THE DOS 6 COMPANION

by Forest Lin

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The DOS 6 Companion

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Forest Lin

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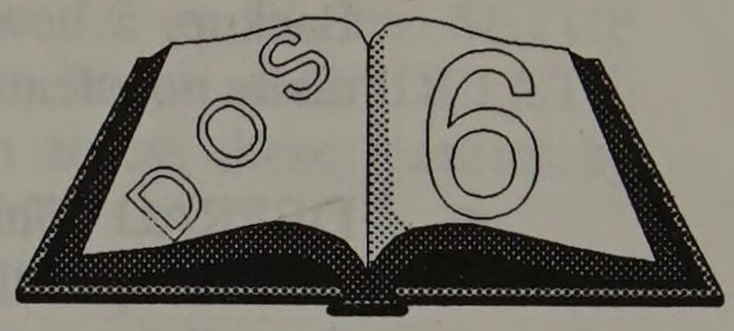
INTRODUCTION



This little book is intended to supplement *The DOS 5 Coursebook* (Coursebook) and *The DOS Primer* (Primer) so that you can use the combination to learn DOS 6. If you are thoroughly familiar with DOS 5, this book is sufficient to bring you up to DOS 6. If you are learning DOS for the first time, either combined pair will give you a comprehensive coverage.

WHAT'S NEW IN DOS 6

DOS 6 has something old and something new. The core is little changed. But lots of accessories, most of them licensed from popular third-party packages, are included. Most of the new features have to do with memory and disks. The major ones are listed and briefly explained below:

- Online Reference Online help was first introduced in version 5; this program is still available in version 6. But there is a new full-screen, menu-driven online reference. This electronic reference has replaced the bulky printed manual that used to accompany each previous version. Consequently, the manual that comes with version 6 is much skimpier (and using much less paper) than its previous incarnations. DOS has turned green—ecologically green.

- File Compression This is the most widely advertised addition, licensed from Vertisoft. The program, known as DoubleSpace, can compress files to fit more data on the same disk, hard or floppy. This can nearly double a disk's capacity. File compression is done at the system level and transparent to the user; you won't notice it.

- Backup The previous BACKUP and RESTORE to back up and restore files have been discarded and replaced with Microsoft

Backup, a new program licensed from Norton Backup. It has many new features and works much better.

- DEFRAG This disk defragmenter is a slimmed down version of Norton SpeedDisk. It brings fragmented files together so that your disk access time can be reduced.

- Anti-Virus Licensed from Central Point Anti-Virus, Microsoft Anti-Virus can detect and clean viruses from your memory or disks. A memory-resident program can also monitor any virus-like (shall we say virulent?) activity and alert you.

- Memory Optimizing The new memory optimizer called MemMaker can analyze and alter your CONFIG.SYS and AUTOEXEC.BAT files so that more memory-resident programs can be loaded to the upper memory area. This can free up more conventional memory for your applications.

- Startup When booting DOS, you can now have a clean boot (bypass both CONFIG.SYS and AUTOEXEC.BAT) and selective boot (answer Y or N to execute a line in CONFIG.SYS). Your CONFIG.SYS file can now be written in such a way to show a menu which will let you select an option to execute only a block of configuration commands. In addition, the option selected by the user can pass value to the subsequent AUTOEXEC.BAT execution.

- Diagnostics MSD (Microsoft Diagnostics) can show lots of information related to your system, including memory maps and peripheral data. You can use it to print a comprehensive report about various parts of your system.

- UNDELETE This old command has absorbed MIRROR, available in version 5. It also offers a new level of protection against file deletion.

- MOVE This new command lets you move files and rename directories.

- DELTREE This new command can be used to delete files and directories (together with files and subdirectories).

- CHOICE This new command can be used in a batch file to handle user interaction.

- Windows If you are using Windows 3.0 or 3.1, the SETUP program lets you install the Windows flavor of UNDELETE, Anti-Virus, and MS Backup. You can access these features by clicking an icon on the Windows screen.

- INTERLNK If you have a laptop computer, you can use the INTERLNK.EXE program and a parallel or serial cable to link up between the laptop and your desktop PC. You can also use POWER.EXE to save power on your laptop.

If you are a DOS novice, most of these probably mean very little to you at this time. But, as you progress with this book, they will make more and more sense to you. You can come back later and look at this list and say, "aha, I know how to use this and that!"

HOW TO USE THIS BOOK

This book comes with three tables of contents: Companion, Coursebook, and Primer. The first lists the contents of only this book. The last two combine the contents of the Companion (this book) and the Coursebook or Primer. If you are learning DOS for the first time, the last two tables of contents can substitute for the one in the Coursebook or Primer. From these combined tables, you can find topics related to both versions 5 and 6.

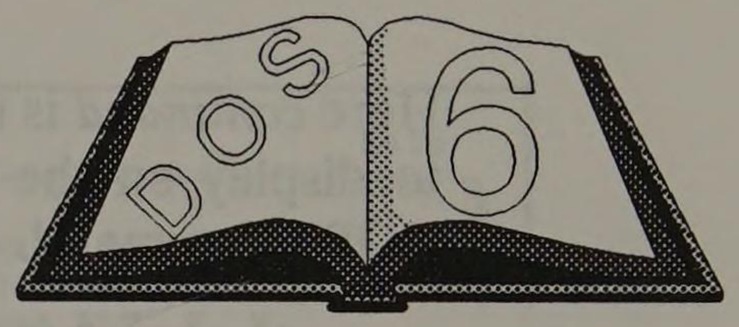
The page numbers in this book are all preceded by the character S (it stands for Six or Supplement)—to distinguish them from those in the Coursebook or Primer. In the last two tables of contents, when you see a page number starting with an S, S45 for example, look for the item in this book. For the others, look them up in the Coursebook or Primer.

In the last two tables of contents, some sections may be marked with the (deleted) notation. These cover the commands or features available in version 5 but no longer available in version 6.

The contents in this book will be merged with those in *The DOS 5 Coursebook* to become *The DOS 6 Coursebook* in the near future.

Fred Cisin of Merritt College (Oakland, CA) edited the manuscript expertly and meticulously. I'd like to express my sincerest thanks.

Chapter 1



ONLINE HELP

(Add this chapter to the section on p. 29 in the Coursebook and the end of Chapter 2 in the Primer.)

Users of old DOS versions used to complain that DOS was hard to use because commands and switches were hard to remember. Microsoft's response was to introduce **online help** in version 5; users can enter a simple command on the command line to display helpful information related to a specific command. This welcome innovation is further improved and expanded in version 6.

Version 6's printed manual, unlike its previous counterparts, is very skimpy. Detailed information on how to use various commands and features is now stored in a comprehensive online help program. The agile electronic reference has replaced the bulky printed manual. You should get familiar with this helpful addition at this early stage so that you can take advantage of it whenever you need it.

TWO ONLINE HELP PROGRAMS

There are several ways to use the online help. You can enter one of these commands:

1. `C>fasthelp`
2. `C>fasthelp command`
3. `C>command /?`
4. `C>help`
5. `C>help command`

Here *command* is the name of a command whose help message you want to display on the screen. Suppose you want to know how to use the COPY command. Enter either command below:

```
C>fasthelp copy
C>copy /?
```

(If the *Bad command or file name* error message appears, enter the CD \DOS command and try again.)

How do you know what command name is available? You can show the entire list of command names by entering this command alone:[1]

```
C>fasthelp
```

A screenful of names appears, together with the --More-- message at the bottom of the screen. Press a key to display the next screen. Continue until the command prompt appears or press Ctrl-C at any time to abort.

If you want more comprehensive help, you should use HELP instead of FASTHELP or /? as described above. If you want the initial screen to display related information about a specific command, use the command's name as a parameter, such as:

```
C>help copy
```

If you just enter HELP alone, the resulting display shows the initial screen as shown in Figure 1.1.

If you have used other Microsoft products, you are in a familiar territory. If not, you should pay close attention at this early stage. Later chapters will show similar screens and arrangements. The techniques you learn here can be applied to other similar screens.

The cursor also rests at the first topic, <ANSI.SYS>. If you press Enter at this point, another screen appears to show information related to it. If you want another topic, press Esc to return to the initial screen, move the cursor to the topic and press Enter. If you use a mouse, you can also click a desired topic (move the mouse pointer to it and press the left mouse button).

---

[1]Version 5 has a HELP program which is renamed FASTHELP in version 6. Version 6 has a new HELP program which is a comprehensive online reference.

```
File  Search                                                          Help
┌──────────────────── MS-DOS Help: Command Reference ────────────────────┐
Use the scroll bars to see more commands. Or, press the PAGE DOWN key. For
more information about using MS-DOS Help, choose How to Use MS-DOS Help
from the Help menu, or press F1. To exit MS-DOS Help, press ALT, F, X.

<ANSI.SYS>                <Erase>                 <Multi-config>
<Append>                  <Exit>                  <Nlsfunc>
<Attrib>                  <Expand>                <Numlock>
<Batch commands>          <Fasthelp>              <Path>
<Break>                   <Fastopen>              <Pause>
<Buffers>                 <Fc>                    <Power>
<Call>                    <Fcbs>                  <POWER.EXE>
<Cd>                      <Fdisk>                 <Print>
<Chcp>                    <Files>                 <Prompt>
<Chdir>                   <Find>                  <Qbasic>
<Chkdsk>                  <For>                   <RAMDRIVE.SYS>
<CHKSTATE.SYS>            <Format>                <Rd>
<Choice>                  <Goto>                  <Rem>
<Cls>                     <Graphics>              <Ren>
<Command>                 <Help>                  <Rename>
<CONFIG.SYS commands>     <HIMEM.SYS>             <Replace>
<Copy>                    <If>                    <Restore>
<Alt+C=Contents> <Alt+N=Next> <Alt+B=Back>                      00006:002
```

Figure 1.1 The initial screen of the HELP command

There are many ways to move the cursor to a desired topic.

