter the following command:

```
DISKMON /UNINSTALL
```

This command takes the program out of memory only if it is the last TSR program in the list. Therefore, you need to uninstall these programs in reverse order. (See Chapter 6 for more information on Disk Monitor.) Two other Norton TSR programs that have an /UNINSTALL switch are Norton Cache and SmartCan.

You can uninstall most TSR programs (check each program's documentation). If you load a TSR program as a result of a command in your AUTOEXEC.BAT or CONFIG.SYS files, you also can remove that program from the batch file and then reboot.

Viewing the Device Drivers Dialog Box

Pressing Enter or choosing Next in the TSR Programs dialog box brings you to the Device Drivers dialog box (see fig. 18.13).

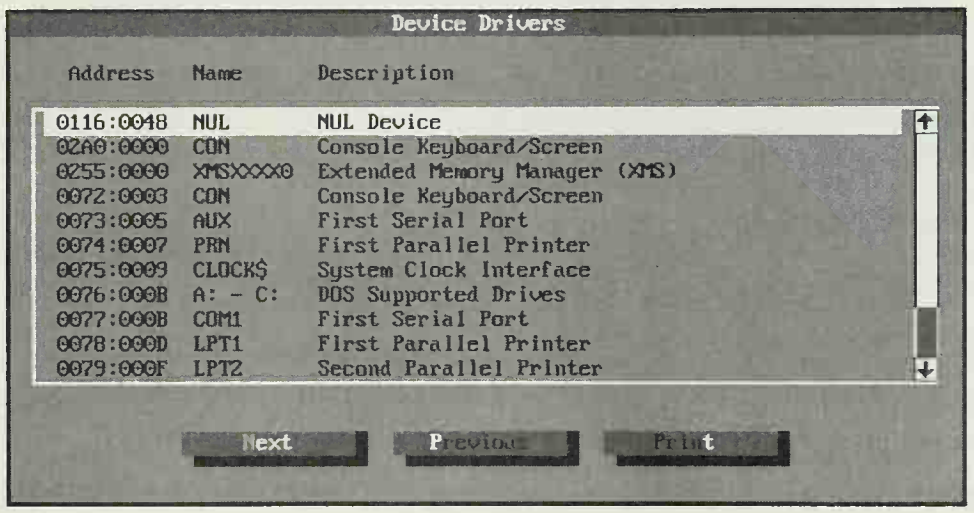

Fig. 18.13
The Device Drivers dialog box.

A *device driver* is a program that tells DOS how to interact with a specific hardware device, such as a disk drive, printer, plotter, or mouse. These programs are stored in memory and are accessed by DOS when DOS needs to "talk" to a specific device. Like the information on DOS memory blocks and TSRs discussed in the preceding sections, device driver information can be helpful if you are diagnosing memory problems related to DOS operation.

Viewing the CPU Speed Dialog Box

Pressing Enter or choosing Next in the Device Drivers dialog box brings you to the CPU Speed dialog box, which compares the speed of the current computer with the speeds of three other popular computers (see fig. 18.14).

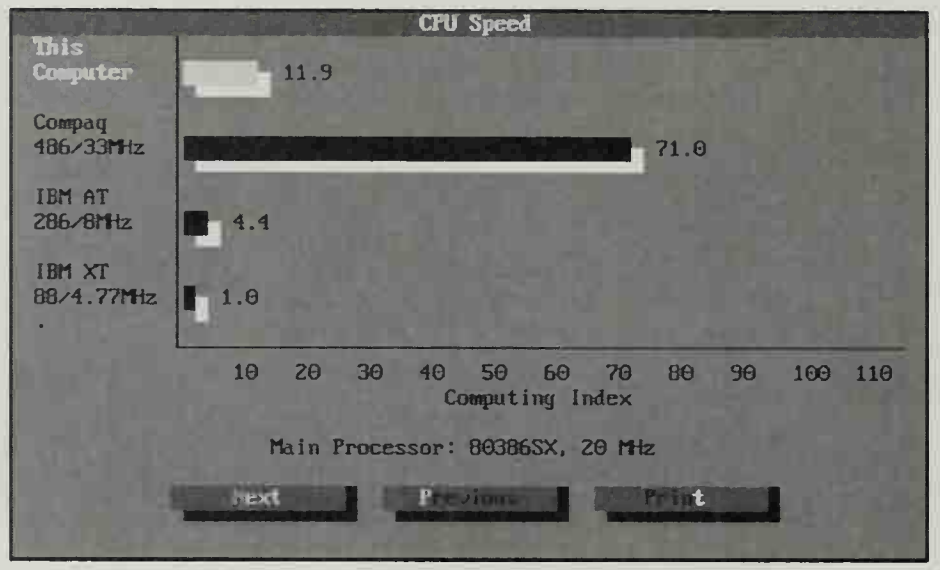

Fig. 18.14
The CPU Speed dialog box.

In this dialog box, the original IBM/XT, running at 4.77 MHz, is used as the base (1.0). A fast machine, the COMPAQ 486/33, is used as an example of a powerful computer. This computer is running about 11.9 times faster than an XT computer.

Keep in mind that this test may be somewhat misleading because the processing speed of a computer has much to do with the data you are processing. One computer may be better at processing numbers, for example, whereas another is more adept at processing text fields. But this dialog box and the following two dialog boxes are good benchmarks to use when you compare computer power.

Be aware that two computers using identical Intel processors at the same clock speed (for example, two 486/50 computers) could generate different reports in the CPU Speed, Disk Speed, and Overall Performance Index Speed dialog boxes. Speed capabilities depend on the architecture of the machine as well as the primary speed of the microprocessor. All cars with V-8 engines, for example, do not have the same acceleration because the engine is only part of the drive train; the transmission, differential, and other components also are factored into the power of the car.

When you shop for a computer, you may want to take a copy of System Info with you and run the utility on several computers to determine their relative speed. In fact, some computer stores will have System Info or a similar program available so that you can make this kind of comparison.

Viewing the Disk Speed Dialog Box

Pressing Enter or choosing Next in the CPU Speed dialog box brings you to the Disk Speed dialog box, which compares the speed of your hard disk with the speed of three other popular computers' hard disks (see fig. 18.15).

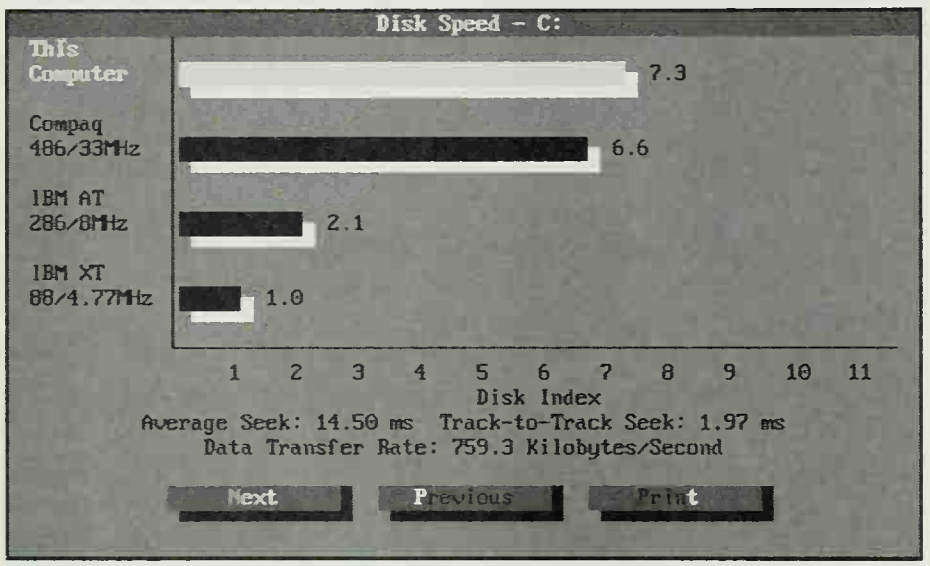

Fig. 18.15
The Disk Speed dialog box.

The hard disk of an IBM/XT computer is used as the base (1.0). The hard disk being compared can access information about 7.3 times as fast as the hard disk in the XT computer. Be aware, however, that hard disk access is affected by how much information is on the disk and whether the files on the disk are fragmented. Cache programs such as Norton Cache (see Chapter 21) and Calibrate (see Chapter 20) also can affect the efficiency of data access on your hard disk.

When you shop for a computer, the speed of the disk drive is an important consideration, particularly if you will be using programs that tend to read and write large amounts of information frequently from the disk (these programs include desktop publishers such as PageMaker). Some computer manufacturers advertise "power" machines with fast CPUs (such as 486/50s) but don't mention the fact that the hard drive is *slow*. If you use such a machine, you are likely to be disappointed in its overall power. That fact is a good reason to use this Disk Speed feature to compare hard drives before you buy.

Viewing the Overall Performance Index Dialog Box

Pressing Enter or choosing Next in the Disk Speed dialog box displays the Overall Performance Index dialog box. This index is a weighted combination of disk and CPU indexes that compares your computer's overall performance with that of three other popular computers (see fig. 18.16).

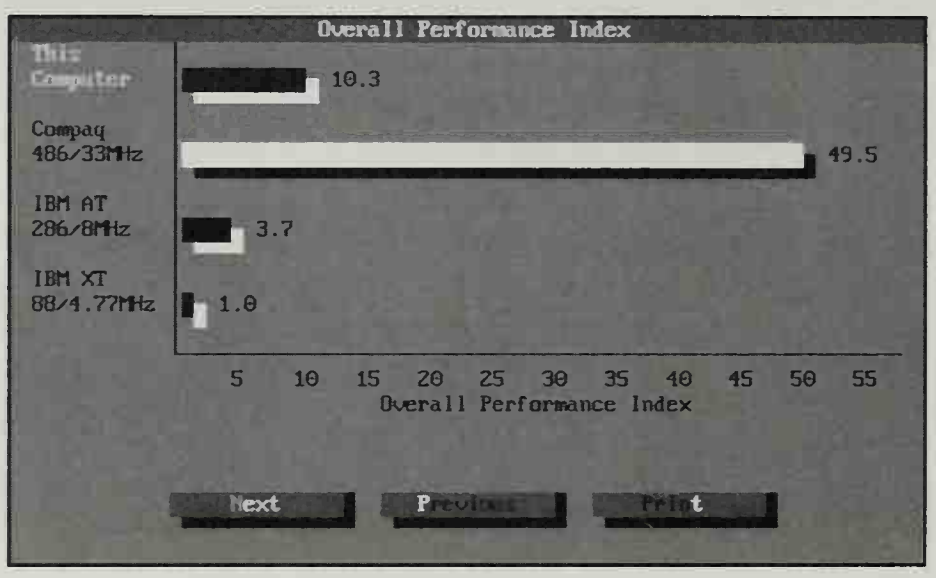

Fig. 18.16
The Overall Performance Index dialog box.

You should look at these indexes in the same way that you look at the miles-per-gallon figures reported for automobiles. The numbers are for comparison only; your actual "mileage" may vary. Like the CPU Speed and Disk Speed dialog boxes, however, this dialog box can be an extremely helpful tool when you compare one machine with another.

Viewing the Network Drive Benchmark Dialog Box

If you are connected to a network, you can view an additional dialog box. When you press Enter or choose Next in the Overall Performance Index dialog box, a dialog box that lists network drives appears, displaying the following prompt:

```
Select Network Drive
```

Use the up- and down-arrow keys to point to a drive name and then press Enter, or double-click the drive name.

To perform a benchmark test on a network drive, you must have read-and-write privileges for that drive. If you do not have those privileges, a warning message appears, telling you that the benchmark test cannot be run. If you have read-and-write privileges, however, you see a dialog box similar to the one shown in figure 18.17.

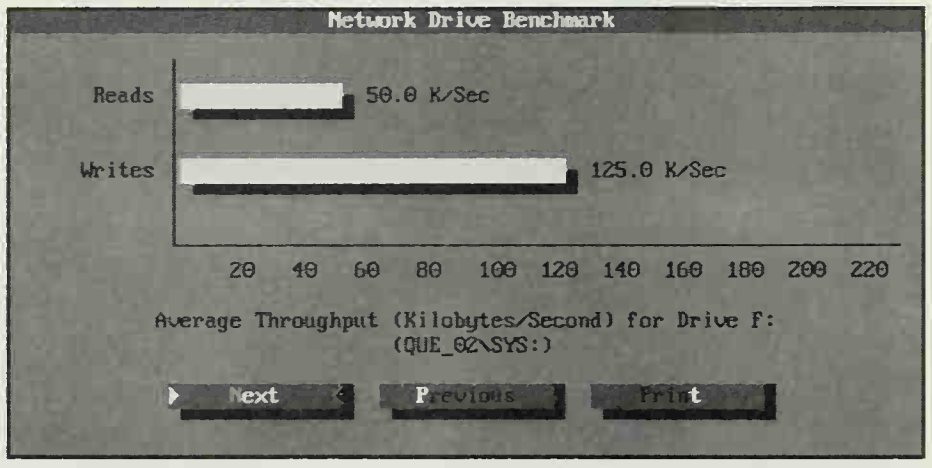

Fig. 18.17
The Network Drive Benchmark dialog box.

This dialog box graphically shows the average access times for this network drive. You may want to compare this dialog box with the Disk Speed dialog box (refer to fig. 18.15). Usually, network drives have slower access times than the access time of your computer's hard disk.

Viewing the CONFIG.SYS and AUTOEXEC.BAT Files

The next two dialog boxes in the System Info report describe your CONFIG.SYS and AUTOEXEC.BAT files (see figs. 18.18 and 18.19). You may want to look at the CONFIG.SYS file dialog box to see which device drivers you have installed; you can check the AUTOEXEC.BAT dialog box to see which TSR programs you begin at boot time.

Three other files may be displayed in the same way as the CONFIG.SYS and AUTOEXEC.BAT files. These three files—NDOS.INI, WIN.INI, and SYSTEM.INI—are displayed only if the programs that they support are loaded on your computer. The WIN.INI file, for example, will not exist on your computer unless you have a copy of Windows on your disk. The NDOS.INI file contains settings for the NDOS command processor. This file is explained in Chapter 28. The WIN.INI and SYSTEM.INI files contain settings for the Microsoft Windows program.

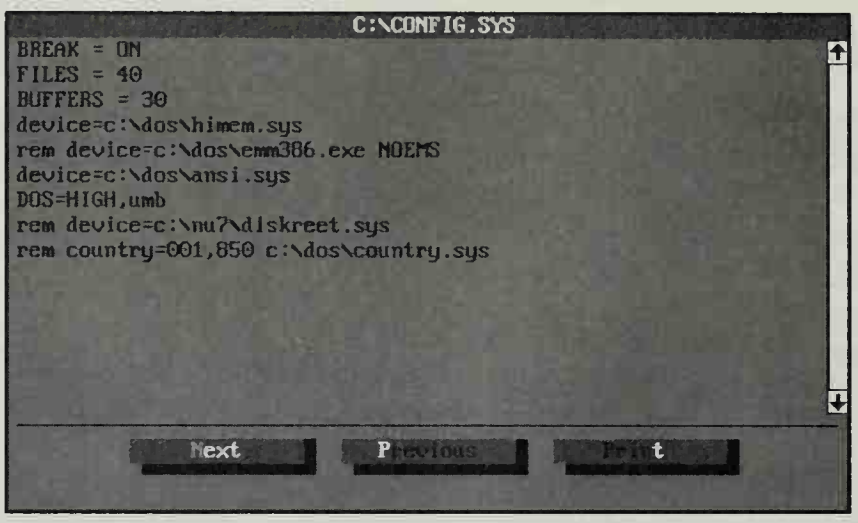

Fig. 18.18
The CONFIG.SYS dialog box.

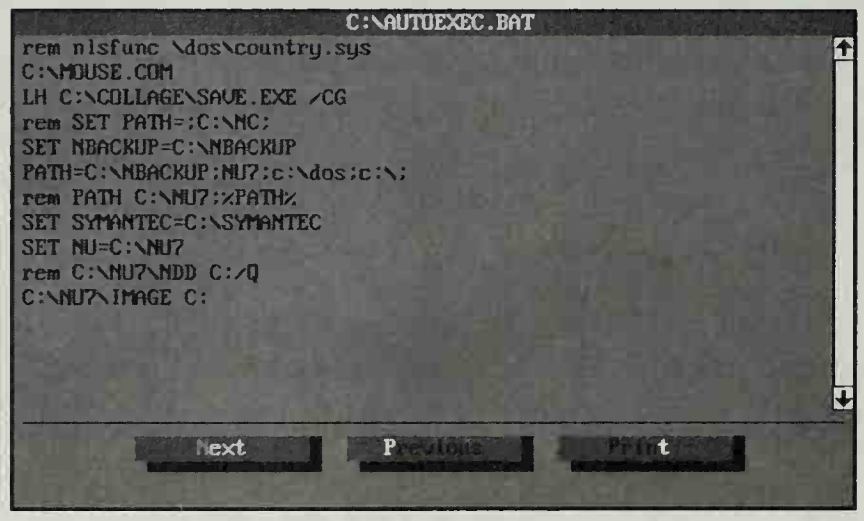

Fig. 18.19
The AUTOEXEC.BAT dialog box.

After you scroll through all the dialog boxes, System Info cycles back to the original System Summary dialog box. To end the System Info program at this point (or from any of the report dialog boxes), press Esc, choose Exit from the File menu, or double-click the control box.

If you want to review one or more of the System Info dialog boxes but do not want to scroll through many other dialog boxes to get to it, use the pull-down menu options to display any of the report dialog boxes, as described in the following section.

Using the Menu Bar and Printing Reports

You can view any of the dialog boxes described in this chapter by choosing the appropriate option from the menu bar at the top of the

System Information screen. The menus are **F**ile, **S**ystem, **D**isks, **M**emory, **B**enchmarks, and **H**elp. You can use the **F**ile menu to view and print reports.

To open these pull-down menus, press Alt (or F10) and the first letter of the menu name, or point to a menu and click. After you extend the menus, you can use the right- and left-arrow keys to move from menu to menu, and the up- and down-arrow keys to choose options in the menus.

Using the File Menu

From the **F**ile menu, you can choose one of the following options:

View **C**ONFIG.SYS

View **A**UTOEXEC.BAT

View **N**DOS.INI

View **W**IN.INI

View **S**YSTEM.INI

Print **R**eport

E**x**it

Each report dialog box contains a Prin**t** option to print a brief report about that item, but not an option to print the entire System Info report. The **F**ile menu has a Print **R**eport option that enables you to print such a report. When you choose Print **R**eport, the Report dialog box appears (see fig. 18.20).

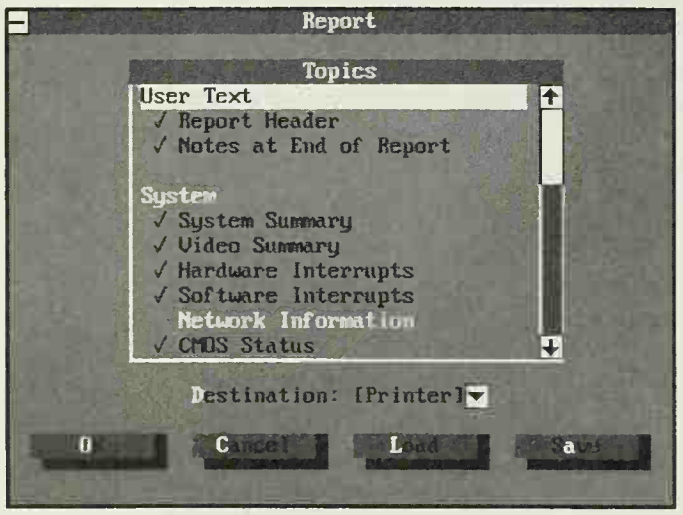

Fig. 18.20
The Report dialog box.

Notice that this dialog box contains a Topics list box. The items in the Topics list box correspond to the dialog boxes that were discussed earlier in this chapter. Each item is an independent part of the report. Therefore, you can select specific items that will be in your report. (You might want your report to contain the System Summary report, for example, but not interrupt information.) When an item is selected, a check mark appears to the left of the item name.

The first two items in the list, under the User Text heading, enable you to include your own information in the title (header) of the report and to add notes at the end of the report.

Following are the report items displayed in the Report dialog box:

- User Text
  - Report Header
  - Notes at End of Report
- System
  - System Summary
  - Video Summary
  - Hardware Interrupts
  - Software Interrupts
  - Network Information
  - CMOS Status
- Disk
  - Disk Summary
  - Disk Characteristics
  - Partition Tables
- Memory
  - Memory Usage Summary
  - EMS Usage Summary
  - XMS Usage Summary
  - DOS Memory Block Allocation
  - Installed TSR Programs
  - Device Driver List
- Benchmark
  - CPU Speed
  - Hard Disk Speed
  - Performance Index
  - Network Performance
- System Files
  - CONFIG.SYS File
  - AUTOEXEC.BAT File
  - NDOS.INI File
  - WIN.INI File
  - SYSTEM.INI File

Some of the items in the list may appear in parentheses or may appear grayed, indicating that the item is not available for the report. The Net-

work Information item, for example, will not be available if your computer is not part of a network.

When the report is created, only items selected in the Report dialog box will be included. By default, all available items are selected. A report on all items will be about 15 pages long. If you want to shorten this report, deselect the Hardware and Software Interrupts items.

The command buttons at the bottom of the Report dialog box are **O**K, **C**ancel, **L**oad, and S**a**ve. If you choose **O**K, the report uses all the selected report items. Choosing **C**ancel closes the Report dialog box and returns you to the dialog box in which you were working when you chose Print **R**eport from the **F**ile menu.

The **L**oad and S**a**ve buttons enable you to save the current selections in the Topics list box to a report-options file and then later load them back to produce a similar report. For example, you could create and save several different reports: a short report, a medium-sized report, and a comprehensive report.

To save a group of topics, first select the items in the Topics list box and then choose S**a**ve. You are prompted to enter the name of the file, as shown in figure 18.21. The report-options file is stored with an SIR extension.

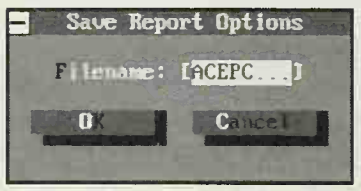

Fig. 18.21

Saving a Report Topics selection.

Later, when you choose the Print **R**eport option again, you can choose the **L**oad option in the Report dialog box. A list of previously saved report-options files appears (see fig. 18.22).

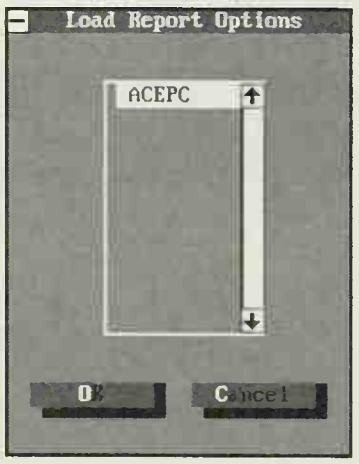

Fig. 18.22

Selecting a file from the Load Report Options dialog box.

Select the name of the report-options file you want to use. All the selections in the Topics list box will revert to the settings that were in effect when the report-options file was saved.

Below the Topics list box is a drop-down list box titled **D**estination (refer to fig. 18.20). In this box, you can choose to output the report to the printer or a file. The default setting is Printer. To change this setting, press PgDn to display the drop-down list and then choose either Printer or File. If you choose the File option, you are prompted to enter a file name for the report (see fig. 18.23). The default name is SIREPORT.TXT. You can use this name or enter your own file name.

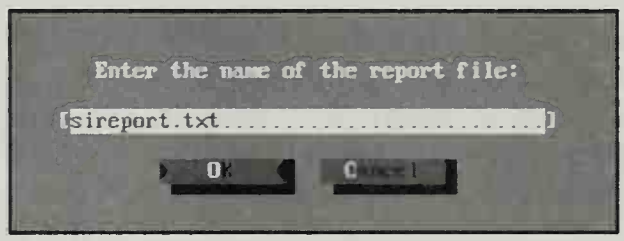

Fig. 18.23
Entering the destination file name for the System Info report.

If you chose the Report Header option in the Report dialog box, you then are prompted to enter a single line of information to appear in the title of the report (see fig. 18.24).

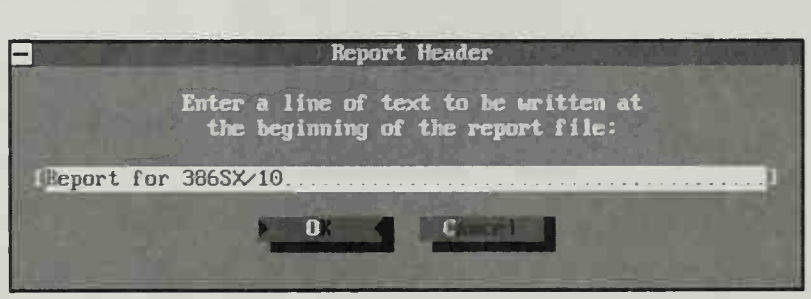

Fig. 18.24
Entering a report header for a System Info report.

If you chose the Notes at End of Report option in the Report dialog box, a User Notes dialog box appears (see fig. 18.25).

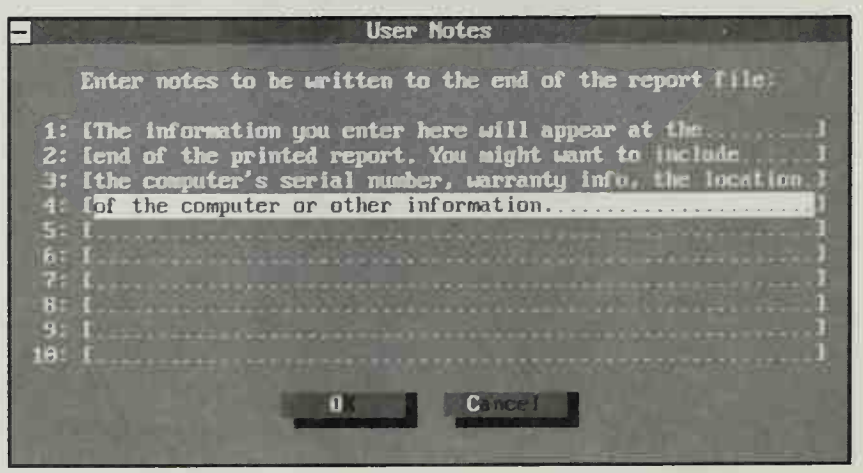

Fig. 18.25
Entering user notes to be placed at the end of the report.

The Notes at End of Report message can be up to 10 lines long. You may want the message to include information such as the serial number of the computer, warranty information, the physical location of the computer, and so on.

After you enter the Report Header and User Notes information, the report prints to your printer or is stored in a file, according to the destination you selected. A portion of the report, consisting of the System Summary and Video Summary options, is shown in figure 18.26.

```
                    System Information
                       System Report
                 Friday, March  5, 1993 5:11am
                       Report for 386SX/10

                     **********************
                     *   System Summary   *
                     **********************

    -------------------- Computer ---------------------
      Computer Name: IBM AT or compatible
      Built-in BIOS: AMI, Monday, April  9, 1990
     Main Processor: 80386SX, 10 MHz
  Math Co-Processor: None
      Video Adapter: VGA, Secondary: None
         Mouse Type: Serial Mouse, Version 6.24

      --------------------- Disks ---------------------
    Hard Disks: 122M
  Floppy Disks: 1.2M, 1.44M

      --------------------- Memory --------------------
        DOS Memory:    640K
    Extended Memory:  1,408K
    Expanded Memory:    0K

    --------------------- Other Info ---------------------
          Bus Type: ISA (PC/AT)
      Serial Ports: 3
     Parallel Ports: 1
      Keyboard Type: 101-Key
  Operating System: DOS 5.00



                     **********************
                     *   Video Summary    *
                     **********************

      --------------------- Display ---------------------
  Video Display Adapter: VGA, Secondary: None
          Monitor Type: Analog Color
     Current Video Mode: 3 (Color, 80x25)

      --------------------- Character ---------------------
      Maximum Scan Lines: 400
          Character Size: 9 x 16
    CGA Cursor Emulation: Enabled

      --------------------- Memory ---------------------
          Video Memory: 256K or more
  Video Segment Address: B800 (hex)
```

Fig. 18.26

A portion of the printed System Info report.

For purposes of comparison, upkeep, diagnostics, and support, you may want to run this type of report on each computer you use and then file the information for future use. These reports may be valuable if you ever need to rebuild a hard disk or recover from a virus attack.

Using Other Menu Options

The rest of the System Info menu options enable you to view individual report items. If you do not want to print an entire report, you can display one report dialog box and then print that information.

From the **S**ystem menu, you can choose one of the following dialog boxes to view:

System Summary

Video Summary

Hardware Interrupts

Software **I**nterrupts

Network Information (if available)

CMOS Status (if available)

From the **D**isks menu, you can choose one of the following dialog boxes to view:

Disk Summary

Disk **C**haracteristics

Partition Tables

From the **M**emory menu, you can choose one of these dialog boxes to view:

Memory **U**sage Summary

Expanded Memory (EMS)

E**x**tended Memory (XMS)

Memory **B**lock List

TSR Programs

Device Drivers

From the **B**enchmarks menu, you can choose one of the following dialog boxes to view:

CPU Speed

Hard Disk Speed

Overall Performance Index

Network Performance Speed (if available)

The Help menu enables you to access Norton's Help system (discussed in Chapter 1). When you are viewing a particular dialog box, you can press F1 for interactive Help information or choose the Help option to display information about the dialog box.

Exiting System Info

To exit the System Info program, press Esc, choose Exit from the File menu, or double-click the control box in the upper-left corner of the System Information screen.

Summary

This chapter covered the use of the Norton System Info utility. System Info produces a variety of reports about what components are used in your computer, how fast your computer operates, and what operating system and support software your computer uses. The Print Report option in this program enables you to print a detailed report about your computer. This report can be a helpful tool in diagnosing or correcting problems related to your computer's performance.

Chapters 19 through 21 discuss other Norton Utilities that can help you make your computer run more efficiently.

CHAPTER 19

Making Your Disk Run Faster with Speed Disk

After a great deal of use, your files on disk can become fragmented. Fragmentation occurs when the disk does not have enough space for storing the file in one contiguous area, so DOS stores part of a file in one cluster, part in the next available cluster (which may not be near the first cluster), and so on.

Because fragmentation causes DOS to look here and there to find a file, access to the hard disk can slow considerably. Excessive fragmentation can even cause DOS to lose information on some files, although data loss from fragmentation usually isn't a major problem.

Because slower data access caused by fragmentation is a common problem, Norton Utilities offers a solution—the Speed Disk utility. Speed Disk safely reorganizes the files on your disk without erasing or losing any data. If your disk drive grinds when it reads and saves a file, or if the drive seems to operate slowly, you may be able to regain speed with Speed Disk. Speed Disk optimizes a disk by rearranging the disk's files so that each file is stored in contiguous clusters. Instead of taking up to 30 seconds on a fragmented disk, for example, DOS can save a word processing file to an optimized disk in only 5 seconds.

Trimming the time needed to save files is not the Speed Disk command's only contribution. A number of programs, such as Aldus PageMaker and Ventura Publisher, access your disk many times as you use them. With a slow hard disk, the use of these programs can resemble a crawl. So when you use Speed Disk periodically, you can have some real productivity advantages.

Because your disk undergoes drastic reorganization, take the following precautions before executing the Speed Disk program:

- Run Disk Doctor to make sure that no current problems with your hard disk exist (see Chapter 12).
- Make sure that no memory-resident programs are running. (Use the System Info command, covered in Chapter 18, to check this out.) Some programs may access particular places on disk that the disk reorganization will move.

T I P If you have a complicated AUTOEXEC.BAT file that loads several programs into memory, you may want to boot from a floppy disk that contains only DOS and Speed Disk. This way, you ensure that no memory-resident programs are being used.

- Although SPEEDISK generally is safe, keep a backup of your hard disk before you do anything that significantly alters the disk.
- Get rid of unneeded files, such as backup (BAK) files. The more full your disk is, the greater the likelihood of disk fragmentation.

T I P To eliminate unneeded files, use the WipeInfo command in "non-wiping" or DOS ERASE mode across directories (use the /N switch). For example, to erase all BAK files on disk, use this command:

```
WIPEINFO C:\*.BAK /N/S
```

The /N switch tells the command to erase files just as DOS ERASE does. The /S command tells the command to search for all files (in all subdirectories) that match the *.BAK specification. Because your initial search is in the root directory, this command erases all *.BAK files on disk.

NOTE If your computer is attached to a network, you can use Speed Disk to optimize local disks on your own computer, but you cannot use Speed Disk to optimize a network drive. The program does not include network drives on the list of drives to optimize.

Starting Speed Disk

Although you can make a number of choices when you use Speed Disk, the easiest way to use the program is to allow it to make a recommendation about how to optimize your disk, and then follow that recommendation. The following sections tell you how to use Speed Disk, how to follow its recommendations, and how to choose options to optimize your disk.

To begin the Speed Disk program, you can choose it from the Norton main screen or enter **SPEEDISK** at the DOS prompt. When you begin Speed Disk, the program reads information from system memory. You then see the Speed Disk screen, displaying information like that in figure 19.1. The drives that appear on-screen may be different, depending on the drives you have available on your computer.

From the dialog box that is displayed, you can choose which disk to optimize. Highlight the drive name of the disk you want to optimize and choose OK, or point to the drive with the mouse and double-click.

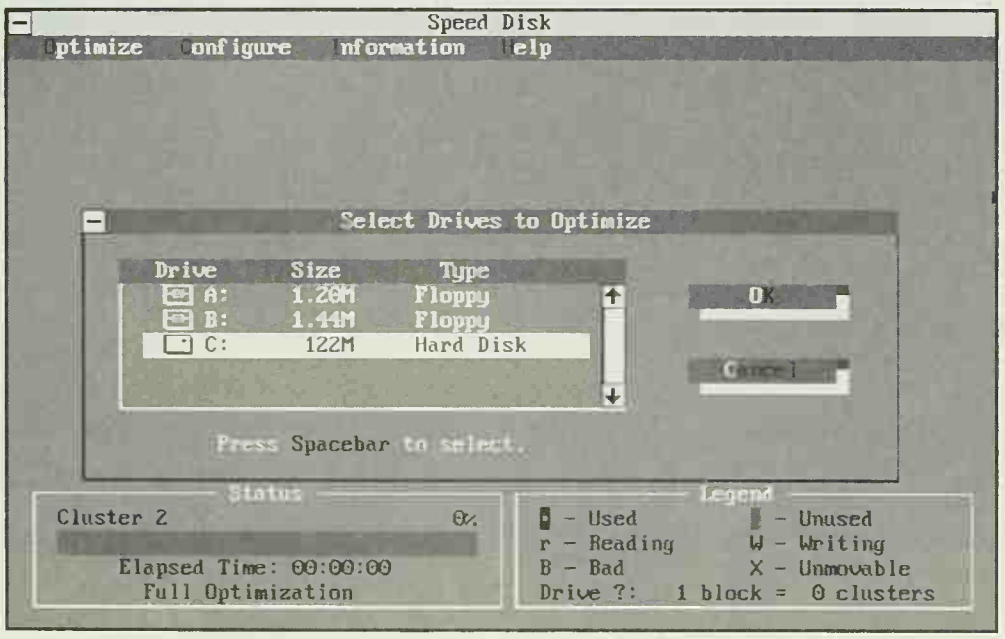

Fig. 19.1
The Select Drives to Optimize dialog box.

After you choose the drive to optimize, Speed Disk analyzes the information on the drive and produces a Recommendation dialog box (see fig. 19.2). This box contains a recommended course of action. In this example, the program recommends unfragmenting files only. To accept this recommendation, choose the **U**nfragment Files Only option and then choose **O**ptimize. To choose another optimization method, select the radio button for that method. The meanings of these methods are described in table 19.1. To cancel the optimization, choose **C**ancel.

Fig. 19.2
The Speed Disk Recommendation dialog box.

Table 19.1 Speed Disk Optimization Methods

Method	Action
Full Optimization	Optimizes your disk by unfragmenting all files but does not reorder your directories. Reorders files if you specified which files should go first. When finished, no holes in the directory structure exist.
Full with **D**irectories First	Moves directories to the front of the disk space, making their access faster; does everything the full optimization method does. Offers the best overall performance gain.
Full with File **R**eorder	Reorders files by directory; does everything the full optimization method does. Files associated with directories that are placed first are also placed first in the file list. This method takes the most time to run.

Method	Action
Unfragment Files Only	Attempts to unfragment as many files as possible without removing all the holes in the directory, as the full optimization method does. This sort is fast, and Norton recommends that you run it about twice a week.
Unfragment Free Space	Moves data forward on the disk to fill in any free space; does not unfragment any files. May not provide significant speed for old files, but provides space for new files to be stored as unfragmented files.

After you specify the optimization method, the optimization begins immediately. During this process, do not turn off your computer. If you need to stop the program, press Esc; then choose Cancel or Resume at the prompt.

During the optimization process, Speed Disk displays a map of the computer's disk space (see fig. 19.3). The legend in the lower-right corner of the screen explains what each symbol on the map means. During the process, you can watch the movement of used clusters to the top of the map and the movement of unused clusters to the bottom. For full optimization, all unused clusters are positioned at the bottom of the map.

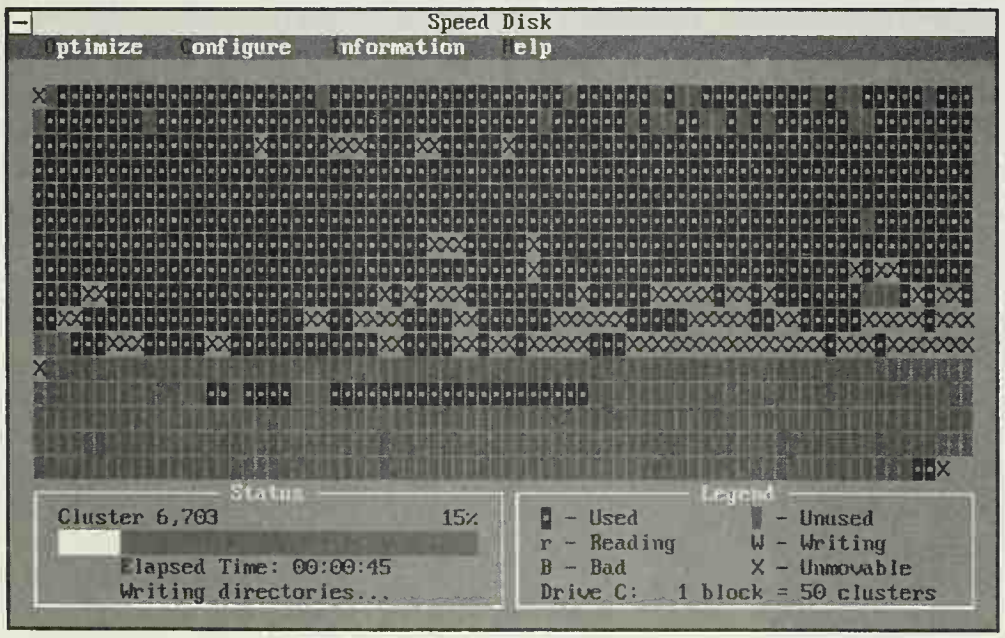

Fig. 19.3
Speed Disk in action.

T I P If you have never optimized your disk, it is likely that full optimization will be recommended the first time you use Speed Disk. This method is the most thorough and takes the longest time—maybe an hour, depending on your hard disk size. After you have fully optimized your disk, you may want to use the recommended approach on a weekly basis. Subsequent recommended optimization methods may be one of the faster approaches, which takes only a few minutes.

T I P If by some slight chance you lose power during an optimization, run Disk Doctor on your disk to check for and correct any disk problems as soon as you are able to bring your computer back up (see Chapter 12).

Using the Speed Disk Menus

In addition to choosing an optimization method from the Recommendation dialog box, you can make this choice and others from the Speed Disk pull-down menus. To display a pull-down menu, press Alt plus the highlighted character in the menu name, or just click the menu name. The pull-down menus enable you to specify Speed Disk options manually. The menu choices are **O**ptimize, **C**onfigure, and **I**nformation. The following sections describe the options available on each menu. The **H**elp option displays the Norton Help menu as described in Chapter 1.

Selecting Optimization Options

The Speed Disk **O**ptimize menu, shown in figure 19.4, contains a number of options that you can use to control the optimization process. Although the **B**egin Optimization option is first in the menu, you should set all options in the other menus to your choice before you choose **B**egin Optimization. (Notice that you can press Alt+B to begin optimization, even if you are not in this menu.)

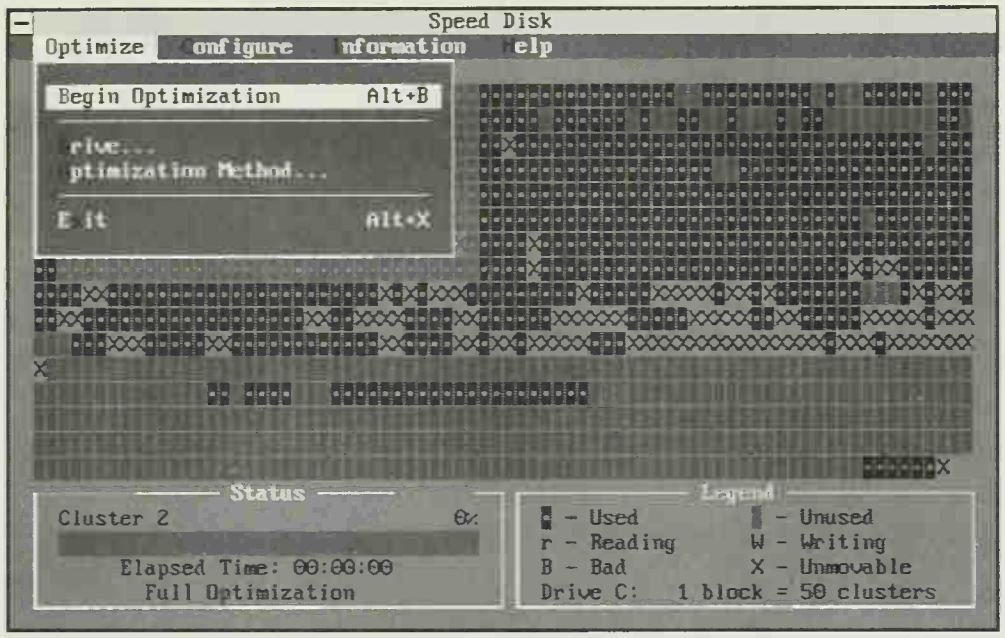

Fig. 19.4
The Speed Disk **O**ptimize menu.

You use the **D**rive option in the **O**ptimize menu to specify which drive to optimize.

The **O**ptimization Method option opens the Select Optimization Method dialog box from which you can choose the methods to use (see fig. 19.5). Use the up- and down-arrow keys to highlight the radio button of the method you want, and press the space bar to choose the option. You can also point to the button and click the mouse. Press Enter or choose **O**K to lock in the option; press Esc or choose **C**ancel to cancel this menu.

Fig. 19.5
The Select Optimization Method dialog box.

To leave the Speed Disk program, choose **E**xit.

Configuring the Speed Disk Program

The Configure menu enables you to choose options concerning how files and directories are ordered in the optimization process (see fig. 19.6). The following sections describe these options.

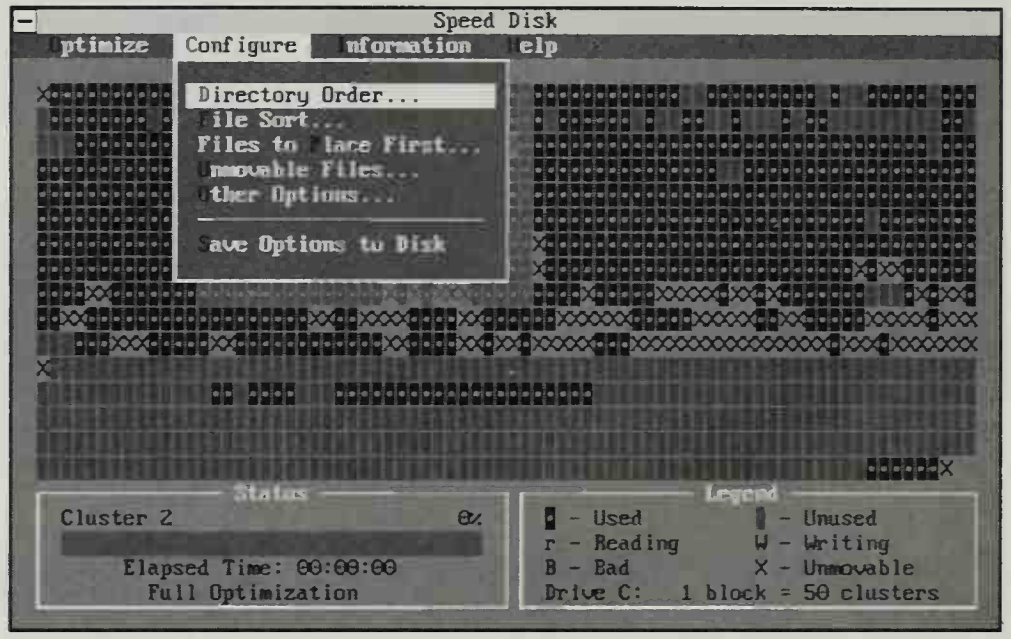

Fig. 19.6
The Speed Disk Configure menu.

Changing Directory Order

The Directory Order option accesses the Select Directory Order dialog box, which enables you to specify the order in which directories are placed on the disk (see fig. 19.7). The directories at the beginning of the disk have the fastest access time. By default, the order that Speed Disk uses is the order you specified in your PATH statement, which usually is found in your AUTOEXEC.BAT file.

The Directory List box displays all directories on the disk. The Directory Order list box contains the list of directories to be reordered on your disk during optimization. To specify a customized directory order, you can move the files already in the Directory Order list to new locations in the list, add new directories to the list, or delete directories from the list.

NOTE Changing the directory order in Speed Disk in no way affects the order of directories in your PATH statement or AUTOEXEC.BAT file.

Fig. 19.7
The Select Directory Order dialog box.

To move a directory name in the Directory Order list, follow these steps:

1. Highlight the directory name in the Directory Order list. Choose **M**ove, press the space bar, or double-click the directory name.
2. Press the up- or down-arrow key to move the directory name to its new place in the list; or highlight the directory name, press and hold down the left mouse button, and drag the directory to the new location. As you move the directory up or down in the list, the other listed directory names move to accommodate the selected directory. To anchor the directory name in the list, press Enter (or double-click again).
3. Repeat steps 1 and 2 until you have all the directories in the order you want.

To add a new name to the Directory Order list, you must copy the directory's name from the Directory List box. Follow these steps:

1. If the highlight is not in the Directory List box, press the Tab key to move it there.
2. In the Directory List box, use the up- and down-arrow keys to highlight the directory you want. Choose **A**dd to add the selected directory to the list in the Directory Order box.

   Alternatively, you can double-click the directory name in the Directory List box to add it to the Directory Order list.
3. Repeat step 2 to add all the directories you want to the Directory Order list.

T I P When choosing a directory name in the Directory List box, you can use the Speed Search field in the Select Directory Order dialog box to locate a directory name quickly. With the highlight in the Directory List box, type the first letter of the directory you want to highlight (for example, type **K** to search for the KWIKSTAT directory). If the highlighted directory is not the one you want, you can type the next letter of the name (**W**, for example). Continue typing letters of the name until the directory you want is highlighted. Usually, typing one or two letters is sufficient.

If you often change the files in a directory, you may not want this directory in the Directory Order box. To delete a directory from the Directory Order box, follow these steps:

1. Make sure that the highlight is in the Directory Order box. If necessary, press Tab to move the highlight.
2. Highlight the directory name you want to delete.
3. Choose **D**elete.
4. To delete additional directories, repeat this procedure.

NOTE These steps do not delete the directory from the disk.

NOTE You cannot delete directories when the highlight is in the Directory List box on the left. The **D**elete option is available only when the highlight is in the Directory Order box; **D**elete becomes **A**dd when the highlight is in the Directory List box.

After you finish your changes, choose **O**K. Choose **C**ancel if you decide not to change the directory order.

Specifying File Order

The Speed Disk **C**onfigure menu offers two options for specifying the order of files on the disk during reorganization. The **F**ile Sort option controls a general sorting of files into ascending or descending order by name, extension, date and time of last revision, or size. The Files To **P**lace First option moves selected files so that they precede all other files on the disk.

Because sorting files reorganizes file names, you can find the files quickly in a directory of names. When you create a file, DOS locates an empty spot in the disk directory and places the name and information about that file in the directory. Usually, files in the directory are listed in the order in which they were created. Sorting enables you to place these files in the order you want. This feature can help you find certain files faster and determine easily which file is smallest or largest, which files were created last or first, and so on.

With the **F**ile Sort option in the **C**onfigure menu, you can specify the way that files are sorted within directories. In the File Sort dialog box, you can set Sort Criterion and Sort Order (see fig. 19.8). The options from which you can choose are **U**nsorted, **N**ame, **E**xtension, Date and **T**ime, and **S**ize. You can also choose to make the sort **A**scending or **D**escending.

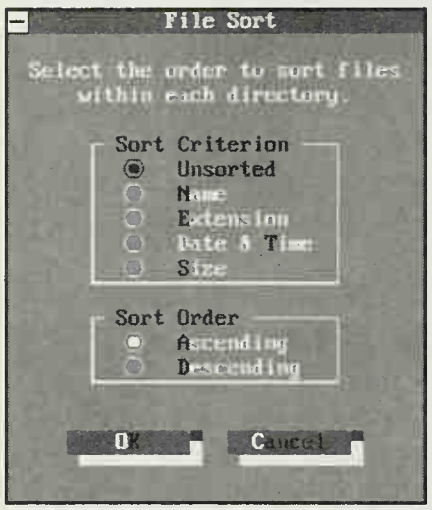

Fig. 19.8
The File Sort dialog box.

Because files placed at the beginning of the disk are accessed faster than those placed later on the disk, you may want to place your most commonly used files at the beginning of the disk. Usually, this includes program files—files with the EXE or COM extension. For this process, use the Files To **P**lace First option on the Speed Disk **C**onfigure menu. Choose this option to access the Files To Place First dialog box, where you can place the file specifications for those files that you want to place at the beginning of the disk during optimization (see fig. 19.9).

To add a new file to the end of the list, use the up- and down-arrow keys to move the highlight to a blank line and then enter a new file specification. You can use the wild-card characters ? and * in your file specification. To insert a new file in the list, move the cursor to a file specification and choose the **I**nsert option. **I**nsert adds a blank line above the highlighted file specification so that you can enter a new file specification.

Fig. 19.9
The Files To Place First dialog box.

To move a file specification, highlight the file specification and choose the **M**ove option. Then move the file specification up or down by using the arrow keys or dragging it with the mouse.

To delete a file from the list, highlight the file specification and choose **D**elete. Choose **O**K to exit this dialog box and save the changes you have made. Choose **C**ancel to exit the box without saving any of the changes you have made.

Specifying Unmovable Files

Unmovable files are not physically moved on disk during an optimization. Speed Disk analyzes your disk and marks all hidden files and files related to copy-protection schemes as unmovable. However, because the nature of protection schemes that may be created in the future cannot be predicted, Norton has allowed you to manually designate files to remain unmovable. If you have other files not recognized by Norton as needing to remain unmovable, you can choose **U**nmovable Files in the **C**onfigure menu and then specify the file names manually in the Unmovable Files dialog box (see fig. 19.10). Files used in copy-protection schemes are becoming more rare, but if you have a copy-protected program, you may want to specify any files used in the protection scheme as unmovable. If you have copy-protection files that have been moved, you may no longer be able to run the program associated with the copy-protection scheme. In that unlikely case, you may have to contact the program's owner for a disk that will put the protection back into place, or reload the program from its original disks.

Fig. 19.10
The Unmovable Files dialog box.

To add a new file to the list of unmovable files, press the down arrow to go to a blank line, and enter the new name. To delete a file from the list, highlight the file name and choose **D**elete. Choose **O**K to exit this dialog box and save the changes you have made. Choose **C**ancel to exit the dialog box without saving any of the changes you have made.

Selecting Other Options

If you choose **O**ther Options from the Speed Disk **C**onfigure menu, Speed Disk displays the Other Options dialog box, containing three check boxes (see fig. 19.11). The **R**ead-After-Write option causes Speed Disk to verify that information moved to different locations on the disk during optimization matches the original information. You can also choose the Clear **U**nused Space option. This option blanks out unused file space on disk so that old file information cannot be recovered from the disk. To protect your old data from discovery by others, use Clear **U**nused Space. The **B**eep When Done option causes a beep to sound when optimization is complete.

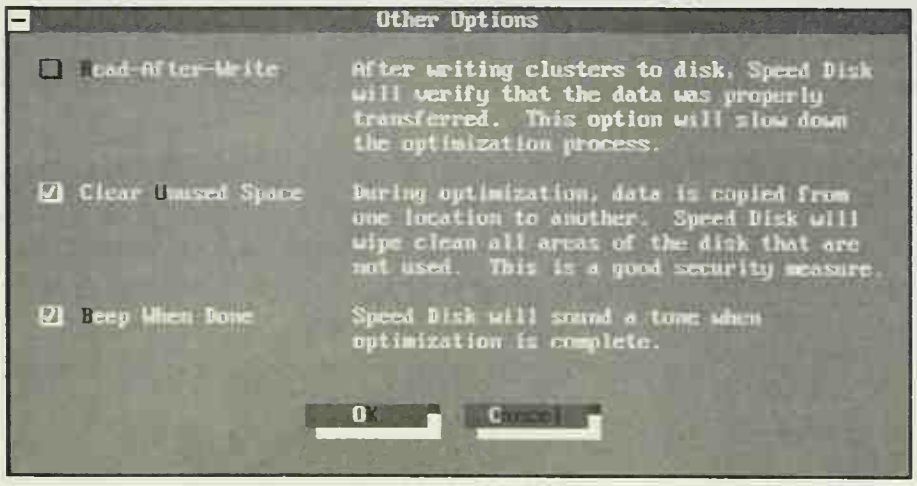

Fig. 19.11
The Other Options dialog box.

Saving Configuration Settings to Disk

After you make selections for the various **C**onfigure menu options, you can save the selections to disk by choosing **S**ave Options to Disk from the **C**onfigure menu. Then when you begin Speed Disk again, these options are in effect. If you don't choose **S**ave Options to Disk, the configuration changes you made for this optimization session apply only to the current session. Speed Disk returns to the default settings (or the last set of saved settings) for the next optimization session.

Obtaining Additional Information about the Disk

The **I**nformation menu enables you to look at a number of pieces of information that relate to the way your disk is optimized. The **I**nformation menu is shown in figure 19.12.

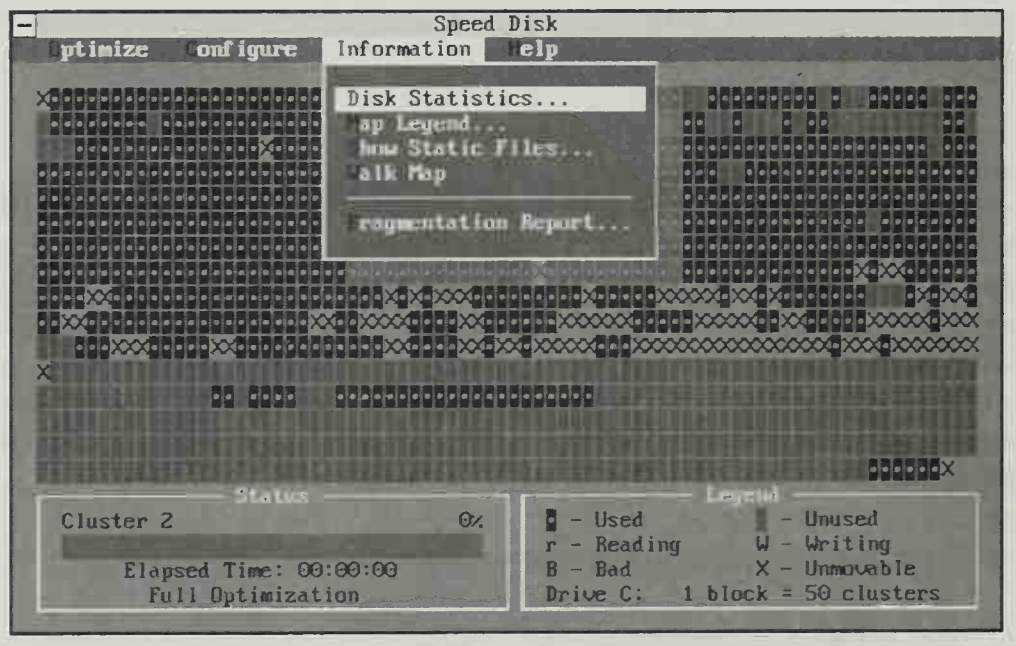

Fig. 19.12
The Speed Disk **I**nformation menu.

The **D**isk Statistics option gives you information about the disk to be optimized (see fig. 19.13). The most important information in the Disk Statistics dialog box is the Percentage of Unfragmented Files field. If this number is 95 percent or more, you have little fragmentation. If the number is about 90 percent, you probably should perform an optimization. If the number is under 90 percent, you need a full optimization.

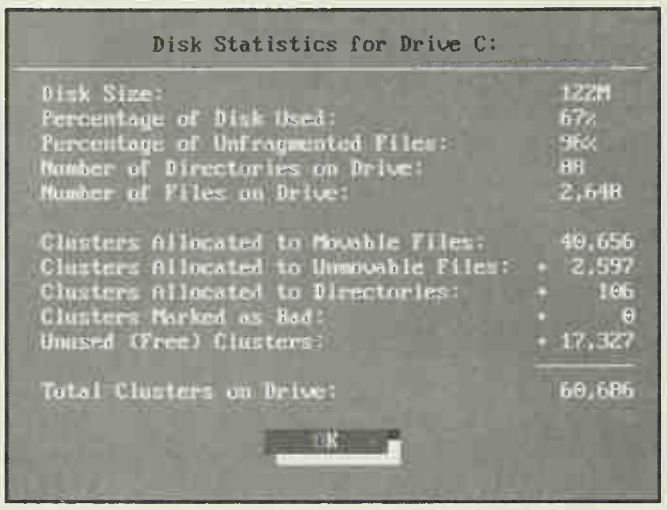

Fig. 19.13
The Disk Statistics dialog box.

The **M**ap Legend option gives you a key for the symbols used on the disk map that is in view during the optimization (see fig. 19.14). This legend provides a more detailed explanation of the symbols than the explanation that appears in the legend on the disk map.

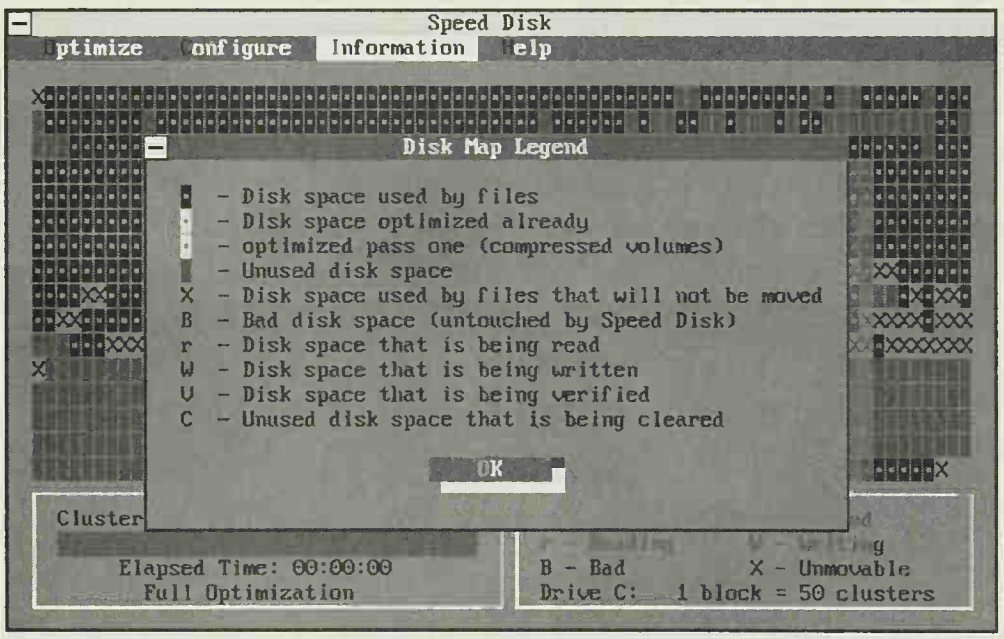

Fig. 19.14
The Disk Map Legend dialog box.

The **S**how Static Files option gives you a list of files that the program has determined should not be moved (see fig. 19.15).

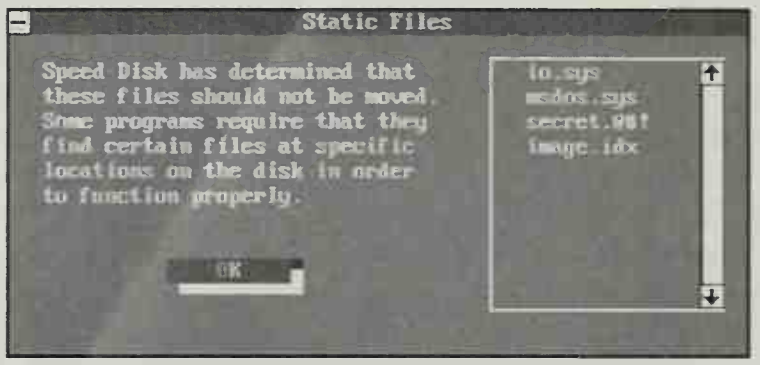

Fig. 19.15
The Static Files dialog box.

The **W**alk Map option displays the disk map and enables you to use the arrow keys to highlight blocks on the map. When you highlight a block, a cluster range is displayed. If you want to know where a bad block is located on disk, use the **W**alk Map option to determine the location of the bad cluster. You may want to examine this cluster by using Disk Editor (see Chapter 17).

With the **F**ragmentation Report option, you can examine the amount of fragmentation of individual files (see fig. 19.16). In this figure, the left side of the dialog box is a directory tree; the files for the directory highlighted in the directory tree appear on the right side of the dialog box. If the file listing shows files with dots in front of their names, those files are fragmented. The percent of fragmentation is listed in the % column. Files that have 100 percent listed are completely unfragmented. Any file with 90 percent or less is considered highly fragmented. The lower this number, the more fragmented the file is.

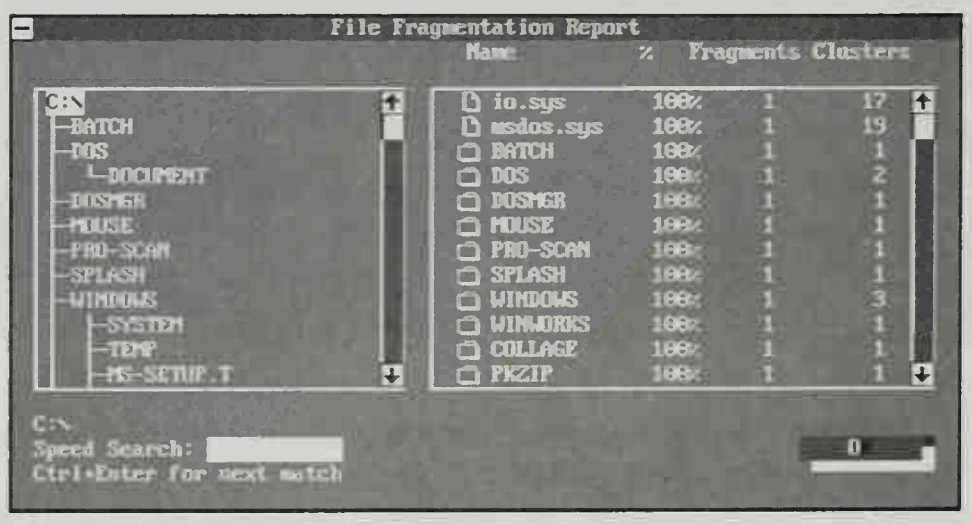

Fig. 19.16
The File Fragmentation Report dialog box.

Using Speed Disk Switches

The Speed Disk command reorganizes your disk so that fragmented files can be unfragmented. Files may be packed and rearranged to help your disk run at top speed. When entering this command at the DOS prompt, use this syntax:

SPEEDISK [*d:*] [*switches*]

You can use the following switches with the Speed Disk command:

Switch	Description
/B	Reboots after the command finishes.
/F	Performs a full optimization of the disk.
/FD	Performs a full optimization with directories first.
/FF	Performs a full optimization with a file reorder.
/Q	Unfragments free space and fills unused gaps (quick compression).
/SD[-]	Sorts files by date. If you include the minus parameter, the sort is from the most recent date to the oldest date.
/SE[-]	Sorts files by extension. If you include the minus parameter, the sort is in descending alphabetical order.
/SN[-]	Sorts by file name. If you include the minus parameter, the sort is in descending alphabetical order.
/SS[-]	Sorts by file size. If you include the minus parameter, the sort is from largest to smallest.
/U	Unfragments as many files as possible without moving parts of the directory structure. Some damaged files may not be capable of unfragmenting.
/V	Uses verify-after-write data verification. That is, whenever information is written to the disk, it is read from the disk to verify that it was correctly written.

For example, to optimize your hard disk C: with a full optimization and then reboot the computer after the optimization, use the following command:

SPEEDISK C: /F/B

NOTE You run Speed Disk in interactive mode by entering **SPEEDISK** with no switches. In interactive mode, you can choose the options from the Speed Disk menus. You can also choose which files not to move and which files to place first on the disk (nearest track 0).

Summary

In this chapter, you learned how to use the Speed Disk program to optimize your disks so that you can access files quickly. When the disk begins to fill, files can become fragmented, and your hard disk access time can slow considerably. If you use Speed Disk regularly, you can prevent file fragmentation and enhance your computer's productivity.

The Calibrate program can help some disks improve their access speeds. Turn to the next chapter for a discussion of Calibrate.

CHAPTER 20

Using Calibrate

The Calibrate program optimizes the speed and reliability of reading and writing information to and from your hard disk. In order for Calibrate to know how to optimize your hard disk, the program runs a series of tests to determine some of the disk's logical and physical characteristics. Calibrate is designed specifically for use on your hard disk. It is not intended to work on floppy disks, network disks, RAM disks, assigned disks (DOS ASSIGN command), or substitute disks (DOS SUBST command).

You use Calibrate for two reasons. First, you use it to check the interleave factor to see whether the disk is working efficiently. You need to test the disk only once. Second, if your hard disk gives intermittent errors when reading and writing files, you must run Calibrate to evaluate and solve the problem. Norton recommends that you run Calibrate every three months to test your hard disk for problems.

Understanding Calibrate

Calibrate can improve the speed at which data is read from your hard disk by adjusting the disk's interleave factor. The interleave factor has to do with the way DOS reads and writes information from your hard disk. Because the hard disk is spinning at a rapid speed, the read/write head cannot always get information off the disk in one long stream.

Often information is read and written from the disk in spurts of 512K (a sector). In reading information from the disk, the head may read one 512K sector on the disk, skip the next sector while the first sector of information is being sent to the computer, read the next sector, skip the next, read the next, and so on.

The number of sectors skipped between reads is called the *interleave factor*. In this example, the interleave factor is 2 (sometimes called 2:1). Each hard disk has an optimum interleave factor that makes reading information from the hard disk as fast as possible. Some hard disks, however, may have been formatted at a less-than-optimum interleave factor. If this is true for your hard disk, the Calibrate program can adjust the disk to make it work faster.

Calibrate adjusts the interleave factor by performing a low-level format. This kind of format does not destroy the data on your disk. It simply adjusts how the information is stored on disk and tests the reliability of information storage on the disk. A low-level format, unlike the normal high-level format (FORMAT command) of a hard disk, actually reads and writes information to every area of the disk to verify its capability to store magnetic information. A high-level format does not do this kind of thorough testing of the disk.

Calibrate cannot perform a low-level format on some hard disks, however, and cannot adjust the interleave factor on these disks. When you run the Calibrate program, it informs you if you have a hard disk that the program cannot adjust. Some of the disk types on which Calibrate cannot adjust the interleave factor include the following:

Drives with SCSI controllers or IDE-type controllers

Drives that are not 100-percent IBM compatible

Drives with controllers that perform a sector translation

Drives with on-board disk caching

Iomega Bernoulli Box drives

Novell file servers

Any hard disk with a sector size other than 512K

Even if you have one of these disk types, however, Calibrate can still perform some valuable tests for you. It can test each byte of your hard disk for reliability and move any data that is in danger to a reliable portion of the disk.

NOTE

Before you run Calibrate the first time, back up your hard disk. Although Calibrate is safe and reliable, you may run into problems on drives that are not 100-percent IBM compatible. After you run Calibrate on your computer and verify that your disks are compatible, you no longer need to back up each time you use the program.

Before you run Calibrate, you should also remove all TSR programs from memory and have only essential device drivers (in your CONFIG.SYS file) in use when you issue the Calibrate command. Many times, the easiest way to do this is to boot with your original DOS floppy disk in drive A.

Calibrating Your Hard Disk

You can run Calibrate by choosing it from the Norton main screen or by entering **CALIBRAT** at the DOS prompt. If you run Calibrate without any switches, you see an opening dialog box like the one in figure 20.1. The first Calibrate dialog box gives you a brief description of what Calibrate does. To continue with the calibration, choose **C**ontinue; choose **Q**uit to stop the calibration process.

Fig. 20.1
The Calibrate opening dialog box.

If you choose **C**ontinue and have more than one hard disk, Calibrate prompts you to choose which hard disk to analyze. If you have only one hard disk, you are not prompted; you go directly to the next dialog box. An additional message may appear, warning you to make sure that you have a backup copy of your hard disk before performing the Calibrate low-level format and tests. Again, choose **C**ontinue or **Q**uit.

The next dialog box that you see, shown in figure 20.2, lists the preliminary tests that Calibrate can perform on your hard disk. (On certain types of drives, such as RLL drives and MFM drives, this dialog box may list the Seek tests also.) These compatibility tests tell Calibrate what it needs to know about the logical and physical characteristics of your disk. Choose the Continue option from this dialog box to go to the next dialog box, or choose Cancel to stop the procedure.

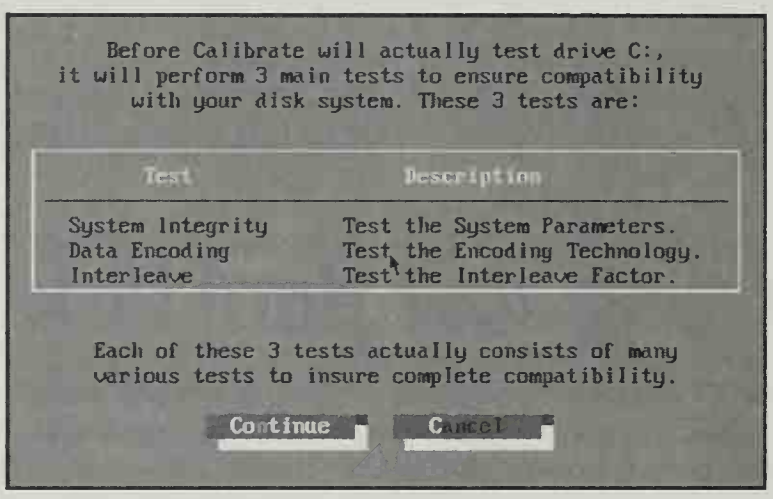

Fig. 20.2

The Calibrate compatibility tests.

System Integrity Tests

When you continue to the System Integrity Tests dialog box, the System Integrity tests begin (see fig. 20.3). While each test is in progress, a dot appears to the left of the test name. The Test Status progress bar lets you know how much of the test has been performed. When Calibrate finishes the test, a check mark appears beside the name. Choose the Stop option if you want to cancel a test in progress.

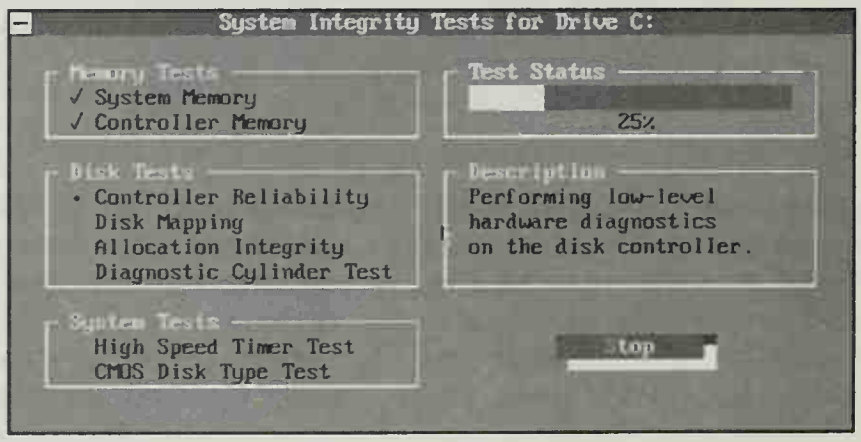

Fig. 20.3

The Calibrate System Integrity Tests dialog box.

As you continue with the calibration tests, you see the Seek Tests dialog box. The Seek tests examine how fast the read/write head on your hard disk can seek out information on the disk. While the tests are in progress, the movement of the head is animated on-screen, moving back and forth on the picture of the drive in the middle of the screen. The Value column gives you the time required to perform each of the tests (in milliseconds).

Seek performs the following four tests:

Test	Description
BIOS Seek Overhead	Tests the time spent getting ready to read information from the disk.
Track-to-Track	Tests how much time the head takes to move to the next track on disk.
Full Stroke	Measures how long the head takes to move from one track to another track on the other side of the disk.
Average Seek	Determines how long, on the average, the head takes to find and read information from the disk. The Average Seek is the number you most often see quoted in advertisements for hard disks. A fast disk has an average seek time of less than 20 ms. A slow hard disk has an average seek time from 60 ms to 80 ms. If you are using disk-intensive application programs on your computer, the average seek time can be a major factor in how efficiently your computer works.

When you run Calibrate from the DOS prompt, you can cause the program to skip the Seek tests if you use the /NOSEEK switch in the command.

Data Encoding Tests

The Data Encoding tests analyze the physical characteristics of the hard disk. The Calibrate program uses this information to do further testing. A technician who is examining a hard disk for problems may also need this information.

Interleave Test

If calibration is possible, Calibrate tests your hard disk by using a number of possible interleaves. This test takes several minutes, after which Calibrate indicates the current and the optimal settings (see fig. 20.4). If Calibrate indicates an optimal setting that varies from the current setting, the program also indicates an expected improvement in performance that you can gain by switching to the optimal setting. If you prefer, you can keep the current setting instead of using the optimal setting. Your disk works optimally at the interleave that is lowest on the graph. This interleave number is labeled `Optimal` on the graph. Your current interleave is also marked.

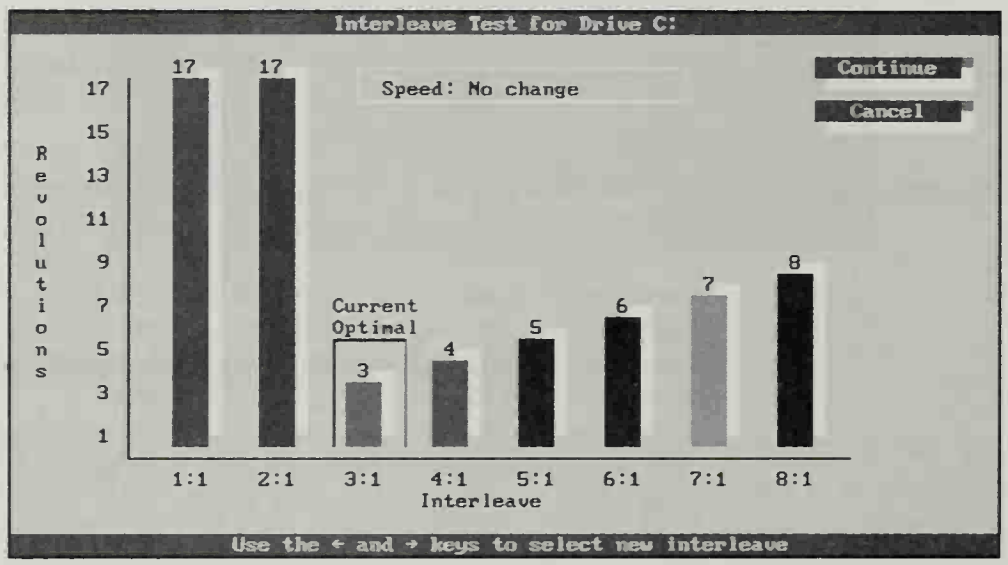

Fig. 20.4

A dialog box displaying the results of the Interleave test.

In figure 20.4, the box around the 3:1 bar indicates that the optimal interleave is 3:1, as determined during pattern testing. In this case, the current setting is the optimal setting. Note the message `Speed: No change` at the top of the dialog box. If Calibrate had found that adjusting the interleave to a new setting would help, this message would be something like `Speed: Increase by 16%`. This means that if the interleave is changed to the optimal setting, you increase the access speed to your hard disk by the stated amount (16%). If you do not want to reset your interleave to the setting indicated by the box, you can use the right- and left-arrow keys to move the box to another setting. Choose Continue to continue with the program or choose Cancel to end Calibrate.

If the Calibrate program is unable to perform the interleave tests, a dialog box like the one shown in figure 20.5 appears. This dialog box indicates that your hard disk controller contains an advanced translating controller (common on newer machines), and the Calibrate

program cannot adjust it. (Depending on the equipment you are calibrating, you may get a different version of this dialog box.) If you have a cache program installed, such as NCACHE2, you can temporarily remove it from AUTOEXEC.BAT or CONFIG.SYS and try running Calibrate again.

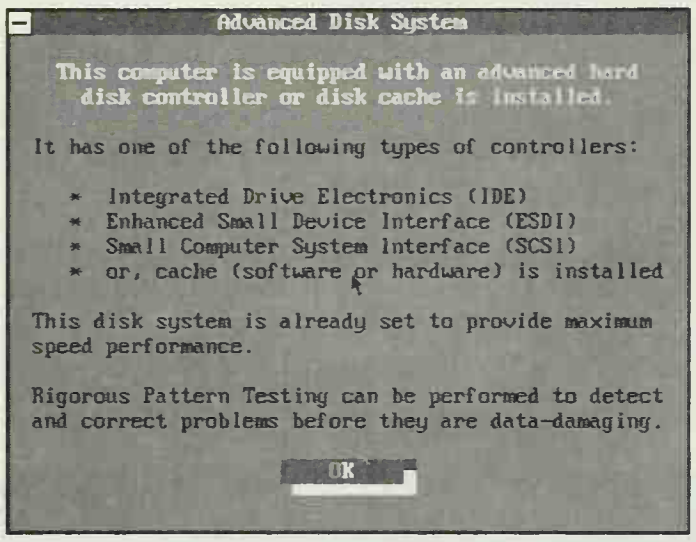

Fig. 20.5
A dialog box telling you that you have an advanced hard disk controller.

Pattern Testing

After interleave testing is complete, the Pattern Testing dialog box appears (see fig. 20.6). You use Calibrate pattern testing to test your hard disk for defects. You can choose the thoroughness of this test in the Pattern Testing dialog box. The options run from **N**o Pattern Testing to **R**igorous Pattern Testing. The higher the level of testing, the more time is required. The **N**o Pattern Testing option may take 5 to 10 minutes, and the **R**igorous Pattern Testing option may last overnight, depending on the size of your hard disk.

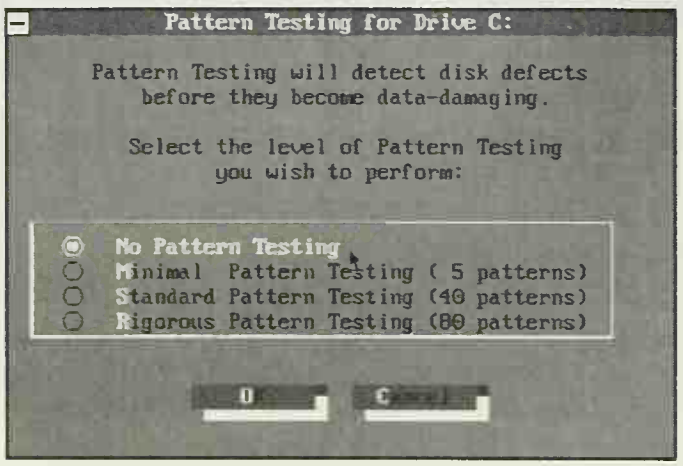

Fig. 20.6
The Pattern Testing dialog box.

You use pattern testing to test the disk for its read/write capabilities. A pattern of magnetic signals, such as 101010101, is written to the disk and then read back. Pattern testing uses the alternating 1 and 0 pattern, which is the most difficult pattern to read. If you did not receive a warning that Calibrate could not perform a low-level format, then pattern testing also performs a low-level format as it tests the disk.

Use the No Pattern Testing option if you indicate a new interleave factor in the Interleave test. This option is the quickest way to update your interleave factor. Use one of the other pattern-testing options if you have had some problems with your disk, such as the loss of information or files becoming unreadable.

When pattern testing begins, you see a disk map (similar to the Speed Disk map discussed in Chapter 19) that shows the progress of the test. You can safely interrupt the test by pressing Esc. If you stop the pattern testing/low-level format in the middle of its run, Calibrate takes up where it left off when you begin it again (see fig. 20.7).

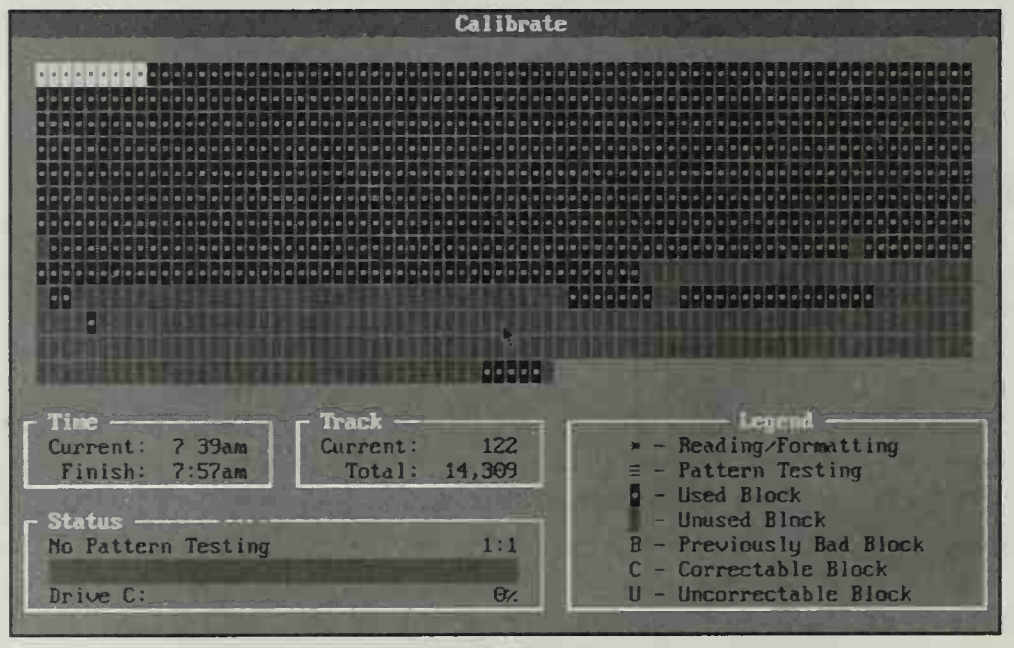

Fig. 20.7
The Calibrate program showing pattern testing in progress.

T I P Because pattern testing can take some time, Norton has a built-in, screen-blanking routine that enables you to blank your screen so that the image does not burn into the screen. During pattern testing, press the space bar to blank the screen. While the screen is blank, a floating message appears occasionally to tell you that the testing is still in progress. Press the space bar again to bring back the image.

Calibrate Report

After all the Calibrate tests are complete, you see a Test Summary message box like the one shown in figure 20.8. Choosing **O**K in this message box displays a report dialog box like the one in figure 20.9. This report summarizes the findings of all the Calibrate tests. Use the up- and down-arrow keys to view parts of the report not shown. It is a good idea to choose the **P**rint option in the report dialog box so that you can keep a folder of reports about your hard disk. Such reports may become important if a technician needs to diagnose problems with your disk in the future. Alternatively, you can choose the **S**ave As option to save the report to a file. Choosing **D**one returns you to the beginning of the Calibrate program, which displays an option dialog box that enables you to choose which disk to test. If you do not want to do further testing, press Esc to return to DOS or the Norton main screen.

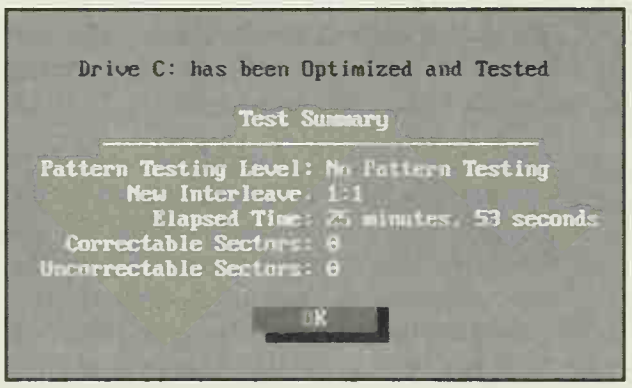

Fig. 20.8

The Test Summary message box.

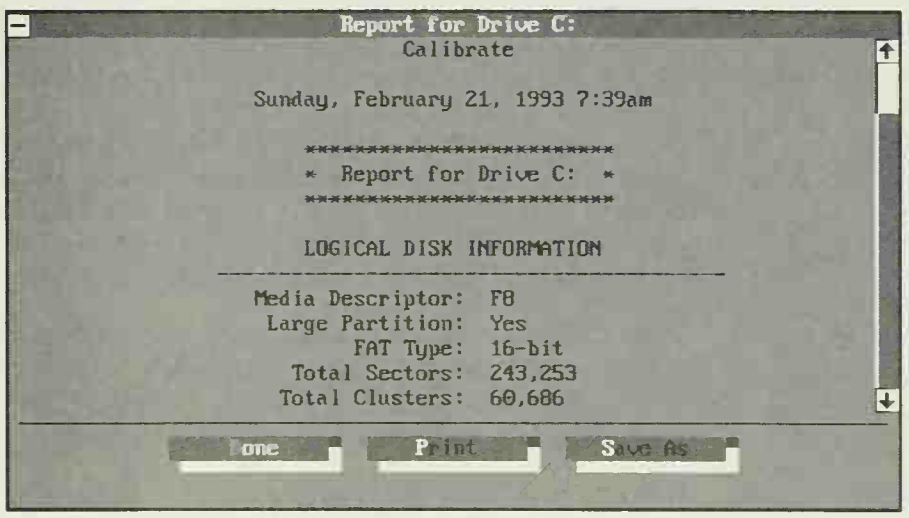

Fig. 20.9

The Calibrate Report dialog box.

Using the Calibrate Switches

You can use a number of switches when you run the CALIBRAT command from the DOS prompt. You use the following syntax:

CALIBRAT [*d:*] [*switches*]

Here are the available switches:

Switch	Description
/BATCH	Does not prompt for any input from the user; returns to DOS when finished. This switch automates the entire test procedure. If you use this option, you may also want to choose one of the /R options to create a report of the test findings.
/BLANK	Blanks the screen while performing the tests.
/NOCOPY	Does not make a duplicate copy of the track being tested. You might run this option to discover bad tracks before deciding to let Calibrate fix them.
/NOFORMAT	Performs pattern testing only and skips the low-level format. Use this option if you know Calibrate cannot perform a low-level format (or Interleave test) because you have an advanced controller. You can discover if you have such a controller by running the program interactively as described earlier in this chapter. If you get a message that the interleave testing cannot be done (refer to fig. 20.5), use this option from then on when you run the program from the DOS prompt. You should also use this option on any other computers you might have of the same brand and model.
/NOSEEK	Skips the Seek tests. Use this option when you do not want Calibrate to test the head-positioning mechanism of the disk. Usually, you need to use Calibrate once without this switch to test the seek-testing mechanism. Thereafter, use this switch.
/PATTERN:*n*	Tells Calibrate which testing level (*n*) to use during a pattern test. The parameter *n* can be 0, 5, 40, or 80. The higher the number, the more thorough the test, but the longer Calibrate takes to test the disk.
/R:*file*	Generates a report and writes it to the file name specified. You must also use the /BATCH switch when you use this option.

Switch	Description
/RA:*file*	Generates a report like that generated by /R:*file*, but appends information to the *file* instead of making a new file.
/X:*drives*	Excludes named drives from the test. For example, /X:DE excludes disks D and E from testing.

Summary

The Norton Calibrate program optimizes the speed and reliability of your hard disk. This chapter showed you how to run the Calibrate command interactively or from the DOS prompt. Calibrate is particularly useful for an older hard disk that may not have been set to its maximum interleave value. With Calibrate, you can set your hard disk to run at its optimum speed, and check the hard disk for flaws with the pattern testing option.

Now turn to Chapter 21 to learn how to use your computer's memory to make access to your disk faster and more efficient.

CHAPTER 21

Using Norton Cache

The flow of information from the disk into a computer program often creates an information bottleneck. Although you can access information in the computer's RAM almost instantaneously, getting information from a disk can be very slow by comparison. If you are using disk-intensive programs, slow disk access can bring your program speed down to a crawl.

A solution to slow disk access is for the computer to read more information from the disk than is needed and to place the extra information into RAM—anticipating that the next piece of information requested by the program will be in RAM and therefore accessed faster. The computer stores this information in a disk buffer, or *cache*.

This chapter provides a brief description of the Norton Cache (NCACHE2) program. This program does more than just create an information buffer. By using two features—IntelliWrites and SmartReads—NCACHE2 tries to guess which data you will read or write from the disk next in order to place in the cache the information you are most likely to need. NCACHE2 predicts future disk access by analyzing the pattern of past disk access. This program can improve the speed at which your hard disk operates and can even help prolong the life of the hard disk.

NOTE Advanced disk caching is beyond the scope of this book. For information on this subject, consult your *Norton Utilities 7 User's Guide*.

Understanding Disk Caching

Figure 21.1 shows how the information is read from the computer disk and stored in a buffer, called a *cache*, until the program requests the information. If your computer has 1M of memory, for example, and your software programs can access only 640K of that memory at one time, you have extra memory that you can use as a disk cache. The more extra memory you can use as a cache, the more potential speed you can experience in disk access.

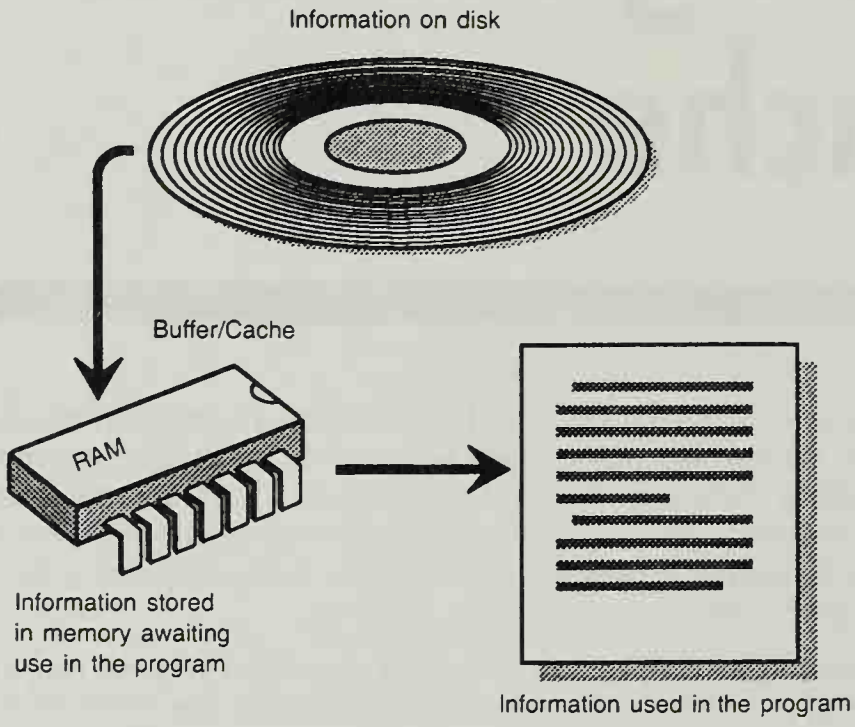

Fig. 21.1
How caching works.

Extra memory is any memory beyond what your programs normally need. This memory may be regular DOS memory, which goes up to 640K. If all your programs in memory (including DOS) use only 320K, you have extra memory that you can use as a cache. Other kinds of extra memory are extended and expanded memory. *Extended memory* is memory above 1M. *Expanded memory* is add-on memory that can be accessed by certain programs that subscribe to the *LIM standard*—a special way to use memory developed by Lotus, Intel, and Microsoft.

A disk cache can provide speed and extend battery life in laptop computers (because the laptop doesn't need to use the motor to access the hard disk as often); the disk cache can also give your programs an enormous boost in speed. Reading information from a floppy disk can take around 200 ms, whereas reading the same information from a hard disk may take from 18 ms to 80 ms. Getting information from RAM takes less than 1 ms.

Installing Norton Cache (NCACHE2)

You can use the Norton Cache program in one of two ways. You can include the program command as a line in your AUTOEXEC.BAT file, or you can include the program as a device driver in your CONFIG.SYS file. If you requested that NCACHE2 be installed when you ran the Norton Install program, NCACHE2 was installed as a device driver in the CONFIG.SYS file. The benefit of installing NCACHE2 in the AUTOEXEC.BAT file is that if you install it as the last terminate-and-stay-resident (TSR) program, you can uninstall it from memory if you need to use the memory to run a large program. The advantage of placing NCACHE2 in CONFIG.SYS is that the command will have compatibility with more computers.

To run NCACHE2, your computer must use DOS 3.0 or a later version, with 640K or more of conventional (RAM) memory and at least 384K of extended or expanded memory. NCACHE2 is also compatible with DR DOS 5.0 from Digital Research, and NCACHE2 supports more storage devices than many other cache programs, including removable drives, external drives, and CD-ROMs.

Using NCACHE2 Options

You can use the Configuration menu in the Norton main screen or the NUCONFIG command to install NCACHE2 in your AUTOEXEC.BAT or CONFIG.SYS file automatically (see Chapter 2 for details). To place the NCACHE2 program in AUTOEXEC.BAT manually, use the following syntax:

path\NCACHE2 [*switches*]

The *path* refers to the directory name where the NCACHE2 file is stored. To place the program in CONFIG.SYS, use this syntax:

DEVICE=*path*\NCACHE2 [*switches*]

Many optional switches are explained later in this chapter.

Either of these commands causes the disk cache to be in effect when you boot your computer. (Do not use both commands; use one or the other.) As with the AUTOEXEC.BAT file, you can enter the NCACHE2 command from the DOS prompt at any time to begin or end the NCACHE2 program, using the switches described later.

NOTE Usually, NCACHE2 loads automatically into high memory. You should not use a memory manager (such as QEMM) to load NCACHE2 high. If you are using DOS 5.0 (or later) and EMM386, load NCACHE2 from your AUTOEXEC.BAT file in order to load into high memory.

You can use NCACHE2 with most default conditions on many computers. You should have to refer to the switches only if you are having problems getting your cache to work correctly. Some ways in which you can use NCACHE2 are described in the following sections. The commands listed are what you place in your AUTOEXEC.BAT file, although you can achieve the same effect by typing **DEVICE=** in front of the command and placing it in your CONFIG.SYS file.

Specifying the Cache Size

The Norton Cache program enables you to specify how much random-access memory (RAM) in your computer is to be used as a buffer when the computer is reading information from disk. The larger the cache, the faster your disk access tends to be.

The following command, for example, is used on a Dell 486P/50 computer (80486):

```
\NU7\NCACHE2 /INSTALL
```

Because programs used on this computer never use more than 640K, NCACHE2 is set to use 2968K of the memory as a cache. The NCACHE2 program is in the NU7 directory.

The /INSTALL switch causes the NCACHE2 program to be installed using a default cache size that is equal to all available expanded memory plus all available extended memory. If you do not have any extended or expanded memory, the /INSTALL option causes 128K of memory to be allocated to the cache. After you enter this command, you see a screen like the one shown in figure 21.2. Notice that 2968K is assigned as cache memory.

```
Conventional memory:      0K cache     37K management    513K free
High DOS memory:          0K cache      0K management      0K free
Expanded (EMS) memory:    0K cache      0K management      0K free
Extended (XMS) memory:  2968K cache     0K management     40K free

   Total cache size is 2968.0K - Currently using 0.0K   (0.0%)

          The following drives are being cached: C:
```

Fig. 21.2
Installing NCACHE2 with defaults.

You can use the /DOS, /EXT, and /EXP options to allocate some other amount of conventional (/DOS), extended (/EXT), or expanded (/EXP) memory for cache. Suppose that you want to create a small cache of 20K conventional memory. You use the following command:

```
\NORTON\NCACHE2 /DOS=20
```

The examples in this section illustrate typical ways of using the NCACHE2 program. If you use one of these versions of the command, replace /DOS =20 with the amount of extra DOS memory you are willing to use as a cache. The most common command options you may want to use are the /+S and /+I options. The /+S option enables SmartReads; /+I enables IntelliWrites. These options can provide additional speed for some applications such as word processing and spreadsheet programs, but the options may not provide additional speed for database programs. You may have to experiment with these options to determine which combination gives you the best disk access for the type of application programs you run.

Another option that you may use is /USEHIGH=ON. If you are using an advanced memory manager such as QEMM or 386MAX on your computer, this option enables NCACHE2 to use less of your initial 640K DOS memory and may provide more memory for use in your application programs. If you need further options to make the program fast enough for your needs, refer to the additional parameters described in the following section.

Choosing Command Switches

As described earlier, you place the Norton Cache program in your AUTOEXEC.BAT file by using the following syntax:

```
\path\NCACHE2 [switch]
```

The *path* refers to the directory name where the NCACHE2 file is stored. To place the Norton Cache program in your CONFIG.SYS file, you can use this syntax:

```
DEVICE=\path\NCACHE2 [switches]
```

Many switches are available to specify how the NCACHE2 program creates and uses a disk buffer. The first group of switches contains the drive switches. They are used to control and fine-tune the cache for each drive. Notice that some of these switches are preceded by a plus (+) or minus (–), which tells the program to activate or deactivate the option. To use one of these drive switches for a particular drive, precede the switch with the drive designation. For example, to deactivate

caching for drive D, use the switch D:/–A. Here are the drive switches that may be used with NCACHE2:

Drive Switch	Description
/+|–A	Activates or deactivates caching. Use this switch if you need to deactivate caching in order to run a program in which you do not want caching to be used.
/+|–C	Enables or disables caching of additional information. No new information is cached when this switch is disabled.
/+|–I	Enables or disables IntelliWrites. When on, this switch accelerates disk writes and returns control to the application before the write is finished.
/+|–P	Enables or disables write protection for drives.
/+|–S	Enables or disables SmartReads.
/+|–W	Enables or disables write-through caching. When write-through caching is disabled, writes are written directly to the disk, bypassing the cache.

Another group of switches contains the install switches. You use these switches when you are installing the NCACHE2 program. Here are the install switches that are available:

Install Switch	Description
/BLOCK=*n*	Sets the size of the cache blocks. The *n* is a number in kilobytes. Use large blocks if you are accessing large files and your disk is unfragmented. Use smaller blocks if you access small files or if your disk is fragmented.
/DOS=*n* or /DOS=–*n*	Specifies how much DOS (conventional) memory is to be used by the cache. Use this switch only when you do not have expanded or extended memory. A negative value tells the command to leave that much memory free for other programs to use.
/EXP=*n* or /EXP=–*n*	Specifies how much expanded memory (in kilobytes) is to be used by the cache. A negative value tells the command to leave that much memory free for other programs to use. /EXP=750, for example, tells the command to use 750K of expanded memory for the disk cache. Any expanded memory used must be compatible with LIM 4.0.

Install Switch	Description
/EXT=*n* or /EXT=–*n*	Specifies how much extended memory (in kilobytes) is to be used by the cache. A negative value tells the command to leave that much free memory for use by other programs. /EXT=256, for example, tells the command to use 256K of extended memory for the cache.
/G=*n*	Limits the caching of group sector reads for the specified drive(s).
/INI=*filespec*	Indicates where to look for the file that contains installation options. If, for example, your installation options are in your NORTON directory in a file named NCACHE.INI, you use the parameter /INI=\NORTON\NCACHE.INI.
/INSTALL	Installs Norton Cache with all default values, including the use of all available expanded and extended memory for the cache. This switch is often the easiest and quickest way to execute the command.
/OPTIMIZE=[S|E|M]	Optimizes for speed, efficiency, or memory. The S (Speed) option sets the following parameters: /BLOCK=8K /DELAY=1.0 /READ=8K /WRITE=*x* (*x* is the largest track, in kilobytes, of all tracks being cached) The E (Efficiency) option sets the following parameters: /BLOCK=*s* (*s* is the smallest block size for the current cache size, usually 512K to 1M) /DELAY=1.0 /READ=8K /WRITE=8K The M (Memory) option sets the following parameters: /BLOCK=8K /DELAY=0.0 /READ=0 (disables the read-ahead feature) /WRITE=0 (disables IntelliWrites)

continues

Install Switch	Description
/R=D*n*	Specifies how many sectors ahead should be read. A specification of /R=0 or /R=D0 disables read-aheads. /R=*n* causes read-aheads always, and /R=D*n* causes read-aheads only when the file being read is not a random file. For *n*, you can specify a number of sectors from 0 to 15.
/READ=*n*	Sets the maximum size (in kilobytes) for read-aheads. For *n*, use a whole number from 8 to 64.
/USEHMA=ON|OFF	Uses the XMS high memory area to reduce the use of DOS RAM (if set to ON). This option is available only if you have an extended memory manager.
/USEHIGH=ON|OFF	Minimizes the use of conventional (low) DOS memory if high memory is available (if set to ON). The default setting is OFF.
/WRITE=*n*	Sets maximum size (in kilobytes) for the IntelliWrites buffer. For *n*, use a whole number from 8 to 64.

A third group of switches contains the reconfigure switches. You use them to change something about the program after it has been installed. Here are the reconfigure switches:

Reconfigure Switch	Description
/DELAY=*ss.hh*	Delays writes to the disk in seconds or hundredths of a second (00.01 is one hundredth of a second). The default is 00.00. Slight writing delays can improve the speed of write-intensive programs.
/DISKRESET=ON|OFF	Specifies that all data be written to disk when an application makes a disk reset request.
/DUMP	Writes all information currently in the cache to disk.
/Help or /?	Displays a list of the command-line switches to the screen.
/MULTI ON|OFF	Specifies whether the multitasking feature of IntelliWrites should be enabled (ON) or disabled (OFF).
/QUIET	Specifies quiet mode. Only errors are reported.

Reconfigure Switch	Description
/QUICK=ON|OFF	Displays the DOS prompt even when information is being written to disk (ON), or waits until all writes to the disk have finished before displaying the DOS prompt (OFF).
/REPORT=ON|OFF	Displays status and performance information (ON) or does not display such information (OFF). An example of this report appears in figure 21.3.
/RESET	Resets the cache by writing all pending disk writes, flushing all data from all drives.
/SAVE	Saves current cache settings in the file specified by the /INI switch (or NCACHE.INI).
/STATUS=ON|OFF	Displays a condensed version of the cache report. If the OFF switch is used, the report is not displayed at install time.
/UNINSTALL	Removes the NCACHE2 (TSR) program from memory and discontinues caching. You can uninstall only if the program was loaded from the AUTOEXEC.BAT file (not from the CONFIG.SYS file).

```
   Conventional memory:        0K cache      37K management    513K free
   High DOS memory:            0K cache       0K management      0K free
   Expanded (EMS) memory:      0K cache       0K management      0K free
   Extended (XMS) memory:   2968K cache       0K management     40K free

      Total cache size is 2968.0K - Currently using 159.0K   (5.3%)

DOS = 0K                    BLOCK = 8192     USEHIGH  = ON       DELAY = 1.00
EXP = 0K, 0K                READ  = 8K       USEHMA   = ON       QUICK = ON
EXT = 2968K, 1480K          WRITE = 8K       OPTIMIZE = SPEED    MULTI = OFF

      A   C   I   W   P      R      G      Cache Hits / Disk Reads
A:    -   +   -   +   -     D8     128            0 / 0          (0.0%)
B:    -   +   -   +   -     D8     128            0 / 0          (0.0%)
C:    +   +   +   +   -     D8     128          105 / 328        (32.0%)
```

Fig. 21.3

An NCACHE2 status and performance report.

NOTE If your computer is using the Microsoft SmartDrive cache, you must remove it from your AUTOEXEC.BAT file or CONFIG.SYS file before using the NCACHE2 program.

When you install NCACHE2, you must specify a cache size. If you do not specify a size, the default conditions are /EXT=4096, 2048K.

To install the cache using default conditions, enter the following command:

```
NCACHE2 /INSTALL
```

To install this program using all but 64K of extended memory and using read-ahead of 32K only for disk C, enter the following command:

```
NCACHE2 /EXT=-64 /READ=32K /-A C:/+A
```

Note that /-A deactivates caching for all drives, and then C:/+A activates caching for drive C. Thus, only disk C is cached.

Using Batch Files To Simplify NCACHE2 Options

Because NCACHE2 contains so many options, you may want to create a few batch files to issue versions of the command that you use most often. To make the uninstall procedure easier, you can place the following line in a batch file called UNI.BAT:

```
NCACHE2 /UNINSTALL
```

Suppose that you want to deactivate NCACHE2 during the use of a program. You can place the following command in a batch file called DEACTIVE.BAT:

```
NCACHE2 /-A
```

Then, to reactivate the command, you can have a batch file called ACTIVE.BAT containing this command:

```
NCACHE2 /+A
```

If you use a complicated NCACHE2 command from the DOS prompt, you can place the following command line in a file called CACHE.BAT:

```
NCACHE2 /USEHIGH=ON /EXT=920 /+S /+I
```

Then you just enter **CACHE** to begin the NCACHE2 program. Assigning these batch file names to such tasks makes working with long commands that have difficult-to-remember options much easier.

Summary

This chapter explored the Norton Utilities NCACHE2 command. The NCACHE2 program helps make your disk access more efficient and speeds up disk access as well as the operation of many programs. You can run NCACHE2 on computers that use MS-DOS or PC DOS 3.0 (or later) or that use DR DOS 5.0 (or later).

The next chapter begins a tour of the Norton Utilities programs for managing computer resources.

PART

VI

Managing Your Computer's Resources

OUTLINE

Using Norton Control Center

Using Norton Change Directory

Creating and Using Batch Files

Finding Files

Using Norton Command-Line Utilities

Using Norton Diagnostics

22

CHAPTER

Using Norton Control Center

So far, this book has concentrated on issues of safety and maintenance. Part VI introduces various Norton Utilities commands that make using your computer easier and more fun.

The Norton commands covered in Part VI include Norton Control Center (NCC), Norton Change Directory (NCD), Batch Enhancer (BE), commands for finding files, Norton command-line utilities, and Norton Diagnostics. These commands enable you to navigate around your computer faster and with fewer keystrokes than you can with DOS commands. You can use the NCC command to modify some of your computer's environment settings (such as colors, cursor size, and keyboard rate) and to create better batch files, search files by name or by contents, duplicate disks, manage a file's date and time, and perform a series of diagnostic tests on your computer. This chapter shows you how to use Norton Control Center.

With Norton Control Center (NCC), you can change several settings on your computer, including the size of your cursor, your monitor's colors, the number of lines displayed, and the date and time. The Time Mark (TM) command that you may have used in Norton Utilities 4.5 is now part of the NCC command for Versions 5, 6, and 7.

You can use Norton Control Center interactively or from the DOS prompt. This chapter first describes interactive mode and then the options available from the DOS prompt.

Using Norton Control Center in Interactive Mode

If you run the NCC command at the DOS prompt or from the main Norton menu with no quick switches, you enter interactive mode, and the Norton Control Center screen appears (see fig. 22.1).

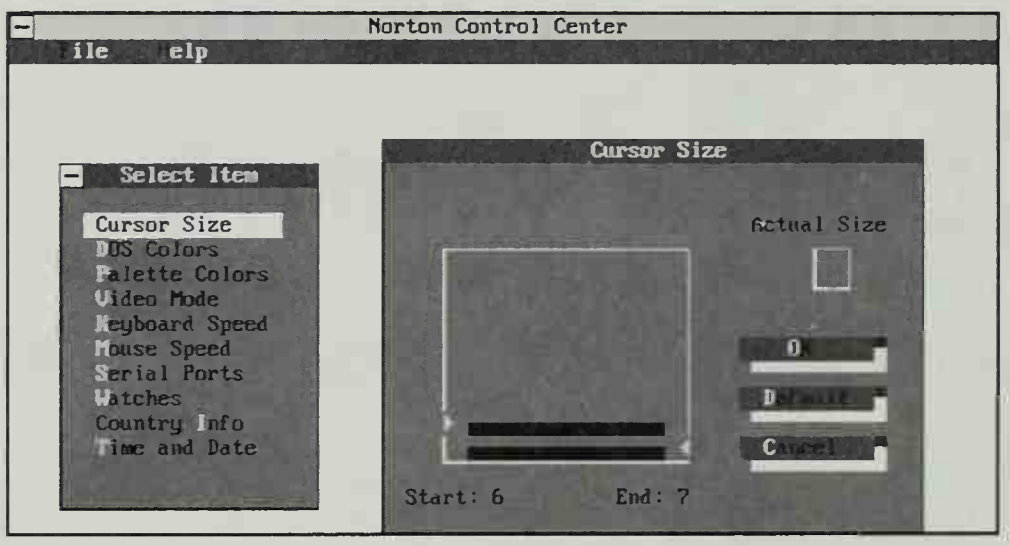

Fig. 22.1
The Norton Control Center screen.

Notice the list of options in the Select Item menu on the left side of the screen. These options represent the settings that you can change in Norton Control Center. When you enter the NCC command from the DOS prompt or from the Norton main menu, the first option, **C**ursor Size, is highlighted. When you highlight a Select Item option, a dialog box appears on the right side of the screen, displaying information on the highlighted option. (You can use the right- and left-arrow keys, Tab key, or mouse to move to the right or left side of the screen.)

After you choose your settings, open the **F**ile menu at the top of the screen. The **F**ile menu has three options:

Option	Description
Save Settings (F2)	Saves your settings to a file. From the DOS prompt, you must enter the NCC command with the /SETALL switch to save the settings so that you can activate the settings at any time. (See the command-line options described later in this chapter.)
Load Settings (F3)	Loads the previously set NCC options that were saved in a file.
E**x**it (Alt+X)	Exits the NCC program.

The following sections discuss the settings you can change with Norton Control Center in interactive mode.

Setting the Cursor Size

When you first enter Norton Control Center, the Cursor Size option is highlighted in the Select Item menu, and the Cursor Size dialog box appears on the right side of the screen (refer to fig. 22.1). Notice the two lines at the bottom of this dialog box and the fields labeled Start and End. In interactive video mode, the cursor consists of lines 6 and 7. (In higher-resolution modes, you may have as many as 14 cursor lines.) This combination of lines 6 and 7 creates a cursor that looks like a small underline—the normal setting for most computers.

If you are using a computer on which the cursor is hard to find—for example, a laptop with a hard-to-read display—you may want to create a larger cursor. You can use lines 0 to 7 for the cursor. If you want the cursor to be larger, press the up-arrow key to add more lines.

Figure 22.2 shows settings that display the cursor as a square rather than an underline. (The new version flashes in the upper-right corner of the dialog box.)

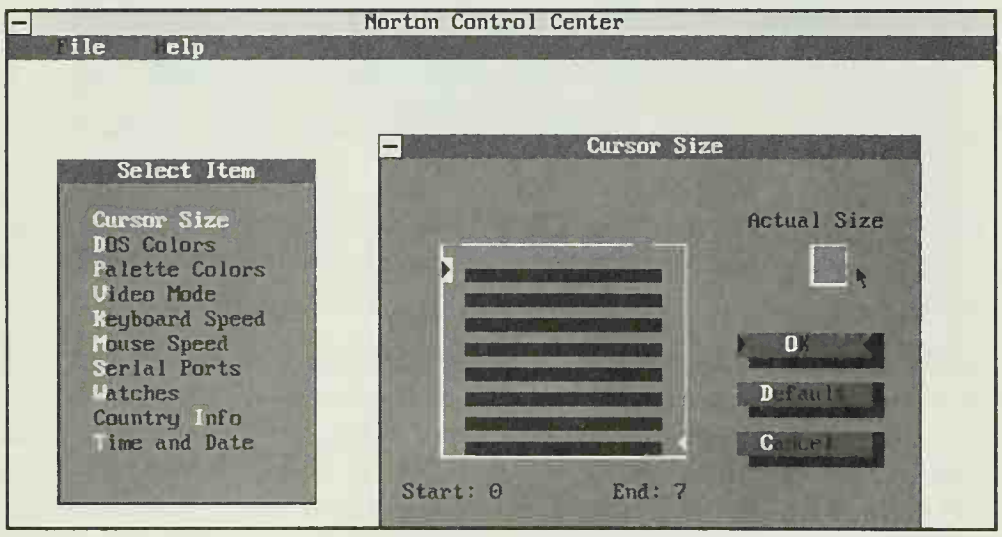

Fig. 22.2
Changing the cursor size.

After you size your cursor, choose **OK** to return to the Norton Control Center screen or press Esc to end the NCC command.

Setting Monitor Colors

The **D**OS Colors option in the Select Item menu enables you to choose color settings for your monitor. The settings that you can choose, however, depend on the kind of monitor you have. Some computers support only a few colors, whereas others support hundreds. If you tire of the black-and-white display that you normally see in DOS, you can use **D**OS Colors to specify colors that better fit your mood or decor.

When you choose **D**OS Colors, the DOS Colors dialog box appears (see fig. 22.3).

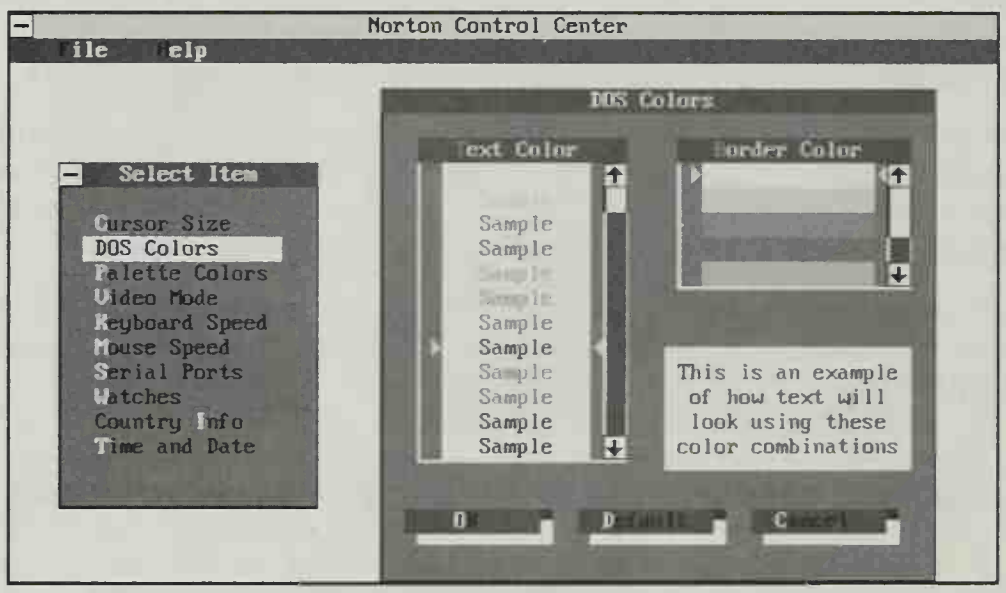

Fig. 22.3
The DOS Colors dialog box.

The DOS Colors dialog box enables you to change the settings in two boxes: **T**ext Color (including the background color) and **B**order Color. You can use the arrow keys to move between these boxes.

To choose a color combination in the **T**ext Color box, scroll through the list of options. Arrows on the right and left sides of this box point to the currently selected color combination. When you choose an option, a sample of that color combination appears in the lower-right corner of the DOS Colors dialog box. The **T**ext Color options include white on black, yellow on black, white on blue, and red on blue. You can also choose a Border color from the box in the upper right of the DOS Colors dialog box in the same way you choose a Text color.

After you choose color options, choose **O**K at the bottom of the box to return to the Select Item menu. If you want to revert to the default colors, choose **D**efault. To revert to the colors that you were using when you entered Norton Control Center and to return to the Select Item menu, choose **C**ancel.

Setting Palette Colors

The Select Item menu in Norton Control Center includes the **P**alette Colors option (available for EGA and VGA monitors only). When you choose the **D**OS Colors option, you can use only 16 colors at one time, even if your monitor can display more colors. You use the **P**alette Colors option to specify those 16 colors and how they are used (for the text, background, and so on).

If your monitor supports more than 16 colors, **P**alette Colors enables you to select alternative colors to be used as the 16 **D**OS Colors. (You can change the normal DOS blue to a lighter blue, for instance.) Some computers support as many as 256 colors, any of which you can use as a **D**OS Color.

When you choose the **P**alette Colors option, the Palette Colors dialog box appears (see fig. 22.4).

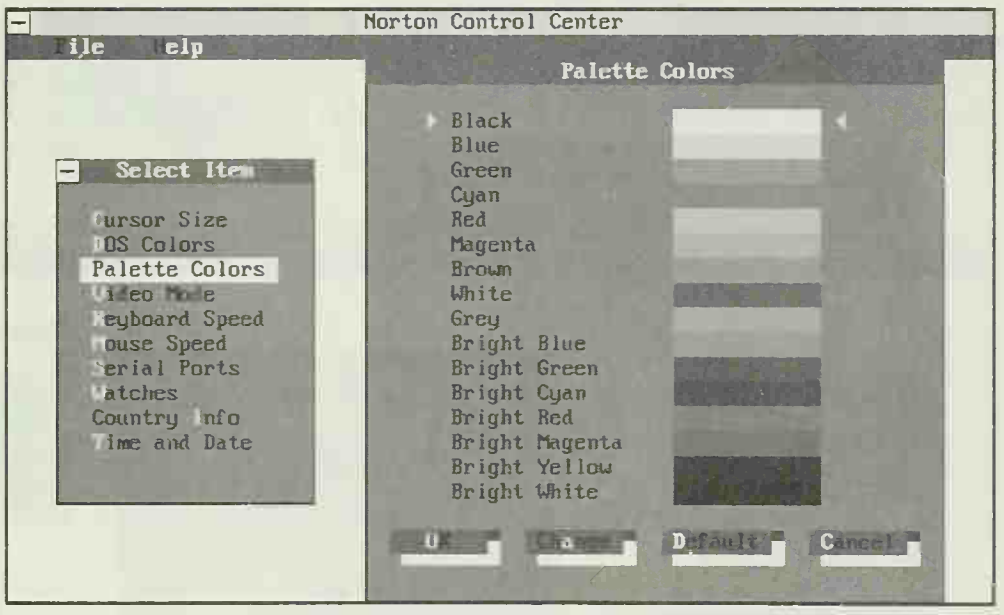

Fig. 22.4
The Palette Colors dialog box.

This dialog box displays a list of 16 colors, including black. (Although you cannot see the actual colors in this black-and-white figure, you can see the names of the colors on the left side of the Palette Colors dialog box.) When you first access this dialog box, the colors displayed are the 16 standard DOS colors. You can change any of these colors to any other supported color. You can change the color named Green, for example, to purple. The color will still be named Green on-screen, but whenever a program uses a color named Green, that color will actually be displayed as purple.

To choose an alternative color for one of these original DOS colors, highlight the original DOS color that you want to change and then choose the Change button. Another color menu appears. Scroll through this list to find a new color, select the color you want, and then press Enter to choose that color as the replacement for the original DOS color. You return to the Palette Colors dialog box. If, for example, you chose blue-green to replace DOS's original blue, DOS displays blue-green where the program usually displays blue.

After you select the colors you want to use, choose **O**K in the Palette Colors dialog box. If you want all the colors to revert to the normal DOS colors, choose **D**efault. If you want to cancel this option and revert to the colors that were in effect when you entered Norton Control Center, choose **C**ancel.

Setting the Video Mode

Although the typical DOS monitor displays 25 lines per screen, some monitors—EGA and VGA in particular—can display more. To change the display mode, choose **V**ideo Mode from the Select Item menu. The Video Mode dialog box appears (see fig. 22.5).

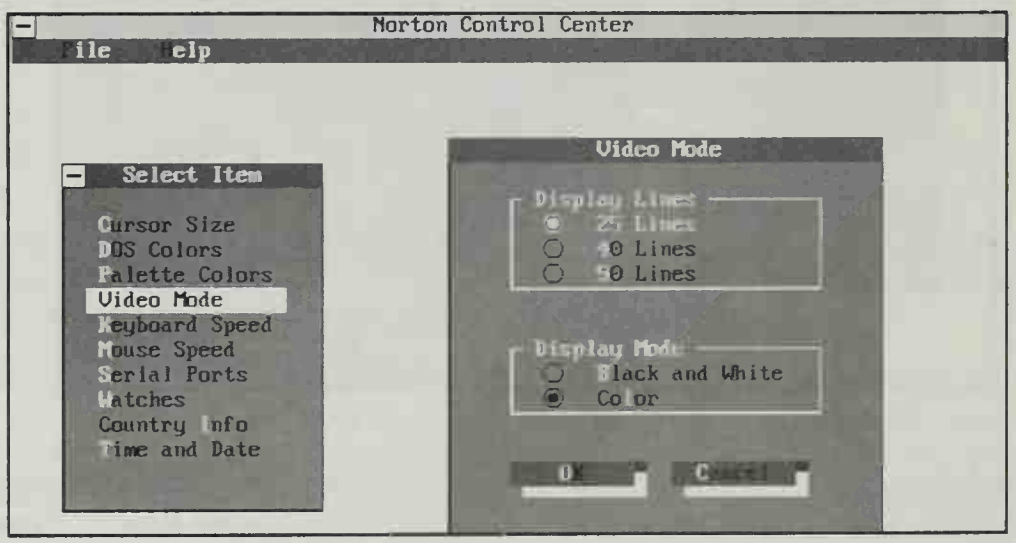

Fig. 22.5
The Video Mode dialog box.

The options in this dialog box are **2**5 Lines, **4**0 Lines, **5**0 Lines, **B**lack and White, and Co**l**or. After you choose the settings you want to use, choose **O**K. To revert to the preceding video mode, choose **C**ancel.

Setting the Keyboard Speed

You can use the NCC command to change the speed of the IBM PC keyboard. If you are a fast typist, for example, you may want to make the keyboard more responsive. To change the PC keyboard, choose **K**eyboard Speed from the Select Item menu. The Keyboard Speed dialog box appears (see fig. 22.6).

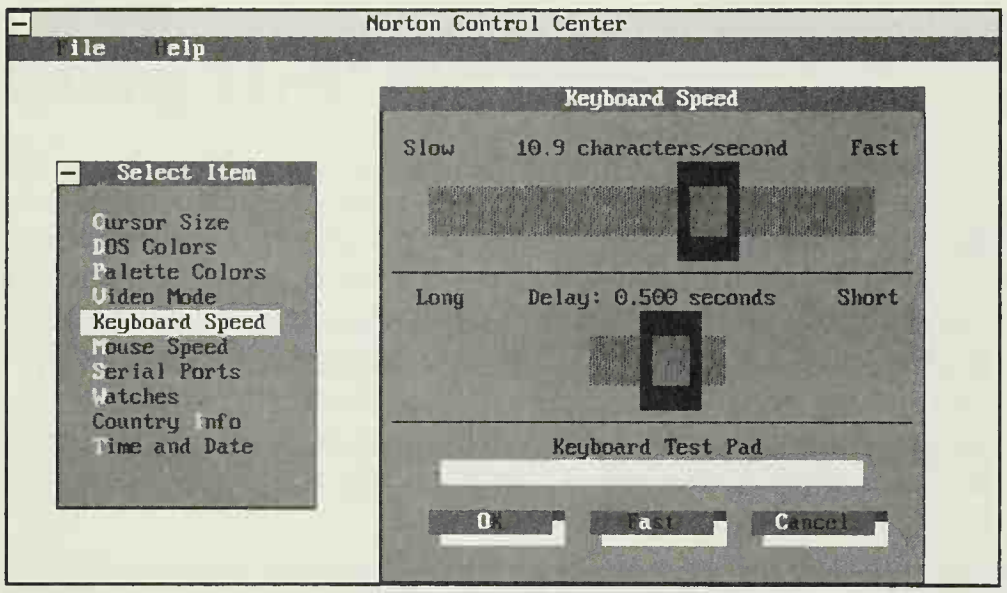

Fig. 22.6
The Keyboard Speed dialog box.

NOTE The **K**eyboard Speed option is not available for some early versions of the PC (original PC and XTs, for example). If your computer does not support a change in keyboard speeds, Norton displays a message telling you that this option does not work on your computer.

The Keyboard Speed dialog box contains two areas in which you can set keyboard options. Use the top area to set the keyboard rate; use the bottom area to set the delay. *Keyboard rate* is how quickly a character repeats when you hold down that key. *Delay* is the time that elapses before the character begins to repeat.

The normal keyboard rate is 10.9 characters per second (cps). You can change this speed to a minimum of 2 cps or a maximum of 30 cps. The normal delay rate is 0.5 second. You can change this delay to a minimum of 0.25 second or a maximum of 1 second.

To change either setting, use the arrow keys or the mouse to move the box along the appropriate bar. To choose the fastest settings for keyboard rate and delay, choose the **F**ast button at the bottom of the Keyboard Speed dialog box.

You can experiment with these settings by typing in the Keyboard Test Pad box at the bottom of the dialog box. Press and hold down the A key, for example, and notice how much delay occurs before the letter starts repeating and how quickly the letter repeats.

When you are satisfied with your settings, choose **O**K to return to the Select Item menu. Choose **C**ancel to revert to the previous speed settings.

Setting the Mouse Speed

If you use a mouse, you may want to adjust the device's *sensitivity*—the way in which the movement of the mouse corresponds to the movement of the mouse pointer on-screen. *Slow sensitivity* means that you must move the mouse more to see movement on-screen. *Fast sensitivity* means that a small movement of the mouse on your mouse pad translates to a large movement on-screen.

When you choose the **M**ouse Speed option from the Select Item menu, the Mouse Speed dialog box appears (see fig. 22.7).

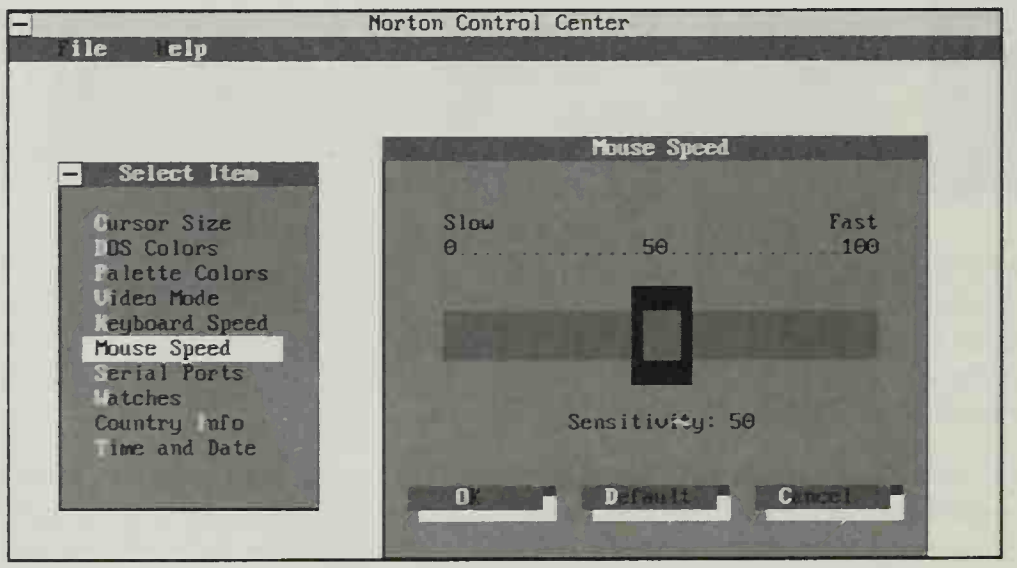

Fig. 22.7
The Mouse Speed dialog box.

The default sensitivity setting is 50; you can use any setting from 0 to 100. Change the sensitivity by using the arrow keys or the mouse to move the box along the bar in the middle of the dialog box.

After you select the mouse sensitivity that you want, choose **O**K. If you want to revert to the normal sensitivity (50), choose **D**efault. If you want to cancel this option and revert to the sensitivity setting you were using when you entered Norton Control Center, choose **C**ancel.

NOTE Setting the mouse sensitivity to 0 may cause the mouse pointer movement to stop completely.

Choosing Serial Port Settings

In Norton Control Center, you can choose the settings for your serial ports—a required task if you have a printer, a plotter, or another device that requires a serial port. A modem, for example, may require settings of 2400 baud, no parity, 8 data bits, and 1 stop bit. If you must choose settings for communication with a peripheral device (such as a printer) or another computer, these settings usually are specified in the peripheral device's manual.

When you choose **S**erial Ports from the Select Item menu, the Serial Ports dialog box appears (see fig. 22.8).

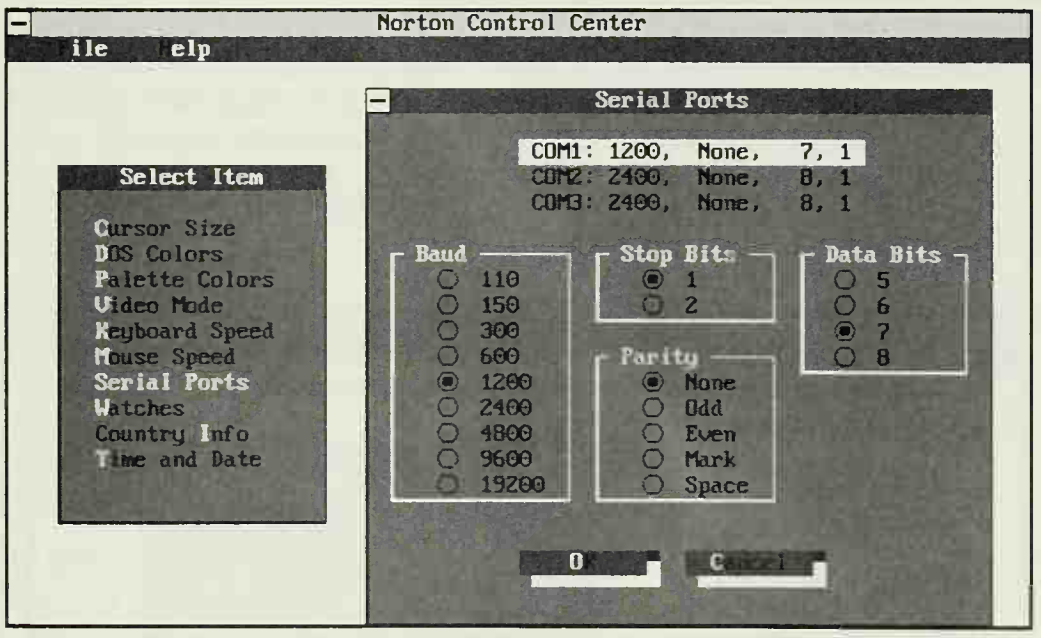

Fig. 22.8
The Serial Ports dialog box.

The following options determine how communications take place through as many as four COM (serial) ports:

Setting	Defines
Baud	Speed of communication. Common baud settings are 110, 150, 300, 600, 1200, 2400, 4800, 9600, and 19200. The higher the baud setting, the faster the communication.
Stop Bits	Number of stop-bit signals sent with each pulse of information. This option is usually 1 or 2.
Parity	Type of error-checking protocol to be used: None, Odd, Even, Mark, or Space. The most common setting is None.
Data Bits	Number of bits of information included in each communication pulse. This option is 5, 6, 7, or 8.

After you make your choices, choose **OK** to lock in all selections, or choose **C**ancel to revert to the preceding settings.

Setting Stopwatches

Norton Utilities provides four stopwatches that enable you to time certain events. You can use the **W**atches option to observe and reset these watches. You can use **W**atches also to reset the watches before you time something—for example, to compare the time that two different accounting packages take to generate an end-of-month report.

When you choose **W**atches from the Select Item menu, the Watches dialog box appears (see fig. 22.9).

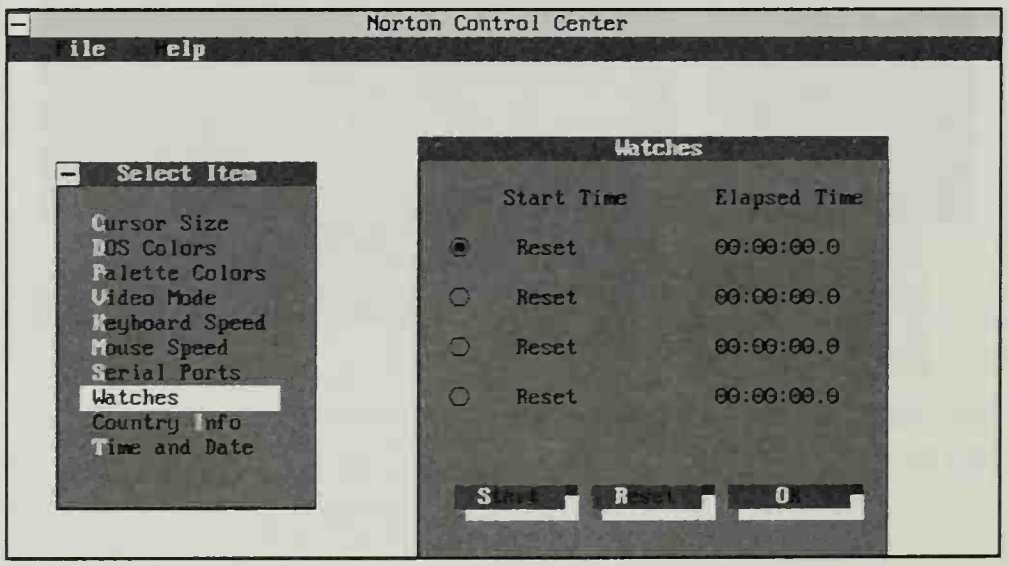

Fig. 22.9
The Watches dialog box.

To use a watch, choose one of the four radio buttons, and then reset or start that watch by choosing **S**tart or **R**eset at the bottom of the dialog box. When you finish using the watch, choose **O**K to return to the Select Item menu.

Usually, you will use the watches by issuing the NCC command from the DOS prompt. For more information, see the section "Using Norton Control Center from the DOS Prompt" later in this chapter.

NOTE When you use the NCC command with the /START or /STOP switch, the elapsed times appear on-screen. If the result of a /START or /STOP operation scrolls off-screen, you can view the time by choosing Norton Control Center's **W**atches option.

Setting Country Info

Because many countries use PCs, you occasionally may have to change the formatting of certain items so that those items match another country's standard. In the United States, for example, dates are usually written in month-day-year format; Europeans, however, write dates in day-month-year format. Other formats that vary from country to country are time, currency (£ rather than $), lists (separated by semicolons rather than commas), and numbers (1.000 rather than 1,000). The Country **I**nfo option in the Select Item menu enables you to set these items for your computer. If, for instance, you are preparing a report to be sent to Europe, you can change the date format so that Europeans can understand the report.

For the Country **I**nfo option to work, you must have the COUNTRY.SYS driver in your CONFIG.SYS file. If the COUNTRY.SYS driver is not in CONFIG.SYS, a screen appears when you choose that option. This screen displays the current settings, which you cannot change (see fig. 22.10). If the driver is in the CONFIG.SYS file, however, you can change the settings in the Country Info dialog box.

If the driver is in CONFIG.SYS, a list box in the bottom-left corner of this dialog box lists several country options, including U.S.A., Arabic Speaking, and Australia. If you choose a country from this list, the Country Info information changes to match that country's normal usage. After you choose a country, choose **O**K to lock in the formats, or choose **C**ancel to revert to the preceding settings.

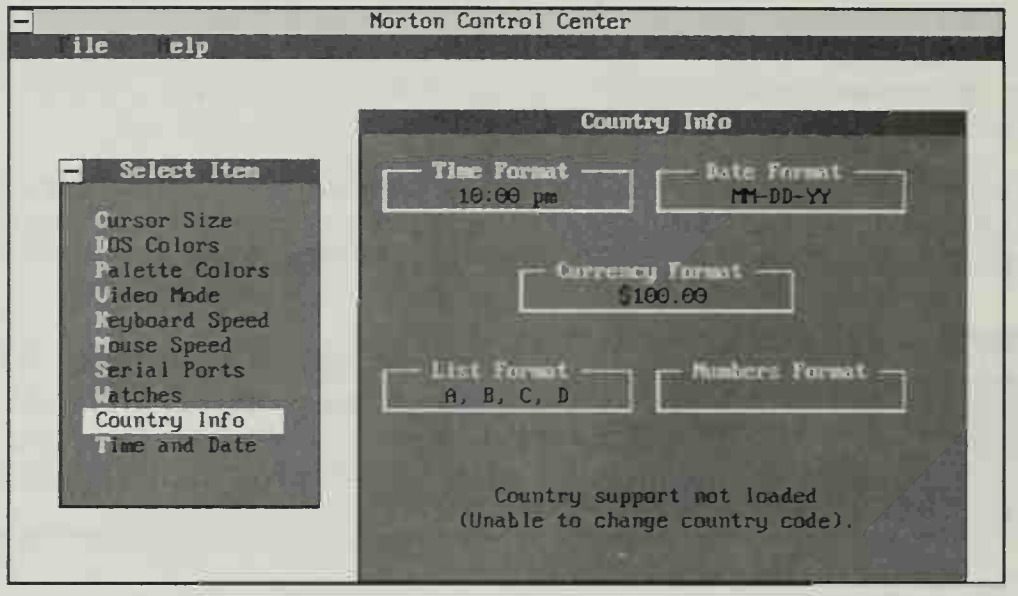

Fig. 22.10
The Country Info dialog box.

If you want to be able to change your country settings, place a line like this one in your CONFIG.SYS file:

```
COUNTRY=001,850 C:\DOS\COUNTRY.SYS
```

The 001 specifies the United States, and 850 is a selection for a character set. The other common character set used in the United States is 437. (See your DOS manual for more information on country settings.)

You must also enter a command similar to this one from the DOS prompt (or in AUTOEXEC.BAT):

```
NLSFUNC \DOS\COUNTRY.SYS
```

This command assumes that you stored the COUNTRY.SYS driver in a directory named DOS.

After you include the proper COUNTRY.SYS driver in your CONFIG.SYS file, reboot, and enter the NLSFUNC command, you can change your country settings in Norton Control Center.

Setting the Time and Date

If your clock battery has failed, the date and time settings for your computer will not be correct. On some computers, particularly the AT, you must use the diagnostics disk to reset the date and time so that the computer remembers the settings. Norton Control Center's Time and Date option, however, enables you to set these parameters without booting with the diagnostics disk.

NOTE You can use the Time and Date option to set the date and time for several DOS computers, but some computers may not respond to your setting if they use a nonstandard clock. You should experiment to see whether this Norton Control Center option works for your computer.

When you choose Time and Date from the Select Item menu, the Time and Date dialog box appears (see fig. 22.11).

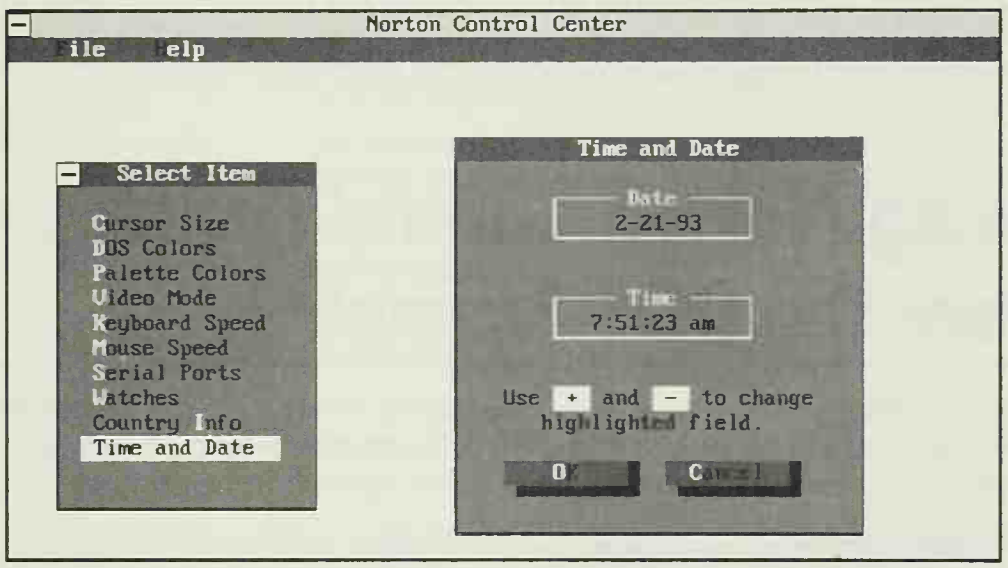

Fig. 22.11
The Time and Date dialog box.

To set the time or date, use the arrow keys to highlight the number and then press the plus (+) key or minus (–) key to increase or decrease the number. (Or you can enter the numbers.) Choose **O**K to lock in the changes, or choose **C**ancel to return the time and date to their previous settings.

Saving Norton Control Center Settings to Disk

To save the changes you made with Norton Control Center, choose **S**ave Settings from the **F**ile menu. When you are prompted for a file name, type the name and then press Enter. The settings you changed in Norton Control Center are saved to that file.

After you save the information to a file, you can use command-line switches to reset Norton Control Center to the settings you saved. Suppose that you chose certain colors, along with other settings that you

want to use all the time, and then saved this information in a file named SETTINGS.NCC. You can place the NCC command in your AUTOEXEC.BAT file with the /SETALL switch, using the following command:

```
NCC \NORTON\SETTINGS.NCC /SETALL
```

This command reactivates all the settings (color choices, cursor size, and so on) that you saved in Norton Control Center. In this case, the SETTINGS.NCC file is in the NORTON directory, so the path name is necessary. Otherwise, the file is activated from the root (\) directory. If you do not want to include the command in your AUTOEXEC.BAT file, you can enter the same NCC command at the DOS prompt.

Using Norton Control Center from the DOS Prompt

Several settings that you can choose interactively in Norton Command Center can be set also from the DOS prompt with Norton Control Center command-line options. Here is the syntax:

NCC [*filespec*] [*switches*]

The *filespec* variable refers to a file that contains system-information specifications. Before you use this version of the command, you must create this file by using Norton Control Center to choose the settings you want and then save the information to a file.

The following switches are available for use with *filespec*:

Switch	Description
/CURSOR	Reads the information in the file named by *filespec* but sets only the cursor size
/DOSCOLOR	Reads the information in the file named by *filespec* but sets only the previously chosen DOS colors for foreground, background, and border
/PALETTE	Reads the information in the file named by *filespec* but sets only the palette colors
/SET	Reads the information in the file named by *filespec* and sets all the parameters

If you have not created a settings file by running the NCC command in interactive mode, you can set a few options with these quick switches:

Switch	Description
/25	Places the monitor in 25-line mode (same as /CO80)
/35	Places the monitor in 35-line mode (supported only by EGA monitors)
/40	Places the monitor in 40-line mode (supported only by VGA monitors)
/43	Places the monitor in 43-line mode (supported only by EGA monitors)
/50	Places the monitor in 50-line mode (supported only by VGA monitors)
/BW80	Places the monitor in black-and-white mode with 25 lines and 80 columns
/CO80	Places the monitor in color mode with 25 lines and 80 columns
/FAST	Sets the keyboard rate to its fastest possible value

You can use the NCC command to set stopwatches also. Here are the available switches:

Switch	Description
/C:*comment*	Displays the text string *comment* after you execute the command. This switch is useful for documenting which timer is being reported. If the *comment* contains any blanks, you must enclose the entire *comment* in quotation marks.
/L	Displays the time and date on the left side of the monitor.
/N	Suppresses display of the current time and date.
/START:*n*	Starts stopwatch number *n* (1 to 4).
/STOP:*n*	Stops stopwatch number *n* (1 to 4).

NOTE To access Norton Control Center interactively, enter the NCC command without using any file specification. The Norton Control Center menu appears, enabling you to choose interactively the same options that you can set with switches in command-line mode.

You can combine switches to change multiple settings. For example, to set your VGA computer so that 50 lines are displayed on-screen and the keyboard rate is the fastest value, use this command:

```
NCC /50/FAST
```

Summary

Norton Control Center gives you the capability of customizing your computer. If you have a laptop computer, for example, and want a large cursor, you can create that larger cursor in Norton Control Center. In this chapter, you learned how to change the colors that appear on your monitor, select the number of lines displayed, adjust keyboard and mouse speed, set up options for your serial ports, set up country formats, and use stopwatches to time various events.

Another Norton Utilities program that you can use to manage your computer resources is Norton Change Directory. The next chapter shows you how to use this utility to manage your disk directories.

CHAPTER 23

Using Norton Change Directory

DOS provides commands to make, remove, and change directories. The Norton Change Directory (NCD) command, however, gives you even greater control over directory management. In the preceding chapter, you learned how to use Norton Control Center (NCC) to manage your computer's hardware settings. Similarly, you use Norton Change Directory to manage your files and directories. With NCD, you can efficiently manage your directories on disk and navigate easily between directories.

Norton Change Directory is actually two commands in one. If used in command-line mode (from the DOS prompt), Norton Change Directory replaces the DOS commands MD, CD, and RD, which are used to make, change, and remove directories, respectively. If used in interactive mode, Norton Change Directory acts as a directory-management tool. This chapter discusses Norton Change Directory in both modes.

Using Norton Change Directory in Interactive Mode

If you enter the NCD command without parameters, you activate the command's interactive mode, and a graphic representation of your directory structure appears on-screen (see fig. 23.1). The disk in figure 23.1 has four levels of directories. Directory ONE-A has a subdirectory called TWO-A, which has a subdirectory called THREE-A, which in turn has a subdirectory called FOUR-A. Directory ONE-B has only a single subdirectory, named TWO-B. Directory ONE-C has no subdirectories.

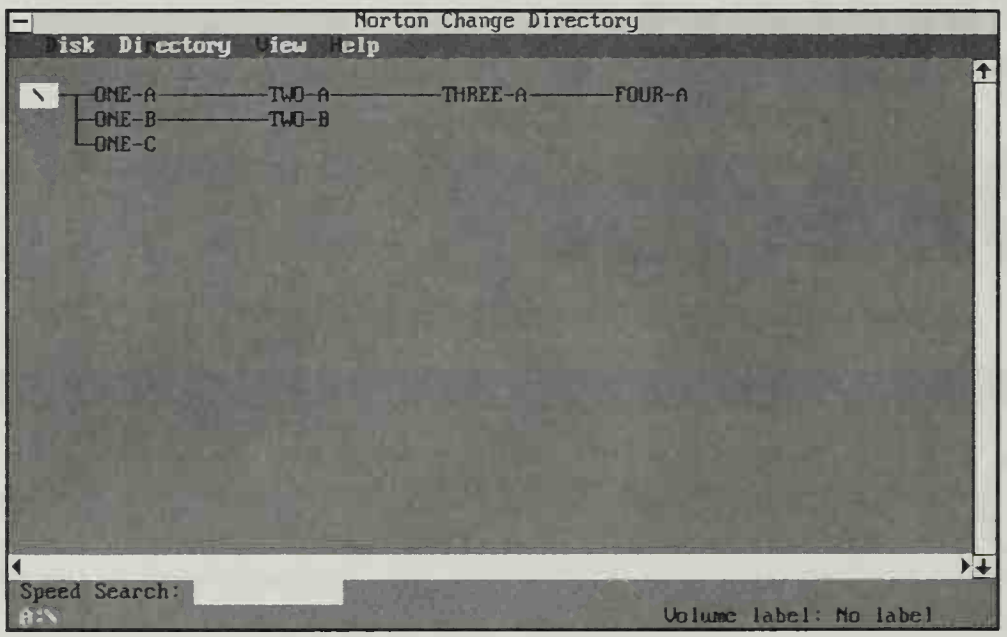

Fig. 23.1
Norton Change Directory in interactive mode, displaying a graphic representation of your directory tree.

To go to any directory on disk, use the arrow keys to move the highlight to the directory you want, and press Enter. You then exit the Norton Change Directory command and return to the DOS prompt—in the directory you chose.

You can do much more than just change directories on this screen. The menu bar at the top contains the menus **D**isk, **D**irectory, **V**iew, and **H**elp. To open any menu on the menu bar, press Alt plus the highlighted letter of the menu name or just click the menu name. These pull-down menus contain a number of options that allow you to manage the directory tree and to use the NCD program, such as choosing what drive tree is currently being viewed.

Using the NCD Disk Menu

The NCD **D**isk menu, shown in figure 23.2, contains several options. **C**hange Disk selects the disk for which you want to display a directory tree. **R**escan Disk updates Norton Change Directory's TREEINFO.NCD file, which contains the names of all directories. If you add or remove a directory without using the NCD command, you must select this option to ensure that the directory tree on-screen is accurate.

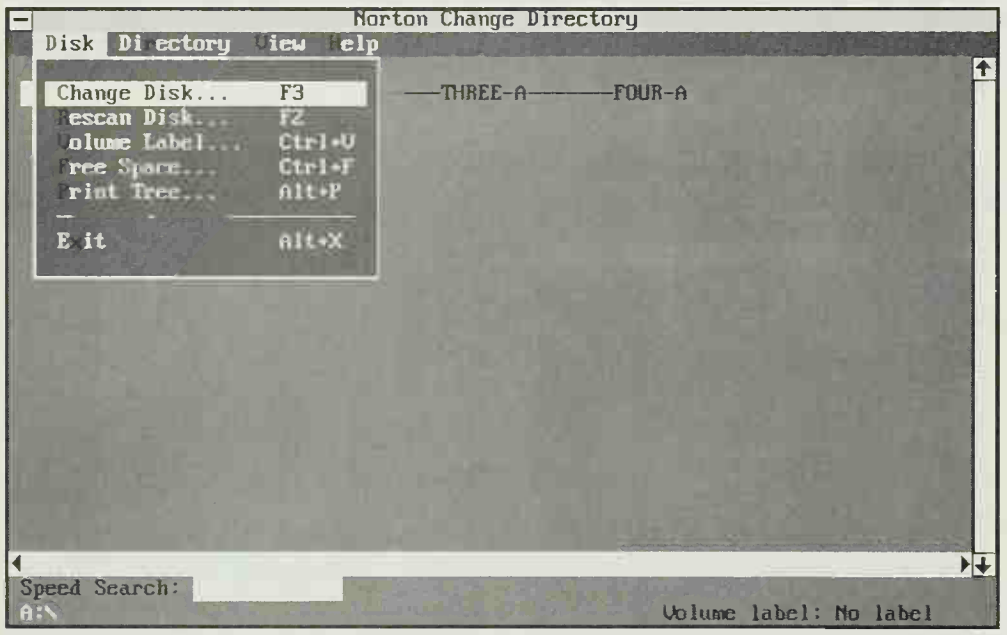

Fig. 23.2
The NCD **D**isk menu.

With the **V**olume Label option, you can change the volume label on the disk or add a volume label if one is not present. (This function replaces the VL command in Norton Utilities 4.5.) **F**ree Space displays disk size, amount of space used, and amount of free space. With **P**rint Tree, you can print a copy of the directory tree. (This option is especially useful if your directory tree is too large to fit on-screen.) To exit Norton Change Directory, choose E**x**it.

Note that each option has a shortcut key or key combination. You can access the **C**hange Disk option, for example, by pressing the shortcut key F3 even if the **D**isk menu is not open. Alternatively, you can access **C**hange Disk by opening the menu (pressing Alt+D) and then choosing the option (pressing C) from that menu.

Using the NCD Directory Menu

The NCD Directory menu, shown in figure 23.3, offers options dealing with the manipulation of directories on disk. In this menu, you can choose to list the files in a directory; rename, make, or delete a directory; display the size of a directory; copy a directory from one part of the tree to another part (or to another drive); remove a directory and all its files; and move a directory to a different location on the tree. In addition, you can choose configuration options for the NCD command that allow you to permit or disable the copying, removing, and moving of directories. The following paragraphs describe these options in more detail.

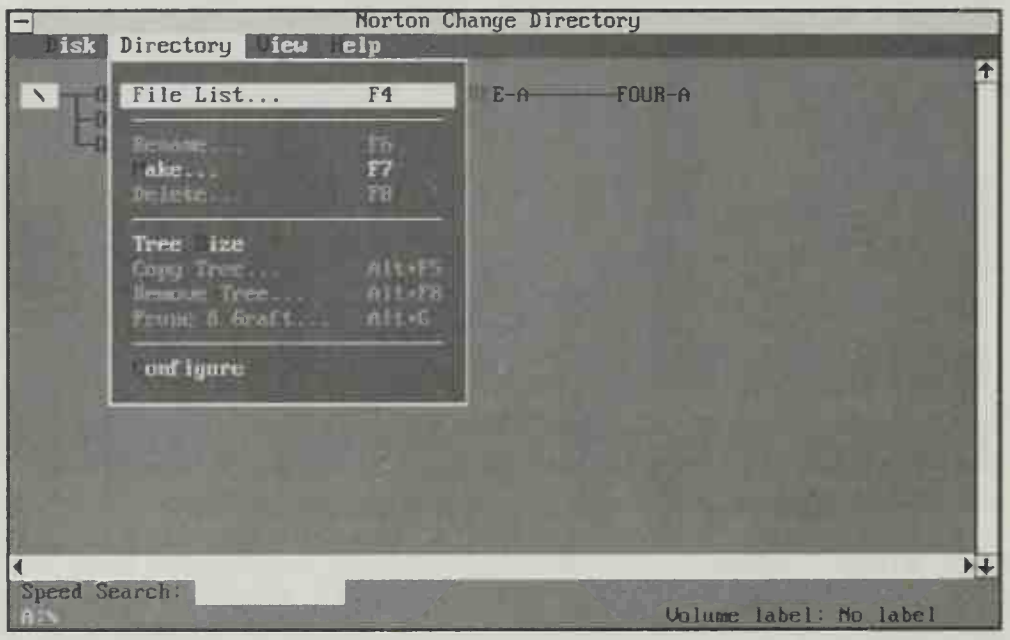

Fig. 23.3
The NCD Directory menu.

With **F**ile List, you can display a list of files in the currently selected directory (see fig. 23.4). You can sort the names in a certain order by choosing options from the Sort Order list. You use **R**e-sort to revert to the original listing.

The **R**ename option enables you to rename the highlighted directory. This feature is particularly useful because you cannot rename a directory by using DOS commands.

You use **M**ake to create a new directory. Highlight the directory to which you want to add a subdirectory, choose **M**ake, enter a name for the new directory, and press Enter. **D**elete removes a directory. Just highlight the directory (which must not contain any files or subdirectories) and choose **D**elete.

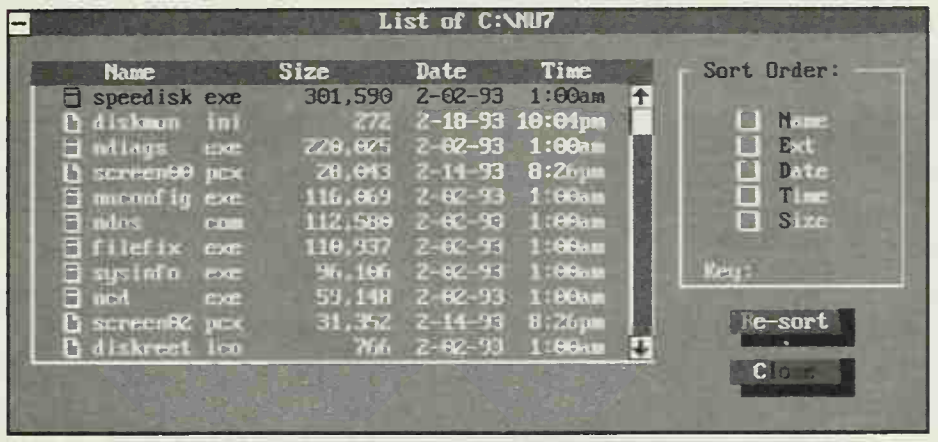

Fig. 23.4

Displaying files with **F**ile List from the NCD Di**r**ectory menu.

The Tree **S**ize option displays the total size of all files in the currently selected directory, as well as the total allocated disk space for the files. With Cop**y** Tree, you can copy the selected directory and all its subdirectories to a new location on the tree or to another drive. Select the directory to be copied, choose Cop**y** Tree, type the name of the directory or drive to which you want to copy the selected directory, and press Enter. You are asked whether you want to delete the original directories and files after the copy is complete.

Remove **T**ree deletes a directory and all its subdirectories. Select the directory, choose Remove **T**ree, and verify at the prompt that you want to remove the directory.

The **P**rune & Graft option enables you to rearrange directories in the directory tree. Choose **P**rune & Graft and select the directory you want to *prune* (to cut from the tree). Then indicate where to *graft* the directory into the existing directory tree. A dialog box prompts you to confirm the graft.

With the **C**onfigure option, you can enable or disable the Cop**y** Tree, Remove **T**ree, and **P**rune & Graft options (see fig. 23.5).

NOTE Because the Copy **T**ree, Remove **T**ree, and **P**rune & Graft options are potentially dangerous, these options are turned off by default. To enable these options, you must choose **C**onfigure from the Di**r**ectory menu.

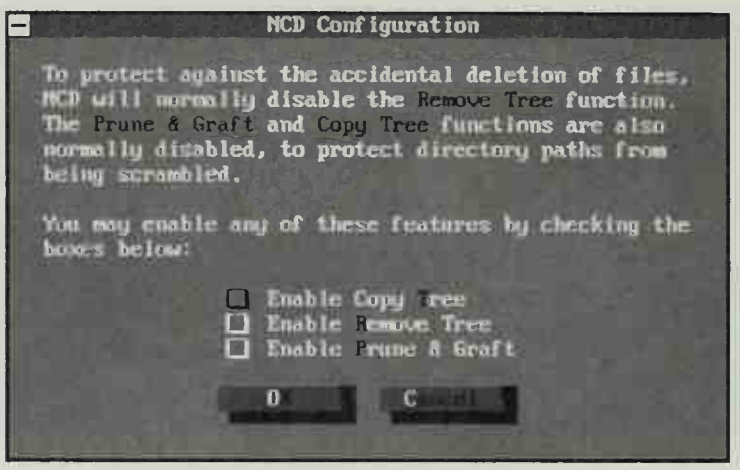

Fig. 23.5
The NCD Configuration dialog box.

Using the NCD View Menu

Large directories may not fit on the Norton Change Directory screen. The NCD **V**iew menu enables you to display as many lines on-screen as your monitor type supports. (EGA screens can display up to 40 lines, and VGA screens can display up to 50 lines.) The **V**iew menu contains the following options:

25 lines

28 lines

43 lines

50 lines

The options shown in the **V**iew menu vary according to what kind of monitor you have. For MDA and CGA monitors, the only option is **2**5 lines. For EGA monitors, your choices are **2**5, **3**5, and **4**3 lines. For a VGA monitor, the options are **2**5, **4**0, and **5**0 lines.

A check mark appears to the left of the current selection (usually **2**5 lines).

Using Norton Change Directory from the DOS Prompt

Norton Change Directory gives you more control over directory names than do the normal DOS commands. The Norton Change Directory command is particularly well suited for interactive use, but you can also use the command from the DOS prompt.

The syntax for the NCD command can be any of the following:

NCD [*dirname*] [*switches*]

NCD [*d:*][*pathname*] [/R] [/N]

NCD [*d:*] /V[:*label*]

NCD [*d:*] /L[:*output*] [/G|/NG|/T] [/P] [/A]

NCD MD [*dirname*]

NCD RD [*dirname*]

NCD SIZE [*dirname*]

NCD COPY *source destination* [/DELETE]

NCD GRAFT *source destination* [/DELETE]

NCD RMTREE *dirname* [/BATCH]

The *dirname* parameter is the name of the directory you want to change to, make, remove, or display the size of. The *source* and *destination* parameters tell the command the original location of the directory to be copied or grafted (*source*) and the target location (*destination*) for the directory.

Changing to Another Directory

To use Norton Change Directory to change directories, enter **NCD**, followed by a space, and then the name of the directory to which you want to change. (You do not need to type the names of all the directories in the path, as you do when using the DOS CD command.) For example, to change to the directory \ONE-A\TWO-A\THREE-A\FOUR-A, enter the following command:

NCD FOUR-A

Actually, you need to enter only enough characters of the target directory's name to make the command unique to that directory. You can, therefore, enter the command in this way:

NCD FOUR

If no other directories begin with the letter F, you can even enter the command like this:

NCD F

If you do have more than one directory that begins with the letter F, the NCD command switches to the first directory beginning with that letter. If you enter the command again (press F3 and then Enter), Norton Change Directory switches to the next directory beginning with F. As you name your directories, you may want to choose unique names to make the Norton Change Directory command faster to use. The more complicated your directory structure, the easier changing directories becomes if you use the Norton Change Directory command instead of the DOS CD command.

Understanding NCD Switches

The NCD command-line switches allow you to bypass the menus while still performing powerful directory operations. Notice from the command syntax descriptions shown earlier that some switches cannot be used together. For example, the designation [/G | /NG | /T] means that you can select only one of these switches at a time (the | means "or").

Here are the switches you can use with NCD:

Switch	Description
/A	Displays the directory tree for all drives except floppy disk drives.
/BATCH	Skips all prompts and exits to DOS after finishing.
/DELETE	Deletes copied files from their original directory.
/G	Displays the directory tree graphically.
/L:*output*	Prints the directory tree to the specified *output* file.
/N	Does not write to the file TREEINFO.NCD. If you use Norton Change Directory on a write-protected disk, you must use this switch.
/NG	Displays the tree in nongraphic characters (best if you use a printer that does not support graphic characters).
/P	Pauses after each screen of information is displayed.
/R	Updates the file TREEINFO.NCD, which contains information about your directory tree structure.
/T	Totals the number and sizes of all files.
/V:*label*	Places a volume label on the disk.

Note some other command-line options that may be used with NCD:

Option	Description
MD *path*	Makes a new directory specified in *path*
RD *path*	Removes a directory specified in *path*
SIZE *directory*	Displays the size of a branch on the tree
COPY	Copies a directory to a new location
GRAFT	Deletes files from the old location
RMTREE	Removes a directory and all associated files

NOTE To use the COPY, GRAFT, and RMTREE options, you first must enable them in the NCD Configuration dialog box, which you access with the Directory Configure option.

Using a Nongraphic Version of the Tree Structure

To record a nongraphic version of the tree structure on all your hard drives to a file named MYDIRS, for example, enter the following command:

```
NCD /L:MYDIRS /A /NG
```

Changing the Volume Label

The /V:*label* switch enables you to change the volume label on the disk. To change the volume label on the disk in drive A to MYDISK, enter the following command:

```
NCD A: /V:MYDISK
```

Creating and Removing Directories

The MD and RD versions of the Norton Change Directory command are similar in function to the DOS MD and RD commands. You use these DOS commands to make a new directory or to remove an empty directory, respectively.

You can use the Norton Change Directory command rather than the DOS MD and RD commands to make and remove directories. To create a directory, such as \FIRST\SECOND, enter the following command:

```
NCD MD \FIRST\SECOND
```

NOTE In this example, FIRST must already exist; otherwise, you get the error message `Invalid path or path no longer exists`.

To delete that directory, enter this command:

```
NCD RD \FIRST\SECOND
```

This deletes only the SECOND directory. It does not delete the FIRST directory.

You may be tempted to pass up the Norton Change Directory command and use MD and RD instead, but a good reason exists for using Norton Change Directory. The first time you run the NCD command, Norton analyzes and stores your entire directory structure in a file (TREEINFO.NCD) for quick access. If you use the DOS versions of RD and MD, the Norton file is not updated. If you use the Norton Change Directory versions, the Norton file is updated, and changing directories continues to be quick and easy.

If you accidentally use RD or MD, you can update the Norton file TREEINFO.NCD by using the /R switch with the NCD command. To update the NCD tree file, use this command:

```
NCD /R
```

Checking the Size of a Directory

The NCD SIZE command displays the amount of space taken up by the files in the directory. This information can be useful to you if you are planning to copy the directory to another drive; you would want to be sure that the target drive had enough space (see also the discussion of the File Size command in Chapter 26). To find out how much space your \WP51\DOCS directory takes, for example, enter the following command:

```
NCD SIZE \WP51\DOCS
```

This command reports two numbers, such as the following:

```
Total size of files : 5,656,832 Bytes
Total allocated space : 6,184,960 Bytes
```

The difference between the allocated space and the total size of the files is *slack space*—wasted space not taken up by actual file data, but unavailable for use. Slack space is discussed in Chapter 3, "Understanding How Disks Work," and in the discussion of the File Size (FS) command in Chapter 26.

Copying Directories and Their Files

Using the NCD COPY command, you can copy an entire directory and all its files to a new location. For example, to copy the directory MYDIR to its new location as a subdirectory of YOURDIR, enter the following command:

```
NCD COPY \MYDIR \YOURDIR
```

To copy the directory and then delete the old version of MYDIR and its files, enter this command:

```
NCD COPY \MYDIR \YOURDIR /DELETE
```

NOTE The NCD COPY command is disabled by default and must be enabled in the NCD Configuration dialog box. You choose Configure from the NCD Directory menu to access this dialog box.

Moving Directories and Their Files

The NCD GRAFT command is similar in function to the NCD COPY command. NCD GRAFT doesn't copy, however, but actually moves the source directory, all its subdirectories, and all the files contained in these directories to the destination location. Suppose that you want to move the directory named MYLETS to the WP51 directory, resulting in the subdirectory \WP51\MYLETS. Use this command:

```
NCD GRAFT \MYLETS \WP51
```

You may need to add the /NET switch if you use this command on a network. Usually, you do not need this switch.

NOTE The NCD GRAFT command is disabled by default and must be enabled in the NCD Configuration dialog box. You choose Configure from the NCD Directory menu to access this dialog box.

Removing a Directory and Its Files

The Norton Change Directory RMTREE command removes a directory and all its files from the directory tree. The command prompts you for confirmation before actually deleting the information. If you use the /BATCH switch, the prompt for confirmation does not appear. To remove the directory TMP from the tree, erasing all files in that directory, use the following command:

```
NCD RMTREE \TMP
```

NCD responds with this message:

```
You are about to remove ALL FILES in the directory
tree starting at C:\TMP.
Are you sure (Y/N)?
Enter Y to continue with the remove or enter N to
cancel.
```

NOTE This potentially dangerous command is disabled by default and must be enabled in the NCD Configuration dialog box. To access this dialog box, choose Configure from the NCD Directory menu.

Summary

Although similar in some ways to such DOS commands as MD, CD, and RD, the Norton Change Directory command is more powerful, easier to use in its graphic mode, and capable of performing more tasks on your directories than are similar DOS commands. After you begin using the Norton Change Directory command, either from the DOS prompt or interactively, you are certain to find the command far superior to its DOS counterparts for managing directories.

In the next chapter, you learn how to use Norton Batch Enhancer to create better batch files.

CHAPTER 24

Creating and Using Batch Files

Norton Batch Enhancer (BE) enables you to create more powerful and elaborate batch commands than you can create with DOS's batch language.

Batch files usually consist of several DOS commands listed one after another. These files are named with the BAT extension, such as AUTOEXEC.BAT. When a batch file is executed, DOS acts on the commands in the file one at a time, beginning with the first command in the file and continuing to the last command in the file. The DOS batch language, however, lacks a few useful batch file features. You may, for example, want to prompt for input in a batch file and then branch according to the user's response. In addition, you may want to set colors, draw windows or boxes, and print text from a batch file. The Batch Enhancer command enables you to perform these tasks.

You use one of the following versions of this command:

BE *command* [/DEBUG]

BE *filespec*

NOTE When you enter the *command* version, BE acts on the command; when you enter the *filespec* version, BE acts on the commands in the file.

These commands may be used with BE:

ASK	GOTO	SA
BEEP	JUMP	SHIFTSTATE
BOX	MONTHDAY	TRIGGER
CLS	PRINTCHAR	WEEKDAY
DELAY	REBOOT	WINDOW
EXIT	ROWCOL	

You can use the BE command at the DOS prompt, but the command is generally used in batch files. That is, you can place a BE command in a DOS batch file and use it just as you would from the DOS prompt. The following command, for example, produces a standard system beep:

```
BE BEEP
```

You may want to include this command at the end of a batch file so that your computer will signal you when the operation is finished.

Each BE command has its own parameters, which are described in the following sections.

NOTE Some of the BE commands are also implemented in NDOS, which is described in Chapter 28. These commands include the following:

ASK	MONTHDAY	SHIFTSTATE
BEEP	PRINTCHAR	TRIGGER
BOX	REBOOT	WEEKDAY
CLS	ROWCOL	WINDOW
DELAY	SA	

Using Script Files

A *script file* is similar to a batch file, but a script file executes commands through the Norton BE program instead of DOS. A script file can contain and will act on any of the Norton BE commands; however, DOS

commands that are contained in the BE script will be ignored when the script is run. The advantage of writing a script file instead of a normal DOS batch file is that a script file runs faster and enables you to use features that are not available in DOS. Thus, BE commands can be used in DOS batch files, but DOS batch commands cannot be used in BE script files. The BE script command has the following syntax:

BE *scriptname* [[GOTO] *label*]

NOTE When naming script files, avoid using the BAT extension so that you prevent confusion between script files and batch files.

Suppose that you create a script file named SETCOLOR which contains the following command:

SA BRIGHT WHITE ON BLUE

NOTE You do not have to include BE in front of a command when the BE command is used in a script file. That is, you can use the command BEEP rather than BE BEEP. (See the section "Using the SA Command" later in this chapter.)

To run this script, issue the following command at the DOS prompt:

BE SETCOLOR

A script can contain several labels; you can have the command execute at a particular label by entering that label name in the command line. For example, all the lines that begin with a colon in the following SETCOLOR script file are labels:

```
:BLUE
SA BRIGHT WHITE ON BLUE
EXIT
:GREEN
SA BRIGHT WHITE ON GREEN
EXIT
:RED
SA BRIGHT WHITE ON RED
```

When you enter **BE SETCOLOR GREEN**, the program begins at the label :GREEN, executes the SA command, and then executes the EXIT command. (See the section "Using the EXIT Command" later in this chapter.)

NOTE The BE commands that can be used only in script files and not in regular DOS batch files include EXIT, GOTO, and JUMP.

Using the ASK Command

The ASK command enables you to capture a user's response and then act on that response. You can use the ASK command to create menus. If you use ASK in your AUTOEXEC.BAT file, you can control the way in which your computer boots. Sometimes you may want to load memory-resident programs, such as SideKick, at boot time. At other times, you may want to boot without loading those programs.

The ASK command has the following syntax:

BE ASK *prompt* [*keys*] [DEFAULT=*key*] [TIMEOUT=*n*] [ADJUST=*n*] [*color*] [/DEBUG]

The *prompt* is a text string that you want to display on-screen. (You must enclose the string in quotation marks.) The cursor is placed after the prompt to anticipate a single-character user response.

A simple example of the BE ASK command follows. Suppose that you want your AUTOEXEC.BAT file to give you the option of booting with no memory-resident programs. You want the computer to ask the following question:

```
Skip memory-resident programs (Y/N)?
```

If you press Y, you want to skip loading memory-resident programs. If you press N, you want the computer to go ahead and load those programs. Use the following ASK command:

```
BE ASK "Skip memory-resident programs (Y/N)?" YN
```

Notice that the expected responses are listed as the keys Y and N. The next two lines use the DOS IF ERRORLEVEL command to tell the computer what to do when the user makes one of the choices:

```
IF ERRORLEVEL 2 GOTO DOMEMORY
IF ERRORLEVEL 1 GOTO SKIP
```

If you press N, an errorlevel code 2 is generated, and these commands send the flow of the batch file to a label named DOMEMORY. If you press Y, an errorlevel code 1 is generated, and the flow of the batch file is sent to a label named SKIP. If you press any other key, the computer beeps, and the ASK command waits for you to press Y or N.

Here is how the complete batch file may look with the ASK command:

```
ECHO OFF
CLS
BE ASK "Skip memory resident programs(Y/N)?" YN
IF ERRORLEVEL 2 GOTO DOMEMORY
IF ERRORLEVEL 1 GOTO SKIP
:DOMEMORY
REM place commands for memory-resident programs here
:SKIP
REM place the rest of the AUTOEXEC.BAT command here
```

The REM lines are remarks about where to place the commands that load memory-resident programs and where to place other AUTOEXEC.BAT commands.

With the ASK command's DEFAULT=*key* parameter, you can specify what Enter means. DEFAULT=Y, for example, means that pressing Enter is the same as choosing **Y**es.

With the TIMEOUT=*n* parameter, you can specify how long the ASK command waits for an answer before taking the default answer (*n* denotes the number of seconds to wait).

If one menu will not hold all the options you want to use, you may have to use a multipart menu. You may have a two-layer menu, for example, with 10 options in the first layer. When BE returns an errorlevel code in the second layer, you can adjust the errorlevel by 10 by including the option ADJUST=10 so that the level matches your IF. . .GOTO statements. If you do not adjust the errorlevel, the errorlevels in the second menu are 1, 2, 3, and so on. With the adjustment, the errorlevels become 11, 12, 13, and so on. This adjustment enables you to tell the difference between option 1, menu 1 (errorlevel=1) and option 1, menu 2 (errorlevel=11).

ADJUST=*n* enables you to make the errorlevel numbers higher so that they do not conflict with numbers you have already used. If, for example, your first menu has four options, the menu could have an errorlevel value of 1 to 4. In a subsequent menu, you can include an ADJUST=4 command so that the menu begins with the errorlevel value 5. You then use the resulting errorlevel number to branch to the proper location in the batch file.

You also can set colors in the ASK statement. (Color options are described in the section "Using the SA Command" later in this chapter.) Including WHITE on BLUE in the BE ASK command line, for example, causes the prompt to appear as white letters on a blue background. The *color* selection is in effect only for the ASK prompt.

When you use the /DEBUG switch, the errorlevel of a command is displayed. This switch helps you figure out what the various errorlevel codes mean, because you cannot find out in DOS.

Using the BEEP Command

The BEEP command produces a tone or series of tones. This command can come in handy if you create a batch file that performs a long operation. You can use BEEP to tell you audibly that the batch file is finished or is at a certain stage of the process.

Note two versions of this command:

BE BEEP [*switches*]

BE BEEP [*filespec*] [/E]

If you include a *filespec* parameter, the file specified should contain a list of tones to be played. When used with *filespec*, the /E switch instructs the BE BEEP command to echo the text in the file to the screen.

If you do not include *filespec*, use switches to specify the tones to be played. The following switches are available for use with BE BEEP:

Switch	Description
/D*n*	Specifies the duration of a tone in measurements of 1/18 of a second. Thus, D3 specifies that the tone be sounded for 3/18 of a second.
/E	Echoes (displays) to the screen quoted text in comments in the BEEP script file.
/F*n*	Specifies the frequency of a tone, where *n* is hertz (Hz), or cycles per second. The switch /F440, for example, plays a tone at 440 Hz. The larger the value of *n*, the higher-pitched the tone.
/R*n*	Specifies that the tone be repeated *n* times.
/W*n*	Specifies a wait in durations of 1/18 of a second. The switch /W3, for example, causes a wait of 3/18 of a second. You usually use this switch to specify a pause between beeps.

The following command plays a tone at 440 Hz for one second (18/18), waits half a second (9/18), and then repeats the tone:

BE BEEP /F440 /D18 /R2 /W9

To place this command in a file named TONE, enter the following as the TONE file:

```
/F440 /D18 /R2 /W9
```

Note that when the tone information is in a file to be called by the BEEP subcommand, you do not place BE BEEP in front of the tone information.

Then enter the following command at the DOS prompt to sound the tone:

```
BE BEEP TONE
```

Using the BOX Command

The BOX command enables you to draw boxes on-screen. Boxes are helpful for emphasizing on-screen messages and for creating menus.

Here is the syntax of the BOX command:

BE BOX *top,left,bottom,right* [SINGLE|DOUBLE] [*color*]

The following parameters may be used with this command:

Parameter	Description
top	Specifies the row number of the top-left corner of the box
left	Specifies the column number of the top-left corner of the box
bottom	Specifies the row number of the bottom-right corner of the box
right	Specifies the column number of the bottom-right corner of the box
SINGLE	Produces a box with single lines (the default)
DOUBLE	Produces a box with double lines
color	Specifies color choices

The SINGLE or DOUBLE parameter specifies a single or double line around the box. The *color* parameter specifies color choices (see the section "Using the SA Command" later in this chapter).

Note this example:

```
BE BOX 2,10,10,70 SINGLE
```

This command draws a single-line box beginning at the 2nd row, 10th column of the screen and extending to the 10th row, 70th column.

Using the CLS Command

The purpose of the CLS command is to clear the screen. Optionally, you can use this command to set the screen color.

The CLS command has the following syntax:

BE CLS [*color*]

The *color* selections you can use are the same as those for the BE SA command. A list of color choices appears in the section "Using the SA Command" later in this chapter. The BE SA command has a /CLS switch option, so you can also use that command to set colors and clear the screen.

The following command clears the screen and displays characters in bold white on a blue background:

BE CLS BOLD WHITE ON BLUE

Using the DELAY Command

The DELAY command causes a batch file to suspend operation temporarily. Suppose that your batch file is displaying information on-screen. You may want to build in a delay so that you can read this information before other information appears on-screen.

The DELAY command has this syntax:

BE DELAY [*time*]

The *time* parameter is measured in 1/18 of a second. Thus, the following command causes a one-second delay:

BE DELAY 18

Using the EXIT Command

The EXIT command causes a script file to end. You can use this command, which has no options, to stop a script at any point.

Here is the syntax of the EXIT command:

BE EXIT

You should use this command only in a script file. The command has no meaning in a regular DOS batch file.

Using the GOTO Command

With the GOTO command, you can control the starting point of a script. You can use this command only in script files; it does not work in DOS batch files.

The GOTO command has the following syntax:

BE *pathname* [[GOTO] *label*]

The *pathname* is a script file, and *label* is a label in the script file. As mentioned earlier, a label is a statement that begins with a colon. The following statement, for example, is a label:

:THISISALABEL

Using the JUMP Command

With the JUMP command, you can perform conditional branching in a script. You can use this command only in script files; it does not work in DOS batch files.

Unlike GOTO, which always branches to a specified label, JUMP enables you to branch to one of several labels based on the current value of the exit code.

Note the syntax of the JUMP command:

BE JUMP *label1*,[*label2*[,...*labeln*]] [/DEFAULT:*label*]

In this line, *label1* is the name of the label to which the flow of the script is sent if the exit code is 1, *label2* is the name of the label to which the flow is sent if the exit code is 2, and so on. If no label matches the exit code, the flow goes to the label specified by *label* in the /DEFAULT switch. If no match to an exit code and no default label exist, execution continues with the command following the JUMP command.

The following script file displays the day of the week:

```
BE CLS
BE WEEKDAY
BE JUMP SU,M,TU,W,TH,F,S
:SU
```

```
BE ROWCOL 1,1 "Today is Sunday"
BE JUMP /DEFAULT:LAST
:M
BE ROWCOL 1,1 "Today is Monday"
BE JUMP /DEFAULT:LAST
:TU
BE ROWCOL 1,1 "Today is Tuesday"
BE JUMP /DEFAULT:LAST
:W
BE ROWCOL 1,1 "Today is Wednesday"
BE JUMP /DEFAULT:LAST
:TH
BE ROWCOL 1,1 "Today is Thursday"
BE JUMP /DEFAULT:LAST
:F
BE ROWCOL 1,1 "Today is Friday"
BE JUMP /DEFAULT:LAST
:S
BE ROWCOL 1,1 "Today is Saturday"
:LAST
```

The BE CLS command clears the screen. The BE WEEKDAY command returns 1, 2, 3, 4, 5, 6, or 7 (see the section "Using the WEEKDAY Command" later in this chapter). The BE JUMP command branches to the correct day-of-week display, and the BE ROWCOL command prints the message at the top of the screen. Then the JUMP /DEFAULT:LAST command branches to the :LAST label and ends the program.

Using the MONTHDAY Command

The MONTHDAY command returns the day of the month as an exit code, which you then can use in a JUMP command or an IF ERRORLEVEL command.

The MONTHDAY command has the following syntax:

```
BE MONTHDAY [/DEBUG]
```

The /DEBUG option causes the exit code to display on-screen.

The following example shows how you could use the BE MONTHDAY command in a DOS batch file. The batch file clears the screen, and if today is the first day of the month, an important message is displayed on-screen:

```
ECHO OFF
CLS
```

```
BE MONTHDAY
IF ERRORLEVEL 1 GOTO FIRST
GOTO LAST
:FIRST
ECHO Today is the first day of the month!
ECHO Be sure to mail your house payment!
:LAST
```

Compare this example with the one in the preceding section to see the difference between writing a batch file and writing a script file. This example uses the DOS ERRORLEVEL command to branch, and the preceding section's example uses the Norton BE JUMP command to branch.

Using the PRINTCHAR Command

With the PRINTCHAR command, you can print a character a specified number of times. This command comes in handy if you are drawing images on-screen, perhaps to highlight a message or embellish a menu.

Here is the syntax of the PRINTCHAR command:

BE PRINTCHAR *character,repeats* [*color*]

The *character* parameter can be any ASCII character. You can specify any number of *repeats* up to 80. The *color* parameter is described in the section "Using the SA Command" later in this chapter.

T I P

In the BE PRINTCHAR command, you can use characters from the extended IBM character list—ASCII characters 128 to 255—if your program can access them. (Some editing programs, such as WordStar, may not be capable of accessing the IBM extended characters.) The ASCII codes for the extended character set are listed in the back of most DOS or BASIC manuals.

For example, to use the Greek letter beta (β) in the BE PRINTCHAR command, hold down the Alt key, type the ASCII code 225 on the numeric keypad, and release the Alt key. The letter β should appear on-screen.

To print the character 20 times, enter the following command:

BE PRINTCHAR β,20

Using the REBOOT Command

The REBOOT command enables you to perform a warm boot of the computer. REBOOT has the following syntax:

BE REBOOT [/VERIFY]

When you include the /VERIFY switch in the command, you are prompted to confirm whether the reboot should take place. This command may be useful if you change or replace your AUTOEXEC.BAT or CONFIG.SYS file within a batch file. Causing a reboot then resets your computer to the new values within these files.

Using the ROWCOL Command

You use the ROWCOL (Row Column) command to place the cursor somewhere on-screen before writing a message to the screen. With the ROWCOL command, you can place information anywhere on-screen and be creative in designing menus or messages.

Here is the syntax of the ROWCOL command:

BE ROWCOL *row,col*[,*text*] [*color*]

The *row* parameter represents the number of the on-screen row where you want the cursor to appear (usually 1 to 25). The *col* parameter is the number of the column on-screen (usually 1 to 80). The *text* parameter is a message, enclosed in quotation marks, that you want to display at the specified location. The *color* parameter is described in the next section.

Suppose that you are designing a menu screen and you want the text *ABC Company, Inc.* to appear on the top line of the screen. You can use the following command:

BE ROWCOL 1,33,"ABC Company, Inc."

In this command, 1 specifies the top line of the screen, and 33 specifies the 33rd column. This specification centers the message on-screen.

Using the SA Command

The SA (Screen Attributes) command enables you to specify colors and other screen features. With this command, you can design your screen by combining different colors, boldfaced text, normal text, and blinking text. You can use the SA command to call attention to messages on-screen or to make your menus more colorful.

You use one of the following versions of the SA command:

BE SA *main-setting* [*switches*]

BE SA [*intensity*] [*foreground*] [ON *background*] [*switches*]

The options for *main-setting* are NORMAL, REVERSE, and UNDERLINE. Choices for *intensity* are BRIGHT, BOLD, and BLINKING. (BRIGHT and BOLD are identical.) Choices for *foreground* and *background* colors are WHITE, BLACK, RED, MAGENTA, BLUE, GREEN, CYAN, and YELLOW.

Here are the available switches:

Switch	Description
/CLS	Clears the screen after setting the screen attributes; enables you to see the effects of the SA command on-screen immediately
/N	Instructs the SA command not to set a border color

The SA command is helpful not only as a command in Batch Enhancer but also directly in DOS. For example, to set your monitor to a blue background with white letters, use the following command:

BE SA WHITE ON BLUE

This sets the color for the screen and stays in effect until you use another command to change the setting.

The following is a list of color choices for SA:

Setting	Command
Intensity	BRIGHT or BOLD (these commands are identical) BLINKING
Main setting	NORMAL REVERSE UNDERLINE
Colors (either foreground or background)	WHITE BLACK RED MAGENTA BLUE GREEN CYAN YELLOW

Using the SHIFTSTATE Command

The SHIFTSTATE command reports the status of the Shift, Alt, and Ctrl keys. The command returns an exit code according to the state of the left Shift, right Shift, Alt, and Ctrl keys. You can then use the exit code to cause the script to branch with the JUMP command or DOS ERRORLEVEL command. Here is the syntax of SHIFTSTATE:

BE SHIFTSTATE [/DEBUG]

The /DEBUG switch causes the exit code to display on-screen. SHIFTSTATE returns the following exit codes:

If Key Is in Shift State	Code Returned
Alt key (left or right)	8
Ctrl key (left or right)	4
Left Shift key	2
Right Shift key	1

For example, type **BE SHIFTSTATE /DEBUG** at the DOS prompt; then hold down the left Shift key and press Enter. The response will be the message `ERRORLEVEL: 2`. You can use SHIFTSTATE to create commands that perform different tasks according to which of these keys is being pressed when the command is invoked.

Using the TRIGGER Command

The TRIGGER command halts the execution of a script until a specified time. Suppose that you have a communications program set up to send data to a distant location. You can use this command to instruct the program to begin execution early in the morning, when telephone rates are lowest.

The TRIGGER command has the following syntax:

BE TRIGGER *hh:mm* [AM] [PM]

The *hh:mm* parameter is the hours and minutes in military (24-hour clock) time. Thus, 14:00 is 2 p.m.

NOTE You can use the AM or PM designation in the command line to specify 12-hour clock time, as in 2:00 PM. In this designation, 12:00 AM is the same as 0:00 (midnight), and 12:00 PM is noon.

The following command causes the script to pause until 2 a.m. before continuing:

```
BE TRIGGER 2:00 AM
```

Using the WEEKDAY Command

The WEEKDAY command, which is similar to MONTHDAY, returns the day of the week as an exit code. You can use the WEEKDAY command in a JUMP command or an IF ERRORLEVEL command.

Note the syntax of the WEEKDAY command:

```
BE WEEKDAY [/DEBUG]
```

The /DEBUG switch causes the exit code to display on-screen.

For example, to cause a backup to be performed on the second day of the week (Monday), you can use the following commands:

```
BE WEEKDAY
BE JUMP NOBACKUP,BACKUP /DEFAULT:NOBACKUP
```

On the first day of the week, the command branches to NOBACKUP. On the second day of the week, the batch file goes to the label :BACKUP (which contains instructions for performing a backup). On other days, the flow of the script is to the :NOBACKUP label.

You can use the related command MONTHDAY in the same manner to design batch files that are sensitive to specific days of the month. **T I P**

Using the WINDOW Command

Like the BOX command, the WINDOW command draws boxes on-screen. WINDOW, however, gives you the options of drawing the box with a shadow and of zooming the box onto the screen. You can use the WINDOW command to create menus or to highlight messages on-screen.

Here is the syntax of the WINDOW command:

BE WINDOW *top,left,bottom,right* [*color*] [SHADOW] [ZOOM]

The following parameters are available:

Parameter	Description
top	Specifies the row number of the top-left corner of the window
left	Specifies the column number of the top-left corner of the window
bottom	Specifies the row number of the bottom-right corner of the window
right	Specifies the column number of the bottom-right corner of the window
color	Determines color setting (see the section "Using the SA Command" earlier in this chapter)
SHADOW	Adds a shadow to the right and bottom edges of the window
ZOOM	Zooms the window onto the screen (the window starts as a small rectangle and grows to full size)

The following command draws a window with the top-left corner positioned two lines from the top and 10 columns from the left of the screen:

BE WINDOW 2,10,20,70 SHADOW ZOOM

The bottom-right corner of the window is 20 lines from the top and 70 columns from the left of the screen. The window, which has a shadow, zooms onto the screen. The main difference between the BOX and WINDOW commands is that BOX does not overwrite any text on-screen. WINDOW blanks out the window, erasing any text on-screen.

Combining DOS and Batch Enhancer Commands

By combining DOS batch commands and Norton Batch Enhancer commands, you can develop creative batch files. The following example is a batch file named MENU.BAT that uses DOS batch commands and several Batch Enhancer commands to create a menu system for your computer:

```
ECHO OFF
:BEGIN
CD\NU7
BE SA WHITE ON BLUE
CLS
BE WINDOW 2,10,12,65 WHITE ON RED SHADOW ZOOM
BE ROWCOL 3,30 "My Special Menu"
BE ROWCOL 5,16 "Exit to DOS.........................D"
BE ROWCOL 6,16 "Begin Norton Utilities.............N"
BE ROWCOL 7,16 "Begin WORDPERFECT..................W"
BE ROWCOL 8,16 "Begin KWIKSTAT.....................K"
BE ROWCOL 10,16
BE ASK "Choose an option letter:",dnwk default=D
IF ERRORLEVEL 4 GOTO KWIKSTAT
IF ERRORLEVEL 3 GOTO WORD
IF ERRORLEVEL 2 GOTO NORTON
IF ERRORLEVEL 1 GOTO THATSALL
:KWIKSTAT
CLS
CD\KWIKSTAT
KS
GOTO BEGIN
:WORD
CLS
CD\WP51
WP
GOTO BEGIN
:NORTON
CLS
CD\NU7
NORTON
GOTO BEGIN
:THATSALL
BE SA WHITE ON BLUE
CLS
```

After you create the batch file MENU.BAT and issue the MENU command from the DOS prompt, a screen like the one in figure 24.1 appears.

As you can see in lines 6 through 12 of the batch file, the batch file creates the menu by first drawing a box with the WINDOW command and then using the ROWCOL command to give the menu a heading and to locate the items for the menu. The ASK command captures the user's response, which the IF ERRORLEVEL commands evaluate. Each menu choice points to a label in the batch file, and at that label, the batch file begins a program or exits to DOS. If you choose a program by pressing

N, W, or K, the program associated with that selection begins. After the program returns to DOS, the batch file continues to operate and displays the menu again.

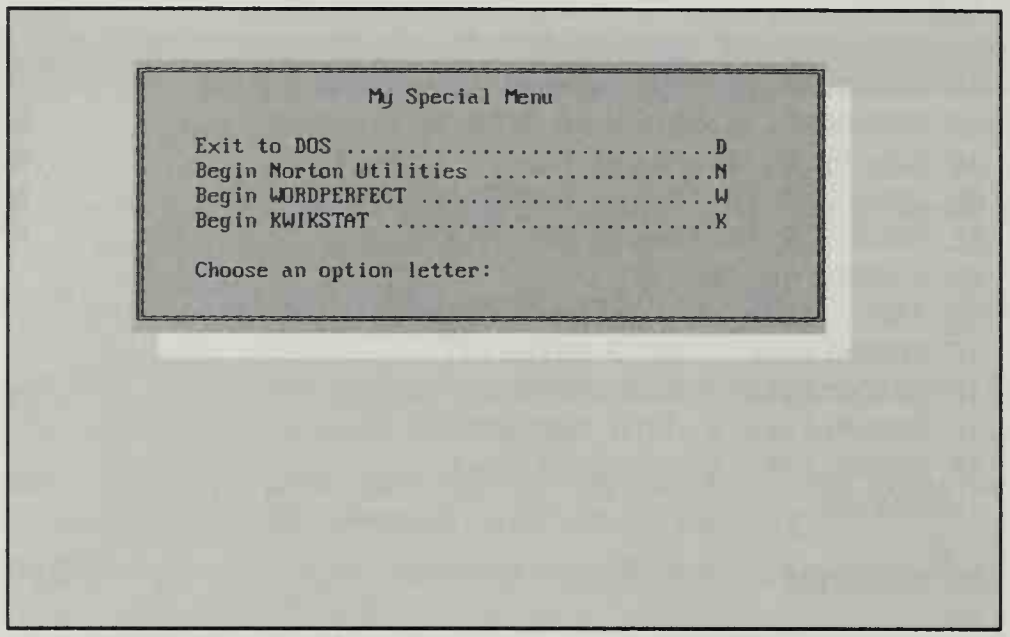

Fig. 24.1
The screen displayed by the batch file MENU.BAT.

The MENU.BAT program is created to run from the NU7 directory. Because the BE command is located in this directory, the program runs quickly. If you use a menu program like this one, be sure that you put the program in the directory that contains the Norton BE.EXE Batch Enhancer program. If you use the BE command in another directory, DOS searches the directories defined in your DOS path for the BE.EXE program. If the NU7 directory appears early in the path, the execution of the BE command goes faster than if the NU7 directory appears later in the path.

Summary

The Norton Batch Enhancer command enables you to create more useful batch files—programs that consist of a series of DOS and Batch Enhancer commands. This chapter described the commands you can use with the BE command and presented ways in which you can use these commands.

The next chapter shows you how to use Norton commands to find files by name and by content.

CHAPTER 25

Finding Files

When it comes to managing your computer files, hard disks are both a blessing and a curse—a blessing because they can store thousands of files, and a curse because finding a file when you can't remember its name or location is frustrating. Norton Utilities provides not one, but three solutions to this problem.

The Text Search (TS) and File Locate (FL) commands, which relate to finding files, have been around since the early versions of Norton Utilities. Because they are command-line programs, you can enter them at the DOS prompt with switches and options, just as you would enter a DOS command. The third program, File Find, is a more recent development. Designed to be an interactive program, File Find enables you to choose options from information displayed in a dialog box. For many Norton Utilities users, the Text Search and File Locate commands are familiar, quick, and easy to use. If you prefer to see all the options on-screen and to choose them interactively, the File Find command is for you.

This chapter covers all the options of the File Find command, which includes the capability to find files and to set file attributes, dates, and times. The chapter also explains how to use the File Locate and Text Search commands.

Searching for Files

Two Norton commands enable you to locate files on disk by name. File Locate is designed to be used from the DOS prompt; File Find can be used to locate files interactively (that is, you choose search options in a dialog box).

If you created a file months ago but don't remember where you placed it on disk, File Find and File Locate can help. If you can remember the file's name—or even a part of the file name—you may be able to locate the file with one of these two commands. They also can help you find file duplicates or the most recent copy of a file on disk.

Using File Find To Locate a File

The File Find command displays a dialog box, where you provide information and select options.

To locate a file by name on the current drive with the File Find command, follow these steps:

1. Choose File Find from the Norton main screen or enter **FILEFIND** at the DOS prompt. The File Find dialog box appears (see fig. 25.1).

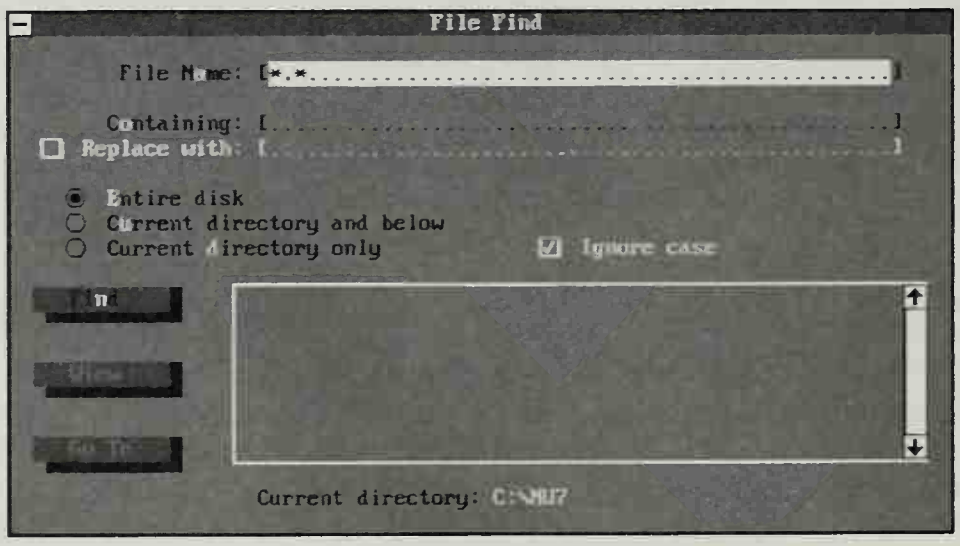

Fig. 25.1
The File Find dialog box.

2. In the File Name text box, enter the file name or a part of the file name (use the DOS wild-card characters * and ?). Do not type anything in the Containing field.

For example, to find all files with an XYX extension, type ***.XYX** in the File **N**ame text box.

3. To select the portion of the disk to search, choose one of the following options: **E**ntire Disk, C**u**rrent Directory and Below, or Current **D**irectory Only.
4. To start the search, choose Fi**n**d, which finds all files that match the criteria you specified. The Search Complete dialog box appears when the search finishes. Choose **O**K. A list of the matching files appears in the list box.
5. To view the contents of the list box, use the up- and down-arrow keys or the scroll bar to highlight the name of a file (or use the mouse to click the file name).
6. To view the contents of the highlighted file, choose Vie**w** or double-click the file name. The contents are displayed on-screen. To exit the view, press Esc or choose **C**lose.

To locate a file by name on multiple drives with the File Find command, follow these steps:

1. Choose File Find from the Norton main screen or enter **FILEFIND** at the DOS prompt.
2. In the File **N**ame text box, enter the file name or a part of the file name.
3. Choose **E**ntire Disk.
4. Choose the **S**earch Drives option from the **S**earch pull-down menu. The dialog box shown in figure 25.2 appears.

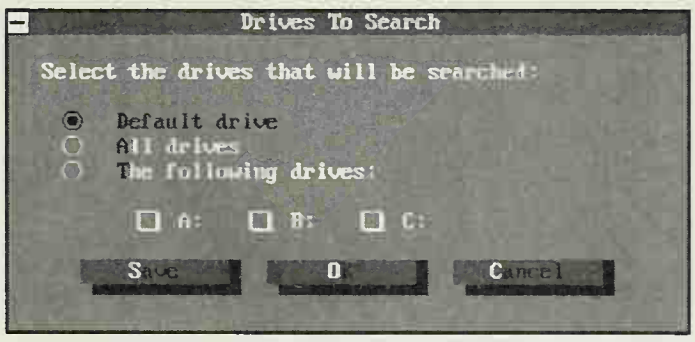

Fig. 25.2
The Drives To Search dialog box.

5. Choose **D**efault Drive (the default setting) to search only the current drive, choose **A**ll Drives to search all drives that appear in the Drives To Search dialog box, or choose **T**he Following Drives and then specify the drives to search.

6. Choose **S**ave to permanently save these drives for searching, or choose **O**K to save these drive specifications for the current File Find session only. To ignore your selections and return to the File Find dialog box, choose **C**ancel.
7. To start the search, choose Fi**n**d. When the search finishes, the Search Complete dialog box appears. Choose **O**K. A listing of matching files appears in the list box.
8. To view the contents of the list box, use the up- and down-arrow keys or the scroll bar to highlight the name of a file (or use the mouse to click the file name).
9. To view the contents of the file, choose Vie**w** or double-click the file name. The contents are displayed on-screen. To exit the view, press Esc or choose Cl**o**se.

To end File Find, choose **F**ile E**x**it.

Using the File Locate Command

The File Locate (FL) command is designed so that you can use it from the DOS prompt. FL has the following syntax:

FL [*filespec*] [*switches*]

The following switches are available:

Switch	Description
/A	Searches for files on all drives.
/F*n*	Finds the first *n* files that match the file specification. The default number of files to find is 1.
/P	Pauses after each screen.
/T	Searches the directories in the PATH statement only.
/W	Lists files in wide format on-screen.