Tab	Move forward horizontally
Shift-Tab	Reverse of Tab
↑/↓	Move vertically one line at a time
PgUp/PgDn	Scroll one screen up/down
letter	Move to the first matching topic
Shift-letter	Reverse of above
Ctrl-Home	Top of the current message
Ctrl-End	Bottom of the current message

If you press a letter key on the keyboard, the cursor jumps to the first of the group of topics whose first letter matches the key you press. For example, if you now press C, the cursor goes to <Call>. If you press C repeatedly, the cursor goes to each following matching topic and returns to the top after the bottom is reached. You can hold down Shift and press a letter key to reverse the direction.

After you go to another screen, you can always come back to the initial (table of contents) screen by pressing Alt-C or pressing Alt-B (or Esc) as many times as needed. Alt-N takes you to the next screen. You can also use a mouse to click one of the three buttons shown at the bottom of the screen—just move the mouse pointer to the item, press the left mouse button and release it. A button is an action option which you can click with a mouse or press an equivalent keyboard key. Some buttons (as

shown below) can also be reached by pressing Tab repeatedly; press Enter when a desired button is highlighted.

USING HELP'S MENUS

Notice that the top of the HELP screen shows three menus: File, Search, and Help. To activate (open) a menu, press Alt; the first (capitalized) letter of each menu is highlighted and the cursor stays at the first menu. At this time, you can press a highlighted letter (F, S, or H) to open that menu. You can also press → or ← to highlight a menu and press Enter to open it. If you have a mouse, just click a menu name without having to press Alt first.

If you do not know what a menu option is supposed to do, use the **context-sensitive help**. When an item is highlighted, press F1 to show related help message. A pop-up window appears in the middle. You can press PgUp or PgDn to show more. Press Esc or Enter to clear the message.

When you open the File menu, you are given two options:

Print...
Exit

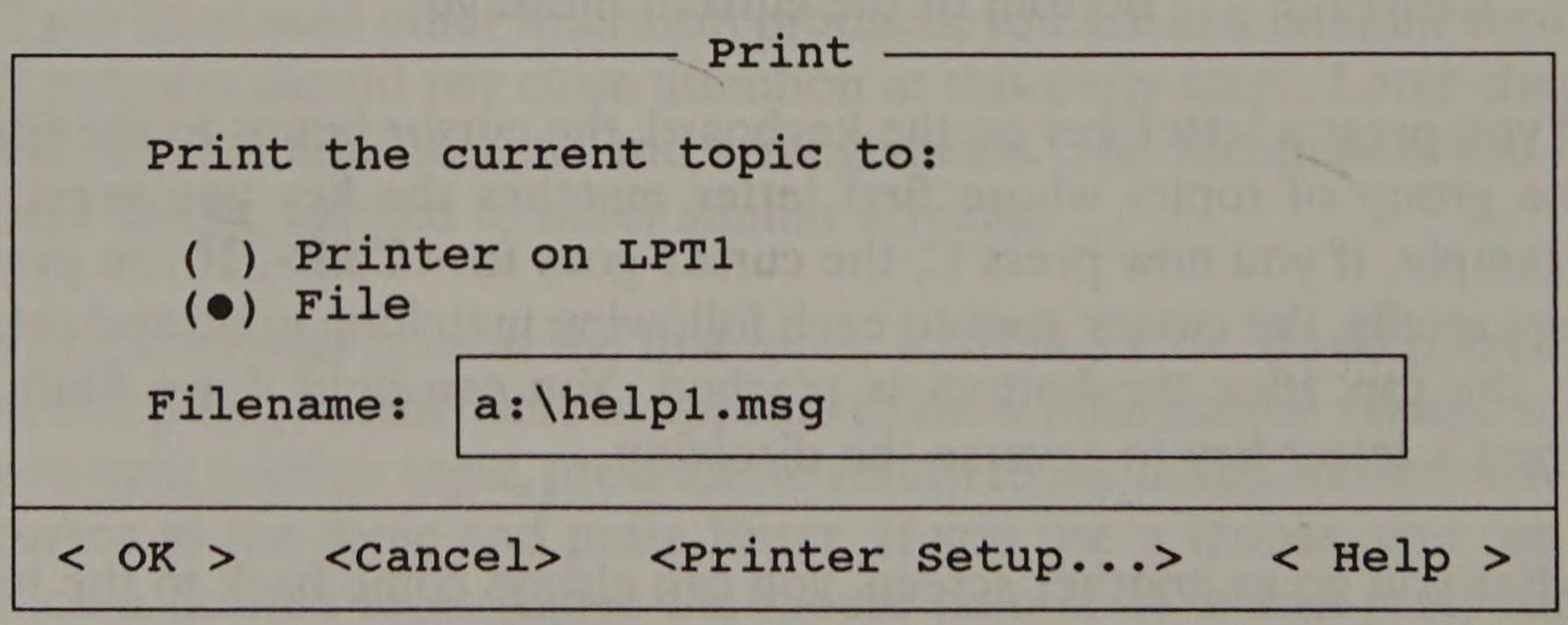


Figure 1.2 The Print dialog box

The first item is highlighted. You can press ↓ or ↑ to highlight one of the available options. Pressing Enter executes the highlighted option; clicking

a displayed item with your mouse or pressing a highlighted letter accomplishes the same goal. For example, if you now select Exit, the program ends and you are back to the DOS command line.

The Print option has an ellipsis (...) at the end. That means there are more things to come if you select this item. Selecting Print displays the **dialog box** shown in Figure 1.2. A dialog box, as shown here, lets you make selections with which you communicate with DOS.

To select or change an item in a dialog box, press Tab (forward) or Shift-Tab (reverse) to make an item current. When the cursor goes to *Printer on LPT1*, press ↓ or ↑ to move the bullet (•) up or down to mark the selection. If you want to print a help message, select Printer. If you want to send it to a disk file, select File.

After selecting File, the cursor goes inside the box for you to enter a file name (add a directory path if necessary). After entering a text string in the Filename box, pressing Tab moves the cursor among the buttons at the bottom row and the Filename box. What if you now want to print instead? Tab to the Filename box and press ↑; you can now shift the bullet between the two options. With a mouse, you can just click the space inside a pair of parentheses to move the bullet.

Select <Printer Setup...> if you want to change the printer port to another parallel port or serial port—depending on how your printer is connected. When you are done, select the <OK> button to print or save. Select <Help> (or press F1) if you need more information.

The Search menu has these options:

Find...
Repeat Last Find F3

Find leads to a dialog box shown in Figure 1.3.

The topic where the cursor is located before you open this dialog box also appears inside the box. If you start typing, it will disappear. You can also move the cursor keys and edit the string. If you want a case-sensitive search or find only complete (not just a fraction) word, tab to the proper location and press the space bar to enter or clear X in the check box. Press Enter after you type a search string or select <OK> to start the search. If a matching topic is found, you are taken to the help screen of that topic. If the search string matches only a fraction of one of the

available topics, the cursor moves to that topic's name instead of displaying its relevant help screen. To repeat searching for the same string, press F3.

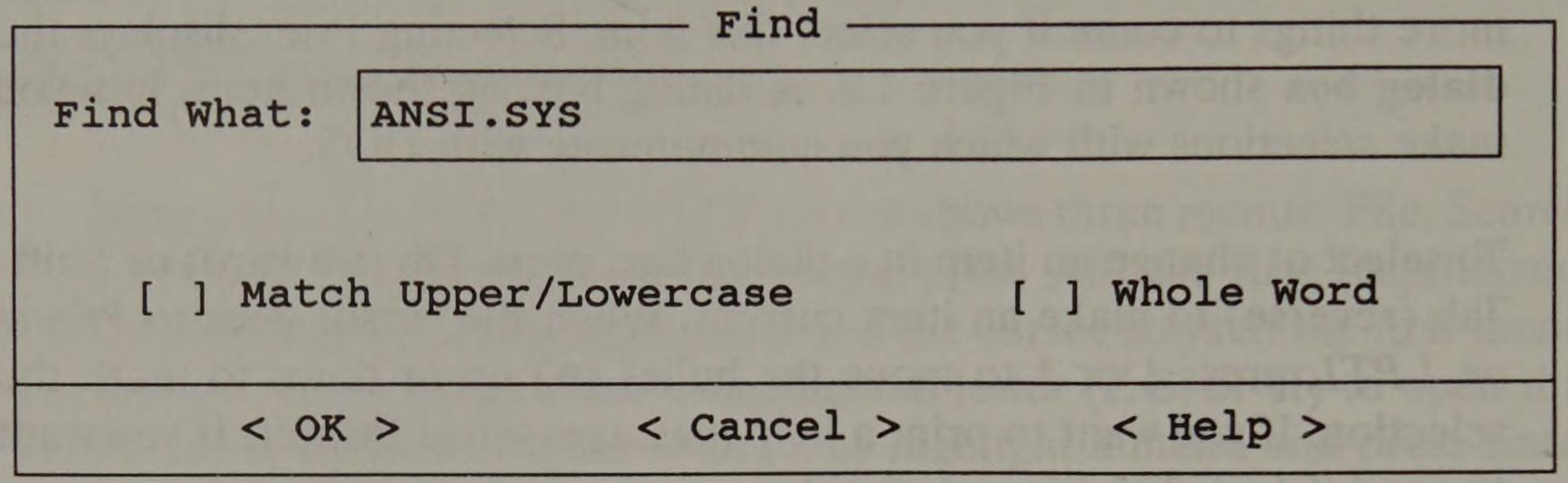


Figure 1.3 The Find dialog box

The last menu, Help, has these options:

How to Use MS-DOS Help
About...

The second gives you a simple copyright message and the first provides details of using the HELP feature.

STEPS IN USING HELP

Let us now go through the following steps to find and print the help message for the COPY command:

1. Enter either command below:

   ```
   C>help
   C>help copy
   ```

   (If you enter the second command, skip step 2 below.)

2. The initial screen as shown in Figure 1.1 appears. Press ↓ repeated (or use another method discussed earlier) to move the cursor to <Copy> and press Enter.

3. The initial help (◂Syntax▸) screen for COPY appears. The menus (File, Search, and Help) remain available. Two other options are also added near the top of the screen: ◂Notes▸ and ◂Examples▸. If you wish, you can tab to each option and press Enter (or click it with your mouse) to show a related screen.

4. Press PgUp or PgDn to show more.

5. Open the File menu and select Print to print this message. Get your printer ready before selecting <OK>.

6. Press PgUp repeatedly until the cursor goes to ◂Notes▸ and press Enter. Another screen appears. Two choices, ◂Examples▸ ◂Syntax▸, are now available. You can now select ◂Syntax▸ to return to the previous display.

7. Select ◂Examples▸ to show the third screen. You can press PgUp or PgDn to show more or select ◂Syntax▸ or ◂Notes▸ to go to a previous screen.

8. Open the File menu and select Exit. You are now back to the command line.

HELP has limited **hypertext** capability, which allows you to jump from one screen to another related topic which is usually enclosed in angle brackets (<>, in green color if you have a color monitor). You can reach a related topic by pressing Tab repeatedly to move the cursor there. In the initial Copy screen (step 3 above), if you press Tab twice, you will move the cursor to <Xcopy>. If you press Enter at that point, XCOPY's help screen will appear. You can also click a bracketed item with you mouse to do the same thing.

HELP provides much more information than FASTHELP. Use the latter if you need to find something quickly, such as available switches of a command. If you want more detailed information or information not available through FASTHELP, such as SYS files, you need to use HELP. These two can be likened to two dictionaries, one short and simplified and the other long and comprehensive. Use the one that is appropriate for the occasion.

Chapter 2

PROTECTING DISKS AND FILES

(Coursebook Users: Add this chapter to the end of Chapter 3.)

NOTE: The RECOVER command discussed on p. 100 in the Coursebook is no longer available in DOS 6.

DELETION PROTECTION

(Coursebook Users: This section replaces the coverage of UNDELETE and MIRROR in the sections on p. 103 and p. 257 in the; UNFORMAT, discussed on pp. 104-105, is unchanged from DOS 5. Primer Users: Add this section to the end of Chapter 5.)

DOS 5 came with UNDELETE to recover files erased by DEL, and MIRROR to keep track of deleted files to enhance their recovery. In DOS 6, MIRROR is merged into UNDELETE and no longer exists as a separate entity. Furthermore, UNDELETE also offers a new level of protection.

Three Levels of Protection

UNDELETE now offers three levels of deletion protection: standard, Delete Tracker, and Delete Sentry. Each provides progressively more protection with more cost to your RAM and disk space.

The standard level of protection requires you to do nothing and imposes no additional overhead. When you use UNDELETE to recover a deleted file, DOS uses the directory information to show files; each recoverable file's name, minus the first character, will be shown. If the original space is written over by another file, recovery is not possible.

The other two levels require you to use proper switches with UNDELETE to load a memory-resident portion requiring 13.5KB RAM. Delete Tracker uses a small hidden file named PCTRACKER.DEL (the same file created by MIRROR in DOS 5) to track deletions. When you delete a file, its directory information is saved to PCTRACKER.DEL. When you try to undelete a file, PCTRACKER.DEL is used to find the deleted file's location. Recovery may be only partial if the space is used by another file.

Delete Sentry offers the highest degree of protection. It uses a hidden directory named SENTRY to store the files you deleted. When the directory is full, earlier files are then discarded to make room for new ones. This arrangement is like putting your junk in the garage; when the garage is full, you then actually throw out the older stuff. How large is the SENTRY directory and how long are the junk files kept? You can control that.

UNDELETE comes with 11 switches:

/ALL	Recover all files
/DOS	Use DOS directory to recover files
/DS	Use Delete Sentry to recover files
/DT	Use Delete Tracker to recover files
/LIST	List recoverable files.
/LOAD	Load memory-resident portion with default values
/PURGE	Clear the contents of SENTRY directory
/S	Load memory-resident portion for Sentry
/STATUS	Show protection status
/T	Load memory-resident portion for Tracker
/UNLOAD	Unload memory-resident portion

Some of them are used for setting up the system and others to let you recover deleted files. We will first discuss these options and then ask you to do some activities.

Installing UNDELETE

UNDELETE comes with a memory-resident portion. If you want to use Delete Tracker or Delete Sentry, you need to put this portion in memory by using the /LOAD switch. If you want to unload, use the /UNLOAD switch to clear the memory-resident portion from RAM.

Used with /LOAD, UNDELETE will use an ASCII file named UNDELETE.INI to set default values, including what level of protection and which drive(s). If this file does not exist, it will be created. You can use a text editor to alter this file. To understand what the default values in this file mean, enter HELP UNDELETE on the command line and then go to the Note screen.

If you do not want to use the default values contained in the UNDELETE.INI file, you can specify them by using /S[drive] for Sentry or /Tdrive[-entries] for Tracker. Use /S to specify a drive to protect, such as /SC (drive C); if no drive is specified with /S, the current drive is used. With /T, a drive (which you want to track) is required but the number of entries is optional. You can specify 1 to 999 entries; for example, UNDELETE /TA-20 will track drive A for 20 entries. If it is not specified, the following default values are used, each in turn determines the file size of PCTRACKER.DEL:

Disk size	Entries	File size
360KB	25	5KB
720KB	50	9KB
1.2MB	75	14KB
1.44MB	75	14KB
20MB	101	18KB
32MB	202	36KB
32MB	303	55KB

You can use /STATUS to show you what kind of protection and which drive. You can also use /PURGE[drive] to delete the contents in the hidden SENTRY drive. If no drive is specified, the current drive is searched.

Recovering Deleted Files

You can specify a switch to use a particular method to recover deleted files. /DOS uses the directory to recover files, /DT the PCTRACKER.DEL file, and /DS the SENTRY directory. If no switch is used with UNDELETE, DOS will try the best method (Sentry) and if it is unavailable the next best—Tracker and finally standard.

Used alone, the above switches will prompt you for Y/N for recovering a deleted file. In the case of /DOS, you will also be asked to supply the first missing character to complete a file name. If you combine /ALL with any of these switches, you are not prompted. If you combine /DOS and /ALL, the first characters of the recovered files will use the following list:

#%&0123456789ABCDEFGHIJKLMNOPQRSTUVWXYZ.

The first recovered file will use #, the second %, and so on.

You can combine /LIST with /DS, /DT, or /DOS to list (but not recover) all the files that can recovered. Based on the specified method, in combination with drive and file name parameters, the recoverable files are displayed. You can thus try different combinations to see what files can be recovered. If you intend to recover a specific file, use the same parameter, minus the /LIST switch.

Using UNDELETE

We are going to take a few steps to demonstrate how to install UNDELETE and use it to recover a file. Before you do the following, copy SAMPLE.TXT (discussed in Chapter 2 in the Coursebook and p. xvii in the Primer) to a practice disk in drive A and make sure a path is provided to C:\DOS to access external DOS commands. Now follow these steps:

1. Load UNDELETE to protect drive A with Delete Sentry:

```
A>undelete /sa
```

2. Show status:

```
A>undelete /status
```

A message tells you that drive A is enabled.

3. Delete SAMPLE.TXT:

```
A>del sample.txt
```

4. Undelete all the files protected by Delete Sentry:

```
A>undelete /ds /all
```

The file deleted in step 3 is now automatically recovered. There is no need for you to supply the first character of the file name.

5. Unload Delete Sentry:

```
A>undelete /unload
```

Confirm with Y at the prompt, and a message tells you that the program is unloaded.

6. Purge the SENTRY directory:

```
A>undelete /purge
```

If you want to know what else has happened that is not evident to you, go to the C:\DOS directory and use TYPE to show the UNDELETE.INI file. Some of the parameters you specified show up here.

When you delete files with Delete Sentry on, the SENTRY directory is automatically created in the target drive. You can use DIR /A to show the name. You can use CD to go to the directory and DIR to show the file names. You may find a name like #A1B2C3F.MS; the sequential letters and numbers change as more deleted files are put in the directory. These files contain the contents of the deleted files. There is also a hidden file named CONTROL.FIL, which contains the above file names. If you run UNDELETE /PURGE in the SENTRY directory, the files will be deleted. If you do it in a higher directory, the directory will also be removed.

DEFRAGMENTING A DISK

(Primer Users: Add this and the next sections to the end of Chapter 3.)

A fragmented disk can slow down disk access and prematurely wear out a disk drive. Many PC users have for many years used Norton Utilities and similar packages to defragment their hard disks. DOS 6 now includes DEFRAG licensed from Symantec, which has purchased Norton Utilities.

DEFRAG is relatively easy to use. Just enter the command on the DOS command line. If no drive is specified, the current drive is the target. To defragment drive A, enter this:

```
C:\DOS>defrag a:
```

A screen like Figure 2.1 appears. The top portion uses different graphic characters to portray the disk condition; the purpose of each character is explained in the Legend box at the bottom right corner.