To locate all files on all drives that match the file specification *.XYX, use the following command:

FL *.XYX /A

Norton then produces a listing of the locations where this file is found.

Searching for Information within Files

Two Norton commands enable you to search for information *within* files. The Text Search command is convenient to use from the DOS prompt, and the File Find command enables you to perform the search interactively.

When you look for a file that contains certain information, but you cannot remember the name of the file, you can perform a text search to help. You can even perform a search on erased files. The following sections show you how to search for text in files by using File Find and Text Search.

Using File Find To Locate Information

File Find locates a file that contains specified text in much the same way that the command locates a file, as discussed earlier in the chapter. When you locate a file with specified text, however, you place search criteria in the Containing field in the File Find dialog box and specify whether to ignore case.

The information you place in the Containing field specifies which files appear in the list box. Only those files that match the specified criteria in the Containing field will be listed. By default, the Ignore Case option is selected, which means that if you search for *QUE*, you also find occurrences of *Que*. To turn off the Ignore Case option, use the Tab key to highlight the option, and then press the space bar to deselect it (or point to the option with the mouse pointer and click).

Choose Find to begin the search; the matching files appear in the list box. End File Find by pressing Esc or choosing File Exit.

For information about viewing the files in the list box and searching multiple drives, see the section "Using File Find To Locate a File" earlier in this chapter.

Using Text Search To Locate Information

The Text Search (TS) command enables you to search for text in files anywhere on disk, including erased space. The command has the following syntax:

TS [*filespec*] [*string*] [*switches*]

The *filespec* variable specifies the files to be searched, such as *.BAT. If *filespec* is missing, all files are searched. The *string* is the text to be located, such as ALABAMA.

The following switches are available:

Switch	Description
/A	Automates the search (that is, ignores prompts).
/C*n*	Begins the search at the cluster specified by *n*.
/CS	Performs a case-sensitive search. If you specify the search string as *Alan*, it will not find *ALAN*.
/D	Searches the entire disk.
/E	Searches only the erased portions of the disk.
/EBCDIC	Specifies that files being searched are in EBCDIC format.
/LOG	Creates output suitable for a log file or printer.
/S	Searches subdirectories also.
/T	Sets the noninteractive summary total.
/WS	Specifies that files being searched are in WordStar format.

To find occurrences of *ALABAMA* in files with a TXT extension, use the following command:

```
TS *.TXT ALABAMA
```

To find all instances of ALABAMA in erased space on disk, enter this command:

```
TS *.TXT ALABAMA /E
```

The command displays the file name or location of a find and asks whether you want to continue the search (unless you have used the /A switch). Press Y to continue the search or press N to cancel the search.

Using File Find To Set File Dates and Times

The File Find command (like the File Date command discussed in Chapter 26) enables you to set the date and time stamp on a file. The date and time stamp usually contains information about when the file was

created or last changed. This information is displayed when you use the DOS DIR command. You may want to reset the date and time stamp on a file, for example, to identify the release date or version number of a disk. If the release date for Version 1.3 of a program was 1-1-93, you could set the date of the files on the disk to 1-1-93 and the time to 1:30. Later, after the disk has been distributed, a support person can tell exactly what disk it is by looking at the date and time stamp.

To set the date and time of one or more files, follow these steps:

1. Choose File Find from the Norton main screen or enter **FILEFIND** at the DOS prompt.
2. Enter the file names to be affected in the File Name field. Do not enter anything in the Containing field.

   For example, to change all the dates and times for the files on drive A to 1-1-93 and 12:00, type **A:*.*** in the File Name field.
3. Make sure that the Entire Disk option is chosen. If it is not, choose this option.
4. Choose Find to start the search.

   In this example, choosing Find searches all files on drive A. The file names appear in the list box.
5. Choose the Set Date/Time option from the Commands pull-down menu.
6. The Set Date/Time dialog box appears (see fig. 25.3). This dialog box enables you to set the date and time for one file (the one currently highlighted in the list box) or for all files in the list. Choose the option you want.

Fig. 25.3
The Set Date/Time dialog box.

7. Select the Set Time To field and then press Tab to place the cursor in the time text box. In this example, type **12:00**.
8. Select the Set Date To field and press Tab again to place the cursor in the date text box. Type **1-1-93**.

9. Choose **OK**. The program changes the dates and times according to your selections. Press Esc or choose **F**ile **E**xit to end the File Find program.

The next chapter discusses the File Date (FD) command. The FD program is a command-line utility that also enables you to set file dates and times.

Using File Find To Set Attributes

You can use the File Find command to set attributes on files. When you create a file on disk, DOS stores the name of the file as well as other pieces of vital information. When you enter the DOS DIR command, you see some of this information—the size of the file, the date and time the file was created, and so on. DOS also stores four other pieces of information that you usually do not see.

With the File Attributes and File Find commands, you can control these attributes and protect important files from accidental changes or erasure. Chapter 9 covers ways to set these attributes.

Summary

When your hard disk accumulates files you created over several months or years, you may begin to lose track of which file is in what directory. When you need to search for a file by the file name, the extension, or the contents of the file, Norton Utilities provides two DOS command-line programs (File Locate and Text Search) and an interactive program (File Find) that enables you to search your disks for the file. This chapter described how to use the File Find, File Locate (FL), and Text Search (TS) commands.

Norton Utilities offers several other command-line utilities that can help you manage your computer's resources. Turn to the next chapter to learn about the File Date, Duplicate Disk, Line Print, File Size, and Directory Sort commands.

CHAPTER 26

Using Norton Command-Line Utilities

Several Norton Utilities programs do not fit into the previous chapters. This chapter covers command-line utilities, which are utilities you use by entering a command at the DOS prompt. Except for the command that is new to Version 7 (DUPDISK), most of these programs have been part of Norton Utilities for many years. This chapter describes the following utilities:

- File Date (FD), which allows you to set the file data and time stamp for one or more files
- File Size (FS), which determines the size in bytes of a file or group of files
- Line Print (LP), which prints a text document to the printer
- Directory Sort (DS), which sorts a directory
- Duplicate Disk (DUPDISK), which duplicates disks

Directory Sort and Duplicate Disk can also be used interactively. This chapter explains how to use these programs and describes their command-line options. Other on-line utilities that have been described in previous chapters include Norton Cache (Chapter 21), File Attributes (Chapter 9), File Locate (Chapter 25), and Text Search (Chapter 25).

Using File Date (FD)

The File Date (FD) command enables you to change the date and time stamp on a disk file. When a file is created, DOS places the creation date and time in the file directory; when you issue the DOS DIR command, you see the date and time that the file was created or last changed. Usually, you cannot change the date and time stamp on a file. With the Norton File Date command, however, you can easily change this information. You use this syntax:

FD [*filespec*] [*switches*]

The following command-line switches are available:

Switch	Description
/D[:]*date*	Sets date (*mm-dd-yy*)
/P	Pauses after each screen is displayed
/S	Also sets dates on files in subdirectories
/T[:]*time*	Sets time (*hh:mm:ss*)

To set all files on a disk to a date of 1-1-93 and a time of 12:00, use this command:

FD *.* /D:1-1-93 /T:12:00

NOTE The File Find command, described in Chapters 9 and 25, can also be used to set the date and time stamp for files.

Using File Size (FS)

The File Size (FS) command enables you to list the size of a file or the total size of a group of files. You can, for example, find out how much room on your disk is taken up by files with the extension EXE.

File Size also lists the slack space associated with files. *Slack space* is space within a cluster that is allocated to a file but not actually used. If, for instance, a cluster is 512 bytes and the file stored in it is only 300 bytes, there are 212 bytes of unused slack space. This disk space is wasted because another file cannot use it. The only way that you can really control slack space is to control the size of your files so that their

size is close to a multiple of the cluster size. That is hard to do, however. Another way to control slack space is to avoid having many small files by combining them into one large file.

You can use File Size to determine whether a target disk has enough space to receive a copy of a group of files. Because the size of clusters differs between hard disks and floppy disks, you cannot tell just by the size of files on your hard disk whether they will fit on a floppy disk. A floppy disk may have a 512-byte cluster, whereas a hard disk may have a 2,048-byte cluster. Thus, the 300-byte file on the floppy disk takes up one cluster (512 bytes), but the same file takes up 2,048 bytes on the hard disk. Even though you may have a group of files containing more than 360K on your hard disk, the files may fit on a 360K floppy disk. The File Size command tells you whether this fit is possible. Here is the syntax of the FS command:

FS [*filespec*] [*target drive*:] [*switches*]

The following switches may be used with FS:

Switch	Description
/P	Pauses after each screen
/S	Includes subdirectories in the file list
/T	Displays the total size for the specified files, not the size of individual files

To find out the size of all files in the current directory, use the command FS *.* or just FS. To find out whether there is room for these files to be copied onto drive A, use the command FS *.* A:.

Using Line Print (LP)

The Line Print (LP) command enables you to print a text file to the printer. This command is similar to the DOS PRINT command, but LP has a number of options not found in PRINT. Note the syntax of the LP command:

LP [*filespec*] [*output*] [*switches*]

The *output* parameter tells Line Print where to print the file. The default is PRN. Some common output designations are LPT1, LPT2, COM1, and COM2.

The following switches are available:

Switch	Description
/80	Sets page width at 80 columns.
/132	Sets page width at 132 columns.
/A	Appends the file to the specified output file. If an output file exists, the new information is added to the end of that file. Otherwise, LP creates a new file. This switch works only if you have specified an output file.
/B*n*	Sets bottom margin to *n* lines (default is 3).
/CONFIG:*file*	Prints *file* according to the information in the specified file. Use the NUCONFIG command to create this configuration file.
/EBCDIC	Tells Line Print that the original file is in EBCDIC format.
/HEADER*n*	Sets the type of header, where *n* is one of the following: 0 = no header 1 = header consisting of current date and time on line 1 (default) 2 = header consisting of current date and time plus file date and time, on two lines
/Hl*n*	Sets page height to *n* lines (default is 66).
/L*n*	Sets left margin to *n* spaces (default is 5).
/N	Turns on page numbering.
/PA*n*	Sets starting page number at *n* (default is 1).
/PR:*xx*	Tells LP what kind of printer you are using. Note the following options: TT = Teletype (TTY) GE = Generic (the default) EP = Epson dot matrix PR = Proprinter QU = Quietwriter TO = Toshiba LA = LaserJet PO = PostScript

Switch	Description
/R*n*	Sets right margin to *n* spaces (default is 5).
/SET:*filespec*	Tells Line Print that a printer setup string is in the specified file.
/SP*n*	Sets line spacing to *n* lines (default is 1).
/TAB*n*	Sets tab spacing to *n* spaces (default is 8).
/T*n*	Sets top margin to *n* lines (default is 3).
/W*n*	Sets page width to *n* spaces (default is 85).
/WS	Tells Line Print that the original file is in WordStar format.

For example, to print a file named REPORT.TXT (which was created with WordStar) to the printer, use this command:

```
LP REPORT.TXT /WS
```

Using Directory Sort (DS)

Directory Sort (DS) enables you to sort one or more directories by name, extension, time, date, or size. You can use Directory Sort in command-line mode or interactively.

By sorting files, you can cause the file names to appear in a particular way when you use the DIR command. Sorting files makes it easier to find files with similar characteristics. If you sort by extension, you can easily locate all EXE files because they will appear together. If you want to look at the names of your most recently changed files, you can sort on date and time. Then the directory shows all the most recent files at the end of the directory list.

The following sections describe the Directory Sort options.

Using Directory Sort with Switches

Here is the syntax of the Directory Sort (DS) command:

```
DS sortkeys [directory] [/S]
```

The *directory* option tells Directory Sort which directory to sort. If you do not include a directory, DS sorts the current directory. The *sortkeys*

tell the utility how to sort the files in the directory. You can use the following sort keys:

Key	Meaning
D	Date
E	Extension
N	Name
S	Size
T	Time

You can include one or more keys in the command line. The sort progresses in the order in which the sort keys appear. If you use the keys EN, DS sorts on extension first, with names sorted within like extensions. If you place a minus sign after any key, the sort is in reverse order. For example, S sorts by size from smallest to largest, and S– sorts from largest to smallest.

The /S switch tells Directory Sort to sort the files in the current or specified directory and all subdirectories. For example, to sort files in the MYDIR directory and all subdirectories by date and time, use this command:

```
DS DT \MYDIR /S
```

Using Directory Sort in Interactive Mode

If you enter **DS** at the DOS prompt or choose Directory Sort from the Norton main screen, the Sorting dialog box appears (see fig. 26.1). In the left portion of this dialog box is a box containing a list of the files in the current directory, including the name, size, date, and time. In the right portion of the dialog box is the Sort Order box in which you specify the type of sort you want. To sort the file list according to the criteria in the Sort Order box, see the section "Specifying Sort Order" later in this chapter.

To end the program, press Esc or choose **Q**uit at the bottom of the dialog box. If you re-sort the directory and then choose **Q**uit, you are prompted with `Write changes before quitting?` If you choose **Y**es, the current sort is written to disk before the program ends. If you choose **N**o, the program ends without saving the new sort order to disk. If you choose **C**ancel, you return to the Sorting dialog box.

The next two sections describe the options in the Sorting dialog box.

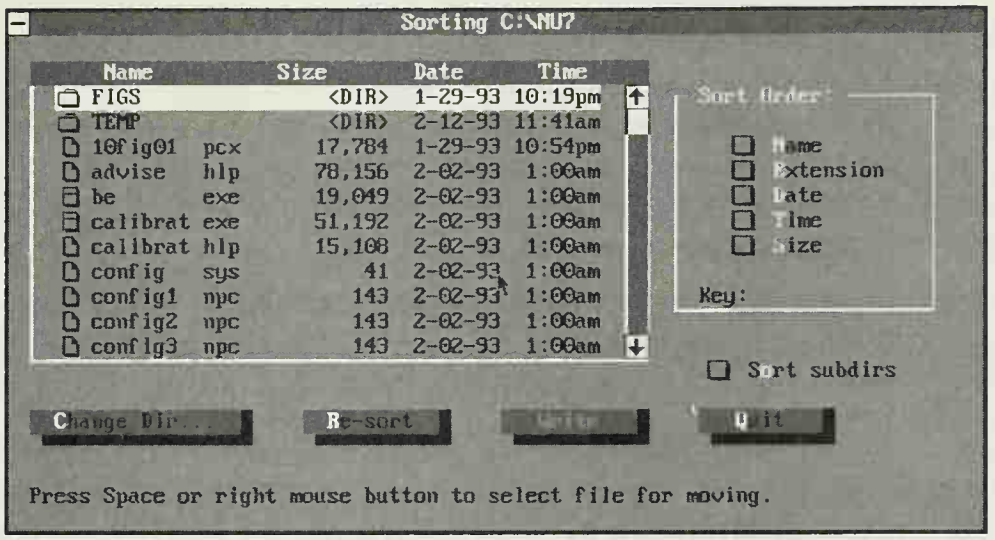

Fig. 26.1
The Sorting dialog box.

Manually Rearranging Files

You can manually rearrange the files and directories in the list box in the Sorting dialog box by moving a file from one position to another. To move a file by using the arrow keys, follow these steps:

1. Use the up- and down-arrow keys to highlight a file or directory to move. Press the space bar to lock in your choice.
2. Use the up- and down-arrow keys to move the selected file or directory to a new location in the list.
3. Press the space bar or Enter to fix the selected file or directory in its new location.

To move a file or directory by using a mouse, follow these steps:

1. Point to the file you want to move with the mouse pointer.
2. Click and hold down the right mouse button to select the file to move.
3. While holding down the right mouse button, drag the file to a new location in the list. Release the mouse button to fix the file or directory in its new location.

To save this rearrangement to disk, choose **W**rite at the bottom of the dialog box. To display files in another directory, choose **C**hange Dir and then choose a directory from the list. Press Esc or choose **Q**uit to end the program.

Specifying Sort Order

To specify the sort order, use the Sort Order box. Choose one or more of the sort items in the order in which you want the sort to take place. For example, to sort by extension first and then by name, choose **E**xtension and then **N**ame. A 1 appears beside your first choice, a 2 appears beside your second choice, and so on.

If you want to change the sort order, highlight the item and press the + or – key. A + or – appears to the right of the sort item to indicate the sort order. The sort key as you build it appears at the bottom of the Sort Order box.

Changing and Sorting Subdirectories

Below the Sort Order box is a check box named S**o**rt Subdirs. If you check this box, the sort you perform affects the current directory and any subdirectories. To sort a directory other than the one containing the files in the list box, choose **C**hange Dir. In the Change Directory dialog box, you are prompted to indicate the directory to use (see fig. 26.2). You can specify a new **P**ath, select a new D**r**ive, or choose a subdirectory from the **S**ubdirectories list. After you make your selection, choose **O**K to return to the Sorting dialog box, or choose **C**ancel to exit the Change Directory dialog box without making a directory or drive change.

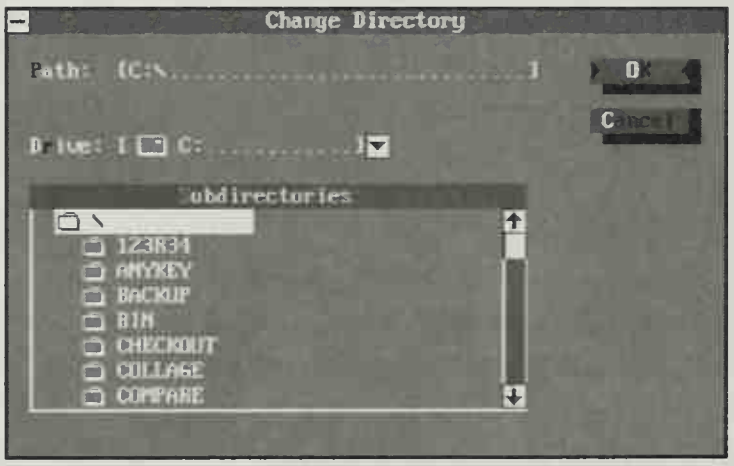

Fig. 26.2
The Change Directory dialog box.

Using Duplicate Disk (DUPDISK)

The Norton Duplicate Disk (DUPDISK) program is similar to the DOS DISKCOPY command, but DUPDISK has more features. Like DISKCOPY,

DUPDISK makes an exact duplicate of the contents of disks of the same size (such as 360K or 720K). You use the following syntax (*d*: is a disk drive):

DUPDISK *d*: [*d*:]

For example, to duplicate a disk from drive A to drive B, use this command:

DUPDISK A: B:

If you do not specify a second disk drive, DUPDISK assumes that the disk duplication will occur on the same disk.

Unlike DISKCOPY, DUPDISK enables you to make multiple copies of the same disk without having to reread the master (source) disk. If you are using a single floppy drive, DUPDISK usually asks you to swap disks only once during a copy instead of several times, as required by DISKCOPY.

DUPDISK and DISKCOPY create disks differently. When DOS formats a disk (beginning with DOS 4.0), it assigns the disk a unique volume serial number. (This number appears when you perform a directory listing of the disk.) Thus, when DOS runs DISKCOPY and formats the target disk, DOS gives that disk a serial number different from that of the original (source) disk. DUPDISK, however, makes an exact copy of the source disk to the target disk, including the serial number.

NOTE Because DUPDISK is designed to copy disks of the same size, you cannot use DUPDISK to duplicate a 360K source disk on a 720K target disk. To copy disks of different sizes, use the DOS COPY command.

If you issue the DUPDISK command with no command-line prompts, a dialog box appears, enabling you to specify the source (**F**rom) and destination (**T**o) drives for the copy (see fig. 26.3).

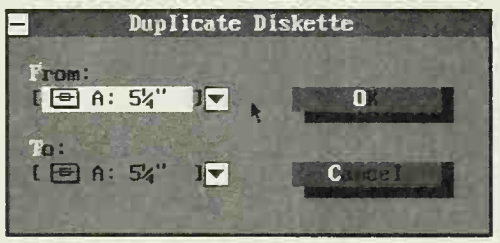

Fig. 26.3
The Duplicate Diskette dialog box.

Summary

This chapter described several command-line programs in Norton Utilities. These programs include File Date (FD), which allows you to change the date and time stamp on one or more files; File Size (FS), which determines the size in bytes of a file or group of files; Line Print (LP), which prints a text document to the printer; Directory Sort (DS), which sorts a directory; and Duplicate Disk (DUPDISK), which duplicates disks.

The next chapter describes the Norton Diagnostics (NDOS) program. With NDOS, you can run a thorough series of diagnostic tests on your computer.

CHAPTER 27

Using Norton Diagnostics

In Chapter 18, "Using System Info," you were introduced to the concept of using your computer more efficiently. Before you can take advantage of the many features covered in that chapter, you need to understand where problems occur and when they occur. Like System Info, Norton Diagnostics (NDiags) can be viewed as taking an X-ray of the internal components of your system and then offering a diagnosis that can be treated appropriately.

NDiags provides a variety of diagnostic tests as well as the following access methods:

- You can select and run the tests individually from the pull-down menus.
- You can run the tests in a predefined sequence, presented at the time you begin NDiags.
- You can run the tests from within the Report component, where you can identify the areas to be tested as well as the report format for presenting the results.

Understanding the Diagnostic Tests

Norton Diagnostics can perform a variety of sophisticated diagnostics on the components that make up your computer system. NDiags can perform these diagnostics individually, by user-defined groups, or as a full group. The component checklist includes the following:

- System board
  - DMA (Direct Memory Access) controller and registers
  - DMA concurrency pertaining to hard disk transfers
  - Interrupt controller responses
  - Timer frequencies
  - Real-time clock
- Serial ports
  - Modem control and status
  - Line control and status
  - Interrupts
  - Data
  - Loop tests (requires a loopback plug)
- Parallel ports
  - Control and data registers
  - Interrupt test (requires a loopback plug)
  - Data throughput (requires a loopback plug)
- CMOS status
  - Hard and floppy disks
  - Installed memory
  - CMOS battery functionality
  - CMOS time
  - Fixed disk controller
  - Memory and equipment configurations
  - Checksum
- Base memory
- Extended memory
- Expanded memory
- Hard disks
  - Sequential and random read tests
  - Effective RPM

- Floppy drives
  - Sequential and random read tests
  - Disk change test
  - Write protect test
  - Rotation and speed test
- Video memory tests
- Video mode tests
- Video grid tests
- Video color tests
- Mouse test
  - Button press test
  - Movement test
- Speaker test
- Keyboard press test
- Keyboard light test
  - Num Lock, Caps Lock, and Scroll Lock status lights

By default, each test provides an introductory dialog box that describes the test. You can turn off the introductory dialog boxes, as explained in the section "Understanding the Information Dialog Boxes" later in this chapter.

When you begin Norton Diagnostics without using any of the available switches, you are immediately placed in a mode to begin testing all system components in the order given in the preceding list. This chapter explains how to do the following:

- Perform all tests in a predefined order
- Examine the results of the tests
- Run selected tests
- Prepare written documentation of the test results

Running Norton Diagnostics

You can access Norton Diagnostics in one of two ways. You can use Norton Diagnostics interactively by choosing Diagnostics from the Norton main screen (see fig. 27.1). You can also work from the DOS prompt by entering the following command:

NDIAGS [*switches*]

As illustrated in figure 27.1, you can enter switches in the text box containing the NDIAGS command. The switches in this figure run Norton Diagnostics in auto (automatic) mode with a screen pause of five seconds between tests.

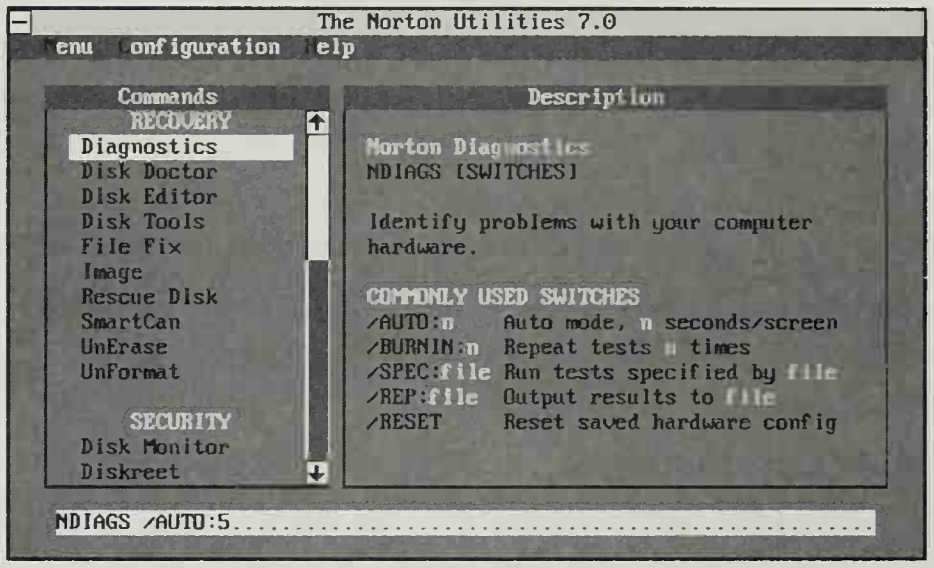

Fig. 27.1
The Norton Utilities main screen.

The following switches may be used with NDIAGS:

Switch	Description
/AUTO:*n*	Instructs the command to operate in automatic mode. The *n* parameter specifies a delay of *n* seconds between screens.
/BURNIN:*n*	Tells the command to perform the tests *n* number of times.
/SPEC:*file1*	Tells the command to generate a report with the parameters stored in *file1*. The section "Creating a Report" later in this chapter discusses this feature in greater detail.
/REP:*file2*	Tells the command to print a report to the file specified by *file2*.
/RESET	Tells the command to reset to the saved hardware configuration.

The **H**elp option in the NDiags menu allows you to access Norton's Help feature, as described in Chapter 1 on the basics of Norton Utilities. When you are viewing a particular screen, you can choose **H**elp or press F1 to display information about the currently displayed screen.

To exit the Norton Diagnostics program, press Esc, choose **E**xit from the **F**ile menu, or double-click the control box in the upper-left corner of the Norton Diagnostics dialog box.

Understanding the Information Dialog Boxes

Regardless of which method you choose for implementing Norton Diagnostics, until you elect to disable the messages that precede each test function, you are presented with an information dialog box describing the task(s) the test will perform. Figure 27.2 illustrates one of the information dialog boxes you encounter each time you access Norton Diagnostics. This particular message offers a comprehensive description of what NDiags does. To scroll through the entire message, press PgDn or click the scroll bar.

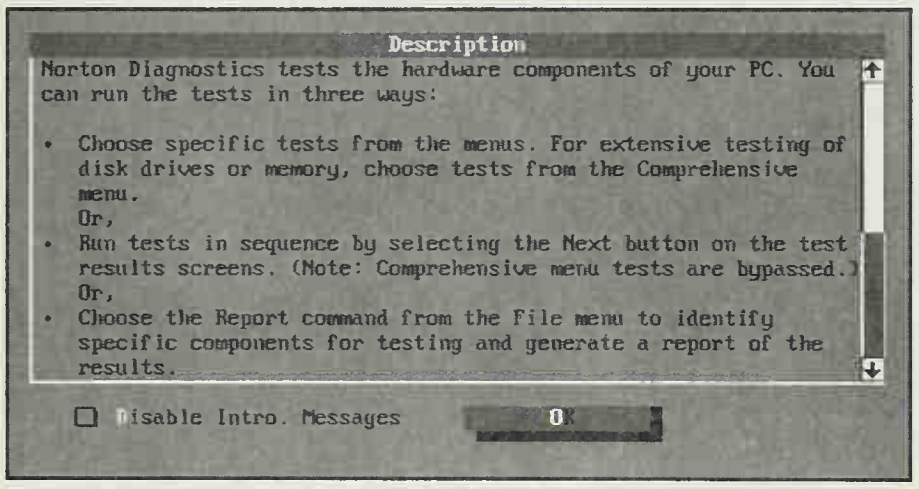

Fig. 27.2
A description of Norton Diagnostics.

Notice the check box that allows you to disable the information messages. You should familiarize yourself with the diagnostic procedures before you disable this function. When this information is no longer useful and you feel comfortable with each test, select the **D**isable Intro Messages option.

NOTE If you disable the messages, you can reinstitute them by choosing **O**ptions from the **F**ile menu.

Listing the Hardware on Your System

If the introductory messages are still enabled, you see the System Information Description message, describing what test is about to be performed (see fig. 27.3). After you press PgDn or use the scroll bar to scroll through the Description message and then select **OK**, you are presented with a System Information Description message that describes the next function.

The System Information dialog box, shown in figure 27.4, provides a complete listing of the physical components that Norton Diagnostics has detected in your system. This information might be particularly useful if, for instance, you know that you have two serial ports installed in your computer but only one is detected by Norton Diagnostics. Such information might help you determine why a device (such as a printer, modem, or plotter) is not working.

Fig. 27.3

The System Information Description message.

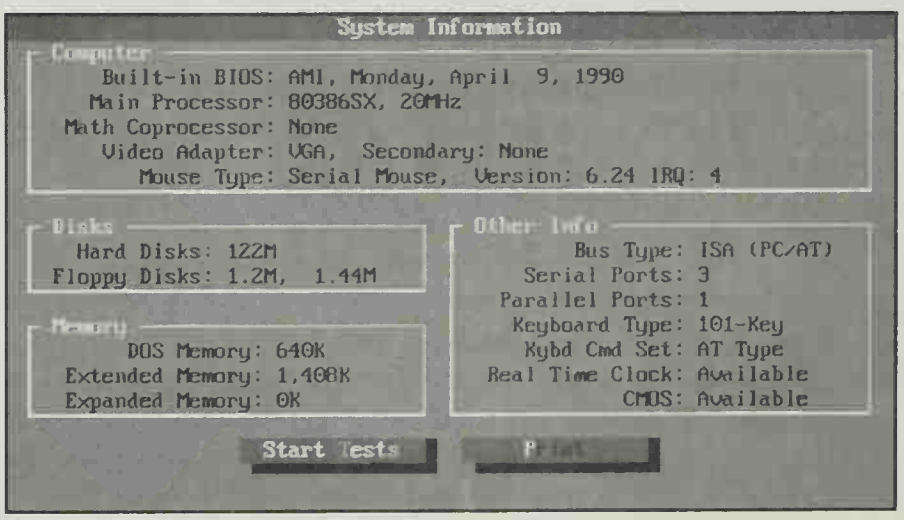

Fig. 27.4

The System Information dialog box.

As illustrated in figure 27.4, the system being tested here has AMI built-in BIOS, an 80386SX processor operating at 20 MHz, no math coprocessor, only 1 video adapter card (VGA), a serial mouse using IRQ 4 and mouse driver Version 6.24, a 122M hard drive, and 1.2M and 1.44M floppy drives. The Memory section shows 640K of DOS (base) memory, 1,408K of extended memory, and no expanded memory. The Other Info section indicates that this system's architecture (Bus Type) is ISA (PC/AT). The system has 3 serial ports and 1 parallel port; a 101-key, AT-type keyboard; and a real-time clock. CMOS is available. Examine this list closely to make sure that all components are present.

If you want to print your system configuration, choose **P**rint. As illustrated in figure 27.5, the printed report offers you a document worthy of filing for future reference.

```
                ************************
                *  System Information  *
                ************************

 ---------------------- Computer ----------------------
    Built-in BIOS: AMI, Monday, April  9, 1990
   Main Processor: 80386SX, 20MHz
 Math Coprocessor: None
    Video Adapter: VGA,  Secondary: None
       Mouse Type: Serial Mouse,  Version: 6.24 IRQ: 4

     ---------------------- Disks ----------------------
  Hard Disks: 122M
Floppy Disks: 1.2M,  1.44M

    ---------------------- Memory ----------------------
       DOS Memory: 640K
 Extended Memory: 1,408K
 Expanded Memory: 0K

 ---------------------- Other Info ----------------------
         Bus Type: ISA (PC/AT)
    Serial Ports: 3
  Parallel Ports: 1
   Keyboard Type: 101-Key
    Kybd Cmd Set: AT Type
 Real Time Clock: Available
            CMOS: Available
```

Fig. 27.5
The System Information report.

Starting the Diagnostic Tests

When you are ready to begin testing the components, choose Start Tests or press Enter.

After you choose Start Tests, the System Board Tests dialog box appears, offering information as to what is about to happen (if you have not disabled the introductory messages). Choose **O**K to begin testing the system board, or choose **S**kip to bypass this test. If you choose **O**K, the testing begins, and all components related to the system board are analyzed, with results presented in the format shown in figure 27.6.

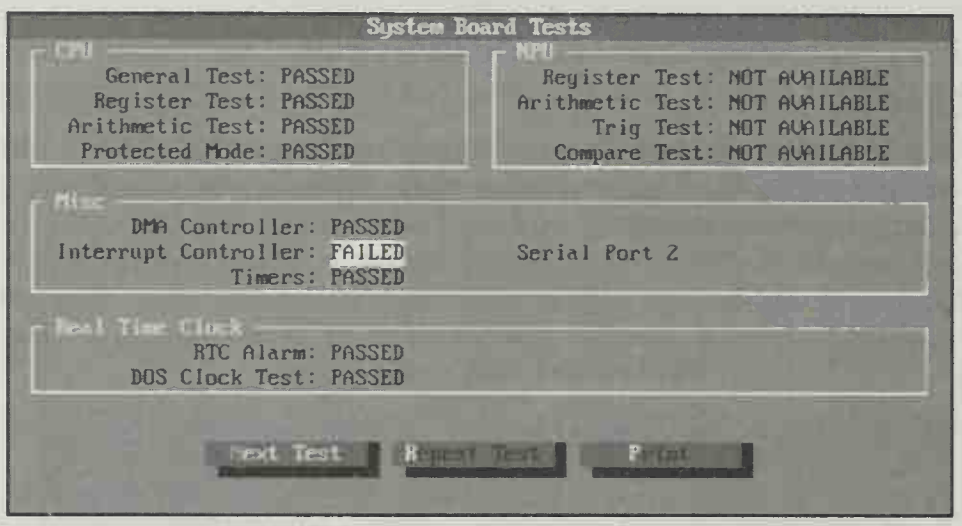

Fig. 27.6

The results of the System Board tests.

Note the following interpretation of the results:

Result	Meaning
All CPU tests PASSED	No problems were detected.
No NPU (numeric processing unit)	No test was performed.
Miscellaneous tests	A problem exists with the interrupt controller related to serial port 2.
Real Time Clock tests PASSED	No problems were detected.

After the completion of these tests and all those to follow, you may elect to choose **N**ext Test, **R**epeat Test, or **P**rint. If the results are as expected, choose **N**ext Test. If components have failed the test, choose **R**epeat Test at least two more times to verify the failure. If you want to print a copy of the results, choose **P**rint.

Serial Port Tests

The Serial Port tests check all serial ports installed in your computer. Using the internal loopback inherent to your serial ports, NDiags tests

the serial chip's registers. During this portion of the test, no data is actually transferred through the port; a loopback plug, which may be purchased from your local electronics store, provides for a more effective test of the serial port. The loopback plug will actually test data being sent to and received from the serial port at various speeds (300 baud to 115,200 baud). If you do not have a loopback plug, you can disable this particular test feature by canceling the test when informed that the test could not find a loopback plug (see fig. 27.7). Or you can disable the loopback feature by using **O**ptions from the **F**ile menu, as discussed later in this chapter.

After the serial port has been tested, the results are presented (see fig. 27.8). Had a loopback plug been available for this test, results would have been recorded in the appropriate place next to the baud rate(s) checked.

If any of the serial ports fails during the test, detach all devices connected to the serial port being tested and repeat the test. If the serial port continues to fail, you may have a defective serial port/card. You should also verify that your serial ports are not sharing the same IRQ with other devices used on your computer.

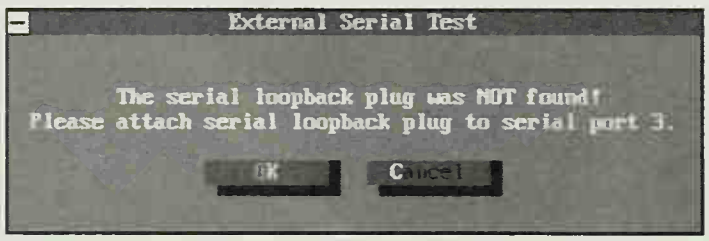

Fig. 27.7

A message indicating that the serial loopback plug was not found.

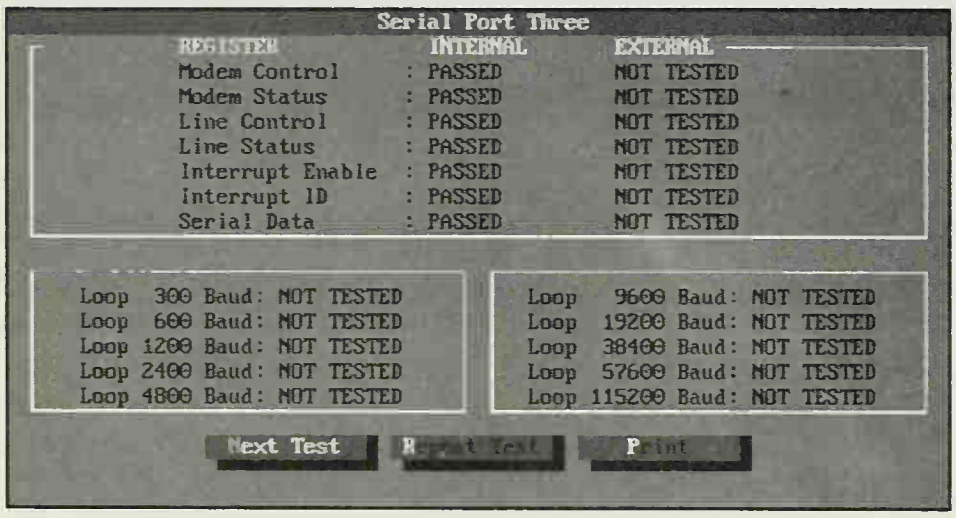

Fig. 27.8

The Serial Port Three test results.

NOTE If more than one serial port resides in your computer, each serial port is tested separately.

Parallel Port Tests

The Parallel Port tests operate in the same way as the serial port tests. A loopback plug offers a more thorough test, but again, if a loopback plug is not available, you may follow the preceding instructions for bypassing this part of the test. Figure 27.9 shows the results of the Parallel Port One test. Had a loopback plug been used, the EXTERNAL results would have indicated whether the port PASSED or FAILED.

As mentioned in the preceding section, if Norton Diagnostics indicates a problem, remove all devices attached to the parallel port that has failed and then run the test again. If the port fails after two more tests, you may have a defective parallel port/card.

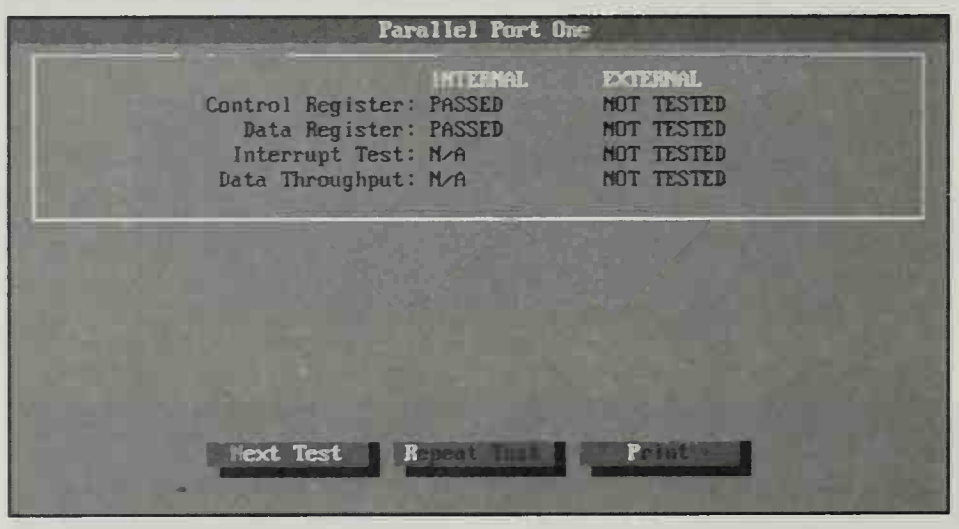

Fig. 27.9
The Parallel Port One test results.

CMOS Tests

The CMOS tests report the information derived from the internal CMOS table, as well as the POST (*p*ower-*o*n *s*elf-*t*est) results. The CMOS table includes the following information:

- Disk drive types and capacities
- Installed memory
- Functionality of the CMOS battery, CMOS time, fixed disk controller, memory and equipment configurations, and checksum

Figure 27.10 illustrates the results of the CMOS tests.

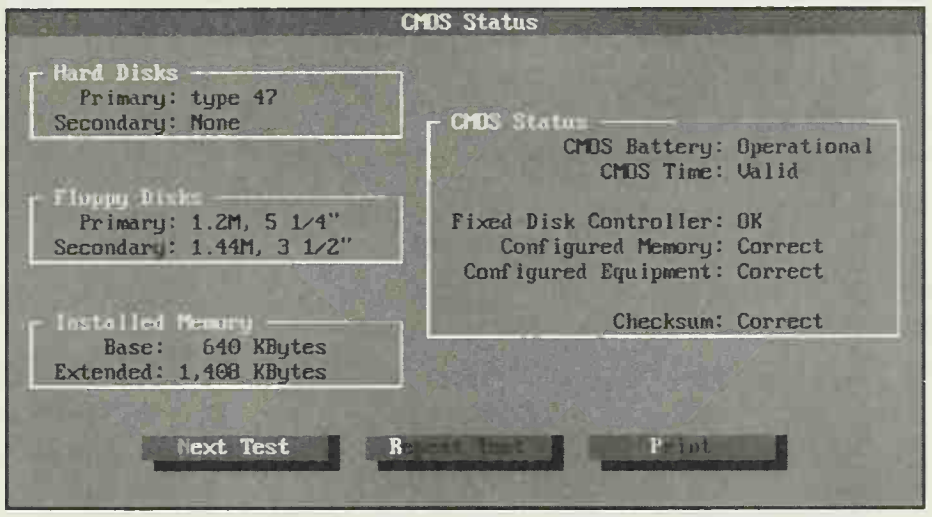

Fig. 27.10
The results of the CMOS tests.

The test results presented in figure 27.10 show that the system being tested has a hard disk present (type 47). The test has detected two floppy drives. Installed memory, both base and extended, has been detected. The CMOS is functioning properly, and the CMOS time is valid. The disk controller is functioning as it should, and the memory and system components are configured properly. Tests performed on the checksum have passed.

Failure of any CMOS component will require you to correct values. Information related to these values can be found in your hardware reference manuals.

> **WARNING:** Altering the hard disk CMOS values may have disastrous consequences. Do not alter these settings unless you are absolutely sure of the exact CMOS values.

Base Memory Test

The Base Memory test tests memory, up to and including 640K, by sending information to the chips that make up the base memory and then testing to see whether the information was properly received by the chips. If a problem is detected, the memory address is displayed in the Failure List box (see fig. 27.11).

The test results indicate that information (1s and 0s) sent to the various memory blocks and bit locations was written and verified properly.

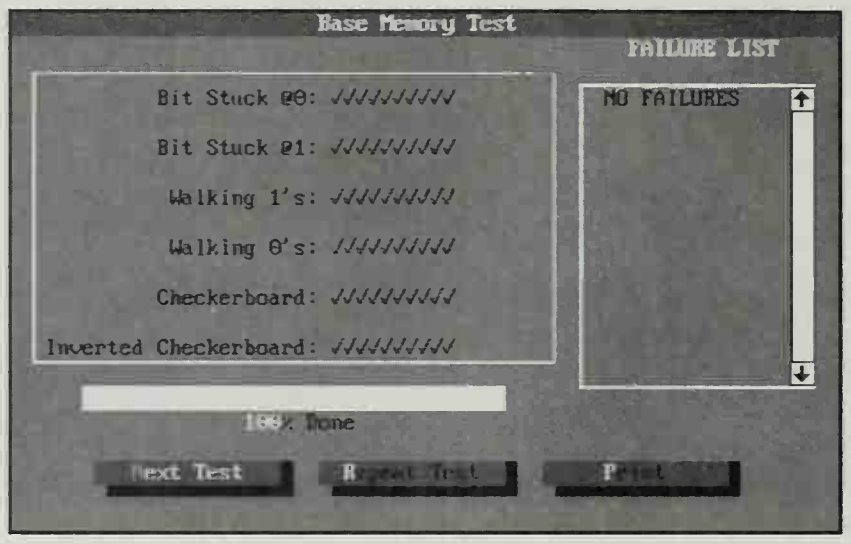

Fig. 27.11
The Base Memory test results.

If any of the test's patterns failed, immediately remove any terminate-and-stay-resident (TSR) programs from your AUTOEXEC.BAT file and remove all device drivers from your CONFIG.SYS file. Reboot your computer and repeat the Base Memory test again. Should you experience a failure again, run the Comprehensive Memory test, available from the Comprehensive menu. If this test fails, there is a high probability that a memory chip/module is defective.

Extended Memory Test

Much like the Base Memory test, the Extended Memory test sends information to extended memory and verifies that the information was received and manipulated properly. If an error occurs, the exact address of the problem appears in the Failure List box (see fig. 27.12).

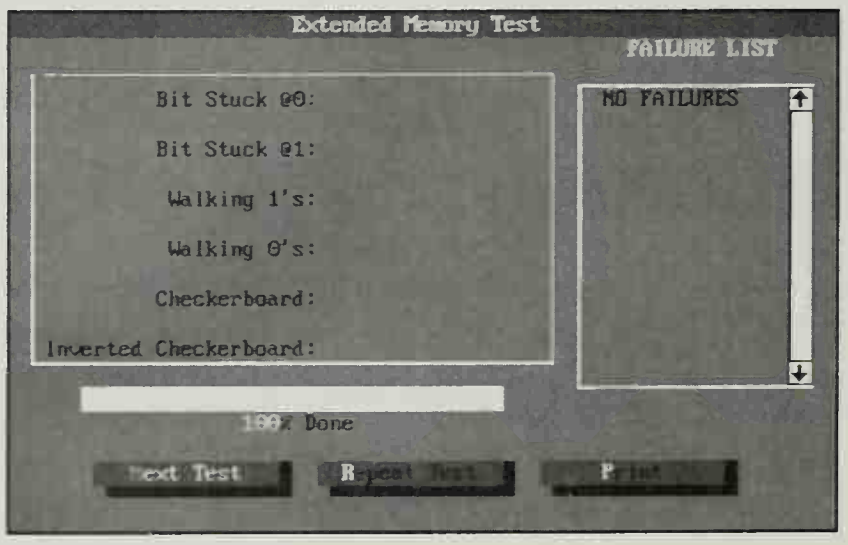

Fig. 27.12
The Extended Memory test results.

If any of the test's patterns failed, immediately remove any terminate-and-stay resident (TSR) programs from your AUTOEXEC.BAT file and remove all device drivers from your CONFIG.SYS file. Reboot your computer and repeat the Base Memory test again. If you experience a second failure, run the Comprehensive Memory test from the Comprehensive menu. If this test fails, there is a high probability that a memory chip/module is defective.

If you are using expanded memory, you must activate the memory manager. You may find it necessary to invoke the memory manager software, reboot the system so that it becomes active, and then perform this test. These steps are required if you want to test expanded memory.

Hard Disk Tests

The Hard Disk tests check the hard disk's read capabilities. The hard disk's rotation speed is also measured and reported. The Calibrate utility, discussed in Chapter 20, provides more in-depth information based on a more sophisticated testing routine. (Calibrate is not available here; it is a separate test procedure and is not part of the predefined test routine.) Figure 27.13 illustrates the tests in progress for Hard Disk 1, and figure 27.14 shows the results.

NOTE This set of tests is nondestructive. The tests only read; no writes to the hard disk occur.

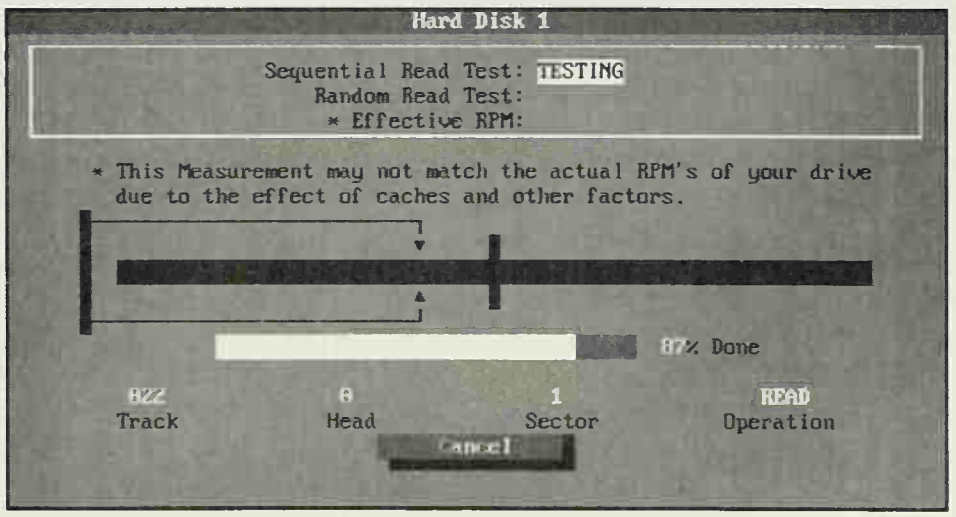

Fig. 27.13
The Hard Disk 1 tests in progress.

The Sequential and Random Read tests performed here show no signs of problems. The Effective RPM (revolutions per minute) is excessively high, which may be attributed to a hard drive caching controller.

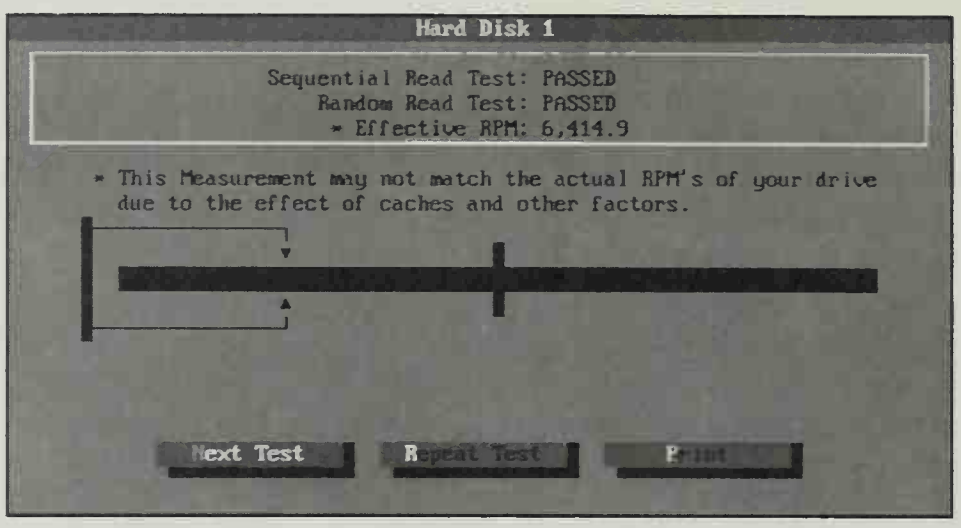

Fig. 27.14
The Hard Disk 1 test results.

NOTE Norton Diagnostics may give false results if your hard disk is equipped with a caching controller. The average effective RPM of most hard drives is around 3600 RPMs. The results shown in figure 27.14 suggest that the hard disk being tested here is equipped with such a caching controller.

If more than one hard disk was detected in your computer, the **Next Test** option tests a second hard drive.

Floppy Drive Tests

As with the Hard Disk tests, the number of Floppy Drive tests performed depends on the number of floppy drives installed in your computer. Nearly identical tests to those for the hard disks are performed here. The differences are in the tests that check whether a floppy disk is write-protected or has been removed from the drive. Diagnostic problems may be related not only to a defective disk drive but also to defective disks. If an error is recorded during this test, try another disk.

The Floppy Drive tests require intervention on your part, and you will need a formatted disk. Be sure that this disk contains no useful information because the information may be destroyed during the testing procedure. A newly formatted disk is recommended. Concerning user intervention, you will be prompted to remove the disk during the test, enable write-protect, remove the disk again, and disable write-protect. Figure 27.15 shows the first Floppy Drive test dialog box, prompting you to insert a formatted floppy disk in drive *x* (*x* represents the floppy drive about to be tested). In this example, the drive being tested is drive A.

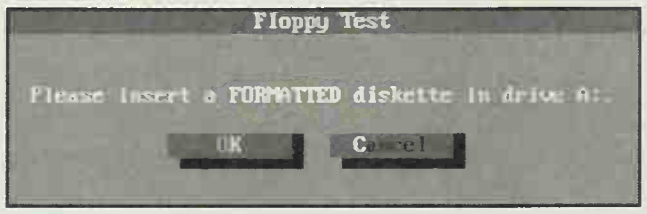

Fig. 27.15
Beginning a Floppy Drive test.

After the Sequential and Random Read tests have been performed, you are prompted to remove the disk from the drive and then reinsert it. This Disk Change test checks your computer's capability to detect the removal and reinsertion of a disk.

After the Disk Change test is complete, you are prompted to remove the disk from the drive. Write-protect the disk and then reinsert it. This test is the last one performed on your floppy disk. Figure 27.16 shows sample results of testing drive B.

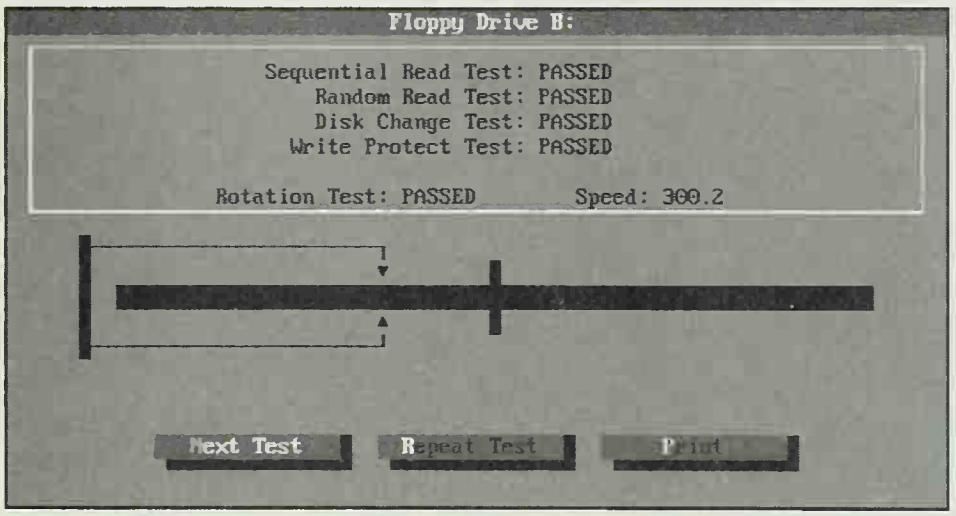

Fig. 27.16
Floppy Drive tests of drive B.

Video Memory Tests

The Video RAM test is the first of a group of tests to be performed for your video card and display. This test, like many others, sends information to the memory of your video card and then verifies that the information was stored and manipulated properly. During this test, don't be alarmed if your screen goes blank or blinks several times. This is a normal part of the testing procedure. If everything is working OK, a dialog box like the one shown in figure 27.17 appears.

The Video Mode tests check the text and graphics capabilities of your video controller card. You will be asked several questions during this phase of testing. You respond by pressing Y if the display appears as it should, or N if the display is not acceptable. Figure 27.18 shows one of the test screens. Figure 27.19 illustrates the results of the Video Mode tests.

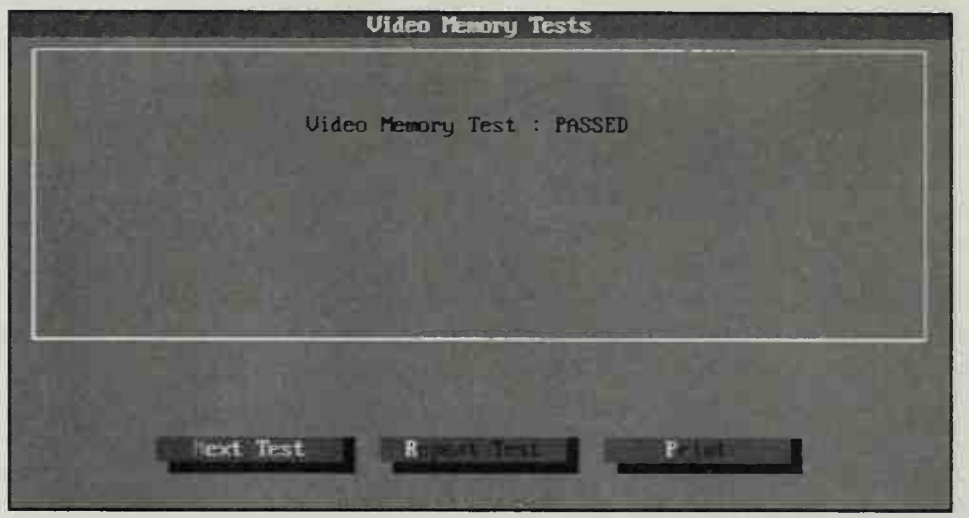

Fig. 27.17
The results of the Video RAM test.

The various screens presented show the modes being tested and ask you to press Y if the display reflects the appropriate mode, N if it is not correct, and Esc if you want to cancel the test.

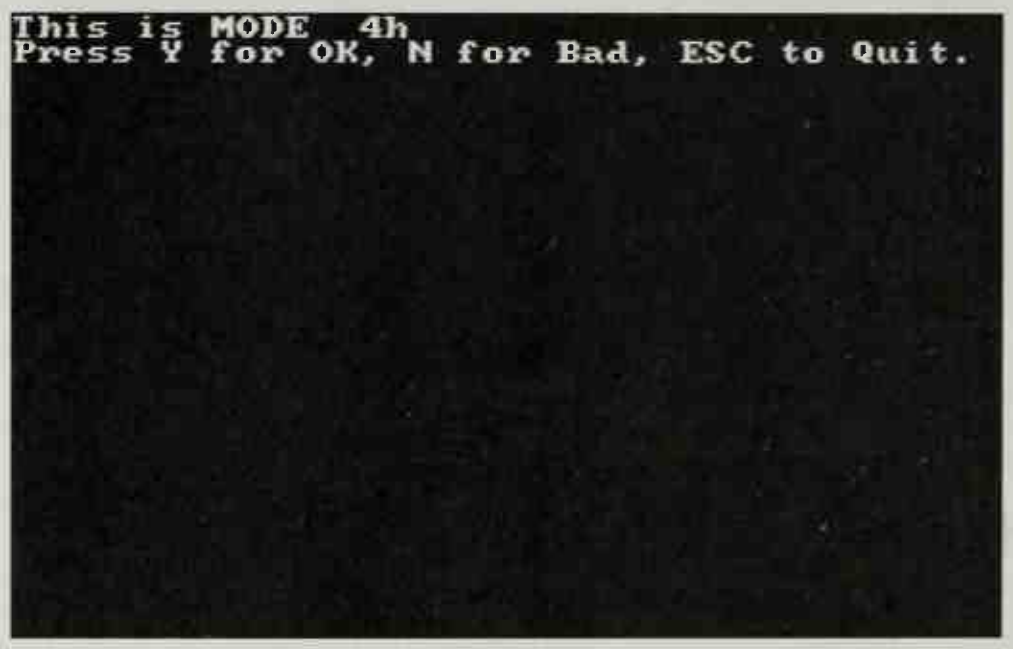

Fig. 27.18
A Video Mode test in progress.

The Video Grid tests check each graphic capability available to your video controller card. During this test, various grids are displayed on-screen, and you are asked to verify the appearance of the grid. Press Y if the grid appears to be OK, or press N if it is not acceptable. Press Esc to cancel the Video Grid tests. Figure 27.20 shows the results of the Video Grid tests.

Fig. 27.19
The results of the Video Mode tests.

Fig. 27.20
The results of the Video Grid tests.

The final video tests performed are the Video Color tests, which check the appearance of all colors supported by your video controller card. The three basic colors (red, green, and blue) are tested first. Then all supported graphics modes are tested, using all colors supported by the card. You must respond to the questions as they are asked. Figure 27.21 shows the results of the Video Color tests.

Mouse Test

If you have a mouse connected to your computer and it has been detected by Norton Diagnostics, the Mouse test checks the functionality of the mouse buttons and the movement of the mouse pointer. You are presented with several prompts during this test—to press a button or move the pointer, for example. Figure 27.22 illustrates one of the prompts. Figure 27.23 shows the results of the six actions tested.

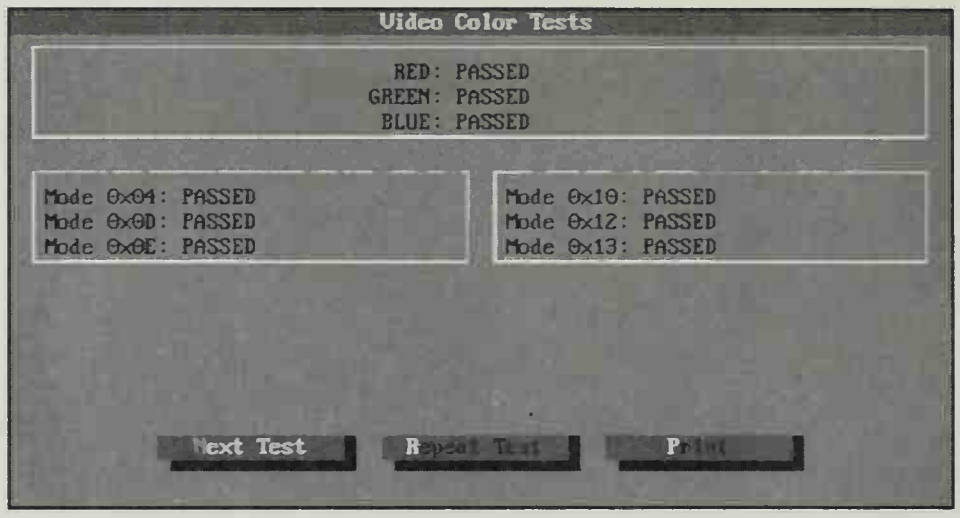

Fig. 27.21

The results of the Video Color tests.

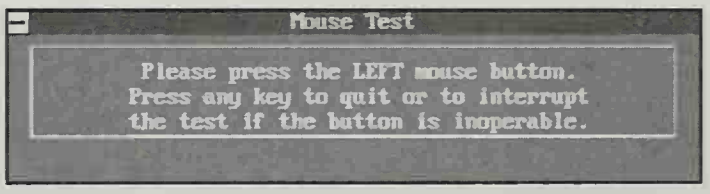

Fig. 27.22

A user prompt for testing the mouse functions.

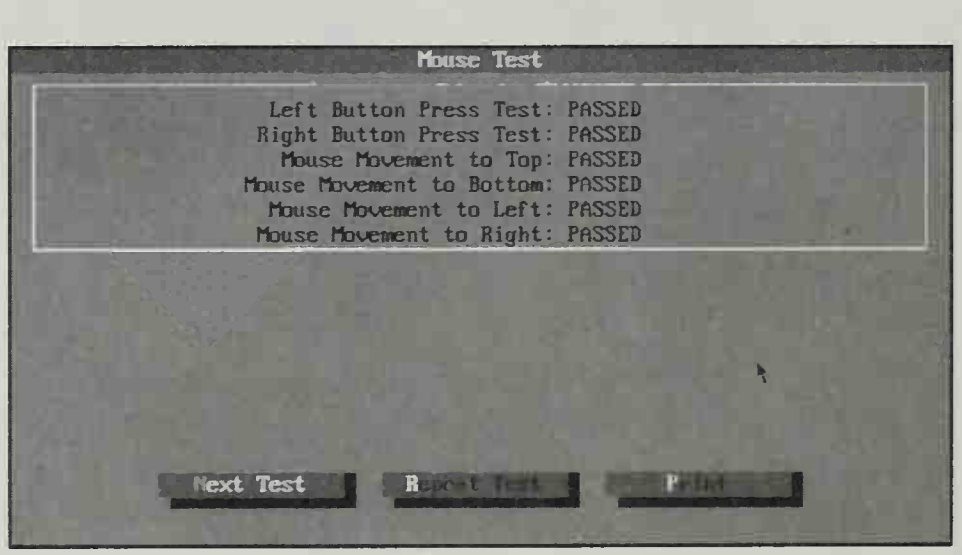

Fig. 27.23

The results of the Mouse test.

Speaker Test

The Speaker test checks the audibility of your speaker by sending a sequence of musical notes or a digitized voice message to the speaker. After the sounds are transmitted to the speaker, you are asked whether the sounds were audible. If they were, choose **Yes**; if they were not, choose **No**. Figure 27.24 illustrates a successful test.

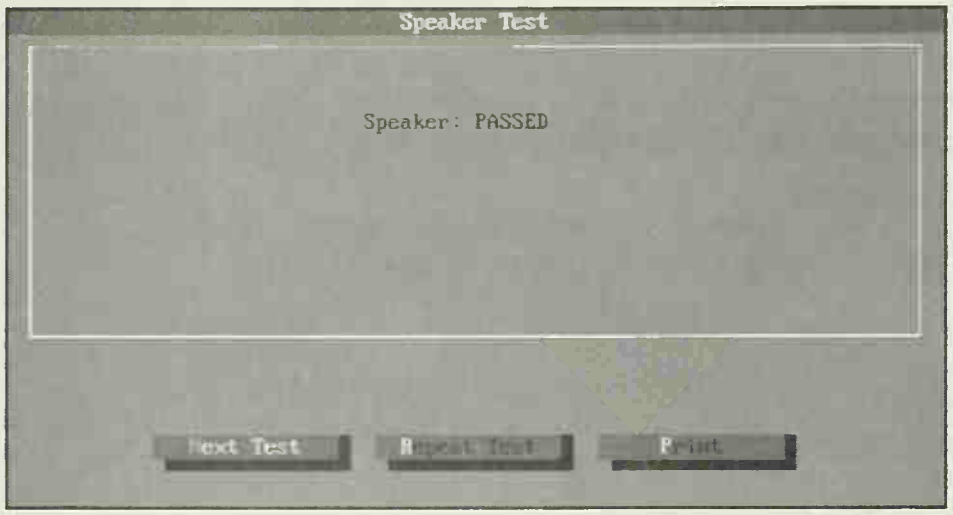

Fig. 27.24
The Speaker test results.

Keyboard Tests

The final two tests check the functionality of your keyboard. In the Keyboard Press test, you must press and release each key on your keyboard. This test is considered successful if Norton determines that all keys have been pressed. If you terminate the test by pressing any single key three times in succession, you are prompted to choose **P**assed if you are satisfied with the results, **F**ailed if you encountered a problem, **C**ancel if you want to stop, or **R**esume if you want to continue. As each key is pressed, its associated scan code is displayed in the Scan Code text box. Figure 27.25 illustrates a successful Keyboard Press test.

Fig. 27.25
The results of a successful Keyboard Press test.

The Keyboard Lights test is the last test to be performed in this default sequence of tests. It verifies that all keyboard lights (Num Lock, Caps Lock, and Scroll Lock) are performing correctly. Figure 27.26 shows the

Keyboard Status Light test in progress. Look at your keyboard lights. For this example, if the Num Lock light is off, press Enter or press Y. Continue this cycle until you have responded to all questions, after which you are given the results of the test.

Fig. 27.26
The Keyboard Status Light test in progress.

Using Norton Diagnostics Menus

You can activate all the test functions described in the previous sections from the menu bar at the top of the Norton Diagnostics dialog box. The options on the menu bar are **F**ile, **S**ystem, **M**emory, **D**isks, **V**ideo, **O**ther, **C**omprehensive, and **H**elp. To open these pull-down menus, press Alt plus the highlighted letter of the menu name; or press F10, highlight the menu you want, and press Enter. Alternatively, you can point to a menu with the mouse pointer and click. After you extend the menu, you can use the right- and left-arrow keys to move from menu to menu, and the up- and down-arrow keys to choose options within the menus.

The **F**ile menu is shown in figure 27.27. From this menu, you can choose **H**ardware Configuration, **O**ptions, **R**eport, and **E**xit.

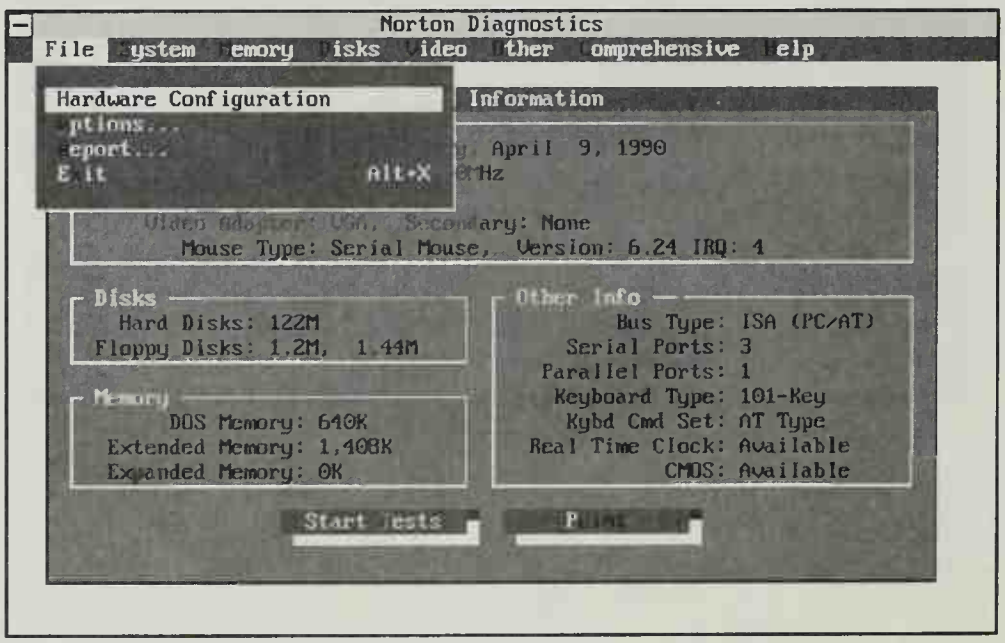

Fig. 27.27
The Norton Diagnostics **F**ile menu.

If an option is in parentheses or is grayed (dimmed), the option is not currently available.

Creating a Report

The previous sections discussed the various tests available in Norton Diagnostics. Each test that was run offered you the option to print a report containing the results of the individual test performed. By choosing **R**eport from the **F**ile menu, you can define which tests you want to run and then generate a comprehensive report based on your selections. When you choose the **R**eport option, a Report dialog box appears on-screen (see fig. 27.28).

Fig. 27.28
A Report dialog box.

From this dialog box, you can choose which items you want to test and which items you want to appear in the report. These items correspond to the tests and reports discussed earlier in this chapter. Because each item is an independent part of the report, you can be selective about what items will be tested and printed in the report. When an item is selected to appear in the report, a check mark appears to the left of the item name. An asterisk to the right of an item name indicates that when the test is run, the user must provide or perform some sort of user input. (With the Keyboard Press test, for example, you must press the keyboard keys to complete the test.)

The two items under the User Test heading in the Topics list allow you to include your own information in the title (header) of the report and at the end of the report. Notice that the list is in a list box, which means that you can scroll the box by pressing the up- and down-arrow keys or clicking the scroll bars. The following report items appear in the list:

- User Test
  - Report Header
  - Notes at End of Report
- System
  - System Info
  - System Board
  - Serial Port 1
  - Serial Port 2
  - Serial Port 3
  - Serial Port 4
  - Parallel Port 1
  - Parallel Port 2
  - Parallel Port 3
  - Parallel Port 4
  - CMOS Status
- Disks
  - Hard Disk 1
  - Hard Disk 2
  - Floppy Disk A
  - Floppy Disk B
- Memory
  - Base
  - Extended
  - EMS
- Video
  - Memory
  - Mode
  - Grid
  - Color
- Other
  - Mouse
  - Speaker
  - Keyboard Press
  - Keyboard Lights
- Comprehensive
  - Floppy A
  - Floppy B
  - 16550 1
  - 16550 2
  - 16550 3
  - 16550 4

The 16550 1, 2, 3, and 4 tests check a special buffering chip used in serial communications. Your system may not be equipped with 16550 UART chips.

Some of the items in this list may appear in parentheses or grayed (dimmed), indicating that the item is not available for the report. If you have only one floppy disk drive, for example, the Floppy Drive B test will not be available.

When the report is created, only information from those items with a check mark will be placed in the report. To select items, use the arrow keys to highlight the item on the list, and press the space bar to select or deselect the item. Or just click the item. By default, all available items are checked (selected).

Option buttons at the bottom of the Report dialog box include **O**K, **C**ancel, **L**oad, and S**a**ve. If you choose **O**K, the report is created with all the selected report parameters. Choosing **C**ancel closes the Report dialog box and returns you to the Norton main screen.

The **L**oad and S**a**ve buttons enable you to save the current selections in the list box and load them back at a later time. For example, you could create and save several different selections: a short report (only disk drives are tested and reported on), a medium-sized report (only system board, output port, and disk drives are tested), and a comprehensive report. To save a group of topic selections, select the items you want tested and reported, and choose S**a**ve. You are prompted to enter the name of the file where you want to store the settings (see fig. 27.29). The file is stored with the extension NDR. If you enter the name **BOBBIE** as the file name, the file is stored on the disk as BOBBIE.NDR. After you specify the name, press Enter or choose **O**K.

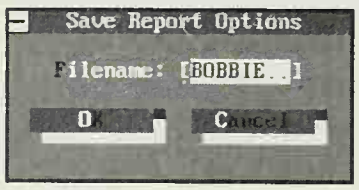

Fig. 27.29
The Save Report Options dialog box.

Later, when you use the NDiags **R**eport option again, you can choose **L**oad. A list of previously defined report-options files will be listed (see fig. 27.30). Choose the name of the report-options file you want to use; then press Enter or choose **O**K. All selections in the Topics list in the Report dialog box will revert to the settings that were in effect when the report-options file was saved.

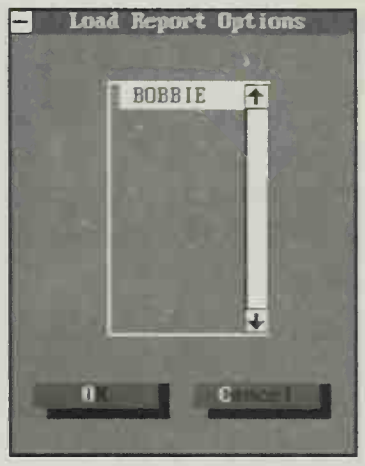

Fig. 27.30
The Load Report Options dialog box.

Below the Topics list in the Report dialog box is the **D**estination drop-down list box. From this box, you can choose to output the report to the printer, the screen, or a file. To change this setting, choose **D**estination, press PgDn to display the drop-down list, and choose the destination you want. Or click the triangle at the right of the box to display the drop-down list, and then click the destination. If you choose the File option, you are prompted to enter a file name to be assigned to the report, as shown in figure 27.31. The default report name is NDIAGS.RPT. To accept the default file name, select **O**K; if you want to quit without saving the report to a file, choose **C**ancel. If you want to assign another file name to the report, just begin typing the new name (remember to conform to DOS file-naming conventions) and then choose **O**K. You can use this name or enter your own file name. If you print to the screen, you use a scroll bar to move through the report.

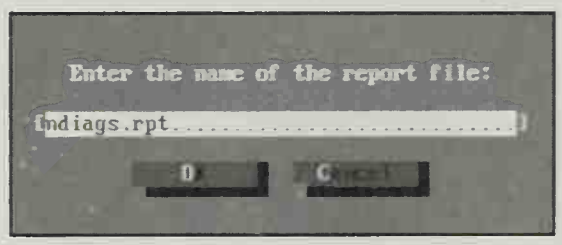

Fig. 27.31
Specifying the name of the report file.

If you chose the Report Header option from the Topics list, you are prompted to enter a single line of information to appear in the title of the report, as shown in figure 27.32. After you specify the name, press Enter or choose **O**K. The printed report is shown in figure 27.33. (This figure shows an abbreviated version of the full report.)

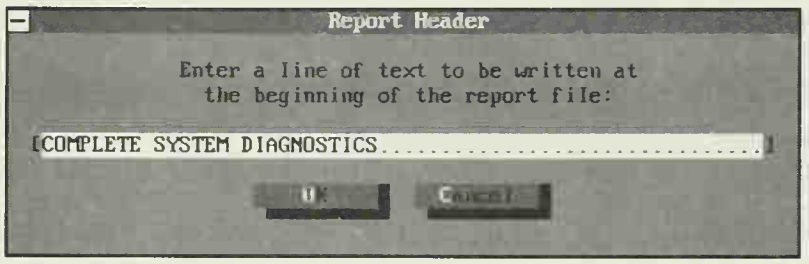

Fig. 27.32
Specifying the report header.

```
                    Norton Diagnostics
                 Tuesday, March  2, 1993 11:28pm
                   COMPLETE SYSTEM DIAGNOSTICS

                      ************************
                      *  System Information  *
                      ************************

   --------------------- Computer ---------------------
     Built-in BIOS: AMI, Monday, April  9, 1990
    Main Processor: 80386SX, 20MHz
  Math Coprocessor: None
     Video Adapter: VGA,  Secondary: None
        Mouse Type: Serial Mouse,  Version: 6.24 IRQ: 4

     --------------------- Disks ---------------------
   Hard Disks: 122M
 Floppy Disks: 1.2M,  1.44M

     --------------------- Memory ---------------------
       DOS Memory: 640K
  Extended Memory: 1,408K
  Expanded Memory: 0K

     --------------------- Other Info ---------------------
          Bus Type: ISA (PC/AT)
     Serial Ports: 3
   Parallel Ports: 1
    Keyboard Type: 101-Key
     Kybd Cmd Set: AT Type
  Real Time Clock: Available
             CMOS: Available



                    ************************
                    *  System Board Tests  *
                    ************************

       ---------------------- CPU ----------------------
      General Test: PASSED
     Register Test: PASSED
   Arithmetic Test: PASSED
    Protected Mode: PASSED

       ---------------------- NPU ----------------------
    Register Test: NOT AVAILABLE
  Arithmetic Test: NOT AVAILABLE
        Trig Test: NOT AVAILABLE
     Compare Test: NOT AVAILABLE

       --------------------- Misc ----------------------
        DMA Controller: PASSED
  Interrupt Controller: PASSED
               Timers: PASSED

  --------------------- Real Time Clock ---------------------
             RTC Alarm: PASSED
      Test DOS's Clock: PASSED
```

Fig. 27.33
An abbreviated report.

If you chose the Notes at End of Report option from the Topics list, a User Notes dialog box appears (see fig. 27.34). The end-of-report message can be up to 10 lines long. You might want to include such information as serial number of the computer, warranty information, or the physical location of the computer. After typing the information, press Enter or choose **OK**.

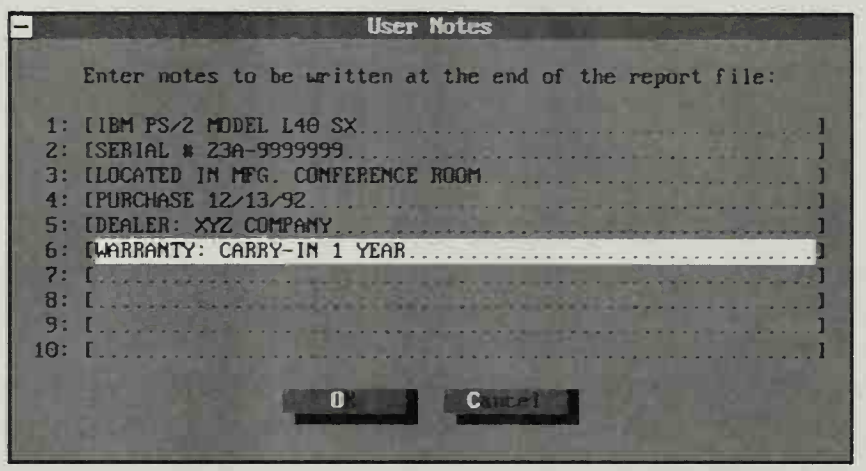

Fig. 27.34

Entering additional notes to be printed at the end of the report.

After you enter the Report Header and User Notes information, the tests are performed, and the report is printed to your printer or stored in a file according to the destination you have selected.

For purposes of comparison, upkeep, diagnostic, and support, it would be helpful to run this kind of report on all your computers and then file the information for future use.

Running Individual Tests from the Menus

The rest of the NDiags menu options allow you to choose individual tests and their associated reports. If you do not want to test multiple items as discussed previously, you have the option of accessing single tests. The following list shows the tests available in each menu:

- File

  Hardware Configuration Tests

- **S**ystem

  Information, **S**ystem Board Test, Serial Port **1**, Serial Port **2**, Serial Port **3**, Serial Port **4**, Parallel Port 1 (hot key **A**), Parallel Port 2 (hot key **B**), Parallel Port 3 (hot key **C**), Parallel Port 4 (hot key **D**), and C**M**OS Status

- **Memory**

  Base Memory Test, Ex**t**ended Memory Test, and Expanded Memory (EMS) Test

- **Disks**

  Hard Disk **1** Test, Hard Disk **2** Test, Floppy Disk **A** Test, and Floppy Disk **B** Test

- **Video**

  Memory, M**o**de, **G**rid, and **C**olor

- **Other**

  Mouse, **S**peaker, **K**eyboard Press, and Keyboard **L**ights

- **Comprehensive**

  Floppy **A**, Floppy **B**, **R**un CALIBRAT, **M**emory Test, 16550 **1**, 16550 **2**, 16550 **3**, and 16550 **4**

The difference between the Floppy **A** and Floppy **B** tests on the **C**omprehensive menu and the previously discussed Floppy Drive tests is the addition of the write tests. In the previous Floppy Drive tests, only Sequential and Random Read tests were performed. During this sequence of Floppy **A** and Floppy **B** tests, read and write tests are performed. You will need a formatted floppy disk containing useless data. Any data contained on the disk used during the test will be destroyed.

NOTE Chapter 20 offers a complete explanation of the Calibrate program. Before running Calibrate, you should perform a complete backup of your entire system. Calibrate runs a low-level format procedure; although this procedure isn't destructive, you should safeguard against unforeseen problems.

Summary

This chapter covered the use of the Norton Diagnostics utility. This portion of Norton Utilities 7 tests your system components and produces appropriate reports about the success and failure of those components. The reporting capabilities allow you to print individual reports about specific components, or an all-encompassing report about all components. These reports can be helpful in diagnosing and correcting problems related to the successful operation of your computer.

In the next chapter, you learn to use NDOS, a set of utilities that will enhance your DOS capabilities.

Using NDOS, Norton Backup, and Norton Commander

PART VII

OUTLINE

Using NDOS

Backing Up and Restoring Files with Norton Backup

Using Norton Commander

CHAPTER 28

Using NDOS

A file called COMMAND.COM contains the core of the commands used for DOS. When you use a command such as DIR or COPY at the DOS prompt, the COMMAND.COM program interprets that command and causes the computer to perform the request. Norton's NDOS program replaces the normal COMMAND.COM file because NDOS has all of COMMAND.COM's features—and more. With NDOS, you add a whole new set of "DOS" commands to use.

This chapter explains how to use NDOS commands. It was written with the assumption that you would already be familiar with commonly used DOS commands. If you need a refresher course in DOS commands, however, read Appendix A, "A DOS Review."

Installing NDOS

To try out NDOS at any time, begin the program by entering **NDOS** at the DOS prompt. If you like NDOS, place it in your CONFIG.SYS file so that NDOS is activated each time you boot your computer. The easiest way to install NDOS in your CONFIG.SYS file is with the Norton configuration program described in Chapter 2. When NDOS loads, you see the copyright screen. Otherwise, your DOS prompt looks the same as it does under normal DOS. If you enter **NDOS** at the DOS prompt to begin NDOS, entering **EXIT** returns you to the standard COMMAND.COM mode.

Using NDOS Command Enhancements

Before this chapter introduces specific NDOS commands, it describes a number of enhancements that NDOS provides beyond the normal DOS commands. These enhancements include on-line help, expanded command-line editing, command recall, more flexible use of wild-card characters, file descriptions, multiple commands per line, conditional commands, enhanced batch processing, and added redirection options.

Accessing On-Line Help

NDOS provides an on-line Help facility for all DOS and NDOS commands. Beginning with DOS 5, DOS also has a Help feature. To display a brief explanation about a command, you enter the command name at the DOS prompt followed by a /? switch. For example, if you enter the command

```
CLS /?
```

at the DOS prompt, the information shown in figure 28.1 appears on-screen. In MS-DOS, only a one-line description appears for the CLS help; with NDOS, the Help information that appears is more extensive. Notice that the Help dialog box is the same as for other Norton commands (as described in Chapter 1).

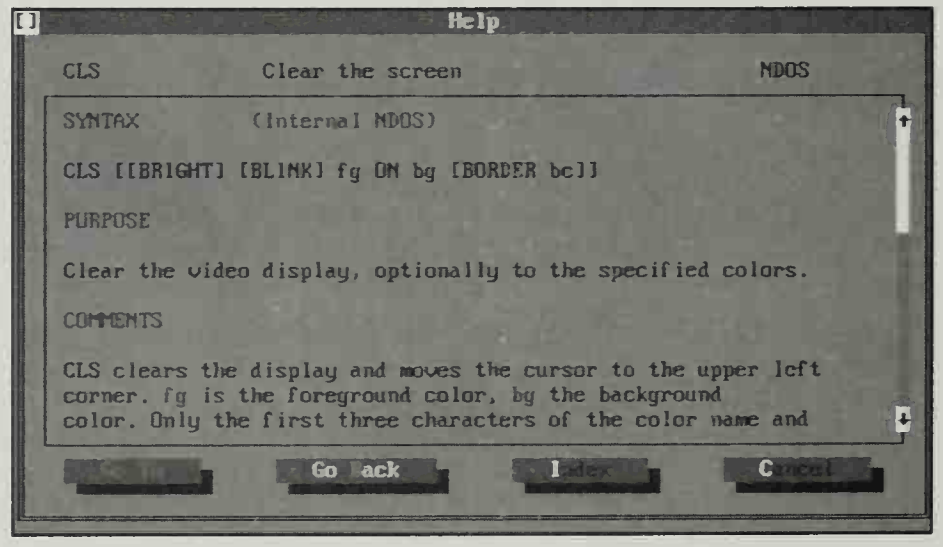

Fig. 28.1

The NDOS Help dialog box for the CLS command.

You also can get help for NDOS commands not found in DOS. For example, if you enter the command

DELAY /?

at the DOS prompt, the information shown in figure 28.2 appears.

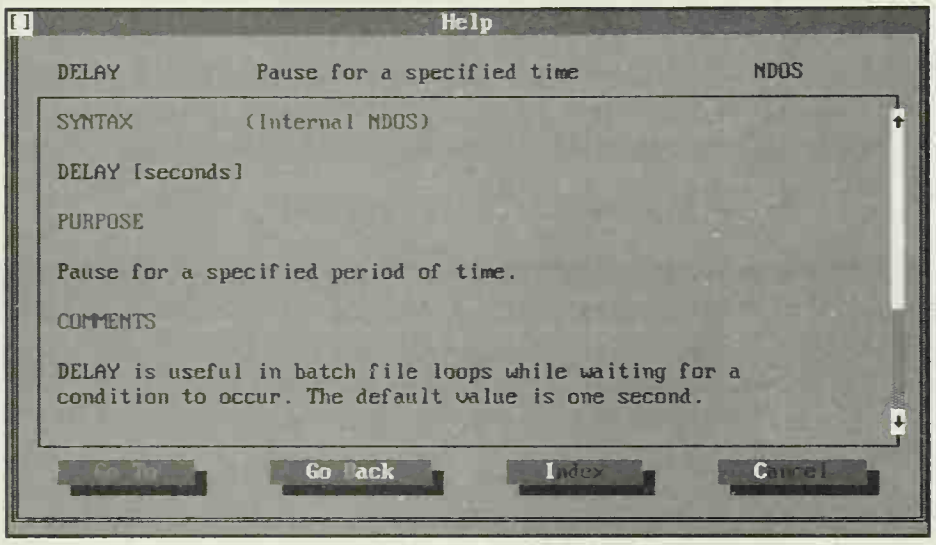

Fig. 28.2
The NDOS Help dialog box for the DELAY command.

A second way to get help is to press the F1 key to bring up a menu of topics. You can then choose to display information about a particular command.

Another way to get help is to enter **HELP** at the DOS prompt. A Help menu similar to the one in figure 28.3 appears. From this menu, you can choose Help topics. See Chapter 1 for more information on the Help system options.

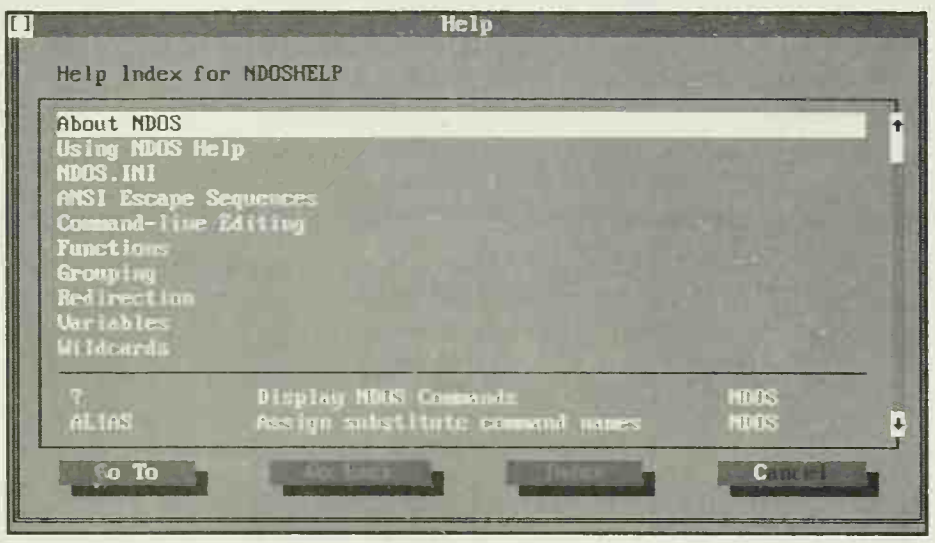

Fig. 28.3
An NDOS Help menu.

Using Expanded Command-Line Editing Features

The normal DOS command line has limited editing features. If you type a long command and then notice that something is wrong, you must use the Backspace key to erase much of the command, and then retype the command. With NDOS, you get a basketful of editing options, including the capability to move the cursor on the command line and insert, change, and delete characters. Table 28.1 lists the available editing keys.

Table 28.1 Command-Line Editing Keys

Key(s)	Description
←	Moves cursor one space to the left.
→	Moves cursor one space to the right.
↑	Recalls preceding command entered at DOS prompt.
↓	Recalls next command in the Commands list.
Ctrl+←	Moves cursor one word to the left.
Ctrl+→	Moves cursor one word to the right.
Home	Moves cursor to beginning of line.
Ctrl+Home	Deletes characters from beginning of line to character preceding cursor.
End	Moves cursor to end of line.
Ctrl+End	Deletes characters from cursor to end of line.
Ins	Toggles insert and overwrite modes.
Del	Deletes character at cursor.
Backspace	Deletes character to the left of cursor.
CR or LF (carriage return or line feed)	Executes command on command line.
Esc	Erases entire line.
Ctrl+L	Deletes word to the left of cursor.
Ctrl+R or Ctrl+Backspace	Deletes word to the right of cursor.

Key	Description
Ctrl+D	Deletes current command history entry (a previous command entered at the NDOS prompt), erases line, and displays preceding command history entry.
Ctrl+E	Displays last command history entry.
Ctrl+K	Saves current command history list and erases current line.
F1	Begins on-line help procedure.
F3	Repeats preceding command.
F8 or Shift+Tab	Enters on the command line a previously used file name displayed by F9.
F9 or Tab and F10	Looks at the file name or wild-card characters to the left of the cursor and replaces the file name with the first matching file name. Press F9 to replace with the next matching name. Press F10 to append the file name at cursor.
Alt+255	Tells NDOS to ignore a command character. Usually, if you enter an NDOS line-editing command (such as Ctrl+D) on the command line, NDOS performs the function associated with the command. In some cases, however, you may need to include a command character that you do not want to be seen by NDOS as a command on the command line. By pressing Alt+255 and entering the command character (Ctrl+D, for example), NDOS does not respond to Ctrl+D as a command. The computer just beeps when that command character is entered. For example, hold down the Alt key and type **255** from the numeric keypad. Release the Alt key and press Ctrl+D. Instead of NDOS recognizing Ctrl+D as a command, the Ctrl+D character (a diamond) appears on the command line.

Suppose that you want to view a file on-screen with the NDOS LIST command, but all you can remember is that the file has the extension TXT. Enter the following command and press the F9 key:

```
LIST *.TXT
```

The first match of *.TXT is placed in the command line instead of *.TXT. If that file is not the one you want, press F9 again; the next

matching file name appears. Keep pressing F9 until the file you want appears. Then press Enter to execute the command.

To recall a previous command, press the up-arrow key. The preceding command entered at the DOS prompt appears. You can press Enter to execute the command, or you can edit the command with the editing keys. Pressing the up-arrow key several times recalls commands in sequence so that you can recall a command you entered a number of commands ago. NDOS usually sets aside 1,024 bytes of memory to hold the history commands. You can change this size by using the SET command, described in the "SET" section in this chapter.

Using Multiple Commands on One Line

With DOS, you can enter only one command per line. With NDOS, you can enter several commands on one line. To enter more than one command on a line, separate the commands with a caret (^), which is Shift+6 on most keyboards. For example, to delete all BBB files and then display a directory, enter the following command at the DOS prompt:

```
ERASE *.BBB^DIR
```

Using Conditional Commands

NDOS provides a way to execute a second command on a command line based on the outcome of the first command. When a DOS or NDOS command is executed, an exit code in the computer is set. This code explains the result of the command; it usually reports whether the command succeeds or not. All NDOS commands return an exit code of 0 if successful. If a command is not successful, the exit code is a number other than zero.

If two ampersands (&&) separate two commands, the second command is executed only if the first command returns an exit code of 0. If two commands are separated by vertical bars (||, meaning OR), the second command is executed only if the first command returns a nonzero exit code.

Suppose that you want to copy the files *.* to the disk in drive A. If the copy fails, you want the message `ERROR IN COPY!` to be displayed. You can have this message appear with the following command:

```
COPY *.* A: || ECHO ERROR IN COPY!
```

Using Batch-to-Memory Files

DOS usually executes the commands in a batch file by reading one line at a time and executing the command in the current line before going to the next command. NDOS provides a faster way to execute the commands in a batch file with the batch-to-memory command. This command is designated by a BTM file rather than a BAT file. The batch-to-memory method of batch file execution is significantly faster than the normal DOS execution.

DOS batch files allow the use of variable names that correspond to information entered on the command line when the batch file name is entered at the DOS prompt. These variable names are %0 to %9. NDOS batch files use 128 variables (%0 to %127) instead of DOS's 10 variables (%0 to %9).

To convert a DOS batch file to a batch-to-memory file, you use the RENAME command to change the BAT extension to a BTM extension. To change a batch file named SETUP.BAT to a BTM file, use the following command:

```
RENAME SETUP.BAT SETUP.BTM
```

You run the BTM file in the same way you run a normal BAT file. For example, entering **SETUP** at the DOS prompt executes the SETUP.BTM batch file.

Using Executable Extensions

With NDOS, you can specify a certain meaning for a file extension; then, when a file with that extension is entered as a command name, the appropriate program is executed. Suppose that you have many TXT files that you often want to read on-screen. You can tell NDOS that if you enter the name of a TXT file at the DOS prompt, that name should be viewed with the LIST command. Use the following command:

```
SET .TXT=LIST
```

If you have a file named MARY.TXT, entering **MARY** at the DOS prompt causes the LIST program to execute and display the file MARY.TXT.

Using I/O Redirection

DOS allows the use of redirection commands to direct the output of a command to a file or device (other than the monitor), or to input

information to a command from a source other than the keyboard. NDOS uses these standard DOS redirection commands:

```
>
>>
<
|
```

NDOS adds some new options, however. The following redirection commands are available:

Command	Description
< *filename*	Gets input from the specified file instead of the keyboard
> *filename*	Sends the output of a command to the specified file
>> *filename*	Appends the output of a command to the specified file
>! *filename*	Sends the output of a command to the specified file, overriding the NDOS NOCLOBBER setting that usually prevents a file from being replaced
>& *filename*	Sends the output and standard error messages to the specified file
>&> *filename*	Sends only standard error messages to the specified file
>&! *filename*	Sends output and standard error messages to the specified file, overriding the NDOS NOCLOBBER setting that usually prevents a file from being replaced
com1 | com2	Uses the output of the command COM1 as the input for the command COM2
com1 |& com2	Uses the standard output and standard error of COM1 as the input for COM2

The I/O commands help to redirect information into or from a command. To output the results of the DIR command to the printer (LPT1:), for example, use the following command:

```
DIR > LPT1:
```

To sort the information in a file called LIST.TXT and to output the results to a file called SORTED.TXT, use the following command:

```
SORT < LIST.TXT > SORTED.TXT
```

This command tells DOS to use the LIST.TXT file as input to the SORT command and to place the resulting output in the SORTED.TXT file.

These I/O commands also work with NDOS commands. For example, to send the output of the NDOS MEMORY command to the printer, use this command:

```
MEMORY > LPT1:
```

Using Escape Sequences

NDOS has several character sequences that have special meanings. These sequences include an Escape character (not the ASCII Esc key) followed by a single letter. You produce the Escape character by pressing Ctrl+X, which appears as an up arrow on-screen. (See "SETDOS" later in this chapter to change the Esc key sequence.) The following single letters are available for use with the Escape character:

Escape Command	Description
b	Backspace
e	ASCII Esc character (ASCII 27)
f	Form feed
n	Line feed
r	Carriage return
t	Tab

For example, certain terminals and printers enable you to change characteristics by using Escape characters. If your computer has the ANSI.SYS device driver installed (in the CONFIG.SYS file) and you are using a color monitor, you can set the monitor default color with ANSI Escape sequences. The following command causes your monitor colors to be bright white on blue:

```
ECHO ^Xe[1;37;44m
```

NOTE The ^X (Ctrl+X) appears as an up arrow on-screen when you type the command.

For more information on ANSI codes, see Que's *Using MS-DOS 6,* Special Edition.

Using Norton NDOS Commands

Norton NDOS provides more than 90 commands, some of which are the same as those you use in DOS. Some commands are similar to DOS commands but have been enhanced with added features. NDOS also supports many commands supported by Norton Batch Enhancer (BE). More than 50 commands are new NDOS commands.

The following commands supported by NDOS are the same as DOS commands:

BREAK	DATE	TIME
CHCP	EXIT	VER
CTTY	GOTO	VERIFY

The following commands are similar to DOS commands but are enhanced under NDOS:

CALL	FOR	REN
CD (CHDIR)	IF	RENAME
CLS	MD (MKDIR)	RMDIR
COPY	PATH	SET
DEL	PAUSE	SHIFT
DIR	PROMPT	TYPE
ECHO	RD	VOL
ERASE	REM	

For a list of Batch Enhancer commands supported by NDOS, see the "BE" section later in this chapter. Chapter 24 describes the Norton Batch Enhancer commands.

The following sections discuss the enhanced DOS and NDOS commands. Many of the Norton NDOS commands have several options. In this book, the following conventions apply to those options:

- In the command syntax, items enclosed in [brackets] are optional.
- For words written in *italic*, substitute the appropriate word. For example, to use the DIR [*switches*] syntax, you type **DIR /W**, **DIR /P**, and so on.
- The [*d*:] option is a designation for the disk drive name, such as drive A:, B:, C:, or D:.

- The [*filespec*] option is a designation for a file specification. Unless noted, this specification can include a path name. For example, the file specification for a file named MYFILE.TXT in the WP51 directory is \WP51\MYFILE.TXT. You can usually use DOS wild-card characters—the asterisk (*) and question mark (?)—in file specifications. For instance, *.TXT specifies all files with the TXT extension. When *filespec*... appears, you can include multiple file specifications.
- The [*color*] option refers to a selection of colors. WHITE ON BLUE can be a color designation, for example. Chapter 24 describes how to use colors.

The following descriptions of NDOS commands do not cover all the NDOS options that duplicate those of DOS commands.

?

The NDOS ? command displays a list of available internal NDOS commands. This command has no options; simply enter **?** at the DOS prompt. A list of the NDOS commands appears on-screen.

ALIAS

With the NDOS ALIAS command, you can create a new command from another command. The ALIAS command has the following syntax:

ALIAS [*switches*] [*name*=[*value*]]

The following switches are available for use with ALIAS:

Switch	Description
/P	Pauses after displaying a screenful of information
/R *filespec*	Tells the command to read an alias list from the specified file

Suppose that you want to create a new command called DD that performs a DIR /W command (wide directory). Enter one of the following commands:

ALIAS DD DIR/W

ALIAS DD=DIR/W

The equal sign (=) is optional. In this command, the DD is the new name assigned to the value DIR/W. Now, whenever you enter the command **DD** at the DOS prompt, a DIR /W command executes.

ATTRIB

The NDOS ATTRIB command, similar to the DOS ATTRIB command, displays or changes the attribute settings on files. The DOS version of ATTRIB, available only in DOS 3 or later, does not include the /D switch included in the NDOS version and does not enable you to set hidden or system attributes (available in DOS 5). ATTRIB has the following syntax:

ATTRIB [*switches*] [-|+[AHRS]] *filespec...*

If you enter **ATTRIB** with a path name and no options, the current attribute settings of the files appear.

The following switches may be used with ATTRIB:

Switch	Description
/D	Modifies directory attribute settings and file settings
/S	Modifies the attributes of matching files in subdirectories of the specified directory
/Q	Quiet mode; does not display file names whose attributes are being changed

The following options are available for use with the ATTRIB command. Here the vertical bar (|) means *or*. Thus, for the A option, you can place a plus or minus sign in front of the A (+A or –A).

Option	Description
[+|–]A	Sets/clears the archive attribute
[+|–]H	Sets/clears the hidden file attribute
[+|–]R	Sets/clears the read-only attribute
[+|–]S	Sets/clears the system file attribute

For each option, a plus sign (+) sets the attribute on, and a minus sign (–) sets it off. For example, the following command sets the attribute for the file named SECRET.FIL to read-only and hidden:

ATTRIB +RH SECRET.FIL

This command is similar in function to the Norton Utilities File Find and File Attributes commands, which are described in Chapters 25 and 9.

BE

The NDOS BE (Batch Enhancer) commands are similar to the BE commands in Norton Utilities (described in Chapter 24). The following BE commands are supported in NDOS:

ASK	MONTHDAY	SHIFTSTATE
BEEP	PRINTCHAR	TRIGGER
BOX	REBOOT	WEEKDAY
CLS	ROWCOL	WINDOW
DELAY	SA	

BEEP

The NDOS BEEP command, used to beep the computer's speaker, is similar to the BE BEEP command described in Chapter 24. However, this command is an internal NDOS command with a slightly different use. BEEP has the following format:

BEEP [*frequency duration*]

The *frequency* is the value in hertz (Hz). For example, 440 is the rate of A. The *duration* is the length of time for the sound in 1/18-second increments. To sound an A for a half second, for example, use this command:

BEEP 440 9

BREAK

The NDOS BREAK command, similar to the DOS BREAK command, enables, disables, or displays the Break key setting (Ctrl+Break or Ctrl+C). You use the following syntax:

BREAK [ON|OFF]

The OFF option tells DOS to check for a Ctrl+Break (or Ctrl+C) when information is entered into the computer through the keyboard, screen,

serial port, or printer. The ON option tells DOS to check for a Ctrl+Break (or Ctrl+C) during any DOS operation. The ON option makes breaking out of a program easier. If the command doesn't include either option, the current status of BREAK is displayed.

CALL

The NDOS CALL command enables you to call one batch file from another batch file. CALL has the following syntax:

CALL *filespec*

The *filespec* parameter represents the name of a batch file. NDOS supports calling batch files within up to eight nested files. For example, if you are within one batch file, you enter the following command to call another batch file named SECOND:

CALL SECOND

After the SECOND batch file finishes, control returns to the original batch file.

CANCEL

The NDOS CANCEL command ends a batch file. You use the following command:

CANCEL

No options are available. CANCEL enables you to end a batch file within any nested (called) batch file and return to DOS. For more information, see the "CALL" and "QUIT" sections in this chapter.

CD or CHDIR

You use the NDOS CD or CHDIR command (like the DOS CD or CHDIR command) to change directories. The NDOS version also displays the name of the current directory. This command has the following syntax:

CD [*d:*][*path*]

The *d:* designation is the name of the disk drive to access, and *path* is the name of the directory. CD changes to the directory designated by the path. The drive is not changed. Using CD with no options causes

the command to display the name of the current directory. As in DOS, entering the following command makes the root directory the default:

```
CD \
```

Entering the following command changes to the parent directory, making it the current directory:

```
CD..
```

NDOS adds a new feature. Entering the following command changes to the directory one higher than the parent directory:

```
CD...
```

Thus, if you are in the directory \MYDIR\YOURDIR\OURDIR and enter CD..., you change to the \MYDIR directory.

CDD

The NDOS CDD command is similar to the CD command except that NDOS CDD also changes the default drive and directory. CDD has the following syntax:

```
CDD [d:][path]
```

If you are in the drive and directory C:\MYDIR, you can enter the following command:

```
CDD D:\YOURDIR
```

This command changes the default drive to drive D and the default directory to \YOURDIR. Otherwise, CDD operates just like the NDOS CD command.

CHCP

Like the DOS CHCP command, the NDOS CHCP command displays or changes the current system code page. A *system code page* controls which language character set DOS uses. The CHCP command requires that you load the COUNTRY.SYS information file in the CONFIG.SYS file, run the DOS NLSFUNC (National Language Support) command, and specify code pages with the DOS MODE *device* CODEPAGE PREPARE command. (See your DOS manual for information on how to use the NLSFUNC and MODE commands.) CHCP has the following syntax:

```
CHCP [nnn]
```

Here *nnn* is the number of the code page to set. Consult your current DOS manual for a list of the code pages supported by your version of DOS. If you issue the CHCP command without options, the current code page is displayed.

CLS

The NDOS CLS command is similar to the DOS CLS command, but NDOS CLS also contains the capability to change your monitor's colors. This command has the following syntax:

CLS [[BRIGHT] [BLINK] *foreground* ON *background*]

Entering CLS with no options clears the screen. The colors available for *foreground* and *background* are BLACK, BLUE, YELLOW, GREEN, RED, MAGENTA, CYAN, YELLOW, and WHITE. For example, to clear the screen and switch to a bright white foreground with a blue background, use the following command:

CLS BRIGHT WHITE ON BLUE

The BLINK option makes the entire screen blink in the selected colors. You can use this option to create, for example, an eye-catching warning screen in a batch file.

COLOR

The NDOS COLOR command sets the foreground and background colors for your monitor without clearing the screen as CLS does. You use the following syntax:

COLOR [BRIGHT] [BLINK] *foreground* ON *background*

The colors available for *foreground* and *background* are BLACK, BLUE, YELLOW, GREEN, RED, MAGENTA, CYAN, YELLOW, and WHITE. To set your monitor to use white letters on a blue background, for example, use this command:

COLOR WHITE ON BLUE

For more information, see the "SCRPUT" section later in this chapter.

COPY

Similar to the DOS COPY command, the NDOS COPY command enables you to use a list of files to copy. Here is the syntax for the COPY

command (the optional plus sign [+] concatenates the files, as in a DOS command):

COPY [*switches*] *filespec* [+]...[/A] [/B] *filespec* [/A] [/B]

The following switches are available for use with COPY:

Switch	Description
/A	Treats the file as ASCII text (default).
/B	Treats the file as binary text.
/M (Modified)	Copies only files with the archive bit set. The archive bit (the archive attribute discussed in Chapter 9) is retained on the copy.
/P	Prompts you to confirm each copy.
/Q (Quiet)	Suppresses the display of the names of files being copied.
/R (Replace)	Prompts you before overwriting an existing file.
/U (Update)	Copies only files that are newer than the matching target files.
/V	Verifies that copy is OK.
/C	Copies changed files only.
/H	Copies hidden files only.
/N	Performs all actions as if the copy were performed, but does not actually do the copy. You can use this switch to see what the results of the command would be before actually performing it.
/S	Copies subdirectory trees.

You use the /A, /B, and /V switches and the + key with the NDOS COPY command as you would use them with DOS COPY. In the NDOS version of COPY, you can copy more than one file to a destination. To copy the files *.WK1 and *.DBF to the disk in drive A, use the following command:

```
COPY *.WK1 *.DBF A:
```

To copy all files from drive A to drive C and to avoid overwriting any existing files on drive C that have the same name on both drives, use this command:

```
COPY /R A:*.* C:
```

You are prompted to confirm the copy before any file from drive A overwrites a file with the same name on drive C. For more information, see the "MOVE" section later in this chapter.

CTTY

The NDOS CTTY command, which is similar to DOS CTTY, changes the default I/O console device. This device is usually the keyboard (called the console). CTTY has the following syntax:

CTTY *device*

The possible devices to use include AUX, COM1, COM2, COM3, COM4, and CON (console). To be used by NDOS, the device must support all standard DOS I/O functions, including DOS internal commands (with the exception of the DRAWBOX, DRAWHLINE, LIST, SCREEN, SCRPUT, and SELECT commands, as well as all the BE commands). To change the CTTY device to a device connected to the first COM port, use the following command:

CTTY COM1:

Now the device (usually a terminal) on the COM1 port assumes control of all command input and output for your system.

To change back to the standard use of the keyboard and display, use this command:

CTTY CON:

DATE

The NDOS DATE command is similar to the DOS DATE command. The DATE command has the following syntax:

DATE [*mm-dd-yy*]

If you issue the DATE command with no option, you are prompted to enter a new date.

DEL and ERASE

The NDOS DEL and ERASE commands are similar to the DOS DEL and ERASE commands. However, with the NDOS versions, you can specify a list of files to delete. DEL and ERASE are the same command. You use one of the following forms:

DEL [*switches*] *filespec...*

ERASE [*switches*] *filespec...*

These switches are available for use with DEL and ERASE:

Switch	Description
/P	Prompts for a confirmation before deleting a file.
/Q (Quiet)	Suppresses the display of file names being deleted.
/Y (Yes)	Assumes that all responses are yes, including responses to the command DEL *.* or ERASE *.*.
/Z (Zap)	Deletes hidden, system, and read-only files (overrides the NDOS EXCEPT command; see "EXCEPT" later in this chapter).
/N	Performs all actions as if the deletion were performed, but doesn't actually do the deletion. You can use this switch to see what the results of the command would be before actually performing it.

To erase the files that match the file specifications *.WK1 and *.DBF, use one of the following commands:

```
ERASE *.WK1 *.DBF
DEL *.WK1 *.DBF
```

To erase files but be prompted before each deletion, use one of these commands:

```
ERASE /P *.WK1 *.DBF
DEL /P *.WK1 *.DBF
```

DELAY

The NDOS DELAY command causes the computer to pause for a few seconds before resuming operation. This command is most often used in a batch file. DELAY has the following syntax:

```
DELAY [seconds]
```

To cause the computer to wait five seconds before resuming operation, use this command:

```
DELAY 5
```

The default is one second.

DESCRIBE

The NDOS DESCRIBE command creates, modifies, or deletes file and subdirectory descriptions. With the DESCRIBE command, you can write a description for a file or subdirectory so that when you issue a DIR command, the description appears on-screen. DESCRIBE has the following syntax:

DESCRIBE *filespec* ["*description*"]

To add a description to the file MARY.TXT, use the following command:

DESCRIBE MARY.TXT "Mary had a little lamb poem."

When you perform a DIR command, the description appears next to the file name in the directory listing. If you enter the DESCRIBE command with a file name but no description, you are prompted to enter a description. To delete a description, enter a blank description.

To delete the description for MARY.TXT, enter the following command:

DESCRIBE MARY.TXT ""

DIR

Like the DOS DIR command, the NDOS DIR command displays file information. Unlike DOS's DIR command, however, NDOS DIR displays any descriptions you have defined for file names. With NDOS DIR, you can place more than one file specification on the command line. File names appear in lowercase, and directory names appear in uppercase, making it easier to tell them apart at a glance. The NDOS DIR command has the following syntax:

DIR [/A:[*attributes*]] [/O[:][*sortorder*]] [*switches*] [*filespec*]

When you use the /A option, DIR displays only those files that have the requested attribute or attributes set (or are not part of a particular set if a minus sign precedes the attribute name).

The following attributes are available for use with DIR:

Attribute	Description
h	Hidden file
r	Read-only file
s	System file

Attribute	Description
d	Directory
a	Archived file

To list the names of all the read-only files, use this command:

```
DIR /A:r
```

To list all files that are *not* archived, use this command:

```
DIR /A:-a
```

With the following *sortorder* options, you can sort the directory list. Placing a minus sign (–) before a sort order causes the sort to be in descending order rather than ascending order (the default).

Option	Sort Order
d	Date and time
e	File extension
i	NDOS file description
n	Name
s	Size
g	Directories first in the list (default)
u	Unsorted (same as normal DOS DIR)

To list the files in name and extension order, use this command:

```
DIR /O:ne
```

Other switches can help you customize the way the DIR command lists the files. The following switches may be used:

Switch	Description
/1	Displays files in a single-column list
/2	Displays files in a double-column list
/4	Displays files in a four-column list
/A	Displays files with a particular attribute
/B	Suppresses the header line and summary information

continues

Switch	Description
/C	Displays compression specifications for file names
/E	Displays file names in uppercase
/F	Displays the full path for each file name
/J	Justifies file names as in the DOS DIR command
/K	Suppresses the display of the volume label and path name information
/L	Displays file names in lowercase
/M	Omits the display of total bytes
/N	Resets the DIR command to its default values
/O:*n*	Displays files in a requested sort order, where *n* is one of the sort order options
/P	Pauses after each screen of information is displayed
/S	Displays files in the directory and all subdirectories
/T	Displays only the file attributes
/U	Displays only the summary information
/V	Displays the file names sorted vertically rather than horizontally (use with the /2, /4, or /W option)
/W	Displays the files names in wide five-column mode (same as DOS /W)

To display a directory of files with the WK1 extension from the MYFILE directory and all its subdirectories, use this command:

```
DIR /S \MYFILE\*.WK1
```

If you want the DIR command to display files in a certain way all the time, you can set the defaults for the command in your AUTOEXEC.BAT file. To set the command always to display files in sorted order by name (/O:*n*), use the following command (*n* represents one of the sort order options):

```
SET DIRCMD=/O:n
```

The DIRCMD is a DOS environment variable that enables you to preset DIR command parameters and switches. Refer to your DOS documentation for more information on DIRCMD.

DIRS

The NDOS DIRS command displays the current directory stack. The PUSHD and POPD commands, however, create and recall a directory stack. Suppose that you are in the root directory. When you enter the PUSHD C:\MYDIR command, the root directory (C:\) is placed in the directory stack, and your default directory is changed to \MYDIR. Then you enter the command PUSHD C:\TMP; the C\MYDIR directory is placed in the stack, and you are changed to the \TMP directory. If you then enter the command DIRS, the following listing is displayed:

```
C:\MYDIR
C:\
```

This listing means that the first (or top) directory in the stack is C:\MYDIR and that the previous directory is C:\ (root). For more information, see the "POPD" and "PUSHD" sections in this chapter.

DRAWBOX

The NDOS DRAWBOX command draws a box on-screen. This command is similar to the Norton BE BOX command. However, some differences exist. If you draw overlapping boxes by using DRAWBOX, the command detects other boxes on-screen and draws appropriate connecting characters when possible. DRAWBOX also has a Fill option, which is not available in BE BOX. (BE BOX is discussed in Chapter 24.) DRAWBOX has this syntax:

DRAWBOX *ulrow ulcol lrrow lrcol style* [BRIGHT] [BLINK]
foreground ON *background* [FILL *backgroundfill*] [SHADOW]

The *ulrow* variable specifies the position of the upper-left row of the box. Similarly, the *ulcol*, *lrrow*, and *lrcol* variables specify the upper-left column, lower-right row, and lower-right column. On a standard 25-line-by-80-row screen, the valid rows are 0 to 24, and the valid columns are 0 to 79. The BRIGHT option displays the box in a bright (high-intensity) version of the color, and BLINK causes the box to blink on-screen. The SHADOW option causes the box to be displayed with a shadow.

The *style* variable refers to the style of box to be drawn. You can choose from the following style options:

Option	Description
0	Borderless
1	Single line

continues

Option	Description
2	Double line
3	Single lines on the top and bottom, and double lines on the sides
4	Double lines on the top and bottom, and single lines on the sides

The *foreground*, *background*, and *backgroundfill* variables are colors. You can choose from the options BLACK, BLUE, GREEN, RED, MAGENTA, CYAN, YELLOW, and WHITE.

To draw a single-line box with a bright white foreground and a red background, use this command:

```
DRAWBOX 10 10 20 20 1 BRIGHT WHITE ON RED
```

DRAWHLINE

With the NDOS DRAWHLINE command, you can draw a horizontal line on-screen. You use the following syntax:

DRAWHLINE *row col len style* [BRIGHT] [BLINK] *foreground* ON *background*

The *row* and *col* variables specify where the line begins on-screen. The *len* variable specifies the length, and *style* refers to style 1 (single line) or style 2 (double line). The *foreground* and *background* colors are BLACK, BLUE, GREEN, RED, MAGENTA, CYAN, YELLOW, and WHITE. On a standard 25-line-by-80-row screen, the valid rows are 0 to 24, and the valid columns are 0 to 79. The BRIGHT option displays the line in a bright (high-intensity) version of the color, and BLINK causes the line to blink on-screen.

To draw a single white line with a blue background across the middle of the screen, use this command:

```
DRAWHLINE 10 0 79 1 WHITE ON BLUE
```

DRAWVLINE

The NDOS DRAWVLINE command is similar to the DRAWHLINE command except that DRAWVLINE draws a vertical line on-screen. DRAWVLINE has the following syntax:

DRAWVLINE *row col len style* [BRIGHT] [BLINK] *foreground* ON *background*

To draw a single white line with a magenta background down the middle of the screen, use the following command:

DRAWVLINE 12 0 24 1 WHITE ON MAGENTA

ECHO

The NDOS ECHO command is similar to the DOS ECHO command. The main advantage is that NDOS ECHO enables you to use the NDOS redirection symbols (see the section "Using I/O Redirection" earlier in this chapter) and to include multiple commands per line (see the earlier section "Using Multiple Commands on One Line"). The NDOS ECHO command has the following syntax:

ECHO [ON | OFF | *message*]

In NDOS, the default is ECHO ON for batch files and ECHO OFF for keyboard commands. If you enter ECHO ON at the keyboard, NDOS displays fully parsed and expanded commands (including aliases and variables) before the command is executed. If no arguments are included, ECHO displays its current state (OFF or ON).

For example, look at the following three lines in a batch file:

```
ECHO OFF
REM This is a comment—not displayed
ECHO This is displayed
```

This file causes ECHO to be turned off (first line), which causes the REM (remark) *not* to be echoed (second line). The third line *is* displayed on-screen. When entering the ECHO OFF or ECHO ON command, you may precede the command with the *at* symbol (@) to suppress the ECHO command from being displayed on-screen. For example, this command is *not* displayed on-screen:

@ECHO OFF

The following command is displayed:

ECHO OFF

ECHOS

The NDOS ECHOS command is similar to the ECHO command except that when a message is displayed, the cursor is not automatically sent

to the next line (no carriage return is performed). This command enables you to echo another message that begins where the previous message left off.

ENDLOCAL

The NDOS ENDLOCAL command restores the computer to a previously saved (with a SETLOCAL command) disk drive, directory, environment variable, or alias. ENDLOCAL, which has no options, is useful in a batch file when you temporarily change directories (using the CD command) or disk drives to execute a procedure, and you then want to change back to your current settings.

The following example uses the SETLOCAL command to save your current settings. Some changes are made, and then the previous settings are restored by the ENDLOCAL command:

```
SETLOCAL
C:
CD \MYDIR
SET PATH = C:\KWIKSTAT
KS
ENDLOCAL
```

In this example, suppose that your current drive is A and your directory is \. The batch file changes to drive C and the \MYDIR directory, and then executes the SET and KS commands. At this point, if the batch file ended, your current drive and directory would be C:\MYDIR. However, the ENDLOCAL command automatically switches you back to your original state (captured by the previous SETLOCAL command). Thus, your current drive and directory are set back to A:\. See the "SETLOCAL" section for more information.

ESET

The NDOS ESET command edits environment variables and aliases. Environment variables are used to customize how DOS operates. Aliases are substitute names for commands (see the "ALIAS" section in this chapter). ESET has the following syntax:

ESET [*switches*] *varname*

The following switches are available for use with ESET:

Switch	Description
/A	Assumes that the *varname* is an alias, which allows you to edit an alias that has the same name as an environment variable
/M	Edits an environment variable in the master environment

You can list more than one environment variable in the *varname* list; separate the names with a blank space.

To edit the file search path, for example, enter this command:

```
ESET PATH
```

The current path is displayed on-screen. Then you can use the NDOS command-line editing keys to edit the path (refer to table 28.1).

EXCEPT

The NDOS EXCEPT command enables you to perform a command and specify the files that should be excluded from that command. EXCEPT has the following syntax:

EXCEPT (*filespec...*) *command*

The following DOS command displays all files with a WK1 extension:

```
DIR *.WK1
```

The following command displays all files *except* the ones with the WK1 extension:

```
EXCEPT (*.WK1) DIR
```

EXCEPT recognizes all NDOS internal commands, aliases, external commands (including DOS external commands), and batch files. EXCEPT does not work with the DEL or ERASE command if you use the /Z switch on those commands.

EXIT

You use the NDOS EXIT command to return from a secondary command processor. The EXIT command has this syntax:

EXIT [*n*]

Here *n* is an errorlevel value you have selected. This value returns you to the calling command processor. If *n* is not included, the errorlevel is the one returned by the last external program. EXIT is usually used when a program "shells" temporarily to DOS to enable you to enter a DOS command. When you enter **EXIT** at the DOS prompt, you are returned to the original program. If you began NDOS from the DOS command line, EXIT ends NDOS, and you return to the DOS prompt. For information about how to use errorlevel values, see Chapter 24 on Batch Enhancer.

You choose the errorlevel you want. Otherwise, for some Norton commands, the /DEBUG option displays the errorlevel (exit code) returned. In general, 0 means that the program exited with no problems, and NOT 0 usually means that the program ended in error. See the discussion of the BE ASK command in Chapter 24 for more information on using an errorlevel.

FOR

The NDOS FOR command, like the DOS FOR command, repeats several times a command defined by a set of files. You use the following syntax:

FOR [/A[[:] [–]rhsda]] *%variable* IN (*set*) [DO] *command*

FOR repeats the command and replaces the variable in the command with the information in *set*. Commands recognized by the NDOS FOR command are internal DOS commands or aliases, external commands, or batch files. The /A switch followed by a list of attribute letters causes the command to retrieve only those files that match the attribute list. Here are the meanings of the attributes:

Attribute	Description
h	Hidden file
r	Read-only file
s	System file
d	Directory
a	Archived file

The colon [:] after the /A is optional (for appearance only). For example, the switch /A:rh retrieves only files that have the read-only and hidden switches set. If a minus sign appears before the attribute list (as in /A:–rh), the FOR command excludes those files that match the attribute list.

The DOS FOR command requires the variable name to be only one character in length (such as A), but NDOS allows variable names of up to 80 characters (for example, *%variablename*). The DO is optional in NDOS but is required in the DOS command.

Look at the following example:

```
FOR %a IN (*.DOC *.TXT) DO LP %a
```

This command causes all DOC files to be printed with the LP command followed by all TXT files. In other words, this command translates into the following two commands:

```
LP *.DOC
LP *.TXT
```

FREE

The NDOS FREE command displays the total disk space available, total bytes used, and total bytes free on disk. FREE has the following syntax:

```
FREE [d:]...
```

To get this information for drives A and C, for example, enter this command:

```
FREE A: C:
```

If you do not specify a drive, information for the default drive is displayed.

GLOBAL

The NDOS GLOBAL command executes a command in the current directory and its subdirectories. GLOBAL has the following syntax:

```
GLOBAL [switches] command
```

The following switches are available for use with GLOBAL:

Switch	Description
/H	Looks for hidden directories.
/I	Ignores nonzero exit codes. GLOBAL usually ends if a nonzero exit code is returned.
/P	Prompts for excution of the command in each directory.
/Q	Suppresses the display of each directory name.

To erase all BK files in the TEXT directory (assuming that is the current default directory) and all its subdirectories, use this command:

```
GLOBAL ERASE *.BK
```

GOSUB

The NDOS GOSUB command calls a subroutine in a batch file. A *subroutine* in a batch file is a series of commands that begins with a label and ends with the command RETURN. GOSUB has the following syntax:

```
GOSUB label
```

Suppose that you have a subroutine in your batch file with the following commands:

```
:MYSUB
ERASE *.BAK
RETURN
```

To execute this subroutine, use the following command:

```
GOSUB MYSUB
```

The command in the subroutine executes, and the flow of the batch file returns to the line following the GOSUB command.

GOTO

Like the DOS GOTO command, the NDOS GOTO command branches the flow of a batch file to a specified label. This command has the following syntax:

```
GOTO [/I] label
```

In this line, *label* is a standard DOS batch file label, which must begin with a colon (:) on the label line (for example, :ENDBATCH). However, when you reference the label in the GOTO command line, do not include the colon in the label name. This practice is standard for referencing labels in DOS.

For example, the following command transfers control of the batch file to the label :ENDBATCH in the batch file:

```
GOTO ENDBATCH
```

GOTO is often used with the IF command. Suppose that you want to check for the existence of a file and then go to a label depending on whether that file exists. The command

IF EXIST EDIT.EXE GOTO ITSTHERE

causes the flow of the batch file to go to the label :ITSTHERE if the file EDIT.EXE is on disk. If EDIT.EXE does not exist, the flow of the batch file continues with the command following the IF command.

You may use the GOTO statement to exit an IFF block (see the "IF" and "IFF" sections in this chapter). Note that if you use a GOTO within an IFF block, the statement must branch entirely outside the block. The /I switch tells GOTO not to cancel any IIF statements.

HELP

The NDOS HELP command is similar to the DOS (Versions 5 and 6) HELP command. HELP has the following syntax:

HELP [*topic*] [*switches*]

Using HELP with no switches displays a list of topics. From this list, you can pick a specific topic for which help is available.

You can use these switches with the HELP command:

Switch	Description
/BW	Displays information in black and white
/HERC	Displays information using Hercules Graphics
/M	Displays information in monochrome display mode
/G0	Disables the graphic mouse pointer and graphics symbols (for EGA or VGA monitors)
/G1	Disables the graphic mouse pointer only (for EGA and VGA monitors)
/G2	Disables the use of graphic dialog boxes
/LCD	Displays information using colors appropriate for an LCD (usually a laptop) monitor

To display help on the command HISTORY in black-and-white mode, for example, enter the following command:

HELP HISTORY /BW

Figure 28.4 illustrates the Help dialog box for the HISTORY command. From this dialog box, you can choose Go **T**o to go to the next topic (commands are in alphabetical order), Go **B**ack to go to the preceding

topic, Index to display a list of topics, or Cancel to end Help and return to the DOS prompt. You can also use the mouse pointer to choose these options.

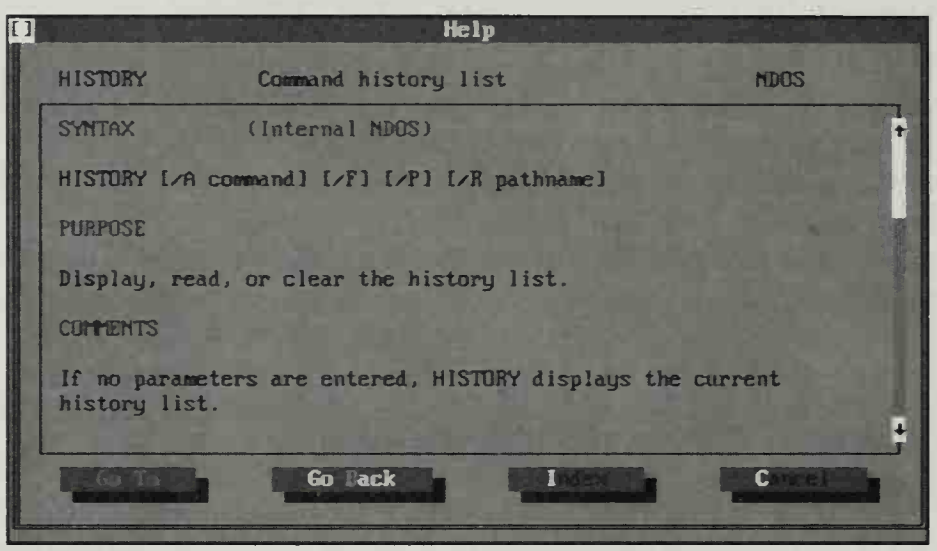

Fig. 28.4

The Help dialog box for the NDOS HISTORY command.

HISTORY

The NDOS HISTORY command displays, clears, or reads a list of previously entered commands. HISTORY has the following syntax:

HISTORY [*switches*]

These switches are available for use with HISTORY:

Switch	Description
/A	Adds a command to the history list
/F (Frees)	Clears the history list
/P	Tells the command to pause after displaying a screenful of information
/R *filespec*	Tells the command to load a command history from the file specified by *filespec*

To save the output of the HISTORY command to a file, use the redirection option (>). To save the current history information to a file named HISTORY.TXT, enter this command:

HISTORY > HISTORY.TXT

Using the HISTORY command with no options causes the command to display the current contents of the history list. Each time you enter a

command at the DOS prompt, that command is added to the history list. When the history list gets full (the SETDOS command specifies its size), older commands are dropped to make room for new commands.

IF

The NDOS IF command, like the DOS IF command, is used in batch processing to transfer the flow of the batch file to a label. This transfer depends on a condition. The list of conditions recognized by the NDOS IF command is more extensive than the conditions recognized by the DOS IF command. The NDOS IF command has the following syntax:

IF [NOT] *condition command*

NDOS evaluates the *condition*. If the *condition* is true, NDOS executes the *command*. If the NOT option is used, the *command* is executed only if the *condition* is false. The *condition* can use one of the following forms:

Condition	Description
string1==*string2* or *string1* EQ *string2*	True if *string1* is equal to *string2*
string1 NE *string2*	True if *string1* is not equal to *string2*
string1 LT *string2*	True if *string1* is less than *string2*
string1 LE *string2*	True if *string1* is less than or equal to *string2*
string1 GT *string2*	True if *string1* is greater than *string2*
string1 GE *string2*	True if *string1* is greater than or equal to *string2*
ERRORLEVEL [*condition*] *n*	Errorlevel tested to the number *n* (for *condition*, use ==, EQ, and so on)
EXIST *filespec*	True if file names by *filespec* are found on disk
ISALIAS *aliasname*	True if the specified name is an alias
ISDIR *dirname*	True if the directory named exists

NOTE The designation *string* refers to a group of characters.

When using EQ, NE, LT, LE, GT, and GE comparisons, IF performs a numeric comparison if both strings begin with numeric digits. The

comparison otherwise is an ASCII comparison (case differences are ignored). For example, the following test performs a DIR command because ALAN is less than BAKER:

```
IF "ALAN" LE "BAKER" DIR
```

(The letter A appears before B in the alphabet.) A variable is usually used in an IF statement of this sort. If the command line variable %1 is to be compared with BAKER, for example, use this command:

```
IF %1 LE "BAKER" DIR
```

You can also use the IF statement with the NDOS INPUT command, which enables you to input a variable. The following example inputs the name of a directory to print:

```
:NEXTDIR
INPUT "Enter directory to print or END to End:" %%CHOICE
IF %%CHOICE == "END" THEN GOTO THATSALL
DIR %%CHOICE >LPT1:
GOTO NEXTDIR
:THATSALL
```

If you enter END, the procedure stops. Otherwise, the DIR command is performed, and the output is sent to the printer (LPT1:).

See also the "INPUT" section in this chapter.

IFF

The NDOS IFF command, although similar to the IF command, adds an ELSE clause. You use the following syntax:

IFF [NOT] *condition1* THEN *command1* ELSE [IFF[NOT]] *condition2* THEN *command2* ENDIFF

The conditions are the same as those used in the IF command. NDOS tests *condition1*. If *condition1* is true, *command1* is executed. If *condition1* is false, the ELSE *condition2* is checked. If the ELSE *condition2* is true, *command2* is executed. Consider the following example:

```
IFF EXIST KS.EXE THEN ^ GOTO ISTHERE ^ ELSE GOTO
NOTTHERE
:ISTHERE
...commands
:NOTTHERE
...commands
```

This example tests to see whether the file KS.EXE exists. If the file exists, the flow of the batch file is sent to the label :ISTHERE. If the file KS.EXE does not exist, the flow of the batch file is sent to the label :NOTTHERE.

INKEY

The NDOS INKEY command displays a prompt and waits for single-keystroke input from the user. Then you can assign this input to a variable name. INKEY has the following syntax:

INKEY [/K"..." /W*n*] [*text*] %%*varname*

The /K"..." option enables you to specify a list of allowable keystrokes. For example, /K"ABCD" causes the command to recognize only the keystroke A, B, C, or D. The /W*n* switch causes a wait of *n* seconds for an input to be entered. If no keystroke is entered in the specified time, the value of %%*varname* is unchanged. If you use /W0, the buffer is checked immediately for an entry and returns that value to the %%*varname* if a keystroke exists.

The *text* option enables you to display a message on-screen.

The %%*varname* parameter is a variable name where the input is stored. The double percent sign (%%) tells NDOS that this name is a variable name. (Do not confuse %%*varname* with %*varname*.) Keystrokes are stored as ASCII values. The uppercase letter A, for example, is 65. Keystrokes that are extended characters are stored in the variable as an *at* symbol (@) plus a number. The Home key, for example, is @71.

You can use %%*varname* in IF statements. Consider the following example:

```
INKEY Enter a drive name: %%CHOICE
IF %%CHOICE == "C" THEN GOTO HARDDRIVE
...batch file code continues...
:HARDDRIVE
```

In this case, the name of a directory (a single character) is requested. If the value of %%CHOICE is equal to C, the batch file branches to the label :HARDDRIVE.

INPUT

The NDOS INPUT command enables you to enter a variable. You use the following syntax:

INPUT [/W*n*] [*text*] %%*varname*

The /W*n* switch causes a wait of *n* seconds for an input to be entered. If no keystroke is entered in the specified time, the value of %%*varname* is unchanged. If you use /W0, the buffer is checked immediately for an entry and returns that value to the %%*varname* if a keystroke exists.

The *text* option enables you to display a message on-screen. The %%*varname* parameter is a variable where the input is stored. You can also use INPUT with an IF command. For more information, see the "IF" section in this chapter.

KEYSTACK

You use the NDOS KEYSTACK command to send keystrokes to a program from a batch file. KEYSTACK has the following syntax:

KEYSTACK ["*text*"] [*nn*] [*key*] [@*nn*] [!] [/W*n*]

The *text* option is input that is sent as characters to the program. The *nn* values are ASCII codes. For example, 65 sends an uppercase A to the program. The @*nn* values are extended codes. The optional ! clears all pending keystrokes in the KEYSTACK buffer and the keyboard buffer. The optional /W*n* switch specifies an *n*-second pause while waiting for a response.

Suppose that you want to create a batch file that changes one string to another string by using the EDLIN editor. (EDLIN is an editor provided with DOS. See your DOS manual for more information on EDLIN.) To create such a file (called CHANGE.BAT), you use the following commands:

```
KEYSTACK "1,999R%2" @64 "%3" 13 "Exit" 13
EDLIN %1
```

Suppose that you then want to change all occurrences (from line 1 to line 999) of the word *lamb* to *sheep* in the ASCII text file MARY.TXT. Use this command:

```
CHANGE MARY.TXT lamb sheep
```

The KEYSTACK command in the batch file then enters the following command (in EDLIN):

```
1,999RlambF6sheepCR
ExitCR
```

F6 is the F6 function key, and CR is the Enter key (carriage return). Notice that the KEYSTACK is defined before the application (EDLIN, in this case) is called. For keystack to work, you must have the device driver KEYSTACK.SYS defined in your CONFIG.SYS file.

LIST

The NDOS LIST command displays a file with forward and backward scrolling. LIST has the following syntax:

LIST [*switches*] [*filespec*]...

The following switches are available for use with LIST:

Switch	Description
/H	Strips the high bit from each character before displaying it. This process is necessary for displaying some non-ASCII files created by some word processors.
/S	Reads from the standard input rather than from a file. With this switch, you can read the output from commands, such as DIR, as a list file.
/W	Wraps the text at the right margin.

When viewing a file, you can scroll by using the following keys:

Command	Description
Home	Displays first page of the file
End	Displays last page of the file
Esc	Exits current file and goes to the next file in the file specification list (if one exists)
Ctrl+C	Quits list
↑	Scrolls up 1 line
↓	Scrolls down 1 line

continues

Command	Description
←	Scrolls left 8 columns
→	Scrolls right 8 columns
Ctrl+←	Scrolls left 40 columns
Ctrl+→	Scrolls right 40 columns
F1	Calls on-line help
F	Prompts and searches for a string
N	Finds the next matching string
P	Prints file to LPT1

To examine a file called KS.DOC, enter the following command:

```
LIST KS.DOC
```

To redirect the output of the DIR command to a list file, use this command:

```
DIR|LIST /S
```

LOADBTM

The NDOS LOADBTM command is used in batch files to switch a running batch file from or to the BTM (batch-to-memory) mode. Batch files run faster in BTM mode because all commands are read at once; normal batch files, however, read a command from disk when needed. LOADBTM has this syntax:

```
LOADBTM [ON|OFF]
```

For example, placing the command

```
LOADBTM ON
```

in your batch file causes the contents of the batch file to be read into memory and executed. The following lines are a small batch file. The LOADBTM command causes the commands beginning with COPY to be read into memory and executed:

```
REM switch to BTM mode
LOADBTM ON
COPY *.* A:
DIR A:
```

LOADBTM ON tells NDOS to read the batch file lines into memory to the end of the batch file or until a LOADBTM OFF command appears.

LOADHIGH or LH

Like the DOS LOADHIGH or LH command, the NDOS LOADHIGH or LH command causes a program to be loaded into high DOS memory. This command can give you more conventional memory, enabling you to run larger programs on your computer. You must use DOS 5 or later to use this command; you must also be operating on a 286 (or higher) system with suitable software and have the command DOS=UMB in your CONFIG.SYS file.

Note the following forms of the LOADHIGH command:

LOADHIGH [*filespec*]...

LH [*filespec*]...

To load the program MYPROG.COM into high memory, use this command:

LOADHIGH MYPROG.COM

If not enough memory is available in the 640K or 1M range to load the program, the program is loaded into conventional memory.

LOG

You use the NDOS LOG command to save a log of the commands entered at the DOS prompt. LOG has the following syntax:

LOG [/W *filespec* | ON | OFF | *text*]

The /W switch causes the command to be stored in the file specified by *filespec*. The ON option tells the command to begin logging commands; OFF stops the saving of commands. The *text* option enables you to insert a header or other text into the log file. Using LOG with no options causes the command to report whether the log is on or off. To save a command to a file named MYLOG.TXT, use this command:

LOG /W C:\MYLOG.TXT

MD or MKDIR

The NDOS MD or MKDIR command operates the same as the DOS MD or MKDIR command. With the NDOS version, however, you can have multiple commands per line. You use the following syntax:

MD [*drive*]*path*...

To create a subdirectory called WP51 from the root directory, for example, use this command:

```
MD /WP51
```

To create two directories at once (\WP51 and \KS), use this command:

```
MD \WP51^MD \KS
```

Remember that the caret (^) is a separator between two commands.

MEMORY

The NDOS MEMORY command, like DOS MEMORY, displays the amount of memory available, including total RAM, number of bytes free, total EMS memory and bytes free, XMS memory, size of the total environment and bytes free, size of the alias space and bytes free, and size of the history buffer. No options are available.

MOVE

The NDOS MOVE command moves files to other directories or drives. MOVE has the following syntax (similar to the COPY command syntax):

MOVE [*switches*] *filespec... filespec*

The following switches may be used with COPY:

Switch	Description
/C	Moves changed files
/D	Requires a directory as the target *filespec*
/H	Moves hidden files
/N	Tests and displays the results of the move without making the changes
/P	Prompts for confirmation before each move
/Q	Turns off the display of file names as they are moved
/R	Prompts for confirmation before each move that replaces an existing file
/S	Moves files from the current directory and any subdirectories
/U	Moves the designated file only if a file with that name exists in the target location and the target file is older

To move files with a WK1 extension from the C:\MYDIR directory to the D:\YOURDIR directory, use the following command:

```
MOVE C:\MYDIR\*.WK1 D:\YOURDIR
```

PATH

The NDOS PATH command, similar to DOS PATH, tells DOS where to look for executable files and batch files when they are not in the current default directory. The main difference in the NDOS version of PATH is that PATH also looks for BTM, COM, EXE, and BAT files. The NDOS PATH command has the following syntax:

PATH [*path*/[;*path2*]...]

Using PATH with no options causes the command to display the current path on-screen. Using PATH with a single semicolon clears the path. To tell NDOS to search the NU, DOS, and KWIKSTAT directories (all on drive C) when a command is not in the current directory, use this command:

```
PATH C:\NU;C:\DOS;C:\KWIKSTAT
```

PAUSE

Like DOS PAUSE, the NDOS PAUSE command suspends the processing of a batch program until you press any key (except Ctrl+Break or Ctrl+C). With the NDOS version, you can place more than one command on the command line. PAUSE has the following syntax:

PAUSE [*message*]

Consider this example:

```
PAUSE Press a key to continue with this batch file...
```

When this command is encountered, the following message appears on-screen:

```
Press a key to continue with this batch file...
```

The batch file does not continue to the next command until a key is pressed. This command is often useful for pausing after displaying information on-screen so that the information does not scroll off the screen before the user has a chance to read the message.

POPD

Use the NDOS POPD command to recall a command from the top of the directory stack. POPD has the following syntax:

POPD [*]

If the * option is included, the directory stack is cleared without changing the current drive and directory.

For more information, see the "PUSHD" section, which describes how to create directory stacks, and the "DIRS" section, which displays the current directory stack.

Suppose that you are in the root directory on drive A. When you enter the PUSHD C:\MYDIR command, the root directory (C:\) is placed in the directory stack, and your default drive and directory change to C:\MYDIR. Then, after you enter **PUSHD D:\TMP**, the C:\MYDIR directory is placed in the stack, and you are changed to the D:\TMP directory and drive. If you enter the command

POPD

you are switched back to the first drive and directory entry on the stack (C:\MYDIR).

PROMPT

The NDOS PROMPT command, similar to the DOS PROMPT command, changes the prompt used by DOS. You use the following syntax:

PROMPT [*text*]

The DOS prompt usually consists of the current disk name followed by >. For example, if you are logged on to drive A, the default prompt is A>.

The *text* option enables you to specify what appears on the prompt line by listing a series of commands; each command is preceded by a dollar sign ($). Text that is not a command preceded by a dollar sign is displayed verbatim. The following commands are available:

Command	Description
$b	| character.
$c	Opening parenthesis (NDOS only).
$d	Current date, *WWW MMM DD, YYYY* (day of week, month, date, and year). An example is `Thu Oct 17, 1993`.

Command	Description
$e	Esc character (ASCII 27).
$f	Closing parenthesis (NDOS only).
$g	> character.
$h	Backspace character. (You can use this command to display characters. For example, dhhhhh$h causes the last six characters in the date ($d) to be erased from the prompt so that it appears as `Thu Oct 17.`)
$l	< character.
$n	Default drive letter.
$P	Current disk and directory in uppercase. (In DOS, $P is always displayed in uppercase.)
$p	Current disk and directory in lowercase (NDOS only).
$q	= character.
$s	Space character.
$t	Current time (in hours, minutes, and seconds).
$v	DOS version number.
$X[$]*d*:	Current disk and directory in uppercase, where *d*: is the drive specification (NDOS only).
$x[$]*d*:	Current disk and directory in lowercase, where *d*: is the drive specification (NDOS only).
$z	Current NDOS nesting level (NDOS only).
$$	Dollar sign.
$_	CR/LF (go to next line).

Those options marked as "NDOS only" are available only in the NDOS version of the PROMPT command, not in the PC DOS or MS-DOS version of PROMPT. To cause the prompt to appear as the name of the disk drive and the name of the current directory, use either of the following commands:

```
PROMPT $P$g
PROMPT $X$c:
```

The optional dollar sign, when included in the second version of the PROMPT command, causes the ending colon to appear in the prompt.

When you are in drive C and in the \MYDIR directory, these two commands cause the DOS prompt to be the following:

```
C:\MYDIR>

C:\MYDIR:
```

PUSHD

The NDOS PUSHD command places a disk drive and directory in the directory stack. PUSHD has the following syntax:

PUSHD [[*d*:]*path*]

For more information, see the "POPD" section, which tells you how to recall a directory stack, and the "DIRS" section, which discusses displaying the current directory stack.

Suppose that you are in the root directory of drive A. When you enter the command

PUSHD C:\MYDIR

the root directory (C:\) is placed in the directory stack and your default drive and directory changes to C:\MYDIR. Then you enter the following command:

PUSHD D:\TMP

This places the C:\MYDIR directory in the stack and changes to the D:\TMP directory and drive. If you enter the command POPD, you are switched back to the last drive and directory entry (C:\MYDIR).

QUIT

You use the NDOS QUIT command to end the processing of a batch file at any point. No command-line options are available. If you quit one batch file that has been called from a previous batch file, you return to that previous batch file.

RD or RMDIR

The NDOS RD or RMDIR command, used to remove directories, is similar to the DOS RD or RMDIR command. Unlike the DOS version,

however, this version enables you to list several directories to delete at once. You use one of the following forms:

RD [*drive*:]*path*...

RMDIR [*drive*:]*path*...

To delete the directories \MYDIR and \YOURDIR, use the following command:

```
RD \MYDIR \YOURDIR
```

Before removing a directory, you must delete all files in that directory. See the "MD or MKDIR" and "CD or CHDIR" sections for more information.

REM

The NDOS REM command, like the DOS REM command, places a comment in a batch file. For example, the following command is ignored when the batch file commands are being processed:

```
REM This is a comment in a batch file
```

Programmers usually use REM lines to document the actions of the batch file for purposes of maintaining the file.

REN or RENAME

The NDOS REN or RENAME command, like the DOS REN or RENAME command, renames a file or subdirectory. You use one of these forms:

REN [*switches*] *filespec...filespec*

REN [*switches*] *path...path*

The following switches may be used with REN:

Switch	Description
/N	Displays the projected results of the command—without changing any files
/P	Prompts you to confirm each rename
/Q	Suppresses display of the names of the files as they are being renamed
/S	Renames subdirectories with a wild-card specification

To rename a file named MYFILE.TXT to YOURFILE.TXT, use this command:

```
REN MYFILE.TXT YOURFILE.TXT
```

Unlike DOS, you can rename files to a different directory (but not a different drive). Consider the following command:

```
REN \WP51\MYFILE.TXT \TMP\YOURFILE.TXT
```

This command renames the file in the WP51 directory to the TMP directory. You can rename directories also. For example, the following command renames the directory MYDIR to YOURDIR:

```
REN \MYDIR \YOURDIR
```

RETURN

The NDOS command RETURN ends a subroutine in a batch file. This command has no command-line options. Suppose that in your batch file you have a subroutine with the following commands:

```
:MYSUB
ERASE *.BAK
RETURN
```

To execute this subroutine, use the following command:

```
GOSUB MYSUB
```

The subroutine is executed up to the command RETURN. The flow of the batch file then returns to the line following the GOSUB command.

SCREEN

The NDOS SCREEN command positions the cursor on-screen and optionally displays a message. You use the following syntax:

SCREEN *row column* [*message*]

To locate the cursor at the 10th row and 4th column and to display the message `Here I am`, use this command:

```
SCREEN 10 4 Here I am
```

SCRPUT

The NDOS SCRPUT command displays text in color. SCRPUT has the following syntax:

> SCRPUT *row column* [BRIGHT] [BLINK] *foreground* ON *background text*

The colors available for *foreground* and *background* are BLACK, BLUE, YELLOW, GREEN, RED, MAGENTA, CYAN, YELLOW, and WHITE. For example, to place the text `This is a message` on-screen with bright white letters and a cyan background 10 rows down from the top and 12 columns over from the left, use this command:

> SCRPUT 10 12 BRIGHT WHITE ON CYAN This is a message

SELECT

The NDOS SELECT command enables you to choose command-line file arguments from a full-screen menu by using the arrow keys or mouse pointer. After you make your selections, the command is executed on the selected files. You use the following syntax:

> SELECT [/A:*attributes*] [/C] [/D] [/O:*sortorder*] *command* (*filespec...*)

The /A switch causes files with certain attributes to appear in the select list, and the /O switch causes files in the select list to be displayed in a sorted order. The /C switch causes the list to be displayed in upper-case; the /D switch disables directory colorization.

When the /A option is used, SELECT displays only those commands that have the requested attributes set (or commands that do not have the requested attribute set if a minus sign precedes the attribute name). The following attributes are available:

Attribute	Description
h	Hidden file
r	Read-only file
s	System file
d	Directory
a	Archived file

To use SELECT to copy a list of all archived files to drive A, enter this command:

```
SELECT /A:a COPY (*.*) A:\
```

To copy all files that are *not* archived, use /A:–a instead of /A:a.

The *sortorder* parameter enables you to sort the select list. The following sort order options are available. Placing a minus (–) before a sort order causes the sort to be in descending order rather than ascending order (the default).

Option	Sort Order
d	Date and time
e	File extension
i	NDOS file description
n	Name
s	Size
g	Directories first in the list
u	Unsorted (same as normal DOS DIR)

When you enter the SELECT command, a file list appears on-screen. If, for example, you enter the following command, you see a screen similar to the one in figure 28.5:

```
SELECT COPY (*.EXE) B:
```

Use the up- and down-arrow keys to move the highlight from line to line. To select a file to be copied, press the space bar (or the plus key). Selected files have a small triangle to the left of their names. If a file already is selected, pressing the space bar (or the minus key) unselects the file. Pressing the asterisk (*) key selects all files. After you select the files you want to copy, press Enter to initiate the COPY command.

SET

The NDOS SET command, like the DOS SET command, displays, creates, modifies, or deletes environment variables. SET has the following syntax:

```
SET [/M] [/P] [/R filespec...] [variable[=] [value]]
```

```
 33 chars | ↑ or ↓ Selects | + Marks  - Unmarks | ENTER to run | Page  1 of  2
copy (*.exe) b:                                   Marked:    0 files      0K
 brt71efr.exe    87248   2-24-93  3:34a
 epson.exe        1499   2-24-93  3:34a
 herclj.exe       2688   2-24-93  3:34a
 ks3.exe         35707   2-24-93  1:09p
 ks3aov1.exe     36395   2-24-93  9:20p
 ks3aov2.exe     40731   2-25-93  3:34a
 ks3cros.exe     37947   2-25-93 10:40a
 ks3entry.exe    33723   2-25-93  1:02p
 ks3life.exe     30491   2-24-93  9:38p
 ks3nonp.exe     31819   2-25-93 10:40a
 ks3plot1.exe    35195   1-04-93  6:36p
 ks3reg.exe      35419   2-25-93 10:40a
 ks3simu.exe     26939   1-04-93  6:34p
 ks3stat.exe     37387   2-25-93 10:40a
 ks3test.exe     33090   1-04-93  3:33a
 ks3tfor.exe     38486   1-04-93  3:33a
 ks3time.exe     38811   2-25-93  3:34a
 ks3trans.exe    26683   2-22-93  2:51p
 ks3tww.exe      34074   1-04-93  3:33a
 ks3util.exe     38859   2-25-93 10:40a
 ksetup.exe      15819   2-25-93 12:54p
 laserjet.exe     2688   2-24-93  3:34a
 mark.exe          571   2-24-93  3:34a
```

Fig. 28.5

Picking file names from a SELECT command list.

The /M switch tells the command to display or modify the master environment rather than the local copy of the environment. The /P option tells the command to pause after displaying a page of entries. The /R *filespec* option tells the command to load a list of environment variables from the file specified by *filespec*. To create a file that contains environment variables, you can redirect the output of the SET command to a file name. For example, use the following command:

```
SET > ENVIRON.LST
```

This command creates a file named ENVIRON.LST containing the current environment settings. Then you can use the /R option to read these same settings back.

Using the command SET with no options lists the current settings onscreen. To add a variable, use this form:

```
SET varname=value
```

To set the value of the variable MYVAR to the path C:\MYDIR, use the following command:

```
SET MYVAR=C:\MYDIR
```

To erase the variable MYVAR from the list of variables, use the following command:

```
SET MYVAR
```

To edit an environment variable, use the NDOS command ESET, described earlier in the chapter.

Using the SET command, you can tell NDOS that a file with a particular extension should be used for a specific program. Suppose, for example, that you have many TXT files that you often want to display on-screen to read. You can tell NDOS that you want to use the LIST command to view any TXT file entered at the DOS prompt. Here is the command for this procedure:

```
SET .TXT=LIST
```

If you have a file named MARY.TXT, entering **MARY** at the DOS prompt causes the LIST program to execute and display the file MARY.TXT.

SETDOS

The NDOS SETDOS command displays or sets the NDOS configuration variables. With this command, you can customize NDOS for your personal use. SETDOS has this syntax:

SETDOS [*switches*]

The following switches are available for use with SETDOS:

Switch	Description
/A*n*	Determines whether NDOS tries to use ANSI Escape sequences. With /A0, NDOS can determine whether an ANSI driver is installed. /A1 forces NDOS to assume that an ANSI driver is installed. /A2 forces NDOS to assume that an ANSI driver is not installed.
/C*n*	Tells the command what compound character to use for separating multiple commands on the same line. The default is ^ (caret). You cannot use the following characters: `| < > = , ;` To use the tilde (~) as the compound character, use the option /C~.
/Eh	Sets the character to be used as the Escape character (see the earlier section "Using Escape Sequences"). The default is ^X (Ctrl+X), which appears as an up arrow. You cannot use the following characters: `| < > = , ;`
/F0	Tells the command to turn on file name truncation. (This switch is the default.) /F1 uses full file names. When truncation is on, a file with a long path may appear in command output with the path \..\.

Switch	Description
/H*nnn*	Determines the minimum command size to save to the history list. /H0 saves all command lines (the default). /H256 disables history saves.
/I[+|-]	Enables or disables the specified internal NDOS command. For example, /I-LIST disables the LIST command; /I+LIST enables the command.
/L*n*	Determines whether you can edit the command line. /L0 (the default) enables NDOS command-line editing, and /L1 reverts to the standard DOS line input.
/M*n*	Determines the line-editing mode. /M0 (the default) sets line editing to overwrite mode. /M1 sets line editing to insert mode.
/N*n*	Enables or disables overwrite mode. /N0 (the default) sets NOCLOBBER to off, which enables files to be overwritten by output redirection (>). /N1 prevents files from being overwritten and requires that a file exist for the >> redirection command to work.
/R*n*	Sets the number of screen rows used by the video display. For example, /R20 sets the rows to 20. This switch is useful for nonstandard monitors with less than 25 lines.
/S*s*:*e*	Determines the shape of the NDOS cursor. The format is /S*s*:*e*, with *s* representing the starting scan line and *e* representing the ending scan line. For more information on placing the cursor on-screen, see Chapter 24.
/U*n*	Determines whether file names are displayed in upper- or lowercase. /U0 (the default) displays the file names in commands, such as DIR and COPY, in lowercase. /U1 displays the file names in uppercase.
/V*n*	Determines whether commands are echoed to the screen. /V1 (the default) echoes commands from a batch file (verbose). /V0 suppresses command echoing.

To change the compound character to @, for example, use this command:

```
SETDOS /C@
```

To suppress the display of commands in batch files, use the following command:

```
SETDOS /V0
```

SETLOCAL

The NDOS command, SETLOCAL, saves the names of the current disk drive, directory, environment variables, and aliases. The NDOS ENDLOCAL command restores the computer to previously saved names. SETLOCAL, which has no options, is useful in a batch file when, after you change from a directory or disk drive temporarily to execute a procedure, you want to change back to your current settings.

The following example uses the SETLOCAL command to save your current settings. Some changes are made in order to run the KS program (which requires the new PATH setting C:\KWIKSTAT). When that program is finished, the previous settings are then restored by the ENDLOCAL command:

```
SETLOCAL
C:
CD \MYDIR
SET PATH = C:\KWIKSTAT
KS
ENDLOCAL
```

For more information, see the "ENDLOCAL" section in this chapter.

SHIFT

The NDOS SHIFT command, similar to DOS SHIFT, enables you to use more variables in a batch file. In DOS, you can usually use the variables %0 to %9 (10 variables in all) in a batch file. NDOS supports the variables %0 to %127. Otherwise, SHIFT works the same as the DOS SHIFT command.

SWAPPING

With the NDOS SWAPPING command, you can display, enable, or disable the NDOS swapping state. The swapping state controls how NDOS swaps its transient portion when other programs run. Setting swapping off usually means that small programs run faster, but the amount of DOS conventional memory is temporarily reduced by as much as 80K.

If swapping is on, you have more memory available to run programs.

The SWAPPING command has the following syntax:

```
SWAPPING [ON | OFF]
```

When you use SWAPPING with no options, the current swapping state (on or off) is reported. To set swapping on, use the following command:

```
SWAPPING ON
```

To set swapping off, use this command:

```
SWAPPING OFF
```

TEE

The NDOS TEE command copies a file to the standard output device (usually the monitor) and meanwhile saves a copy of the output to a file or files. You use the following syntax:

```
TEE [/A] path name...
```

The /A switch causes output to be appended to the specified file instead of replacing the file.

TEE often is used to capture the intermediate piped output of a command. Suppose that you want to search the file REPORT.TXT for lines containing *CREDIT*, copy the matching lines to C.DAT, sort the lines, and write them to the output file CREDIT.DAT. Use this command:

```
FIND "CREDIT" REPORT.TXT | TEE C.DAT | SORT > CREDIT.DAT
```

TEXT and ENDTEXT

Use the NDOS TEXT and ENDTEXT commands to display a block of text in a batch file. TEXT has the following syntax:

```
TEXT
lines of
output text
ENDTEXT
```

For example, the following lines cause the poem "Mary Had a Little Lamb" to be output to the screen from within a batch file:

```
TEXT
Mary had a little lamb
Its fleece was white as snow
And everywhere that Mary went
The lamb was sure to go.
ENDTEXT
```

This method of displaying text is often more convenient than using the ECHO command on every output line.

TIME

Similar to DOS TIME, the NDOS TIME command enables you to display or set the current system time. You use the following syntax:

TIME [*hh*[:*mm*[:*ss*]] [A|P]]

To set the system time to 1:30 p.m., enter either of the following commands:

TIME 1:30 P

TIME 13:30

NOTE When you do not use the A or P option, the line is in 24-hour format.

TIMER

You use the NDOS TIMER command to turn the NDOS system stopwatch on and off. This command has the following syntax:

TIMER [ON] [/S] [/1] [/2] [/3]

To start the timer, enter **TIMER** with no options. To display the current time, leaving the timer running, use this command:

TIMER /S

When a timer is running, the TIMER command with no options turns the timer off. The current clock time and elapsed time are then displayed. To force the timer's stopwatch to restart, use the ON option. The /1, /2, and /3 options refer to three different timers. The default is 1. Thus, you can operate three separate timers independently.

TRUENAME

The NDOS TRUENAME option finds and displays the full, true path and file name for each file. TRUENAME has the following syntax:

TRUENAME *filename*

The *filename* is the name of a file whose true path you want to know. The TRUENAME command displays the actual name of a file even if the name is disguised by the use of DOS JOIN or SUBST.

TYPE

The NDOS TYPE command, which is similar to the DOS TYPE command, displays the contents of a text file on-screen. The DOS version does not have the /L and /P switches. You use the following syntax:

TYPE [*switches*] *filespec...*

The following switches are available for use with TYPE:

Switch	Description
/L	Precedes each output line with a line number
/P	Pauses after a page of text has been displayed on-screen

To display the contents of the files REPORT.TXT and BUDGET.TXT on-screen and pause at each screen of information, use the following command:

TYPE /P REPORT.TXT BUDGET.TXT

UNALIAS

The NDOS UNALIAS command removes an alias from the list. You can use either of these forms:

UNALIAS *alias...*

UNALIAS *

If you use the * version, all aliases are deleted.

You can specify one or more aliases to delete from the list. To delete the aliases D and DDD from the list, use this command:

UNALIAS D DDD

For more information, see the "ALIAS" section in this chapter.

UNSET

The NDOS UNSET command removes variables from the environment list. You can use one of these forms:

UNSET *name...*

UNSET [/M]*

The /M switch removes the master environment variables. If you use the second version (with the *), all environment variables are deleted. Use this version with caution.

You may specify one or more names to delete from the environment list. To delete the names MYENV and YOURENV, for example, use this command:

UNSET MYENV YOURENV

See the "SET" section for more information.

VER

The NDOS VER command, like the DOS VER command, displays the current DOS version numbers for NDOS and DOS. VER has the following syntax:

VER [/R]

In DOS 5.0 or later, you can use the /R switch to display the DOS revision level and the location of the DOS kernel.

VERIFY

With the NDOS VERIFY command, which is similar to DOS VERIFY, you can enable or disable the capability to display the current setting of write verification. DOS uses the verification process to check that no write error occurs when information is written to disk. You use the following syntax:

VERIFY [ON|OFF]

If the command is given with no options, the current state of VERIFY is displayed. To enable write verification, enter the following command:

VERIFY ON

To disable write verification, enter this command:

VERIFY OFF

The default setting for VERIFY is OFF.

VOL

Similar to DOS VOL, the NDOS VOL command is used to display the disk volume label. This command has the following syntax:

VOL [*d:*]...

Entering VOL with no options displays the volume label for the current disk. You can request the volume label for one or more disks at once. To display the volume label for drives A and C, enter this command:

VOL A: C:

VSCRPUT

The NDOS VSCRPUT command enables you to display text vertically on-screen. VSCRPUT has the following syntax:

VSCRPUT *row column* [BRIGHT] [BLINK] *foreground* ON *background text*

The options are similar to the SCRPUT command described earlier, except that the text is displayed vertically rather than horizontally.

Y

The NDOS Y command copies standard input to standard output while copying specified files to the standard output. You use the following syntax:

Y *filespec...*

Suppose that you want to enter information from the keyboard (standard input), append the file MARY.TXT to the information, append to that information a file named HUMPTY.TXT, and output the three sources to one file named RHYMES.TXT. Use the following command:

Y MARY.TXT HUMPTY.TXT > RHYMES.TXT

This command results in the file RHYMES.TXT, which includes input from the keyboard, the contents of MARY.TXT, and the contents of HUMPTY.TXT.

When you use the Y command to enter information from the keyboard, you must signal an end to the input by entering ^Z (Ctrl+Z) and then pressing Enter.

Summary

The NDOS commands provide you with a much richer operating system than the normal DOS commands provide. With NDOS, you retain all the features you are already comfortable with in DOS, you gain more flexibility for the commands you already know, and you gain a whole new repertoire of handy, DOS-like commands. Some of the benefits of NDOS are its capability to read more than one line on a command line, extended editing features on the command line, and the capability to bring up previously entered commands to reexecute.

CHAPTER 29

Backing Up and Restoring Files with Norton Backup

Backup

Norton Backup is a powerful tool that helps protect the one thing you cannot replace: your data. Many threats to your data exist—hard disk failure, accidental erasure, and viruses. With Norton Backup, you can protect your data from potential hazards and perform a variety of other tasks. For all the power that Norton Backup offers, however, it remains a program you can easily master.

In this chapter, you learn the basic terminology of Norton Backup, as well as ways to use the Backup, Restore, and Compare features. This chapter also introduces the Backup Scheduler, which enables you to automatically perform backups at regular intervals. Along the way, you should discover ways to customize Norton Backup so that it runs most efficiently for you.

Using Norton Backup

If you have already used Norton Backup and configured it to suit your needs, you can start the program from the DOS prompt. Be certain that you are in the subdirectory containing NBACKUP, or that you have established a path to the subdirectory. Then type **NBACKUP** and press Enter. The Norton Backup main screen appears (see fig. 29.1).

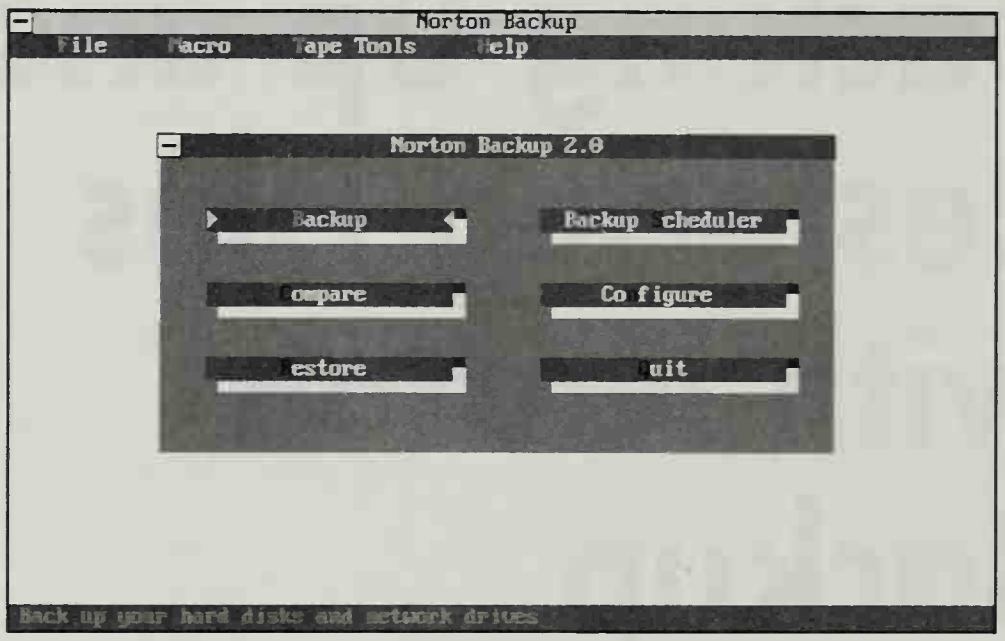

Fig. 29.1
The Norton Backup main screen.

On the menu bar at the top of the screen, the four menus—**F**ile, **M**acro, **T**ape Tools, and **H**elp—provide additional options to use with Norton Backup. Table 29.1 gives an overview of each menu.

Table 29.1 Norton Backup Menus

Menu	Description
File	Provides options that enable you to open, save, delete, and print setup files (SET extension) used in Norton Backup.
Macro	Enables you to record keystrokes for a macro and play macros. (A *macro* enables you to record a sequence of often-used keystrokes and replay them by pressing only one or two keys.) Each setup file can contain one macro. When the setup file is loaded, the macro for that setup file is also loaded.

Menu	Description
Tape Tools	Contains six tools that assist users who back up files to a tape drive: **I**dentify displays a directory of the contents of the tape in the drive. **E**rase erases files on tape (similar to deleting a file from a disk). **S**ecurity Erase erases files on tape and then overwrites the files to ensure that the files cannot be undeleted. **F**ormat formats the tape in the drive for use. **D**elete Volumes enables you to delete one or more volumes from the tape. **R**etension winds the tape to the end and rewinds it back to the beginning. Use this tool if you're having difficulty writing to or reading from a tape.
Help	Contains on-line help for all aspects of the Norton Backup program.

The Norton Backup main screen also displays the following options in the Norton Backup 2.0 dialog box:

- **B**ackup enables you to set up and run backups tailored to your individual needs. For more information, see the next section, "Backing Up Files."
- Backup **S**cheduler helps you maintain a consistent backup strategy by automatically running all types of backups on the days and times you specify. See the section "Using the Backup Scheduler" for more details.
- **R**estore enables you to return backup files to a hard disk in cases of hard disk data loss. You also use this option to transport data from one computer to another. See the section "Restoring Backup Files" for more information.
- **C**ompare compares backup files to originals to ensure data integrity. See the section "Using Compare" later in this chapter.
- Co**n**figure displays a dialog box that contains the default setup determined by the data Norton Backup used in the initial system configuration tests. You change the default settings through this dialog box. See the later section "Reconfiguring Norton Backup" for more information.
- **Q**uit exits Norton Backup.

The following sections examine the options in the Norton Backup main screen.

Backing Up Files

When you choose the **B**ackup option from the Norton Backup main screen, the Norton Backup dialog box appears (see fig. 29.2). Through this dialog box, you can choose to back up any number of drives and files. You can back up a complete drive or just a few files. You can choose the destination—a floppy drive or tape drive—for the backed-up files.

NOTE If you use the Basic program level, the dialog box shown in figure 29.2 displays the heading `Norton Basic Backup`, the Advanced program level displays `Norton Advanced Backup`, and the Preset program level displays `Norton Preset Backup`. You set these levels during the configuration process when you first start Norton Backup.

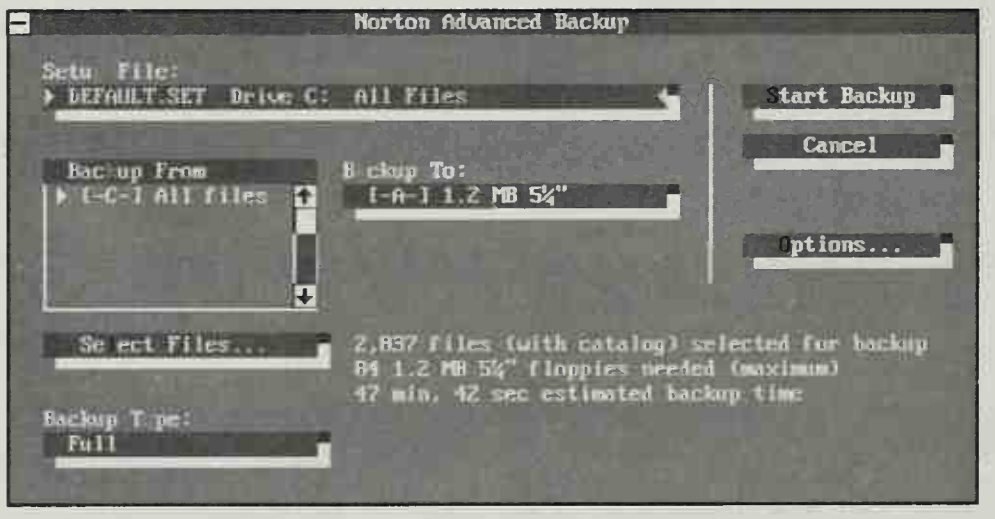

Fig. 29.2
The Norton Advanced Backup dialog box.

This section takes you through the steps for making a backup of drive C. After you have a basic understanding of the procedure, the various steps are explained so that you understand the different types of backups that exist. You also learn about selecting files and options such as data verification and compression, which make Norton Backup conform to your needs as it helps you protect your data.

Making a Quick Backup

The following exercise creates a backup of drive C. This exercise should help familiarize you with the backup process. Follow these steps:

1. From the Norton Backup main screen, choose **B**ackup. The Norton Backup dialog box appears (refer to fig. 29.2).
2. Choose the Setu**p** File option. A list of setup files appears. These files are backup routines that have been saved. You learn how to create your own setup files in the section "Working with Setup Files" later in this chapter.
3. From the list of setup files, choose the file named DEFAULT.SET, using the arrow keys or the mouse.

   After you choose DEFAULT.SET, all other selections are made for you. Check each selection to make sure that it's correct. Look at the Backup Type to see that a full backup is selected. Check the **B**ackup To box and make sure that the correct disk or tape drive is chosen for your system.

> **NOTE** The Norton Backup dialog box also gives you information for the backup you select. Figure 29.2, for example, shows that drive C contains 2,837 files to back up. The operation requires 84 1.2M 5 1/4-inch floppy disks and takes about 47 minutes and 42 seconds to complete. The information on your screen may be different.

4. Choose the **S**tart Backup option to begin the backup.

Norton Backup prompts you to place new disks or tapes in your drive. Be sure to number your disks or tapes so that you know the correct order.

You may not want to take the time to back up your hard drive now. If you don't, choose **C**ancel or press Esc. If you decide to continue with the backup, make sure that you have an adequate number of disks.

Understanding Backup Types

You can perform several types of backups, each with its own purpose. In the Norton Backup dialog box, choose the Backup **T**ype option to bring up the Backup Type dialog box, which displays a list of backup types (see fig. 29.3).

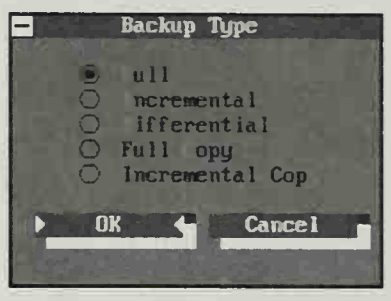

Fig. 29.3
The Backup Type dialog box.

The following list describes the backup types available:

- **Full** provides a complete backup that backs up all selected files—whether or not you changed the files since the last backup. After backup, archive flags are set to off. A full backup doesn't require backing up the entire hard disk. You can choose a full backup of a subdirectory or a few files.

NOTE DOS uses an *archive flag* to indicate whether a file has been changed since it was last backed up. After a file is changed or created, DOS sets the archive flag to on, signaling that the file hasn't been backed up.

T I P To have a complete set of all data on the disk, begin backing up files with a full backup of the entire hard disk.

- **Incremental** provides a partial backup that backs up only those files changed or created since the last full or incremental backup. An incremental backup looks only for files with the archive flag on. After backup, it sets the flag to off. To maintain complete protection, use this type of backup with a full backup.

NOTE Do not use the same incremental backup disks more than once. You also must keep all sets of incremental backup disks between full backups. If you reuse the disks before you perform a full backup, you overwrite previous data with new data.

- **Differential** also provides a partial backup. Unlike the incremental backup, a differential backup backs up files that have changed

since the last full backup. After a differential backup finishes, the archive flag is left on. With each subsequent differential backup, the files backed up in the first differential backup are backed up again, so you don't need to maintain several sets of differential backups. You can reuse the same set of disks each time. You need only the full backup set and a differential backup set.

NOTE If the same disks are used, a differential backup overwrites previous differential backups. This feature isn't usually a problem because a differential backup continues to back up the same files. For people who want to maintain older file versions, however, a problem develops. If you need to keep older file versions, use the incremental backup as described earlier.

- Full Copy provides a full backup, but it doesn't reset the archive flag. You can use Full Copy to copy your files without disrupting your backup cycle. This option enables you to transfer files or the contents of your hard drive to another computer.
- Incremental Copy enables you to copy selected files that have changed without changing the archive flag. You can use this option to keep a remote computer up-to-date with your current work.

Now that you understand the various types of backups available, you can choose the appropriate type for your needs. Then choose **OK** to accept your choice and return to the Norton Backup dialog box. The Backup Type option reflects the backup type you chose.

Selecting Files To Back Up

You may not want to back up your entire hard drive each time you use Norton Backup. Sometimes you may want to back up only files you have been working on that day. If you are working on a special project, for example, you may want to back up only project files. Norton Backup provides an easy method to select the drives, directories, subdirectories, and files you want to back up.

Choose the Select Files option from the Norton Backup dialog box to begin selecting files to back up. The Select Backup Files dialog box appears (see fig. 29.4).

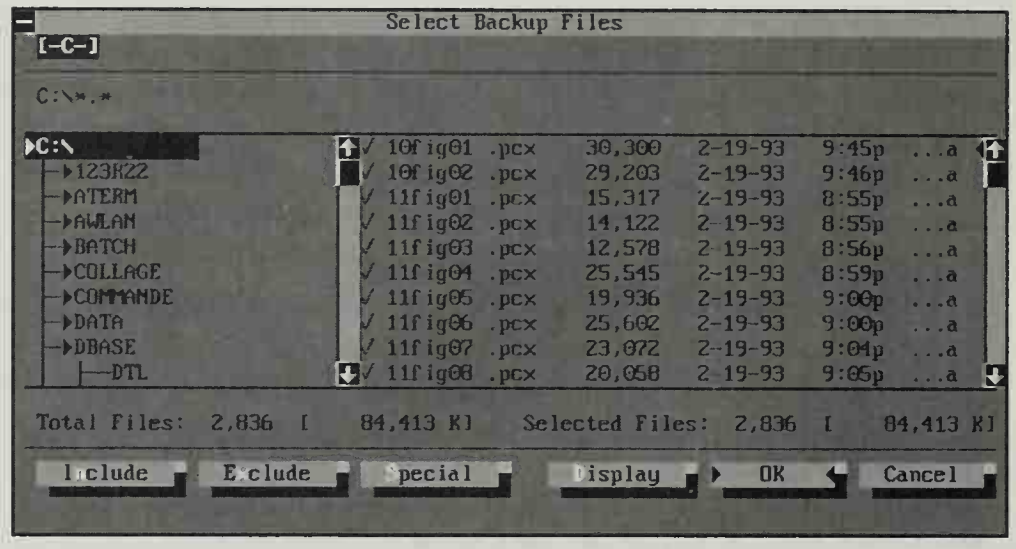

Fig. 29.4

The Select Backup Files dialog box.

The drive list at the top of the dialog box (just below the title bar) shows the drives you can select to back up. Notice that the dialog box in figure 29.4 shows only one available hard drive. If you have more than one hard drive (for example, C and D), both appear as available options. Simply press Tab and then Enter to select the hard drive you want, or click the drive.

On the left side of the dialog box is a directory tree, which lists all directories and subdirectories for the currently selected hard drive. To the right of the directory tree is the file list, which lists the files in a selected directory or subdirectory. To scroll through the items in the directory tree and file list, use the arrow keys or the scroll bars.

To make a selection in one of these areas, click the area or press Tab until the highlight moves to the area. Next select the drive, directory, or file by double-clicking or highlighting the one you want. Then press the space bar.

If you use the Advanced backup configuration, you can also make selections with the **I**nclude option at the bottom of the Select Backup Files dialog box. Choose this command to display a dialog box that you can use to include or exclude all subdirectories. The default setting is to include—that is, to back up—all subdirectories of the selected directory. An E**x**clude option, which removes a file from the backup list, is also available.

After you make a selection, an arrow appears, indicating the selected directory or subdirectory, and a check mark appears before selected files in the file list (refer to fig. 29.4). As you select files for back up, a message showing the total number of files on the hard drive and the number of files selected for backup appears in the dialog box.

T I P

If you do an Advanced backup, you can select files by date created as well as by name. The **S**pecial option displays the Special Selections dialog box. In this dialog box, you can fill in the **F**rom and **T**o text boxes to select all files in a certain date range. The program selects all files that fall between the two dates. (Note that you must choose the option **A**pply Date Range.) You can back up all files created or modified in a specified day, week, month, or year. The Special Selections dialog box also enables you to exclude from the files selected within the date range any files that are copy-protected, read-only, system, or hidden.

The **D**isplay option can help you select files. This option calls up the Display Options dialog box, from which you can control the way the files are displayed in the Select Backup Files dialog box (see fig. 29.5).

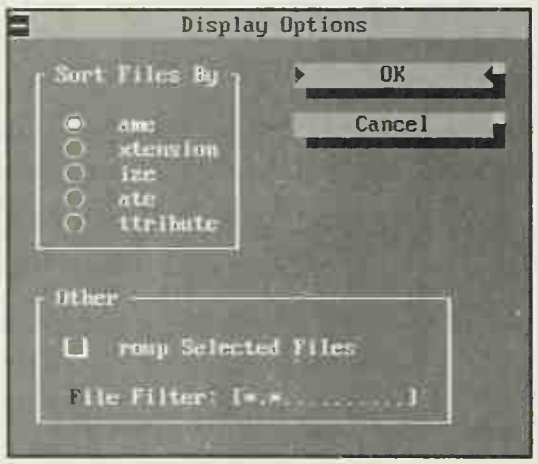

Fig. 29.5
The Display Options dialog box.

From the Display Options dialog box, you can choose to sort the files by **N**ame (the default setting), **E**xtension, **S**ize, **D**ate, or **A**ttribute. You can also create a filter to display only certain files or all selected files as a group. This filter is useful when you try to find and back up specific file types. If, for example, you want to back up only dBASE IV files, you specify *.DBF as the filter. By doing so, you eliminate all files that have an extension other than DBF.

Working with Setup Files

Because everyone has different backup needs, Norton Backup enables you to create a customized file called a *setup file*. A setup file is needed when you back up and restore files. You used a setup file named DEFAULT.SET in the section "Making a Quick Backup" earlier in this chapter.

NOTE To create setup files, you must be in the Advanced level of operation. If you are now using the Basic level of operation, you can use already created setup files, but you cannot create them. To change the program level, see the section "Reconfiguring Norton Backup" at the end of this chapter.

From the Norton Advanced Backup dialog box (refer to fig. 29.2), you have many choices that enable you to customize the way you back up files. You can choose the backup type you want to perform, the drives and files you want to back up, and where to send the backed-up files (floppy disk or tape drive). More than likely, you want to make different types of backups at different times. You probably don't want to do a full backup every time you back up; perhaps you want to back up only the files that have changed since your last full backup.

To create a setup file, you can select different backup options and then save these options. You can open the setup file the next time you want to perform the same type of backup.

Creating a setup file is simple. Follow these steps:

1. From the Norton Advanced Backup dialog box, make the following selections:
   - Use the Backup From list box and the Select Files option to select the drive, directories, and files to back up.
   - Use the Backup Type option to choose the type of backup to perform.
   - Use the Backup To option to choose the drive to back up to.

   NOTE You also can choose Options in the Norton Advanced Backup dialog box to select the various data-compression and error-correction choices available. See the next section, "Choosing Backup Options."

2. From the File menu at the top of the screen, choose Save Setup As. The Save Setup File dialog box appears (see fig. 29.6).

   NOTE If you choose Save Setup instead of Save Setup As, all your selections are saved in the setup file now in use.

3. In the Save Setup File dialog box, type a new file name for your selections in the File Name text box. Remember to leave the file extension SET that Backup provides.

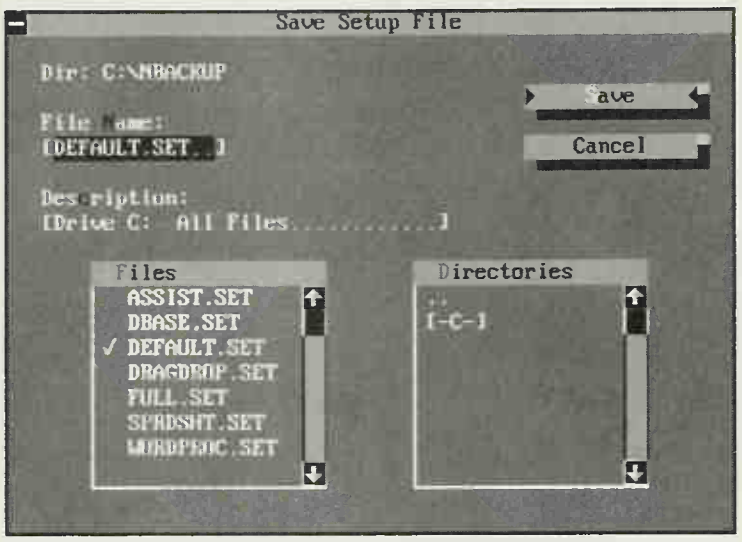

Fig. 29.6
The Save Setup File dialog box.

To overwrite an existing setup file, choose the setup file's name from the **F**iles list box.

4. Type a description of the setup in the Description text box.
5. Choose the location in which to store the setup file from the **D**irectories list box. You usually store the setup file in the default directory with your other setup files.
6. Choose **S**ave to save your setup file.

You successfully saved a new setup file. The setup file is now ready for you to use.

Choosing Backup Options

You can choose a number of options with Norton Backup. For example, you can customize the speed of the backup, password-protect the backed-up data, and test your hard disk before you start the backup.

To set the options, choose **B**ackup in the Norton Backup dialog box. Choose **O**ptions to bring up one of two dialog boxes. If you back up to disks, the Disk Backup Options dialog box appears (see fig. 29.7). If you back up to tape, the Tape Backup Options dialog box appears. Both dialog boxes contain the same basic options; you can switch from one menu to the other through the Disk **O**ptions or Tape **O**ptions option in each dialog box.

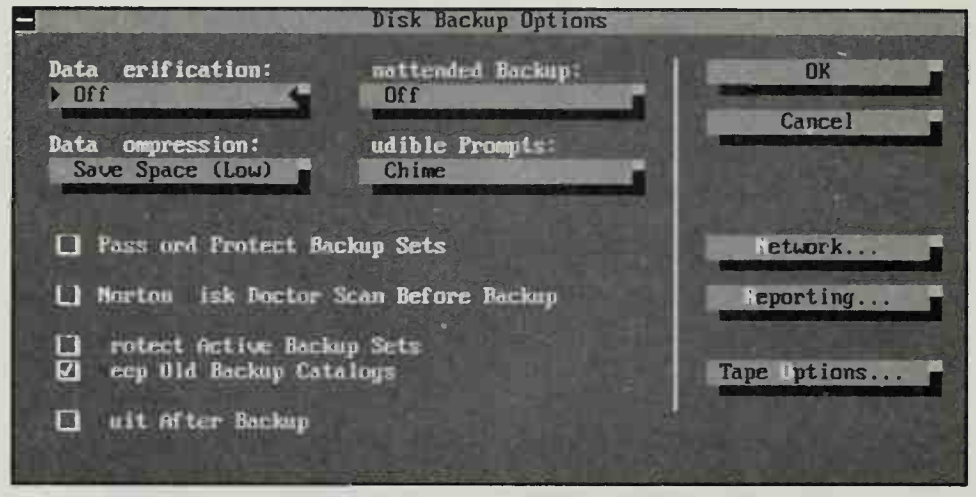

Fig. 29.7
The Disk Backup Options dialog box.

Using Data Verification

The first option in the Disk Backup Options dialog box is Data Verification. This option enables you to activate or deactivate the program's data verification feature. You choose the option to ensure the integrity of your backed-up data.

You can choose one of the following levels of data verification:

- **O**ff performs no data verification.
- **S**ample Only randomly checks sections of the backed-up data to see whether it matches the original data.
- Read and **C**ompare checks all backed-up data against the original (the most thorough method of verification).

NOTE The term *data verification* describes the process of checking the backed-up data to see whether it matches the original. Any discrepancies found in the data are corrected to match the original.

If you use any type of data verification, the backup process slows. Read and **C**ompare, for example, decreases backup speed by approximately 50 percent. The increased integrity of your data justifies this decrease in speed, however.

For your first full backup, use the **S**ample Only verification or even Read and **C**ompare. For incremental backups, choose **O**ff (not using verification). If you have been using disks for some time, choose Read and **C**ompare when you perform a full backup.

NOTE When you use the Read and Compare verification option, Norton Backup prompts you if you need to replace a disk with questionable data integrity.

Compressing Backup Data

Data compression enables Norton Backup to compress your data onto fewer disks or less tape. If you choose the Data Compression option in the Disk Backup Options dialog box, the Data Compression dialog box appears. This dialog box enables you to choose whether to compress the data you are backing up.

NOTE On some older computers, choosing to compress data increases the amount of time that backing up takes.

You can choose from the following compression options:

- Off doesn't compress data.
- Save Time uses computer time that is not being used for reading or writing data to compress data read from the hard disk.
- Save Space (Low) compresses as much data as possible with as little effect on backup speed as possible.
- Save Space (High) performs the most compression at the cost of backup speed.

If time is a concern, choose the Save Time option, which compresses data the least. For most users, especially those who back up to floppy disks, space is more important than time. Choose Save Space (Low), which compresses data significantly; or, to save the maximum amount of disk or tape space, choose Save Space (High) for full compression of the data.

T I P The Save Time option is best for the widest range of computers. The Save Space (Low) option is best for higher-performance computers, such as those with 80386 or 80486 CPUs.

The best data compression option depends a great deal on the computer you use. To determine the best option for your computer, perform a sample backup of about 1M of data, using each compression option. (Be sure to include COM and EXE files in the sample backup as

well as data files.) After each backup, record the time the backup took, the amount of data per second backed up, and the compression ratio. This information appears each time you back up. Select the compression with the best overall specifications.

A 12 MHz 80286 computer, for example, may give the following backup statistics for the compression options covered earlier:

	Off	Save Time	Save Space (Low)	Save Space (High)
Backup Time (Seconds)	31	19	21	41
Bytes/Second	2045K	3337K	3020K	1546K
Compression Ratio	0	1.7	2.3	2.4

Save Time or Save Space (Low) is a good choice for this computer. If the computer contains 50M of data to back up, however, the Save Space (Low) option costs only about two more minutes and saves about five disks. Remember, however, that backup time is the time the computer spends backing up data—not the time you spend changing disks. If you choose Save Time rather than Save Space (Low), you actually can use the two minutes saved changing the additional five disks.

NOTE You don't have to do anything special to compressed backup data before you restore it. When you restore the data, the program expands the files, returning them to normal size. For more information, see the section "Restoring Backup Files" later in this chapter.

Performing an Unattended Backup

During the backup process, you must respond to prompts to continue the process. Norton Backup prompts you to insert new disks. After you place a new disk in the drive, you press a key or click to tell Norton Backup to continue. By using the Unattended Backup option in the Disk Backup Options dialog box, you can have Norton Backup answer the prompts and avoid answering the prompts yourself.

NOTE If you are not able to change disks during an unattended backup, the backup process stops.

You can choose from the following options for an unattended backup:

Option	Description
Off	You must respond to all prompts.
On, **N**o Delay option	Norton Backup responds to a prompt immediately with a predetermined response.
On, **5** Second Delay	Norton Backup waits 5 seconds for you to respond and then uses a predetermined response.
On, **1**5 Second Delay	Norton Backup waits 15 seconds for a response.
On, **6**0 Second Delay	Norton Backup waits 60 seconds for a response.

When you first start using Norton Backup, you should set **U**nattended Backup to **O**ff. After you feel comfortable with Norton Backup, you can select one of the On settings.

Setting Audible Prompts

When Norton Backup requires you to respond to a prompt, the program doesn't rely just on a visual prompt. An alarm also sounds to draw your attention to the computer. When you choose the **A**udible Prompts option from the Disk Backup Options dialog box, three different settings for the alarm are available (besides turning off the alarm):

Option	Description
Off	No alarm
Low Tone	Low-pitched buzz
High Tone	High-pitched beep
Chime	Four tones that simulate an alarm clock

In an office environment, you may want to choose the **O**ff setting because an audible tone may bother your colleagues. T I P

Password-Protecting Backup Sets

Files that you keep on your computer may contain sensitive data. Just because the data is backed up, however, doesn't make the data less sensitive. If you include a password with your backup, the information cannot be restored without the password.

To include a password with the backup set, choose the Password Protect Backup Sets option from the Disk Backup Options dialog box. When you choose this option, Norton Backup prompts you to type the password twice (see fig. 29.8). Asterisks appear each time you type the password. After you enter the password the second time to ensure that you correctly entered it, choose OK to save the password.

Fig. 29.8
Password-protecting a backup set.

Passwords can be from one to eight characters long and are case-sensitive. If you create the password *WiLkey*, for example, you must remember to use uppercase *W* and *L* and lowercase *key*.

> **CAUTION:** Password protection is case-sensitive, and there is no way to disable the case-sensitivity. Be certain that you remember the exact way you entered your password. If you forget your password and its associated case-sensitivity, there is no way to restore your backup files.

If the Password Protect Backup Sets option has a check mark in the Disk Backup Options dialog box, you cannot restore the backed-up files unless you correctly enter the password.

Scanning with Norton Disk Doctor

Problems with files on your hard disk can affect a backup. Nothing is worse than nearing the end of a backup, only to find that a problem with a file on the hard disk kept you from having a sound backup.

The Norton Disk Doctor Scan Before Backup option tests the integrity of your hard disk and its files before the backup begins. If an error is found, you can correct it before you continue with the backup. (For more information, see Chapter 12, "Diagnosing and Treating Disks with Disk Doctor.")

Protecting Backup Sets

After you back up your data, Norton Backup creates a *catalog file*. The catalog contains information about the backup, such as the names of the files you backed up. When you restore backup files, catalog files are useful. A user must load the catalog file that corresponds to the backed-up data in order to restore it. The section "Restoring Backup Files" later in this chapter has more information on catalog files.

Two check boxes in the Disk Backup Options dialog box deal with catalogs:

- **P**rotect Active Backup Sets. If you choose this option, Norton Backup warns you when a backup disk contains information from a different backup set. This warning keeps you from accidentally destroying data on a backup disk from another backup set.
- **K**eep Old Backup Catalogs. If you choose this option, information from previous backups is maintained in the master catalog. Keeping previous catalogs enables you to restore an earlier version of a file, if necessary. You must have the backup disks that correspond to the previous catalog, however.

Setting Network Options

You can use Norton Backup to back up files from a Novell-based network server, but you must make special considerations. If someone on the network accesses a file, for example, you cannot back up the file. Instead of skipping a file, set the network options so that you can accomplish a full backup without missing any files.

After you choose the Network option from the Disk Backup Options dialog box, the Network Options dialog box appears (see fig. 29.9). From this dialog box, you can select how to back up files in use and whether to send a message to a user.

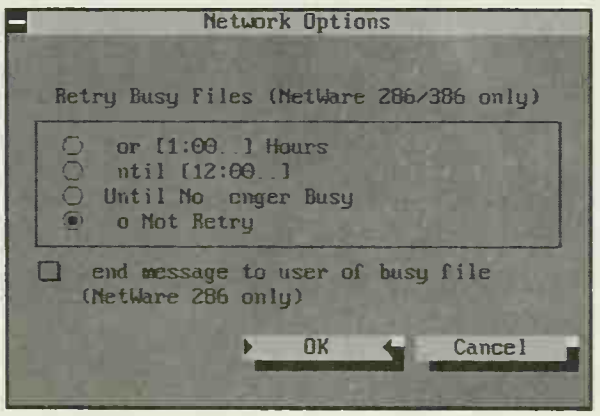

Fig. 29.9
The Network Options dialog box.

To back up files in use, you can choose from the following options:

- The **F**or [ ] Hours option specifies the length of time that Norton Backup tries to back up a file in use. Norton Backup continues to try to back up the file until the time expires.
- The **U**ntil [ ] option specifies the time of day (in 12-hour format) that Norton Backup stops trying to back up the file.
- The Until No **L**onger Busy option specifies that Norton Backup continues to try to back up the file until it is no longer in use.
- The **D**o Not Retry option instructs Norton Backup to ignore backing up any file in use.

The other option in the Network Options dialog box is only for users of NetWare 286. If you choose the **S**end Message to User of Busy File option, Norton Backup sends a message to any user of a busy file that the file will be closed so that it can be backed up.

Creating a Backup Progress Report

Norton Backup can automatically create a report after it completes a backup. If you choose the **R**eporting option in the Disk Backup Options dialog box, you see the Reporting Options dialog box (see fig. 29.10). You use this dialog box to save the report to disk in the directory that contains Norton Backup. The report file name is the name of the setup file, but with the extension RPT. If you back up using the DEFAULT setup file, for example, a file called DEFAULT.RPT contains the report.

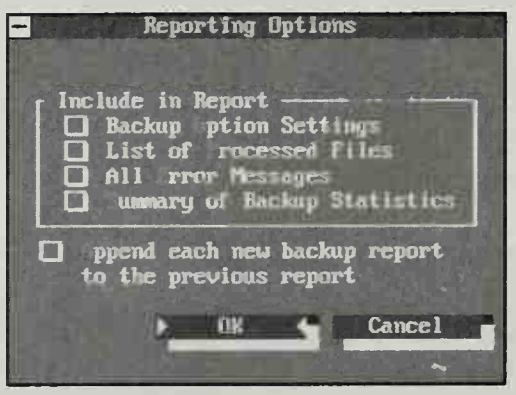

Fig. 29.10
The Reporting Options dialog box.

Two types of information are in the report: data you cannot change and information you can choose to include. The following information always appears in the report:

- The starting date and time of the backup
- The setup file name and description
- The catalog name

You can choose to include the following information:

- Backup **O**ption Settings includes all backup option settings.
- List of **P**rocessed Files lists all backed-up files, including file name, size, date, time, attributes, and number of backup tapes or disks.
- All **E**rror Messages lists errors that occurred during backup and files that cannot be backed up.
- **S**ummary of Backup Statistics includes the same information listed in the Backup Progress dialog box, which appears after a backup.

You may not find this information useful other than for documentation when you watch the backup. For unattended backups, however, the information in this report is very valuable.

The final option that you can choose from the Reporting Options dialog box is **A**ppend Each New Backup Report to the Previous Report. If you don't choose this option, each report is replaced by the successive report.

Quitting When Finished

If you choose the **Q**uit After Backup option from the Disk Backup Options dialog box, Norton Backup automatically quits after the backup is complete. Generally, you choose **Q**uit from the Norton Backup dialog box. If you run Norton Backup from a batch file or with the Backup Scheduler, however, choose the **Q**uit After Backup option.

NOTE For more information about batch files, see Chapter 24.

Using the Backup Scheduler

The Backup Scheduler is a program that enables you to run Norton Backup at regular intervals and specific times. Use the Backup Scheduler even if you work in another DOS program. When the designated time for a backup arrives, the Backup Scheduler asks whether you want to run the backup.

NOTE

The Backup Scheduler depends on another program, NSCHED.COM, which is a terminate-and-stay-resident (TSR) program. After you load the TSR, NSCHED.COM remains active in the computer's memory. Norton Backup shares this TSR with Scheduler.

When you install Norton Backup, you can choose whether to load NSCHED.COM each time you start your computer. This method is best, especially if you want to run backups on a regular schedule, because scheduled backups cannot take place without NSCHED.COM.

If you didn't have the AUTOEXEC.BAT file changed to run NSCHED.COM at computer startup, you can load NSCHED.COM manually. Enter **NSCHED** at the DOS prompt before you start Norton Backup. NSCHED.COM must be the last TSR loaded in order to operate correctly.

Start the Backup Scheduler from the Norton Backup main screen (refer to fig. 29.1). The Backup Scheduler dialog box, shown in figure 29.11, displays a calendar and an information box that lists scheduled backups. From the Backup Scheduler dialog box, you can add, delete, and edit scheduled backups.

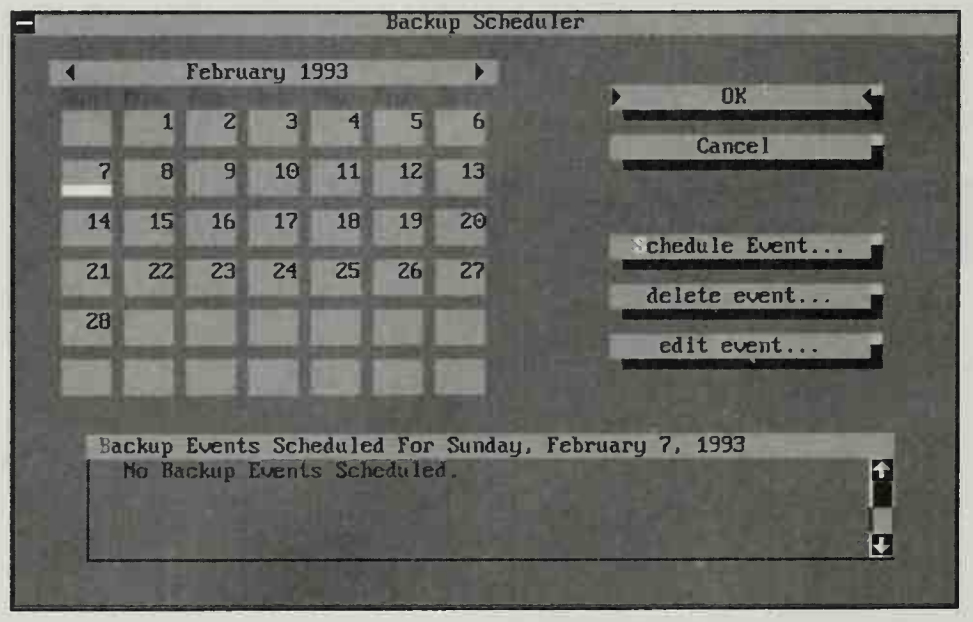

Fig. 29.11

The Backup Scheduler dialog box.