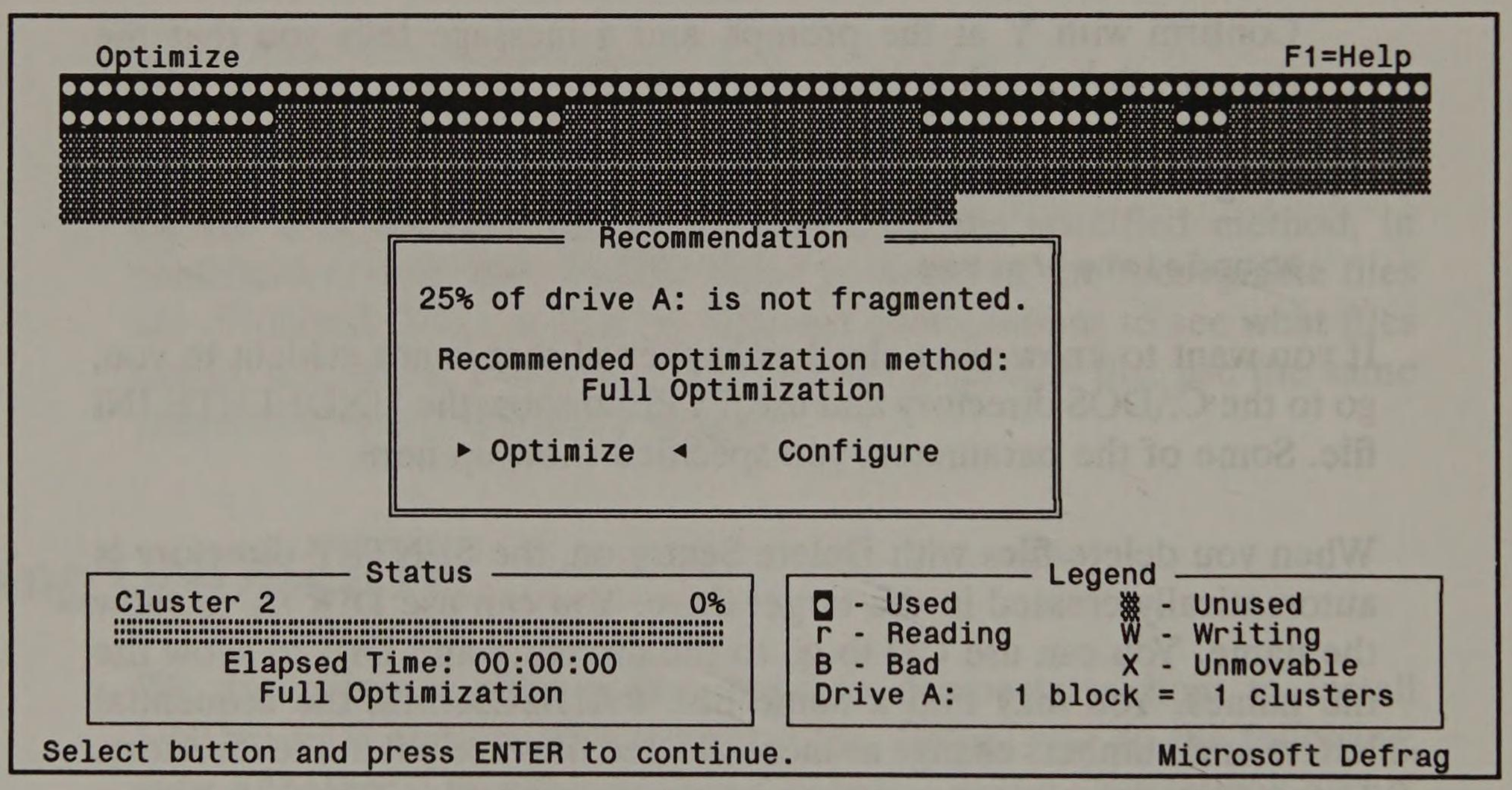


Figure 2.1 The DEFRAG screen

The center of the screen gives you two options, with Optimize highlighted. If you press Enter now, defragmenting will begin. If you press Esc once, the Optimize menu (top left corner) will open; the same thing happens if you select the Configure option If you press Esc twice, the center box will disappear.

If you press F1 or click the F1=Help button at the top right corner, a pop-up window appears. You can use a cursor key to highlight an item

and press Enter to show related help message. If the screen is full, press PgUp or PgDn to show more. Press Esc to exit when done.

To open the Optimize menu, click it with your mouse or press Alt. This menu shows eight items:

Begin optimization
Drive...
Optimization method...
File sort...
Map legend...
About Defrag...
eXit

To select an option, click it with your mouse or press ↓ or ↑ to highlight an option and press Enter. You can also press a letter key that corresponds to the first capital letter of each option.

Drive lets you select a new drive. If the target disk is not fragmented to begin with, a message and the OK button appear. Press Enter to clear the message. Stick in a new disk if you wish. Open the menu and select Drive. The available drive icons appear. Select drive A and it will be read. Follow this procedure anytime you want to work on another disk.

Optimization method lets you choose between Full and Unfragment. The former, the default, will reintegrate the entire disk and take more time. The latter will put together different pieces of each file without putting all the files next to each other, thus leaving gaps between files.

File sort lets you choose among: Unsorted (based on the disk order, default), Name, Extension, Date & Time, and Size. If you choose to sort, you can also choose Ascending or Descending order. Sorting takes extra time.

Map legend shows the same thing as shown at the bottom right corner of the initial screen. The other items in the menu are either self evident or redundant.

After you settle all the options and select *Begin optimization* from the menu (or press Alt-B), the characters in the top portion begin to move around. The bottom left box also shows elapsed time and completion percentage. If you work on a large disk, this could take a long time. A floppy disk with only a few files will take a short time.

When a disk is completed, you are prompted for another drive, for more configuration, or for exit. You can always select eXit from the menu to get out and get back to the command line.

DEFRAG /? shows a series of switches. These switches let you set the configuration values before the full screen appears. You can set these values either from the command line or from the Optimize menu.

If you have used Norton Utilities, you will know that the package includes many other tools for you to fix or read a disk. The scaled-down portion bundled with DOS 6 does nothing except defragmenting disk files.

VIRUS VIGILANCE

If your PC has been attacked by a computer virus and you have not purchased an anti-virus program, the anti-virus feature in DOS 6 will be of great benefit to you.

Virus Overview

Computer viruses have generated considerable headline news in recent years. A computer-science graduate student was convicted of unleashing a virus to paralyze for a few days the nationwide Internet network system. The Michelangelo and Columbus Day viruses attracted worldwide attention and sent throngs of people to computer stores waiting to buy anti-virus programs. Vendors of these programs (notably Central Point Anti-Virus and Norton AntiVirus) thrived in this widespread panic. User demand finally led Microsoft to license Central Point's Anti-Virus and include it in DOS 6.

A computer virus is a computer program that hides itself in your computer system and travels via disks or networks to infect other systems. Some viruses can play harmless but annoying tricks such as making weird noises or making an image pop out on the screen unexpectedly. Others can do a great deal of harm such as erasing all or certain types of files on your hard disk or damaging some programs to render them useless.

There are all kinds of viruses, each given a unique name by those who discovered it. More are being hatched each year. You can use MS Anti-Virus to show a list of viruses it can identify and what harm they are supposed to cause.

You are vulnerable if you meet the following conditions:

- Use a networked PC.
- Run programs downloaded from bulletin boards.
- Boot your PC with an infected disk

All in all, the more your system has contacts with the outside world, the more likely it will be infected. It is the same principle as the more you reach out and tough someone, the more likely you are to catch a flu virus.

If you belong to the susceptible category, you should take some steps to protect your hardware and software. Before DOS 6, you had to shell out big bucks to purchase an anti-virus program. Now DOS 6 can give you some protection with no extra cost. It comes with two related programs, MSAV and VSAFE. Use MSAV to detect and/or clean known viruses from disks, and load VSAFE to monitor any virus activity when the PC is on.

MSAV's Main Menu

You start MS Anti-Virus by running the program on the DOS command line:

```
C:\DOS>msav
```

The program begins to read the C (current) drive and, after a while, displays the Main Menu, shown in Figure 2.2.

The cursor also rests at the first of these options:

Detect
Detect & Clean
Select new drive
Options
Exit

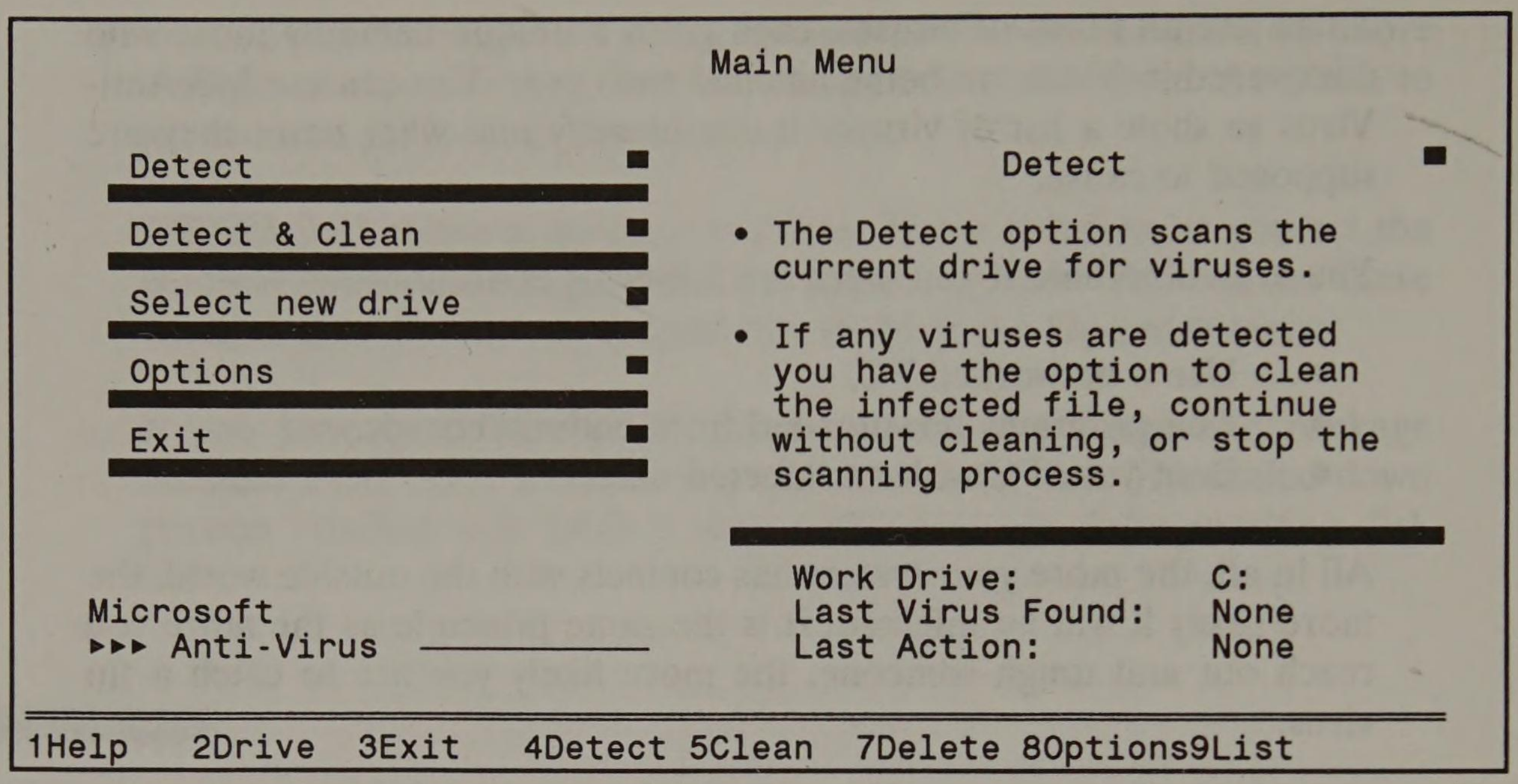


Figure 2.2 MSAV's Main Menu

As you press ↑ or ↓ to move the cursor up or down to highlight an option, the little box on the right displays the information about the highlighted option. When you press Enter, the highlighted menu option will be selected and a proper action taken.