To schedule a backup, choose the **S**chedule Event option. The Schedule Backup Event dialog box appears (see fig. 29.12). From this dialog box, you can set the following information:

- **S**etup enables you to choose the setup file to use for the scheduled backup.
- **F**requency enables you to set how often to run the scheduled backup. Choose from the options **O**nce (one time only), Wee**k**days (Monday through Friday only), **D**aily, **W**eekly (once a week), **M**onthly, and **C**ustom (specified days).
- With **B**ackup Type, you can set the type of backup from the Backup Type dialog box. Choose **F**ull, **I**ncremental, **D**ifferential, Full **C**opy, or Incremental Cop**y**.
- Start **D**ate enables you to set the first date (*mm-dd-yy*) to perform the backup.
- With Start **T**ime, you can set the time of day to perform the backup; you can use 12-hour or 24-hour (military) time format.

Make the changes you want; then choose OK. The backup now is scheduled to start on the date you select. The calendar shows the days that backups are scheduled (see fig. 29.13).

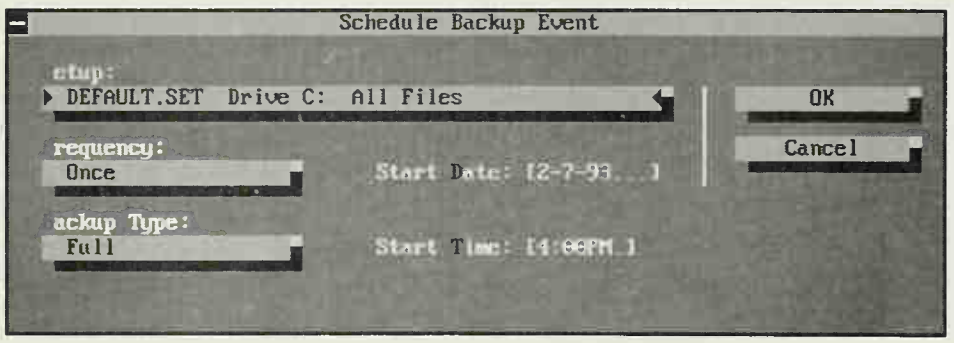

Fig. 29.12
The Schedule Backup Event dialog box.

The calendar in the Backup Scheduler displays any backups you scheduled. A check mark appears by the day that any backup is scheduled. The window at the bottom of the dialog box displays any backup information for the current day. If a backup is scheduled for that day, the window displays the setup file that controls the backup, the type of backup, the frequency of the backup, and the time the backup will occur.

The following sections enable you to begin hands-on work with the Backup Scheduler. The sections take you through the process of scheduling an actual backup and then editing or changing a backup that you already scheduled.

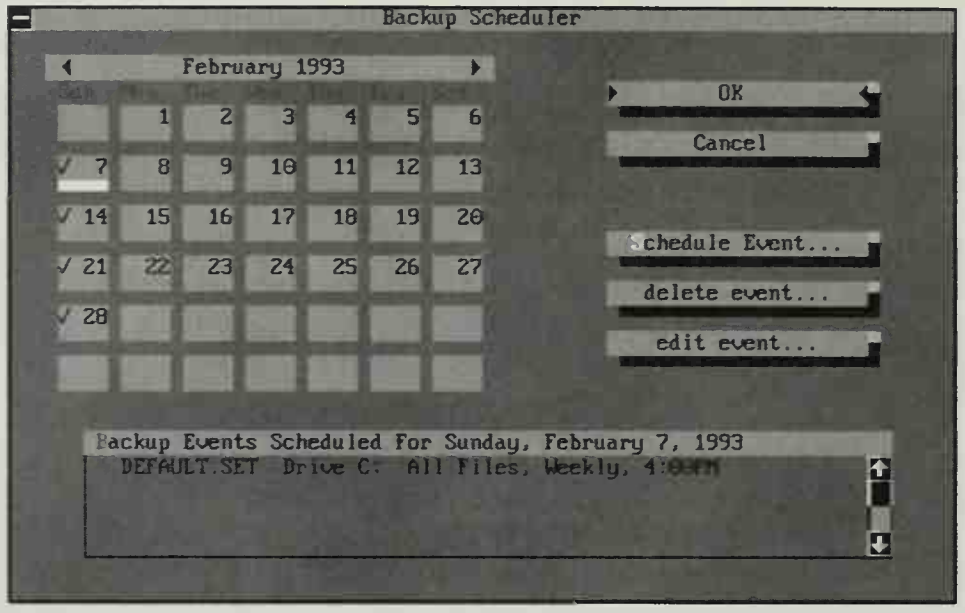

Fig. 29.13

Scheduling a weekly backup beginning Sunday, February 7, 1993.

Scheduling a Backup

Now that you understand the basics of the Backup Scheduler, you may find the following exercise helpful. It takes you through scheduling a weekly backup of drive C. Follow these steps:

1. In the Backup Scheduler dialog box, choose **S**chedule Event.
2. In the Schedule Backup Event dialog box, choose **S**etup, which displays a list of active files with the SET extension. From that list, select DEFAULT.SET. The Setup command button now displays DEFAULT.SET.
3. Choose **F**requency, which displays a list of frequency options. To back up drive C every week, choose **W**eekly.
4. To select the type of backup to perform every week, choose **B**ackup Type. From the list, choose **F**ull.
5. In the Start **D**ate and Start **T**ime text boxes, type the start date and time of the backup. If you want the backup performed every Friday, type the date of the upcoming Friday. Type **4:00pm** in the Start Time text box to schedule the backup for 4 p.m.
6. Choose OK to save the scheduled backup.

You have successfully scheduled a backup. Regardless of the program in which you are working, each Friday at 4 p.m., you are asked whether you want to back up your hard disk.

Changing Scheduled Backups

After you schedule backups, you can edit or delete them to fit your changing needs. From the Backup Scheduler dialog box, select the scheduled backup that you want to change from the Backup Events list at the bottom of the dialog box. Highlight the scheduled backup and press the space bar to select it, or just double-click it.

To edit the scheduled backup, choose the **E**dit Event option to display the Edit Backup Event dialog box. This dialog box works just like the one you used to schedule the backup initially. Make the appropriate changes and choose OK.

Deleting a scheduled backup is even easier. After you select the backup to be deleted and choose **D**elete Event, Norton Backup asks you to verify that you want to delete the backup. To delete the backup, choose OK from the warning box.

Restoring Backup Files

Though the similarity may not be obvious at first, backing up your data and buying health or life insurance have much in common. When you buy insurance, you want the best policy that fits your needs for the least cost, but you never want to have to use the policy. Similarly, you want the best backup that fits your needs for the least cost in disks, tapes, and time. And you never want to have to use your backup disks. Just as people file health and life insurance claims daily, however, people restore backup disks daily.

The **R**estore option in the Norton Backup dialog box places your backed-up files onto your hard disk. After you choose **R**estore, the Norton Restore dialog box appears (see fig. 29.14).

NOTE Different levels of Restore exist, just as different levels of Backup exist. The levels are Basic, Advanced, and Preset. Depending on the level of Norton Backup, the actual name of the Norton Restore dialog box changes to include the program level. Figure 29.14 shows the Norton Advanced Restore dialog box.

Catalog files are very important to the backup and restore process. The following section describes catalog files so that you can better understand their purpose and the way you work them. You also learn how to read the information in the name of a catalog file. With that understanding, the process of restoring a backup is easier to master. All restore options also are explained to enable you to make the restore process work more efficiently for you.

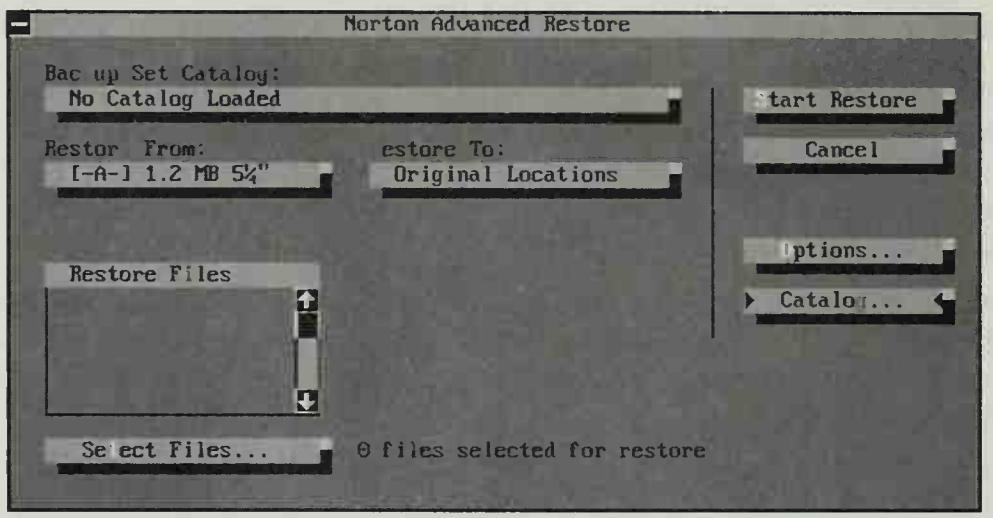

Fig. 29.14

The Norton Advanced Restore dialog box.

Using Catalogs with Restore

After you complete a backup, Norton Backup creates a catalog file for the backup. Norton Backup stores these catalog files in two places: in the Norton Backup directory and on the last disk of the actual backup.

The *selections* catalogs and the *master* catalogs are the two types of catalog files. Selections catalogs, which are usually referred to as just *catalogs*, contain the names of all the backed-up files and the directory structure from which the files originated.

Selections catalogs have the extensions FUL, lNC, DIF, and CPY. The extensions correspond to the various backups you can perform: full, incremental, differential, and copy (see "Understanding Backup Types" earlier in the chapter). These types of files are the ones that Norton Backup looks for when you initiate the **R**estore command.

Understanding how a selections catalog file is named is important so that you can later determine the file's contents. When you look at the catalog list, you see file names like CD20221A.FUL. Here are the meanings of the characters in the file name:

Character	Meaning
C	Stands for the first drive backed up in the file. In this case, the first drive backed up was drive C.
D	Indicates the last drive backed up in the file (in this case, drive D). If you have only one drive, this letter is the same as the first letter.
2	Denotes the last digit of the year in which the backup was performed—for this file, 1992.

Character	Meaning
02	Corresponds to the month the backup was performed—for this file, February.
21	Indicates the day the backup was performed. Combining this information with the preceding year and month information tells you that the backup was performed on February 21, 1992.
A	A sequence letter that distinguishes between catalogs of the same name. Because this file is the first file created under this name, the next file has the letter B, the file after that has the letter C, and so on, through the letter Z.
FUL	An extension that tells you the type of backup performed.

The other catalog type, the master catalog, coordinates the information when you restore files to the hard drive. The master catalog, stored in the Norton Backup directory, maintains a list of the catalog files. A master catalog takes the same file name as the setup file, except that a CAT extension is used (see the earlier section "Working with Setup Files" in this chapter).

Restoring Data

Now that you understand the two types of catalogs, you can get to know the Norton Restore dialog box better (refer to fig. 29.14). Although this dialog box looks similar to the Norton Backup dialog box shown in figure 29.2, the options are different. The Norton Restore dialog box provides the following options:

- Backup Set Catalog displays a list of catalogs containing files you can restore.
- Restore From selects the drive that contains the backup disks.
- Restore To selects the destination on the hard drive to which you want to restore. You can choose from a number of destinations. The Original Locations option restores the files to the location from which the files were backed up. Choosing Other Drives restores files to a different drive, and Other Directories restores to a different directory. Single Directory places all files in one directory, even if they originally resided in different directories.
- Restore Files displays the name of the drive as supplied by the catalog file.

- Select Files chooses specific files to restore from the catalog.
- Options selects advanced restore options (described in the next section).
- Catalog loads, finds, or rebuilds a catalog.

Restoring is similar to backing up. The difference is that you move information from backup disks back to the hard drive. Selecting the catalog to use is like selecting the setup file to use when backing up. Selecting files to restore is exactly the same as selecting files to back up.

After you set all your restore parameters in the Norton Restore dialog box, choose the **S**tart Restore option. Norton Backup restores the files to the drive and directory you selected.

T I P You generally restore files to their original locations, but not always. Suppose that you store spreadsheet files in your hard disk at C:\SHEETS. Your colleague wants to copy those files to drive D, in the directory SSHTS. Use Norton Backup to back up all the spreadsheets. On the other computer, choose **R**estore from the Norton Backup dialog box and choose **R**estore To from the Norton Restore dialog box. From the Restore To dialog box, choose **S**ingle Directory and then choose OK. Because you chose **S**ingle Directory, a text box appears below the **R**estore To command button. In that box, specify the directory to which you want to restore; for this example, type **D:\SSHTS**.

Using the backup/restore process to move files from one PC to another is more efficient than simply copying files to a disk with DOS for two reasons:

- With Norton, you can select all files to be transferred at once. This way, you save time—you don't need to enter the COPY command for every file or subdirectory.
- You can compress the data being transferred. This way, you can put more files on less disk or tape space. You may not want to use Norton for a few files, but if you transfer many files, this way is more efficient.

Setting Restore Options

You can customize the restore process by using the **O**ptions option, which displays the Disk Restore Options dialog box. The dialog box, shown in figure 29.15, lists all the options you can change for Restore.

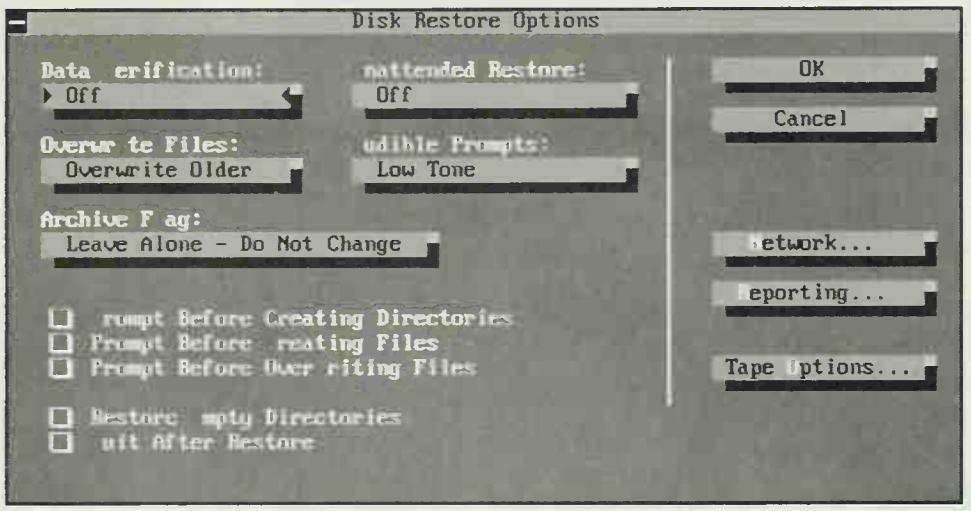

Fig. 29.15
The Disk Restore Options dialog box.

The options in the Disk Restore Options dialog box are the same whether you restore from disk or from tape. The options are self-explanatory or similar to their backup counterparts (see the earlier section "Choosing Backup Options" for more details). Here are the available options:

Option	Description
Data Verification	Verifies data before restoring it. Choose **O**ff (the default), **S**ample Only, or Read and **C**ompare.
Overwrite Files	Specifies what to do if a file that is being restored already exists on the hard drive. Choose **N**ever Overwrite Files, **O**verwrite Older Files Only (the default), or **A**lways Overwrite Files.
Archive Flag	Shows whether a file is new or changed. Choose **L**eave Alone—Do Not Change (the default), **C**lear—Mark as Backed Up, or **S**et—Mark as Not Backed Up.
Unattended Restore	Enables Restore to respond to prompts. Choose **O**ff (the default); On, **N**o Delay; or specify a 5-, 16-, or 60-second delay.
Audible Prompts	Specifies the type of audible tone to use when prompting for user specifications. Choose **O**ff, **L**ow Tone (the default), **H**igh Tone, or **C**hime.
Prompt Before Creating Directories	Prompts the user before a directory is created.

continues

Option	Description
Prompt Before Creating Files	Prompts the user before a file is created.
Prompt Before Overwriting Files	Prompts the user before an existing file is overwritten.
Restore Empty Directories	Creates directories even though no files are stored in them.
Quit After Restore	Immediately quits Norton Backup after a restore procedure is completed.

NOTE To access the options for tape drives, choose the Tape Options option. Likewise, in the Tape Restore Options dialog box, choose Disk Options to access options for disk drives.

Restoring to a Network

When you restore to a network, you face the same potential problem you had when you back up from a network: files that you want to restore may be in use. You cannot back up from or restore to a file in use; however, you can specify that Restore retry files in use.

The Network option in the Disk Restore Options dialog box works exactly the same as in the Disk Backup Options dialog box. You can specify how long to continue retrying to restore a file in use, when to stop retrying to restore the file, or to skip a file in use. You can also send messages to users on a NetWare 286 network that files in use will be closed for a restoration. Make whatever settings are appropriate for your type of network and choose OK.

See the section "Setting Network Options" earlier in the chapter for more information.

Creating a Restoration Report

As with Backup, you can generate a report by choosing the Reporting option from the Disk Restore Options dialog box. You can specify that the report contain such information as the option settings used for the restoration, a list of processed files, the restoration statistics, and a list of any error messages.

Generating a report that includes any of these options is a good idea because it provides tangible and ready information for future reference and use. For more information on generating reports, see the section "Creating a Backup Progress Report" earlier in the chapter.

Using Compare

The Compare option in the Norton Backup dialog box matches backed-up files with the originals to ensure that the backup is an exact duplicate. After you choose Compare, you see the Norton Compare dialog box (see fig. 29.16).

NOTE The actual name of the Norton Compare dialog box reflects the level of Norton Backup in use (Basic, Advanced, or Preset). Figure 29.16 shows the Norton Advanced Compare dialog box.

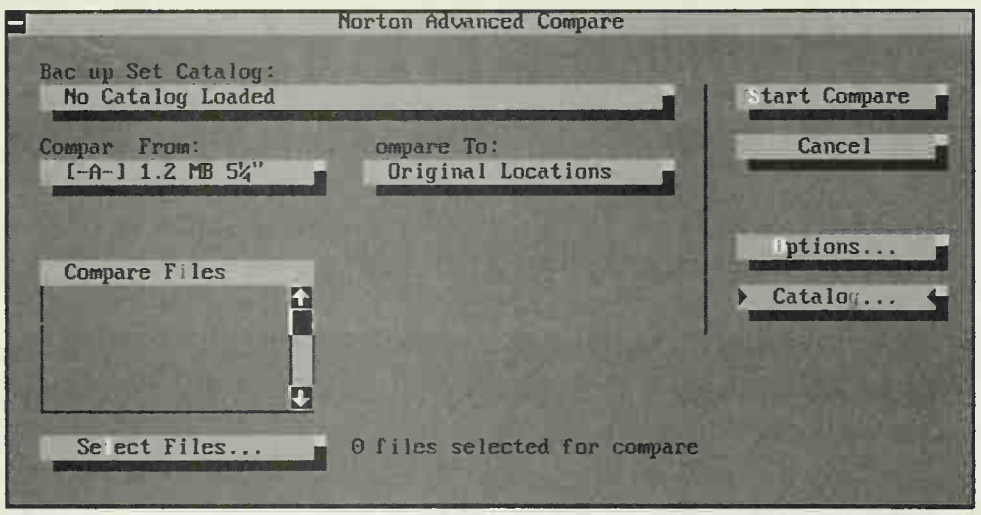

Fig. 29.16 The Norton Advanced Compare dialog box.

You may notice that the Compare dialog box is nearly identical to the Restore dialog box discussed earlier. The process of using the command is also the same.

First use the Backup Set Catalog option to choose the catalog that corresponds to the files you want to compare. If you are not sure which catalog you want, choose the Catalog option to list the available catalogs. Through the Catalog list, you can search for files, retrieve files from floppy disks or the hard drive, load other catalogs from floppy disk, and delete entire catalogs.

TIP If you cannot remember which catalog contains a certain file, you can choose the Select Files option. This option prompts you for the name of the file and provides you with a list of all the catalogs that contain that specific file.

After you find the catalog that contains the files you want to compare, double-check the Compare From and Compare To options to make sure that the source and destination of the files are correct. Then select the files to compare.

The Options option in the Compare dialog box enables you to choose the Unattended Compare and Audible Prompts options in the same way as the Restore and Backup commands. You also can choose how to handle network options and the type of report to create. (See the earlier section "Restoring Backup Files" for more on these options.) Choosing Start Compare in the Compare dialog box activates your selections and begins comparing your backed-up files to the hard drive.

Reconfiguring Norton Backup

To look at or change Norton Backup's configuration settings, Norton Backup provides a simple way to review these settings through the Configure option in the Norton Backup dialog box. Choosing this option displays the Configure dialog box, as shown in figure 29.17.

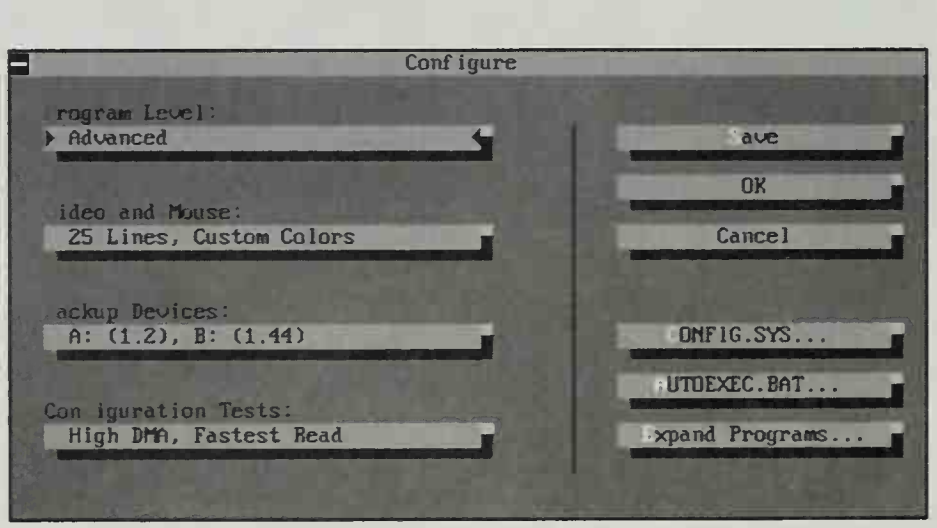

Fig. 29.17
The Configure dialog box.

The Configure dialog box enables you to adjust all the settings that Norton Backup determined for you when you first started the program. The first setting, Program Level, enables you to choose the Basic, Advanced, or Preset level of operation.

T I P At the Advanced level, you can create and save your own setup files, as discussed in the earlier section "Working With Setup Files."

With the **V**ideo and Mouse option, you can customize the way your screen and mouse work. If you choose this option, you see the Video and Mouse Configuration dialog box, which enables you to access six additional dialog boxes (three for video and three for the mouse). The options in this dialog box work similarly to those in the Norton Utilities Configuration dialog box (see Chapter 2 for details).

The **B**ackup Devices option displays a dialog box that lists two floppy drives and a tape drive (if a tape drive is installed). Because Norton Backup determines the types of drives you have in your system, you simply need to choose the backup drive you want. You can change drives by selecting the appropriate drive from this list, and you can choose Auto **C**onfig so that Norton Backup checks your system and reinstalls all drives. The Auto **C**onfig option is best for users who add a tape drive to their system.

With the Co**n**figuration Tests option in the Configure dialog box, you can check the settings that Norton Backup's initial tests determined were most efficient for your system (displayed on the Co**n**figuration Tests button). The Direct Memory Access (DMA) and Compatibility tests are the two basic tests. For more information on these tests, see Appendix C on installing Norton programs.

CAUTION: During the DMA test, your computer may *hang*, or stop working. If the message `Testing DMA` appears for more than 30 seconds, your computer has hung. If this problem occurs, restart your computer and Norton Backup. The DMA now is set to **L**ow Speed. Don't try to set it to **H**igh Speed. (The **L**ow Speed and **H**igh Speed options in the Configuration Tests dialog box determine the rate at which data can be transferred.)

In the lower-right corner of the Configure dialog box, notice the options **A**UTOEXEC.BAT and **C**ONFIG.SYS. During the Norton Backup initial testing and installation, you had the choice to change these two files. If you chose to change them, Norton Backup changed CONFIG.SYS so that it had 30 BUFFERS and 30 FILES. Norton Backup also was added to your AUTOEXEC.BAT file's PATH statement, as were the Norton Backup environment variable and NSCHED.COM (the Backup Scheduler TSR program). If you didn't choose to change the files, you can use these two options to do so at any time. Choose either option and the proposed changes appear, along with OK and Cancel options. To accept the changes, choose OK.

The last option in the Configure dialog box is Expand Programs. Choosing this option displays a dialog box explaining the process of expanding archived files and asking whether you want to proceed. Norton Backup keeps some files compressed and, when those files are needed, expands them. It recompresses them again when through.

NOTE

If Norton Backup seems to take a long time to execute, the delay may mean that your system works better with the files expanded at all times rather than expanded only when needed. Choosing OK expands the files. Remember that after these files are expanded this way, you cannot compress them again.

After you make all the configuration changes you want, you can choose to make the changes permanent or leave them active only for the current session. If you choose **S**ave, all changes are saved as your regular configuration setup. If you choose OK, the changes are effective until you exit from Norton Backup. Choosing Cancel ignores any changes made and returns you to the original setup configuration.

Summary

In this chapter, you became familiar with Norton Backup's dialog boxes, enabling you to harness the power of the program. Whether you want to back up a small number of regularly used files or a complete hard disk, a few mouse clicks or keystrokes can assure you that the data you worked so hard to create is protected and secure.

The next chapter explores another powerful Norton program, Norton Commander.

CHAPTER 30

Using Norton Commander

Norton Commander 3 is a program that enables you to perform a variety of tasks on your computer in a menulike environment rather than from the DOS command line. Instead of having to remember the syntax of the DOS COPY command, for example, you can follow a series of menus and prompts through the Commander copy process. Commander automates commands through its menu structure, making the "driving" of the computer easier for you. Commander is particularly helpful for beginning users who have not memorized DOS and Norton commands.

Commander is not just a substitute for some DOS commands, however; it also has several features that are not available in DOS. You can use Commander, for example, to view the contents of a variety of database, spreadsheet, and word processing files without having to use the respective programs. Commander also enables you to execute several Norton Utilities commands, such as those that display a sorted directory, set file attributes, find files, and set an EGA monitor to display more than 25 lines.

Using Norton Commander is like adding a "power package" to a plain automobile. DOS is that plain automobile that generally gets you where you want to go. With Commander added to DOS, however, you have power windows (pull-down menus), extra horsepower (commands that can do more than DOS commands), a car phone (MCI Mail), and more. Commander makes using your computer more fun, and the program's array of features also can make you more productive.

This chapter introduces the basics of using Norton Commander. The chapter is arranged according to how you normally would use Norton Commander, not necessarily by the order of the options in the on-screen menus. You first learn how to display and access the various Commander menus. Most of the action takes place in the Commander's left and right panels, so the contents of the panels and the options that control these panels are discussed early in the chapter.

After giving a preliminary description of how Commander works, the chapter explains how to manage and manipulate your directories and files; look at files from spreadsheet, database, and word processing programs; use the Commander editor to edit ASCII files; and customize Commander.

NOTE In this chapter, it is assumed that you already have installed Norton Commander on your hard disk. If not, see Appendix C for installation instructions. Be sure that you choose to place the NC directory name in the PATH statement in your AUTOEXEC.BAT file (an option during installation). If you already have installed Commander but did not place NC in your PATH statement, see Appendix A for information on how to use the DOS PATH command and edit an AUTOEXEC.BAT file.

Understanding Norton Commander Basics

To begin the Norton Commander program, type **NC** and press Enter at the DOS prompt. A screen similar to the one shown in figure 30.1 appears.

Under normal installation, the initial Commander screen consists of a directory panel on the right half of the screen and a function key bar at the bottom of the screen. As you learn later in this chapter, however, you can customize the way that Commander looks on your screen. Generally, the screen includes four areas of interest: a right panel, a left panel (not visible in fig. 30.1), a menu of function key commands at the bottom of the screen, and a menu bar at the top of the screen (not visible in fig. 30.1). Notice that the normal DOS prompt appears just above the function key menu.

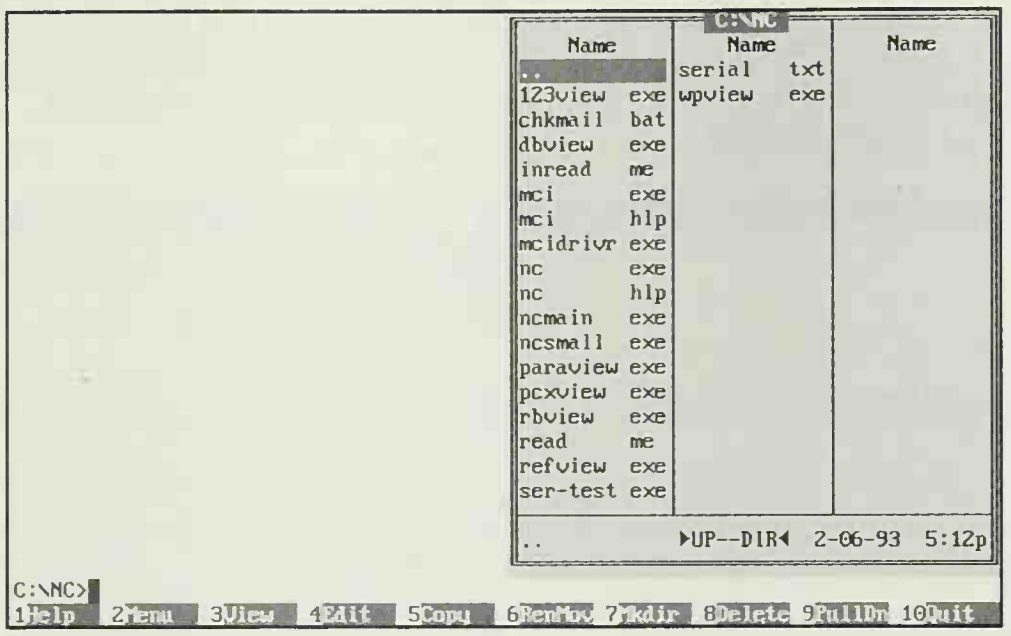

Fig. 30.1
The Norton Commander opening screen.

Although only the function key bar and the right panel are visible in the initial screen, you can easily display the menu bar at the top of the screen, and the left panel on the left half of the screen. Table 30.1 lists the key combinations that turn the screen components on and off.

Table 30.1 Displaying the Commander Screen Components

Screen Component	Keys That Toggle the Display
Menu bar	F9
Function key bar	Ctrl+B
Left panel	Ctrl+F1
Right panel	Ctrl+F2

Using the Menus

After you press F9 (PullDn), the menu bar appears at the top of the Commander screen (see fig. 30.2). This menu bar enables you to access five Commander menus: Left, Files, Commands, Options, and Right.

The Left menu controls what you see in the left panel; the Right menu controls what you see in the right panel. The Files menu enables you to choose Commander options that deal with files. The Commands menu contains disk-management commands that are similar to some of the

Norton Utilities commands. The Options menu contains options that enable you to control how Commander information is displayed on your computer. These menus are described in more detail in later sections of this chapter.

Fig. 30.2
Displaying the Norton Commander menu bar.

Using the Function Key Bar

The function key bar appears at the bottom of the screen when the Norton Commander is in operation. If you are using a mouse, you can choose one of the function key options by clicking it. If you are using the keyboard, press the function key that corresponds to the menu number. To choose the Help option (1), for example, press F1. The function keys are described in the following sections.

One of the first function keys you should learn about is F10, which is the Quit key. If you want to end Norton Commander, simply press F10. A small dialog box appears in the center of the screen, asking you to verify that you want to quit. To exit Commander, choose **Y**es or press Enter.

Using the DOS Prompt and the History Option

The DOS prompt also appears in the Norton Commander screen, directly above the function key bar. As mentioned previously, you can use Commander menus to access commands, or you can enter DOS commands directly from the DOS prompt.

Commander offers another convenient feature for entering DOS commands. If you recently entered a DOS command and want to repeat that command, you can use the **H**istory option in the Commands menu to review and choose any of the last 15 commands you entered at the DOS prompt. You can access the **H**istory option by choosing it from the Commands menu or pressing Alt+F8. A panel then appears on-screen, listing up to 15 commands.

Using the Left and Right Panel Displays

With DOS's DIR command, you can display the contents of only one directory at a time. When you want to use one of the directory's files in a command such as COPY or RENAME, you must spell out the full file name—and you had better not make any typing mistakes.

Norton Commander's left and right panels, however, enable you to display two directories on-screen—twice as much information as you can with DOS. You can choose files or directories in these panels without worrying about typing the file or directory names. These features are among the reasons why using Commander's right and left panels is easier than using DOS commands.

The contents of the right and left panels are controlled by the options in the Right and Left pull-down menus. Depending on your preferences, these panels can contain the following information:

- A brief directory of files (names only)
- A full directory of files (including dates, times, and sizes)
- A graphic representation of the directory tree
- Information about the directory and disk
- The displayed contents of a file

When you activate the left and right panels in Commander by pressing Ctrl+F1 and Ctrl+F2, respectively, you see a display like the one shown in figure 30.3.

Usually, after you activate both panels, the left panel is set up to display the directory tree structure of the disk, and the right panel is set up to display the files in the directory that is selected in the left panel.

You can access information in only one panel at a time. When both panels are displayed, you move from one active panel to the other by pressing the Tab key (or by pointing with the mouse to a panel and clicking). When a panel is active, you can use the arrow keys or the mouse to select files or directories that you want to access or use in some way.

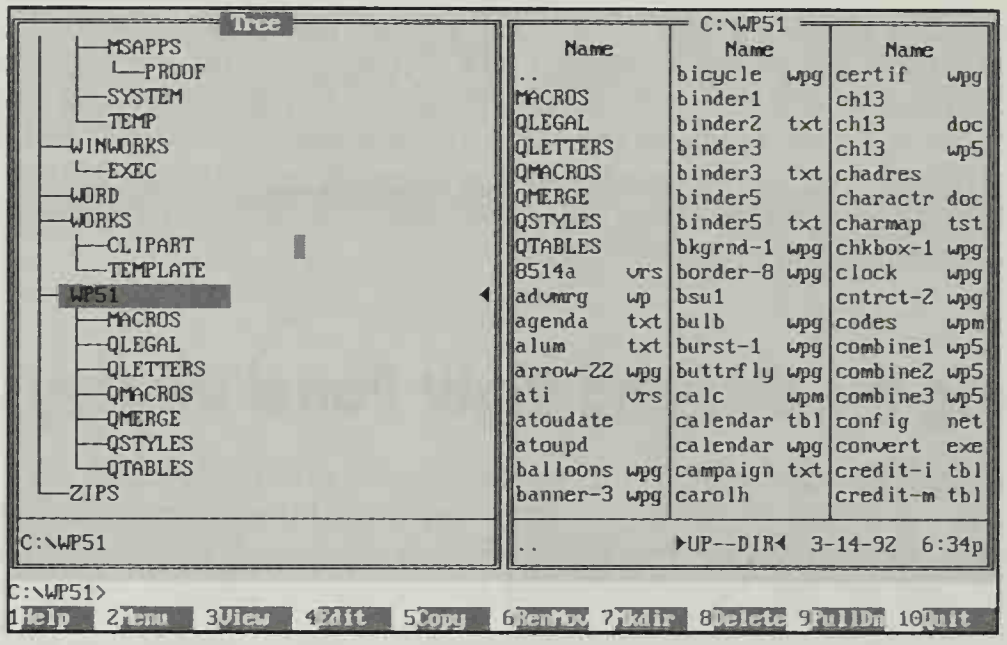

Fig. 30.3

The Norton Commander screen with both panels activated.

If you want to swap the current left and right panels on-screen, choose **S**wap Panels from the Commands menu or press Ctrl+U. The reason for swapping panels is purely aesthetic; you can perform the same operations no matter which panel holds the information. Using the **S**wap Panels option, however, is faster than swapping manually by choosing different options for each panel.

Using the Keyboard To Control the Panel Display

As mentioned previously, you press Ctrl+F1 to toggle the left panel on and off and Ctrl+F2 to toggle the right panel on and off. Commander provides several other keyboard commands for controlling the panel display and for manipulating the files and directories listed in the panels. Table 30.2 lists these keyboard commands.

Table 30.2 Keyboard Commands for Controlling the Panel Display

Key(s)	Description
↑	Scrolls panel information up
↓	Scrolls panel information down
Enter	Changes to a directory if that directory name is highlighted (works like an NCD command); begins a program if a program file name (a BAT, EXE, or COM file, for example) is highlighted; has no effect if any other file name is highlighted

Key(s)	Description
Ctrl+PgUp	Changes to the parent directory
Ctrl+\	Changes to the root directory
Gray +	Selects a group of files
Gray –	Deselects a group of files
Alt+*filename*	Speed-searches for a file
Ins	Selects or deselects file at cursor position
Ctrl+Enter	Copies file or directory name to command line
Ctrl+P	Turns inactive panel on or off
Ctrl+O	Turns both panels on or off
Ctrl+U	Swaps panels

You can change to another directory by selecting that directory with the arrow keys or the mouse, or by typing the following command at the DOS prompt:

NCD *dirname*

You press Ctrl+PgUp to change to the parent directory and Ctrl+\ to change to the root directory.

At times, you may want to select several files at the same time (for example, to copy a group of files with the F5 key). You can select a group of files with the gray + and – keys, which usually are located at the right end of the keyboard. If you press the gray + key, Commander prompts you to enter all files to be included in the selection. You can enter ***.TXT**, for example, to include all files with a TXT extension. The selected files then appear highlighted in the panel. To exclude files from the list, press the gray – key. You can press the gray – key and then enter **B.***, for example, to exclude all files that begin with the letter B. After selecting files, you can use the function key commands to copy, rename, move, or delete these files.

The Alt+*filename* command enables you to find a file in a directory quickly. Suppose that you are looking for a file named SAMPLING.TXT and you know that the directory in which this file is located contains 200 files. You can scroll through the entire directory list until you find SAMPLING.TXT, but an easier method is to press Alt+S. A small dialog box appears at the bottom-right corner of the screen. The highlight in the directory panel points to the first file in the list that begins with the letter S. After you press the second letter in the file name (A), the highlight moves to the first file name in the directory that begins with the letters SA. You soon will locate the file you want. You can then use that file in a command to copy the file, rename it, and so on.

The Ctrl+Enter command enables you to copy the name of a highlighted file to the DOS command area quickly. Suppose that you want to enter the following command at the DOS command prompt:

```
WP51 FY9293RT.WP5
```

Instead of typing the whole command (and possibly misspelling the file name), you can highlight the file name in the directory panel, type **WP51**, and press Ctrl+Enter. The name `FY9293RT.WP5` appears in the DOS command line; you have entered the command you wanted.

As mentioned previously, to control exactly what information appears in the panels (and the way that information appears), you use the options in the Left and Right pull-down menus. The following sections describe these menu options.

Displaying Files in Brief and in Full

The **B**rief and **F**ull options in the Left and Right menus determine how files are displayed in a panel. The **B**rief option lists only the file names; the **F**ull option (the default) also lists the file size, date, and time.

The **B**rief option enables you to display more file names at one time. Figure 30.4 shows an example of a right-panel display with the **B**rief option selected. (For an example of full mode, see the right panel shown in fig. 30.5.)

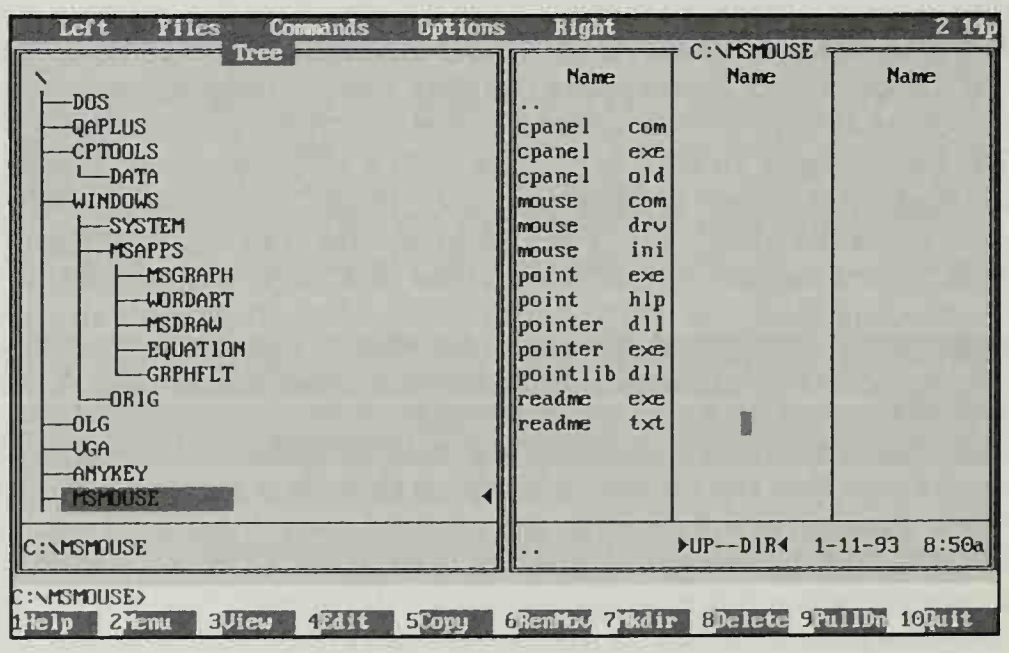

Fig. 30.4
Displaying the right panel in brief mode.

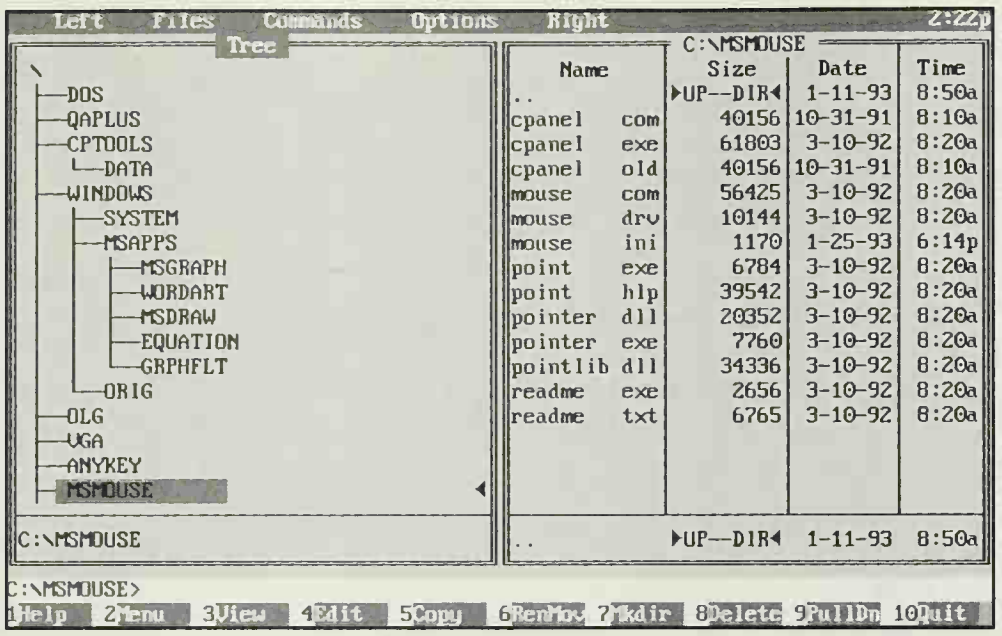

Fig. 30.5

Displaying the full version of the file list.

If you have many files in a directory and want to see only the file names, use the **B**rief option so that you do not have to scroll to find the files you want.

Displaying Summary Information

When you choose the Info option from the Left or Right menu, the panel corresponding to that menu displays information about the current drive. This information is similar to the information the DOS CHKDSK command generates (see fig. 30.6).

The top part of the Info panel tells you the amount of memory available, the disk size and disk space available, the number of files in use, and how much space the files occupy.

Notice that the bottom part of the Info panel shown in figure 30.6 includes the message `No 'dirinfo' file in this directory`. In the DIRINFO file, you can place information about, or a brief description of, the contents of the directory. In the WP51 directory, for example, you can place the message `This directory contains WordPerfect Version 5.1`.

If you want to create such a DIRINFO file for the current directory, press F4 (Edit). A small edit window appears at the bottom of the Info panel. Enter your summary information and press F10 to save the DIRINFO file. Thereafter, whenever you display the Info panel for that directory, your description appears at the bottom of the panel.

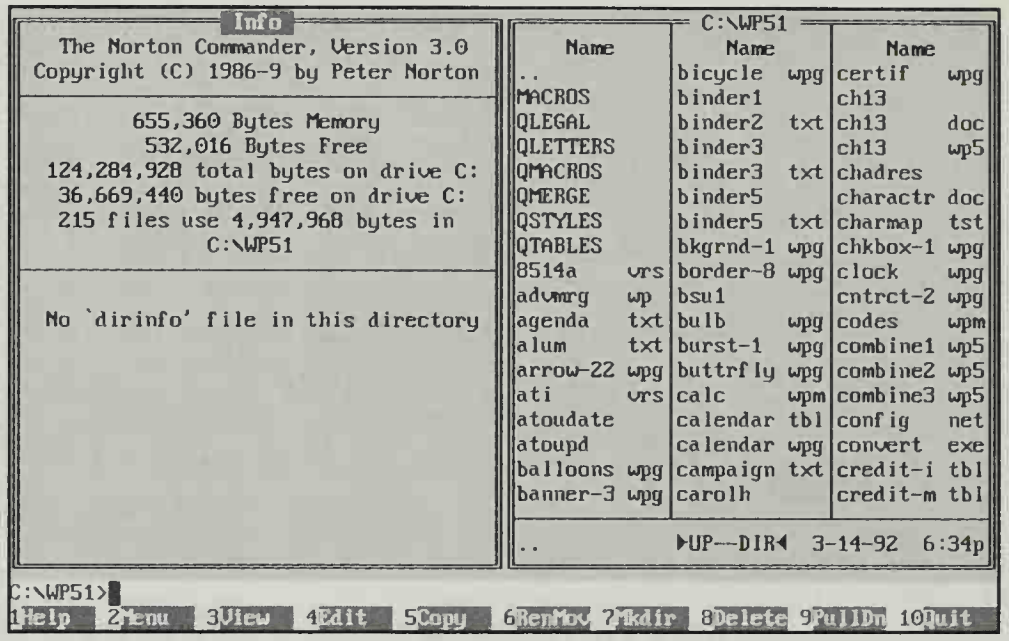

Fig. 30.6

Displaying the Info panel.

After you examine the Info panel, you can return the panel to its previous state by pressing Ctrl+L or by choosing another panel option from the Left or Right menu.

The Info option is useful for several reasons. The Bytes Free information tells you how much RAM is available for use by programs. (Most programs have minimum memory requirements.) Commander itself uses about 13K, but Commander frees itself from memory when a program begins and then restarts itself when the program finishes. When you start a program, therefore, you have 13K more available memory than the Info panel reported.

Info also tells you how many bytes are free on a disk. This information can be important if you need to copy files to the disk. Displaying the Info panel can save you the trouble of trying to copy files that the disk cannot handle. If you don't know the amount of memory available on your floppy disks, you can get that information from the total-bytes message.

Displaying a Directory Tree

Choosing the Tree option from the Left or Right menu displays a graphic tree of the disk-directory structure, as shown in the left panel of figure 30.3. After you activate a panel that contains a directory tree, you can select a directory. If the other panel is set up to display file names, that panel displays the file names associated with the selected directory.

Sorting Files

File names displayed in the panels may be listed in various sorted orders, according to the active options in the Left and Right menus. Sort orders are helpful if you are trying to locate files by a certain criterion, such as when the files were created or what extension was used.

You can list files in order by name, extension, time of creation, or size; or you can choose to have the files listed in unsorted order, which is how they normally would appear in a DOS DIR list. After you choose the **N**ame, **E**xtension, Ti**m**e, **S**ize, or **U**nsorted option from the Left or Right menu, a check mark appears to the left of the option name.

Filtering Files

The Filter option enables you to specify which files are displayed in a panel. When you choose Filter from the Left or Right menu, the Filter dialog box appears, enabling you to choose the type of files to be displayed (see fig. 30.7).

Fig. 30.7
The Filter dialog box.

Your choices are All Files, Executable Files, and Custom. If you choose the Custom option, you then must enter a file specification; use the wild-card characters—the question mark (?) and the asterisk (*)—to describe the files to be included. If you want to list only files with the PIX extension, for example, choose the Custom option and then enter the file specification ***.PIX**.

Changing Drives

The **D**rive option in the Left and Right menus enables you to specify which drive should be used for the panel. When you choose this option, a dialog box displays a list of drive names. Choose a drive and press Enter. The panel then reflects the change.

Rereading and Updating File Information

The **R**e-read option in the Left and Right menus makes Commander reread file information from the disk and then update this information in a panel. The program often performs this operation automatically when you make a change. If you change a disk in a drive or modify a file with a memory-resident program, however, you should choose the **R**e-read option to make sure that Commander has up-to-date knowledge about the files on disk.

Choosing **R**e-read when the directory tree is activated ensures that Commander has current information about all directories on disk.

Displaying a Quick View of Files

The Left and Right menus' Quick **V**iew option displays the contents of a file that is highlighted in the other panel. You can view the contents of files from programs such as Lotus 1-2-3, WordStar, WordPerfect, and dBASE III, even if you don't have those programs. In addition, you can view graphic files that match the ZSoft PCX standard.

The Quick **V**iew option is similar to the F3 (View) key (see the section "Viewing Files with F3" later in this chapter). This option, however, initially displays only half a screen rather than the full-screen F3 view.

Figure 30.8 shows a Quick **V**iew panel of a Lotus 1-2-3 spreadsheet file. Notice in the function key bar that the F3 key, which previously was called View, now is called Zoom. When a Quick **V**iew panel is displayed, you can press F3 (Zoom) to expand the view from half a screen to a full screen.

Use the arrow keys to move the cursor on-screen and to scroll the spreadsheet in any direction. If you use a mouse, move the pointer to any edge of the spreadsheet until you see the pointer change to an arrow. Then click to scroll the screen in the direction of the arrow.

Managing Directories with Norton Commander

Norton Commander enables you to access and manage your directories on disk. Using Commander, you can make new directories by pressing a function key, access a command similar to the Norton Change Directory (NCD) command, and compare directories.

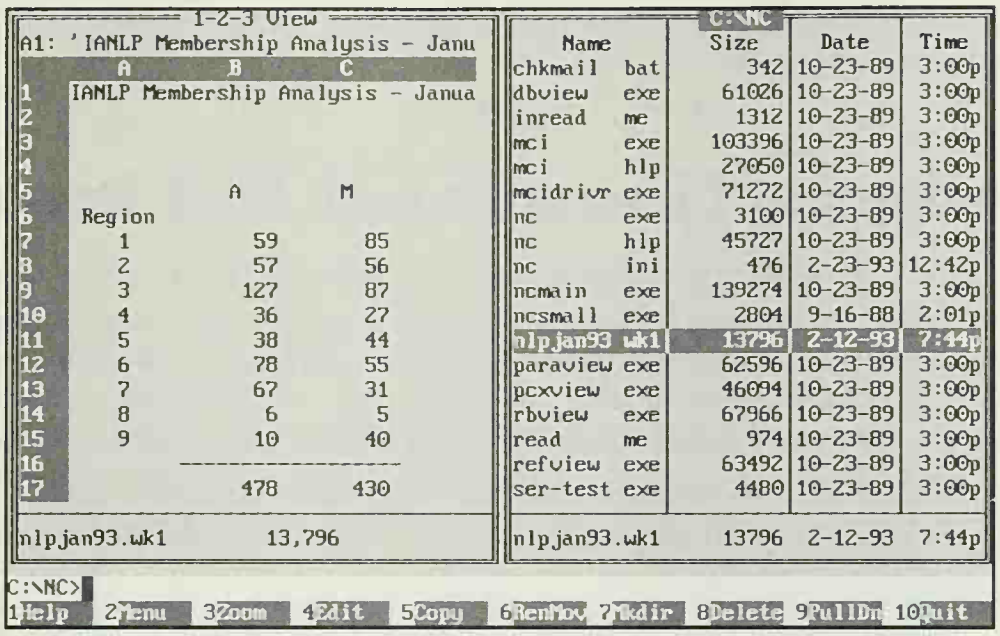

Fig. 30.8
Using the Quick **V**iew option.

Table 30.3 summarizes the commands you use to perform these tasks.

Table 30.3 Commands for Managing Directories

Task	Key(s)	Menu Command
Make directory	F7	Make Directory option (Files menu)
Access NCD program	Alt+F10	NCD Tree option (Commands menu)
Compare directories		Compare Directories option (Commands menu)

Creating Directories

The F7 (Mkdir) key enables you to make a new directory on disk. After you press F7, you are prompted to enter the name of the new directory. Enter the full path name. To make a directory named KWIKSTAT as a subdirectory of the root directory, type the path name **\KWIKSTAT** and press Enter. To make a directory named LETTERS as a subdirectory of the WP51 directory, type **\WP51\LETTERS** and press Enter.

When you press F7 (Mkdir), the Norton Commander and Norton Utilities information file TREEINFO.NCD is updated so that the NCD command works properly without having to rescan the disk to update the directory tree.

You also can make a directory by using Norton Commander's NCD command and pressing F7. See the following section for details.

Navigating Directories with NCD Tree

The NCD Tree option in the Commands menu is similar to the Norton Utilities Norton Change Directory (NCD) command. (Chapter 23 contains a detailed description of that command.) The NCD Tree option enables you to navigate among the directories on disk. This capability becomes more useful as your directory structure grows more complex.

Choose the NCD Tree option from the Commands menu or press Alt+F10. You see a display similar to the one shown in figure 30.9.

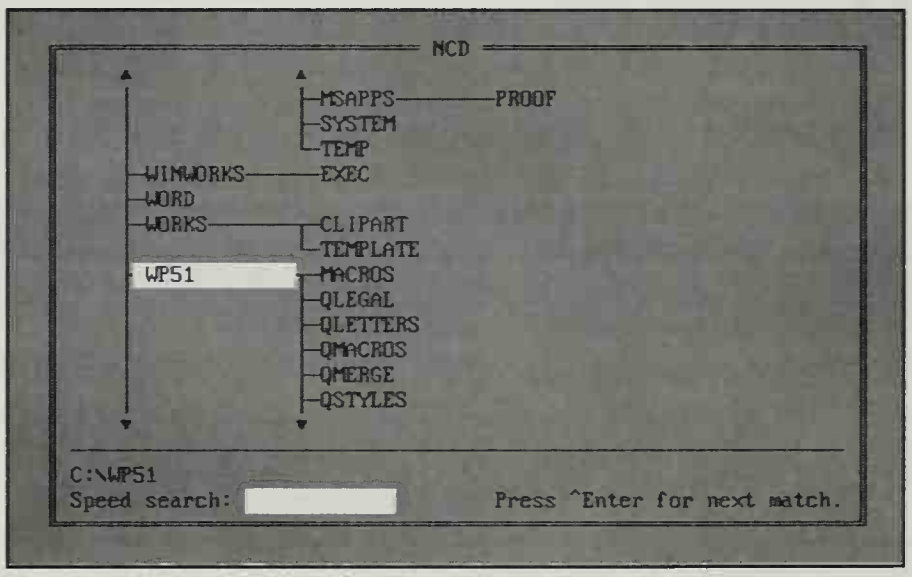

Fig. 30.9
Displaying a directory tree.

After the directory tree is displayed, you can change directories simply by selecting a new directory.

Table 30.4 lists the specific direction keys available when working with the NCD Tree display.

Table 30.4 NCD Tree Keys

Key	Description
↑, ↓, ←, →	Moves in direction of arrow
PgUp	Moves up the tree one page (19 directories at a time on a standard 25-line screen)

Key	Description
PgDn	Moves down the tree one page (19 directories at a time on a standard 25-line screen)
Home	Moves to beginning of tree
End	Moves to end of tree
Gray +	Moves forward (down) one directory entry
Gray –	Moves backward (up) one directory entry

Other keyboard shortcuts are available when you are working with the NCD Tree display. To select a directory, for example, you can type its name. You may not have to type the entire directory name for it to be highlighted. When you begin typing, NCD begins a speed search, matching the letters you type to the directory names. You need to type only enough letters to make the name unique.

To choose the \WP51\QLETTERS directory from the tree displayed in figure 30.9, for example, you can press W at the `Speed search` prompt. After you press W, the directory name WINWORKS is highlighted on-screen. If more than one directory name begins with the letter you press, as in this example, the first matching directory in the directory list is highlighted. To search for the next match, press Ctrl+Enter or the next letter of the directory name. For this example, press P.

Table 30.5 summarizes the NCD Tree shortcut commands.

Table 30.5 NCD Tree Keyboard Shortcuts

Key(s)	Description
Any letter	Begins speed search to select a directory
Ctrl+Enter	Searches for next match
Enter	Changes directory
F2	Rescans and rebuilds TREEINFO.NCD file
F6	Renames a directory
F7	Makes a directory
F8	Deletes a directory
Esc or F10	Quits NCD

Notice that table 30.5 lists several function keys. These keys are located at the bottom of the NCD Tree display and are described in more detail in the following list:

- *Rescanning a disk with F2.* Pressing F2 (Rescan) causes NCD to rescan a disk in order to update the directory structure and the TREEINFO.NCD file, which contains the tree-structure information. If you make or remove a directory with the DOS MD or RD command rather than the NCD command, the TREEINFO.NCD file becomes out-of-date. When you rescan to make sure that this file contains current information, the NCD Tree command works faster. The Rescan option (F2) has the same function as the **R**e-read option in the Left and Right menus.
- *Renaming a directory with F6.* The F6 (Rename) key enables you to rename a directory. DOS has no equivalent feature. To rename a directory, highlight the directory in the NCD Tree, press F6 (Rename), type a new name, and then press Enter.
- *Making a directory with F7.* The F7 (Mkdir) key enables you to make a new directory. First point to the directory that will be the parent directory of the new directory; then press F7, type the new directory name, and press Enter. For example, to create a subdirectory of MISC named TMP, point to MISC in the tree, press F7, type **TMP**, and press Enter. The result is a directory named \MISC\TMP. To create a subdirectory of the root directory, highlight that directory before pressing F7. When you use F7 to create a directory, the TREEINFO.NCD file is updated automatically.

  F7 creates a new directory only in the NCD Tree screen. If you press F7 in other screens, a dialog box appears, prompting you for the name of the new directory.
- *Removing a directory with F8.* The F8 (Delete) key enables you to remove a directory that contains no files or subdirectories. To delete a directory, simply highlight the directory name and press F8. When you use this method to delete a directory, the TREEINFO.NCD file is updated automatically.

Using the Compare Directories Option

The Compare Directories option in the Commands menu enables you to compare the contents of two directories. Before you use this command, you must display one directory in the right panel and the other directory in the left panel.

Any file in one directory that has the same name as, but a more recent date than, a file in the other directory is highlighted. This feature can be helpful if you want to compare similar files. Suppose that you want to make sure that a directory on a floppy disk contains all the latest files from the hard disk directory. You can use the Compare Directories

option. You then can make both directories identical by copying unmatching files to the other directory with the COPY command (see the section "Copying Files" later in this chapter).

Figure 30.10 shows a comparison of two directories (NU and NU7) on drive C. Any files that do not appear in both directories appear in a different color or highlight.

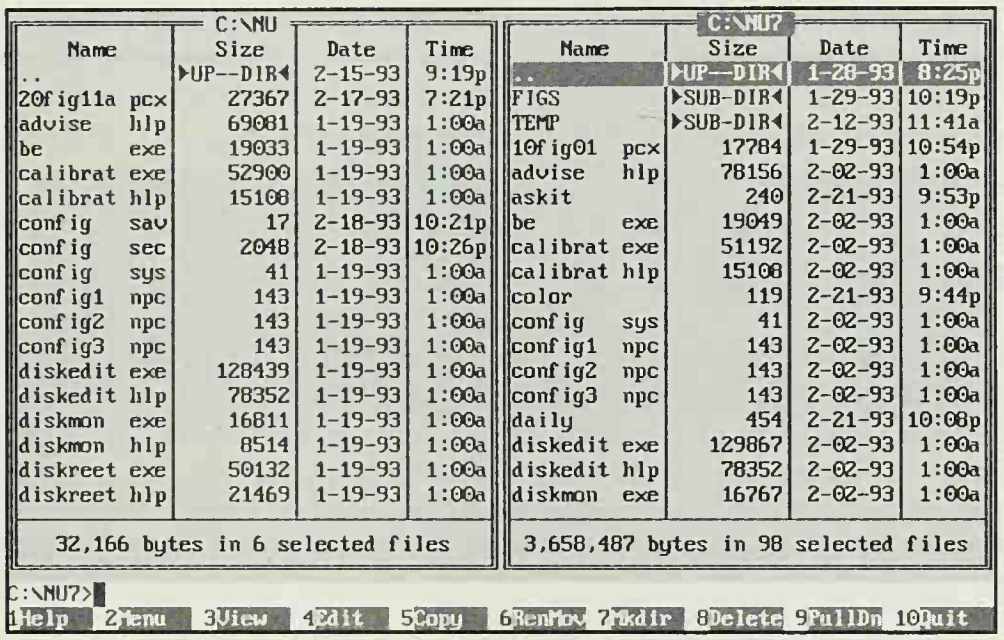

Fig. 30.10
Comparing directories.

Managing Files with Norton Commander

Along with facilitating management of your directories, Norton Commander enables you to manage your files on disk with options that exceed DOS's capabilities. You can use Commander to copy, rename, move, and delete files. You can also set file attributes and find files on disk.

Table 30.6 summarizes the options you use to perform these tasks.

Table 30.6 Commands for Managing Files

Task	Function Key(s)	Menu Command
Copying files	F5	Copy (Files menu)
Renaming files	F6	Rename or Move (Files menu)

continues

Table 30.6 Continued

Task	Function Key(s)	Menu Command
Moving files	F6	**R**ename or Move (Files menu)
Deleting files	F8	**D**elete (Files menu)
Setting attributes		File **A**ttributes (Files menu)
Finding files	Alt+F7	**F**ind File (Commands menu)

These options are described in the following sections.

Copying Files

You can access the **C**opy option by pressing F5 (Copy) or by choosing **C**opy from the Files menu. This option, which is similar to the DOS COPY command, enables you to copy one or more files to another disk or location. When you use the Commander **C**opy option, however, you are prompted for the information on which files to copy and where to copy them. You therefore do not have to remember the correct DOS COPY command syntax.

When you are working with a disk that contains many files, you may want to limit the files that appear in a panel. You can do so by setting the filter to display files that match a certain file specification. If you are working only with *.EXE files, for example, set the filter to display only those files (refer to the earlier section "Filtering Files").

To copy a file, follow these steps:

1. Display in a panel the files that you want to copy.
2. Select the file in the Commander panel. To select multiple files, use the gray + and – keys or the mouse.
3. Choose **C**opy from the Files menu or press F5. Commander prompts you for a destination (see fig. 30.11).
4. Enter the name of a disk drive (such as **A:**), a path name (such as **\WP51**), or a combination (such as **C:\WP51**). When you are specifying the destination, you can press F10 to display a tree of the available directories. From this tree, you can highlight the directory to which you want to copy the files.
5. After you type or select the destination, press Enter. The copy operation begins.

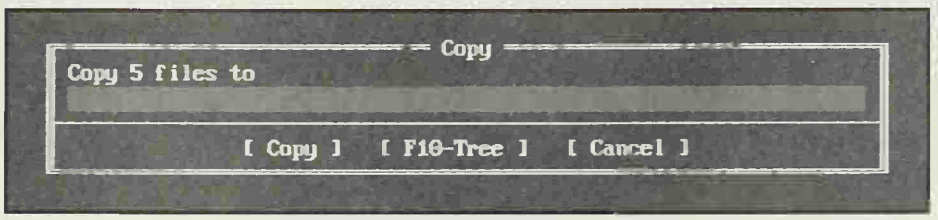

Fig. 30.11
A prompt for a copy destination.

Another way to copy a file (regardless of the panels displayed) is to press Shift+F5 at the DOS prompt. Commander asks you for the file specification and the destination (see fig. 30.12).

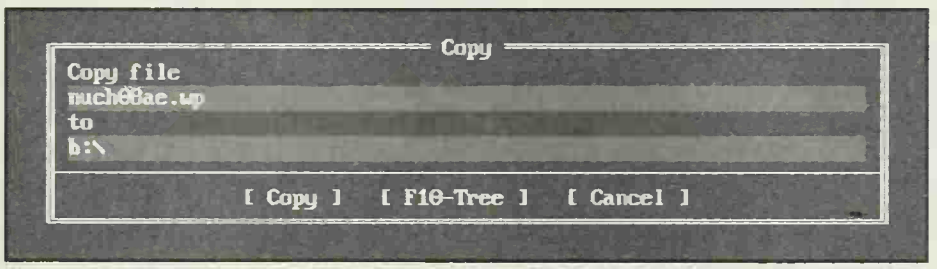

Fig. 30.12
Using the manual copy process to specify the destination file.

You also can press F10 to display a directory tree. Highlight a directory name in the tree and then press Enter to select that directory as the destination. (You also can use the mouse to select a directory.)

Renaming and Moving Files

The **R**ename or Move option, which you access from the Files menu or with F6 (Rename), enables you to rename one or more files in the same directory or to move files from one location on a disk to another location on the same disk or a different one. The rename process works much like the copy process but changes the name of a file in a directory instead of copying the file. You use the move process to specify a destination other than the current directory. A move operation copies the file to the new destination and erases the original file. DOS offers no equivalent MOVE command.

To rename or move a file, follow these steps:

1. Select the file.
2. Choose **R**ename or Move from the Files menu or press F6. A prompt appears for you to enter the destination (or new name) for the file.

3. To rename the selected file, specify the destination as a file name or a file specification containing the wild-card characters * or ?. If you want to select all files with the WP extension (*.WP), type ***.BAK** as the destination. This operation renames all files with the WP extension to files with a BAK extension.

   To move the selected file, enter the name of a different destination disk or directory, or press F10 to display the directory tree and then select the destination. If you specify a different directory or drive, the selected files are moved to the new location under their original names. If you choose a destination and also include a file specification, the files are moved and renamed. If, for example, you select all files with the WP extension in the WP51 directory in drive C, and you specify the destination A:\WP51*.BAK, the files move from the original C:\WP51 directory to the A:\WP51 directory and are renamed from WP files to BAK files.

4. If the file that you want to copy or move already exists in the target directory, Commander displays the following message:

   ```
   Do you wish to write over the old file?
   ```

   Choose **O**verwrite, **A**ll, or **S**kip. **O**verwrite enables you to copy or move the current file. With **A**ll, you can use the copy and move operations for all other files to be copied or moved (no more prompts will appear). **S**kip means that you want to skip this particular copy or move operation.

To perform a rename or move operation manually, press Shift+F6. Commander prompts you to enter the name of the file to be renamed or moved and to enter the destination. You can press F10 to select a destination directory in the directory tree.

Deleting Files

The **D**elete option, which you access from the Files menu or with F8, enables you to delete one or more files.

To delete a file, follow these steps:

1. Select the file.
2. Choose **D**elete from the Files menu or press F8 (Delete). The Delete dialog box appears (see fig. 30.13).
3. Choose the **D**elete option to delete the files or choose **C**ancel to cancel the procedure.

To delete a file manually, press Shift+F8. Commander prompts you to enter the file specification of the file to be deleted. To delete all files with the BAK extension, type ***.BAK** and press Enter.

Fig. 30.13
The Delete dialog box.

Setting File Attributes

File attributes enable you to set the read-only, archive, hidden, and system attributes for files. These attributes are the same as those described for the Norton Utilities File Find and File Attributes programs (see Chapter 9). You can set file attributes in Norton Commander by choosing the File Attributes option from the Files menu.

To set file attributes, follow these steps:

1. Select the file or files for which you want to set attributes.
2. Choose File Attributes from the Files menu. The Attributes dialog box appears (see fig. 30.14).

NOTE If you selected only one file, the Clear column does not appear in the Attributes dialog box; only the Set column appears.

Fig. 30.14
The Attributes dialog box.

3. Choose the attributes you want by highlighting a check box and pressing the space bar or clicking the appropriate check boxes.
4. Highlight the Set option at the bottom of the dialog box and press Enter to activate the settings, or choose Cancel or press Esc to cancel the procedure.

Finding Files

The **F**ind File option in the Commands menu is similar to the File Find command in Norton Utilities. **F**ind File enables you to locate files on disk by searching for matching file specifications.

To find a file, follow these steps:

1. Choose **F**ind File from the Commands menu or press Alt+F7. The following prompt appears:

```
File(s) to find:
```

2. To search for one file (such as REPORT.93), type the full file name at the prompt. To search for a group of files, type a file specification that includes wild-card characters (for example, type ***.PCX**).

3. Press Enter to initiate the search. If Commander finds a file that matches the file specification, Commander displays the directory, the file name, the size, and the date and time when the file was created. If Commander finds many files that match the specification, it lists them on-screen, grouped in their respective directories.

Figure 30.15 shows the results of a **F**ind File search for all files matching the specification *.PCX.

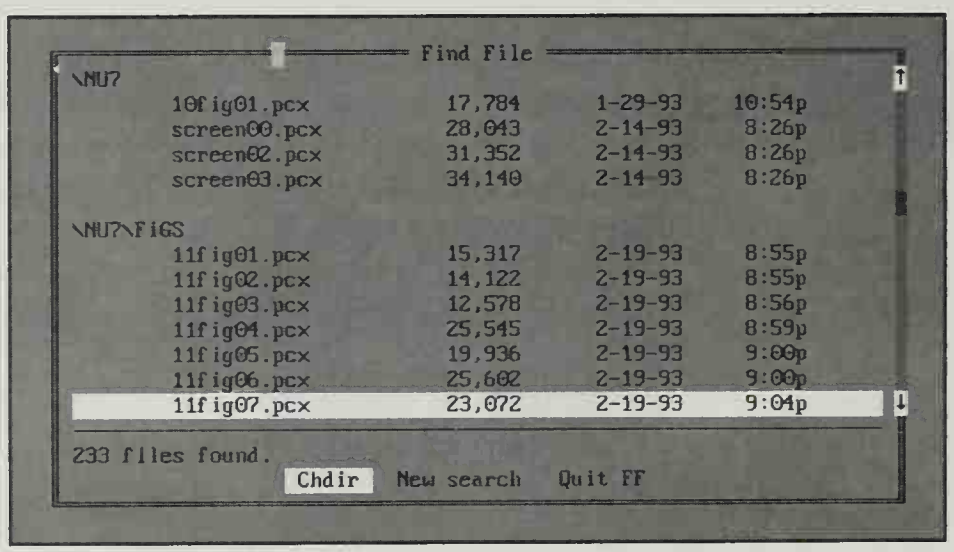

Fig. 30.15
Results of a **F**ind File search.

To move to the directory containing the file in which you are interested, use the up- and down-arrow keys to highlight the file and then press Enter. If you want to change to the directory for a particular file,

highlight that file name and then choose the Chdir option at the bottom of the dialog box. If you want to begin a new search, choose the New Search option. Choose Quit FF to end the Find File procedure.

Viewing Files with F3

The F3 (View) key is one of the handiest features of Norton Commander. This function key enables you to examine the contents of a file without using the program in which that file was created. To look at a dBASE IV database, for example, you normally have to start the dBASE IV program, enter a command to get the file you want, and then enter another command to display the contents of the file. With Commander, however, you simply highlight the file name on-screen and press F3. If you want to enter the name of a file manually, press Shift+F3. Commander then prompts you for the name of the file you want to view.

You can use the View option to display files created in several major software programs. (See table 30.7 for a list of compatible programs.) Keep in mind that this information is not exhaustive, however, because several other programs create files that use the file formats of the popular programs listed in table 30.7. The programs PC-FILE:db (Buttonware) and Kwikstat (TexaSoft), for example, create and use dBASE III-type files. Thus, you can view PC-FILE:db and Kwikstat files with Norton Commander's View option.

Table 30.7 Programs Compatible with Commander's View Option

Program Type	Programs
Database programs	dBASE II, III, III PLUS, and IV dbXL FoxBASE FoxPro TexaSoft Kwikstat Microsoft Works Nantucket Clipper Paradox R:BASE Reflex
Graphics programs	All programs that create ZSoft standard PCX-type (Paintbrush) files

continues

Table 30.7 Continued

Program Type	Programs
Spreadsheet programs	1-2-3 (Releases 1.x, 2.x, and 3.x) Quattro, Quattro Pro Excel Microsoft Works Mosaic Twin Multiplan 4.0 Symphony VP-Planner Plus Words & Figures
Word processing programs	Microsoft Word 4.0, 5.0, and 5.5 Microsoft Windows Write Microsoft Works MultiMate WordPerfect 4.2, 5.0, and 5.1 WordStar Pro, WordStar 2000 XyWrite All word processing and editing programs that create ASCII text files

NOTE Your use of the View option in some graphics programs may be restricted by your monitor's capability to display colors and by your computer's memory.

The following sections describe how to use the View option to view databases, spreadsheets, and word processing files.

Viewing Database Files

Norton Commander recognizes common database files for the programs listed in the preceding section. To view the contents of a database file—a dBASE IV file, for example—highlight the file name in a panel and press F3 (View). Figure 30.16 shows the screen that appears when you select a database file named MAGAZINE.DBF. The information displayed is the first record of the database.

By using the arrow keys, you can page through the database records and examine them one at a time, or you can use the mouse to scroll the

records. You cannot change any of the information in the database, however, when you use the Commander View option.

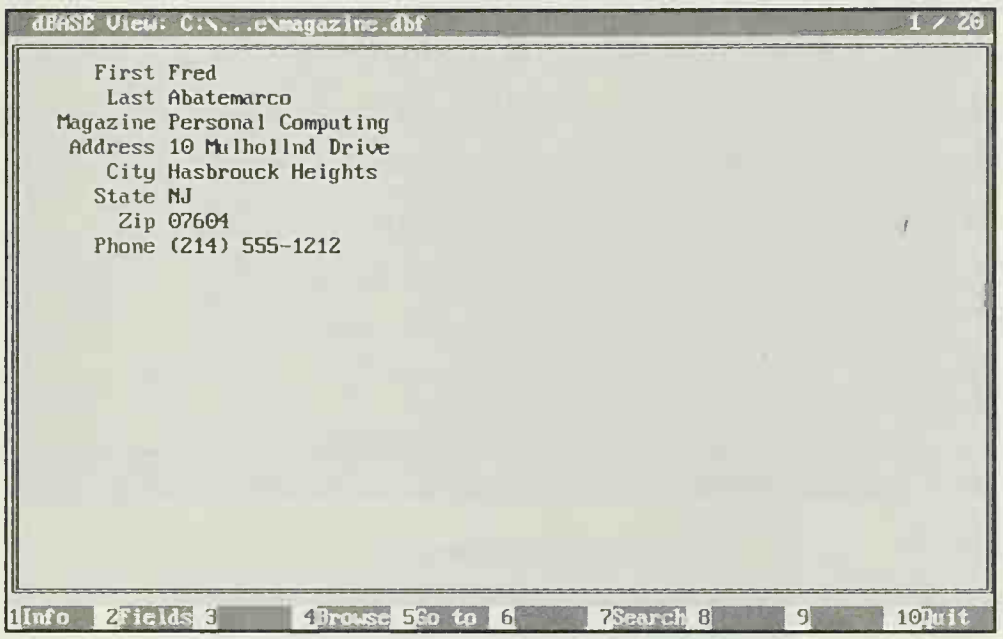

Fig. 30.16
Using the View option to view a dBASE IV database file.

At the top of the view screen, you see information about which view method is being used to display the contents of a file. Figure 30.16 indicates `dBASE View`.

The number of the record being viewed and the total number of records in the database appear in the top-right corner of the screen. In figure 30.16, the message `1 / 20` means that the database contains 20 records and that you are viewing record 1.

Notice also the function key options at the bottom of the dBASE View screen. Table 30.8 lists these function keys and other command and direction keys that you can use when you view database files.

Table 30.8 Keyboard Commands in Database View

Key(s)	Description
↑ or Ctrl+E	Goes back one field
↓ or Ctrl+X	Goes forward one field
PgUp or Ctrl+R	Moves up one page or to preceding record
PgDn or Ctrl+C	Moves down one page or to following record

continues

Table 30.8 Continued

Key(s)	Description
Gray –	Goes to preceding record
Gray +	Goes to following record
Ctrl+Home or Ctrl+PgUp	Goes to first record
Ctrl+End or Ctrl+PgDn	Goes to last record
F1	Displays file information
F2	Displays field information
F4	Browses
F5	Goes to specified record
F7	Searches
Shift+F7	Continues a search
Ctrl+Pause	Stops a search
Esc or F10	Exits view and returns to Commander menus

When you first view a database, a single record is displayed on-screen. If you press F4 (Browse), the display changes to look much like a browse in dBASE, with one record displayed per line. Figure 30.17 shows this display for a magazine database.

By using this method, you can see multiple records at one time. Notice, however, that only the first three fields of the record are displayed. To view the information off the screen to the right, press the right-arrow key until the information in the other fields appears. To return to viewing a single record at a time, press F4 again.

Suppose that you want to find information—the phone number of Sam Jones, for example—in a particular record. If you press F7 (Search), the Search dialog box appears. In this dialog box, you can enter a *search key* (the text you want to search for). Figure 30.18 shows how you enter the information necessary to search for the name *Jones*.

After you enter the search key and press Enter, the first record containing that key in any field appears on-screen. If the record shown is not the one for which you are looking, you can press Shift+F7 to continue the search.

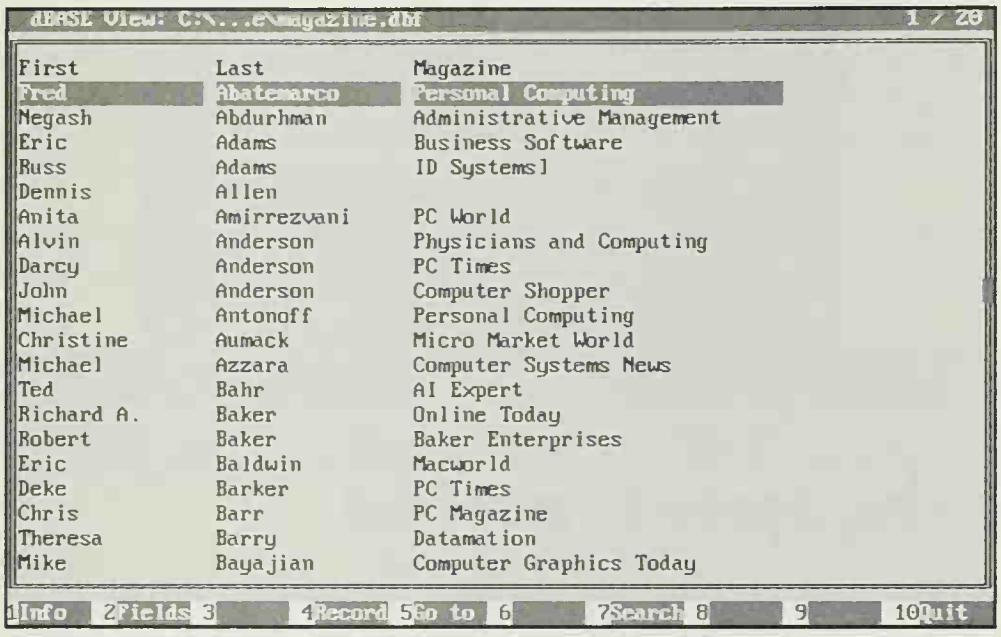

Fig. 30.17

Viewing a record from a magazine database.

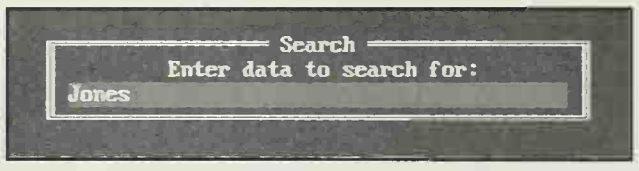

Fig. 30.18

Searching records for the name *Jones*.

If you know the number of the record you want to view, you can press F5 (Go to). Commander prompts you to enter the record number, and then the program displays that record.

At times, you may need to know the structure of a database. You may be working on a program to merge information from the database, for example, and you need to know field names and widths. When you are viewing a database, you can press F2 (Fields) to display the structure of the database in the Field Information dialog box, as shown in figure 30.19.

The dialog box lists the field names, types, lengths, and decimals used (if any) in the database. When you press the F1 (Info) key, information about the database size, number of fields, and records appears.

To exit the view screen and return to Commander, press Esc or F10.

Field Information

Name	Type	Length	Decimals
First	Character	15	
Last	Character	15	
Magazine	Character	30	
Address	Character	20	
City	Character	30	
State	Character	2	
Zip	Character	5	
Phone	Character	14	

Fig. 30.19

The Field Information dialog box, displaying a database structure.

Viewing Spreadsheet Files

Norton Commander recognizes common spreadsheet files for the programs listed earlier in table 30.7. To view the contents of a spreadsheet file—a Lotus 1-2-3 file, for example—highlight that file name in a panel and press F3 (View). Figure 30.20 shows the screen that appears after you select a spreadsheet file named NLPJAN93.WK1.

1-2-3 View: C:\123r22\nlpjan93.wk1

A5:

	A	B	C	D	E	F	G	H
5		A	M	F	MC	P	Total	
6	Region							
7	1	59	85	35	20	55	254	
8	2	57	56	19	12	58	202	
9	3	127	87	18	24	59	315	
10	4	36	27	9	2	20	94	
11	5	38	44	26	5	35	148	
12	6	78	55	9	3	39	184	
13	7	67	31	25	11	42	176	
14	8	6	5	4	0	7	22	
15	9	10	40	40	2	17	109	
16								
17		478	430	185	79	332	1504	
18								
19								
20		BOA	CA	MP	EA	MA	T_NLP	RA
21	Region							
22	1	28	38	13	26	13	45	8
23	2	29	27	16	17	9	27	6
24	3	42	36	12	18	8	25	3

1Help 2 3 4 5Goto 6 7Search 8 9 10Quit

Fig. 30.20

Using the View option to view a spreadsheet file.

At the top of the screen, you see information about which view method is being used to display the contents of a file. In figure 30.20, the first line indicates `1-2-3 View`. The second line of the screen shows the name and contents of the highlighted cell being viewed (in this example, cell A5 is empty).

In this screen, the F1 (Help) key displays information about cursor movements and the function key commands. The F5 (Goto) key enables you to choose the area of the spreadsheet to be displayed. With the F7 (Search) key, you can search for text in the spreadsheet. F10 (Quit) exits the view and returns you to Commander.

Table 30.9 lists the function keys and other command and direction keys you can use when you view spreadsheet files.

Table 30.9 Spreadsheet View Keyboard Commands

Key(s)	Description
Home	Goes to top-left cell
End	Goes to last active cell
← or Ctrl+S	Moves one cell to the left
→ or Ctrl+D	Moves one cell to the right
↑ or Ctrl+E	Moves one cell up
↓ or Ctrl+X	Moves one cell down
PgUp or Ctrl+R	Moves one page up
PgDn or Ctrl+D	Moves one page down
Tab or Ctrl+ →	Scrolls one page to the right
Shift+Tab or Ctrl+ ←	Scrolls one page to the left
F5	Goes to specified record
F7	Searches
Shift+F7	Continues a search
Esc or F10	Exits view and returns to Commander menus

If you want to search the spreadsheet for specific information, you can use the F7 (Search) key. If, for example, you want to find a label containing the word *Taxes*, you can press F7 and then enter the search word in the View dialog box, as shown in figure 30.21.

After you press Enter, the first cell containing a match is highlighted in the spreadsheet. If the highlighted cell is not the one for which you are looking, press Shift+F7 to continue the search. If you already know the name of the cell you want to view, press F5 (Goto) and then enter a cell address (for example, enter **A5** or **N50**). Press Esc or F10 to exit the view and return to Commander.

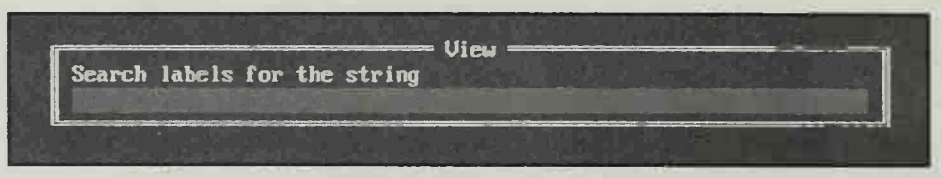

Fig. 30.21
The View dialog box.

Viewing Word Processing Files

Norton Commander recognizes common word processing files created in the programs listed earlier in table 30.7. To view the contents of a word processing file—a WordPerfect file, for example—highlight that file name in a panel and press F3 (View). Figure 30.22 shows a view of a WordPerfect file.

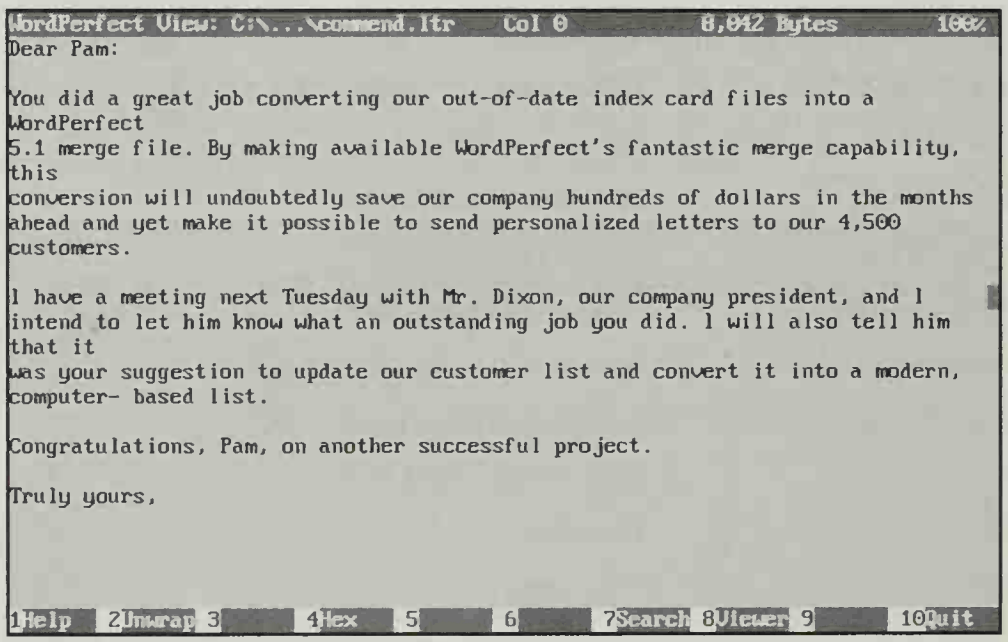

Fig. 30.22
Using the View option to view a WordPerfect file.

At the top of the screen, you can see information about which view method is being used to display the contents of a file. The top line in figure 30.22 indicates `WordPerfect View`. The top line of the word processing view screen also displays the file name, the current column location of the cursor, the size of the file in bytes, and a percentage that represents the amount of the file that has been paged off the top of the screen.

Table 30.10 lists the function keys and other command and direction keys you can use when you view word processing files.

Table 30.10 Word Processing View Keyboard Commands

Key(s)	Description
↑ or Ctrl+E	Scrolls up
↓ or Ctrl+X	Scrolls down
← or Ctrl+S	Scrolls left
→ or Ctrl+D	Scrolls right
Ctrl+ ← or Ctrl+A	Scrolls left 40 columns (a half screen)
Ctrl+ → or Ctrl+F	Scrolls right 40 columns
PgUp or Ctrl+R	Moves one page up
PgDn or Ctrl+C	Moves one page down
Home, Ctrl+Home, or Ctrl+PgUp	Goes to beginning of file
End, Ctrl+End, or Ctrl+PgDn	Goes to end of file
F2	Toggles word wrap on/off
F3	Returns to Quick View panel (available only if the view screen originally was a Quick View panel)
F4	Enables you to view a file in hexadecimal code
F7	Searches for text
Shift+F7	Continues search
Ctrl+Break or Esc	Stops a search
F8	Selects view type
Esc or F10	Quits

In the WordPerfect View screen, the F2 (Unwrap) key enables you to toggle the word-wrap feature on and off. When word wrap is on, text that would exceed the right margin is wrapped around to the next line. When word wrap is off, text is permitted to exceed the right margin. You can use the direction keys to display information past the right margin.

The F4 (Hex) key enables you to examine a file in hexadecimal code. This feature may be useful if you are looking for special character codes that normally are not displayed on-screen. These *ghost characters* can cause problems when you try to edit or print the file. If you display the file in hexadecimal format, you can locate these unusual characters and edit them out of your file.

When you select a database or spreadsheet file to view, the extension tells Commander what kind of file you selected. DBF files are dBASE databases, for example, and WK? files are Lotus 1-2-3 spreadsheets. Word processing programs, however, usually enable you to use any extension when you name files. Commander often can figure out what kind of file you are attempting to display, and thus uses whatever view type the program thinks is most appropriate. If Commander is wrong, however, you have to press F8 (View) and then select the correct view type.

Figure 30.23 shows the Select Viewer dialog box that appears when you press F8.

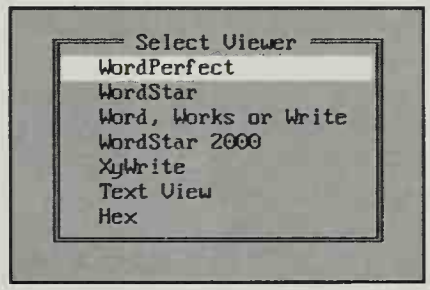

Fig. 30.23
The Select Viewer dialog box.

Because many word processing documents are long, scrolling through a document to look for a specific piece of information may take time. If you know that some key word is located in or near the paragraph for which you are looking, you can use F7 (Search) to help locate the information. Suppose that you are looking for a paragraph about a virus. To find this paragraph, press F7 (Search). A dialog box appears (similar to the ones previously discussed for database and spreadsheet views). Type the key word **virus** and press Enter. The text that includes the first occurrence of *virus* appears on-screen. If this paragraph is not the one for which you are looking, press Shift+F7 to continue the search until you find the right information. To end a search, press Ctrl+Break or Esc.

Press Esc or F10 to exit the view and return to Commander.

Editing ASCII Text Files

In addition to giving you another way to view files, the Edit command in the Files menu enables you to edit ASCII text files. You can use this command to edit files that contain up to 25K (about 25,000 characters). The command is ideal if you need to create or modify batch files (such as AUTOEXEC.BAT) or other ASCII text files.

Using the Commander Editor

The Commander editor is a full-screen editor similar to a word processing program's editor. To use the Commander editor to edit an existing file, highlight the file name in a Commander panel and then choose Edit from the Files menu or press F4. If you want to enter the name of the file you want to edit, press Shift+F4. Commander then prompts you to enter the file name.

Figure 30.24 shows the editor being used to edit CONFIG.SYS.

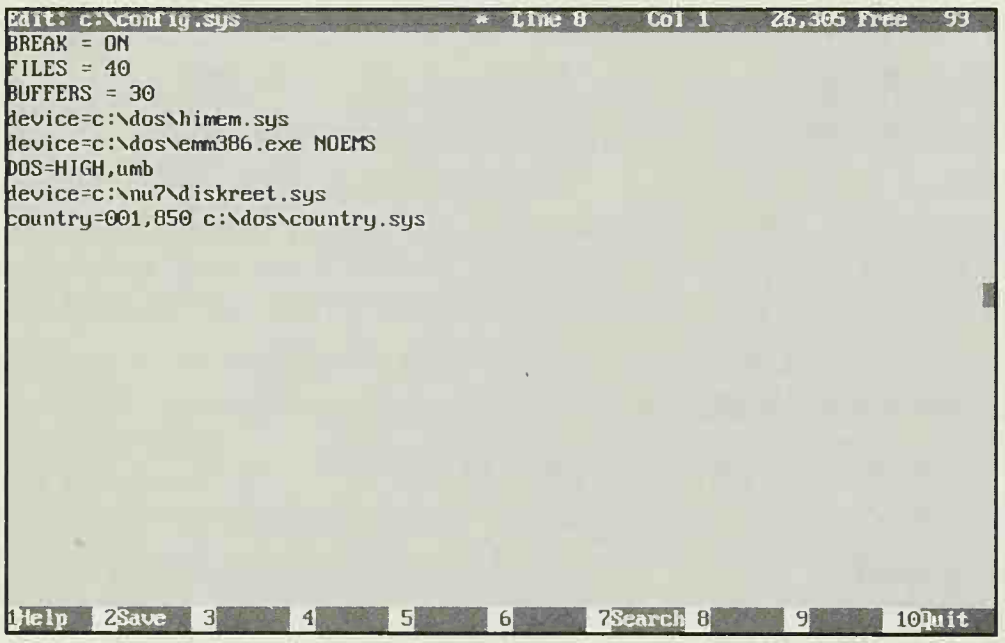

Fig. 30.24
Editing the CONFIG.SYS file.

Most of the commands in the editor, particularly the cursor-movement commands, are the same as in any full-screen editor. Several editor commands, however, deserve some added explanation.

You use Ctrl+Q to enter special characters into a file. Suppose that you want to enter the ASCII Esc character in a file as part of a printer code. Normally, if you press Esc, you quit the editor and return to Commander. If you press Ctrl+Q and then press Esc, however, the Esc character is placed in the file as though you had typed it.

If you want to search for a particular word or phrase in a long file, you can press F7 (Search). Commander then prompts you to enter the search word. If the first word that Commander finds is not the one for which you are looking, press Shift+F7 to repeat the search.

To end the editor, press Esc or F10. Remember to save the file before quitting if you want your changes to be saved to disk. Press F2 to save the edited file under the original file name you chose from the Commander panel. If you want to use a new name, press Shift+F2. Commander then prompts you to enter a new name.

Table 30.11 lists the direction keys and editing keys you can use in the Commander editor.

Table 30.11 Direction and Editing Keys

Key(s)	Description
↑ or Ctrl+E	Scrolls up
↓ or Ctrl+X	Scrolls down
← or Ctrl+S	Scrolls left
→ or Ctrl+D	Scrolls right
Ctrl+ ← or Ctrl+A	Moves one word to the left
Ctrl+ → or Ctrl+F	Moves one word to the right
Home	Goes to beginning of line
End	Goes to end of line
PgUp or Ctrl+R	Moves one page up
PgDn or Ctrl+C	Moves one page down
Ctrl+Home or Ctrl+PgUp	Goes to beginning of file
Ctrl+End or Ctrl+PgDn	Goes to end of file
Backspace	Deletes character to left
Del or Ctrl+G	Deletes character at cursor location
Ctrl+Backspace or Ctrl+W	Deletes one word to the left
Ctrl+T	Deletes one word to the right
Ctrl+Y	Deletes line
Ctrl+K	Deletes to end of line
Ctrl+Q	Causes the next character(s) you press to appear on-screen For example, if you press Ctrl+Q and then press Ctrl+F, that command is not activated; instead, the ASCII character associated with Ctrl+F appears on-screen. (Because F is the sixth letter in the alphabet, ASCII character 6—a spade—would appear.)
F1	Accesses help
F2	Saves file
Shift+F2	Asks for file name
F7	Searches for text

Key(s)	Description
Shift+F7	Continues a search
Esc or F10	Quits the editor and returns to Commander
Shift+F10	Saves file and quits the editor

Using a Substitute Editor

Normally, when you choose an editing option, Commander uses a built-in editor. You may, however, prefer to use your own editor if you are more comfortable with it.

You can specify that Commander use a substitute editor of your choice. Choose **E**ditor from the Options menu. You then are prompted to choose **B**uilt-in (the built-in editor) or **E**xternal (an external editor).

If you choose the **E**xternal option, Commander prompts you to enter the command used to begin the editor. Enter this command, followed by an exclamation mark (**!**) if you want to use only a file name when editing, or type **!.!** after the command if you want to use a file name plus an extension. If you are using the WP (WordPerfect) editor in the WPROC directory, for example, you should enter the following command to indicate that you want the full file name used during editing:

```
\WPROC\WP !.!
```

The path name (\WPROC) is necessary if you must use the path name to start the editor from the DOS prompt. If you do not specify ! or !.!, Commander uses !.! as the default.

Other editors that you may use include DOS 5.0 Editor, WordStar, Boxer, and PC-Write.

Customizing the Norton Commander Screen Display

Norton Commander has several options that you can use to customize how the program looks on your screen. You can, for example, change the number of lines displayed (if you have an EGA or VGA monitor), enabling Commander to display more information per screen. The following sections describe these options in detail.

Controlling the Number of Lines Displayed

The EGA Lines command enables you to set your EGA or VGA monitor to display more than the normal 25 lines per screen. You can access this command by choosing EGA Lines from the Commands menu or pressing Alt+F9. The command is a toggle. If you have an EGA monitor, choosing the command toggles between normal 25-line mode and 43-line mode. If you are using a VGA monitor, you toggle between 25- and 50-line mode.

Displaying more information on-screen may simplify your access to files and directories. The only problem with the 43- and 50-line modes is that the characters are smaller than normal and may be more difficult to read.

NOTE

If your CONFIG.SYS file in the root directory contains the command line DEVICE=ANSI.SYS, you can display only 25 lines on-screen. (See Appendix A for more information.) Thus, even if you enter 43-line EGA mode or 50-line VGA mode, your monitor still displays only 25 lines. You can remove the DEVICE=ANSI.SYS command from the CONFIG.SYS file to enable your monitor to display more lines per screen. If you are using DOS 4 or a later version, you can include the /L switch in the command instead. Before you decide to remove the ANSI.SYS command, be aware that some programs need it to work properly. You need to check your programs to determine whether they require ANSI.SYS.

Choosing Other Screen Options

The Options menu provides several other screen options. Like the EGA Lines option, these options operate as toggles, turning the features off and on. When an option is on, a check mark appears beside the option name in the menu.

The following additional options are available in the Options menu:

- Auto Menus is an advanced feature that enables you to create custom menus, which are covered in the section "Automating Menus" later in this chapter.

- **P**ath Prompt controls whether the DOS prompt includes a path name. If you are in the WP51 directory with the **P**ath Prompt option turned off, for example, the DOS prompt (on drive C) is `C>`. When **P**ath Prompt is turned on, the prompt is `C:\WP51>`. Most users prefer the second version of the prompt (which includes the path) because it displays the current directory.
- **K**ey Bar determines whether the function key bar appears at the bottom of the screen.
- **F**ull Screen determines whether the right and left panels extend from the top to the bottom of the screen or are only half that size.
- **M**ini Status controls the status line at the bottom of each panel. When the **M**ini Status option is turned on, the status line shows the name, size, date, and time of the highlighted file or directory. If you have selected files in the panel, the status line displays the number of files selected. If the **M**ini Status option is off, the status line does not appear.
- **C**lock determines whether a clock appears in the upper-right corner of the Commander screen.
- Another option in the Options menu is **C**onfiguration. When you exit Norton Commander, the screen display reverts to the display that was in effect when you started Commander. The **C**onfiguration option enables you to save any changes so that they are in effect the next time you use Commander. To save your changes, choose **C**onfiguration from the Options menu and then choose Auto Save Setup in the Configuration dialog box (by default, this option already is on).

See the following sections for more information on the **C**onfiguration option.

Setting Commander's Configuration

After you choose the **C**onfiguration option from the Options menu, the Configuration dialog box appears (see fig. 30.25).