The bottom right corner shows Work Drive, Last Virus Found, and Last Action. If you change a drive, found a virus, or take any action against a virus, proper messages will be shown here.

The bottom line of the screen shows 8 options that overlap with the menu options shown in the middle of the screen. Each of these options is preceded by a function key number to indicate that you can select it by pressing a proper function key.

If you have a mouse, you can easily select any item shown on the screen by moving the mouse pointer and press the left mouse button. Also, in the initial Main Menu screen as well as other subsequent screens, there is an icon at the top left corner that looks like the door of a disk drive. You can use a mouse to click it to close that screen or exit MS Anti-Virus. You can also press Esc on the keyboard to do the same thing.

Getting Help

Let us follow these steps to get familiar with MS Anti-Virus:

1. Start the program:

   ```
   C:\DOS>msav
   ```

2. Press F1 (or click Help) when the Main Menu appears. The initial help screen appears, listing the topics at the top and the options at the bottom.

3. Press F1 again. A new screen appears explaining how to use the help system. Press PgDn repeatedly to show more.

4. Press F2 (or click Index). An index of topics appears. Press Enter with the first item (About Microsoft Anti-Virus) highlighted.

5. Press Esc or F3 (or click Exit). You are now back to the Main Menu.

6. Press F9 (or click List). The Virus List screen appears. Each known virus's name, type, and size are shown in one line.

7. Press PgDn or PgUp to scroll the list, or Home or End to go to the top or bottom. Altogether, 1234 viruses are listed.

8. When a virus is highlighted, press Enter to show more details; you can also click a name with a mouse.

9. Press Esc (or F3) twice to return to the Main Menu.

Detecting and Cleaning

We are going to demonstrate how to check a floppy disk and clean any virus on it. Insert in drive A a formatted and used disk, and follow these steps:

1. From the Main Menu, press F2 (or click Drive). The bottom of the screen shows a one-line instruction. The cursor now goes to the top left corner where drive letters and icons are shown.

2. Press Tab to highlight drive A and press Enter. You can also click the icon with a mouse. The bottom right corner shows A as the work drive.

3. Press ↑ or ↓ to highlight Options and press Enter; or click it with a mouse. The Options screen now appears.

4. With a mouse, click appropriate check boxes to enter or clear check marks in desired options; click OK when done. From the keyboard, press Tab to highlight an option and then press the space bar to enter or clear a check mark; when done, press Esc or tab to OK and press Enter.

5. Press F5 or click Clean to begin action. The screen shows a bar indicating the completion rate. When done, a new screen shows how many files checked, infected, and cleaned.

6. Press Esc to return to the Main Menu.

7. Press Esc or F3 to exit. A screen appears with a check mark marking the Save Configuration check box. Press Tab to highlight the check box and press the space bar to clear it. Click OK or tab to OK and press Enter. The DOS command line reappears.

In step 4, you can check an option to ask MS Anti-Virus to create a report. A file named MSAV.RPT containing similar information shown at step 5 will be saved to the root directory of the disk being checked. You can read this ASCII file with the TYPE command. Erase it if you do not want to keep it.

Many of the options in the Main Menu can be specified on the command line as parameters. For example, you can enter MSAV A: to scan drive A. You can also use various combinations of 25 available switches. Enter HELP MSAV to show all the available switches and their legal combinations.

Monitoring Viruses

Another way of guarding your system against a virus attack is to load VSAFE.COM to memory so that it can continuously monitor suspicious activities. This TSR (terminate and state resident, or memory resident)

program can be loaded and unloaded as you wish. It takes up 44KB of your RAM.

After running VSAFE, the screen shows a message and the <Alt>-<V> hotkey. Pressing Alt-V displays its menu, shown in Figure 2.3.

R.A. & P.M. JACOBSON
4603 ALLEGHENY DR.
SAN ANTONIO, TX 78229

```
VSafe Warning Options

   |  Warning type                 | ON
   |-------------------------------|---
   | 1 HD Low level format         | X
   | 2 Resident                    |
   | 3 General write protect       |
   | 4 Check executable files      | X
   | 5 Boot sector viruses         | X
   | 6 Protect HD boot sector      | X
   | 7 Protect FD boot sector      |
   | 8 Protect executable files    |

   Press 1-8 toggle ON/OFF
   Press Esc to Exit
   Press Alt-U to unload from memory
```

Figure 2.3 The VSAFE menu

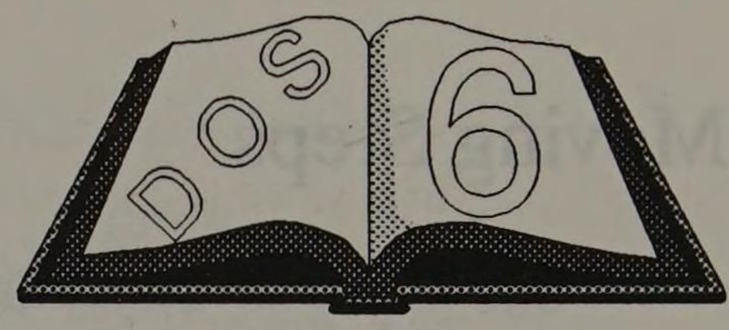
You can now press a number key to toggle on/off any of the available protections. Pressing Esc returns you to the command line. If you press Alt-U instead, the program is erased from memory. VSAFE can also be unloaded with the /U switch.

WARNING: VSAFE should be loaded from the normal DOS prompt, not after a shell program is in memory. If you load VSAFE with an application such as WordPerfect already in memory, your PC may lock up because the memory needed for your application's return may be occupied by VSAFE. If this happens, you will need to reboot your PC and lose the data in RAM.

What you do with regard to viruses depends on your circumstance. If your PC has rare contacts with the outside world, you may not want to devote 44KB of RAM to VSAFE, which also slows down your PC to check viruses. On the other hand, if you are a prime target, you may want to regularly scan new disks (using MSAV) and load VSAFE to safeguard your system.

New viruses continue to appear periodically. If they are different from the existing known strands, MSAV or VSAFE may not be able to detect or ward off. Each DOS 6 package comes with two coupons in the printed manual. You can send them to Central Point for the first two updates free.

Chapter 3



FILE AND DIRECTORY TOOLS

(Coursebook Users: Insert this chapter before the section on p. 165. Primer Users: Add the chapter to the end of Chapter 6.)

This chapter covers two new programs, one to move files and rename directories and the other to delete files and directories.

MOVING FILES AND RENAMING DIRECTORIES

DOS 6 includes a new external command called MOVE.EXE that can do the following:

- Move and rename a single file.
- Move but not rename multiple files.
- Rename but not move a directory.

The above tasks can be done in old versions, but with elaborate steps. Moving files involves using COPY to duplicate them and then using DEL to erase the old ones. Renaming a directory can be done only with the DOS Shell (see Chapter 10 in the Coursebook) available in DOS 4 or later, but not before. The new MOVE command makes these chores much easier.

Moving Steps

Let us do something to gain a little practical experience. Put a practice disk in drive A and follow these steps. (To get the prompt styles shown below, enter PROMPT PG on the command line.)

1. Create two directories:

```
A:\>md abc
A:\>md xyz
```

2. Go to \ABC and create two files:

```
A:\ABC>cd abc

A:\ABC>copy con file1
This is file 1.
^Z

A:\ABC>copy con file2
This is file 2.
^Z
```

3. Move FILE1 from the current directory to \XYZ and rename it FILEX; the message below shows a successful move:

```
A:\ABC>move file1 \xyz\filex
a:\abc\file1 => a:\xyz\filex [ok]
```

4. Move FILEX back to \ABC and restore the original name:

```
A:\ABC>move \xyz\filex \abc\file1
```

5. Go to the root directory and move two files from one subdirectory to another:

```
A:\ABC>cd\

A:\>move \abc\file1,\abc\file2 \xyz
```

The two files in \ABC have now been moved to \XYZ. Notice that we have to provide a full path for each file. Each file is also separated from another by a comma; do not replace a comma with a space or semicolon. If a file is not preceded by a path, DOS will assume that you want to move a file from the current (root) directory to \XYZ. In our example, the first parameter could be shortened to \ABC\File? or \ABC*.*.

6. Move the files from \XYZ to the root directory:

```
A:\>move \xyz\f*
Required parameter missing
```

If we were using COPY, the above command would be legal and successfully executed; the missing target parameter would be the current (root) directory. But MOVE requires both parameters. In our case, ., \, or A:\ at the end would have successfully moved the matching files to the root directory.

7. Create a directory and move files simultaneously:

```
A:\>move \xyz\f* \new\one
Make directory "a:\new\one"? [yn] y
a:\xyz\file1 => a:\new\one\file1 [ok]
a:\xyz\file2 => a:\new\one\file2 [ok]
```

Since the \NEW\ONE directory does not exist, you are asked whether you want to create it. After you enter Y, the directory is created and the two files moved to it. If you enter N, this will be the result:

```
A:\>move \xyz\f* \new\one
Make directory "a:\new\one"? [yn] n
Cannot move multiple files to a single file
```

In this case, DOS assumes that you want to combine all the files matching F* to a new file named ONE in the \NEW directory. You cannot use MOVE to do that. However, you can use COPY to do it, as explained in Chapter 6 in the Coursebook and on p. 188 in the Primer.

8. Change directory names one at a time:

```
A:\>move \new\one \new\uno
a:\new\one => a:\new\uno [ok]

A:\>move \new \old
a:\new => a:\old [ok]
```

Do not change two or more directory names at one time. If you do, this is the result:

```
A:\>move \new\one \old\uno
a:\new\one => a:\old\uno [Unable to open source]
```

After the above steps, there are now these items on your disk:

\ABC
\XYZ
\OLD\UNO\FILE1

\OLD\UNO\FILE2

These items will be used by DELTREE in the last section in this chapter.

MOVE, COPY, and Wild Cards

Although MOVE behaves like COPY, there are many differences, which are further accentuated when combined with wild cards. We can now summarize what you can or cannot do with MOVE and how it differs with COPY and other similar commands:

- You can separate multiple source files with commas; COPY or REN does not permit this.

- MOVE requires both source and target parameters specified. If only one parameter is specified with COPY, the current directory becomes the target.

- You can move and rename a single file (but not multiple files) in one step; if the source and the target are in the same location, the file is renamed. If the target already exists, it is replaced without warning; REN does not allow replacement in this situation.

- When MOVE encounters multiple source files, it will move them to the existing target directory. If the directory does not exist, it will be created. In this situation, COPY will copy the source files to the existing directory or, if the specified target is a file or nonexisting, combine the source files and put them in the target.

- With MOVE, you can use wild cards in the source but not in the target parameter; the latter will cause confusion. COPY and REN permit wild cards in both source and target.

- A single period and double periods can be used in the target parameter with MOVE; put in the source parameter, they will confuse MOVE.

- MOVE does not distinguish between a file and a directory; COPY and REN do.

You can use wild cards liberally with COPY or REN. These commands are perfectly legal:

```
A:\>copy file?.txt *.bak    (copy/rename multiple files)
A:\>ren file?.txt *.bak     (rename multiple files)
A:\>copy longfile *.bak     (copy and rename one file)
A:\>ren longfile *.bak      (rename one file)
```

MOVE cannot be used in any of the above situations. Here is the result:

```
A:\>move file?.txt *.bak
Make directory "a:\*.bak"? [yn] y
Cannot move multiple files to a single file
```

MOVE is now confused. It tries to create a directory and then tries to combine files—both without success.

The following examples provide more contrasts among the three commands:

```
A:\>copy file? total        (copy or file combination)
A:\>ren file? total         (illegal)
A:\>move file? total        (creating directory)
```

In the first example, all the matching files will be copied to the TOTAL directory (if existent) or combined to the TOTAL file. In the last example, all the matching files will be moved to the TOTAL directory if it exists. If the directory does not exist, you will be asked to supply Y or N to create a directory. If TOTAL is an existing file name, this error message appears:

> Cannot move multiple files to a single file

If you specify only one parameter, COPY assumes the current directory to be the target and proceeds to copy the specified matching files, such as this example:

```
A:\ABC>copy \*.txt
```

It will copy all the matching files from the root to the current directory. In the same situation, MOVE will give you this message:

> Required parameter missing

MOVE accepts a single period (.) and double periods (..) only in the target parameter. Here are two examples:

```
A:\ABC>move file? ..
A:\ABC>move \file? .
```

The first moves matching files from the current directory to the parent directory, and the second the opposite direction. Putting periods in the source parameter can confuse MOVE, such as:

```
A:\ABC>move .. .
A:\ABC>move . \xyz
```

In the first case, nothing is done, not even an error message; COPY would have copied all the files from the parent to the current directory. In the second case, the period is treated as the current directory; no action is taken and this message is shown:

Cannot move abc - No such file or directory

Both MOVE and COPY will overwrite matching target files. If the target location contains files of the same names specified by you, the new files will replace the old without warning or a prompt—unless they contain the hidden or read-only attribute. This makes MOVE behave like COPY. Neither can "see" a hidden file as a source; neither can overwrite a hidden or read-only file.[1]

MOVE cannot distinguish between files and directories. When COPY or REN is used with wild cards, they will identify only matching files; MOVE, however, will try to identify both files and directories. Suppose FILE1 and FILE2 are in the root directory and you want to move them to \ABC. Using wild cards leads to these peculiar responses:

```
A:\>move *.* \abc
a:\abc => a:\abc\abc [Unable to open source]
a:\xyz => a:\abc\xyz [Unable to open source]
a:\file1 => a:\abc\file1 [ok]
a:\file2 => a:\abc\file2 [ok]
```

In this case, MOVE tries to move everything, including files and directories, to the target. Although files are successfully moved, directories remain where they are.

---

[1]You can use UNDELETE to recover files written over by MOVE. To increase recovery chances, use UNDELETE before you save another file to the disk. If Delete Sentry is on, the overwritten files are also saved to the Sentry directory.

The *.* in the above example cannot be replaced with a single period. If you do that, no action is taken—not even an error message. This can also happen in other circumstances. The error-handling routine of this program has not been perfected.

The fact that MOVE does not tell apart a file and a directory can pose an intriguing situation. Consider these two examples:

```
A:\>copy dir1 dir2
A:\>move dir1 dir2
```

Assuming that DIR1 and DIR2 are existing subdirectories, the first command will copy all the files from the first directory to the second. The second command will lead to an error—[Unable to open source]. MOVE considers your intent as renaming a directory and is unable to do so because another directory is using the name. If you intend to move all the files, you have to be specific, such as this example:

```
A:\>move dir1\*.* dir2
```

This will successfully move all the matching files from the first directory to the second; if the target directory does not exist, it will be created.

DELETING FILES AND DIRECTORIES

DOS 6 comes with an new external command called DELTREE.EXE. It is a convenient and powerful tool; it is also dangerous. If you make a mistake, there may be no recourse. Use it with caution as you would any power tool.

Before we discuss this tool further, let us have some practice in using it. Use the previous disk and follow these steps:

1. Create a file in the root directory:

```
A:\>copy con rootfile
This is in the root directory.
^Z
```

2. Delete everything in drive A:

```
A:\>deltree .
```

```
Delete directory ".\abc" and all its subdirectories? [yn] y
Deleting .\abc...
Delete directory ".\xyz" and all its subdirectories? [yn] y
Deleting .\xyz...
Delete directory ".\old" and all its subdirectories? [yn] y
Deleting .\old...
Delete file ".\rootfile"? [yn] y
Deleting .\rootfile...
```

If you have files you want to keep, enter N when prompted. If your disk contains nothing except what you did in this and previous sections, the above display shows the result. All the items, files and directories, on the disk are now wiped out.

In step 2, we ask DELTREE to delete everything in the current (root) directory. As shown above, when a matching item is found, you are asked to enter Y or N. If Y is entered, the item is deleted; if N is provided, it remains intact. If you press any other key, the cursor does not budge.

If you use no wild card, only one matching item will be deleted. In our example above, if you enter DELTREE ROOTFILE, only the file will be deleted.

DELTREE has a single switch, namely /Y. If it is used, you are not prompted to supply Y or N; any matching item is deleted as well as shown on the screen. Do not use this switch unless you know what you are doing.

DELTREE is comparable to combining DEL and RD. DEL can delete files but not directories. RD can remove directories but not files.

DELTREE is in some ways more than combining DEL and RD. DEL cannot delete hidden or read-only files. RD cannot remove a directory that is not empty. DELTREE, on the contrary, can delete hidden and read-only files, plus directories that may contain subdirectories and hidden or read-only files. It is not unlike lopping off a tree branch—with all the subbranches, leaves, fruits, and all.

DELTREE can delete almost anything that the DIR /A command shows. It is thus a good idea to use this command to show all the matching items before you resort to DELTREE. When an item slated for deletion is displayed, pay close attention before enter Y.

DELTREE behaves like DEL, not DIR, in finding matching items. Suppose you have two files named X and X.BAT in the same directory.

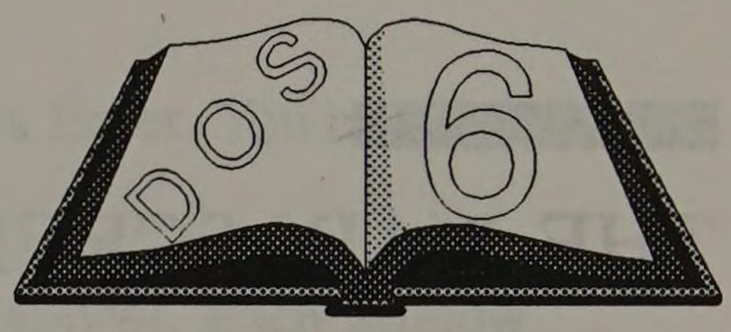
DIR X will match both. DEL X and DELTREE X will match only X, but not X.BAT.

Extreme caution is required when you use DELTREE with a wild card together with the /Y switch. It can delete all the matching files and directories. When a file is involved, it can carry any attribute and still be deleted. If no /Y is used, the file will at least be shown and you will be prompted to enter Y or N. If a file is in the targeted directory, it will not even be shown and the whole directory will be wiped out.

A file that is deleted with DELTREE, just like one that is erased with DEL, can be recovered with UNDELETE. Deleted subdirectories and the files in them, however, are not recoverable. Files in a deleted subdirectory are put in the SENTRY directory (if you load Delete Sentry as explained in Chapter 2) with internally generated names. Delete Sentry, however, does not "see" these files when you try to recover them. You can go to the SENTRY directory and examine them yourself.

When DEL encounters a nonexistent file, it tells you *File not found.* DELTREE, however, does nothing and says nothing—just like MOVE discussed in the previous section.

Chapter 4



BACKING UP FILES WITH MS BACKUP

The pair of BACKUP and RESTORE commands were available in DOS from versions 2 through 5. They can be used to back up a large number of files and restore them to their original locations. These commands, however, were rarely used and often criticized. They were slow, inefficient, difficult to use, and lacking many features available in other packages. Following the "if you can't beat them, join them" approach, Microsoft has licensed Norton Backup from Symantec and included a scaled-down version[1] in DOS 6.

Microsoft Backup (MSBACKUP), as the new feature is now called, can now be used to back up files as well as restore them. The old BACKUP is no longer included.[2] RESTORE, however, is still kept. It serves only one purpose—to restore files from the old backup files created by BACKUP. (Each previous RESTORE can restore only the files created by BACKUP of the same version. RESTORE in version 6 can restore files created by BACKUP in any version.)