This dialog box contains five sections: Screen Colors, Screen Blank Delay, File Panel Options, Tree Panel Options, and Other Options. The following sections describe these areas in detail.

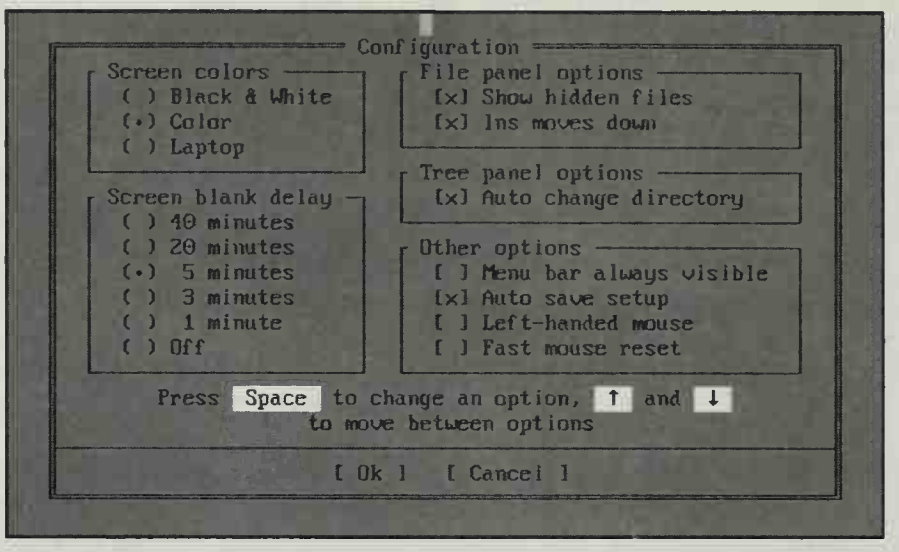

Fig. 30.25
The Configuration dialog box.

Setting Screen Colors

In the Screen Colors section of the Configuration dialog box, you can tell Commander whether you are using a color monitor, a black-and-white monitor, or a laptop monitor. Use the arrow keys or the mouse to select the monitor type.

Setting Screen Blank Delay Options

The Screen Blank Delay options enable you to choose how long Commander waits until automatically blanking out your screen. Blanking out the screen saves your monitor from possible burn-in of an image. (On some screens, if you leave an image on-screen for a long time, a trace of the image remains on-screen, like a ghost.) The default delay is five minutes.

When Commander blanks out the screen, you see a random pattern of white dots on a black background, resembling stars in the sky. The dots come and go, so that you can tell whether the computer is working. When the screen is blanked out, you can press any key or move the mouse to bring back the working screen. Commander blanks out the screen only when you are at the DOS prompt, not when you are working in a program.

You can choose to turn off the blanking feature or to specify a delay of 1 to 40 minutes by using the arrow keys to highlight the appropriate option in the Screen Blank Delay section and then pressing the space bar to lock the option into place. If you are using a mouse, just point to the option and click.

Setting File Panel Options

In the File Panel Options section of the Configuration dialog box, you indicate whether you want hidden files to appear in directories. You can also choose the meaning of the Ins key when selecting files.

If you choose the Ins Moves Down option, you can select files in a panel by repeatedly pressing the Ins key. Each time you press Ins, the cursor moves down to the next file. If you do not choose Ins Moves Down, you have to select options with the arrow keys and the space bar or with the mouse.

Controlling Automatic Display of Directory Files

The Tree Panel Options section contains one option: Auto Change Directory. If you turn on this option, you tell Commander that when you highlight a directory in a tree, you want the other panel to display the files contained in the highlighted directory. This option does not affect the NCD command (Alt+F10).

Setting Other Configuration Options

The following options are also available in the Configuration dialog box:

- Menu Bar Always Visible enables you to specify whether the menu bar always appears at the top of the screen. By default, this option is off.
- With Auto Save Setup, you can save any changes you make in the screen configuration during a Commander session. By default, this option is on.
- Left-Handed Mouse enables you to specify whether you are using a left-handed mouse and to reverse the functions of the left and right mouse buttons. By default, this option is off.
- Fast Mouse Reset, when on, enables Commander to return from a command faster if you are using a COMPAQ or PS/2 computer with a mouse port.

Choose OK to return to the Commander screen and save these settings, or choose Cancel to exit this dialog box without saving any changes.

Defining File Extensions in Commander

Another element of Norton Commander that takes some of the work out of accessing programs is the file extension feature, which you can use to define meanings for file extensions. After Commander knows the definition of a file extension, you can choose any file with that extension from a panel, and Commander begins the appropriate program.

Recall that a file specification has the format *filename.ext*. If you defined WP as an extension for WordPerfect, for example, and later choose the file REPORT.WP from a panel, Commander begins WordPerfect with the file REPORT.WP on-screen and ready to edit.

To tell Commander the meanings of various extensions, you must enter information into the file NC.EXT in the NC directory. To create or edit this file, follow these steps:

1. Choose Extension File Edit from the Commands menu. You see a screen similar to the one shown in figure 30.26. The Help box at the bottom of this screen summarizes the format of an extension command. You are now in the Commander editor.

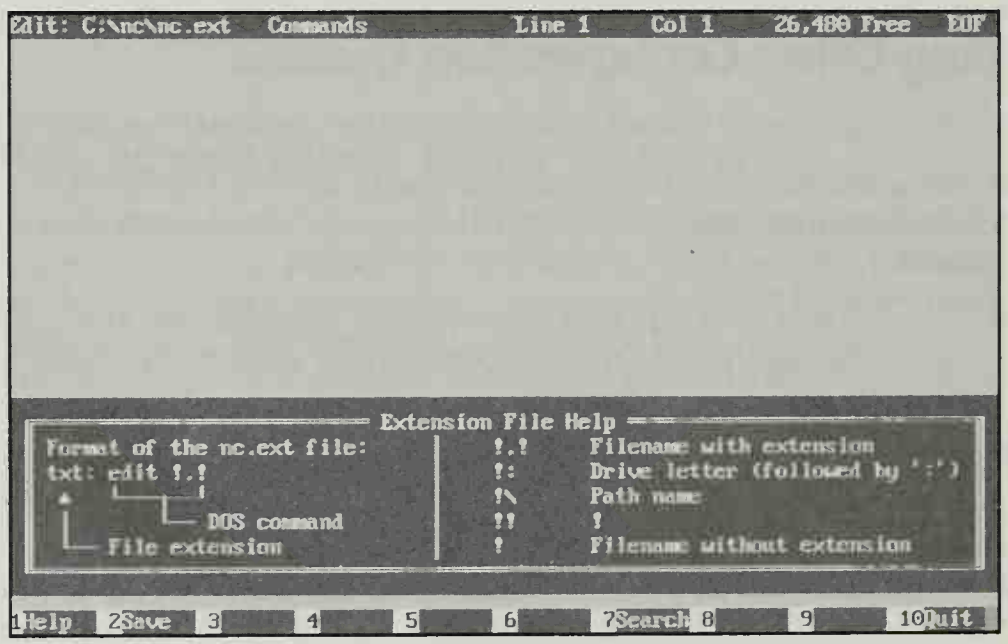

Fig. 30.26

Editing the extension file in the Commander editor.

2. For each extension that you want to define, type a line of information, using the following format:

   ext: *command* !.!

   The *ext*: is the extension that you are defining. This parameter could be DOC: for Microsoft Word files using the DOC extension, FOR: for FORTRAN programs using the FOR extension, and so on. The *command* is the command required to begin the program

associated with the defined file extension. You can include a path to the command, if necessary. The !.! parameter means that the command is to be followed by a file name with an extension, causing WordPerfect to load the selected file into the program for editing.

To tell Commander to use the command WP from the WP51 directory to edit a file with a WP extension, for example, use one of the following specifications:

```
WP: C:\WP51\WP !.!

WP: C:\WP51\WP !.WP
```

The !.! specification is part of Norton Commander's extension definition, similar to DOS's *.* wild-card specification. In the preceding example, you can use !.WP or !.! because both keep the extension WP in the file specification.

Table 30.12 describes !.! and related specifications.

Table 30.12 Specifications Used in the Extension Definition

Specification	Meaning
!.!	File name with extension
!	File name without extension
!:	Drive letter, followed by a colon
!\	Path name

You must choose the specification in the command line according to what the program expects in order for the selected file to be accessed. Thus, the specification ! indicates that the file name is to be placed in the command line without an extension, and the specification !:!.! means that the drive name and a colon appear before the file name and extension. If you do not place a !.! or ! specification in the extension-definition line, Commander begins the program but does not access the selected file automatically.

Suppose that you define the following specification:

```
CAI: \CAI\CAI !:!\!
```

If you later choose the file DEMO.CAI, the command generated contains the current drive (!:), the current path name (!\), and the file name without the extension (!). Therefore, if you are in the C:\TMP directory when you choose this file, the DOS command used to start the program is \CAI\CAI C:\TMP\DEMO.

Figure 30.27 shows an extension file containing a variety of definitions. The first definition is for WordPerfect. The second definition specifies that an editor named Edit be used to edit files with FOR (FORTRAN) extensions. The third definition begins the CAI program (PC-CAI, a computer-aided instructional program).

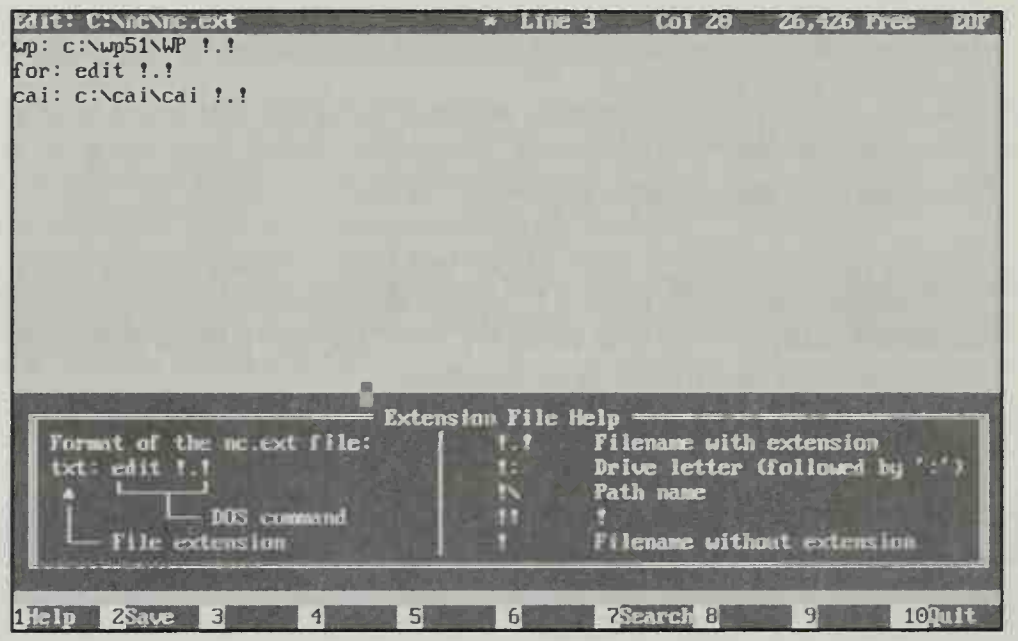

Fig. 30.27
Extension specifications.

After you enter your extension definitions, save them by pressing F2 (Save). End the editor by pressing F10 (Quit). To abandon the edit without saving, press Esc or F10 without first pressing F2.

You can then choose a file from a Commander panel and begin using that file in the proper program. To return to the extension file (\NC\NC.EXT) to change, add, or remove any of your definitions, choose Extension File Edit from the Commands menu again.

Performing Advanced Norton Commander Operations

The Norton Commander commands covered in the preceding sections are straightforward commands you can use without any advanced computer knowledge. Although the topics in the following sections require more knowledge about how a computer works, they also introduce you to some of the more exciting features of Norton Commander. You learn how to use menus to customize your computer so that it works the way

you think it should work. You also discover how to use Commander Mail to send messages by electronic mail (e-mail) and how to use Commander Link to transfer information quickly from one computer to another.

Creating and Using Menus in Commander

Not all computer users have the same programs. You may use WordPerfect, Microsoft Excel, and dBASE IV, for example; another person may use PC-FILE, PROCOMM, Kwikstat, and 10 other programs. To begin any of these programs on your computer, you may need to enter several commands. For example, you may have to change to a different directory and run a preliminary setup program before you run the actual program.

If you use your computer infrequently or have many different directories and programs, you may forget the command sequences for all your programs. You may wish that you had a menu of programs so that you could choose a program and automatically issue all necessary commands to begin the program. Norton Commander's user menus make this procedure possible.

Like a dialog box, a user menu displays options on-screen. A series of commands (usually DOS commands) is associated with each option in a user menu. After you choose a user-menu option, Commander acts like a DOS batch file, issuing these commands in sequence as though you had entered them from the DOS prompt.

Two kinds of user menus are available: *main* and *local*. You use the same commands to create both menus. The primary physical differences between main and local menus are the directories in which the menus are stored. The main menu is stored in the NC directory; local menus are stored in other directories. The primary functional difference between main and local menus is that local menus usually contain options that deal with programs in one directory, whereas main menus usually contain selections that pertain to programs in several different directories.

You activate a user menu by pressing F2 while the Commander program is running and the DOS prompt is on-screen. If a local menu is located in the current directory, that menu appears. If no local menu exists, Commander accesses the main menu from the NC directory. If no menu is available in either place, you get an error message after you press F2.

Thus, the first (and perhaps the only) menu you usually need to create is the one in the NC directory: the main menu. If the main menu is the only user menu, you can access it whenever you press F2. If you want different menus in other subdirectories, however, you need to create local menus. (You can have local menus without having a main menu.)

You may want to have a local menu in a subdirectory that contains several programs you want to access. In your accounting directory, for example, you may want a menu of options for running programs that do posting, end-of-month runs, trial balances, and so on, but you do not want all these options cluttering up the main menu. You can create user menus in such a way that when you choose the broad topic Accounting from the main menu, a local menu containing the detailed accounting choices appears.

Alternatively, because many people may use one computer, you may want to create different menus that start programs. You can create one batch file that causes WordPerfect to load with a particular data-file directory, for example, and another batch file that causes 1-2-3 to open a particular spreadsheet.

Creating User Menus

You create a user menu in Norton Commander by choosing **M**enu File Edit from the Commands menu. You then enter lines of information in a file to tell Commander which selections you want to display in the menu and what should happen when a user chooses any of those menu items.

You can place four basic kinds of lines in the menu file:

- *Comment lines* begin with an apostrophe ('). These lines do not influence how the menu looks or functions. Comment lines are optional and are provided only so that you can document a menu file's function. Comments are helpful to other users who may have to change the file in the future, (and may be helpful to you if you have to return to the file a year later).

- *Menu items* begin with a hot key, followed by a colon (:). To create a menu item called Begin WordPerfect that a user can choose by pressing W, enter this command in the menu file:

  W: Begin WordPerfect

  The W (the hot key) must be in the far-left column of the file (flush left). If you enter a line flush left (any line without a letter and a colon or without an apostrophe that is flush left), that line becomes a menu item without a hot key.

- *DOS commands* or other commands are listed in the lines following a menu item. These commands must not be flush left. To indent these commands, place a tab or one or more blank spaces in front of the text.
- *Blank line separators* should be inserted after each menu item. To create a blank line, press Enter.

To create a typical user menu, follow these steps:

1. Choose **M**enu File Edit from the Commands menu. The User Menu dialog box appears (see fig. 30.28).

Fig. 30.28
The User Menu dialog box.

2. The options in this dialog box enable you to create a main menu, create a local menu, or cancel the command. For this example, choose **M**ain. The User Menu edit screen appears (see fig. 30.29).

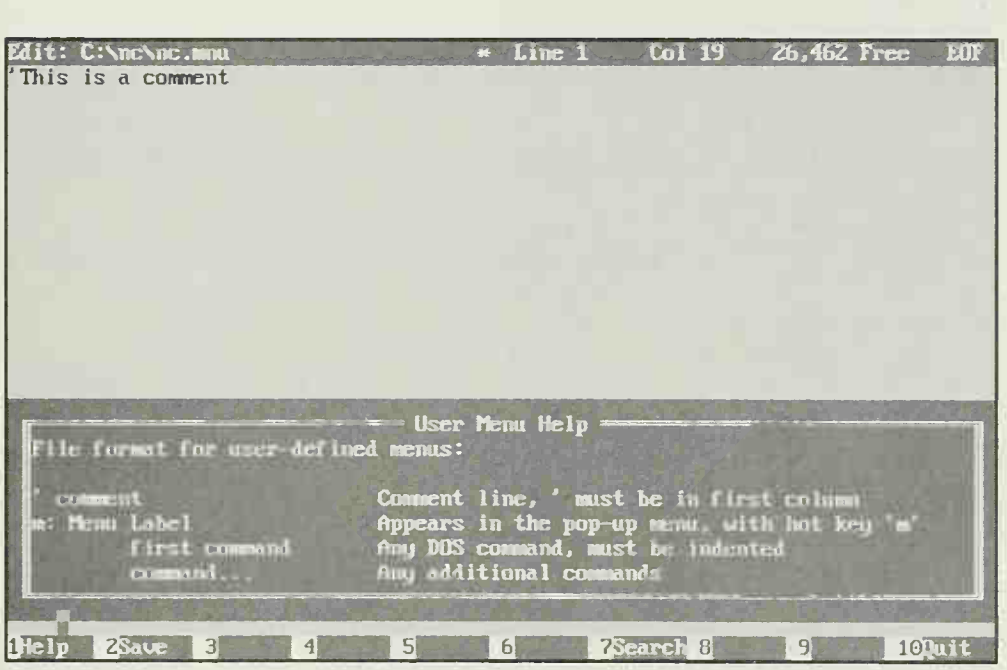

Fig. 30.29
The User Menu edit screen.

This screen is a version of the Commander editor (discussed earlier in this chapter). The file named NC.MNU in the NC directory is displayed and ready for you to edit. (If you choose to edit a local menu in another directory, the edit screen displays the NC.MNU file for you to edit in the specified directory.)

Notice the help box at the bottom of the edit screen in figure 30.29. This screen summarizes the file format for creating a user menu.

3. In the menu file, enter lines that define your user menu. For example, the lines associated with beginning the WordPerfect program are these:

```
W: Begin WordPerfect
     NCD \WP51
     WP
```

Notice in this example (and in fig. 30.30) that the menu-item line—`W: Begin WordPerfect`—is flush left in the file and that the other lines are indented.

Figure 30.30 shows an example of information entered in the editor to create a menu with three options. Each option consists of a letter and a colon, a brief description, and some DOS commands that invoke the appropriate program. The PROCOMM program, for example, begins with two commands. First, the NCD \PROCOMM command changes to the \PROCOMM directory, and then the PROCOMM command begins the PROCOMM program.

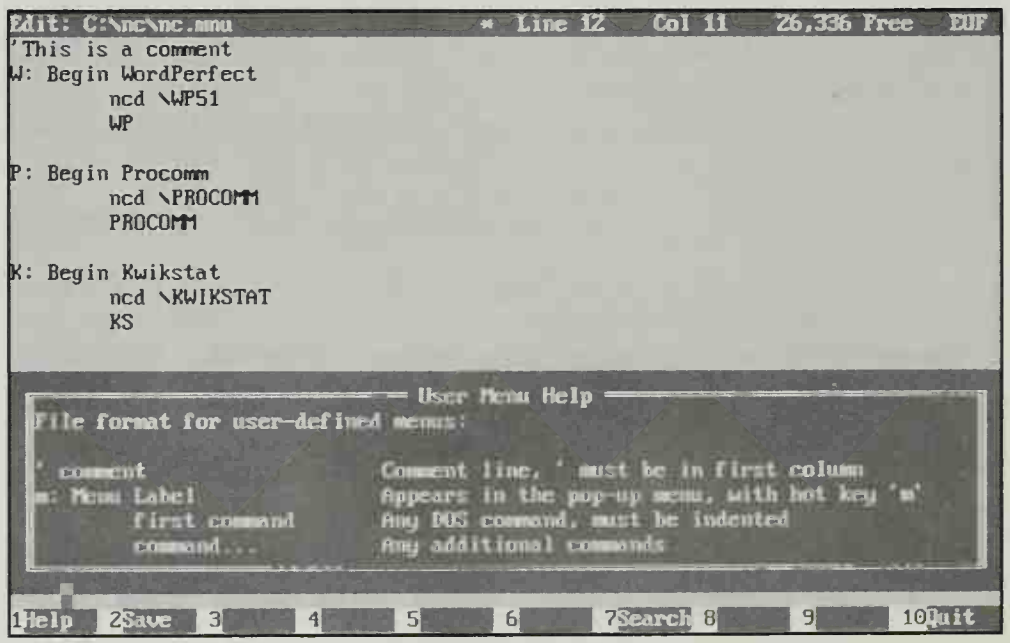

Fig. 30.30

Menu entries in the User Menu edit screen.

4. Save the menu file by pressing F2 (Save).
5. Quit the menu editor by pressing F10 (Quit).

Invoking User Menus

After you create a menu, you can open it by pressing F2 (Menu) in the Norton Commander screen. Remember that if a local menu exists in the current directory, Commander opens that menu. If no local menu exists, Commander opens the main menu located in the NC directory.

Figure 30.31 shows how the menu created in figure 30.30 looks onscreen.

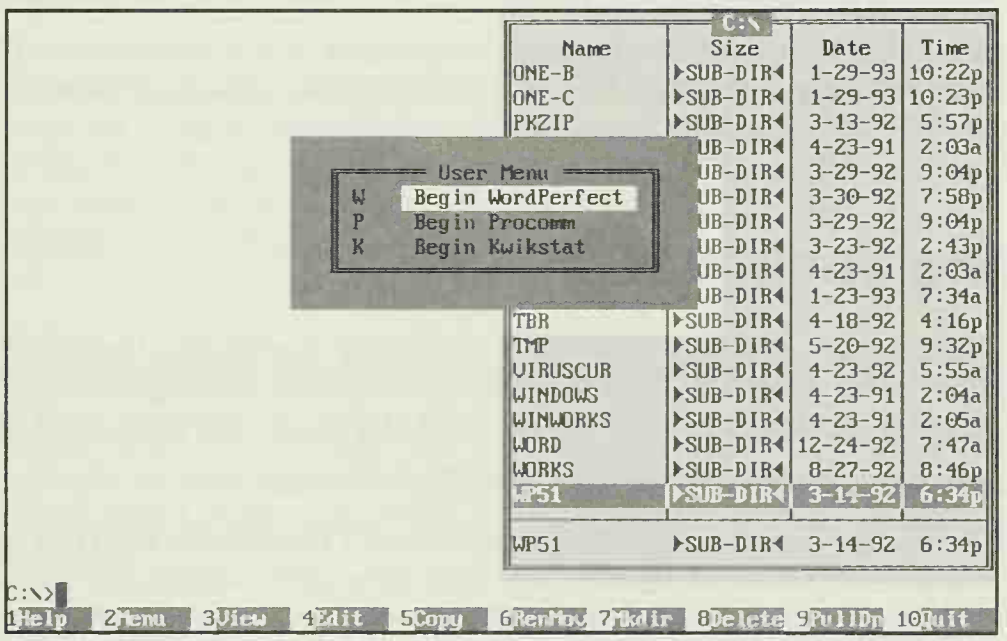

Fig. 30.31
The menu in use.

To exit the user menu without choosing an option, press Esc.

Automating Menus

If you are taking advantage of Commander's menu capabilities, you may want to set up the program to display your user menu whenever you start Commander. You could create a series of menus, for example, to help a novice use a variety of programs without issuing a DOS command.

You can automate the user menu system by choosing Auto Menus from the Options menu. When Auto Menus is turned on, the local or main menu (whichever is appropriate to the current directory) opens whenever you begin Commander. Keep in mind, however, that after you end the menu by pressing Esc or choosing some other menu option, the user menu disappears. You must press F2 to redisplay the menu.

You can design local menus so that they always come back to the main menu, however. You could use the following commands, for example, in the main menu to begin WordPerfect:

```
W: Begin WordPerfect
     NCD \WP51
     WP
     NCD \NC
```

The first line tells the program that the W hot key is associated with the menu item `Begin WordPerfect`. The second line begins the commands that execute if a user chooses this option from the menu. In the preceding example, the second line changes to the \WP51 directory, which contains the WordPerfect program. The third line begins the WordPerfect program, and the fourth line changes back to the \NC directory so that the main menu again appears. Thus, after you exit WordPerfect, the command NCD \NC is issued automatically, bringing you back to the \NC directory and the main menu.

Using Commander Mail

The Commander menu and extension features enable you to access information in your computer. Commander Mail enables you to send and receive information through the MCI electronic network, MCI Mail.

You can perform the following tasks with MCI Mail:

- *Send and receive electronic mail (e-mail).* Electronic mail is a message that is sent electronically from one user's computer to one or more other computers. You write a message on your computer and send the message to someone who has an MCI account. You can also send ASCII text files as e-mail. The message is routed electronically to the specified address (the recipient's computer).
- *Send a letter through Commander Mail to MCI Mail and have that letter printed and mailed to a designated address.* You write the letter on your computer and then send the letter and the recipient's address to the MCI network. MCI prints and mails the letter.
- *Send information to a fax machine through MCI Mail.* You create a letter on your computer and then send the letter and the recipient's fax number to the MCI network. MCI sends the letter to the appropriate fax machine.
- *Send messages through other services.* This feature is useful if you want to send electronic mail to someone who is not an MCI subscriber but does subscribe to a service such as CompuServe or Telemail X.400.

MCI Mail is a convenient way to communicate quickly and is particularly well suited for members of an organization or for colleagues who live in diverse places. Messages can be sent at the sender's convenience and read at the recipient's convenience. Electronic mail messages also arrive much faster than express mail and have the clarity of a letter as opposed to the possible misinterpretations that characterize voice messages. Using MCI Mail, salespeople can send orders to the home office at the end of each day, and journalists can send messages and stories to their offices quickly. The possibilities for improved communication are endless.

Using Commander's MCI interface rather than MCI's interface (which you can use if you dial MCI) means that you do not have to use a communications program (such as PROCOMM or Crosstalk). You can do all the work of preparing and reading communications off-line (which reduces actual connection time). You also have the benefit of Commander's simple pull-down user interface.

Reviewing the Requirements for Using MCI Mail

To use MCI Mail, you need an MCI account and some computer hardware. To get an MCI account, call (800) 444-6245. MCI assigns you a user name and a password, which you will receive by mail within several days.

You also need to have a modem hooked up to your computer. Generally, personal computers use either internal or external modems. An *internal modem* fits inside your computer in one of the expansion slots. An *external modem* is connected to a communication port on your computer by a serial cable.

If your computer has an internal modem, all you see from the outside are phone jacks on the back of the computer. One of these jacks is labeled To Line. To hook your modem into the phone system, you must run a phone line from the To Line jack in the back of the computer to the phone wall jack. Usually, another jack in the back of the computer is called To Phone. You can use this jack to hook up a normal telephone. Figure 30.32 illustrates the proper hookup.

An external modem is hooked into your computer through a serial port—normally, the COM1 or COM2 port. Your COM port usually is a 25-pin (RS-232) connector. IBM AT-type machines use a 9-pin connector. Figure 30.33 shows both kinds of connectors.

A cable connects the modem to the COM port on the back of the computer. A phone line is then hooked into the modem (in the To Line jack) from the phone wall plug. Optionally, you can have a regular phone hooked into the modem's To Phone jack. Figure 30.34 shows this hookup.

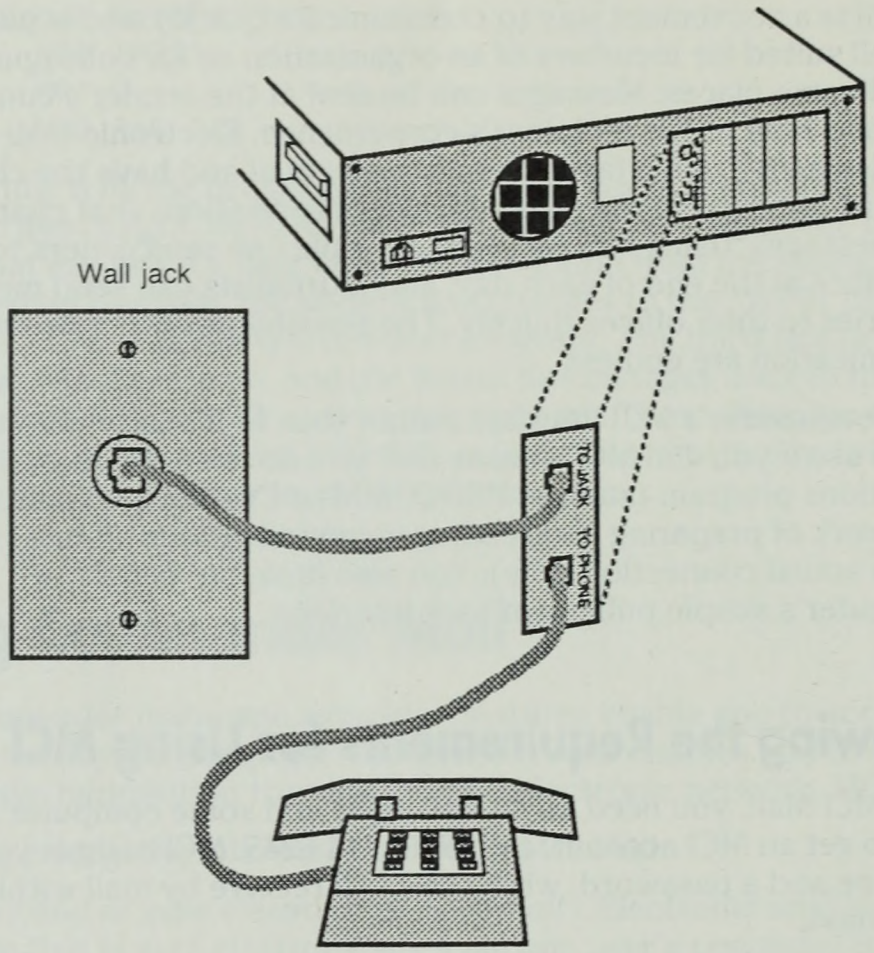

Fig. 30.32
Hooking up an internal modem.

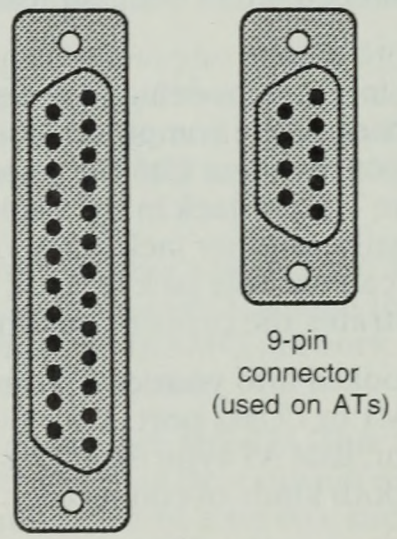

Fig. 30.33
25-pin and 9-pin serial connectors.

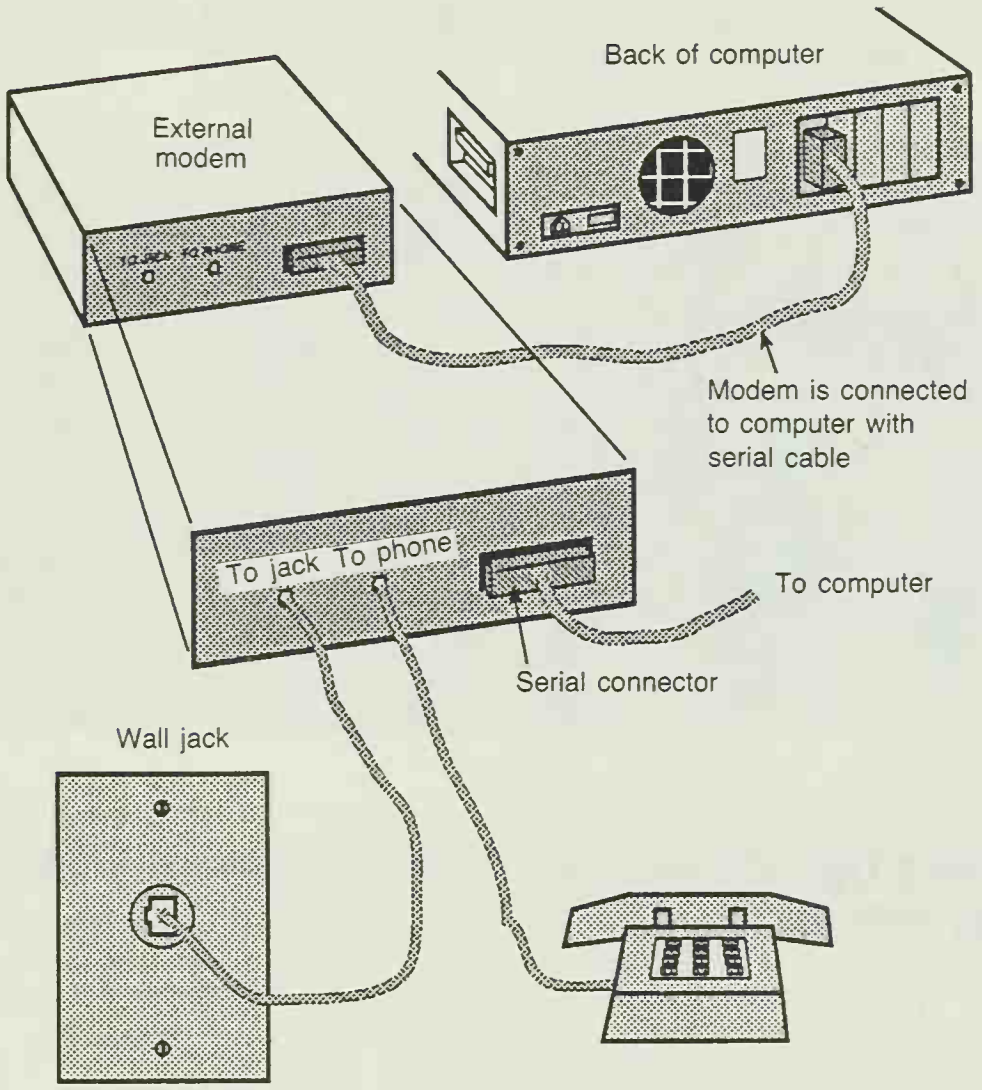

Fig. 30.34
Hooking up an external modem.

MCI supports modems that operate at speeds of 300, 1200, and 2400 baud. The *baud rate* is the speed at which your computer modem transmits and receives information. Although a baud rate of 300 is very slow, 1200 and 2400 baud are acceptable. Speeds of up to 9600 baud are quite common.

The advantage of using an internal modem is that it does not need a communication port, which you may want to use for something else. Using an internal modem makes changing from computer to computer difficult, however, because you have to take your computer apart to remove the modem. An external modem has an important advantage: you can use it with more than one computer simply by unplugging the modem from one computer and plugging it into another. The disadvantage of using an external modem is that it takes up room on your desk. Other than these convenience considerations, the internal and external modems operate the same way.

As soon as your computer is set up with a modem and you have an MCI account, you can start sending and receiving messages.

T I P If you do not have a modem, look for one with a fast baud rate. The faster the modem, the faster you can send and receive messages over phone lines; and the quicker the communication, the shorter the phone call. Because services like MCI charge you by actual connection time, shorter connection time usually saves you money. Probably the most commonly used modems today are 2400 baud. If you are on a tight budget, however, you can buy a 1200-baud modem for less than $100. Using a slow 300-baud modem is not a good idea.

You also need a *Hayes-compatible* modem. Modems operate through a command language in much the same way that a PC DOS computer operates through DOS commands. Hayes-compatible modems operate on the AT command set, which Norton Commander is set up to use.

Setting Up Commander Mail To Communicate with MCI Mail

To set up Commander Mail, choose Commander Mail from the Commands menu. The first time you choose this command, you see a screen like the one shown in figure 30.35.

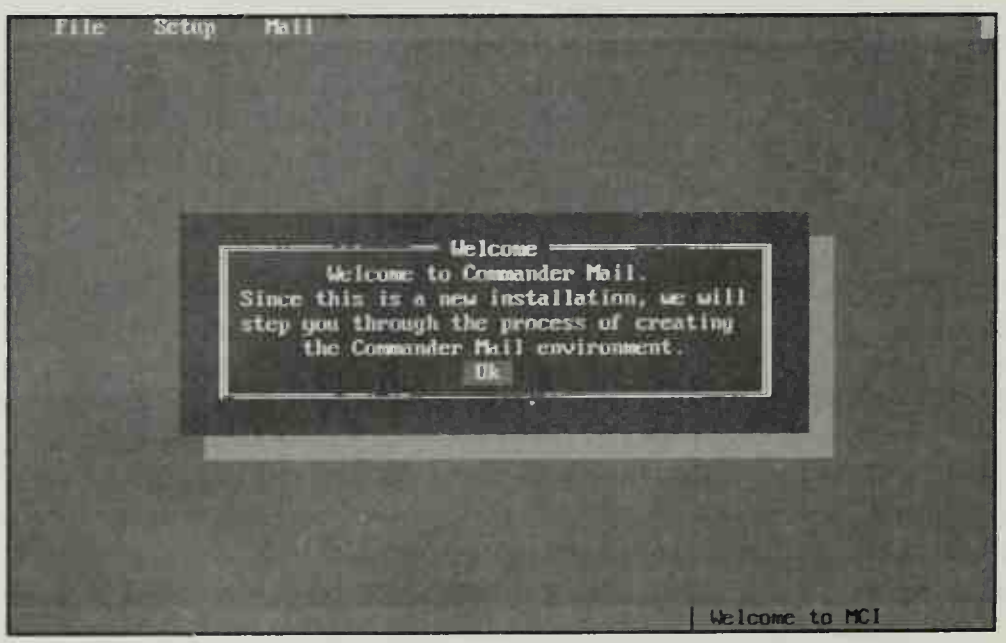

Fig. 30.35
The Commander Mail setup message.

This screen tells you that you must go through a setup procedure before you can use Commander Mail. You need to have your MCI account information handy. If you do not want to set up Commander Mail (for example, if you do not have your account number yet), press Esc. Otherwise, press Enter to proceed with the setup.

Adding, Deleting, and Modifying Accounts

If you proceed with the Commander Mail setup, the Account 1 dialog box appears when you press Enter (see fig. 30.36).

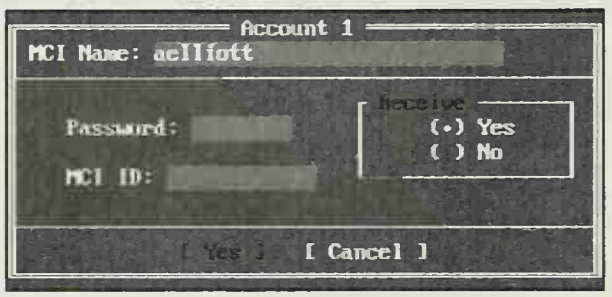

Fig. 30.36
The Account 1 dialog box.

In this box, you enter information about your MCI account. First enter your MCI account name (often, the first letter of your first name, followed by your full last name). No spaces are included in the MCI account name. Then enter your password and MCI ID number, both of which you will find in the Welcome to MCI Mail kit that you receive in the mail after you subscribe.

After you enter your account information, indicate whether you want to receive mail. In the Receive area of the dialog box, choose Yes if you want to be able to send *and* receive MCI electronic mail; choose No if you do not want to receive mail and you plan to use MCI Mail only to send information. Then choose Yes at the bottom of the dialog box to confirm the information for this account. The MCI Account List dialog box appears.

If more than one person with an MCI account will be using Commander Mail on this machine, you can add additional accounts by choosing the Add option. (If you choose Add, an Account 2 dialog box appears, showing basically the same dialog box as for Account 1.) If you need to change or remove one of the accounts after you enter it, highlight the account and choose Modify (to make changes) or Delete (to remove the account). When you finish making additions, modifications, or deletions, choose Ok to save the list.

After you choose Ok, the MCI Account List dialog box appears again (see fig. 30.37), this time displaying information about your account.

Fig. 30.37
The completed MCI Account List dialog box.

Highlight your MCI name and choose Use to tell Commander Mail to charge your account for the messages you send. Commander will charge this account every time you use MCI Mail unless you add another account to the account list.

Specifying Directories for Message Storage

After you choose OK from the MCI Account List dialog box, a Directories dialog box appears, indicating the directories where MCI messages will be stored (see fig. 30.38).

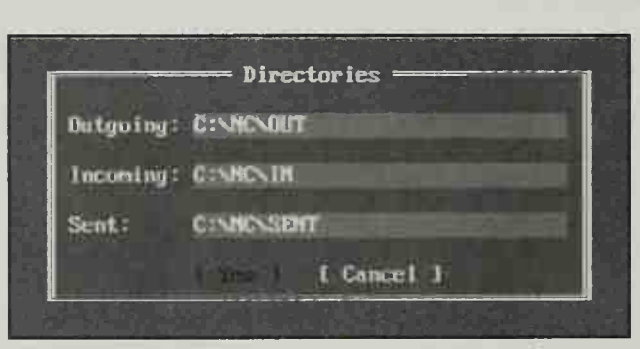

Fig. 30.38
The Directories dialog box.

The default directories are \NC\OUT, \NC\IN, and \NC\SENT. The OUT directory stores outgoing mail, the IN directory stores incoming mail, and the SENT directory stores copies of messages you have sent. You can type new names for these directories or accept the defaults. To enter new names, highlight the directory you want to change, type a new directory name, and press Enter. When the directory names are the way you want them, choose Yes.

Specifying Your Modem Setup

Next, you must tell Commander Mail about your modem setup. Figure 30.39 shows the Modem dialog box, which appears when you choose Yes in the Directories dialog box.

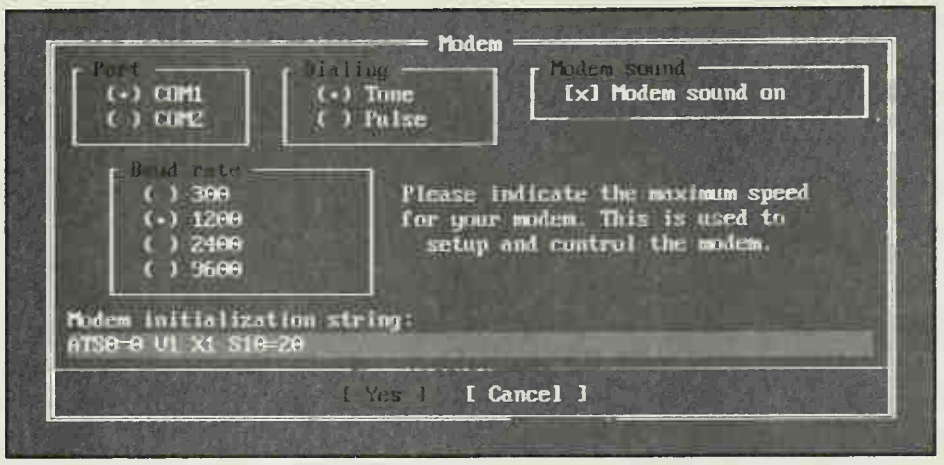

Fig. 30.39
The Modem dialog box.

The Port setting indicates the serial port to which your modem is connected. If you have only one serial port on your machine, you probably are using COM1. If you have two serial ports, you need to check your system's documentation to determine which port you are using. Usually, the COM1 port is any built-in port on your computer, and the COM2 port is a port added with an expansion card.

The Dialing setting indicates whether your telephone exchange uses tone or pulse dialing. Some older exchanges use only pulse dialing. If you must use a rotary-dial telephone, your exchange supports only pulse dialing. If you can use a touch-tone phone, your exchange supports tone dialing. (To find out whether your exchange supports tone dialing, call your telephone company.)

The Modem Sound setting determines whether you hear the dialing process when your modem tries to make a connection. (If your modem does not have a speaker, you will not hear the dialing even if you choose this option.) The advantage of hearing the dialing process is that you can tell whether the call is going through properly—for example, you can hear busy signals. If you have a speaker modem but do not hear the dialing taking place, you may have selected the wrong COM port. Wait for a message from the computer. Usually, this message appears within 30 seconds.

The Baud Rate setting indicates the speed at which you want your modem to operate. For the fastest communication, choose the highest baud rate your modem can support. (Check your modem documentation for the highest baud rate.)

The Modem Initialization String field appears at the bottom of the Modem dialog box. The *modem initialization string* is a code that Commander Mail uses for a modem. The code shown in figure 30.39 is for a Hayes-compatible modem, which is the most common type of modem. If you are using a Hayes-compatible modem, you do not have to know

which initialization string to use; Commander Mail automatically supplies the necessary code. If you are using a non-Hayes-compatible modem, you need to check your documentation for the proper initialization string.

After you choose the appropriate options in the Modem dialog box, choose Yes to save the settings.

Specifying the Phone Number

The next setup dialog box asks for the phone number you will be using to communicate with MCI Mail (see fig. 30.40).

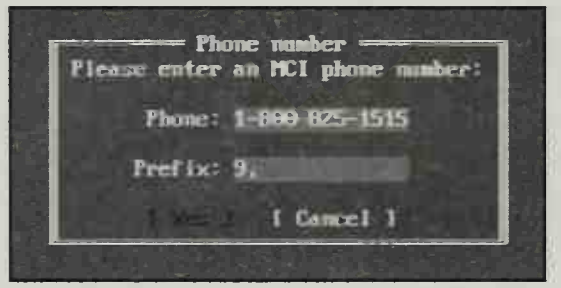

Fig. 30.40
The Phone Number dialog box.

Your Welcome to MCI Mail kit contains the phone numbers you can use:

- (800) 234-6245 for 300- and 1200-baud modems
- (800) 456-6245 for modems up to 2400 baud
- (800) 967-9600 for 9600-baud modems

Type the appropriate number in the Phone Number dialog box.

The Prefix entry is any number or series of numbers that you must type to get an outside line. In many businesses, this prefix is 9. After you enter the phone number and any necessary prefix, choose Yes to save this information.

At this point, the Commander Mail setup program begins creating the directories you specified in the Directories dialog box. A New Directory dialog box appears in sequence for each of the three new directories: IN, OUT, and SENT (or for another three directories, if you changed the default names).

Figure 30.41 shows the New Directory dialog box that asks whether you want Commander to create the \NC\IN directory.

Fig. 30.41
Creating the \NC\IN directory during setup.

Choose Mkdir to create these directories on your hard disk or Cancel to cancel the operation. If you cancel the creation of a directory, you return to the DOS prompt. Later, if you try to run MCI Mail, you will be prompted again to make the necessary directories. You cannot run MCI Mail until these directories exist.

After you create the directories, you have reached the end of the setup procedure. A dialog box appears, displaying the following message:

```
Commander Mail has now created the parameter file,
MCI.INI, required to run the communications driver,
MCIDRIVR.EXE.
```

This message tells you that the settings you chose during the setup procedure are stored in the file MCI.INI and that you can begin using MCI Mail.

After you set up your system to support MCI Mail, a screen like the one shown in figure 30.42 appears when you choose Commander Mail from the Commands menu.

Fig. 30.42
The In Box screen.

The In Box screen displays any messages that you have received. The first time you use Commander Mail, no messages appear in this screen.

Customizing Commander Mail

The menu bar at the top of the In Box screen lists three pull-down menus: File, Setup, and Mail. The File menu contains three options: Help, About MCI, and Quit. The Help option (which you can activate by pressing F1) provides information about how to use Commander Mail. The About MCI option lists the phone numbers for MCI phone support and the MCI support mailbox. The Quit option ends your Commander Mail session.

The Setup menu contains six options—Address Book, MCI Accounts, Schedule, Phone, Modem, and Directories—that enable you to customize Commander Mail. The following sections discuss these options in detail. The Mail menu is described in the section "Managing Messages" later in this chapter.

Entering and Editing Addresses

The Address Book option enables you to create a list of addresses of people to whom you plan to send messages. After you choose this option, the MCI Address Book dialog box appears.

Figure 30.43 shows an Address Book dialog box that contains only one address.

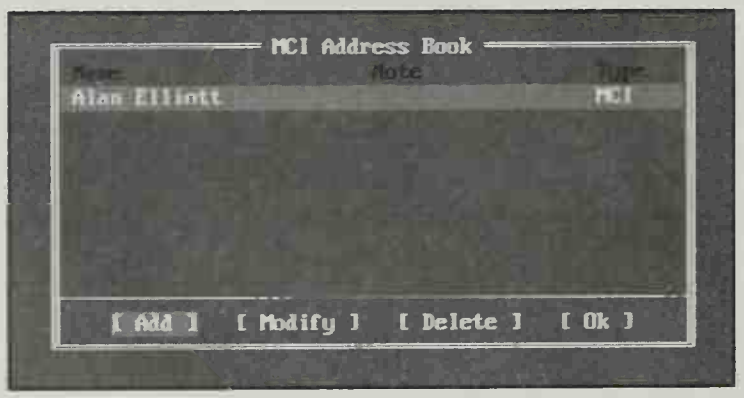

Fig. 30.43
The MCI Address Book dialog box.

At the bottom of the box are command buttons for the following four options:

Option	Description
Add	Adds a name to the address book
Modify	Changes the highlighted address
Delete	Deletes the highlighted address
OK	Exits the Address Book dialog box and returns to the Setup menu

When you choose Add, the Address Type dialog box appears (see fig. 30.44).

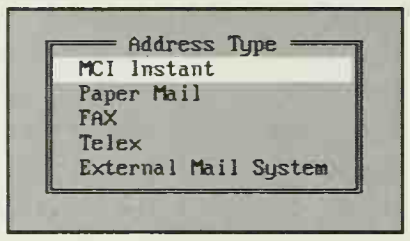

Fig. 30.44
The Address Type dialog box.

In this dialog box, you specify how you want to send messages to the address that you are adding. You have five options:

MCI Instant
Paper Mail
FAX
Telex
External Mail System

If you will be sending messages to the same person but using different methods each time (MCI or a fax, for example), you must enter a separate address for each way that you want to send messages.

To choose an option in the Address Type dialog box, highlight the option and press Enter or click the option. If you choose MCI Instant, the MCI Subscriber Address dialog box appears (see fig. 30.45).

In this box, you enter the information about the MCI account to which the message will be sent. You must know the MCI user name or the MCI account number for this address. (If you know one but are unsure about the other, enter the one you know.) The information that you enter in the Name, Note, Location, and Organization fields appears in the electronic messages you send. As you move the cursor in this dialog box, a highlighted area next to each part of the address indicates how many characters you can enter.

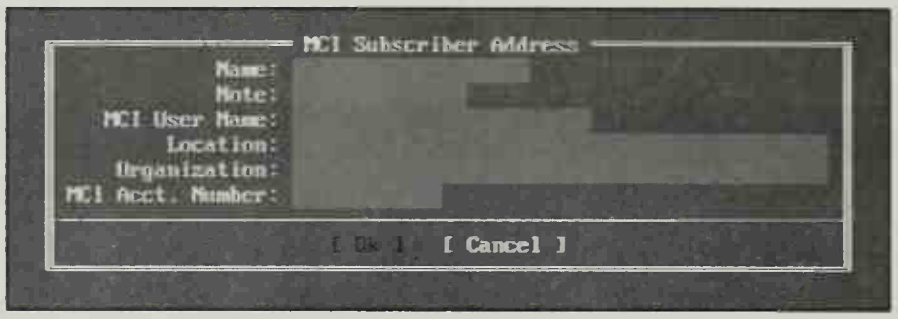

Fig. 30.45

The MCI Subscriber Address dialog box.

After you enter information in the Name field, press Enter to move to the next field. (You also can use the arrow keys to move from field to field.)

If your message recipient does not have an MCI account, you can choose Paper Mail in the Address Type dialog box. You may want to use MCI Paper Mail rather than send the letter yourself for several reasons. You may like the important-looking, telegramlike style of MCI letters. You may find this method easier than writing and printing a letter. And if you are away from your office, you may want to write and send letters directly from your computer—from a hotel room, a conference room, or wherever you can plug your computer into a phone jack.

When you choose the Paper Mail option, you see a dialog box similar to that shown in figure 30.45, but with a different list of fields:

Name
Note
Country
Title/Company
Addr.Line1
Addr.Line2
City
State
ZipCode

Type the necessary information in each field. The information that you enter is used to address the letter that MCI sends by regular mail. You must make entries in the Name and Addr.Line1 fields; entries in the Note, Addr.Line2, and Title/Company fields are optional. You can place any identifying information that you want in the Note Field, or leave it blank. When you finish entering the information, choose Ok.

If you want to send your messages to a fax machine, you can choose the FAX option in the Address Type dialog box. When you choose this option, you see a dialog box similar to the one in figure 30.45, but with a different list of fields:

Name
Note
Phone #
Retry

You must make entries in the Name and Phone # fields; entries in the Note and Retry fields are optional. In the Retry field, you can enter the number of hours that MCI should keep trying to send the message if it cannot get through. The default setting is 4 hours; you can enter a number between 0.5 and 12. If you cannot reach the fax number (the line may be busy, for example), MCI continues to try to send the fax for the length of time specified in the Retry field.

After MCI has sent the fax or has exhausted all attempts (for example, if the specified retry time has expired), you receive an e-mail message from MCI, telling you whether the message was sent.

If you want to send a message to a telex address, choose Telex in the Address Type dialog box. You see a dialog box similar to the one in figure 30.45, but with a different list of fields:

Name
Note
Country
Telex Number
Answerback

You must make entries in the Name and Telex Number fields; entries in the Note, Country, and Answerback fields are optional. If you leave the Country field blank, Commander Mail uses USA as the default. Do not use the Answerback field unless you know your recipient's answerback code. (*Answerback* is a verification code that some telex subscribers use as a safety feature.)

NOTE You also can receive telex messages through MCI Mail. Your telex number is 650 plus your MCI ID number. If your MCI ID is 123-4567, for example, your telex number is 6501234567. Messages sent by telex appear in your MCI Commander Mail In Box as electronic messages.

To send a message to a person who uses an e-mail service other than MCI, you must choose External Mail System in the Address Type dialog box. You see a dialog box similar to the one in figure 30.45, but with a different list of fields:

Name
Note
Mailsystem
MBX Info 1
MBX Info 2
MBX Info 3

You must make entries in the Name, Mailsystem, and MBX Info 1 fields; entries in the Note, MBX Info 2, and MBX Info 3 fields are optional. The Mailsystem field contains the name of the e-mail service, such as CompuServe. (Norton Commander currently does not support e-mail services other than MCI Mail and CompuServe.) The MBX Info 1 field contains the ID number for that service (for example, CompuServe ID number 12345,789). The MBX Info 2 and 3 fields are reserved for future use, because MCI periodically adds new services. Your correspondence from MCI will explain any future uses for these fields.

After you add addresses, they appear in the MCI Address Book dialog box whenever you create a message. You then can highlight the address to which you want to send the message.

Eventually, you will probably need to modify or delete some addresses. To modify an address, choose Address Book from the Setup menu. When the MCI Address Book dialog box appears (refer to fig. 30.43), highlight the address that you want to change, and then choose the Modify option. The address appears. Make the necessary corrections in the address and then choose Ok to save the changes.

To delete an address, choose the Address Book option from the Setup menu. When the MCI Address Book dialog box appears, highlight the address that you want to delete, and then choose the Delete option. Choose Ok to save the change.

Specifying MCI Accounts

The MCI Accounts option in the Setup menu enables you to choose which account should be charged when you send messages. You can add new accounts, modify current accounts, or delete accounts by following the procedure you used to add your first account. See the section "Adding, Deleting, and Modifying Accounts" earlier in the chapter.

To modify an account after you complete the initial setup, choose MCI Accounts from the Setup menu. The MCI Account List dialog box appears (refer to fig. 30.37). You can highlight the account that you want to change, and then choose Modify. Commander Mail displays the information on-screen so that you can edit it. Choose Ok to save the modified account list. Choose Cancel to exit the list without saving your changes.

Deleting an existing account is similar to modifying one. To delete an account, choose the MCI Accounts option from the Setup menu. When the MCI Account List dialog box appears, highlight the account that you want to delete, and then choose Delete. Choose Ok.

Setting Up Commander Mail To Run Automatically

The Schedule option in the Setup menu enables you to specify when (and whether) Commander Mail automatically calls MCI. You can set up Commander Mail to send and receive messages unattended during the night, for example, when rates are lower. Any messages that you receive overnight appear on your computer the next day.

Suppose that you have salespeople who send in orders daily. You can set up Commander Mail to call MCI several times during the day to collect messages and to send your salespeople confirmation that their orders were received.

After you choose the Schedule option, the Schedule dialog box appears (see fig. 30.46).

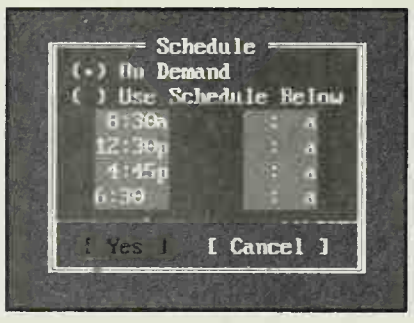

Fig. 30.46
The Schedule dialog box.

In this dialog box, you have two choices: On Demand and Use Schedule Below. The On Demand option means that you choose when to contact MCI Mail. If you choose the Use Schedule Below option, MCI Mail initiates calls at specified times. You can type up to eight times in the dialog box. When you finish, choose Yes to close the Schedule box and return to the Setup menu.

For Commander Mail to operate in automatic mode, you must begin the MCIDRIVR program from the DOS prompt. After you set up the times in the Schedule dialog box for Commander to call MCI Mail, load the MCIDRIVR program by entering the following command at the DOS prompt:

```
MCIDRIVR
```

After you enter this command, the Commander Mail program becomes a background program, and you return to the DOS prompt, from which you can run other programs. Even if you are using another program at the time, Commander Mail initiates a call at the scheduled times, sends all messages that are in your Out Box, and receives any messages that are waiting for you.

When you enter the MCIDRIVR command at the DOS prompt, you can include several switches that control various features of this program. Table 30.13 lists the switches available for the MCIDRIVR command.

Table 30.13 Switches for the MCIDRIVR Command

Switch	Description
/A	Aborts the current communications session.
/D	Leaves MCIDRIVR in memory but temporarily disables it.
/E	Activates the driver. (You use this switch if the MCIDRIVR program is in memory but disabled.)
/N	Initiates a session. The program immediately dials the MCI phone number and then sends and receives messages. The command MCIDRIVR/N, for example, begins an MCI session immediately, even at a time not specified in the Schedule dialog box.
/S	Sets DOS errorlevel to 0 if the driver is waiting for a scheduled event, or sets errorlevel to 1 if the driver is participating in a communications session. (You also can use this switch in a batch program. For more information, see Chapter 24.)
/X	Exits the current session and removes the driver from memory.

Changing the MCI Phone Number

The Phone option in the Setup menu enables you to change the phone number and prefix that you use to call MCI Mail. (MCI will contact you if the number you use to access MCI services changes.)

The Phone Number dialog box appears when you choose the Phone option. This dialog box is the same one you used during the setup procedure to specify the MCI phone number (refer to fig. 30.40).

Changing Modem Settings

The Modem option in the Setup menu enables you to change the settings for your modem, which you may need to do if you install a different modem. (Your new modem may run at a different speed from that of your original modem, for example.) The modem settings include communications port, tone or pulse dialing, modem sound, baud rate, and initialization string.

The Modem dialog box appears when you choose the Modem option. This dialog box is the same one you used during the setup procedure to specify modem settings (refer to fig. 30.39).

Changing Message Directories

The Directories option in the Setup menu enables you to change the names of the directories that you use to store outgoing messages, incoming messages, and delivered messages. Remember that these directories usually are listed as \NC\OUT, \NC\IN, and \NC\SENT during the setup procedure. You may want to change directories, for example, from drive C to another disk if drive C is getting full and cannot store all the messages you are receiving.

The Directories dialog box appears when you choose the Directories option. This dialog box is the same one you used during the setup procedure to specify directories (refer to fig. 30.38).

Managing Messages

You use the Mail menu in the Commander Mail menu bar to manage your incoming and outgoing messages (see fig. 30.47).

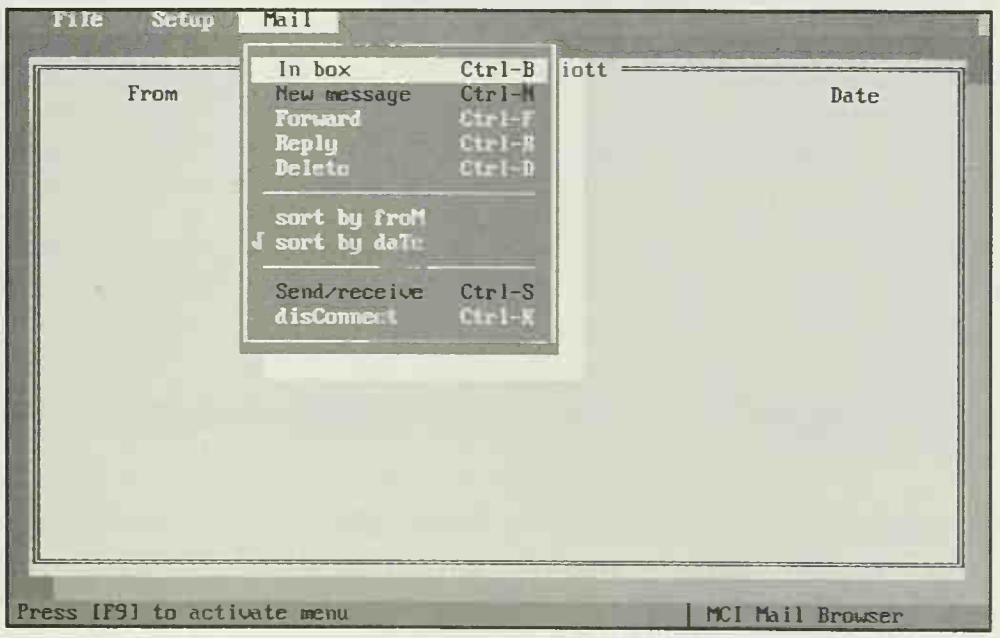

Fig. 30.47
Commander Mail's Mail menu.

The four basic tasks that you perform from this menu are creating, sending, receiving, and reading messages.

To mail an electronic message, you use these steps:

1. Choose New Message from the Mail menu.
2. Select the destination of your message in the MCI Address Book dialog box.
3. Write the message, using the Commander editor, and save it to disk.
4. Send the message by choosing Send/Receive from the Mail menu.

This general procedure is the one you probably will use most of the time. The following sections discuss how to use the options in the Mail menu to manage your incoming and outgoing messages.

Creating Messages

After you choose New Message from the Mail menu, you see a screen similar to the one shown in figure 30.48.

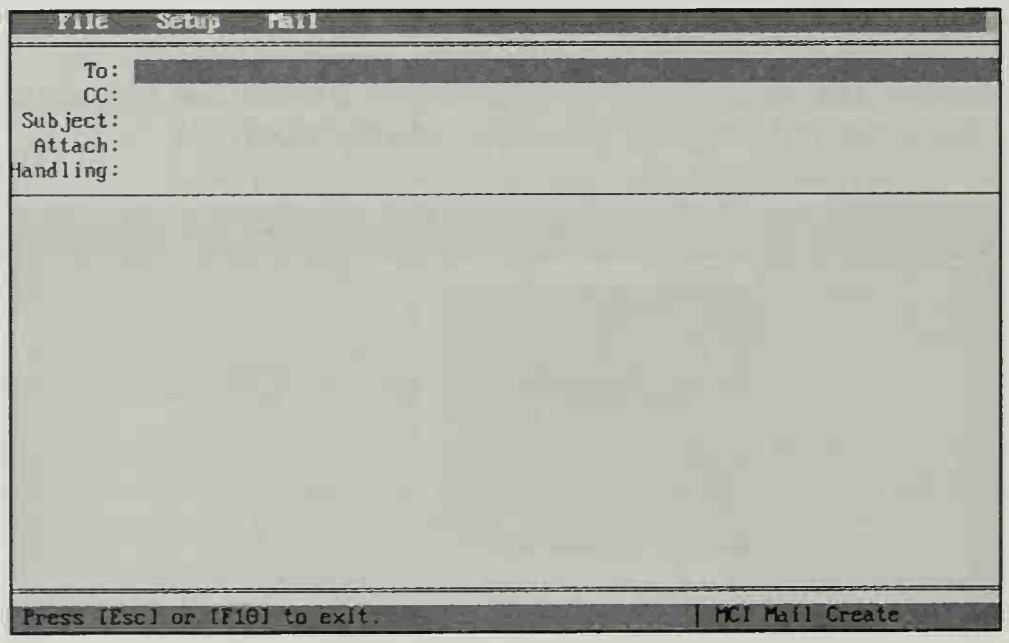

Fig. 30.48
The New Message screen.

In the fields at the top of the New Message screen, you enter information that tells MCI where to send the message. These fields are To, CC (carbon copy), Subject, Attach, and Handling.

The To field is the only field in which you must make an entry. To enter information, highlight the field and then press Enter. The Edit Send List dialog box appears (see fig. 30.49).

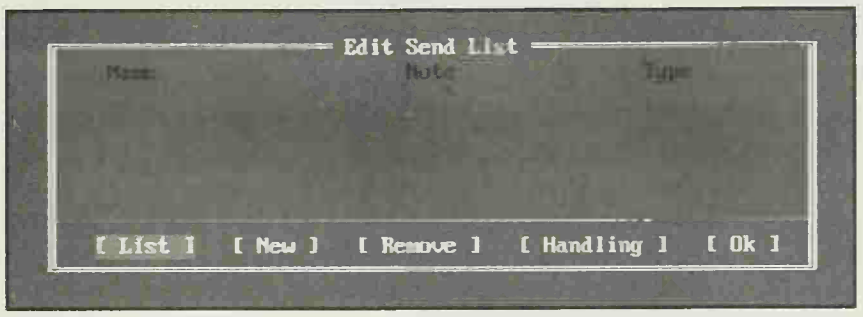

Fig. 30.49
The Edit Send List dialog box.

You use this dialog box to specify the recipient of your message. Choose the List option to display the MCI Address Book dialog box (see fig. 30.50).

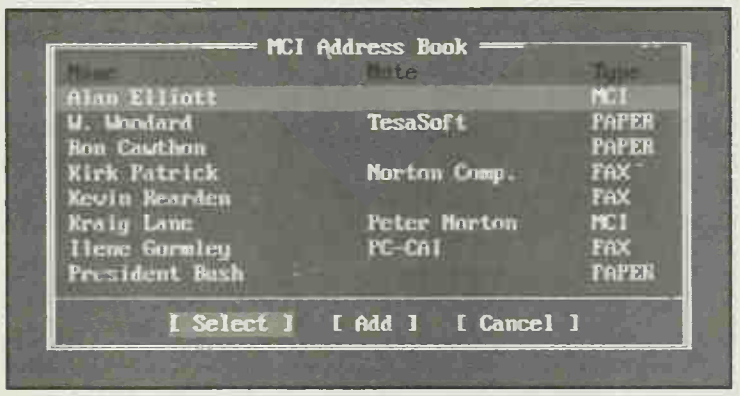

Fig. 30.50
The MCI Address Book dialog box.

Select an address in the MCI Address Book dialog box and then choose Select. You return to the Edit Send List dialog box, which now displays the selected address. Choose List again and repeat this process for as many addresses as you want to select.

If you choose the New option in the Edit Send List dialog box, you are prompted to enter all the information needed to send a message. First, you are prompted to select the address type from the Address Type dialog box (refer to fig. 30.44). After you select an address type, you are asked whether you want to add this name to your address book. Then you see a dialog box similar to the one in figure 30.45, with a list of fields appropriate to the address type you have chosen. After you enter the information, the new address is added to the Edit Send List dialog box.

The Remove option enables you to delete a name from the list. The Handling option enables you to choose several ways of handling your message. After you choose the Handling option, a dialog box appears, displaying the following four options:

Option	Description
Receipt	Indicates that you want a receipt verifying that the recipient has received the message.
4hour	Specifies priority delivery of the message.
Charge	Specifies a charging code. This code, which is for your own use, can be anything you want but cannot contain spaces.
Alert	Notifies the recipient by telephone that an MCI message has been sent. You must supply the recipient's phone number.

You can select names for the CC field in the New Message screen in the same way that you select names for the To field. You can type any information in the Subject field.

The Attach field specifies the name of a file to be included with the message. This file must be an ASCII text file. If you want to include the SALES.TXT file from the C:\REPORT directory, for example, type the following line in the Attach field:

```
C:\REPORT\SALES.TXT
```

You use the Handling option to specify the same handling for all recipients in the send list. When you choose a Handling option for this message, the option is in effect for all addresses in the list. You cannot specify the Alert option for one address, for example, and not for another.

After you enter all the necessary information at the top of the New Message screen, type the actual message in the bottom half of the screen. (In this screen, you are using the Commander editor.) After you type the message, press F10. You are given the option of saving the message. If you choose to save the message, the message goes to your \NC\OUT directory, from which you can send it later.

Sending and Receiving Messages

After you create a message, you need to connect to the MCI network to send and receive messages. Choosing the Send/Receive option from the Mail menu instructs Commander Mail to begin a communications session. A communications session performs the following tasks:

- Calls the MCI Mail service
- Sends any messages you have in the Out Box
- Receives messages from MCI and displays them in your In Box

If you use the Schedule feature to have Commander Mail automatically send and receive mail, your system performs this entire Send/Receive procedure without any human intervention. When you manually choose the Send/Receive option, you see the Send/Receive MCI Mail screen, from which you can monitor the progress of the communication to MCI Mail and the sending and receiving of messages.

The box in the upper-left corner lists the six activities that will be taking place:

Initializing
Dial Service
Get into MCI
Send Mail
Receive Mail
Terminate Session

While an activity is taking place, a dot blinks to the left of the activity name. When Commander Mail completes an activity, a check mark appears next to the activity name.

During the *initializing* process, your computer establishes contact with your modem. During the *dial-service* activity, your modem calls the MCI phone number. If your modem has a speaker and you chose the Modem Sound option in the Modem dialog box, you should hear the dialing process.

The bottom-left box in the Send/Receive MCI Mail screen also displays information about what is happening, including messages about your modem setup—the baud rate or the MCI name of the phone number being dialed, for example. While you are connected to MCI, the message `Connected to MCI` appears. When the session is over, the message `Hanging Up` appears, and then a message stating the length of the session appears.

Boxes on the right side of the screen provide information about the progress of the session. The Total Session box is a bar graph that shows the elapsed time of the session. The Current Activity graph shows the progress of an activity, such as sending or receiving messages. The MCI and Commander Activity area displays modem-activity messages such as `Wait`, `Receive`, and `Send`.

After connecting to MCI, Commander Mail sends your account name and password to MCI. If this information is correct, you are logged on to MCI. After you log on, any messages in your Out Box (the \NC\OUT directory) are sent, and any messages from MCI are placed in your In Box (the \NC\IN directory). Then the session ends automatically.

The Sent and Received messages in the bottom-left corner of the screen tell you how many messages were sent and how many were received. The time you spent logged on to MCI appears in the Current Timer area of the screen. When the session is over, you can go to your In Box to read any messages.

Reading Messages

You use the In Box option in the Mail menu to examine incoming messages. The In Box dialog box appears, containing messages to be read. To read a message in the list, highlight it and press Enter, or double-click the message name. The message then appears on-screen. If the text is too long to fit in one screen, you can use the PgUp and PgDn keys to scroll the message. Press Esc to exit the message and return to the In Box dialog box.

Using Other MCI Mail Options

In addition to creating, sending, receiving, and reading messages, you can forward, reply to, delete, sort by sender (from), sort by date, print messages, and disconnect.

Forwarding Messages

If you choose the Forward option from the Mail menu, you can select a message in your In Box and forward it to a person in your address list. This option enables you to send to a third party a message that you received from someone else.

Replying to Messages

The Reply option in the Mail menu enables you to choose a message from your In Box and reply to that message. When you choose to reply, the To field in the message editor contains the name of the person who sent you the message.

After you type the message, Commander Mail stores it in the Out Box to be sent the next time you choose Send/Receive from the Mail menu.

Deleting Messages

The Delete option in the Mail menu enables you to delete a message that is in your In Box. You should delete messages periodically to make more space available on your hard disk.

Another way to delete messages from the In box is to move those files to another directory. You can use the Commander Move command (F6), for example, to move all files in the directory \NC\IN (your In Box) to another directory.

Sorting Messages

Commander Mail sorts the messages in your In Box by the name of the sender or by the date. To designate a sort option, choose Sort by From or Sort by Date from the Mail menu. A check mark appears next to the option for the chosen sort in effect. If you typically have only a handful of messages in your In Box, either sort option is acceptable because you can easily see all the message names in one screen.

Printing Mail Messages

Commander Mail does not contain an option that enables you to print a message directly from Commander Mail. Because the messages are ASCII text files, however, you can use the DOS PRINT command to print messages from your IN, OUT, or SENT directory. To print an In Box message called ELLIOTT.U00, for example, you would type the following command at the DOS prompt:

```
PRINT \NC\IN\ELLIOTT.U00
```

Disconnecting Communications

You may begin a communications session and realize that you specified the wrong messages to be sent. You can cancel an MCI Send/Receive session at any time by choosing Disconnect from the Mail menu or by pressing Esc or Ctrl+K.

Using Commander Link

Commander Link enables you to link two local computers and then copy or move files between them. This feature also enables you to rename or delete files on either computer. Link may come in handy if you are upgrading from one computer to another and want to copy your old files to the new computer.

The feature also can be helpful if you use both a desktop computer and a laptop. In many cases, laptops use 3 1/2-inch floppy disks, and desktop computers use 5 1/4-inch floppy disks. Commander Link enables you to access files from the laptop without the interim step of copying the file to a computer that has both 3 1/2-inch and 5 1/4-inch drives.

Commander Link has two requirements:

- The two computers must be attached by a serial null modem cable connected to the COM1 or COM2 port of each computer.
- Norton Commander must be running on both computers.

A *null modem cable*, which basically is a serial cable with some of the wires crossed, feeds a signal from one computer to another. You can buy a null modem cable at a computer supply store for about the same price as that of a normal serial cable.

After you attach a null modem cable to the serial ports of both computers and start Norton Commander on both computers, you are ready to use Commander Link. Figure 30.51 shows how a null modem cable is connected to two computers.

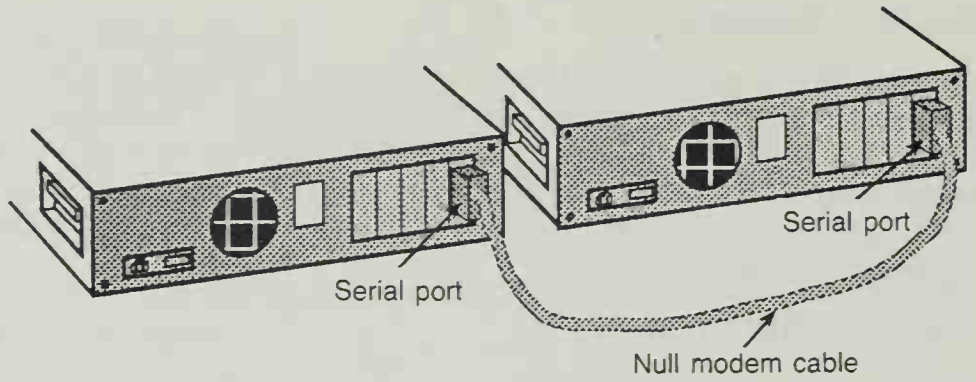

Fig. 30.51
The null modem cable connected to two computers.

To begin Commander Link, choose the Lin**k** option from the Left or Right pull-down menu. A dialog box like the one shown in figure 30.52 appears.

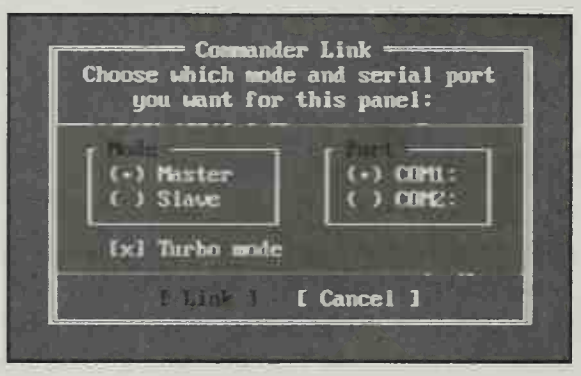

Fig. 30.52
The Commander Link diolog box.

The Mode options in this dialog box are Master and Slave. You must designate one computer the master machine, from which all commands will be given; the other computer is the slave. Using the arrow keys, highlight the Master or Slave option for each computer and then press the space bar.

The Port options are COM1 and COM2. For each computer, choose the Port option that corresponds to the serial port where you attached the cable.

The Turbo Mode option maximizes the speed of communication between the master and slave computers. If you have trouble with the communication, turn off this option on both computers and then try again.

To begin the link procedure, choose the Link option at the bottom of the Commander Link dialog box. You can then access files in the slave machine or the master machine by choosing the **C**opy, **R**ename or Move, and **D**elete options from the Files menu of the master machine. You cannot use DOS commands to access files across the link.

After you set up the link on the master and slave machines, you see panels showing the master and slave directories. You can use the menu bar in the panel containing the slave machine's directory listing to display a full or brief listing. Because of the way the Link program operates, none of the other settings work for the slave machine. The slave machine's keyboard does not respond when the machine is set to slave mode.

You can also change directories on either machine. If the slave machine is set to a subdirectory, you can choose the parent directory (. .) at the top of the directory list to switch to the root directory. Choosing . . moves you up one directory in the tree. You follow the same procedure to choose a directory on the master machine.

You can copy, delete, and rename files between machines. Where the files are copied, moved, deleted, or renamed is determined by the panel in which you are operating. If you are operating from the link panel, which represents the linked (slave) machine, deleting a file in that panel deletes a file on the slave machine. If you delete a file in the nonlink panel, you are deleting a file on the master machine. Because Commander makes deleting files so easy, you need to be careful when you delete. Think of the link panel as being a directory, even though that directory happens to be on another machine.

In Commander Link, you use the Norton Commander **C**opy, **R**ename or Move, and **D**elete commands in essentially the same way you always do, as though you were using two directories on the same hard disk.

To copy files from the slave machine to the master machine, follow these steps:

1. Select the file or files to be copied.

   If you want to copy one file, highlight that file in the Commander panel. You may have to change directories in the link (slave) panel to locate the file.

   If you want to copy multiple files, move your cursor to the link panel and press the gray + key. You are then prompted to specify files. Enter a file name or a file specification, which can include the asterisk (*) or question mark (?) wild-card characters, and then press Enter. The specified files are highlighted. (You also can press the gray + key to specify files to be excluded from the selection.)

   You can add files to the selection list by highlighting the file name and pressing Ins.

2. Press F5 (Copy). Commander prompts you to specify where to copy the files in the master machine.

3. Select the destination.

   A default destination often appears on-screen. To accept that destination, press Enter. Otherwise, enter the name of a disk drive (such as **A:**), a path name (such as **\WP51**), or a drive/path combination (such as **C:\WP51**).

   When you specify the destination, you can press F10 to display a tree of the available directories on the master machine. From this tree, you can highlight the directory to which you want to copy the files.

4. Press Enter to start the copy operation.

5. End the link by choosing Link from the master machine's Right or Left menu. This step disables the link and returns the master and slave machines to normal operation.

To give you an idea of how quickly operations can occur in linked machines, a test copy of a 90,794-byte file took 18.27 seconds. In other words, the file was copied at about 5,000 bytes per second.

Summary

This chapter covered basic and advanced features of Norton Commander. You learned how to use Commander as a substitute for DOS commands. Norton Commander's NCD command enables you to choose directories from a graphic tree, create new directories, change directories, remove directories, and rename directories. You can use the View file options to view the contents of word processing, spreadsheet, and database files. You can use Commander also to set screen colors and blank your screen.

Commander's advanced options generally take a little more time to learn and use, but they represent some of the most exciting aspects of the program. The menu options enable you to customize Commander menus to fit your particular needs. The communications features—Mail and Link—enable you to communicate around the world or with the computer on the next desktop. In all, Norton Commander provides several powerful features that enable you to make better use of your computer's resources.

Norton Utilities 7 Command Reference

This Command Reference lists the commands in Norton Utilities 7 in alphabetical order and provides essential information about their use. If you already know what a command does but you need a reminder of how to use it, this Command Reference is an easy-to-use resource. Commands from earlier versions of Norton Utilities (4.5, 5.0, and 6.0) are listed also, with references to the new Version 7 commands that replace old commands. In addition, this Command Reference provides references to the chapters of this book that contain complete descriptions of commands.

Many Norton Utilities 7 commands include switches and other options. In this book, the following conventions apply to the way those options are presented in the command syntax examples:

- Items enclosed in brackets ([]) are optional.
- For words printed in *italic*, substitute the appropriate parameter. To use the DISKREET [*switches*] syntax, for example, you could type the following command:

  DISKREET /ON

- The [*d*:] option represents the disk drive name (for example, A:, B:, C:, or D:).
- The [*filespec*] option represents a file specification. Unless noted, this specification can include a path name. The file specification for the MYFILE.TXT file in the \WP51 directory is \WP51\MYFILE.TXT. You usually can use the DOS wild-card characters—the asterisk (*) and question mark (?)—in file specifications. For example, *.TXT specifies all files with the TXT extension.
- The [*color*] option refers to a selection of colors. A color designation in a command line, for example, could be WHITE ON BLUE. (For more information, see Chapter 24 on using batch files.)
- A vertical bar (|) between two options (such as ON|OFF) means that you can choose one option or the other, but not both at the same time.
- When specified, the /DEBUG option causes the command to display the DOS errorlevel value returned. Some Norton Batch Enhancer commands use this errorlevel for branching control.

When you use a Norton command from the DOS prompt, several global switches are available. You should place the following switches in the command line after the command:

Switch	Description
/BW	Specifies a monochrome display so that the command displays black-and-white screens rather than color screens.
/G0	Controls EGA and VGA monitor settings. Disables use of a graphic mouse pointer and graphics symbols. To use the /G0 switch with the Disk Tools utility, for example, enter **DISKTOOL /G0**.
/G1	Controls EGA and VGA monitor settings. Disables use of the graphic mouse pointer and enables dialog boxes to use graphics symbols instead of character-based symbols (for example, buttons rather than check boxes).

Switch	Description
/LCD	Specifies an LCD (laptop computer display) so that the command uses colors that Norton specifically chose for this kind of display.
/NOZOOM	Disables zoom-style dialog boxes. This switch cuts screen-redrawing time and is particularly useful for slower computers.

Batch Enhancer (BE)

The Batch Enhancer (BE) command consists of a series of subcommands intended to supplement the DOS batch commands. With Batch Enhancer, you can create batch files and menus. The following sections describe the Batch Enhancer subcommands.

Syntax

BE *subcommand*

BE *filespec*

If a list of subcommands is stored in a file, use the second version of the BE command (BE *filespec*) to cause the subcommands in that file to execute (as in a DOS batch file). You also can enter a BE command from the DOS prompt, as in the first version of the command (BE *subcommand*).

Note

- You must include either a subcommand or a file specification in the BE command line.

For more information, see Chapter 24.

ASK

The BE subcommand ASK waits for a response from the user and then stores the response in the DOS errorlevel variable. You usually need to use the DOS IF ERRORLEVEL GOTO LABEL command after ASK.

Syntax

BE ASK *prompt* [*keys*] [DEFAULT=*key*] [TIMEOUT=*n*] [ADJUST=*n*] [*color*] [/DEBUG]

Example

The following command displays the prompt `Enter Menu Choice:` and waits for your input:

BE ASK "Enter Menu Choice:" ABCD DEFAULT=D TIMEOUT=60

When the user presses a key that represents a menu choice (for example, A, B, C, or D), the BE ASK command sets the errorlevel code; the first key becomes ERRORLEVEL 1, the second key is ERRORLEVEL 2, and so on. If you do not provide a menu-choice key list (such as ABCD), ASK accepts any key the user presses. If the user does not press a key during the TIMEOUT period (60 seconds), the command uses the DEFAULT option (D).

Note

- As the ASK subcommand runs, it displays the prompt on-screen and waits for the user to enter an answer. Design the prompt to display a list of correct responses or to refer to a list of responses in a displayed menu.

Tip

- The DOS IF command can use the ERRORLEVEL values returned by ASK, enabling you to create menus. (See the section "Using the ASK Command" in Chapter 24.)

BEEP

The BE subcommand BEEP causes a beep or musical tone to sound from the PC's speaker.

Syntax

BE BEEP [*switches*]

BE BEEP [*filespec*] [/E]

Switches

Switch	Description
/D*n*	Specifies the duration of a tone, where *n* is in measurements of 1/18 of a second. For example, /D3 specifies that the tone sounds for 3/18 of a second.
/E	Echoes the text in the file to the screen (when used with a file specification).
/F*n*	Specifies the frequency of a tone, where *n* is cycles per second (Hz). The switch /F440, for example, plays a tone at 440 cycles per second.
/R*n*	Specifies that the tone repeat *n* times.
/W*n*	Specifies a wait (pause) in durations of 1/18 of a second. The switch /W3, for example, causes a wait of 3/18 of a second.

Example

The following command creates a sound at a frequency of 440 Hz, pauses for 10/18 of a second, and sounds the tone again:

```
BE BEEP /F440 /R2 /W10
```

BOX

The BE subcommand BOX draws a box on-screen. You can use this box to display a message or create a menu.

Syntax

BE BOX *top*,*left*,*bottom*,*right* [SINGLE|DOUBLE] [*color*]

Parameters in uppercase are key words in the command; these words appear in the command as written here. The parameters in lowercase italic represent a number or option to be placed into the command—for example, *top* = 3 and *left* = 2.

Here are descriptions of the BOX parameters:

Parameter	Description
top	Specifies the row number of the upper-left corner of the box.
left	Specifies the column number of the upper-left corner of the box.
bottom	Specifies the row number of the lower-right corner of the box.
right	Specifies the column number of the lower-right corner of the box.
SINGLE	Produces a box with single lines (the default).
DOUBLE	Produces a box with double lines.
color	Specifies the color of the text. For more information about this option, see the section on the Screen Attributes (SA) command.

Example

The following command draws a box on-screen with the upper-left corner positioned 2 lines from the top of the screen and 10 columns from the left:

```
BE BOX 2,10,20,70 DOUBLE
```

The lower-right corner of the box is 20 lines from the top of the screen and 70 columns from the left. The box has double lines.

CLS

The BE subcommand CLS clears the screen and (optionally) sets the screen color.

Syntax

```
BE CLS [color]
```

Following is a list of the color choices:

Setting	Command
Intensity	BRIGHT or BOLD (these commands are identical) BLINKING
Main Setting	NORMAL REVERSE UNDERLINE
Colors (either foreground or background)	WHITE BLACK RED MAGENTA BLUE GREEN CYAN YELLOW

Example

The following command clears the screen and causes on-screen characters to appear in bold white on a blue background:

```
BE CLS BOLD WHITE ON BLUE
```

Note

- The color selections you can use are the same as those used in the BE SA subcommand.

Tips

- Often color choices are an option in a Norton BE subcommand. Whenever the *color* option is available, you can use the color choices described for the CLS subcommand.
- The BE SA subcommand has a /CLS option, so you can also use that command to set colors and clear the screen.

DELAY

The BE subcommand DELAY causes the batch file to delay for a specified time, measured in 1/18 of a second.

Syntax

BE DELAY [*time*]

Example

The following command delays the execution of the batch file for one second:

BE DELAY 18

The execution of the batch file continues after the delay time has elapsed.

Note

- The *time* option is measured in 1/18 of a second, so a *time* entry of 9 causes a delay of half a second, 18 causes a delay of a second, and 36 causes a delay of 2 seconds.

EXIT

The BE subcommand EXIT terminates a Norton script file (not a DOS batch file). Use this subcommand to stop a script at any point. The subcommand has no options.

Syntax

BE EXIT

GOTO

The BE subcommand GOTO enables you to branch the flow of the script to another part of the file.

Syntax

BE *filespec* [[GOTO] *label*]

The *filespec* parameter is a script file, and *label* is a label on its own line, starting in column 1 of the script file. A label is a statement that begins with a colon (:).

Example

Note the following label:

:THISISALABEL

To send the flow of the script to this label, use this command:

BE *filespec* GOTO THISISALABEL

JUMP

The BE subcommand JUMP enables you to incorporate conditional branching into a script file (not for use in a DOS batch file). Unlike GOTO, which always branches to a specified label, JUMP can branch to any of several labels, based on the current value of the exit code.

Syntax

BE JUMP *label1*, [*label2*[,...*labeln*]] [/DEFAULT:*label*]

The *label1* parameter is the name of the label to which the flow of the script should be sent if the exit code is 1, *label2* is the name of the label to which the flow should be sent if the exit code is 2, and so on. If no label matches the exit code, the flow is sent to the label specified by the /DEFAULT switch. If no label matches the exit code and no default label exists, execution continues with the command following the JUMP command.

Tip

- See the next subcommand, MONTHDAY, for an example of how to use JUMP.

MONTHDAY

The BE subcommand MONTHDAY returns the day of the month as an exit code, which you then can use in a BE JUMP subcommand or in a DOS IF ERRORLEVEL command.

Syntax

BE MONTHDAY [/DEBUG]

The /DEBUG option displays the exit code on-screen.

Example

To perform a backup on the first day of the month, you can use the following commands:

```
BE MONTHDAY
BE JUMP BACKUP /DEFAULT:NOBACKUP
```

Because the BACKUP label is the first label in the BE JUMP command, it corresponds to the first day of the month. On the first day of the month, the batch file goes to the label :BACKUP (which contains instructions for performing a backup). On other days, the flow of the script is to the :NOBACKUP label.

Tip

- You can use the related command WEEKDAY in the same way to design batch files that are sensitive to specific days of the week.

PRINTCHAR

The BE subcommand PRINTCHAR prints a character a specified number of times. You can use this subcommand to create interesting menus or diagrams on-screen.

Syntax

BE PRINTCHAR *character,repeats* [*color*]

The *character* parameter can be any ASCII character (including extended ASCII), and you can specify any number of *repeats* up to

80. The *color* parameter specifies the color of the text on-screen. For more information about color, see the section on the BE Screen Attributes (SA) command.

Example

The following command prints the asterisk (*) character 20 times in a single line on-screen:

```
BE PRINTCHAR *,20
```

REBOOT

The BE subcommand REBOOT enables you to warm-boot the computer—that is, to cause a reboot as though you had pressed Ctrl+Alt+Del.

Syntax

```
BE REBOOT [/VERIFY]
```

When the /VERIFY switch is included in the command, you (or another user) are prompted to confirm whether the reboot should take place.

Note

- If your batch file alters an entry in your AUTOEXEC.BAT or CONFIG.SYS file, or in any other file that may be accessed when you boot your computer, you may want to include the REBOOT command at the end of your batch file to cause the changes to take effect.

ROWCOL

The BE subcommand ROWCOL places the cursor at a designated location on-screen and (optionally) displays text at that location.

Syntax

BE ROWCOL *row,col*[,*text*] [*color*]

The *row* parameter represents the number of the row (usually, 1 to 25) in which you want the cursor and any specified text to appear; *col* is the number of the column (usually 1 to 80). If you include a *text* parameter in the command, that text is written to the screen at the designated location. The *color* parameter specifies the color of the text. For more information about the color option, see the next section on the BE Screen Attributes (SA) command.

Example

The following command places the cursor 10 lines from the top and 5 columns from the left of the screen. At that location, the command prints the text specified in quotation marks:

BE ROWCOL 10,5, "Make a selection using the cursor keys."

The cursor ends up *after* the printed text, not at *row,col*.

Screen Attributes (SA)

The BE subcommand SA sets color attributes for the screen—that is, specifies which colors are used for the background and the text that appears on-screen.

Syntax

BE SA *main-setting* [*switches*]

BE SA [*intensity*] [*foreground*] [ON *background*] [*switches*]

The options for *main-setting* are NORMAL, REVERSE, and UNDERLINE.

Example

The following command is simple and easy to remember:

BE SA NORMAL

This command changes the text to whatever the current monitor's default colors are.

The second version of BE SA is more complicated but more powerful. Choices for *intensity* are BRIGHT, BOLD, and BLINKING. (BRIGHT and BOLD are identical.) Choices for *foreground* and *background* colors are WHITE, BLACK, RED, MAGENTA, BLUE, GREEN, CYAN, and YELLOW. For example, the following command changes colors to high-intensity white on a blue background:

BE SA BRIGHT WHITE ON BLUE

Switches

Switch	Description
/N	Instructs the SA subcommand not to set border color
/CLS	Clears the screen after setting the screen attributes

Following is a list of the color choices for SA:

Setting	Command
Intensity	BRIGHT or BOLD (these commands are identical) BLINKING
Main Setting	NORMAL REVERSE UNDERLINE
Colors (either foreground or background)	WHITE BLACK RED MAGENTA BLUE GREEN CYAN YELLOW

Example

The following command causes characters to appear in bold white on a blue background:

```
BE SA BOLD WHITE ON BLUE /CLS
```

This command also clears the screen. For more information, see the earlier section on the CLS command.

SHIFTSTATE

The BE subcommand SHIFTSTATE examines the status of the left and right Shift keys, the Alt key, and the Ctrl key (the command determines whether the key is *shifted*, or pressed), and returns an

exit code that indicates where those keys are in the shift state. Then you can use the exit code to cause the script to branch with the JUMP subcommand or the DOS ERRORLEVEL command. See Chapter 24 for information on creating script files.

Syntax

BE SHIFTSTATE [/DEBUG]

The /DEBUG option displays the exit code.

This command returns the following exit codes:

Key in Shift State	Returned Code
Right Shift	1
Left Shift	2
Ctrl (left or right)	4
Alt (left or right)	8

Tip

- You can use the shift state to create several versions of the same command. You can write a script file in which BE MYCMD performs one set of commands, but performs another set of commands if Shift, Alt, or Ctrl is pressed.

TRIGGER

The BE subcommand TRIGGER halts the execution of a script file until a specified time. This command enables you to set up your script so that it stops and then waits until the specified time to continue execution. For information about creating script files, see Chapter 24 on using batch files.

Syntax

BE TRIGGER *hh:mm* [AM] [PM]

The *hh:mm* parameter is the hours and minutes in 24-hour clock time. (In 24-hour clock time, 14:00 is 2:00 p.m.) Use the AM or PM designation in the command line to specify 12-hour clock time, as in 2:00 PM. In this designation, 12:00 AM is 0:00 (midnight), and 12:00 PM is noon.

Example

You can use the TRIGGER subcommand to begin executing a communications program early in the morning, when telephone rates are lowest. The following command causes the script to pause until two o'clock in the morning before it continues:

```
BE TRIGGER 2:00 AM
```

WEEKDAY

Like the MONTHDAY subcommand, the BE subcommand WEEKDAY returns the day of the week as an exit code. You can use the WEEKDAY subcommand in a JUMP subcommand or in an IF ERRORLEVEL command.

Syntax

```
BE WEEKDAY [/DEBUG]
```

The /DEBUG option displays the exit code.

Example

To execute a backup on the second day of the week (Monday), use the following commands:

```
BE WEEKDAY
BE JUMP NOBACKUP, BACKUP /DEFAULT:NOBACKUP
```

Because the BACKUP label is the second label in the BE JUMP command, it corresponds to the second day of the week. On the first day of the week, the command branches to NOBACKUP. On the second day of the week, the batch file goes to the label :BACKUP (which contains instructions for performing a backup). On other days, the flow of the script is to the :NOBACKUP label.

Tip

- You can use the related command MONTHDAY in the same way to design batch files that are sensitive to specific days of the month.

WINDOW

The BE subcommand WINDOW draws a window on-screen, with optional shadow and zoom features.

Syntax

BE WINDOW *top,left,bottom,right* [*color*] [SHADOW] [ZOOM]

Following are descriptions of the WINDOW parameters:

Parameter	Description
top	Specifies the row number of the upper-left corner of the window.
left	Specifies the column number of the upper-left corner of the window.
bottom	Specifies the row number of the lower-right corner of the window.
right	Specifies the column number of the lower-right corner of the window.
SHADOW	Adds a shadow to the right and bottom edges of the window.
ZOOM	Zooms the window onto the screen; the window starts as a small rectangle and grows to full size. (You can use EXPLODE instead of ZOOM; these parameters are identical.)

Example

The following command draws a window on-screen with the upper-left corner positioned 2 lines from the top and 10 columns from the left of the screen:

BE WINDOW 2,10,20,70 SHADOW ZOOM

The lower-right corner of the window is 20 lines from the top and 70 columns from the left of the screen. The window zooms onto the screen, with a shadow.

Note

- The main difference between the BOX and WINDOW command is that the BOX command does not overwrite any text on-screen. The WINDOW command blanks out the window, erasing any text on-screen.

Calibrate (CALIBRAT)

To optimize the speed and reliability of reading and writing information to your hard disk, use the Calibrate command. Calibrate performs a nondestructive low-level format, enabling you to check your disk for reliability without destroying the information on it.

Syntax

CALIBRAT [*d*:] [*switches*]

Switches

Switch	Description
/BATCH	Does not prompt for input from the user. Returns to DOS when finished.
/BLANK	Blanks the screen during the test.
/NOCOPY	Does not make a duplicate copy of the track being tested.
/NOFORMAT	Performs pattern testing only and skips the low-level format.
/NOSEEK	Skips the seek tests. Use this switch when you do not want CALIBRAT to test the disk's head-positioning mechanism. Usually, you should use CALIBRAT once without /NOSEEK to test the mechanism. Then you can include /NOSEEK in subsequent tests.
/ISMFM	Specifies that the interleave test be performed on an MFM-type hard drive. You can determine whether you have an MFM drive by using the SYSINFO command.
/PATTERN:*n*	Specifies which testing level (*n*) to use. The parameter *n* can be 0, 5, 40, or 80. The higher the number, the more thorough the test; the higher the number, however, the longer CALIBRAT takes to test the disk.
/R:*file*	Generates a report and writes it to the file name specified in the switch. You must use the /BATCH switch when you use /R:*file*.

continues

Switch	Description
/RA:*file*	Performs the same function as the /R:*file* switch but adds the information to the file instead of creating a new file.
/X:[*d*][*d*]	Excludes named drives from the test. The switch /X:DE, for example, excludes disks D and E from testing. If your computer has allocated nonexistent drives, you must use this switch to exclude those drives from the tests.

Note

- When you use this command, make sure that no memory-resident programs (TSRs) are loaded and that only essential device drivers (in your CONFIG.SYS file) are in use.

For more information, see Chapter 20.

Directory Sort (DS)

You use the Directory Sort (DS) command to sort the names of files in a directory by name, extension, time, date, or size.

Syntax

DS [*sortkeys*] [*pathname*] /S

The *pathname* parameter is the directory to be sorted. If you do not include sort keys, the program runs in interactive mode. Here are the sort keys that are available:

Key	Sorts By
N	Name
E	Extension
D	Date
T	Time
S	Size

Adding a minus sign (–) to any sort key reverses the sort order. The –N switch, then, tells the command to sort by name in reverse alphabetical order. The /S switch tells the command to include subdirectories in the sorting.

Example

To sort by name and extension order, use the following command:

```
DS NE
```

For more information, see Chapter 26.

Disk Editor (DISKEDIT)

Norton Disk Editor enables you to view and edit information on the entire floppy disk or hard disk, including system areas, boot records, file allocation tables, and data areas. Disk Editor is useful when you cannot recover information with Norton Disk Doctor or UnErase. To use this program effectively, however, you must understand how disks work.

Syntax

DISKEDIT [*d*:][*path*][*filename*] [*switches*]

Switches

Switch	Description
/M	Operates in maintenance mode, enabling Disk Editor to bypass DOS and directly view the contents of a disk.
/SKIPHIGH	Does not load into high memory. Use this switch if you are using a memory manager that already occupies high DOS memory.
/W	Uses write-access mode. Otherwise, the command is in read-only mode, in which you cannot write information to disk.
/X:[*d*][*d*]	Excludes certain drives from processing. The switch /X:DE, for example, excludes disks D and E from testing. If your computer has allocated nonexistent drives, you must use this switch to exclude those drives.