---

[1]Unlike the original Norton Backup, MS Backup cannot handle tape drives.

[2]It should remain in the C:\DOS directory unless it has been intentionally deleted. DOS 6's SETUP program does not erase it.

THE MAIN SCREEN

If you chose to install the Backup option when you ran the SETUP program, as explained in the Appendix, several related files would be copied to the C:\DOS directory. You now need to run MSBACKUP.EXE to configure it. A series of tests will follow and you will be instructed to choose a proper floppy disk type and insert a disk in the chosen drive to test the compatibility. You can use a mouse to click an option or tab to the desired choice and press Enter. If the configuration and compatibility tests are successful, a menu appears for you to do backup. A series of files with the MSBACKUP and DEFAULT names and various extensions will be created and saved to C:\DOS.

After you have set up the system, running MS Backup the second time leads to the main screen. The top of the screen shows two menus:

File Help

You can open a menu by clicking it with a mouse (pressing left or right button). From the keyboard, you need to hold down Alt and press F (File) or H (Help) to pull down a menu. If you follow Microsoft's convention of pressing Alt (and then releasing it), you can wait forever for a menu to open.

The middle of the main screen shows a dialog box with four options (buttons), shown in Figure 4.1

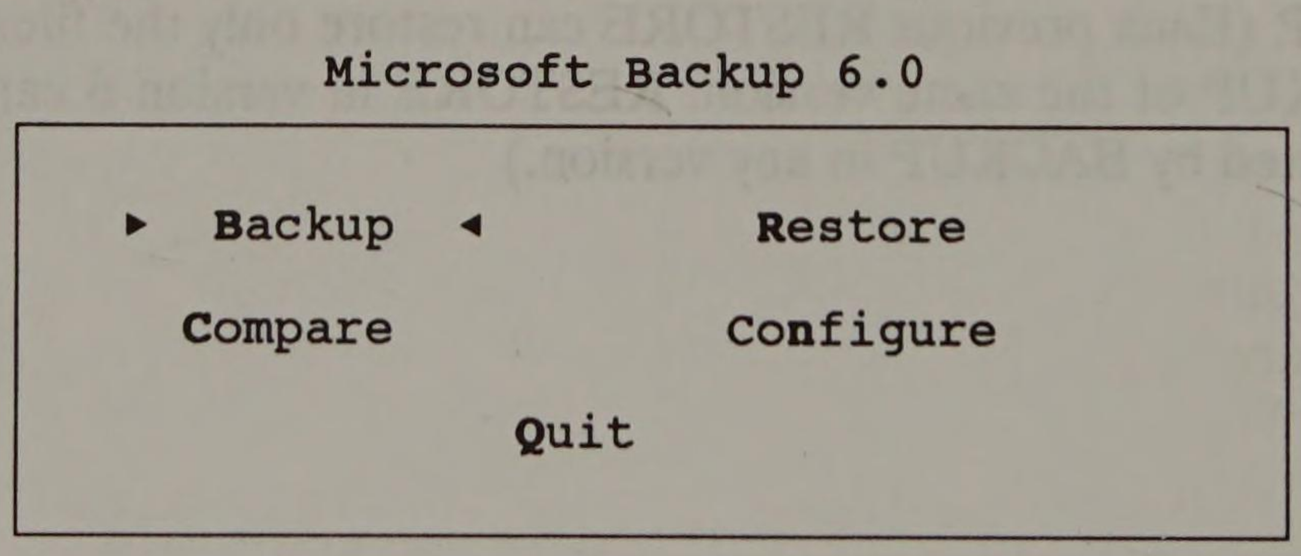


Figure 4.1 The main screen of MS Backup

The first option is highlighted and flanked by two triangles. The bottom of the screen shows a one-line message about this action. You can click

another option with a mouse, or tab to it and press Enter. You can also press a highlighted letter to select that option.

After you choose an option, another window will appear. Each window has at its top left corner an icon that looks like the door of a disk drive. You can generally double-click this icon to close a window—just move the mouse pointer there and press the left button twice in rapid succession. Pressing Esc will also do the same thing.

GETTING HELP

MS Backup contains elaborate and comprehensive online help (MSBACKUP.HLP is more than 300KB in size). Numerous topics, each with a title, are logically arranged and cross-linked. You can scroll through the entire system by following the pre-arranged sequence of topics one after another, or jump from one topic to another as you see fit. With this system, you no longer need a printed manual.

To use this help system, press F1 from the main screen. A window appears in the middle with a text frame titled BACKUP HELP TOPIC. This frame also appears when you open the Help menu and select Index.

Opening the Help menu leads to these options:

Index
Basic Skills
Backup
Compare
Restore
Configure
Glossary
Using Help

The middle group of items provide help for the four items shown in the main screen. Others add bells and whistles to this versatile system. You can go directly to a topic or start with the basics.

One way to explore the whole system is to press F1 from the main screen or select Index from the Help menu. The BACKUP HELP TOPIC appears. The bottom of the screen shows four buttons:

Topics previous Next Cancel

Topics (or Alt-T) always leads to this first frame. Previous is at this time not capitalized, meaning it is not available. As you go to a subsequent frame, it will become capitalized and you can click it with a mouse or press Alt-P to reach each previous frame. Next (or Alt-N) goes to a pre-arranged frame. Cancel (or Esc) clears the help screen and returns you to the main screen.

At this time, you can press Alt-N repeatedly to go to each subsequent frame. Related topics that can give more information are highlighted in each frame. You can click it or tab to it and press Enter to jump to that frame; this allows you to break out of the pre-arranged sequence.

When a long text frame is encountered, a scroll bar appears on the right side. You can press PgUp or PgDn to scroll the text. You can also click the ↑ or ↓ or drag the scroll box with your mouse to scroll the text. Home (but not Ctrl-Home) and End (but not Ctrl-End) show the top and bottom of each frame.

After you choose an option from the main screen, Compare for example, you can press F1 to show a context-sensitive help. A pertinent frame, Compare in our case, will appear. You can then follow the above procedure to read as much as you want.

BACKUP OPTIONS

By selecting Backup from the main screen, another screen appears that resembles Figure 4.2. This screen shows 8 buttons:

Setup File
Backup From
Backup To
Select Files
Backup Type
Start Backup
Cancel
Options

You can now press Tab to highlight a button and move the pair of triangles marking the current button. As you tab to a button, the bottom of the screen shows a one-line message related to the current selection. Press Enter to select the button. You can also select a button by pressing a highlighted letter or clicking it with your mouse.

```
                          Microsoft Backup
File     Help
                              Backup
Setup File:
  DEFAULT.SET  (No Description)                          start backup

                                                            Cancel
  Backup From                 Backup To:
▶ [-C-]                         [-A-] 1.2 MB 5.25"
  [-H-]
                                                        ▶ Options... ◀
   Select Files...          0 files selected for backup
                            0 1.2 MB 5.25" floppies needed (maximum)
                            0 min, 00 sec estimated backup time
Backup Type:
  Full

Select backup options (verify, compress, network, report, etc.)
```

Figure 4.2 The Backup screen

To back up files, you need to do the following steps:

- Select source files if necessary.
- Change the target drive if necessary.
- Change backup type if necessary.
- Change options if necessary.
- Select Start Backup.

The default values are set by the setup file known as DEFAULT.SET. This file was created when you first ran MS Backup. We will discuss this in another section below. The above steps are necessary only if you want to change the default values.

Notice that in Figure 4.2, drive C is marked by a triangle. This is the default source drive. When you tab to this area, you can press ↓ or ↑ to move the triangle to mark one of the available drives.

When a drive is current, you can press the space bar (or the right mouse button) repeatedly to toggle between no file or All Files, and possibly Some Files if at least one file has been selected. As a message is shown after the drive letter, check the middle of the screen to see how many files will be backed up, and how many disks and how much time will be needed. Take these numbers into consideration before selecting Start Backup.

To select files to back up, select the Select Files button. The current drive will be read and displayed. The resulting screen may resemble Figure 4.3.

```
                              Select Backup Files
[-C-]  [-H-]
C:\*.*
C:\                          a        .bat        10   1-31-92   4:05p   ...a
 ├─123                       auto     .bak       163   5-08-93   8:45a   ...a
 ├─123R23                    autoexec.b          236   5-11-93   8:24p   ...a
 │  └─WYSIWYG                autoexec.bat        165   5-11-93   9:39p   ...a
 ├─123R24                    autoexec.y          166   5-08-93   4:43p   ...a
 ├─BAT                       command  .com    52,925   3-10-93   6:00a   r...
 │  └─X                      config   .bak       465   5-12-93   9:43a   ...a
 ├─BTFONTS                   config   .sys       477   5-12-93   9:44a   ...a
 ├─C                         config   .x         488   5-11-93   8:24p   ...a
 │  ├─BIN                    config   .y         261   5-08-93   5:04p   ...a
 │  ├─INCLUDE                io       .sys    40,470   3-10-93   6:00a   rhs.
Total Files:  1,173  [     39,085 K]     Selected Files:       0  [         0 K]
  Include      Exclude      Special          Display    ▸   OK   ◂    Cancel
Select entire directories with right mouse button or Spacebar
```

Figure 4.3 The Select Files screen

The left side of the screen shows the directory structure of the current drive (C in our case). The right side shows the files in the current directory. As you move the cursor up or down to highlight another directory, the right side changes accordingly. Each side has a scroll box. You can scroll the display with the usual cursor keys or with this scroll box/bar. Another technique is to press a letter, D for example, to go to the first directory or file starting with that letter. You can use a mouse to click either side to move the cursor there; from the keyboard, use Tab or Shift-Tab to switch sides.

The bottom of the screen shows four buttons for you to use wild cards to include or exclude matching files, such as *.WK1 for all Lotus 1-2-3 files; you can also use the Edit option from Include or Exclude to change

existing selections. You can use Special to handle files fitting a date range or with certain file attributes. Use Display to specify how files are to be displayed—sorted by name, extension, and so on. After selecting Display, you can check Group Selected Files. This leads to a display of selected files at the top in alphabetic order while the unselected files are listed in reverse order at the bottom. This lets you quickly find out the selected (and not yet backed up) files.