Note

- Disk Editor is an interactive program that you operate from the Norton main screen.

For more information, see Chapter 17.

Disk Information (DI)

The Disk Information command in Norton Utilities 4.5 has been integrated into the System Info command in Versions 5, 6, and 7. For more information, see the section on the System Info (SYSINFO) utility later in this Command Reference.

Disk Monitor (DISKMON)

Disk Monitor contains three main features:

- Disk Protect prevents unauthorized use of your files on disk.
- Disk Light places a disk-access light on your monitor so that you can see when your disk is being used.
- Disk Park moves the read/write head on your hard disk to a safe location so that you can move your computer.

Syntax

DISKMON [*switches*]

Switches

Switch	Description
/LIGHT+|–	Turns on (+) or off (–) the Disk Light feature.
/PARK	Parks all drives.
/PROTECT+|–	Turns on (+) or off (–) the Disk Protect feature. When this feature is on, protection is set to the selections that were stored in DM.INI when you ran the command interactively.

Switch	Description
/SKIPHIGH	Does not load into high memory. Use this switch if you are using a memory manager that already occupies high DOS memory.
/STATUS	Displays a summary of Disk Monitor status.
/UNINSTALL	Uninstalls the Disk Monitor program from memory if that program was the last TSR (terminate-and-stay-resident) program loaded into memory.

Note

- Run Disk Monitor interactively (enter **DISKMON** at the DOS prompt) the first time you use this command to choose the type of protection you want (files, system areas, entire disk, and floppy format). Disk Monitor stores your selections in a file named DM.INI. After you set up the command the way you want it, you can use Disk Monitor and its switches from the DOS prompt.

For more information, see Chapter 6.

Disk Test (DT)

The Disk Test (DT) command for Norton Utilities 4.5 has been incorporated into the Norton Disk Doctor command for Versions 5, 6, and 7. For more information, see the section on Norton Disk Doctor (NDD) later in this Command Reference.

Disk Tools (DISKTOOL)

Disk Tools is a set of four utilities containing data protection and recovery features. These tools enable you to perform the following tasks:

- Make a disk bootable
- Recover from DOS's RECOVER command

- Revive a defective floppy disk
- Mark a cluster

Syntax

DISKTOOL [/MAKEBOOT] [/SKIPHIGH]

DISKTOOL [/DOSRECOVER] [/SKIPHIGH]

DISKTOOL [/REVIVE] [/DEVICEDRIVEN] [/SKIPHIGH]

DISKTOOL [/MARKCLUSTER] [/SKIPHIGH]

Switches

Switch	Description
/DOSRECOVER	Skips the Disk Tools menu and proceeds to the Recover from DOS's RECOVER option.
/MAKEBOOT	Skips the Disk Tools menu and proceeds to the Make a Disk Bootable option.
/REVIVE	Skips the Disk Tools menu and proceeds to the Revive a Defective Diskette option.
/DEVICEDRIVEN	Tells the command that the drive being used is device-driven.
/MARKCLUSTER	Skips the Disk Tools menu and proceeds to the Mark a Cluster option.
/SKIPHIGH	Does not load into high memory. Use this option if you are using a memory manager that already occupies high DOS memory.

Notes

- The Disk Tools program is designed primarily for interactive use. By including switches in the command line, however, you can choose which tool to use and tell the program not to use high DOS memory.
- Previous versions of the Disk Tools command included Rescue Disk options. To create or use a rescue disk in Version 7, use the RESCUE command (see Chapter 14).

For more information on Disk Tools, see Chapter 13.

Diskreet (DISKREET)

Diskreet is a program that enables you to protect files or disks by using a password. Files stored by Diskreet are encrypted so that they are unreadable, even by Disk Editor. An *NDisk* is an area of your hard disk that operates like a separate disk; this area contains encrypted information that is password-protected.

Syntax

DISKREET [*switches*]

Switches

Switch	Description
/CLOSE	Closes all disks
/D:*filespec*	Decrypts the specified files
/E:*filespec*	Encrypts the specified files
/HIDE[:*d*]	Hides the specified drive (NDisk)
/OFF	Disables use of the Diskreet driver
/ON	Enables the Diskreet driver
/P:*password*	Specifies *password* to use for encryption or decryption
/T:*filename*	Specifies a target name for the encrypted file
/SHOW[:*d*]	Shows the hidden drives (disks) being used to store files

Note

- For the Diskreet program to work, the following line must be in your CONFIG.SYS file:

  DEVICE=*path*\DISKREET.SYS

  The *path* is the name of the directory in which your Norton files are stored. When you boot your computer, this line tells DOS to make the Diskreet driver available for use.

For more information, see Chapter 7.

Duplicate Disk (DUPDISK)

The Duplicate Disk (DUPDISK) program is similar to the DOS DISKCOPY command but has more features. Like DISKCOPY, DUPDISK copies the contents of a disk to a disk of similar size (that is, 360K, 720K, and so on).

Syntax

DUPDISK d: [*d*:]

If a second disk drive is not specified, DUPDISK assumes that the disk duplication occurs on the same disk.

Example

To duplicate a disk from drive A to drive B, use this command:

DUPDISK A: B:

For more information, see Chapter 26.

Notes

- Unlike DISKCOPY, DUPDISK enables you to make multiple copies of the same disk quickly, without having to reread the master (source) disk. If you use a single floppy drive, DUPDISK often enables you to swap disks only once during a copy instead of several times, as usually required by DISKCOPY.
- When DOS formats a disk (beginning with Version 4), it assigns the disk a unique volume serial number. (This number appears when you perform a directory listing of the disk.) So when DOS performs a DISKCOPY and formats the target disk, it also gives the target disk a unique serial number. DUPDISK, however, places an exact copy of the source disk on the target disk, including the serial number.
- Because DUPDISK is designed to copy only disks of similar size, you cannot use this command to copy a 360K source disk to a 720K target disk. To copy to a disk of another size, use the DOS COPY command.

File Attributes (FA)

The File Attributes (FA) command enables you to display, set, or reset the archive, hidden, read-only, and system file attributes.

Syntax

FA [*filespec*] [*switches*]

Switches

Switch	Description
/A+|–	Sets archive attribute on (+) or off (–)
/CLEAR	Removes (clears) all the attributes
/DIR+|–	Sets hidden directory on (+) or off (–)
/HID+|–	Sets hidden attribute on (+) or off (–)
/P	Pauses after each displayed screen
/R+|–	Sets read-only attribute on (+) or off (–)
/SYS+|–	Sets system attribute on (+) or off (–)
/S	Includes subdirectories
/T	Displays only file and directory totals
/U	Lists all "unusual" files (those for which some attribute has been set)

Example

The following command sets the read-only attribute on for all BAT files in the current directory:

```
FA *.BAT /R+
```

Note

- You also can use the Find File command to set file attributes.

For more information, see Chapter 9.

File Date (FD)

The File Date (FD) command enables you to change a file's date and time stamp.

Syntax

FD [*filespec*] [*switches*]

Switches

Switch	Description
/D[*date*]	Sets the date (in the format *mm-dd-yy*)
/P	Pauses after each screen is displayed
/S	Sets the date in files in subdirectories
/T[*time*]	Sets the time (in the format *hh:mm:ss*)

Example

To set all files on the disk to the date of 1-1-93 and the time of 12:00, use this command:

```
FD *.* /D:1-1-93 /T:12:00
```

Note

- You also can use the File Find command to set the date and time stamp for files.

For more information, see Chapter 26.

File Find (FILEFIND)

The File Find command helps you find files by name in any directory on disk, search for text in files, set file attributes, and set dates and times for files. This command also tells you whether enough room exists on a disk to copy a group of files from another disk. See also the Text Search (TS), File Size (FS), and File Locate (FL) commands.

Syntax

FILEFIND [*d*:][*filespec*] [*search-text*] [*switches*]

The *filespec* option can include wild-card characters—the question mark (?) and asterisk (*).

Switches

Switch	Description
/A+|–	Sets (+) or unsets (–) the archive attribute. If neither + nor – is included, the command lists files that have the archive attribute set.
/BATCH	Exits the program automatically and returns to the DOS prompt.
/C	Includes the current directory in the search.
/CLEAR	Clears all file attributes.
/CS	Makes the search case-sensitive.
/D[:][*date*]	Specifies the date to be placed on the files that match the file specification. The date should be in the format *mm-dd-yy*. (The date format may differ if your computer uses a non-United States country code.)
/HID+|–	Sets (+) or unsets (–) the hidden attribute. If neither + nor – is included, the command lists files with the hidden attribute set.
/NOW	Sets the time and date to the current system time and date.
/O:*file*	Saves output lists from the command to the specified file.
/R+|–	Sets (+) or unsets (–) the read-only attribute. If neither + nor – is included, the command lists files that have the read-only attribute set.
/S	Includes all subdirectories in the search.
/SYS+|–	Sets (+) or unsets (–) the system attribute. If neither + nor – is included, the command lists files that have the system attribute set.
/T[:][*time*]	Specifies the time to be placed on the files that match the file specification. The time should be in the format *hh:mm:ss*. (The time format may be different if your computer uses a non-United States country code.)
/TARGET:*d*	Determines whether the files specified will fit on the target drive *d*.

Example

The following command sets the date and time to 1-1-93 and noon for all files on the floppy disk in drive A:

```
FILEFIND A:*.* /D01-01-93 /T12:00:00
```

The following command produces a list of the files stored on drive C that match the *.DRV file specification:

```
FILEFIND C:*.DRV
```

This list reports the file name, size, date, time, and file attributes.

Notes

- For more information on setting the time and date, refer to the section on the File Date (FD) command earlier in this Command Reference.
- For more information on setting file attributes, refer to the earlier section on the File Attributes (FA) command.

For more information, see Chapters 9 and 25.

File Fix (FILEFIX)

To diagnose and repair damaged dBASE, Clipper, Quattro Pro, WordPerfect, Lotus 1-2-3, Symphony, or compatible files, you use the File Fix utility. File Fix examines the contents of damaged files and attempts to reconstruct those files. Many files can be repaired automatically, but some require the user to intervene and make decisions about how to fix the file.

File Fix runs in interactive mode.

Syntax

FILEFIX [*filename*]

The *filename* option is the name of the file you want to fix.

Example

```
FILEFIX MYFILE.DBF
```

File Fix determines from the DBF extension that this file is a dBASE-compatible file and begins the File Fix procedure for that file type.

Note

- File Fix determines the file type by the file extension.

For more information, see Chapter 15.

File Info (FI)

The File Info (FI) command for Norton Utilities 4.5 is not included in Version 5, 6, or 7.

File Locate (FL)

The File Locate (FL) command is similar to the File Find utility, but FL operates only from the DOS prompt and does not include the date-, time-, and attribute-setting functions of File Find.

Syntax

FL [*filespec*] [*switches*]

Switches

Switch	Description
/A	Searches for files on all drives
/F[*n*]	Finds the specified number (*n*) of files that match the file specification (the default for *n* is 1)
/P	Pauses after each screen
/T	Searches the directories in the PATH statement only
/W	Lists files in wide format on-screen
/E:*name*	Search for files in a path specified by an environment variable

Example

To locate all files on all drives that match the file specification *.XYX, use the following command:

```
FL *.XYX /A
```

Note

- If you omit the *filespec* parameter, File Locate finds all files on the drive, which is equivalent to displaying a directory (DIR) for each directory on the drive and is a way to display a list of all file names on a disk.

For more information, see Chapter 25.

File Save

The File Save command in Norton Utilities 5 was renamed SmartCan in Versions 6 and 7. For information on this command, see the section on SmartCan later in this Command Reference.

File Size (FS)

The File Size (FS) command enables you to list the size of a file or the total size of a group of files. File Size lists also the slack space. Use File Size to determine whether a target disk has enough space to receive copies of files.

Syntax

FS [*filespec*] [*target drive*:] [*switches*]

Switches

Switch	Description
/P	Pauses after each screen
/S	Includes subdirectories in the file list
/T	Displays only the total size of a specified group of files, not the sizes of individual files

Examples

To find out the sizes of all files in the current directory, use one of the following commands:

```
FS *.*

FS
```

To display the sizes of all files in the current directory and all subdirectories, use this command:

```
FS /S
```

To find out whether you have enough room to copy all files with a WP extension to disk A, use the following command:

```
FS *.WP A:
```

For more information, see Chapter 26.

Format Recover (FR)

The Format Recover (FR) command in Norton Utilities 4.5 has been integrated into the UnFormat command in Versions 5, 6, and 7. For more information, see the section on the UnFormat command later in this Command Reference.

Image (IMAGE)

The Image program captures important information about the files on your hard disk and saves that information to a file named IMAGE.DAT. If you accidentally format your disk, the information in the IMAGE.DAT file can help the UnFormat program restore your files.

Syntax

IMAGE [*switch*]

Switches

Switch	Description
/NOBACK	Instructs the command not to create the backup file IMAGE.BAK
/OUT	Instructs the command not to display a message that the IMAGE file has been updated

Note

- To keep the IMAGE.DAT file current, place the IMAGE command in your AUTOEXEC.BAT file so that IMAGE.DAT is updated each time you boot your computer.

For more information, see Chapter 4.

Line Print (LP)

The Line Print (LP) command enables you to print a text file to the printer and to choose print options.

Syntax

LP [*filespec*] [*output*] [*switches*]

The *output* option tells LP where to print the file. The default is PRN:. Some common output designations are LPT1:, LPT2:, COM1:, and COM2:.

Switches

Switch	Description
/80	Sets page width to 80 columns.
/132	Sets page width to 132 columns.
/A	Adds the file to the specified output file. If an output file exists, the new information is added to the end of that file; otherwise, LP creates a new file. (This switch works only if you specified an output file.)
/B*n*	Sets bottom margin to *n* lines (the default is 3).

Switch	Description
/CONFIG:*file*	Prints a file according to the information in the specified file. Use the NUCONFIG command to create this configuration file.
/EBCDICT	Tells Line Print that the original file is in EBCDIC format.
/HEADER*n*	Sets the type of header (*n* is a number): 0 = no header 1 = header that consists of current date and time on line 1 (the default) 2 = current date and time, plus file date and time on two lines
/HI*n*	Sets page height to *n* lines (the default is 66).
/L*n*	Sets left margin to *n* spaces (the default is 5).
/N	Turns on page numbering.
/PA*n*	Sets starting page number at *n* (the default is 1).
/PR:*xx*	Tells LP what kind of printer you are using. Here are the available options for *xx*: TT = Teletype (TTY) GE = Generic (the default) EP = Epson dot matrix PR = ProPrinter QU = Quietwriter TO = Toshiba LA = LaserJet PO = PostScript
/R*n*	Sets right margin to *n* spaces (the default is 5).
/SET:*filespec*	Tells Line Print that a printer setup string is in the file specified by *filespec*.
/SP*n*	Sets line spacing to *n* lines (the default is 1).
/TAB*n*	Sets tab spacing to *n* spaces (the default is 8).
/T*n*	Sets top margin to *n* lines (the default is 3).
/W*n*	Sets page width to *n* spaces (the default is 85).
/WS	Tells Line Print that the original file is in WordStar format.

Example

To print the file REPORT.TXT (which was created in WordStar) to the printer, use this command:

```
LP REPORT.TXT /WS
```

For more information, see Chapter 26.

List Directories (LD)

The List Directories (LD) command in Norton Utilities 4.5 has been integrated into the Norton Change Directory command in Versions 5, 6, and 7. For more information, see the section on Norton Change Directory later in this Command Reference.

Norton Cache (NCACHE2)

The Norton Cache program enables you to specify how much random-access memory (RAM) in your computer should be used as a buffer when the computer reads information from disk. The larger the cache, the faster disk access tends to be.

Syntax

To place the Norton Cache program in your AUTOEXEC.BAT file, you can use the following syntax:

path\NCACHE2 [*parameters*]

The *path* refers to the directory name in which the NCACHE2 file is stored. To place the program in your CONFIG.SYS file, you can use the following syntax:

DEVICE=*path*\NCACHE2 [*switches*]

Switches

Drive Switch	Description
/+|–A	Activates or deactivates caching. Use this switch if you need to deactivate caching to run a program in which you do not want to use caching.

Drive Switch	Description
/+|–C	Enables or disables caching of additional information. When this switch is disabled, no new information is cached.
/+|–I	Enables or disables IntelliWrites. When on, this switch accelerates disk writes and returns control to the program before the write operation ends.
/+|–P	Enables or disables write protection for drives.
/+|–S	Enables or disables SmartReads.
/+|–W	Enables or disables write-through caching. When write-through caching is disabled, writes are written directly to the disk, bypassing the cache.

Additional Switch	Description
/BLOCK=*n*	Sets the size of the cache blocks; *n* is a number (in K). Use large blocks if you are accessing large files and your disk is unfragmented. Use smaller blocks if you are accessing small files or your disk is fragmented.
/DELAY=*ss.hh*	Delay writes to the disk in seconds or hundredths of a second (for example, 00.10 is one-hundredth of a second). The default is 00.00. Slight writing delays can improve the speed of write-intensive programs.
/DISKRESET=ON|OFF	Specifies that all data be written to disk when a program makes a disk reset request.
/DOS=*n* or /DOS=–*n*	Specifies how much DOS (conventional) memory the cache uses. Use this switch only when you do not have any expanded or extended memory. A negative value tells the command to leave that much memory free for other programs to use.
/DUMP	Writes to disk all information that currently is in the cache.

continues

Additional Switch	Description
/EXP=*n* or /EXP=–*n*	Specifies how much expanded memory (in K) the cache uses. A negative value tells the command to leave that much memory free for other programs to use. (/EXP=750, for example, tells the command to use 750K of expanded memory for the disk cache.) Any expanded memory used must be compatible with LIM 4.
/EXT=*n* or /EXT=–*n*	Specifies how much extended memory (in K) the cache uses. A negative value tells the command to leave that much memory free for other programs to use. (/EXT=256, for example, tells the command to use 256K of extended memory for the cache.)
/G=*n*	Limits the caching of group sector reads for specified drive(s).
/INI=*filespec*	Indicates where to look for the file that contains installation options. If your installation options are in your NORTON directory in a file named NCACHE.INI, for example, use the parameter INI=\NORTON\NCACHE.INI.
/INSTALL	Installs Norton Cache with all default values, including the use of all available expanded and extended memory for the cache. This switch often is the easiest and quickest way to execute the command.
/MULTI ON|OFF	Specifies whether the multitasking feature of IntelliWrites is on or off.
/OPTIMIZE=[S|E|M]	Optimizes for speed, efficiency, or memory. The S (Speed) option sets the following parameters: /BLOCK=8K /DELAY=1.0 /READ=8K /WRITE=*x*, where *x* is the largest track (in K) of all tracks being cached

Additional Switch	Description
	The E (Efficiency) option sets the following parameters: /BLOCK=*s*, where *s* is the smallest block size for the current cache (usually 512K to 1M) /DELAY=1.0 /READ=8K /WRITE=8K The M (Memory) option sets the following parameters: /BLOCK=8K /DELAY=0.0 /READ=0 (disables the read-ahead feature) /WRITE=0 (disables IntelliWrites)
/QUICK=ON|OFF	ON displays the DOS prompt even when information is being written to disk. OFF displays the DOS prompt after all writes to the disk are finished.
/QUIET	Specifies quiet mode; only errors are reported.
/R=D*n*	Specifies how many sectors ahead should be read. A specification of /R=0 or /R=D0 disables read-aheads. /R=*n* specifies read-aheads always; /R=D*n* causes read-aheads only when the file being read is not a random file. *n* is the number of sectors ranging from 0 to 15.
/READ=*n*	Sets the maximum size (in K) for read-aheads. For *n*, use a whole number from 8 to 64.
/REPORT=ON|OFF	Displays status information (ON) or does not display status information (OFF).
/RESET	Resets the cache by writing all pending disk writes, flushing all the data from all drives.
/SAVE	Saves current cache settings in the file specified by the /INI switch (or NCACHE.INI).

continues

Additional Switch	Description
/STATUS=ON|OFF	Displays a condensed version of the cache report. If the OFF switch is used, the report is not displayed at install time.
/UNINSTALL	Removes the NCACHE2 (TSR) program from memory and discontinues caching. You can uninstall only if the program was loaded from your AUTOEXEC.BAT file, not from your CONFIG.SYS file.
/USEHMA=ON|OFF	Uses the XMS high memory area to reduce the use of DOS RAM (if set to ON). This option is available only if you have an extended memory manager.
/USEHIGH=ON|OFF	Minimizes the use of conventional (low) DOS memory if high memory is available (if set to ON). The default setting is OFF.
/WRITE=*n*	Sets maximum size (in K) of the IntelliWrites buffer. For *n*, use a whole number from 8 to 64.

Example

To install the cache by using default conditions, enter the following command:

```
NCACHE2 /INSTALL
```

To install the cache by using all but 64K of extended memory and using read-aheads of 32K only for drive C, enter this command:

```
NCACHE2 /EXT=-64 /READ=32K /-A C:/+A
```

The /-A switch deactivates caching for all drives, and then C:/+A activates caching for drive C. Thus, only drive C is cached.

Notes

- If your computer currently uses the Microsoft SmartDrive cache, you must remove that cache from your AUTOEXEC.BAT or CONFIG.SYS file before you use the NCACHE2 program.
- When you install NCACHE2 without specifying a cache size, the default setting is /EXT=4096, 2048K.

For more information, see Chapter 21.

Norton Change Directory (NCD)

The Norton Change Directory (NCD) command enables you to manage your directories on disk, change quickly from directory to directory, and print a directory tree. NCD gives you more control of directory names than the normal DOS commands do. The NCD command is particularly suited for use interactively, but you can also use it from the DOS prompt.

Syntax

When you enter the NCD command from the DOS prompt, the syntax can be any of the following:

NCD [*dirname*] [*switches*]

NCD [*d*:] /V:*label*

NCD [*d*:] /L[:*output*] [/G|/NG|/T] [/P] [/A]

NCD MD [*dirname*]

NCD RD [*dirname*]

NCD SIZE [*dirname*]

NCD COPY *source destination* [/DELETE]

NCD GRAFT *source destination*

NCD RMTREE *dirname* [/BATCH]

The *dirname* parameter is the name of the directory to be changed, created, removed, or displayed. The *source* and *destination* parameters tell the command the original location of the directory to be copied or grafted (*source*) and the target location (*destination*) for the directory.

COPY copies a directory to a new location. The following command copies all files from the directory named MYDIR to the directory named YOURDIR:

NCD COPY \MYDIR \YOURDIR

Including /DELETE (described in the "Switches" section) deletes copied files from their original locations.

GRAFT automatically deletes files from the old location. RMTREE removes a directory and all associated files.

The MD and RD versions of the NCD command are similar to the DOS MD and RD commands. You use these commands to make a new directory or remove an empty directory. The SIZE command displays the amount of space taken up by the files in the directory.

To use the COPY, GRAFT, and RMTREE options, you first must enable them in the NCD configuration dialog box, which you access with the Directory Configure option.

Switches

Switch	Description
/A	Displays the directory tree for all drives except floppy drives.
/BATCH	Skips all prompts and exits to DOS when finished.
/DELETE	Deletes copied files from their original directory.
/G	Displays the directory tree graphically.
/L:*output*	Prints the directory tree to the specified output file.
/N	Does not write to the file TREEINFO.NCD. If you are using NCD on a write-protected disk, you need to use this switch.
/NG	Displays the tree using nongraphic characters. Use this switch when you are using a printer that does not support graphic characters.
/P	Pauses after each screenful of information is displayed.
/R	Updates the file TREEINFO.NCD, which contains information about your directory tree structure.
/T	Totals the number and size of all files.
/V:*label*	Places a volume label on the disk.

Examples

To create a directory named \WP51\REPORTS, use this command:

```
NCD MD \WP51\REPORTS
```

To use the NCD command to change directories, enter **NCD** plus the name of the directory to which you want to change. To change to the directory \ONE-A\TWO-A\THREE-A\FOUR-A, use the following command:

NCD FOUR-A

For more information, see Chapter 23.

Norton Control Center (NCC)

Norton Control Center (NCC) enables you to control hardware settings, including display colors, keyboard rates, and clock settings. You can use Norton Control Center in command-line or interactive mode.

Syntax

NCC [*filespec*] [*switches*]

The *filespec* variable refers to a file that contains system information specifications. Before you use this version of the command, you must create this file by using NCC in interactive mode to choose the settings you want and then saving the information to a file.

Switches

Switch	Description
/CURSOR	Reads the information in the file named by *filespec* but sets only the cursor size
/DOSCOLOR	Reads the information in the file named by *filespec* but sets only the previously chosen DOS colors for foreground, background, and border
/PALETTE	Reads the information in the file named by *filespec* but sets only the palette colors
/SET	Reads the information in the file named by *filespec* and sets all the parameters

If you have not created a settings file with the NCC command in interactive mode, you can set a few options with certain quick switches:

Switch	Description
/25	Places the monitor in 25-line mode (same as /CO80)
/35	Places the monitor in 35-line mode (supported only by EGA monitors)
/43	Places the monitor in 43-line mode (supported only by EGA and VGA monitors)
/50	Places the monitor in 50-line mode (supported only by VGA monitors)
/BW80	Places the monitor in black-and-white mode with 25 lines and 80 columns
/CO80	Places the monitor in color mode with 25 lines and 80 columns
/FAST	Sets the keyboard rate to its fastest possible value

You can use Norton Control Center also to set system stopwatches. The following switches are available:

Switch	Description
/C:*comment*	Displays the text string *comment* after you execute the command. This switch is useful for documenting which timer is being reported. If the comment contains blanks, you must enclose the entire comment in quotation marks.
/L	Displays the time and date on left side of monitor.
/N	Suppresses display of the current time and date.
/START:*n*	Begins stopwatch number *n*, which is a number ranging from 1 to 4.
/STOP:*n*	Stops stopwatch number *n*, which is a number ranging from 1 to 4.

Example

To set your VGA computer so that 50 lines are displayed onscreen and the keyboard rate is the fastest value, use this command:

```
NCC /50/FAST
```

Note

- To access Norton Control Center interactively, enter **NCC** at the DOS prompt without using any file specification. The Norton Control Center menu appears, enabling you to choose interactively the same options you can set with switches from the prompt.

For more information, see Chapter 22.

NDOS

NDOS is an alternative command processor that replaces COMMAND.COM, providing several new and enhanced DOS commands.

Syntax

NDOS [*switches*]

You can begin the NDOS processor at any time by entering the NDOS command at the DOS prompt, but the program usually is installed in the CONFIG.SYS file with the NUCONFIG command (see Chapter 2).

Here is the normal command for installing the program in CONFIG.SYS:

```
SHELL=C:\NU7\NDOS.COM /P
```

The /P switch specifies that NDOS is loaded as the primary command processor. This version of the command assumes that you have the Norton Utilities 7 program stored in the directory called \NU7 on drive C. Include also the following command in CONFIG.SYS:

```
DEVICE=C:\NU7\KEYSTACK.SYS
```

You need this command if you want to use the NDOS KEYSTACK command.

Switches

Switch	Description
@d:*filespec*	Uses commands in the designated file as options for loading NDOS.
/A:*n*	Sets the alias list size to *n*, which is a number ranging from 256 to 32000.
/C *command*	Loads a transient copy of NDOS. This switch usually is used by programs to start the command processor, execute a command, and then return to the program.
/E:*n* or /E+*n*	Sets the environment size. If :*n* is used, the size is set to *n* for the primary shell; *n* is a number ranging from 256 to 512 (the default is 256). If the +*n* option is used, the environment is set to its current value plus *n*.
/H:*n*	Sets the history size. *n* is a number ranging from 512 to 8192 bytes.
/L:*d*:*path*	Used with secondary shells, /L specifies where to find the NDOS.OVL file. You must use this switch if the NDOS.OVL file is not in the default directory.
/P	Loads NDOS as the primary command processor.
/S:B[*d*:*path*]	Sets NDOS swapping mode to the default. NDOS first tries XMS memory, then EMS, and then disk swapping (to the specified directory).
/S:E	Sets NDOS swapping mode to EMS memory.
/S:N	Turns off NDOS swapping mode.
/S:X	Sets NDOS swapping mode to XMS memory.
/U	Moves the resident portion of NDOS to XMS UMB (upper memory block) to reduce the size of the resident portion in low memory. You can use this switch only with 286 and later computers.

Note

- Many NDOS commands have the same names and syntax as DOS commands but usually include additional features. NDOS also includes Batch Enhancer commands.

For more information, see Chapter 28.

Norton Disk Doctor (NDD)

Norton Disk Doctor (NDD) finds and corrects, if possible, physical or logical problems on a disk.

Syntax

NDD [*d*:][*d*:] [*switches*]

The *d*: options are disk drive names.

Switches

Switch	Description
/COMPLETE or /C	Tests for bad cylinders on the disk; also tests the partition table, boot record, root directory, and lost clusters.
/DT	Tells the program to perform only the surface test.
/FIXSPACES	Tells the program to fix file names that contain spaces.
/NOCOMP	Omits tests on compression structures (common when you are running file compression programs such as Stacker).
/NOHOST	Omits tests for the host drives of compressed volumes. Drive D, for example, often is the host drive when the disk contains a compression program such as Stacker.
/QUICK or /Q	Omits the test for bad cylinders, but tests the partition table, boot record, root directory, and lost clusters.
/R:*file*	Outputs to the named file a report on the result of the test. Use with /Q or /C.
/RA:*file*	Adds the report to the named file instead of creating a new file (otherwise, this switch is the same as /R). Use with /Q or /C.
/SKIPHIGH	Does not load into high memory. Include this command if you are using a memory manager that already occupies DOS high memory.

continues

Switch	Description
/REBUILD	Rebuilds the entire disk.
/UNDELETE	Undeletes a DOS partition that was skipped when a user chose not to undelete the partition during a previous run of NDD.
/UNDO	Causes the program to undo repairs made in earlier runs of the program.
/X:*d*	Excludes drive *d* from the test.

Example

To run a quick check of a disk, use NDD with the /QUICK switch:

```
NDD /QUICK
```

You can place this command in your AUTOEXEC.BAT file to specify that a quick check of your disk be performed each time you boot your computer.

Notes

- Use Norton Disk Doctor whenever you experience problems accessing a file or when you get a DOS error message concerning the operation of a disk. NDD is your first line of defense against these problems, enabling you to keep the problems from getting worse and to solve the problems before any data is lost.
- If you enter the NDD command with no switches, you operate in interactive mode. The Disk Doctor menu appears. From this menu, you can choose options that diagnose the disk or attempt common solutions (making a disk bootable, reviving a defective disk, or recovering from DOS's RECOVER command).

For more information, see Chapter 12.

Norton Integrator (NI)

The Norton Integrator (NI) command in Norton Utilities 4.5 has been integrated into the NORTON (Norton Utilities main screen)

command in Versions 5, 6, and 7. For more information, see the section on the Norton Utilities main screen (NORTON).

Norton Utilities Configuration (NUCONFIG)

The Norton Utilities Configuration (NUCONFIG) command enables you to change the way the Norton Utilities program works. You can set passwords, edit menus, change video and mouse settings, set up Norton Cache, include commands in AUTOEXEC.BAT and CONFIG.SYS, assign alternative utility names, and uncompress the program's EXE files. From the Norton main screen, you can access these items from the Configuration menu. From the DOS prompt, you can display the Configuration menu by entering **NUCONFIG**.

For more information, see Chapter 2.

Norton Utilities Main Screen (NORTON)

The NORTON command opens the Norton Utilities main screen, which contains a list of all the utilities. From this screen, you can run any of the Norton Utilities programs. From the menu bar, you can access brief help files that describe the purpose and syntax of each utility.

To open the Norton Utilities main screen from the DOS prompt, enter **NORTON**.

Norton Utilities Main Program (NU)

The Norton Utilities main program (the NU command) in Norton Advanced Utilities Version 4.5 has been integrated into the DISKEDIT command in Versions 5, 6, and 7. For information on DISKEDIT, refer to the section on Disk Editor (DISKEDIT) earlier in this Command Reference.

Quick UnErase (QU)

The Quick UnErase (QU) command in Norton Utilities 4.5 has been integrated into the UnErase command in Versions 5, 6, and 7. For more information, see the section on UnErase (UNERASE) later in this Command Reference.

Safe Format (SFORMAT, SF, or FORMAT)

The Safe Format command prevents you from accidentally formatting a disk that contains important information, and writes UnFormat to disk as a safety check for those times when you do format a disk.

Syntax

SFORMAT [*d*:] [*switches*]

You may have renamed the SFORMAT command as FORMAT to replace the DOS command of the same name. If so, you use the following syntax for the SFORMAT (FORMAT) command:

FORMAT [*d*:] [*switches*]

(SFORMAT.EXE is renamed FORMAT.EXE.)

To shorten the name, you can rename Safe Format as SF and then use this syntax:

SF [*d*:] [*switches*]

Use the NUCONFIG program (see Chapter 2) to rename the Safe Format program as FORMAT or SF.

Switches

Switch	Description
/1	Formats the disk as single-sided.
/4	Formats the disk as 360K (in a 1.2M drive).
/8	Formats the disk with eight tracks per sector.

Switch	Description
/B	Leaves space on the disk for system files.
/F:*size*	Specifies the size of the disk in K (360 or 720) or M (1.2, 1.44, or 2.88). *size* can be 360, 720, 1.2, 1.44, or 2.88.
/N:*n*	Specifies the number of sectors per track. *n* can be 8, 9, 15, or 18.
/S	Places system files on the disk.
/T:*n*	Specifies the number of tracks. *n* can be 40 or 80.
/V:*label*	Places a volume label on the disk.

Following are the switches that are unique to Norton's Safe Format command:

Switch	Description
/A	Uses automatic mode (in batch files)
/D	Uses DOS format mode
/Q	Uses quick-format mode
/U	Unconditional format; no warnings

Example

To format a disk with system files and place the volume label MYDISK on the disk, use this command:

```
SFORMAT B: /S /V:MYDISK
```

Note

- You can use the Safe Format command in interactive mode by entering **SFORMAT** (or **FORMAT**) with no switches. From the Safe Format dialog box that appears, you can choose the drive to format, the size of the disk to format, whether to copy system files to the disk, which (if any) volume label to put on the disk, and which format mode to use (safe, quick, or DOS).

For more information, see Chapter 4.

SmartCan (SMARTCAN)

The SmartCan command moves deleted files to a less-used part of the hard disk so that those files remain recoverable for a longer period. After you use the part of the disk that contains a deleted file, any deleted files that occupy that space become unrecoverable.

Syntax

SMARTCAN [*switches*]

Switches

Switch	Description
/OFF	Disables the SmartCan command so that deleted files are not affected. The SmartCan command remains in memory but does not function until you use the /ON switch.
/ON	Enables the SmartCan command to move deleted files to a safe area.
/CONVERT	Causes the program to search for and convert old Erase Protect trash cans. Erase Protect is the name of SmartCan for earlier versions of Norton Utilities.
/SKIPHIGH	Does not load into high memory.
/STATUS	Displays the status of the SmartCan command.
/UNINSTALL	Removes the SmartCan command from memory if the command was the last memory-resident (TSR) command loaded.

Notes

- Usually, you should include the Smartcan command in your AUTOEXEC.BAT file so that the command is in effect whenever you delete files.
- The SmartCan command is a memory-resident (TSR) program.
- For information about unerasing deleted files, see the section on the UnErase command later in this Command Reference.

For more information, see Chapter 5.

Speed Disk (SPEEDISK)

The Speed Disk command reorganizes your disk so that fragmented files can be unfragmented. You can use this command to pack and rearrange files to help your disk run at top speed.

Syntax

SPEEDISK [*d*:] [*switches*]

Switches

Switch	Description
/B	Reboots after the command finishes.
/F	Performs a full optimization of the disk.
/FD	Performs a full optimization with directories first.
/FF	Performs a full optimization with a file reorder.
/Q	Unfragments free space and fills unused gaps (quick compression).
/SD[–]	Sorts file by date. If you include the minus (–) parameter, the sort is from most recent date to oldest date.
/SE[–]	Sorts files by extension. If you include the minus (–) parameter, the sort is in descending alphabetical order.
/SN[–]	Sorts by file name. If you include the minus (–) parameter, the sort is in descending alphabetical order.
/SS[–]	Sorts by file size. If you include the minus (–) parameter, the sort is from largest to smallest.
/U	Unfragments as many files as possible without moving parts of the directory structure. Some damaged files may not be capable of unfragmenting.
/V	Uses verify-after-write data verification. That is, each time information is written to the disk, the information is then read from the disk to verify that it was correctly written.

Example

To optimize drive C with a full optimization and then reboot the computer after the optimization, use this command:

```
SPEEDISK C: /F/B
```

Note

- You can run Speed Disk in interactive mode by entering **SPEEDISK** with switches. In interactive mode, you can choose options from the Speed Disk menus. You can also choose which files not to move and which files to place on the disk first (closest to track 0).

For more information, see Chapter 19.

System Info (SYSINFO)

The System Info (SYSINFO) command provides information about your computer (computer type, peripherals in use, ROM-BIOS information, and so on) and performs tests that enable you to compare your computer's performance with the performance of other computers.

Syntax

SYSINFO [*d*:] [*switches*]

Switches

Switch	Description
/AUTO:*n*	Operates in automatic mode. The *n* parameter specifies a delay of a certain number of seconds between screens.
/DEMO	Operates in demo mode.
/DI	Produces the Drive Information Summary dialog box only.
/NOHDM	Tells the program not to attempt to detect the hard drive model.

Switch	Description
/N	Skips the live memory probe. On some computers, this probe forces you to reboot after the SYSINFO test. Use the /N switch to get around this problem.
/REP:*filespec*	Causes the program to print a report to the specified file.
/SPEC:*filespec*	Causes the program to use settings saved in the specified file.
/SOUND	Produces a beep between CPU tests.
/SUMMARY	Produces the System Summary dialog box only.
/TSR	Shows all TSR (terminate-and-stay-resident) programs in memory.

For more information, see Chapter 18.

Text Search (TS)

The Text Search (TS) command enables you to search for text in files anywhere on disk, including erased space.

Syntax

TS [*filespec*] [*string*] [*switches*]

The *filespec* option names the files to be searched, such as *.BAT. If this parameter is missing, all files are searched. The *string* option is the text to be located in those files (for example, TEXAS).

Switches

Switch	Description
/A	Automates the search and ignores prompts.
/C*n*	Begins the search at the cluster specified by *n*.
/CS	Performs a case-sensitive search. Thus, if you specify the search string as *Alan*, the command does not find *ALAN*.
/D	Searches the entire disk.

continues

Switch	Description
/E	Searches only the erased portions of the disk.
/EBCDIC	Specifies that the files being searched are in EBCDIC format.
/LOG	Creates output suitable for a log file or printer.
/S	Includes subdirectories in the search.
/T	Sets the noninteractive summary total.
/WS	Specifies that the files being searched are in WordStar format.
/F:*filename*	Specifies the output file to hold the disk clusters.

Example

To find occurrences of TEXAS in files with a TXT extension, use the following command:

```
TS *.TXT TEXAS
```

For more information, see Chapter 25.

Time Mark (TM)

The Time Mark (TM) command in Norton Utilities 4.5 has been integrated into Norton Command Center (NCC) in Versions 5, 6, and 7. For more information, refer to the section on Norton Command Center (NCC) earlier in this Command Reference.

UnErase (UNERASE)

The UnErase command enables you to recover erased (deleted) files. You can unerase only files that have not been overwritten by other files.

Syntax

UNERASE [*filespec*] [*switches*]

Switches

Switch	Description
/IMAGE	Uses the information in the IMAGE file to aid in recovery.
/MIRROR	Uses the information in the MIRROR file to aid in recovery. (The MIRROR file is created by the MIRROR command in DOS 5.0.)
/NOINFO	Causes the program not to use the IMAGE and MIRROR information.
/NOTRACK	Does not use DOS delete-tracking information to aid in file recovery.
/PROTECTED	Causes the program to recover only files protected by SmartCan or DOS's Delete Sentry.
/NOPROTECTED	Causes the program to exclude from recovery those files protected by SmartCan or DOS's Delete Sentry.
/SKIPHIGH	Does not load into high memory. Include this command if you are using a memory manager that already occupies DOS high memory.

Example

The following command looks for all erased files with the BAK extension:

```
UNERASE *.BAK
```

The UnErase command may prompt you to provide the first character of the name of the file to be unerased. Follow the prompts on-screen after entering the command.

Notes

- For information on how to protect erased files, refer to the section on the SmartCan command earlier in this Command Reference.
- By default, the command uses the most current of the IMAGE or MIRROR files and also uses DOS delete-tracking information, if that information is available.

- You can use the wild-card characters ? and * to specify which files you want to unerase.

For more information, see Chapters 10 and 16.

UnFormat (UNFORMAT)

You use the UnFormat command to bring back information on a formatted disk that has been reformatted accidentally.

Syntax

UNFORMAT [*d*:]

The *d*: option is the name of the disk to be unformatted.

Switches

Switch	Description
/IMAGE	Tells the command to use the IMAGE recovery-information file
/MIRROR	Tells the command to use the MIRROR recovery-information file

If you do not specify the IMAGE or MIRROR file, UnFormat uses the most recent of the files, if they exist.

Notes

- This command works best if you used the Image (or DOS MIRROR) command to store a copy of the system areas of your disk or if you formatted the disk with Safe Format. (For more information, refer to the sections on the Image and Safe Format commands earlier in this Command Reference.)
- If your hard disk has been formatted, do not copy anything to the hard disk before you attempt to use UnFormat. In this case, you should run the UnFormat program from a floppy disk. (For more information, see Chapter 14 on using a rescue disk.)

For more information, see Chapter 11.

Unremove Directory (UD)

The Unremove Directory (UD) command in Norton Utilities 4.5 has been integrated into the UnErase command in Versions 5, 6, and 7. For more information, refer to the section on the UnErase (UNERASE) command earlier in this Command Reference.

Volume Label (VL)

The Volume Label (VL) command in Norton Utilities 4.5 has been incorporated into the NCD command in Versions 5, 6, and 7. For more information, refer to the section on the Norton Change Directory (NCD) command earlier in this Command Reference.

Wipe Disk

The Wipe Disk command in Norton Utilities 4.5 has been integrated into the WipeInfo command in Versions 5, 6, and 7. For more information, see the section on the WipeInfo (WIPEINFO) command.

Wipe File

The Wipe File command in Norton Utilities 4.5 has been integrated into the WipeInfo command in Versions 5, 6, and 7. For more information, see the section covering the WipeInfo (WIPEINFO) command.

WipeInfo (WIPEINFO)

The WipeInfo command overwrites information on disk in such a way that the information cannot be recovered. You can use this command to wipe certain files or the entire disk.

Syntax

WIPEINFO *d*:[*disk switch*] [*common switches*]

WIPEINFO *d*:[*filespec*] [*file switches*] [*common switches*]

Switches

Disk Switch	Description
/E	Overwrites only information that is unused or that is in erased files (files marked for erasure by the DOS ERASE command but otherwise recoverable).

File Switch	Description
/K	Also wipes any slack space allocated to a file.
/N	Uses no-wipe mode, which causes the WipeInfo command to behave like the DOS ERASE command. The file is marked as erased but is not overwritten.
/S	Wipes out files that match *filespec* in subdirectories also.

Common Switch	Description
/GOV*n*	Uses a government-standard overwriting procedure. The default for *n* (number of overwrites) is 3. Although the default normally is 0, the /GOV switch overrides this default. When you include the /GOV switch, the value written to disk is ASCII value 246.
/R*n*	Overwrites the disk *n* times (the default is 1).
/V*n*	Selects the value that is to be used to overwrite information on the disk. The *n* value is a number ranging from 0 to 255.
/BATCH	Executes the command without prompts (for batch files).

Example

To wipe disk D (adhering to the government standard), enter the following command:

```
WIPEINFO D:/GOV
```

For more information, see Chapter 8.

APPENDIX A

A DOS Review

DOS, which stands for *d*isk *o*perating *s*ystem, is a software program that manages the resources of your computer. On the IBM PC, this operating system is called PC DOS. IBM-compatible computers use a nearly equivalent DOS called MS-DOS, which stands for Microsoft DOS. Microsoft is the company that designed DOS for the IBM family of personal computers.

Items are stored and retrieved in many everyday activities, such as banking, filing, or checking a coat. Information is just one more thing that needs to be stored somewhere so that it can be retrieved later. Because the computer handles information, having a "manager" place information somewhere and later retrieve it makes sense. On the computer, DOS is the manager. You tell DOS what to do with the information, and DOS stores it and retrieves it as directed.

For DOS to understand what you want it to do, you must speak its language. This appendix covers the basic concepts and commands—the *language*—of DOS. If you are a new computer user, read this entire appendix before you use the book, because the book frequently references DOS concepts and commands. If you are familiar with some parts of DOS, you may not need to read the entire appendix. Instead, you can study only the topics that you want to learn more about and those that will be helpful to you as you use this book (and your computer). The topics covered in this appendix include the following:

- Learning how DOS works
- Reviewing commonly used DOS commands
- Managing a hard disk with DOS commands

- Using batch files and system files
- Using DOS to back up information on your hard disk
- Using DOS 5 and DOS 6

Understanding How DOS Works

Before you learn what specific tasks DOS can do, you must first understand how DOS works. To understand that, you must understand the concept of computer files. You can relate computer files to paper files used in the workplace. You are undoubtedly familiar with folders in a file cabinet. Each folder contains information about some person, item, contract, and so on. Computer files operate similarly. Like a physical file, a computer file contains information. This information may be your resume, your monthly budget, an economics report, or a software program. Instead of having physical pieces of paper, you have electronically stored information on the disk.

The computer needs to keep track of all the files on disk somehow, and you need to be able to make copies of files, erase files, and perform other managerial functions concerning the resources of the computer. DOS manages these resources under the direction of you—the computer operator.

This appendix begins with a summary of the changes DOS has undergone since its inception. You then learn how DOS gets your computer going, how to name and use DOS files, and how to issue DOS commands.

Reviewing the Evolution of DOS

When the IBM PC was first introduced in October, 1981, it operated under the PC DOS operating system, Version 1.0. Since that time, PC DOS has undergone several changes, and newer versions have been released. In any business or university, you are likely to find several versions in use, so knowing some of the differences among the various versions is helpful. Some earlier versions of PC DOS are not fully compatible with the newer versions.

DOS has been continually changed so that it can support new storage devices introduced on new versions of the PC. Usually, these changes involve advancements in disk storage. When first introduced, the PC

supported only single-sided floppy disks—disks that stored information on one side only. When double-sided disks were introduced, a new version of DOS was required, and DOS 1.1 was released. Besides supporting new disk devices, later versions of DOS contain new and improved features, such as support for new kinds of monitors and other peripherals.

Various changes in PC DOS are outlined in table A.1. Changes in DOS are typically considered upwardly compatible. That is, new versions of DOS can usually read information from disks created with old versions of DOS—but not always. For example, a major change in the way information is stored on disk was made in DOS 2.0. The result is that a computer that uses DOS 1.1 or DOS 1.0 cannot read a floppy disk formatted with DOS 2.0. Hard disks were first supported with DOS 2.0. The Norton programs covered in this book are based on the assumption that you operate with DOS 2.0 or a later version. The currently popular 1.44M disks were first supported with DOS 3.3. Norton Utilities requires DOS 3.3 or later to run.

Table A.1 Versions of PC DOS

Version	Primary Feature(s)
1.0	Supports single-sided floppy disks (160K)
1.1	Supports double-sided floppy disks (320K)
2.0	Supports hard disks and a subdirectory file structure (double-sided disks, now 360K)
2.1	Supports the half-height floppy disks on the IBM PCjr
3.0	Supports the 1.2M disk and other new functions of the IBM PC AT
3.1	Supports networking
3.2	Supports 720K 3 1/2-inch floppy disks, laptop computers, and networking
3.3	Supports 1.44M 3 1/2-inch floppy disks and the PS/2 series of computers
4.0	Features pull-down menus and supports drive use past the previous 32M limit
5.0	Supports 2.88M 3 1/2-inch floppy disks, provides better memory management, and adds some data recovery features
6.0	Adds disk compression, virus checking, and more utility programs

Booting Your Computer

By itself, the computer hardware does not "know" how to do many tasks. It can match patterns of 0s and 1s and use those patterns to follow commands that programmers stored in the computer's memory. Because the computer knows so little, you need a quick way to "teach" it what to do. That teaching process occurs when the computer is booted.

Within the PC, a small amount of information is always present in ROM (read-only memory). This memory contains the BIOS (basic input-output system) and some other diagnostic and language programs. This memory does not contain DOS.

How, then, can the computer operate? When you turn on your computer, it has only the most primitive instructions. The computer knows enough, however, to look for DOS on a disk in the disk drive. The computer "pulls itself" to life by reading its instructions from the DOS program on disk. In computer jargon, loading DOS into memory is called *booting* the machine. This booting process occurs whenever you turn on the computer.

After you load DOS into memory from your floppy disk or hard disk, the computer can perform many management functions. Most of these functions are ways to access and manipulate information on disk.

At times, you may need to reboot the computer. A program bug, for example, may cause the computer to freeze so that it no longer responds to program commands. Your only chance for recovery may be to reboot. One obvious way to reboot is to turn off the computer and then turn it back on. This process is called a *cold boot*. Electronic equipment is particularly sensitive, however, to being turned on and off. The computer's electronics stabilize when the power is turned on. Many times, if an electronic component fails, it does so after you first turn it on—when it gets the initial burst of power.

Because of this danger of failure, the system gives you a built-in way to restart the computer without turning off the power. This method of rebooting is called a *warm boot*. To perform a warm boot, hold down the Ctrl and Alt keys and press Del. Hold down all three keys for a second, release all keys, and the computer reboots. Some computers have restart buttons that perform warm boots. With Norton Utilities, you can enter **BE REBOOT** to cause the computer to perform a warm boot.

Naming and Using DOS Files

As mentioned previously, files stored on a computer are like folders stored in a file cabinet. Some identifying name is usually written on each folder's tab. If the folder contains the budget for May, 1993, for example, the tab may say *BUDGET MAY 1993*. If the folder contains a copy of the annual report, the tab may say *ANNUAL REPORT*. The name on the tab gives a short description of the contents of the file.

Usually, you do not place folders in file drawers at random. All the budget files may be in one drawer, and all the report files may be in another drawer. In fact, you may reserve an entire file cabinet for reports, and another cabinet may contain only financial information. You should name and organize files on the computer in the same way.

Specifying File Names

Like the name tab on a paper folder, each computer file has a name, called a *file name*. A file name should briefly describe the contents of the file. Your resume may be named RESUME, for example, and the May, 1993, budget may be named BUDMAY93. When you create related files, select names that are similar. If you are writing a three-part paper, you may want to create three separate files named PART1, PART2, and PART3. If you are collecting monthly data, you may want to name the files containing the information MAY93, JUN93, and JUL93.

Although you usually create files from applications rather than from DOS, the file names you use must obey DOS guidelines. A DOS file name can contain up to eight characters, including all letters (upper- and lowercase) and numbers, but it cannot contain spaces or any of the following characters:

```
. ' \ / [ ] : | < > + = ; * ? ,
```

Some programs enable you to use a space in a file name, but not on the DOS level, so avoid using spaces.

Using File Extensions

In the case of computer files, the file name includes a second part, called the *extension*, which you can use to specify the type of file—whether it is a word processing file, database file, letter, or budget.

You can include up to three characters in the extension, which you separate from the file name with a period. You can use the name RESUME.WP for a resume file you create with the WordPerfect word processing program, and you can use the name PROJECT.LET for a letter you write about a certain project. This extended form of the name is called the *file specification*, or *filespec* for short. You also may include a drive name, such as drive C or A, in your file specification. Examples are C:MYFILE.DOC and C:\MYFILE.DOC.

DOS and other software programs commonly follow certain conventions for file extensions because extensions often tell the computer what kind of information is in the computer file. Files on disk that contain DOS commands usually end with the extension COM.

BASIC language programs end with the extension BAS. Application programs also use certain extensions. Lotus 1-2-3 worksheets, for example, may end in WKS, WK1, or WK3. Table A.2 lists some common file extensions. You need to be aware of the extensions that DOS uses so that you can choose your own without conflicting with these predefined extensions.

Table A.2 Common Extensions

Extension	Description
BAS	BASIC language program
BAT	Batch command file (a type of DOS file)
BMT	Norton batch-to-memory file
COM	Command program (DOS command)
DBF	dBASE database file
EXE	Executable program (software)
PRN	Lotus print-to-disk file
SYS	File containing system information
TXT	Text file (standard ASCII)
WKS, WK1, or WK3	Lotus 1-2-3 worksheet file

Using Wild-Card Characters

If you select similar names for related files, you then have the ability to manipulate those files simultaneously as a group. If the files are named

similarly, DOS (and Norton) commands enable you to refer to more than one file with wild cards or global file characters. These wild-card characters are the asterisk (*) and the question mark (?). Like a wild card in a poker game, * and ? may be substituted for any characters—the asterisk for any number of characters, and the question mark for any one character.

To copy all your data files from one disk to another, you must tell DOS which files to copy. Suppose that your files are named JAN, FEB, MAR, and so on, through DEC. To copy all 12 of these files requires 12 commands, each specifying one file to copy. However, if you name the files JAN.DAT, FEB.DAT, MAR.DAT, and so on, through DEC.DAT, you can copy all the files with the single file specification *.DAT. This specifies files with the extension DAT, regardless of the file name. In this case, you use the DAT extension to remind the user that these files contain data.

Because the ? wild card replaces only one character, the specification ???.DAT substitutes for up to three characters in a file name. This file specification selects J.DAT, JA.DAT, and JAN.DAT, but not JANU.DAT or JANUARY.DAT. The wild-card specification *.* matches all files—all file names and all extensions. As this appendix introduces DOS commands, it gives you specific examples of wild cards. Norton commands also use wild cards extensively. Norton's NDOS provides more flexible use of wild cards. See Chapter 28 for more information about NDOS.

Issuing DOS Commands

DOS—whether PC DOS or MS-DOS—is similar to a language. DOS performs management functions on the IBM PC (and compatibles), but not until you instruct it to do so. You, the user, typically give those instructions in the form of a DOS command. A DOS command is usually a word (often a verb) that tells DOS what you want it to do. Sometimes the command is followed by one or more words, or *parameters*, that clarify which task the command performs. These parameters are called *options* or *switches*.

The command CLS (Clear Screen), for example, tells DOS to blank the screen. CLS requires no other parameters. However, the command COPY requires that you also specify what file(s) to copy and where to copy them. Therefore, you must include additional information in the command.

When the DOS prompt is on the computer screen, the operating system is waiting for you to enter a DOS command or the name of an executable program. The DOS prompt usually is a letter (A, B, C, and so on)

followed by the > symbol. The following prompt, for example, means that DOS is waiting for instructions and that drive A is the currently active drive or the default drive:

```
A>
```

If DOS needs to look on disk for some information, it automatically looks on the default drive unless you direct the system to look elsewhere. If you use a hard disk system, the default drive is usually C, with the following prompt:

```
C>
```

This prompt indicates that you are logged on to drive C. To change drives, type the drive letter followed by a colon and press Enter. (You may have variations of these two prompts, such as `A:\>` and `C\:>`.)

DOS consists of a number of commands, which are categorized as two types: *internal* and *external*. Internal DOS commands are copied into the computer's memory when DOS is loaded as you boot the computer. These commands stay in memory until you turn off the computer; you can use these commands whenever the DOS prompt appears on-screen. Internal commands covered in this appendix include ATTRIB, CD, CLS, COPY, DEL, DIR, ERASE, FIND, MD, PATH, PROMPT, RD, RENAME, and TYPE.

If you stored every DOS command in memory, however, not enough memory would be left for application programs. Some DOS commands, therefore, are not copied onto the computer's memory at boot time but are stored on disk in a file until they are needed. These external DOS commands on disk are usually identified by the COM extension. The FORMAT command, for example, is stored on the DOS disk as the file FORMAT.COM. If you use an external command, it must be available on disk. After you enter the FORMAT command, for example, DOS looks on the default (currently active) disk to find the file FORMAT.COM. If the file is not found, the following message appears on-screen:

```
Bad command or file name
```

This error message indicates that the command you requested was not found on disk. External commands covered in this appendix include BACKUP, CHKDSK, DISKCOPY, FORMAT, PRINT, RECOVER, RESTORE, and TREE. To learn how to access external DOS commands, see the section "Working with Directory Path Names," later in this appendix.

Norton commands are much like DOS external commands. Each command constitutes a program that resides on disk until you enter the command name at the DOS prompt. Then the program is entered into memory and run.

To issue a DOS command, type it at the DOS prompt and press Enter. For example, to use the DIR command to display a list of the files located in the default directory, type the following command and press Enter:

```
DIR
```

To have DOS display a directory of a disk other than the default disk, you must add more information to the DIR command. To display a directory of the files on the floppy disk in drive A, use this command:

```
DIR A:
```

Reviewing Commonly Used DOS Commands

Although dozens of DOS commands are available, this review of DOS is limited to the commands you commonly refer to or may need to know so that you can understand the information in this book. This appendix covers selected options and switches for each command. For a more complete list of command parameters, consult your DOS manual or Que's *Using MS-DOS 6,* Special Edition.

NOTE In the syntax descriptions of DOS commands, items enclosed in brackets ([]) are optional. Items that appear in italics are command variables. You should replace the *filespec* variable, for example, with a real file specification when you enter the command at the DOS prompt.

ATTRIB

The ATTRIB command lists or sets the read-only and archive attributes of files. You cannot write to, change, or erase a read-only file. The *read-only* attribute protects the file from accidental or unauthorized change. The *archive* attribute indicates whether the file has been backed up and is used for some backup procedures. ATTRIB is available in DOS 3.0 and later versions. Here is the syntax of this command:

```
ATTRIB [+|–R] [+|–A] filespec [/S]
```

The +R option sets the file or files indicated in the *filespec* to read-only, and –R turns off the read-only attribute. The +A option sets files to

archive (archive is set on), and –A turns off the archive attribute. When you back up a file, the archive attribute setting is switched off, indicating to the system that the file has been backed up.

If you use the /S switch, the files in all subdirectories that match the *filespec* are also affected. If you do not use the +|–R or +|–A option, ATTRIB lists file names that match the *filespec*, and reports the current archive and read-only settings for those files. Norton's NDOS provides an ATTRIB command with additional features beyond the DOS ATTRIB command (see Chapter 28 for more information on NDOS commands).

CHKDSK

With the CHKDSK command, you can examine a floppy or hard disk to determine how much space is being used and whether the disk has any problems. CHKDSK, for example, may detect lost clusters in files on disk. CHKDSK summarizes the amount of available memory on disk and also reports the amount of RAM available to the computer. CHKDSK is an external DOS command and has this syntax:

CHKDSK [*d*:] [/F]

The *d*: designation specifies the floppy disk or hard disk to check. To check the disk in drive B, use this command:

CHKDSK B:

The /F switch tells CHKDSK to fix any problems found with the file allocation table. If you do not use the /F switch, CHKDSK still tells you how much space would be fixed if the /F switch were used, but it does not fix the problems. Instead of using CHKDSK, use Norton Disk Doctor (NDD) to find and solve these kinds of disk problems. For more information on NDD, see Chapter 12.

CLS

The CLS command clears the screen. No options or switches are available. CLS has the following syntax:

CLS

Norton's NDOS provides a CLS command with additional features beyond the DOS CLS command (see Chapter 28 for more information).

COPY

The COPY command is a powerful, frequently used DOS command. COPY copies one or more files to another disk or to the same disk under a new name. You use this syntax:

COPY [*d:*]*filespec* [*d:*][*filespec*]

Here is a more easily remembered syntax:

COPY *source destination*

To copy the file named REPORT.TXT from the current default disk (A) to disk C, use the following command:

COPY REPORT.TXT C:REPORT.TXT

In this command, the source is the file REPORT.TXT, and the destination is C:REPORT.TXT. Note that you do not have to specify a drive letter if the file is on the default drive. Furthermore, you can omit the name of the destination file if it is the same as the source file. The following command, used from the A> prompt, performs the same copy as the preceding command:

COPY REPORT.TXT C:

The source file does not have to be on the default drive. To copy files from a drive other than the default to another drive, include the drive specification in both the source and destination file names. You can also change the name of a file during a copy.

Suppose that the default drive is C and you want to copy a file from drive A to drive B and rename the file at the same time. Use the following command:

COPY A:REPORT.TXT B:RPT.TXT

Another way to use the COPY command is to copy a file on the same disk to a different file name. To make a duplicate copy of the file REPORT.TXT and call the duplicate copy REPORT.DUP, you can use this command:

COPY REPORT.TXT REPORT.DUP

If you attempt to copy a file to itself, an error results. The following command produces an error message:

COPY REPORT.TXT REPORT.TXT

You can copy multiple files simultaneously with the wild-card characters (* and ?). To copy all DAT files from the default drive C to drive A, use this command:

```
COPY *.DAT A:
```

To copy a file from a directory to another directory, you must include the directory name in the command (unless the file is in the current default directory). The following command copies the file named MYFILE.TXT in the C:\MYDIR directory to the \YOURDIR directory:

```
COPY C:\MYDIR\MYFILE.TXT \YOURDIR
```

Norton's NDOS provides a COPY command with additional features beyond the DOS COPY command (see Chapter 28 for information on NDOS).

CAUTION: The COPY command allows you to overwrite an existing file with a new file—without giving you a warning that the old file is about to be overwritten. Norton Disk Monitor (see Chapter 6) can prevent accidental overwrites of files.

DIR

The DIR command displays names of files on disk, file sizes, and dates and times the files were created. You use the following syntax:

```
DIR [d:][filespec] [/P][/W]
```

Here is the simplest version of this command:

```
DIR
```

The DIR command gives you a list of all files on the default drive.

To list files located on another drive, specify the drive letter. To obtain a listing of files on drive B, use this command:

```
DIR B:
```

If you include a file specification in the command, DIR lists only those files that match the specification. To view a directory of just the files with DAT extensions, use the following command:

```
DIR *.DAT
```

To list all files that begin with the letter R, use this command:

```
DIR R*.*
```

The switches in the DIR command are /P and /W. The /P switch instructs DOS to pause after a screen of file names is displayed. If more than 22 file names are in a directory, the names usually scroll off-screen during a directory listing. With the /P switch, the first 22 files are listed, and the following message appears at the bottom of the screen:

```
Press a key to continue. . .
```

After you press a key, the next 22 files are displayed. This process continues until all files are listed.

The /W switch stands for *wide listing.* In this version of the list, only the file names appear, with several file names listed on each line. This format enables you to display more file names on one screen.

You can combine the DIR command's options and switches. The following command lists all the files on drive B with a DAT extension, in wide format:

```
DIR B:*.DAT /W
```

To display a list of files from a directory that is not the current default directory, place the directory name in the command. The following command displays a list of files in the \MYDIR directory:

```
DIR \MYDIR
```

Norton's NDOS provides a DIR command with features beyond the DOS DIR command (see Chapter 28 for information on NDOS).

DISKCOPY

Many times, you may want to make an exact copy of a floppy disk. In fact, when you get new software, always copy all the original disks and use copies instead of originals in your work. Use the DISKCOPY command to copy the contents of an entire floppy disk from one disk to another of equal size. Note the syntax of this command:

```
DISKCOPY d1: d2:
```

The *d1*: designation is the source disk, and *d2*: is the destination disk. To copy the disk in drive A to the disk in drive B, use the following command:

```
DISKCOPY A: B:
```

If the destination disk is not formatted, the DISKCOPY procedure formats the disk. DISKCOPY makes an exact copy of a disk. If the source or destination disk contains any bad sectors, the DISKCOPY procedure may not work. Furthermore, both source and destination disks must be

the same size. You cannot use the DISKCOPY command to copy from the hard disk to a floppy, for example, because the hard disk is a different size from the floppy disk.

If you use a system with only one floppy disk drive, you still can perform a DISKCOPY procedure. From the A> prompt, use this command:

```
DISKCOPY A: A:
```

DOS prompts you to insert the source disk in the drive; then the system prompts you to place the target disk in the drive. You may have to swap disks several times during each DISKCOPY procedure.

Norton Utilities 7 provides a replacement to the DOS DISKCOPY command. See Chapter 26 for information on the Duplicate Disk (DUPDISK) command.

> **CAUTION:** The DISKCOPY command erases everything on the target floppy disk. Be sure that the target disk does not contain anything important, because it cannot be recovered once new information has been copied to it with DISKCOPY.

ERASE and DEL

The ERASE and DEL commands remove files from the disk. These commands are identical and use the same syntax:

ERASE [*d*:][*filespec*]

DEL [*d*:][*filespec*]

Pay attention to what is on your disk and how much space you have used. Running out of space on disk is a common problem. The ERASE and DEL commands can remove unneeded files from disk and free up that space for other files to use. Like most DOS commands, these commands may be used on a single file or multiple files and with wild-card characters in *filespec*. To erase the single file named REQUEST.LET, enter one of the following:

```
ERASE REQUEST.LET
```

```
DEL REQUEST.LET
```

To erase all files with the extension DAT, use this command:

```
ERASE *.DAT
```

To erase all files, use the following:

```
ERASE *.*
```

After you enter the ERASE (or DEL) command followed by *.*, DOS prompts you with this question:

```
Are you sure (Y/N)?
```

DOS is offering you a chance to change your mind before it erases everything on your disk. Press Y and Enter to continue with the erase, or press N and Enter to cancel the procedure.

> **CAUTION:** Be very sure that you know what you are doing when you enter the ERASE or DEL command. Check to make sure that you are logged on to the correct disk drive and directory. (If you accidentally erase a file, however, you may be able to recover it with the Norton UnErase command. See Chapter 10 for more information.)

Norton's NDOS provides ERASE and DEL commands with features beyond the DOS ERASE and DEL commands. See Chapter 28 for more information on NDOS. In addition, Norton Utilities 7 provides a more thorough way to erase a file (so that it can't be unerased). See Chapter 8 for information about the WipeInfo command.

FDISK

The FDISK command prepares your hard disk (fixed disk) for formatting. Usually, you need to execute this command only once—when you first get a new computer. Occasionally, you may need to start over with the FDISK command again. FDISK begins a program that prompts you with questions about how you want to set up your hard disk.

> **WARNING:** If you use FDISK on a hard disk, all information on that disk may be lost. Use FDISK only when you are sure that you want to start from scratch on the disk. Refer to your DOS manual for details. If you are not an experienced user, do not use FDISK until you verify with an experienced user that it is the correct command to use.

FIND

The FIND command, also called a *filter*, searches for a string of characters in a file (or files) and lists each line in the file containing text that matches the string. The FIND command can help you look for a file that contains particular information. You use the following syntax:

FIND *string* [*filespec*] [*filespec*] [*filespec*]...

To determine whether the string *1993 REPORT* is in the files REPORT.1, REPORT.2, and REPORT.3, use this command:

FIND "1993 REPORT" REPORT.1 REPORT.2 REPORT.3

The results of the find may look like this:

```
---------REPORT.1
---------REPORT.2
THE 1993 REPORT ON SILVER PRICES
---------REPORT.3
```

In this example, the phrase *1993 REPORT* was found only in the file named REPORT.2. The line that contains the phrase is listed below the name of the file being searched. The other files had no finds associated with them.

The Norton's Text Search (TS), File Locate (FL), and File Find commands are powerful alternatives to the DOS FIND command. See Chapter 25 for more information on these commands.

FORMAT

The FORMAT command prepares floppy disks and hard disks for use. After you purchase floppy disks, you cannot just put them into the disk drive and use them. You must first format them. Formatting specifies how information is stored on disk. The FORMAT procedure also analyzes the entire disk for defective tracks and prepares the disk to accept DOS files. Here is the syntax of the FORMAT command:

FORMAT [*d*:] [*switches*]

Suppose that you use a computer with a hard disk drive and you are logged on to drive C. To format a new floppy disk in drive A, the simplest command is the following:

FORMAT A:

After you enter the FORMAT command, DOS responds with this message:

```
Insert new diskette for drive A:
and press ENTER when ready. . .
```

This prompt gives you a chance to back out of the command if you discover that you do not want to format that floppy disk. If you want to cancel the command at this point, press Ctrl+Break.

WARNING: You can destroy all information on a floppy disk or hard disk drive by using the FORMAT command incorrectly. If you do not enter the name of the drive to format, the FORMAT command uses the default drive. Thus, if you enter the following command from the C> prompt, DOS assumes that you want to format the hard disk drive C:

FORMAT

Be careful not to do this (unless you want to erase everything on your hard disk)!

The FORMAT command has a number of switches. Only the most common one, /S, is described here.

The /S switch causes the FORMAT procedure to create a system disk—one that contains the files necessary to boot the computer. To format the disk in drive A with a label and the system files, use the following:

FORMAT A: /S

The Norton Safe Format (SFORMAT) command is a safer, faster alternative to DOS FORMAT. In addition, the Norton UnFormat (UNFORMAT) command enables you to unformat a formatted hard disk, but with some restrictions. (For more information on Safe Format, see Chapter 4.) DOS 5 (and later) contains an UNFORMAT command also. And beginning with DOS 5, formatting a floppy disk with the FORMAT command in DOS 5 (or later) is similar to using the Norton Safe Format—it is possible to unformat the disk by using the DOS or Norton UNFORMAT command. If you format a disk with DOS FORMAT in a version earlier than DOS 5, however, it is impossible to recover information from that floppy disk by using the DOS or Norton UNFORMAT command.

PRINT

The PRINT command enables you to print the contents of a text file to the printer. The PRINT command has this syntax:

PRINT [*d:*]*filespec* [/T]

To print a file in drive B called EXAMPLE.TXT to the line printer, enter the following command:

PRINT B:EXAMPLE.TXT

The computer responds with this prompt:

```
Name of list device (PRN):
```

Press Enter to print the file to the standard print device (PRN=Printer), or enter another device name, such as LPT1 or LPT2 (parallel ports), or COM1 or COM2 (serial ports).

You can queue several files to print at once by entering several PRINT commands; DOS remembers each of the files and prints them in the order of the PRINT commands. If you decide to stop the print job, reenter the command with the /T switch. To terminate the current print job, enter the following command:

PRINT /T

This command terminates all print jobs in the print queue. A cancel message is displayed, the page in the printer is advanced to the top of the form, and the printer's buzzer sounds. See Chapter 26 for a description of the Norton Line Print (LP) command.

RECOVER

The RECOVER command recovers files that have been damaged somehow. You can misuse this command easily, so consider using the Disk Tools (DISKTOOL) command instead. For more information on Disk Tools, see Chapter 13.

RENAME or REN

The RENAME or REN command changes the name of a file on disk. Suppose that you save a file named REPORT with your word processor, but you misspell the file name by typing **REPOTR**. When you are back in

DOS, you can correct the problem with the RENAME command. Use the following syntax:

RENAME [*d*:]*filespec1 filespec2*

Notice that the command REN is an acceptable abbreviation of the RENAME command. Basically, the RENAME command has the following form:

RENAME *oldname newname*

The *oldname* variable is the current name of a file, and *newname* is the name you want the file to have. Include a space between the *oldname* and *newname* specifications. To rename the file REQUEST.LET as REQUEST.TXT, use this command:

RENAME REQUEST.LET REQUEST.TXT

You can use wild-card characters to rename a group of related files. To rename the files JAN.DAT through DEC.DAT on drive A to the new names JAN.OLD through DEC.OLD, use the following command from the A> prompt:

RENAME *.DAT *.OLD

You cannot rename a file to a file name that currently exists on that disk. If you try this, you see the following error message:

```
Duplicate file name or file not found
```

Note that RENAME is not a COPY command, which means that you cannot rename a file from one disk drive to another. The following command, for example, does not work:

RENAME A:REQUEST.LET B:REQUEST.LET

If you attempt to use this command, this error message appears:

```
Invalid parameter
```

Norton's NDOS provides RENAME and REN commands with features beyond the DOS RENAME and REN commands. See Chapter 28 for more information on NDOS.

SYS

The SYS command transfers system files from a bootable disk to another disk. Use the following syntax:

SYS *d*:

The *d*: designation is the drive name of the disk in which you want to place the system files. The SYS command does not transfer the file COMMAND.COM to the destination disk. You can use the regular COPY command to copy the COMMAND.COM file to the disk. For more information, see the FORMAT /S command in the FORMAT section earlier in this chapter.

The system files are hidden files. You cannot access them by using the normal COPY command, nor do they appear when you issue a DIR command. You must place the system files at a certain spot on disk, so unless you formatted a disk by using the /B switch, SYS cannot transfer a copy of the system files to the disk. The Make a Disk Bootable option in Norton Disk Tools (discussed in Chapter 13) enables you to transfer system files to a disk that has not been prepared to accept them.

TYPE

The TYPE command prints the contents of a file to the screen. TYPE has the following syntax:

TYPE [*d*:]*filespec*

To display the contents of the EXAMPLE.TXT file located on drive B, use this command:

TYPE B:EXAMPLE.TXT

The file to be printed should be a text file. If you attempt to use TYPE to print the contents of a non-ASCII file, the result probably will be a series of meaningless characters on-screen.

Norton's NDOS provides a TYPE command with features beyond the DOS TYPE command (see Chapter 28 for more information on NDOS).

Managing Your Hard Disk

Most microcomputers sold today include a hard disk storage device. A *hard disk* (also called a *fixed disk*) is a permanent disk usually housed in the computer; the hard disk is capable of storing many times the amount of information that a single floppy disk can hold. The size of most hard disks is measured in megabytes (M), or millions of bytes. A 100M hard disk can store 100 million characters of information.

Using a computer with a hard disk creates several challenges. The fact that a hard disk can store more information can be an advantage as well as a disadvantage. With a hard disk, you don't need to keep up

with a mile-high stack of floppy disks, but you need to plan more. Managing more than 1,000 files stored on a hard disk can be a huge task. When you run the DIR command, the information could take several minutes to scroll by.

Understanding Directories

You can solve this problem by dividing the hard disk into several directories, each of which contains related information. One directory may contain all DOS files. Another directory may contain word processing files. Yet another directory may contain database files. Each directory functions almost like a separate disk.

DOS sets up directories in a particular way. When you format a disk (including a floppy disk), the format procedure automatically creates one directory, called the *root directory*. You can create other directories to branch off the root, thereby building a directory tree. You must choose which directories to create, and you must develop the philosophy behind the structure. Figure A.1 shows one possible directory tree. This tree is organized by task. The top directory is the original or root directory. Branching off are directories (or subdirectories) that contain the task-oriented partitions of DOS, Word Processing, Database, and Spreadsheet.

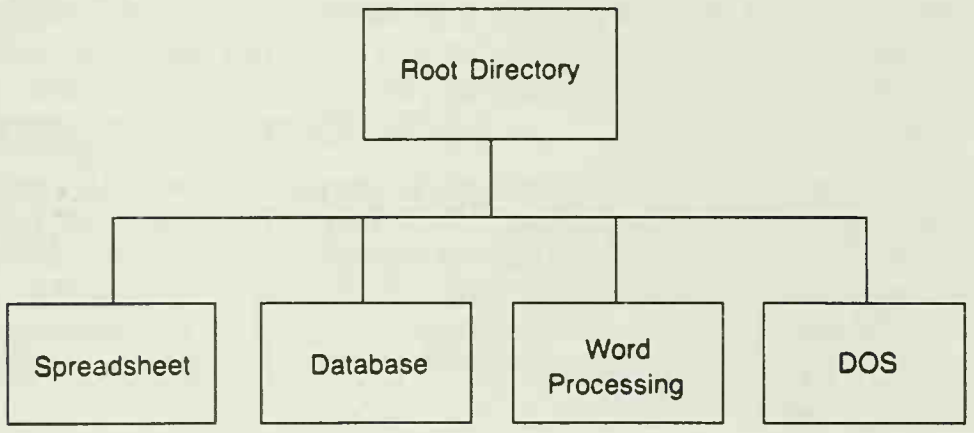

Fig. A.1
A directory structure.

Creating directories according to a planned directory tree can help make your work more efficient. You can move from branch to branch, depending on the tasks you want to complete. If you are doing word processing, for example, you can move to the word processing directory, which gives you access to all your word processing files. Working from this directory also separates you from the unrelated files in other directories. If you are in the word processing directory and enter **DIR**, you get a list of files in that directory only.

How do you create a directory? How do you move from one directory to another? How do you get rid of a directory? These questions are answered by a series of DOS commands, which enable you to create, use, and remove directories as necessary:

Command Name	Abbreviation	Description
MKDIR	MD	Makes a directory
CHDIR	CD	Changes directories
RMDIR	RD	Removes a directory

Before learning how to use the DOS commands to manage your hard disk, you should understand how the names of the directories relate to file specifications. Use the NCD (Norton Change Directory) command instead of the DOS commands (see Chapter 23 for information on NCD). This command provides a graphic interface that makes creating, changing, and removing directories more intuitive. NCD also has additional capabilities, such as renaming directories.

Working with Directory Path Names

Each directory has a name. The root directory always is designated as the \ directory, but you assign your own names to the directories you create that branch off the root directory. A directory name can include up to eight characters (see "Specifying File Names" earlier in this appendix).

When referring to a directory name, most people use the entire path name. A directory's path name describes the path that DOS can take through the directory tree structure to find the directory. The WP directory that branches off the root directory is usually referred to as \WP. The directory named LETTERS that branches off the WP directory is specified by the path name \WP\LETTERS. So a backslash (\) is used for two purposes:

- The first backslash (\) specifies the root directory.
- The second backslash (\) separates the names of subdirectories.

A directory path becomes a part of the file specification of any file in that directory. The path appears between the drive specification and the file name and always contains a beginning and an ending backslash. Generally, a complete file specification consists of the following:

d:*path**filename.ext*

This specification represents a drive name, a path, a file name, a period, and an extension. Here is the complete file specification for a file named MYFILE.TXT on drive C in the \WP directory:

C:\WP\MYFILE.TXT

Norton's NCD command provides features beyond the DOS MD, CD, and RD commands. See Chapter 23 for more information on NCD.

Creating New Directories

You use the DOS MKDIR command, often abbreviated as MD, to make a new directory. Either of these versions will work:

MD *path*

MKDIR *path*

The following command creates a directory named \WP on the current drive:

MD \WP

The new \WP directory branches directly off the root directory. To make a directory named LETTERS that branches off \WP, use this command:

MD \WP\LETTERS

Changing Directories

Every hard disk has one or more directories, beginning with the root directory. The CHDIR command (or CD for short) changes from the current directory to another directory on the same disk drive. While in a particular directory, you can enter such commands as DIR or RENAME that apply only to the files in the current directory. You can use either of the following versions of this command:

CD *path*

CHDIR *path*

To change to the directory named \WP, enter this command:

CD \WP

To go back to the root directory, enter this command:

CD \

With CD, you can move from any directory to any other directory by entering the command and the complete path of the directory to which you want to change.

Here is another version of the CD command:

```
CD..
```

This command takes you to the next higher directory in the tree structure. Suppose that you are in the directory \WP\LETTERS. Typing **CD..** changes you to the \WP directory.

Removing Empty Directories

Sometimes you need to remove a directory from the hard disk to make room for other, more important files. Use the RMDIR or RD command for that purpose. You cannot remove a directory that contains any user files, though, so you must first erase or move all files in the directory first. You can use either of the following versions:

```
RD path
RMDIR path
```

To remove the directory named \MYDIR, use this command:

```
RD \MYDIR
```

Listing Directories

When your hard disk contains a number of directories, you may want to view a list of which directories are available. The DOS command to perform that task is TREE. The TREE command displays a listing of all the directories on the specified drive. TREE has the following syntax:

```
TREE [d:]
```

To see which directories are on your entire disk, enter this command:

```
TREE \
```

The Norton Utilities NCD command enables you to look at the directory tree and interactively change, rename, make, and remove directories. For more information on NCD, see Chapter 23.

Giving Paths to Programs

At this point, you are undoubtedly familiar with the concept of the path as part of a file specification. PATH also is a DOS command. The PATH command tells DOS where to look for programs not in the current directory. Many applications require you to know how to create or modify a PATH command. Use the following syntax for this command:

PATH [*path*];[*path*];[*path*]...

The TREE command, for example, requires that the file TREE.COM be on disk. Under normal circumstances, if you enter TREE in the \WP directory, you get this message:

```
Bad command or file name
```

The reason is that the TREE.COM command file is not in the \WP directory and DOS cannot find and execute the command. To avoid the need to keep copies of all programs in all directories or to type a full path name each time, you can tell the computer where to find a program when you request it from a directory in which the program does not reside. This function is the responsibility of the PATH command.

The PATH command gives the computer a priority list of directories to search for executable program files. The PATH command causes DOS to search for only three kinds of executable files: COM (command), EXE (program), and BAT (batch) files.

A common directory setup includes a directory named \DOS. This directory generally contains all the DOS files as well as external DOS commands. In addition, you may have a \NORTON directory that contains all the Norton commands. Note the following example:

PATH C:\;C:\DOS;C:\NORTON

This command indicates that if the NORTON command is given in any directory and the command is not found in that directory, DOS looks first in the root directory (specified in the PATH command as C:\). If the command is not there, DOS looks in the next directory listed in the PATH command—in this case, the C:\DOS directory. Finally, if the command still has not been found, DOS looks in the C:\NORTON directory. When the command TREE is entered in the \WP directory, then, the command file TREE.COM is found in the \DOS directory, and the command is successful. Notice that each directory name in the PATH command is separated from the preceding directory name by a semicolon (;).

When a PATH command is given, it remains in effect until you reboot the computer or turn it off. Therefore, you usually enter the command only once each time you boot the computer. As you learn in the discussion of the AUTOEXEC.BAT file later in this appendix, you can automate the entry of the PATH command.

Controlling the DOS Prompt

When you switch from directory to directory, you may have difficulty keeping track of which directory you are in. To solve this problem, you can use the PROMPT command to customize the DOS prompt, which is normally `C>` on a hard disk. PROMPT has the following syntax:

PROMPT [*prompt commands*]

The various prompt commands are listed in table A.3. Each command must be preceded by a dollar sign ($). Any text following the PROMPT command that is not preceded by a $ is displayed literally.

Table A.3 PROMPT $ Commands

Command	Displays
_ (underscore)	Carriage return, line feed
B	|
D	The system date
E	The Esc character
G	>
H	The Backspace character
L	<
N	The default drive letter
P	The current path/directory
Q	=
T	The system time
V	The version of DOS

The following DOS command causes the DOS prompt to include the path as part of the prompt:

PROMPT PG

The $P is the prompt command for the path, and the $G is the prompt command for the greater-than sign. While you are in the root directory, the prompt is therefore `C:\>`. The `\` between the `C:` and the `>` tells you that you are in the root directory. If you enter the command **CD \DOS**, the prompt becomes `C:\DOS>`, indicating that you are in the DOS directory.

The PROMPT command offers a variety of ways to customize the DOS prompt. To display any text, include it in the PROMPT command without a preceding $. To display a unique prompt, you can use a command like the following:

```
PROMPT This computer belongs to Bill!$_$P$G
```

The text `This computer belongs to Bill!` is output literally. The $_ command (a dollar sign and an underscore) tells PROMPT to perform a carriage return and a line feed, which means that the cursor moves to the next line. On that line, the prompt appears, specified by the PG prompt commands. When you are logged on to the root directory, this prompt appears as the following:

```
This computer belongs to Bill!
C:\>
```

Norton's NDOS provides a PROMPT command with features beyond those of DOS PROMPT. See Chapter 28 for more information on NDOS.

Using Batch and System Files

A BAT file extension indicates that a file is a batch file—one that contains several DOS commands you want executed in a particular order. A system file often is designated by the SYS extension. A common system file that you need to know about is CONFIG.SYS, which tells the computer certain information about how to operate.

Creating Batch Files

If you have a series of DOS commands that you perform repetitively, you can create a file that contains these commands and have DOS execute all of them in sequence. Suppose that you often use these two commands:

```
CLS
DIR /W
```

These commands clear the screen and perform a directory command in wide mode. You can place these two commands in a file, such as WIDE.BAT. Then, instead of remembering exactly how to type these commands each time you need them, you can run that batch file by just entering **WIDE**. With this command, you tell DOS to execute the two commands contained in the batch file WIDE.BAT.

You have several ways to create this kind of file. The most common method is to use a file editor. A simple file editor named EDLIN is included as a part of DOS. Most word processing programs can create batch files also. In later versions of DOS (beginning with DOS 5), a full-screen editor named EDIT is available.

Here is one way to create a batch file without using a text editor:

1. Enter the following command:

   COPY CON WIDE.BAT

   This command tells DOS that you will enter (copy) information from the console; the command indicates also that the information is to be placed in the file named WIDE.BAT.

2. Enter the commands you want to include in the batch file. You may want to enter these commands:

   CLS
   DIR /W

   You do not see the DOS prompt.

3. To end this procedure, press the F6 key or Ctrl+Z. The lines you typed are now stored in the file called WIDE.BAT.

Creating an AUTOEXEC.BAT File in DOS

Each time you boot the computer, DOS looks for a special batch file called AUTOEXEC.BAT. If you want a series of commands to execute each time you boot the computer, place them in the AUTOEXEC.BAT file. If, for example, you always want the PATH and PROMPT commands to be activated when the computer is booted, you can create an AUTOEXEC.BAT file that contains these commands, as for the WIDE.BAT file you created earlier. Then whenever you boot your computer, your path is set up, and your prompt is customized automatically. The PATH and PROMPT commands are frequently included in the AUTOEXEC.BAT file.

Creating a CONFIG.SYS File

Another file that DOS looks for each time you boot the computer is CONFIG.SYS. Like AUTOEXEC.BAT, CONFIG.SYS is not a required file. If you do have a CONFIG.SYS file in your root directory, however, DOS looks in the file to see how you want the computer configured. You rarely need to decide for yourself what goes into the CONFIG.SYS file, because the software you install usually has instructions about its requirements for the file. DOS, for example, usually enables software to communicate with eight files at once on disk. This sounds like a great many files, but some complicated programs like dBASE IV need more access to the disk than DOS usually provides. Therefore, the dBASE IV installation manual tells you to place the following lines in your CONFIG.SYS file:

```
FILES=20
BUFFERS=15
```

These commands allow more files and more *disk buffers* (reserved portions of RAM that temporarily hold data to be written to disk) than are usually available. These lines are the two most common settings in the CONFIG.SYS file. Other items that you can set in this file include the following:

Item	Description
COUNTRY	Specifies which country you are in. This item pertains to how dates are displayed.
DEVICE	Specifies certain kinds of input and output devices, such as monitors, plotters, and memory disks.
LASTDRIVE	Specifies the maximum number of disk drives on your computer (the normal setting is E).

CAUTION: Unless your program documentation directs you to set or change the information in CONFIG.SYS, you should change or add to this file only under the guidance of someone familiar with its use. For more information, see Que's *Using MS-DOS 6,* Special Edition.

You can create the CONFIG.SYS file with a word processor (using text file mode), the Edlin editor, or the DOS Edit program. The Norton NUCONFIG command also enables you to add or remove drivers and program commands to the CONFIG.SYS and AUTOEXEC.BAT files.

Remember that DOS executes the AUTOEXEC.BAT and CONFIG.SYS files at boot time. If you change one of these files, you must reboot the computer to have DOS act on the information in the files.

Using DOS To Back Up Your Hard Disk

Another important feature of DOS is its capability to back up the information on your hard disk. You can easily destroy data on disks. In fact, sometime during your use of the computer, you are likely to lose some data. With caution, you will experience such a loss only rarely—and if you have a backup procedure, you should be able to recover from the loss with little grief. Although Norton Utilities can help you recover information in a number of ways, keeping backup copies of your work is still a good idea.

One of the simplest ways to back up your information is to make multiple copies of everything you do. If you are writing a paper, for example, you should keep at least two copies, each on a separate disk. If your original copy is on a hard disk, copy the file to a floppy disk each time you finish working on the file.

Save your work often. Never work on a document for hours without making copies. If the electricity goes off or the computer has problems, you can easily lose an entire day's work. How often you should save your work is determined by how much time you are willing to lose. If you do not mind possibly losing a few hours' worth of work, save and back up your work (just the files you are working on—not the entire disk) every few hours, or at least once a day.

In addition to backing up a single file (which you can do easily with the COPY command), you can take advantage of a DOS procedure for backing up an entire hard disk: the BACKUP command.

Using BACKUP

The most common way to back up a hard disk is to copy it to floppy disks. The DOS BACKUP command (for DOS before Version 6) enables you to copy files from the hard disk to any number of floppy disks. You can copy the entire disk or just portions of it to floppy disks. You may need 30 or more floppy disks to back up an entire hard disk. BACKUP has the following syntax:

BACKUP *source destination* [*switches*]

Here is the simplest form of the BACKUP command:

```
BACKUP C: A:
```

This command tells DOS to back up all files on drive C to floppy disks in drive A. After you issue the command, the computer prompts you to insert disk #1 in drive A. Information is copied to the floppy disk until it is full. Then you are prompted to insert disk #2 into the drive. This procedure repeats until all the files are backed up onto the floppy disks. Note, however, that this form of the command backs up only the files from the currently active directory.

If you are using DOS 3.2 or earlier, all backup disks must first be formatted. Unfortunately, this requirement means that you must have some idea of how many floppy disks you need for the backup. To back up a 10M hard disk to 360K floppy disks, you need 28 floppy disks (10,000,000/360,000=27.7). If you are using a version later than DOS 3.3, you do not need to format floppy disks to use for backup. The procedure formats the disks during the backup (if you used the /F switch).

Usually, you have no reason to back up copies of executable programs from the hard disk, because you have those programs on the original floppy disks (which you could reload in a crisis). You do want to back up the files that contain your work. To back up specific files, you can enter the names of those files by using wild-card characters. Suppose that you name all your data files with a DAT extension and you want to back up all those files. Use the following command:

```
BACKUP C:*.DAT A:
```

This command backs up DAT files only in the active subdirectory. To back up all directories, make sure that your file specification begins with the root directory (\) and add the /S switch to the command:

```
BACKUP C:\*.DAT A: /S
```

To back up all files in all directories and all subdirectories, use this command:

```
BACKUP C:\ A: /S
```

The following switches may be used with DOS BACKUP:

Switch	Description
/A	Adds more files to a set of already backed-up files
/D:*mm-dd-yy*	Backs up all files modified on or after a specified date
/F	Tells BACKUP to format disks used in the backup if those disks were not formatted

continues

Switch	Description
/M	Backs up files that have been modified since the last backup
/S	Backs up all subdirectories, starting with the specified or current directory
/T:*time*	Backs up all files modified at or after the specified time (*hh*:*mm*:*ss*)

DOS 6 contains a backup program that is essentially the same as the Norton Backup utility, described in Chapter 29.

Using RESTORE

To use one or more of the files that you have backed up with the DOS BACKUP command, you must use the RESTORE command to copy these files from the backup floppy disks back to the hard disk. RESTORE has this syntax:

RESTORE *source destination* [*switches*]

Note the following example:

RESTORE A: C: /S

This command restores all files from floppy disks in disk A (source) to the fixed disk C (destination), including all subdirectories (/S). Other options for the RESTORE command are listed in your DOS manual. A particularly helpful one is the /P or PROMPT switch. When you use this switch, the computer prompts you before restoring a file and enables you to choose the files to restore.

Creating a Disaster Recovery Plan

Set up a procedure to back up your hard disk—or portions of it—regularly. Here is an example of a good procedure:

1. After you initially load your hard disk, back up the entire hard disk twice. Place backup set #1 off-site. Keep backup set #2 on site for quick restores. Set #1 is for recovery from a major disaster, such as the entire room burning down—including your computer and set #2.

2. Back up the entire disk daily, using the /M and /A switches. This is an incremental backup, which uses additional disks. This backup, along with set #2, provides you with a current backup of the computer.
3. Back up the entire disk once a week. Place this new weekly backup off-site and bring back the old off-site backup so that you can reuse its disks for the incremental backups (step 2) and the next weekly backup.

This procedure results in two backups: one weekly backup stored away from the office in case of an emergency (such as a fire or flood), and one "working" backup at the office that you can use daily.

Keep a copy of this book and Norton Utilities handy in case a disk accidentally is formatted. See Chapters 3 and 4 on how to prepare for and recover from a potential disk-related disaster.

Because backups take up so much disk space, you should keep your hard disk clear of unneeded files. Unneeded files on a disk can clutter the directories, limit the amount of disk space for other uses, and prolong the backup procedure. In addition to the backup procedure, another good idea is to set aside time once a week to erase any unneeded files from the hard disk, or to copy them to floppy disks on a semipermanent basis.

Alternatives to the DOS BACKUP command (particularly for DOS 5 or earlier) are available. Commercially available programs such as Norton Backup (see Chapter 29) and FastBack provide a quicker way to back up your hard disk. Backup devices such as tape drives and optical disk drives enable you to back up an entire hard disk to a single tape or disk in a few minutes.

Using DOS 5

DOS 5 is a recent version of DOS. Although the commands described in the preceding review of DOS are still in DOS 5, the new version contains additional features that relate to data protection and recovery.

DOS 5 contains the commands UNDELETE and UNFORMAT, which are similar to Norton's UnErase and UnFormat commands. These Norton and DOS commands are compared in Appendix B.

In addition, DOS 5 contains the MIRROR program, which is similar to Norton's Image program. MIRROR saves information about your FAT, directory, and system information to help in format and file recovery. In fact, to help with the recovery of files or in unformatting a disk,

Norton programs use information in the DOS MIRROR file, if it is available. If you use the Norton Image program, you do not need to use the DOS MIRROR program.

The DOS 5 FORMAT command now formats floppy disks in a way similar to Norton's Safe Format command. Instead of wiping out all information on a disk (which is what the DOS FORMAT command in DOS 4.0 and earlier versions does), DOS 5 FORMAT, in its default mode, clears only the directory and FAT, enabling you to use the UNFORMAT command to recover the floppy disk if needed.

Another important feature of DOS 5 is its use of RAM (random-access memory). In many cases, using DOS 5 can free up a significant amount of conventional memory, which gives programs more space to operate.

DOS 5 also provides a replacement for the outdated EDLIN line editor. The new Edit program is a full-screen editor, which behaves much like a word processor.

Using DOS 6

Version 6 of DOS was released in 1993. It contains a number of new features and improvements over earlier versions of DOS. One major new feature is data compression. This feature (called DoubleSpace) enables you to store more information on your disk. DOS automatically compresses the information written to disk and uncompresses it when it is read back. After you install the compression, it is transparent to the user, although it may cause some degradation in the speed of disk access.

DOS 6 also contains a small version of the Norton Speed Disk program. The DOS version is called Defrag. If you have both versions, use the Norton version. Another improved feature is MEMMAKER. This DOS 6 program enables you to manage your computer's memory and fine-tune your system to work best with the types of programs you are using.

As mentioned previously, the DOS 6 BACKUP command is essentially a version of Norton's Backup program. This gives you added flexibility in backing up your program in an interactive environment instead of using a command line. The Anti-Virus program in DOS 6 is a version of the Central Point Anti-Virus program. This program checks your system for viruses and cleans infected files. The DOS UNDELETE command can be used from Windows in DOS 6. Previously, this command could be used only from the DOS prompt. DOS 6 also has an enhanced Help system, more support for Windows and networking, and support for workgroup computing.

APPENDIX B

Comparing DOS and Norton Utilities Commands

This appendix contains an alphabetical list of frequently used DOS commands and their descriptions. Each DOS command is compared to a similar Norton Utilities command. (The DOS commands are listed first in the headings for each section and are also discussed first in each section.) In most cases, the Norton commands have advantages over the DOS commands. These advantages are described briefly, and examples of DOS commands and corresponding Norton commands are given. For more information on the available options and switches for each Norton command, consult the alphabetical list of Norton Utilities commands in the Command Reference in this book. NDOS commands that are similar to DOS commands, however, are not listed in this chapter. You can find a list of NDOS commands in Chapter 28.

ATTRIB versus File Find and File Attributes

The DOS command ATTRIB displays or sets read-only and archive attributes for a file. DOS Versions 5 and 6 also enable you to set the system and hidden attributes.

To set all *.TXT files to read-only, enter the following command:

```
ATTRIB +R *.TXT
```

To display the current attributes for all files with the TXT extension, use this command:

```
ATTRIB *.TXT
```

The Norton commands File Find and File Attributes (FA) enable you to set all four attributes, including read-only, archive, hidden, and system. The FA command also can display a directory of files and attributes. It can clear all attributes at once with the /CLEAR switch.

To set all files with the TXT extension to read-only (including files in subdirectories), enter the following command:

```
FA *.TXT /R+
```

With the File Find command, you can set attributes interactively from menu options.

The FA and File Find commands are described in Chapters 9 and 25.

CHDIR or CD versus Norton Change Directory

CHDIR or CD enables you to change to another directory. To change to the \WP\LETTERS directory, enter this command:

```
CD \WP\LETTERS
```

With Norton Change Directory (NCD), you can use a partial name (when it is unique) to change directories. You can use the NCD command in command-line mode or interactive mode. In interactive mode, you can switch to a directory by moving the cursor to the directory name displayed in a tree diagram.

To change to the directory named \WP\LETTERS, enter the following command:

```
NCD LET
```

The NCD command is discussed in Chapter 23.

CHKDSK versus Norton Disk Doctor

CHKDSK enables you to check your disk for errors within the file allocation table (for file fragmentation or lost clusters, for example) and the DOS directory, and report the status.

To test a disk and attempt to fix any logical problems in the directory or file allocation table, enter the following command:

```
CHKDSK A:/F
```

Norton Disk Doctor (NDD) performs a more thorough check of the disk than CHKDSK. NDD searches the disk for bad sectors and attempts to correct both physical and logical problems. You also can use NDD in interactive mode.

To test the partition table, boot record, root directory, and lost clusters, enter this command:

```
NDD /QUICK
```

The NDD command is discussed in Chapter 12.

DATE versus Norton Control Center

The DOS DATE command enables you to set the system date for your computer. This command often does not change the *internal clock* (which keeps track of date and time even when the computer is turned off) in the computer. Thus, when you reboot, you may have to reset the date. To set the date permanently, you must use the SETUP command on some computers.

To reset the date to October 24, 1993, for example, enter the following command:

```
DATE 10-24-93
```

The Norton Control Center (NCC) Time and Date option enables you to set the system date. For many computers, this command also sets the internal clock.

The NCC command is discussed in Chapter 22.

DEL or ERASE versus WipeInfo

DEL or ERASE deletes one or more files. To delete files with the BAK extension in the default directory, enter the following command:

```
DEL *.BAK
```

NOTE You can unerase these files with the Norton UnErase command. Or, if you are using DOS 5.0 or a later version, you can use the DOS UNDELETE command.

WipeInfo erases files so that you cannot recover them—not even by using Norton UnErase operations. Optionally, WipeInfo can mimic the DOS ERASE command and erase files so that you can unerase them. WipeInfo has the advantage of being able to erase files across subdirectories.

To wipe out all files with the BAT extension in the current directory and all subdirectories, enter the following command:

```
WIPEINFO *.BAK /S
```

The WipeInfo command is discussed in Chapter 8.

DISKCOPY versus Duplicate Disk

DISKCOPY copies an entire disk to another disk of the same size. For example, to copy a disk in drive A to a disk of the same size in drive B, use the following command:

```
DISKCOPY A: B:
```

Norton Duplicate Disk (DUPDISK or DD) performs the same task but allows you to choose interactively (from drop-down list boxes) the source and destination disks if you do not specify them in the command line. To copy a disk in drive A to a disk of the same size in drive B, use this command:

```
DUPDISK A: B:
```

Note that drives A and B could physically be the same disk drive because you are prompted to swap disks during the copy procedure. Unlike DISKCOPY, DUPDISK uses extended or expanded memory to store the disk image during copy; thus, less disk swapping occurs than when you use DISKCOPY.

If the destination disk is not formatted, DISKCOPY formats the disk, giving it a unique volume serial number (for DOS 4 and later versions). DUPDISK, however, gives the new disk the identical serial number. When you are using DUPDISK and the destination disk is not formatted, you are asked whether you want the destination disk formatted.

When you make multiple copies of a disk, DUPDISK does not reread the contents of the source disk, although DISKCOPY does. Faster duplicating is the result.

The DUPDISK command is discussed in Chapter 26.

DIR versus File Find and File Attributes

DIR lists selected file names on-screen. For example, to display all files with the BAT extension, enter the following command:

```
DIR *.BAT
```

File Find enables you to display selected file names from a list box, a directory, or an entire hard disk. File Attributes (FA) can list a directory of files along with their file attributes, which are not listed with the DIR command.

To list all files on the disk that match the specification, including those files in subdirectories, enter the following command:

```
FA *.BAT
```

FIND versus File Find and Text Search

FIND enables you to find and report the existence of specified text in selected files. You must explicitly list all the files that you want to be searched; you cannot use wild-card characters in the search for file names.

To list on-screen any lines in REPORT.DOC that contain the string *text*, enter the following command:

```
FIND "text" REPORT.DOC
```

File Find enables you to search files in subdirectories and to search erased spaces on the disk for the specified search string. You can also make the search case-sensitive.

When searching *erased space*, you are actually searching information on disk that was once the information in a file. When a file is erased, only the reference to the file is really deleted. The actual contents of the file remain on disk in erased space until that space is overwritten by another file.

To search all files having the DOC extension in the current directory and subdirectories or to search for the character string specified by *text*, enter the following command:

```
FILEFIND
```

The File Find interactive search screen appears. You then enter the criteria for your search. Specify to search *.DOC in the search entry area and choose to search the entire disk, the current directory, or the current directory and its subdirectories. Then choose the Find option on the menu, and the search begins. After File Find locates files that contain the desired text, you can select a file from the list and choose to view its contents.

The Text Search (TS) command enables you to perform a text search from the DOS prompt. To search for the word DEFICIT in all files on disk that match *.RPT, enter the following command:

```
TS \*.RPT "DEFICIT" /S
```

The searching capabilities of File Find and Text Search are described in Chapter 25.

FORMAT versus Safe Format

DOS FORMAT prepares a disk to store files. To format and place a volume label on a disk in drive A, enter the following command:

```
FORMAT A:/V
```

Beginning with DOS 5, the default method of formatting a disk with the DOS FORMAT command is similar to the Norton Safe Format option.

Safe Format (SFORMAT) formats disks. The Safe Format command has several safety features not available with the DOS FORMAT command. Safe Format saves format information in case the format is an accident, for example. This feature enables you to unformat the disk with the Norton Utilities UnFormat command. Safe Format provides several format modes, including Safe Format, the normal DOS FORMAT, and a quick format. Quick format mode places a new system area on an already formatted disk—effectively erasing all records pertaining to directory and file locations on disk. You also can run Safe Format in interactive mode and choose options from menus rather than remember command-line switches.

To format and place the label MYDISK on a disk in drive A, enter this command:

```
SFORMAT A: /V:MYDISK
```

Safe Format is described in Chapter 4.

MIRROR versus IMAGE

The DOS MIRROR command saves information about files on disk to support the use of the DOS UNDELETE and UNFORMAT programs. Usually, you place the MIRROR command in your AUTOEXEC.BAT file so that a copy of the file information is saved each time you boot your computer. MIRROR is available in DOS beginning with Version 5.

The Norton Image (IMAGE) command is similar to the MIRROR command. For use in DOS recovery commands, the IMAGE command is preferable to the MIRROR command. IMAGE saves information about the files on your disk and is used to support the Norton UnErase and UnFormat commands. The Norton UnErase and UnFormat commands

will use MIRROR information if IMAGE information is missing and MIRROR information is available. Usually, you place the IMAGE command in your AUTOEXEC.BAT file so that a copy of the file information is saved each time you boot your computer.

The Image command is discussed in Chapter 4.

MKDIR or MD versus Norton Change Directory

MKDIR or MD makes a directory. To make a subdirectory named LETTERS in the WP directory, enter the following command:

```
MD \WP\LETTERS
```

Norton Change Directory (NCD), when used with the MD option, also makes a directory. In addition, this command updates the NCD directory file, which gives you quicker access to directories when you later use the NCD command in interactive mode. In interactive mode, you can add a directory by highlighting the directory name on-screen and pressing F7. The NCD command also has a **R**ename option (F6), which enables you to rename a directory. DOS has no equivalent command.

To make a subdirectory named LETTERS in the WP directory and update the NCD directory file, enter this command:

```
NCD MD \WP\LETTERS
```

The NCD command is discussed in Chapter 23.

MODE versus Norton Control Center

MODE specifies communications port settings (among other features). To set up the communication port 1 as 1200 baud, for example, enter one of the following commands:

```
MODE COM1 BAUD=1200
```

```
MODE COM1:1200
```

Norton Control Center (NCC), when used with the **S**erial Ports option, enables you to set up the parameters of a serial port interactively by choosing options from a menu.

The NCC command is discussed in Chapter 22.

PRINT versus Line Print

The DOS PRINT command prints the contents of an ASCII file to a printer or other output device. To print the file MYSTUFF.TXT, you use this command:

```
PRINT MYSTUFF.TXT
```

The Norton Line Print (LP) command includes options not available in PRINT. You can choose to include line numbers or a header in the printout, to print WordStar files, and so on. To print the file MYSTUFF.TXT and include line numbers, use the following command:

```
LP MYSTUFF.TXT /N
```

The Line Print command is discussed in Chapter 26.

RECOVER versus Disk Tools

RECOVER tries to reclaim disks or files with defective sectors.

> **WARNING:** The RECOVER command is dangerous because the slightest misuse can be devastating. Files often are renamed machine-generated names, and you can easily lose perfectly good files. Do not use this command unless you know exactly what you are doing.

Norton's Disk Tools command (DISKTOOL), when used with RECOVER, attempts to reclaim files and directories that have been renamed and removed by the DOS RECOVER command. Instead of using RECOVER to reclaim files, use the NDD command in interactive mode and choose the **D**iagnose Disk option or Disk Tools' Revive a Defective Diskette option.

Chapter 13 discusses Disk Tools.

RMDIR or RD versus Norton Change Directory

RMDIR or RD removes a directory. To remove the WP directory, enter the following command:

```
RD \WP
```

Norton Change Directory (NCD), when used with the RD option, removes a directory. This command also updates the NCD directory file. You can run NCD in interactive mode, enabling you to remove a directory by pointing to the directory name on a graphic tree and pressing F8 (**D**elete).

To remove the WP directory, enter this command:

```
NCD RD \WP
```

The NCD command is discussed in Chapter 23.

SYS versus Disk Tools

SYS places system files (but not the COMMAND.COM file) on disk if the disk was prepared to receive system files when it was originally formatted.

To place the system files on drive C, enter the following command:

```
SYS C:
```

Disk Tools, when used with the Make a Disk Bootable option, places the system files on a disk even if the disk was not prepared for these files when it was formatted. This option also copies the COMMAND.COM file to the disk to make it bootable.

Chapter 13 discusses Disk Tools.

TIME versus Norton Control Center

DOS TIME enables you to set the system time on your computer. For many versions of the PC, however, the DOS time setting does not reset the internal clock. Thus, when you reboot, your time setting may have

disappeared. To set the internal clock, you may have to use the SETUP command.

To set the system time to 10:40 a.m., enter the following command:

```
TIME 10:40
```

The Time and Date option in Norton Control Center (NCC) enables you to set the system time. For many computers, this option also sets the internal clock.

The NCC command is discussed in Chapter 22.

TREE versus Norton Change Directory

TREE displays information about directories on the disk. Beginning with DOS 4, this command displays directories in a graphic tree structure.

To display directory names for the entire disk, enter this command:

```
TREE \
```

NOTE Be sure to include the space between TREE and the backslash (\).

In interactive mode, Norton Change Directory (NCD) displays directories in a tree structure, and NCD enables you to point to directory names on-screen and choose to add, rename, delete, or change the directories.

The NCD command is discussed in Chapter 23.

UNDELETE versus UnErase

The DOS UNDELETE command restores a previously deleted file. If you used ERASE or DEL to delete the file named MYFILE.WK1, you can use the command

```
UNDELETE *.WK1
```

to search for all erased files with a WK1 extension. You then are prompted to enter the first letter of the name of each deleted file found. The UNDELETE command is available beginning with DOS 5.

The Norton UnErase command is similar to UNDELETE. UnErase presents a list of possible files to undelete. This list also predicts the success (poor, fair, good, or excellent) that UnErase will have with undeleting the files. You may view the contents of a file before undeleting it. Norton also contains a manual unerase feature that enables you to piece together an erased file that you cannot unerase automatically. The Norton UnErase command uses information in the MIRROR or IMAGE file to assist in recovering files.

The UnErase command is discussed in Chapter 10.

UNFORMAT versus UnFormat and Disk Tools

DOS UNFORMAT enables you to restore a formatted disk or a disk that has been restructured with the DOS RECOVER command. UNFORMAT uses information from the MIRROR file created when the DOS MIRROR command was last run. To unformat the disk in drive C, enter the following command:

```
UNFORMAT C:
```

The DOS UNFORMAT command is available beginning with DOS 5.

The Norton UnFormat command also enables you to restore a formatted disk. This command can use information in the DOS MIRROR file or the Norton IMAGE file to restore a hard disk. Norton UnFormat can unformat a disk even when this information is not present; however, files in the root directory will be lost and directories under the root will be named DIR0, DIR1, and so on. You can use the Norton Disk Tools command to recover from the DOS RECOVER command.

The UnFormat command is discussed in Chapter 11, and the Disk Tools command is discussed in Chapter 13.

VOL versus Norton Change Directory

VOL displays the volume label for a disk. To display the name given to a disk in drive B when the disk was formatted, enter this command:

```
VOL B:
```

The Norton Change Directory (NCD) command enables you to change a volume label. In interactive mode, this option is on the NCD **D**isk pull-down menu.

The NCD command is discussed in Chapter 23.

UNFORMAT versus Unformat and Disk Tools

VOL versus Norton Change Directory

APPENDIX C

Installing Norton Programs

This appendix covers installation procedures for Norton Utilities 7, Norton Commander 3, and Norton Backup 2. You learn how to install these programs on a hard disk system. Installation of Norton Utilities 7 also includes creation of an emergency floppy disk (a rescue disk).

NOTE In this appendix, it is assumed that you are installing each program on a hard disk (drive C) from a floppy disk (drive A). If your configuration is different, specify a different drive designation when you enter commands—for example, substitute D if your hard disk is drive D, B if your floppy disk is drive B, and so on.

Installing Norton Utilities 7

Norton Utilities 7 includes three 3 1/2-inch high-density disks (which you can exchange for 5 1/4-inch disks if necessary). Disk #1 is labeled *Install*, Disk #2 is labeled *Emergency/Data Recovery*, and Disk #3 is labeled *Utilities*.

The full Norton Utilities 7 program takes about 4M of actual disk space, although the user's manual accompanying the software recommends a minimum of 5M. Because one of Norton Utilities' primary functions is to enable you to manage your hard disk better, you probably will not install the full system on a floppy disk computer. For these installation instructions, therefore, it is assumed that you will be installing the full program on a hard disk.

WARNING: Before beginning the installation, be certain that you have backed up all crucial files located on your hard disk. If your disk contains deleted or erased files that you might want to recover, you must recover them before installing Norton Utilities. During the installation, this advice appears in an information screen; you have the option to return to DOS and perform any necessary backup or recovery procedures.

Viewing the READ.ME and WHATS.NEW Files

On the Install disk for Norton Utilities 7, you may find the file READ.ME, which contains last-minute notes about the program. Assuming that the Install disk is in drive A of your computer, you can print the READ.ME file with the following command:

```
COPY A:READ.ME LPT1:
```

If you inserted the Install disk in a different drive, substitute that drive letter for A in the command. To use this command, you need to have a printer installed on printer port 1. If you do not have a printer, use the following command to display the READ.ME file on-screen:

```
TYPE A:READ.ME | MORE
```

If the file is several screens long, the message `-- MORE --` appears at the bottom of the first screen; press any key to move from one screen to the next. When you finish reading the file, press Ctrl+C or Ctrl+Break to return to the DOS prompt.

You can also examine this file by using Norton Commander (the Edit or View option) or your word processing program. Or you can use the Norton Utilities LP command to print the file after you install the program. To learn more about the LP command, see Chapter 26, which covers the Norton command-line utilities.

You may find another file, called WHATS.NEW, on the Install disk. WHATS.NEW enables you to view information about the new features of this release of the program. Follow the procedures described in the preceding paragraphs to view the contents of this file.

To send the file to the printer, use the following command:

```
COPY A:WHATS.NEW LPT1:
```

To view the file on-screen, enter this command:

```
TYPE A:WHATS.NEW | MORE
```

Installing the Program

To install Norton Utilities 7 on your hard disk, follow these steps:

1. Turn on your computer and boot it in the usual way. End any programs that started automatically (such as a menu) so that you are at the DOS prompt (usually `C:\>` on a hard disk).
2. Insert the Norton Utilities Install disk in drive A.
3. Switch to drive A by typing **A:** and pressing Enter. Your prompt now should be `A>`, `A:\>`, or an equivalent.
4. To begin the installation procedure for Norton Utilities, type **INSTALL** and press Enter.
5. The first dialog box that appears prompts you to choose the display colors. The options are **C**olor, **B**lack & White, **L**aptop, and **R**eturn to DOS (see fig. C.1).

   Use the up- and down-arrow keys to choose the option that matches your monitor; then press Enter. Alternatively, press the highlighted letter associated with your choice, or point to the option with the mouse and click once.

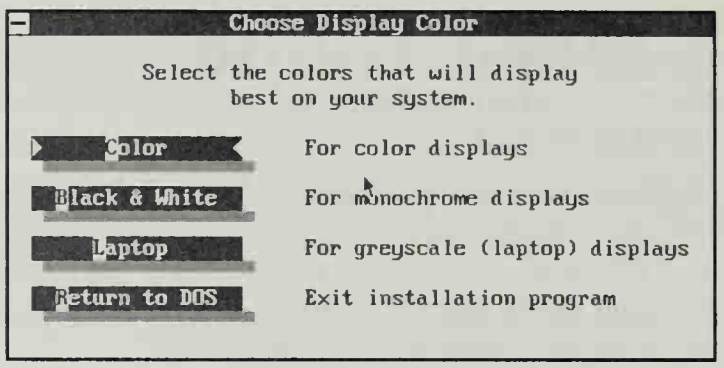

Fig. C.1
The Choose Display Color dialog box.

6. After you make your color choice, the Install program scans for a previous version of the software on your hard disk. If an old copy exists on your disk, Install defaults to that directory to install the new version. Otherwise, the installation directory is NU. (You can choose a different directory later.)

NOTE If a previous version of Norton Utilities exists on your computer and you choose to install the new version in the same directory, all old files will automatically be removed before installation.

After the scan for an old version, a warning box appears, telling you not to install Norton Utilities if you accidentally formatted your hard disk or if you want to recover some files from that disk (see fig. C.2). To unformat the disk or to recover files, use the emergency floppy disk included in the software package.

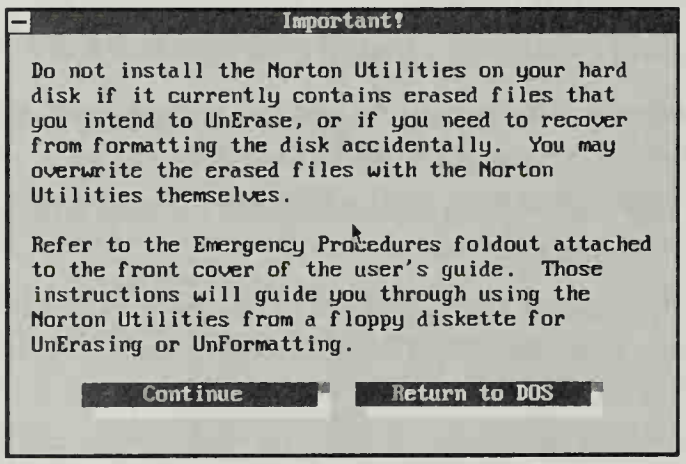

Fig. C.2
Norton Utilities' preinstallation warning.

7. To cancel the installation procedure, choose **R**eturn to DOS. To continue the installation, press Enter or choose **C**ontinue.

The next dialog box that appears summarizes the installation process (see fig. C.3). The installation program does the following tasks:

- Copies Norton Utilities files to your hard disk
- Enables you to place certain Norton Utilities commands in your AUTOEXEC.BAT and CONFIG.SYS files
- Enables you to set the configuration of your computer (screen colors, mouse, and graphics)

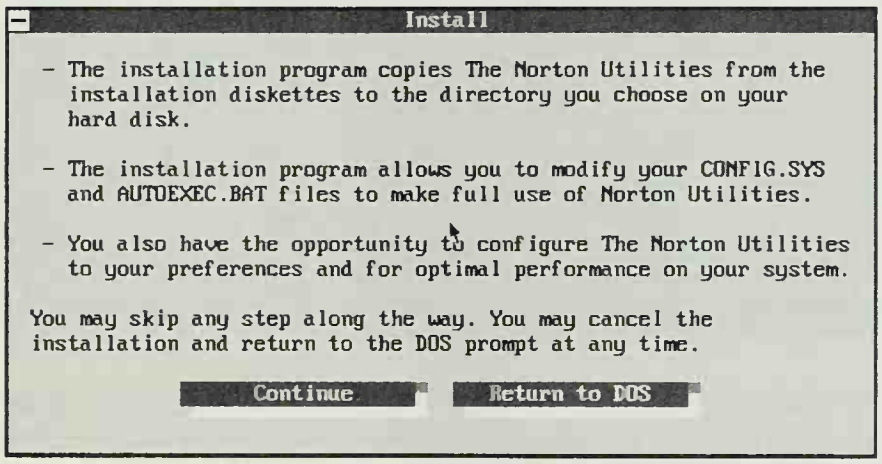

Fig. C.3
A summary of the installation process.

8. Choose **C**ontinue or press Enter. You then see the dialog box shown in figure C.4.

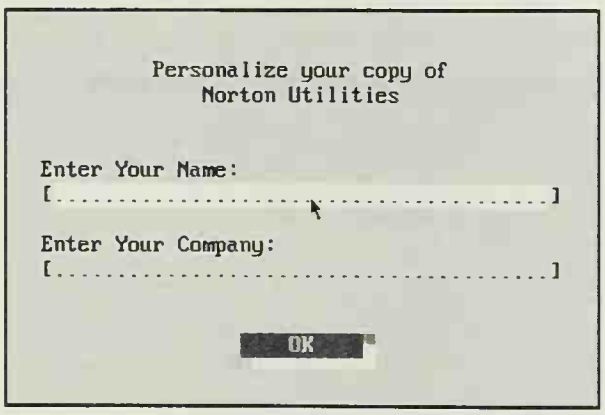

Fig. C.4
Personalizing your copy of Norton Utilities.

9. You must enter your name in this dialog box; the company information is optional. After you enter the necessary information, choose **O**K or press Enter.

10. Install asks you to specify the type of installation you want (see fig. C.5). Choose the appropriate type of installation by pressing the first letter of the option, using the up- and down-arrow keys to select the option, or clicking the option. Notice that the full installation requires 4M of disk space. If you choose **F**ull Install, the installation procedure will copy all Norton Utilities to your hard drive. Choosing **C**ustom Install gives you the opportunity to pick and choose which utilities will be installed, and offers you information on the amount of disk space required by each utility.

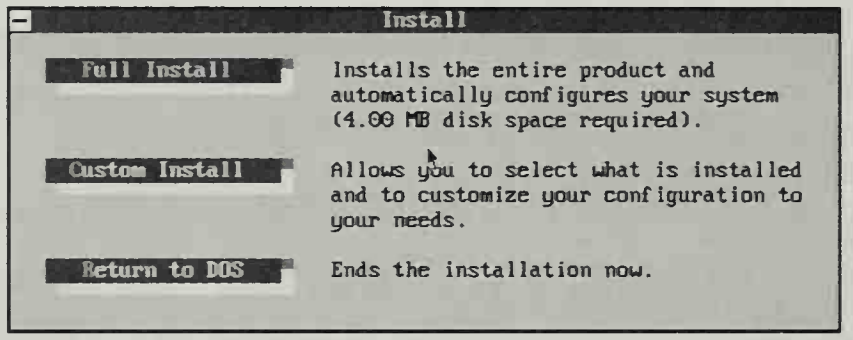

Fig. C.5

Specifying the type of installation.

11. After you select an installation type, a new Install dialog box appears, requesting information about where you want to install Norton Utilities (see fig. C.6). Choose the directory in which the program will be installed.

    If you want to accept the default directory, press Enter to continue the installation. To change the directory, press Backspace to delete the C:\NU entry and then enter a new directory.

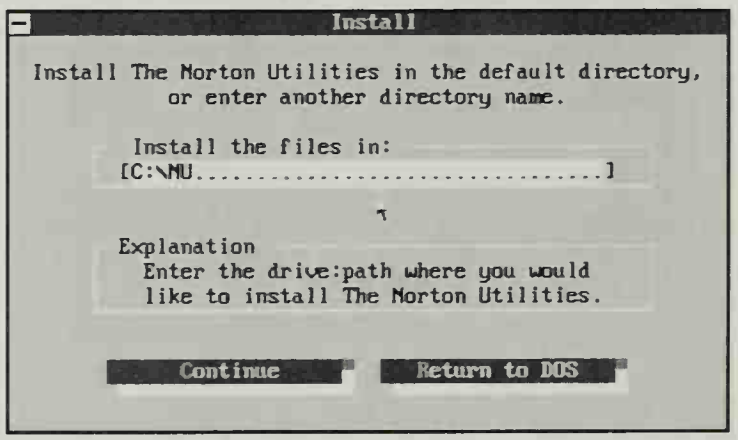

Fig. C.6

Specifying the directory for Norton Utilities.

12. After you specify the directory name, press Enter or choose **C**ontinue. (As noted previously, if an old version of Norton Utilities exists in this directory, that version will be deleted before the new

version is installed.) If you chose **C**ustom Install in step 10, the Install Program Files dialog box appears. This dialog box enables you to specify what portions of the program to install. A check mark appears to the left of every option that is to be installed (see fig. C.7).

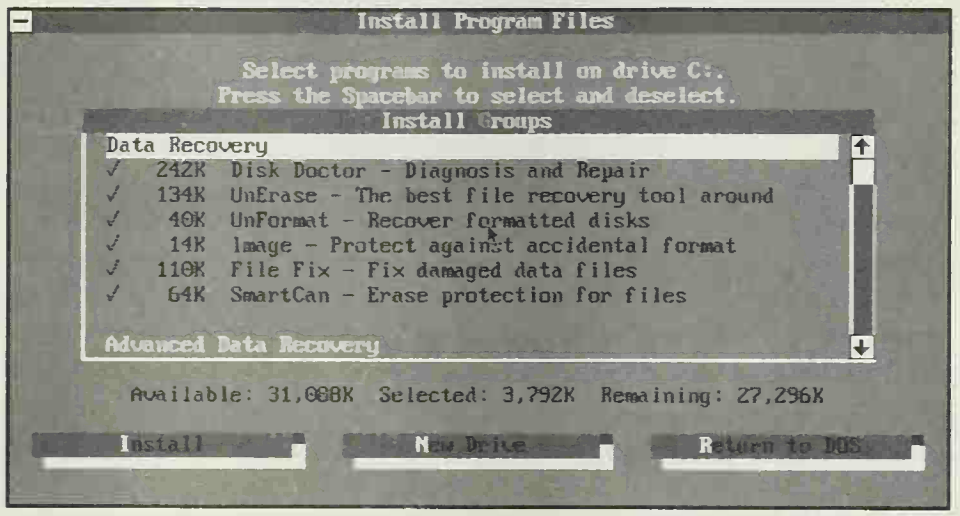

Fig. C.7
Selecting files for a custom installation.

13. Use the up- and down-arrow keys or your mouse to move from option to option, and press the space bar to select or deselect options (or use your mouse). Whenever you select or deselect an option, an odometer (located directly below the Install **G**roups list box) keeps a running tally of the space available on the destination drive, the combined size of all files selected, and the disk space that will remain after you install your selected options. Unless you do not have space to install the entire program, you probably will want to accept the full installation.

14. After you make your selections, press Enter or choose **I**nstall. A dialog box similar to that in figure C.8 appears, enabling you to select what programs are to be added to your AUTOEXEC.BAT. You make these selections by using the up- and down-arrow keys to highlight the programs you want added and then pressing the space bar, or you can double-click each program name. A check mark appears next to each item you select. After you have made your selections, choose **C**ontinue or **R**eturn to DOS. The install program begins copying files from the Install disk. You are prompted to change disks during the installation process.

When the installation process is complete, the program displays the Save System Files dialog box, where you specify the changes you want to make in your system files to accommodate Norton Utilities. The following section describes the options in this dialog box.

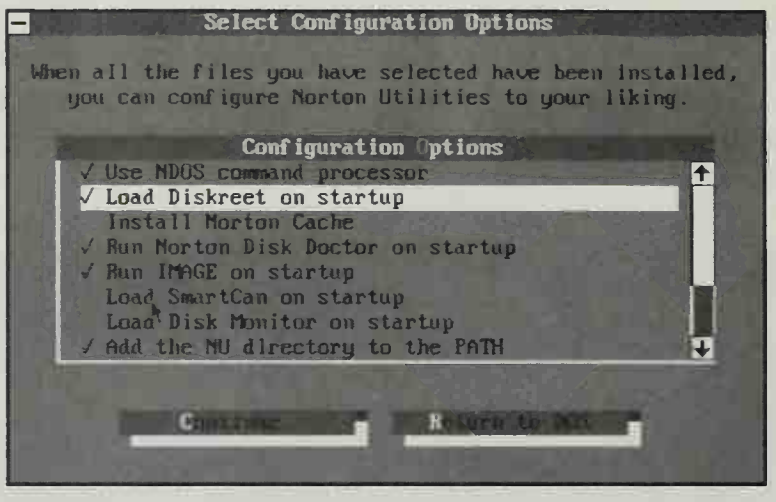

Fig. C.8

The Select Configuration Options dialog box.

Modifying AUTOEXEC.BAT and CONFIG.SYS

After you install Norton Utilities, you have the option of modifying your AUTOEXEC.BAT and CONFIG.SYS files. Although the default option is Make Changes to Startup Files, you may want to save the changes in an alternative file, or you may elect not to save the changes at all. If you choose **R**eview in the Save System Files dialog box, you can preview the changes before the program actually writes them to disk (see fig. C.9). If you accept the changes, backup copies of your original files are saved as AUTOEXEC.NU7 and CONFIG.NU7.

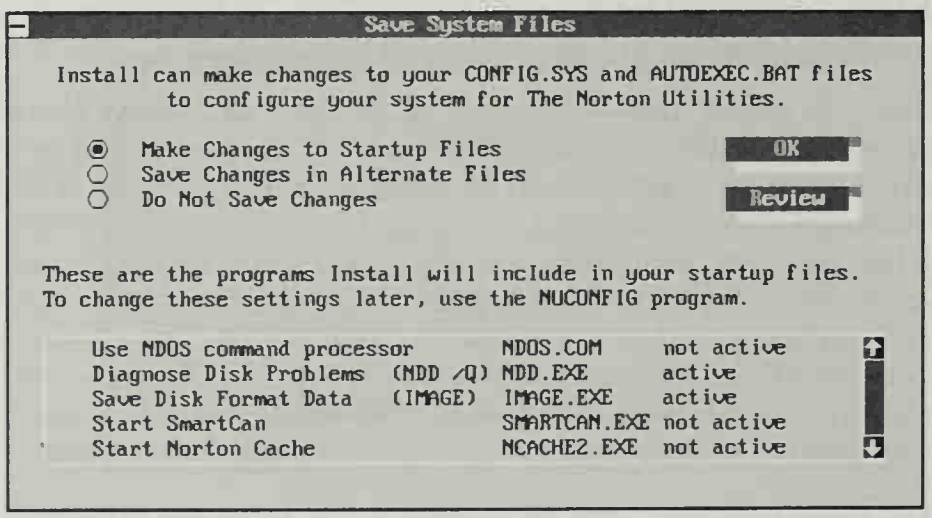

Fig. C.9

The Save System Files dialog box.

Some of the changes that will occur, if you elect to make them during the installation process, include adding the newly installed software to the PATH statement in your AUTOEXEC.BAT file and setting the

environment variable NU to the subdirectory where Norton Utilities is installed. Automatic changes might include changes to your CONFIG.SYS file. If your FILES and BUFFERS statements are not adequate to allow Norton Utilities to run efficiently, it will offer to make the necessary changes for you.

Other options available are **S**ave Changes in Alternate Files and **D**o Not Save Changes. Electing to save changes to an alternative file will create the files AUTOEXEC.TMP and CONFIG.TMP and place them in the directory where Norton Utilities is installed. Should you decide later that you want to implement the changes recorded in these alternative files, you may simply copy them to the root directory and reboot your computer; the changes take effect immediately. Should you elect not to save the changes, the screen for the next installation step, creating a rescue disk, is displayed.

Creating a Rescue Disk

Regardless of whether you chose to modify your AUTOEXEC.BAT and CONFIG.SYS files, Install prompts you to create a rescue disk (see fig. C.10). The floppy disk that you create during this process contains the files you may need if your hard disk is formatted accidentally or develops problems that make it unusable.

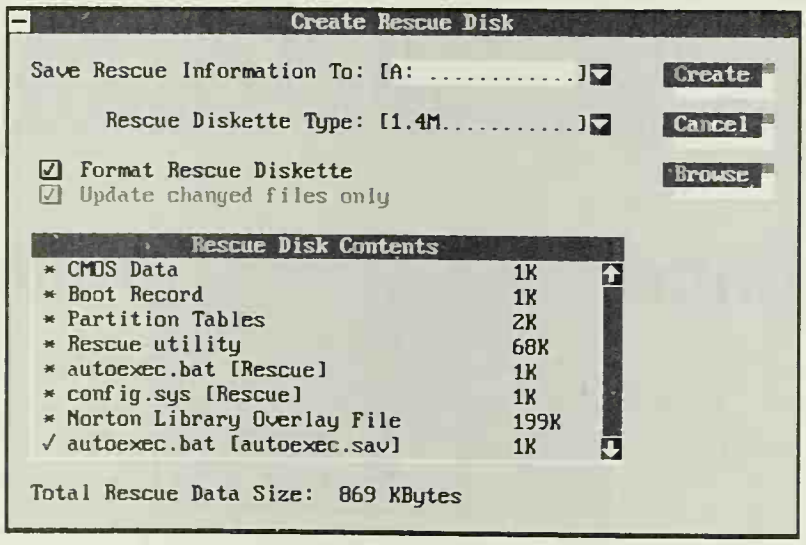

Fig. C.10
The Create Rescue Disk dialog box.

NOTE Have a floppy disk ready for this process (formatted or unformatted). A new disk or one that contains no useful information is recommended. This process automatically formats the disk, thus deleting any information stored on it.

To create the rescue disk, follow these steps:

1. Activate the **S**ave Rescue Information To list box by pressing Tab until the list box is active, pressing S, or clicking the triangle.
2. Press PgDn or click the triangle to open the drop-down list box, from which you can choose options. For the **S**ave Rescue Information To option, you must specify the disk drive to which you want to save the rescue files (such as A, B, or C).
3. Repeat steps 1 and 2 for the Rescue **D**iskette Type list box. For the Rescue **D**iskette Type option, you must indicate the type of disk you are using.
4. Choose the **F**ormat Rescue Diskette option if you didn't format the rescue disk before starting this process. If you want to add files to the rescue disk, other than those displayed in the **R**escue Disk Contents list box, you can choose **B**rowse. This option enables you to select files that you think are important to the reconstruction of your hard drive should some catastrophic act occur. In the lower-left corner of the screen, you will see a message indicating the amount of disk space required to store the selected files. If the space required exceeds the amount of space available on your destination drive, you need to determine which files you can do without, and remove them from the list.
5. After you are satisfied with your selections in this dialog box, choose **C**reate or press Enter.
6. If you elected to format the rescue disk, you receive one last warning (see fig. C.11). If you are sure that the right disk is in the drive, choose **O**K or press Enter. If you have any doubt, choose **C**ancel or press Esc.

Fig. C.11

The last warning before Install reformats the rescue disk.

7. When the process of creating the rescue disk is complete, a dialog box appears, providing three options (see fig. C.12).

   If, during the installation process, you elected to modify your AUTOEXEC.BAT and CONFIG.SYS files, choose the **R**eboot option

so that the changes recorded in those files will take effect. Otherwise, choose **G**o to Program to use Norton Utilities 7, or choose Return to **D**OS.

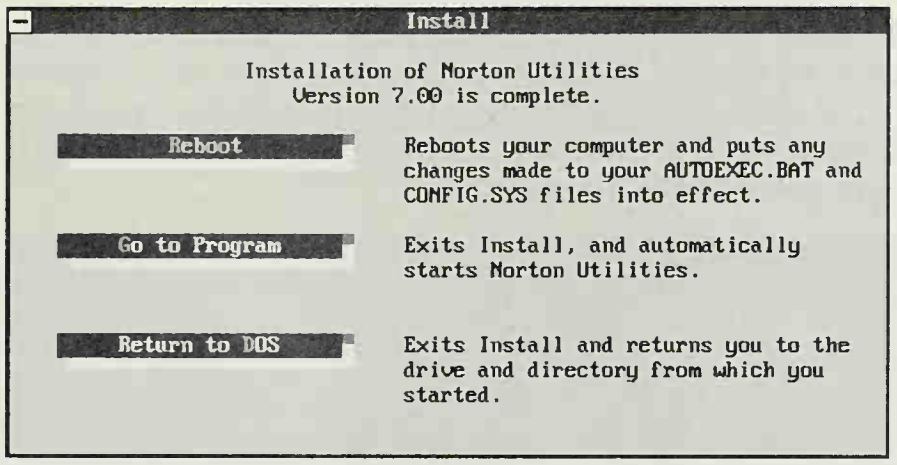

Fig. C.12
Ready to start Norton Utilities.

8. If you elected to return to DOS in step 7 and you want to begin Norton Utilities, enter **NORTON** at the DOS prompt. If you get an error message, check that you are in the proper directory—NU7. If you are not, change to that directory by entering **CD \NU7** and then reissuing the NORTON command. (If you installed Norton Utilities in a different directory, replace NU7 with the appropriate directory name.)

NOTE Be sure to keep your rescue disk and your installation disks in a safe place in case you need to use them later.

Installing Norton Commander 3

The Norton Commander 3 package consists of two 360K 5 1/4-inch disks and one 720K 3 1/2-inch disk. If drive A is a 720K or 1.44M drive, use the 3 1/2-inch disk. If drive A is a 360K or 1.2M disk drive, use the 5 1/4-inch disks.

Norton Commander takes about 850K of disk space. Because one of the Commander's primary functions is to enable you to manage your hard disk better, you probably will not install the program on a floppy disk system. For these installation instructions, therefore, it is assumed that you are installing Norton Commander on a hard disk system.

Viewing the READ.ME and INREAD.ME Files

Before beginning the installation process, you may want to read or print the READ.ME and INREAD.ME files that come with Norton Commander. The INREAD.ME file contains helpful information about what to do if the installation process does not work. The READ.ME file contains last-minute notes about the program.

Assuming that the installation disk is in drive A of your computer, you can print the READ.ME and INREAD.ME files with the following command:

```
COPY A:*.ME LPT1:
```

To use this command, you need to have a printer installed on printer port 1. If you do not have a printer, use the TYPE command to examine these files on-screen. To examine the contents of the INREAD.ME file, enter the following command:

```
TYPE A:INREAD.ME
```

To examine the contents of the READ.ME file, enter this command:

```
TYPE A:READ.ME
```

Neither command requires the | MORE switch (described earlier in this appendix) because both files display a single screen of information.

Installing the Program

To install Norton Commander 3, follow these steps:

1. Turn on your computer and boot it in the usual way. Exit any programs that started automatically (such as a menu) so that you are at the DOS prompt (usually `C:\>` on a hard disk).
2. Switch to drive A by entering **A:** at the DOS prompt. Your prompt now should be `A>`, `A:\>`, or an equivalent.
3. Insert the Norton Commander Program Disk in drive A.

   If you are using a 5 1/4-inch drive, insert the first 5 1/4-inch Commander disk (Disk #1) in drive A.

   If you are using a 3 1/2-inch drive, insert the 3 1/2-inch Commander disk in drive A.

4. To begin the installation process, type **INSTALL** and press Enter.
5. You are prompted to select the drive from which you want to install Norton Commander (A or B). Type the letter, click the drive letter, or use the arrow keys to highlight the appropriate drive letter of the drive that contains the Installation disk. Then press Enter.
6. You see a screen similar to the one shown in figure C.13, summarizing the installation process.

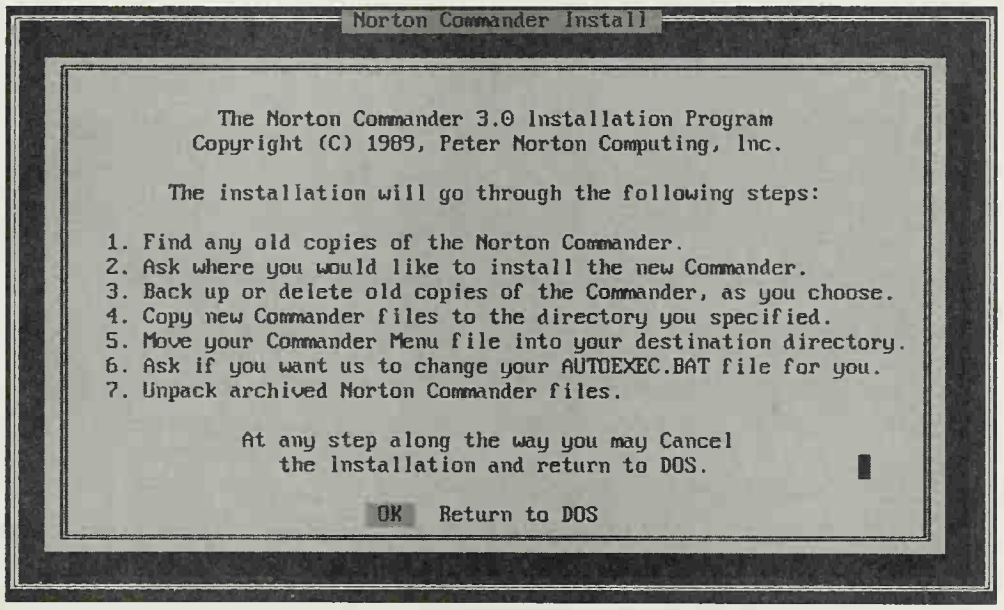

Fig. C.13
The initial installation screen for Norton Commander.

At the bottom of the screen are two options: OK and Return to DOS. OK is highlighted. To continue with the installation, press Enter. To return to DOS, press R.

7. The Install program next looks at your disk to see whether a current copy of Norton Commander is installed in a directory named NC. If you have an old copy, you are given a chance to delete the old copy or back it up to some other location on disk.

   You can choose one of three options:

   - The Overwrite option writes the new version to the old directory, overwriting the old version.
   - The Back Up option causes the installation program to write the old files to a backup directory named NC.BAK.
   - The Return to DOS option cancels installation.

   Use the arrow keys to point to the option you prefer, and then press the space bar to lock in your choice; or just click the option.

After you choose an option, press Enter or click OK to continue with the installation.

8. Install next asks you to enter the name of the disk and directory to which Commander should be copied (see fig. C.14).

   The default directory for Commander is C:\NC, which appears in the text box. If you accept this directory, press Enter to continue the installation. To change the directory, press Backspace to delete the C:\NC entry and then type a new directory. If this is the first time you are installing Norton Commander, a message appears directly above the default directory, indicating that Norton Commander was not contained within your PATH statement.

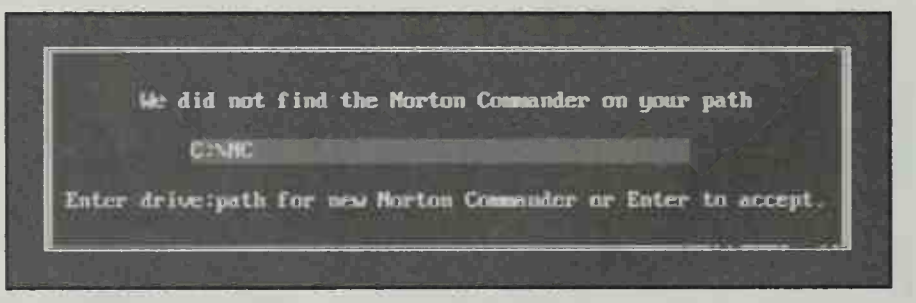

Fig. C.14
Specifying the directory for Commander.

9. The installation program prompts you once more before the copy operation begins, giving you a chance to return to DOS and cancel the installation (see fig. C.15).

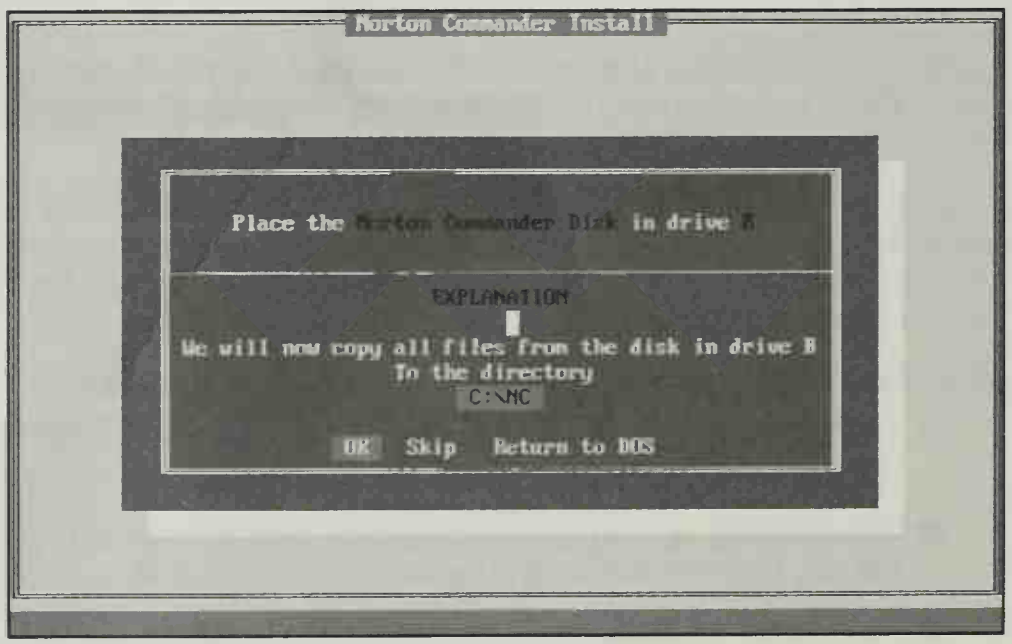

Fig. C.15
Preparing to copy Norton Commander files.

To continue the installation, press Enter to accept the highlighted OK option. To cancel the operation and return to DOS, press R.

10. The Install program asks whether you want the path to the Commander directory to be placed in the PATH statement of your AUTOEXEC.BAT file (see fig. C.16).

    Again, if you are installing Commander for the first time, choose OK. The path to the directory where Norton Commander resides will be added to your AUTOEXEC.BAT file, and a backup of the original file will be created (named AUTOEXEC.BAK). If you already have a path to the Commander's directory, you can press S to skip this part of the installation.

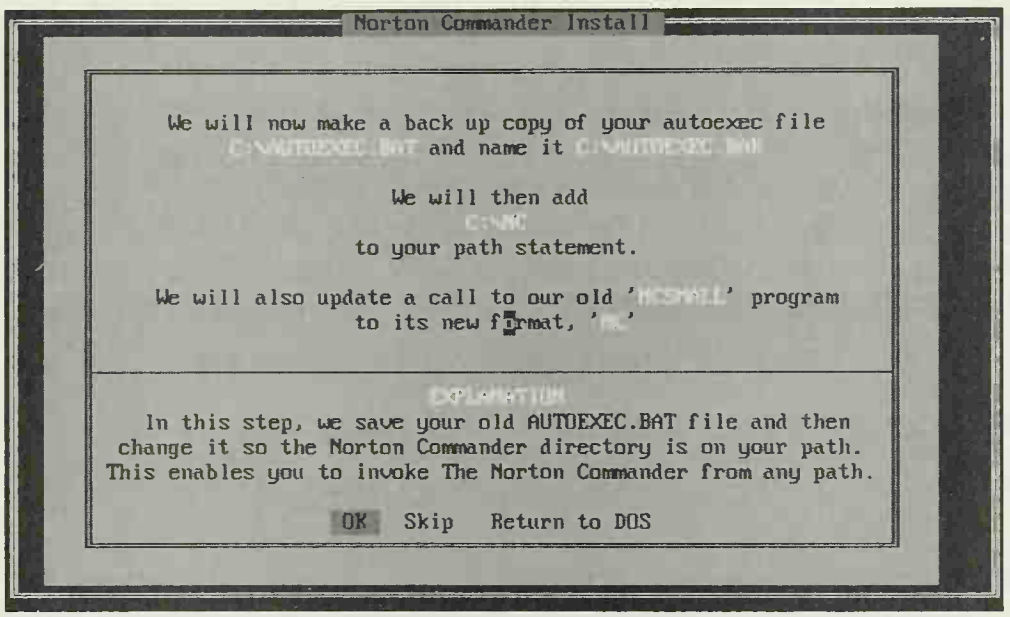

Fig. C.16
Indicating whether you want Install to change your AUTOEXEC.BAT file.

After all the files are copied to disk and modifications are made to AUTOEXEC.BAT, the installation is complete. To begin Norton Commander, enter **NC** at the DOS prompt.

If you want Commander to run each time you boot your computer and you elected to skip the automatic update performed during the installation, you can place the NC command as the last line in your AUTOEXEC.BAT file. (See Appendix A for an explanation of the AUTOEXEC.BAT file and how to edit it.)

Installing Norton Backup 2

Two versions of Norton Backup for DOS have been released (Versions 1.1 and 2.0). The versions function in essentially the same way. If the instructions provided in this section differ from what appears on your screen during the installation process, you should consult the instructions accompanying the version of Norton Backup that you are attempting to install.

Depending on your version, the number of disks associated with your software may vary. For this procedure, it is assumed that you are installing Norton Backup 2.

Installing the Program

The Norton Backup 2 program comes with three 3 1/2-inch disks and two 5 1/4-inch disks. If you are using a computer with a 3 1/2-inch disk (720K or 1.44M) drive, use the 3 1/2-inch disks to install the program. If you are using a computer with a 5 1/4-inch disk (360K or 1.2M) drive, use the 5 1/4-inch disks.

The Backup program requires that you have two blank floppy disks to test the program. Be sure that you have these disks handy when you begin the installation. If you have 3 1/2-inch and 5 1/4-inch disk drives, you can use either size for the test. You do not need to format the disks before the test; the disks are automatically formatted during the procedure, if necessary.

The Norton Backup installation program performs several tasks:

- Copies necessary files to your hard disk.
- Modifies your AUTOEXEC.BAT file to place the Norton Backup directory in your PATH command.
- Examines your computer system to determine which disk drives your computer contains and which disks can be used as backups.
- Runs several tests on your computer to determine the most efficient way to perform the backup. These tests deal with the speed of your computer and your disks.

To install Norton Backup, follow these steps:

1. Insert Disk #1 in drive A.
2. Switch to drive A by typing **A:** at the DOS prompt and pressing Enter. Your prompt now should be `A>`, `A:\>`, or the equivalent.
3. At the DOS prompt, type **INSTALL** and press Enter.
4. The Install program asks you a series of questions about your computer. Choose the default settings or make changes as necessary. (Usually, you should choose the default settings for installation; you can change these settings later.)

   The first decision you must make pertains to the display type. As illustrated in figure C.17, you must select the type of display connected to your computer.

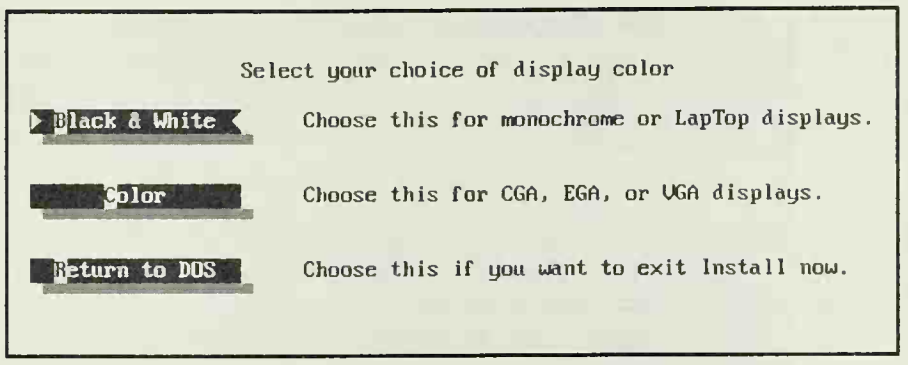

Fig. C.17
Norton Backup display options.

Immediately following your selection of a display type, the installation routine scans the disk for previous versions of Norton Backup and then presents a brief description of what is about to occur (see fig. C.18). If, for any reason, you want to discontinue the installation, choose **R**eturn to DOS. Otherwise, choose **C**ontinue.

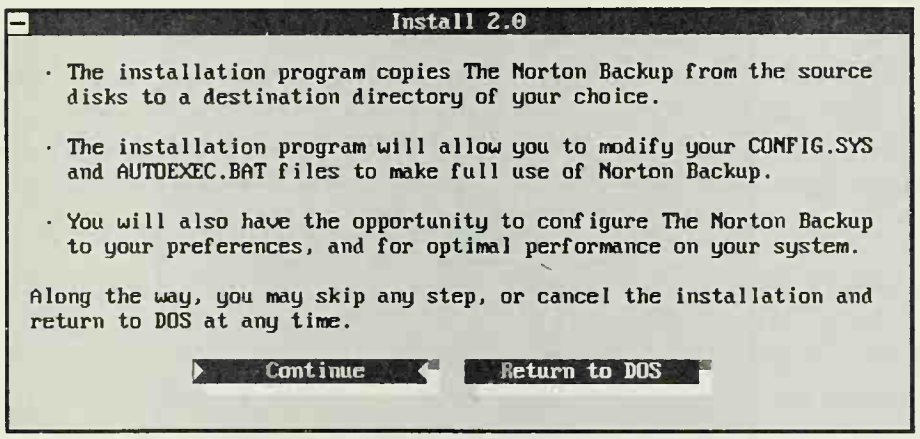

Fig. C.18
A description of the installation procedures.

5. You are prompted to tell the installation program where you want to install Norton Backup. The default is C:\NBACKUP (see fig. C.19). If another version of Norton Backup is found, you will see a message indicating that a copy of the program has been found in C:\NBACKUP. If Norton Backup exists and you want to overwrite the existing version, or if this is a first-time installation and you want the files copied to the default directory (C:\NBACKUP), choose **C**ontinue.

   If you want to change the location where the files will be installed, simply type the new location, specifying the drive and path, and then choose **C**ontinue.

   If old files exist, you will see a message momentarily appear on the screen to indicate that existing files are being deleted. Otherwise, the install routine begins copying the necessary files from the disks.

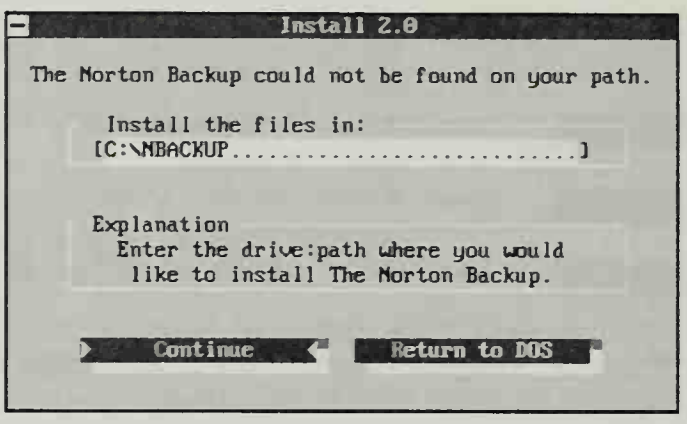

Fig. C.19

Choosing where to install Norton Backup.

6. After the files are copied, you are asked whether you want to add the Norton Backup to your DOS help file. DOS 5.0 and later versions have a Help facility, enabling you to access help on the commands incorporated into Norton Backup. You can choose **A**dd Help or **D**on't Add Help (see fig. C.20).

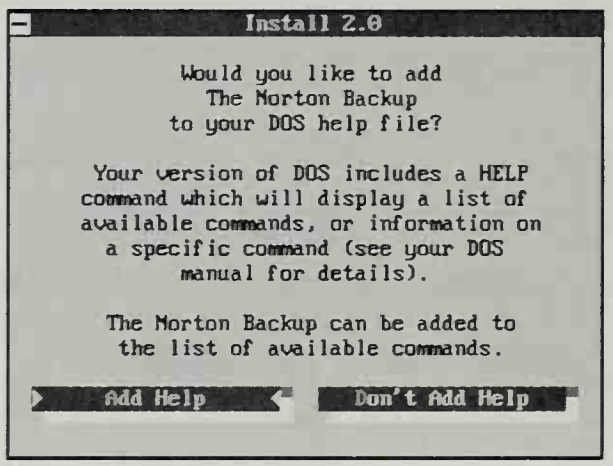

Fig. C.20

The dialog box for adding Norton Backup to your DOS help file.

7. You are prompted to personalize your copy of Norton Backup (see fig. C.21). You must enter your name. The company name is optional.

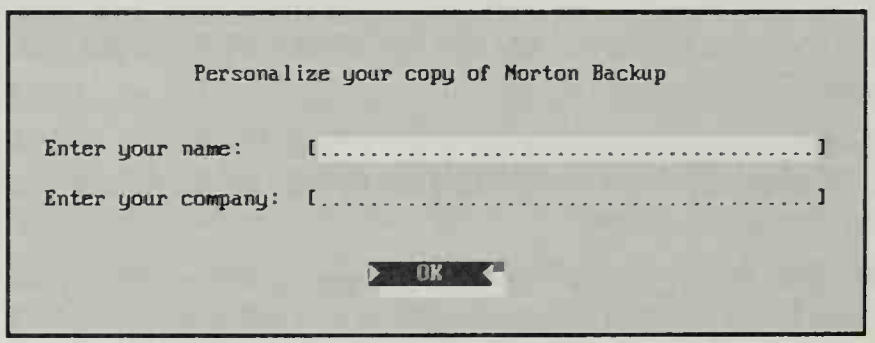

Fig. C.21

The dialog box for personalizing your copy of Norton Backup.

8. After you choose your basic options and the files are copied, the installation procedure runs a series of tests, using two floppy disks that you supply. Follow the instructions on-screen, which prompt you to place the disks in the disk drive at certain times during the tests.

   If your computer fails any of these tests, Norton Backup attempts to reset its options to compensate for the problem. If your computer fails certain tests, the backup program will still work, but it will not be able to back up at its highest speed.

Configuring the Backup Program

You must configure Norton Backup before you start using it. Configuration, performed during installation, involves telling Norton Backup the program level and the type of backup device you use. Then Norton Backup performs tests to determine how the device is used.

When you install Norton Backup, the program automatically performs the configuration, with some input from you. You can reconfigure when you add a new backup device or change devices. If, for example, you have been using disks for backup and then buy a tape backup system, you must reconfigure Norton Backup to use the tape backup system. Reconfiguring Norton Backup is discussed in Chapter 29.

The configuration portion of the installation program first configures itself to your system by running several tests. These tests determine the default setup and tell Norton Backup how fast it can perform the exchange of information. The tests consist of the following steps:

- Selecting the program complexity level
- Configuring the screen and mouse
- Selecting backup devices
- Configuring and testing backup devices
- Making changes to CONFIG.SYS and AUTOEXEC.BAT

This section explains the three levels of operation within Norton Backup, the screen and mouse configuration, and the two tests that help determine how Norton Backup will work with your computer. This section also discusses the proposed changes to your computer's AUTOEXEC.BAT and CONFIG.SYS files.

The first item you can choose is how complex you want Norton Backup to be. Choose one of three levels:

- The **B**asic level is a versatile selection. You can create and change setup files, create and change catalog files, change some options, select specific files, and use Backup Scheduler.
- The **A**dvanced level is for advanced users. This level includes all the Basic level features plus additional option settings, the creation of include and exclude scripts, and the use of special exclusions. Figure C.22 shows the Program Level dialog box.

NOTE Include and exclude scripts are lists that you can build to include or exclude files in a backup automatically. Special exclusions are files that you exclude when selecting backup files. You can, for example, exclude files outside a date range, exclude hidden files, and exclude system files.

Fig. C.22
The Program Level dialog box.

- The **P**reset level is the easiest and best suited for beginners. You can select preset backups, choose backup catalogs, select files for restoration or comparison, and use macros.

After you select the level of complexity, you can configure the screen with the following options:

- The **S**creen Colors option enables you to choose one of the predefined screen palettes or customize the screen colors yourself.
- With the **D**isplay Lines option, you can change the number of lines displayed.
- With the **G**raphical Display option, you can display graphic elements that emulate Microsoft Windows, or you can display simple text elements.
- The **R**educe Display Speed option eliminates snow that appears on some video monitors.
- The E**x**panding Dialogs option changes the size of dialog boxes.

NOTE To select or deselect a check box option, highlight the option and press the space bar, or just click the option. A check mark or x in the box indicates that the option is selected.

You can change the following mouse options:

- The Double-Click option changes the speed at which you must click the mouse button twice in succession to choose an item.
- The Sensitivity option changes the speed that the mouse pointer moves on-screen when you move the mouse.
- The Acceleration option changes how quickly the mouse pointer moves on-screen in relation to the speed changes of the mouse.
- The Left-Handed Mouse option switches the actions of the mouse buttons.
- Choose the Hard Mouse Reset option only if you are experiencing erratic problems with your mouse. Such problems may include a lack of mouse pointer response to mouse movement, or mouse clicks with no results.

Figure C.23 shows the Video and Mouse Configuration dialog box, where you can make all of these selections. After you make all your changes for the screen and mouse, choose OK.

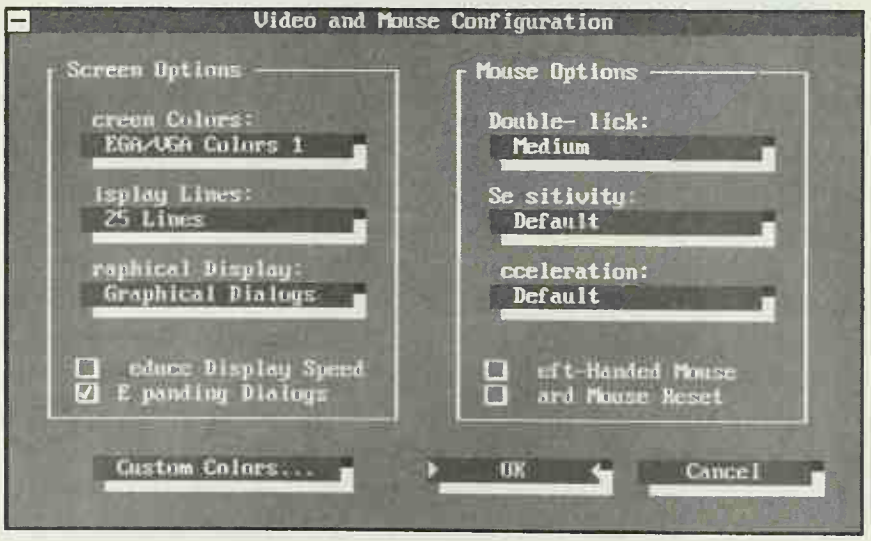

Fig. C.23
The Video and Mouse Configuration dialog box.

The most important step in configuration is selecting the backup devices. The automatic configuration searches for all possible devices—that is, Norton Backup detects disk drives and tape drives. While detecting devices, Norton Backup even determines the maximum capacity

of the device; for example, the program determines whether drive A is a 3 1/2-inch high-density drive. After Norton Backup determines the types of drives available for backup purposes, it will perform a Floppy Drive Change Line test to see whether your system is capable of using the fastest and most reliable method to determine when a disk has been removed and replaced in your floppy drive. To begin this test, choose **S**tart Test (see fig. C.24).

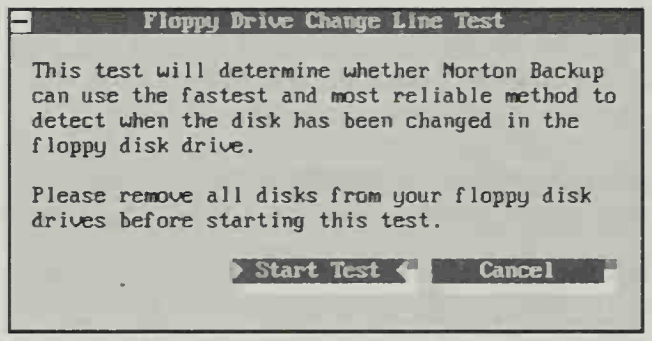

Fig. C.24

The Floppy Drive Change Line Test dialog box.

After you are sure that Norton Backup has made the correct choices, continue by choosing OK in the Backup Devices dialog box that appears. Figure C.25 illustrates the results of its search of all drives.

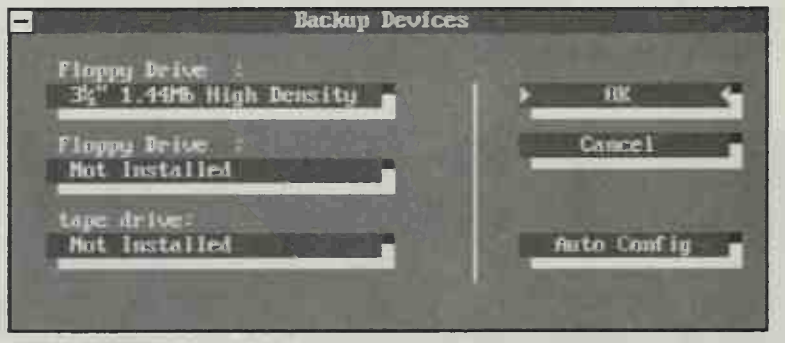

Fig. C.25

A list of backup devices detected.

Norton Backup must know how to access your hard disk and floppy disk or tape drive. The Backup program makes this determination by a direct memory access (DMA) test. Most computers enable Norton Backup to access the hard disk and the floppy disk or tape drive at the same time, which greatly increases backup speed. In the DMA Test dialog box (which appears after you specify the backup devices), choose **S**tart DMA Test or press Enter to start the DMA test, which takes just a moment (see fig. C.26). After the test is finished, the results are displayed (see fig. C.27). Press Enter or choose **O**K to continue the testing process.

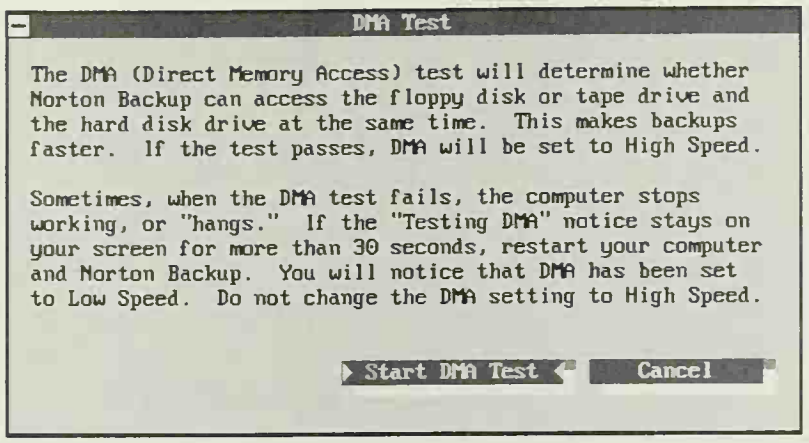

Fig. C.26
The DMA Test dialog box.

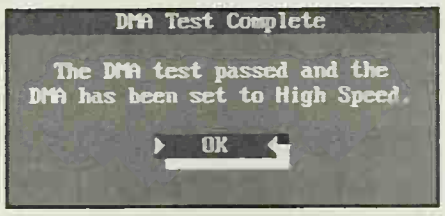

Fig. C.27
The results of a successful DMA test.

CAUTION: During the DMA test, your computer may *hang*, or stop working. If the message `Testing DMA` appears for more than 30 seconds, your computer has hung. If this problem occurs, restart your computer and Norton Backup. This time, the DMA is set to Low Speed. Don't try to set it to High Speed. (Low Speed and High Speed determine the rate at which data can be transferred.)

Norton Backup next runs a compatibility test to verify the configuration (see fig. C.28). This test does an actual backup and comparison. Be prepared to insert two disks sequentially during the test. Press Enter to start the test. Watch the screen as Norton Backup makes backup choices. Insert the disks and press Enter as the program prompts you during the test.

T I P

You can skip the compatibility test, but the test is beneficial because it confirms the setup configuration (see fig. C.29).

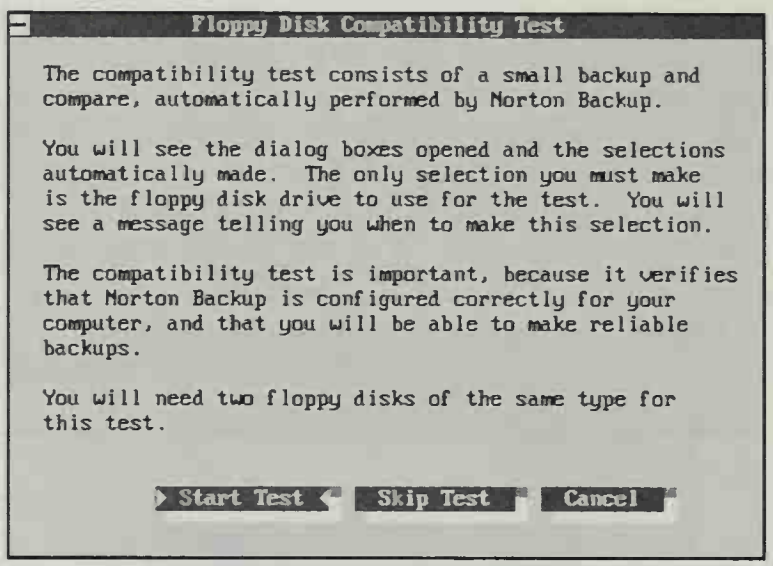

Fig. C.28

The Floppy Disk Compatibility Test dialog box.

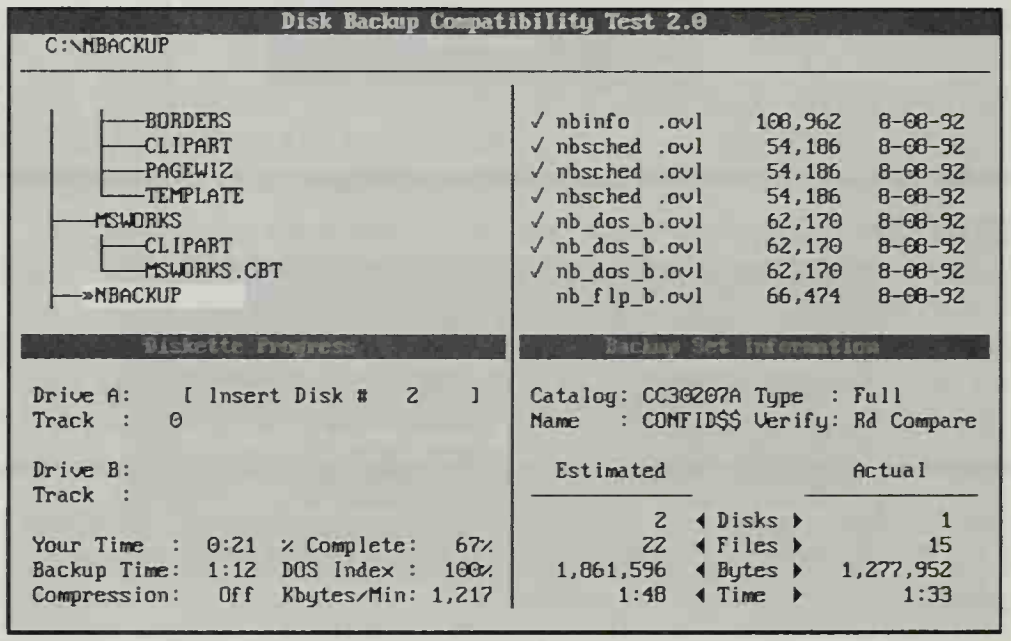

Fig. C.29

The compatibility test in progress.

After the compatibility test is finished, Norton Backup prompts you to change your CONFIG.SYS and AUTOEXEC.BAT files. The changes in CONFIG.SYS pertain to the FILES and BUFFERS statements. For optimum performance, you should have FILES and BUFFERS set to at least 30. If your current CONFIG.SYS statement is less than 30, the program prompts you to make the change.

Norton Backup then displays your computer's CONFIG.SYS file with the changes you selected. You can choose **M**ove Line (to change the order of commands in the CONFIG.SYS file), **S**ave Changes, or **C**ancel (to cancel the changes). If you want to move a line, select the line to move with the arrow keys or mouse. Then press Enter or choose **M**ove Line

and use the arrow keys to move the line to the correct location. After you select a line and choose **M**ove Line, the **M**ove Line command button changes to **D**rop Line. When the line is in the correct position, choose **D**rop Line or press Enter. Choose **S**ave Changes to save the changes made to the CONFIG.SYS file.

Norton Backup enables you to change the AUTOEXEC.BAT file by adding the Norton Backup directory to your PATH statement, setting up a DOS environment variable called NBACKUP, and loading the Backup Scheduler TSR. You are asked whether you want to schedule backups at this time. Your options include the following:

- Perform a complete backup the next time you turn on your computer
- Perform a complete backup every Friday at 4:00PM
- Perform incremental backups Monday through Thursday at 4:00PM

If you want these events to occur automatically, choose **Y**es. Otherwise, choose **N**o.

As with the changes you made to CONFIG.SYS, mark the check boxes for the changes you want to make, and then press Enter. You next see your computer's AUTOEXEC.BAT file. You can move the lines in AUTOEXEC.BAT or save the changes.

Now automatic installation is almost complete. You can save your choices by choosing **S**ave, or you can return to any part of the configuration to make additional changes.

The Norton Backup opening screen is again displayed. Norton Backup is now ready to back up your data.

Verifying the Backup Configuration

After you install Norton Backup, you should back up all or a portion of your hard disk and then restore your backed-up files to verify that the program is installed and working correctly.

After saving your changes, Norton Backup automatically begins a backup session, prompting you to insert Disk #1. If you are prepared to perform a backup, insert your first backup disk in the appropriate drive. The drive light will be active, indicating the drive where the program expects you to insert a disk. If you want to wait and perform a backup at a later time, press Esc, and you are presented with a screen that offers the options **R**eboot, **G**o to Program, and Return to **D**OS.

Reboot reboots your computer, invoking changes made to your AUTOEXEC.BAT and CONFIG.SYS files. **G**o to Program goes to the Norton Backup 2.0 main menu. Return to **D**OS takes you back to the DOS prompt without invoking the changes to your AUTOEXEC.BAT and CONFIG.SYS files.

If you elected to reboot your computer or you returned to the DOS prompt, you can begin the program by entering **NBACKUP** at the DOS prompt. If Norton Backup fails to start, be certain that you are in the directory in which Norton Backup was installed (for example, C:\NBACKUP). If you chose to have the installation program modify your AUTOEXEC.BAT and CONFIG.SYS files, simply reboot your computer and enter **NBACKUP** at the DOS prompt.

D

APPENDIX

Dealing with Disk-Related Problems

Norton Utilities 7 provides a number of commands for fixing disk problems that you cannot fix by using DOS commands alone. Many disk problems occur when bad spots develop on the magnetic surface of a disk. The magnetic signal on the disk gradually weakens until DOS cannot read the information. Other problems occur when a disk gets nearly full of files and they become so fragmented that DOS loses track of critical information. If these problems begin to appear, you may experience computer difficulties ranging from the inability to read one file to the inability to access your entire hard disk.

The first part of this appendix describes some common problems and suggests how you can use Norton Utilities commands to diagnose and solve these problems. Sometimes, however, a disk may be irreparable with these methods. You may have to perform a low-level format on the hard disk, which is explained in the section "The Hard Disk Needs a Low-Level Format" in this appendix.

Another problem is computer sabotage. The data on your computer may be damaged by a computer virus or the deliberate act of an individual. For information on handling these types of problems, see the section "The Threat of Viruses and Sabotage" in this appendix.

For suggestions on how to respond to common DOS error messages, see the final section, "Responding to DOS Error Messages." A DOS error message is usually the result of a problem related to a DOS command. For example, if you enter a command that DOS does not recognize (perhaps you incorrectly spell it), DOS responds with the message `Bad command or file name`. Knowing the meaning of a DOS message can be valuable in figuring out how to deal with the problem.

Diagnosing and Fixing Disk Problems

This section presents several common disk problems and gives suggestions for solving them by using Norton Utilities and DOS commands.

The Computer No Longer Boots from the Hard Disk

If your computer has booted from the hard disk in the past but now it does not, you must boot from a floppy disk in drive A. Make sure that the disk contains the same version of DOS that is on the hard disk.

One condition that can cause a hard disk to fail to boot is that the correct COMMAND.COM file is no longer in the hard disk root directory. After you boot your computer, examine the hard disk's root directory to determine whether it contains the correct COMMAND.COM—you should be able to tell by looking at its date and size. If they do not match the date and size on the original DOS disk, copy the correct COMMAND.COM to the hard disk and try booting again.

If the COMMAND.COM file is OK, your system files may have become corrupted. You can use the DOS SYS command to transfer a fresh copy of the system files to the hard disk or, better yet, you can use the Make a Disk Bootable option in Disk Tools. This option places COMMAND.COM and the system files on your disk. If one of these approaches does not work, your hard disk may be damaged physically, and you probably need to have it repaired.

You should keep a floppy disk handy that contains the files necessary to boot your computer in case it becomes unbootable from the hard disk. This floppy disk should be formatted with the System (/S) FORMAT option. It should contain the DOS programs FDISK and DEBUG,

the Norton programs Disk Tools and Disk Doctor, and the files AUTOEXEC.BAT and CONFIG.SYS. The floppy disk should also include any device drivers (for the mouse or plotter, for example).

The Rescue Disk program provided with Norton Utilities 7 creates such a disk; you can specify which files you want to store on the rescue disk for use in an emergency. See Chapter 14 for details on this program.

The Hard Disk Cannot Be Formatted as a System Disk

The hard disk, like a floppy disk, uses track 0 to store system information. If that track is bad on a hard disk, the DOS FORMAT command will not create a bootable hard disk. You have several alternatives for circumventing this problem, however. After you boot the computer from a floppy disk in drive A, use Norton Disk Doctor to diagnose the hard disk and then attempt to fix the problem (see Chapter 12). If that approach does not work, you may need to perform a low-level format of the disk. If the disk contains valuable information, you need to use a nondestructive program such as SpinRite from Gibson Research or Norton's Calibrate utility. See the section "The Hard Disk Needs a Low-Level Format" later in this appendix for more information.

The DISKCOPY Command Results in Errors

If you use the DOS DISKCOPY command to copy a disk, you may get write errors, read errors, or both. Write errors are associated with writing data to the destination disk. If the destination disk has a bad or unreadable spot, a write error occurs. If you get a write error, change to another destination disk. Read errors are associated with reading data from the source disk. If the source disk has a bad or unreadable spot, a read error occurs.

Of the two types of errors, the read error is of more concern because it occurs on the disk that contains the original data. If you get a read error, use Norton Disk Doctor to examine the source disk. Disk Doctor determines whether the read error is in an area that contains a file and then attempts to correct the problem by moving the file to a safer part of the disk.

The Hard Disk Needs a Low-Level Format

When a hard disk is manufactured, it contains random magnetic signals. To make the disk usable, the manufacturer of the hard disk drive or disk controller performs a low-level format on the hard disk. This format is much more thorough than the procedure performed by DOS FORMAT. A low-level format prepares the surface of the hard disk to receive a DOS format and detects bad spots on the surface.

Occasionally, a working hard disk develops problems that cannot be corrected except by a low-level disk format. Some machines have low-level formatting programs built into their ROM software. You can use the DOS DEBUG program to tell the formatting program to begin operating. This low-level format usually is a completely destructive format, however, and nondestructive low-level formatting programs are available. Examples are SpinRite from Gibson Research and the Calibrate program in Norton Utilities 7. By using one of these low-level formatting procedures, you may be able to recover some information from the disk.

WARNING: Do not perform a low-level format of your disk unless you are an experienced computer user. Before performing the low-level format described here, try the low-level (nondestructive) format described in Chapter 20.

To use the computer's built-in program to perform a low-level format (which is destructive to data on the disk), follow these instructions:

1. Boot the computer, using the original DOS disk in drive A.
2. Begin the DEBUG program, which is located on the DOS disk, by entering **DEBUG** at the DOS prompt.
3. A – prompt should appear on-screen. At this prompt, type **G=C800:5** and press Enter. If nothing happens within a minute or two, your computer probably does not have a built-in low-level formatting program. You must reboot the computer and use a nondestructive low-level formatting program.
4. If a low-level formatting program does exist in ROM, another prompt appears. At this prompt, enter an interleave number, which controls your hard disk access time.

The *interleave* determines how much information is read from the disk on each pass. Use an interleave number from 3 to 6. On most AT-type computers, enter an interleave of **3**. On most PC- or XT-type computers, enter an interleave of **6.** If your PC-type computer is a turbo, you may be able to choose a lower interleave than 6 and therefore make your disk access faster. If you choose an interleave that is not optimum, however, your disk access will be too slow. If, after performing the low-level format and some tests (such as running SYSINFO), you feel that your disk access is too slow, try a higher interleave number.

T I P

Running the Norton Calibrate program gives you the best interleave ratio for your disk. Using Calibrate, you can change the interleave without having to redo a destructive low-level format such as the one originally performed on the disk by the manufacturer.

The low-level format may take several hours to perform. After it is finished, you need to run the DOS FDISK command before formatting the disk.

The Threat of Viruses and Sabotage

At some time, you may become the unfortunate victim of deliberate destruction of computer data. Someone may sabotage your data by destroying, changing, or erasing data on your computer disk. Or your computer may become infected by some type of computer virus program. Virus programs have been known to come from pirated software and from demos that appear in the mail, but rarely from commercial software. Some virus programs are nondestructive and simply give you a message (and a scare). Other virus programs may attempt to destroy all the data on your disk.

You can take a few precautions to lower your chances of having your computer sabotaged. First, load software only from reputable sources and limit other users' access to your computer. You can also set the attributes of important files to read-only. These files should include at least the COMMAND.COM, AUTOEXEC.BAT, and CONFIG.SYS files in your root directory. Be sure to compare the size of your copy of COMMAND.COM on your hard disk with the size of the copy on your original DOS disk. If the sizes differ, your COMMAND.COM may be infected.

You can also purchase and load a virus protection package such as Norton AntiVirus (NAV). Using this program, you can scan your disk for viruses and correct some kinds of virus destruction. You can place the NAV command in your AUTOEXEC.BAT file to verify each time you boot that your disk is free of viruses.

Another important step in being prepared for data destruction is to have current backups of your system, program, and data files. You particularly may want to keep a backup disk of the files in your root directory. Keep also a current copy of your original DOS disk and a copy of your Norton Utilities rescue disk (see Chapter 14).

Virus programs continue to get more complicated and destructive. Depending on the nature of the attack, you may not be able to recover any of your data. If your computer's disk has been compromised by a virus or sabotage, however, Norton Utilities offers some hope of recovery. The following sections provide possible solutions to various problems arising from virus programs or sabotage.

Files or Directories Have Been Erased

Use the Norton UnErase command to recover erased files before you write new information to your disk. You can also use the UnErase command to recover each directory and any associated files that have been erased.

System Files Have Been Altered

Virus programs often attempt to change the COMMAND.COM file or other system files. If you suspect a virus, compare the date and time of the COMMAND.COM file in your hard disk's root directory with the original (or backup) copy of COMMAND.COM. If you notice any difference, replace the infected file on the hard disk.

To replace not only COMMAND.COM but also the other system files, boot your computer from a copy of your original DOS disk in drive A. Use the Make a Disk Bootable option in Disk Tools to copy a fresh version of the system to the hard disk. If a virus program caused the problem, examine your hard disk to find and remove that program. Until you are sure that you have corrected the problem, quarantine all files from the computer and the floppy disk you used to reboot the computer; do *not* distribute any files (particularly program files) from the computer or floppy disk to any other computer.

The AUTOEXEC.BAT File Has Been Altered

If you discover that your AUTOEXEC.BAT file has been changed, try to determine when and why the change was made. Some software installation programs change this file and the CONFIG.SYS file as part of the installation process. Some virus programs, however, may change the AUTOEXEC.BAT file in order to run a destructive program or a counter program that will eventually release a destructive virus. A *counter program* counts the number of times your computer is booted or a program is run, and then activates on a preset count. You should examine your AUTOEXEC.BAT and CONFIG.SYS files and understand the reason for each command. If you notice a suspicious command, replace the old AUTOEXEC.BAT with your backup copy or delete the unknown command. If AUTOEXEC.BAT calls an unknown program, determine where the program is and what it does. Remove the program from your computer if you do not know its purpose. One well-publicized virus that was sent to hundreds of persons in the guise of a demo program used a command in the AUTOEXEC.BAT file to trigger its main counting mechanism.

The Hard Disk Has a Hidden File or Directory

Some legitimate programs create hidden files or directories on disk as part of a file-protection scheme. Some virus programs also create hidden files and directories in which destructive programs may reside. Using Norton Control Center (the NCC command), you can see any hidden directories that reside on your disk. If you notice one directory that looks suspicious, investigate it (for example, examine the file by using Disk Editor). You can also discover any hidden files on disk by using the Norton File Find utility. Again, if you do not know why the files are on your disk, investigate to find out whether a legitimate program placed them there or whether they were created from an unknown source. If you suspect sabotage, be sure to keep copies of all important files on backup disks until you are sure that the danger is past.

The Hard Disk Has Been Erased

If your hard disk looks as if it has been erased completely or reformatted, you have several options:

- Boot your computer from the original DOS disk (or your Norton rescue disk) and then use the Norton UnErase command to see whether any directories and files can be saved. Some attacks have been known to rename files and directories. You may have to examine recovered files individually to determine their contents.

- If the disk was formatted, you can try to unformat it with the Norton UnFormat command. If you recently ran the Image command, recovery will be easier.
- Virus attacks are becoming smarter and more destructive. Having backups of your files is important because some attacks completely destroy data. For these problems, recovering your files from backup disks is the only solution.

Responding to DOS Error Messages

This section contains information about what to do if you encounter DOS error messages. Not all DOS error messages are covered, only the most common disk-oriented messages.

Abort, Retry, Ignore, Fail?

This message may appear if you attempt to read or write something to a disk, a printer, or another device. If a disk is bad or not positioned properly in the disk drive, DOS displays this error message. You have four choices for responding to the prompt: press A to abort, R to retry, I to ignore, or F to fail. The following list gives the meanings of these options:

Option	Description
Abort	Cancels the procedure.
Retry	Tries the procedure again.
Ignore	Ignores the error and proceeds. During a copy, for example, the Ignore option continues the copying operation, but the resulting file may have missing information that could not be copied correctly.
Fail	Skips the problem, and DOS tries to continue with the procedure. If the problem is that the computer cannot access a disk drive, you may be prompted to enter a new current disk drive name. (Fail is similar to Ignore.)

The message `Abort, Retry, Ignore, Fail?` may appear for disk- or device-related problems.

Disk-Related Problems and Solutions

Sometimes if you choose Retry, DOS can read or write to the disk on the second or third try. Even if this approach works, though, you may need to correct the problem by running Norton Disk Doctor to fix files or running Norton Speed Disk to unfragment files.

If the problem is with a floppy disk, verify that you have the disk positioned properly in the disk drive. Make sure that the disk is not upside down, for example, and that the disk drive door is shut.

Sometimes the magnetic media in the disk jacket gets stuck because of a jacket flaw or because the media is out of alignment. Remove the floppy disk from the drive and tap the disk on its side to attempt to loosen it; do not touch the magnetic media. Place the disk back in the drive and try the read or write operation again.

You should make sure that the disk is formatted and that it is formatted so that it can be read on the disk drive you are using. If, for example, you are using a 360K drive and have inserted a disk originally formatted as a 1.2M disk, the drive cannot read the disk.

If you cannot readily solve the problem, choose the Abort option and examine the disk by using Norton System Info (the SYSINFO command) or Norton Disk Doctor (the NDD command).

If you are convinced that the disk is formatted properly for this drive but DOS is still having trouble reading a file, try to correct the problem with Norton Disk Doctor.

Problems Caused by Other Devices

Make sure that your printer is turned on and that it is on-line. Check that a cable is attached properly to the device. Correct any problems and choose Retry.

DOS may be trying to communicate with some other device that is not turned on or attached properly. If so, choose Abort by pressing A and correct the problem.

If DOS is attempting to communicate through a COM port, make sure that it is set up correctly. You can use the DOS MODE command or Norton Control Center (NCC) to set up a communications (serial) port. Abort the current procedure and fix the problem.

Access Denied

This message appears if you attempt to change (or write to) a file that has its attribute set as read-only. You can change this setting by using the DOS ATTRIB command or the Norton File Find utility. Make sure that you want to change this file before you remove the read-only status.

`Access denied` may appear if you attempt to use a subdirectory as a file, such as trying to edit the subdirectory.

Bad Command or File Name

This message appears if you enter at the DOS prompt a command that DOS does not recognize—for example, if you misspell the command. If you see this message, first check your spelling.

Another possibility is that you entered a correct command but you were not in the proper directory or did not have your PATH command set up to find the command in its directory. Correct your PATH command (usually in your AUTOEXEC.BAT file) or change directories by using the DOS CD command or Norton Change Directory (the NCD command).

Bad or Missing Command Interpreter

If the file COMMAND.COM is not on the boot disk or if DOS has a problem reading this file, you get this message. If you attempted to boot from a floppy disk, perhaps it was not a boot disk. If you were booting from a hard disk, you need to correct the problem by rebooting from drive A with a correct version of DOS and then fixing the problem on your hard disk. You may have to copy COMMAND.COM back to the hard disk's root directory. If your hard disk still has problems, you may need to use Norton Disk Doctor (NDD).

Cannot Find System Files

This message appears if DOS cannot find the hidden system files required to boot the computer. You cannot make a disk bootable simply by placing the COMMAND.COM file on it. You must use the DOS SYS command or the Make a Disk Bootable option in Disk Tools to place these hidden files on a disk.

Cannot Read File Allocation Table

This message may appear if you use the DOS RECOVER command. Instead of using this DOS command, use Norton Disk Doctor (NDD) to attempt to recover damaged files. If you already have used RECOVER, use Norton Disk Tools to recover from the RECOVER command.

Data Error

This message usually means that a disk has a bad spot and that DOS is trying to read or write to that spot. You can attempt to locate and correct this problem by using Norton Disk Doctor (NDD).

Drive Not Ready Reading/Writing Device

If the drive door is not fully closed, you get this message. Verify that you have inserted your floppy disk properly in the drive and that the drive door is fully closed. The problem also may be caused by a defective drive. If so, you need to have a qualified technician correct the problem.

Error in Loading Operating System

This message may appear if DOS is unable to find the proper system information while attempting to boot the system. Turn off your computer and try again. You may need to boot the computer from a DOS disk in drive A and then correct the problem by using DOS SYS to write a fresh copy of the system files to your boot disk (usually disk C: for a hard disk). Alternatively, you can use the Make a Disk Bootable option in Disk Tools to correct the problem.

Error Writing Fixed Disk

This message may appear if DOS cannot write system startup information to a disk. Use Norton Disk Doctor (NDD) to analyze and correct the problem. If the problem persists, attempt to copy as much information from this disk as possible. You may need to boot from a floppy disk in drive A, and you may need to perform a low-level format of the disk. See the section "The Hard Disk Needs a Low-Level Format" earlier in this appendix.

Error Writing Partition Table

This message may appear during the FORMAT procedure and may be caused by a hardware problem or a physically damaged disk. The boot record at the beginning of the disk probably cannot be read from or written to. A possible solution is to reformat the boot record. You can use Norton Disk Doctor (NDD) to attempt to fix your disk and recover information. You may need, however, to replace your disk, get a technician to correct the hardware problem, or perform a low-level format on your disk. For more information, see the section "The Hard Disk Needs a Low-Level Format" earlier in this appendix.

File Allocation Table Bad

If this message appears, DOS has lost information about where files are stored. This information is usually kept in the file allocation table (FAT). Two copies (normally identical) of the FAT usually reside on a disk. By using the Norton Disk Doctor's **D**iagnose Disk option, you may be able to recover information from the duplicate FAT.

File Cannot Be Copied to Itself

If you omit a required destination in the COPY command, you get this message. For example, the following command produces this error message because DOS does not allow the file to be written to itself:

```
COPY MYFILE.TXT
```

File Creation Error

This message appears if DOS is unable to write a file to a directory. The directory or disk may be full. Use the DIR command to list files to see how much space is available on disk. If the directory or disk is full, you can delete unnecessary files to make room for the file. This error message can also appear if you attempt to write to a read-only file. If you want to write to a file that has the read-only attribute set, you need to change the file's attribute (use the DOS ATTRIB command or Norton File Find) or save the file under another name.

Furthermore, the disk may be physically damaged, and DOS may have tried to write the file to a bad spot on the disk. You can verify whether the disk has bad spots by running Norton Disk Doctor. NDD marks bad spots so that they cannot be used to store files.

File Not Found

You get this message if you attempt to access a file that is not in the current directory or is not in the directory of the specified path. You may have misspelled the file name or included an incorrect path. You can use Norton File Find to see whether the file is located in another directory.

If you still get this message, the file space on the disk may be damaged. You then should try to reclaim the file by using Norton Disk Doctor's **D**iagnose Disk option.

General Failure

This message appears if DOS cannot figure out why a problem has occurred. In this case, you may have to do your own fishing for the culprit. If you are attempting to access a disk in a drive, you may want to make sure that the disk is readable. Are you, for example, attempting to access a 1.2M 5 1/4-inch disk in a 360K drive, or a 1.44M 3 1/2-inch disk in a 720K drive? You can also check to see that you have inserted your floppy disk correctly in the disk drive and that the disk drive door is closed all the way.

A damaged disk or disk drive can cause the problem. Try moving the disk to another disk drive or use Norton Disk Doctor to attempt to read the disk.

Incorrect DOS Version

You get this message if you attempt to use a DOS external command from a version of DOS other than the one under which the computer was booted—for example, you attempt to use the PRINT command (PRINT.COM) for DOS 3.3 when the machine was booted with DOS 4.0. You should make sure that all your DOS commands on disk are from the same version of DOS. To find out which version of DOS you are using, enter the VER command at the DOS prompt.

Incorrect (or Invalid) Number of Parameters

This message appears when you enter a DOS command that has an incorrect number of parameters or invalid parameters. Check your DOS command syntax and reenter the command.

Insufficient Disk Space

If you attempt to write a file to a disk that is full or does not have enough free space to hold the file, you get this message. To correct the problem, erase unneeded files and retry writing to the disk. You can use the File Size utility to see whether the destination disk has enough space to receive one or more files.

Invalid Drive Specification (or Invalid Drive or File Name)

This message appears when you use a drive specification that does not exist. If you use drive D in a DOS command when you have no drive D, for example, DOS gives you this error message.

Invalid Partition Table

If DOS attempts to boot the computer from your hard disk and finds something wrong with the computer's partition information, this message appears. This information should be on your disk at track 0. If this area is bad, you can use Norton Disk Doctor to attempt to diagnose and recover the partition information for you, or you can use the Make a Disk Bootable option in Disk Tools to refresh the boot information on the disk.

Invalid Path, Not Directory, or Directory Not Empty

This message appears if you attempt to remove a directory that contains files or that does not exist. If you want to remove an existing

directory, you first must erase all files and subdirectories contained in that directory.

Memory Allocation Error

You get this message if a program that you are running overwrites the area in the computer's memory that stores important DOS information, or if the disk does not have enough available memory to load portions of DOS. This command may freeze your computer and cause you to have to reboot. A possible solution to this problem is to lower the number of buffers and/or device drivers specified in your CONFIG.SYS file or to remove some memory-resident programs (also called TSR, terminate-and-stay-resident, or pop-up programs).

Missing Operating System

You get this message if DOS attempts to boot the computer from a disk the system perceives to be bootable, but some or all of the system information is missing. To correct the problem, you can copy all files to floppy disks and then reformat the disk with DOS FORMAT or use the Make a Disk Bootable option in Disk Tools. With Norton, none of the files on disk are removed, so you do not have to back up the disk first.

No Room for System on Destination Disk

This message appears if you attempt to use DOS SYS to place a copy of the system files on a disk that has not been prepared during the format procedure to receive those files. To make the disk bootable with DOS, copy all files from the disk and then reformat the disk with the /S switch. Alternatively, use the Make a Disk Bootable option in Disk Tools to create a bootable disk without destroying files, even on a disk that was not formatted to be a system disk.

Non-System Disk

If you attempt to boot from a disk that does not contain the full DOS system or that has damaged system files, you get this message. If you are using a hard disk system, make sure that you do not have a disk in drive A when you boot the computer because the computer then

attempts to boot from that disk. If your disk should be bootable but is not, you can attempt to fix the disk by using the Make a Disk Bootable option in Disk Tools.

Not Ready

When DOS attempts to read or write information to a device and cannot do so, this message appears. The problem may be that the disk drive door or knob is not closed completely, the disk is not formatted, the printer is not turned on or is not on-line, or another device is not ready to receive information. Determine the problem, correct it, and try again.

If a drive becomes overheated, it may produce the `Not ready` message. Check to see whether the computer is getting proper ventilation. (You may need to vacuum the vents around the edges of the computer.) If your computer has an exhaust fan, make sure that it is working properly. Turn off the computer and let the disk cool down. If the problem continues, consult a technician for further assistance.

Probable Non-DOS Disk

This message appears when DOS has problems reading the FAT or the disk media descriptor during a CHKDSK command. This problem may occur particularly on a hard disk larger than 32M that is partitioned into several drives. You can usually fix the problem by running Norton Disk Doctor's **D**iagnose Disk procedure.

Read Fault Error

If DOS is unable to read information from a disk, you get this message. You may have improperly seated the disk in the drive, or the drive door may not be closed properly. You also will probably get the message `Abort, Retry, Ignore, Fail?`

Abort the procedure and reseat the disk. To reseat the disk, take the disk out of the drive and tap the disk on its side to loosen it up. On a 5 1/4-inch disk, you can carefully place two fingers in the center hole and move the disk in the cover to loosen the disk. Place the disk back in the drive and close the drive door. If other disks work in the drive but this one cannot be read, try the Revive a Defective Diskette option in Disk Tools.

Required Parameter Missing

This message appears if you enter a DOS command that has too few parameters entered on the command line. Check your DOS command syntax and reenter the command.

Sector Not Found

If DOS attempts to read from or write something to a disk when the sector on the disk cannot be accessed, this message appears. You also will probably see the message `Abort, Retry, Ignore, Fail?` Abort the current command by pressing A.

If the problem occurs with a floppy disk, try to read the floppy disk in a different drive. Copy all the files you can from the disk. Use Disk Doctor to find and mark bad spots on the disk. Also try the Revive a Defective Diskette option in Disk Tools. Reformat the floppy disk or discard it.

If the problem occurs with a hard disk, use Disk Doctor to find and mark the bad sectors. If the problem persists on the hard disk, you need to back up all the files you possibly can and then perform a low-level format on the disk. For more information, see the section "The Hard Disk Needs a Low-Level Format" earlier in this appendix.

Seek Error

If DOS is unable to find the track on disk that is needed to read from or write data to the disk, you receive this message. You also get the message `Abort, Retry, Ignore, Fail?` Choose to abort the process by pressing A.

If this message appears while you are trying to access a floppy disk, take the disk out, tap it on its side, and reinsert it correctly into the drive. If the problem continues, use the Revive a Defective Diskette option in Disk Tools. Copy all possible information from the disk and then discard the disk or reformat it.

If the problem occurs when you are trying to access a hard disk, attempt to copy as many files off the disk as possible. You may try to use Disk Editor to restore the usefulness of the bad sectors. After you have recovered as many files as possible, perform a low-level format on the hard disk. For more information, see the section "The Hard Disk Needs a Low-Level Format" earlier in this appendix.

Too Many Parameters

This message appears if you enter a DOS command that has an invalid number of parameters. Check your DOS command syntax and reenter the command.

Top Level Process Aborted, Cannot Continue

If a DOS command failed when you were trying to access the disk, this message appears. Reboot and run Disk Doctor to locate and attempt to fix any bad sectors.

Write Protect Error

You get this message if you attempt to write data to a disk that is write-protected. On a 5 1/4-inch floppy disk, you set write protection by placing a piece of tape over the notch on the side of the disk. A 3 1/2-inch disk is write-protected when you move the write-protect tab so that an open hole appears in the corner of the disk. Before removing write protection, make sure that you want to change information on the disk.

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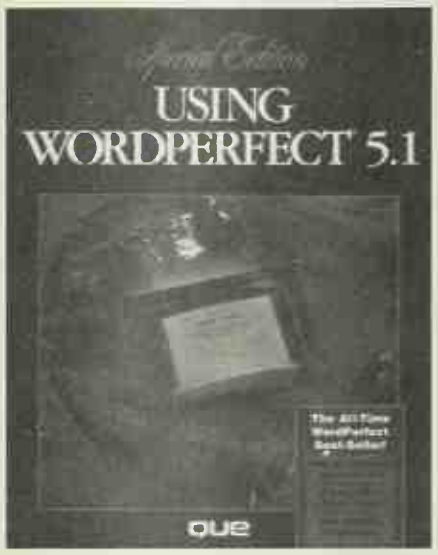

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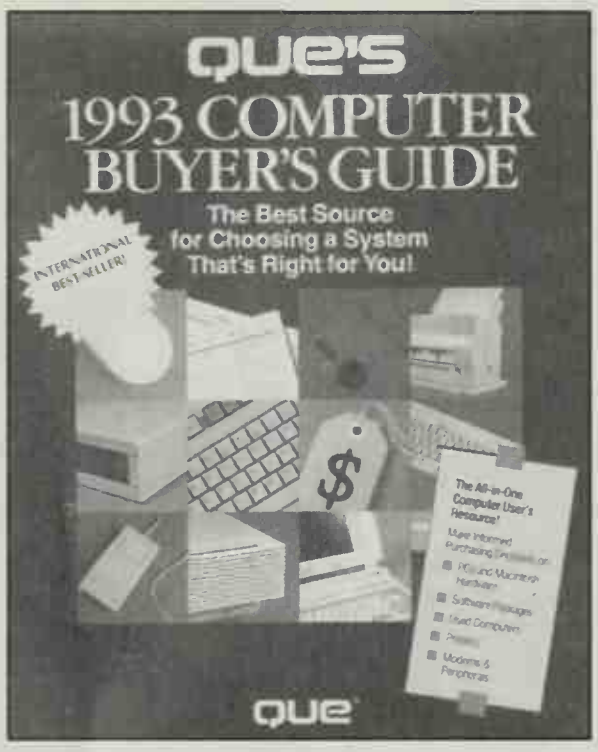

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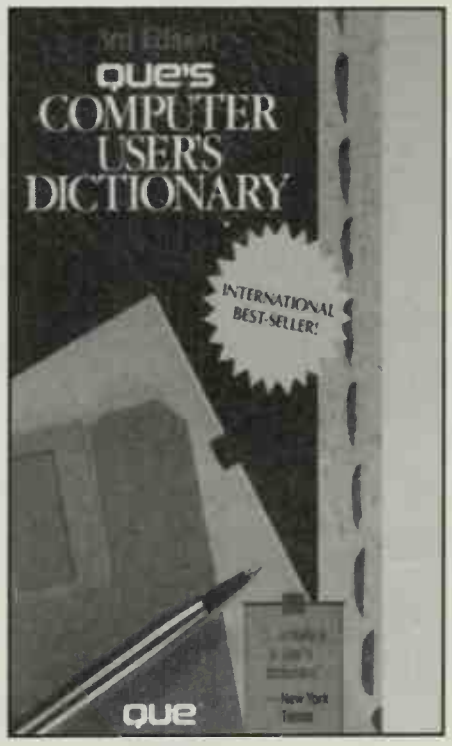

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