To select or deselect a file or a whole directory, move the cursor to the right item and press the space bar; you can do the same thing with a mouse by clicking it with the right mouse button. If the items to be selected/deselected are next to each other, you can drag the mouse to simplify the process; just move the mouse pointer to the first item, hold down the right button, and move the mouse pointer. Selected files are preceded by check marks; these are slated for backup.

— *TIPS & TRICKS* —

Little Signs, Big Meanings

As you select directories or files, pay attention to the little characters added or deleted in response to your action. When a whole directory is selected, the directory name is preceded by a ► sign. If some files in a directory are selected, a » sign marks the directory. When a file is selected, it has a check mark (✔) before it. If a file has been backed up and not available for the next backup, a dot (.) appears instead. When the cursor goes to the right side, the current directory on the left side is marked by a ◄ sign. A directory is also highlighted if it contains selected files or if you have made changes in the current session. These connections are summarized below:

- ► Entire directory selected
- » Some files in the directory selected
- ✔ Selected files
- . Backed up files not available for another backup
- ◄ Current directory

As you select or deselect files or directories, pay attention to the changing number of files and total kilobytes. Selecting a different type of

backup will also affect these numbers. If the numbers are not what you expected, recheck the selected directories and files as well as backup type. When you are done, select the OK button and you are back to the Backup screen; selecting Cancel negates all the changes.

Notice the file attributes shown at the right margin of Figure 4.3. After backing up, some of the A attributes may be removed, as explained in the next two sections.

You can now select Backup To or Backup Type. A window pops up in the middle to show available options and with one marked by a bullet as selected. You can click a new one or press ↑ or ↓ and then the space bar to select a new one. Pressing the space bar repeatedly will also move the bullet among the available options. You can also just press a highlighted letter to move the bullet there. We will discuss backup types in another section below.

If you wish, you can select Options from the Backup screen to show these available options:

Disk Backup Options

Verify Backup Data (Read and Compare)
✔ Compress Backup Data
Password Protect Backup Sets
✔ Prompt Before Overwriting Used Diskettes
Always Format Diskettes

✔ Use Error Correction on Diskettes

✔ Keep Old Backup Catalogs

✔ Audible Prompts (Beep)
Quit After Backup

The default selections are check-marked. You can select or deselect (toggle between the two) an option with any of these techniques:

- Click it with your mouse.
- Tab to it and press the space bar.
- Press a highlighted key.

Some of these options do not require explanation. If you want to know what each does, press F1 and select a pertinent item. If you check the

first or sixth option, you increase the backup data's reliability—at the cost of more time and/or disk space. If you specify a password and forget what it is, you cannot compare or restore the data. We will explain Catalogs later.

BACKUP STEPS

MS Backup has many features that require a great deal of attention from the beginning user. If the above discussion has confused you with too many details, this section should help you refocus on the basic steps.

Depending on your school policy, you may or may not want to do the following; if you follow these steps, a series of files will be written to your hard disk. You also need a floppy disk that contains nothing you want to keep. Put it in drive A and follow these steps:

1. Start MS Backup:

   ```
   C:\DOS>msbackup
   ```

   The main screen appears as shown in Figure 4.1.

2. Select Backup. Figure 4.2 appears.

3. Select Select Files. If drive C is not the source drive, select it first. Drive C's directories and files are read and displayed.

4. Press D (and other cursor keys if necessary) to highlight the C:\DOS directory. Press Tab to move the cursor to the right-side window.

5. Press O (and other cursor keys if necessary) to highlight OS2.TXT. (The A attribute of this file, if any, will be removed after backup.)

6. Press the space bar or press the right mouse button to check-mark it.

7. Select the OK button to return to Figure 4.3.

8. If backup type is not Full, change to Full; if the target disk is different from what you have, select Backup To and change to your disk type and letter.

9. Select Start Backup. You are instructed to insert a disk. If your disk contains some files, you will be prompted to select an option; select Overwrite if you intend to erase the displayed files. Backup begins and, upon completion, another screen displays pertinent statistics. Press Enter or select OK. Select Quit and you are done.

The above steps create more than half a dozen files in the C:\DOS directory. List them with this command:

```
C:\DOS>dir /o-d /p
```

The newly created or modified files are displayed at the top. These files will be used to manage restoration in case of damage to the original files.

Examine your floppy disk and you will find what the program has done. The disk has been given the label DEFAULT.FUL, meaning Default setup file and Full backup type. A read-only file is also saved to drive A with a name like this:

CC30513A.001

The file name can be interpreted this way:

C	The first source drive
C	The last source drive
3	Year, 1993
05	Month, May
13	Date, 13th
A	Sequence of the day; if two or more backups are done in one day, it could be A or B (if Keep Old Backup Catalogs is off) or A to Z (if Keep Old Backup Catalogs is on)
001	The first target disk

(We no longer need this file that takes up the entire disk. You can use ATTRIB to remove the R attribute and then delete it.)

A corresponding catalog file with the same name except the FUL extension is also saved to the C:\DOS directory. The extension could also be INC (incremental) or DIF (differential) depending on the backup type selected; these are explained in the next section.

A new DEFAULT.SET file is created to save the settings you have selected, and the previous file of the same name is now changed to DEFAULT.BAK. DEFAULT.CAT (master catalog) is also created to contain the catalog(s). All these are ASCII files that can be shown with the TYPE command.

Each time you do a backup, you need at least one floppy disk. Even if you back up a small file, an entire disk is used up. You can no longer add new files to it—although you can write over it with a new backup file that will lead to the loss of the original data. So, pay close attention to the required byte size shown on the screen. If more disks are required, you will be prompted to insert a new one.

DIFFERENT TYPES OF BACKUP

MS Backup lets you choose one of these backup types:

Full	Backs up all the selected files (including those without A attributes) and remove their A attributes, if any, after backup.
Incremental	Backs up selected files (only those with A attributes) and removes their A attributes.
Differential	Backs up selected files (only those with A attributes) but does not remove the A attributes of the source files.

All the fancy names can be reduced to a simple archive bit. MS Backup, like the old BACKUP before version 6, depends on the archive file attribute to identify certain files to back up. When you do a full backup, all the files' A attributes are removed. The check marks, however, remain—if Full backup remains selected. If you do another full backup to a new disk, you have two identical backup copies.

If you now change to Incremental or Differential backup type, all the check marks are changed to little dots; these files are no longer selected for backup. If you change back to Full, the check marks reappear; these files are now selected again for backup.

So, after you do a full backup at the outset, you can select Incremental backup to back up only those new and changed files—files that have A attributes. The full backup copy contains the original files, and each ensuing incremental copy holds the new and modified ones. Together, they protect you from any loss to your files on the hard disk. You must keep all the disks because the new ones build on the old ones. If files are modified, each backup copy will be different from the previous one. You can thus restore an older version this way. This combination is efficient only if you create new files regularly, such as writing letters. It can be wasteful of your disk space if you work with the same files again and again because each time a file is changed it is slated for backup; many versions of the same file, with perhaps little change from one another, are taking up your disk space.

— *TIPS & TRICKS* —

Selecting An Entire Directory

It pays to organize your files logically. It pays double if you do so and use MS Backup to back up your files.

If you select an entire directory to back up, any file with the A attribute will automatically be selected. When you add a file to the directory or modify an existing file, it is automatically check-marked, i.e., slated for back up in the future—regardless of which of the three backup types you select. If you select individual files, the unselected or new files are not affected by a backup procedure.

Suppose you work with WordPerfect to write letters for your company. You can select the C:\WP\LETTER directory for backup. Execute incremental backup periodically, perhaps once a week, to a new disk. Use a setup file (see another section below) to determine all the settings to quickly complete the job.

On the other hand, if you follow the initial full backup with a differential backup, you can reuse the disk holding the differential copy while keeping the full copy. A differential backup does not remove A attributes. So the same files, regardless of whether they have changed or not, remain selected for another backup. If you overwrite a disk holding the previous

differential copy, you are backing up the same files, some of which may be changed and others not. There is thus no need for you to keep all the cumulative copies—just the full copy and the latest differential copy. This combination is desirable if you work with the same files again and again. Just select those active files and use Differential to back up the latest version over each previous one.

COMPARE AND RESTORE

The Compare and Restore buttons shown in the main screen (Figure 4.1) can be used to compare the files in the original and those on the backup disk, and restore backup files to the original (or other) places if the original files are damaged or lost.

In both operations, you are given a similar screen and asked to specify a source and a target. You can choose to compare or restore backup files to the original or another drive or directory. The top left of the screen shows the current Backup Set Catalog. By selecting the file name, a list of available files appears for you to choose. These files—with file names containing dates and with FUL, DIF, or INC extensions—store all the backup information for file comparison or restoration. Select a proper catalog file here.

Next, you need to select the Select Files button. The available file names will appear as you highlight each directory. Select the files you want to compare or restore by check-marking them.

If you now select Start Compare or Start Restore, the action will begin. When completed, a window pops up to show a summary report.

Compare and Restore use a series of catalog files created by Backup. There is a master catalog file with the name combining the setup file name (such as DEFAULT) and the CAT extension; this is automatically created each time you perform a full backup. It contains the names of the other catalogs with the FUL, INC, or DIF extensions. These catalog files are used by MS Backup to record all the directories and file names so that they can be compared and restored.

Both Compare or Restore display a new button called Catalog. Selecting it leads to these options:

Load
Retrieve
Rebuild
Delete

Use Load to make a catalog current and Delete to delete a catalog file; either option leads to a separate window showing all the available files. Use Retrieve to load from a floppy disk and Rebuild to rebuild a damaged or deleted catalog file; a list of options, including drive letters, will appear for you to choose.

CONFIGURATION AND SETUP FILES

The Configuration button in the main screen (Figure 4.1) lets you configure your video, mouse, and backup devices. It will also let you run a compatibility test. Use these options when you have a new device or want to change the way they are configured. Use the Save option after making the desired choices.

If your backup activities are varied, you can use a number of setup files to better manage your backup routine. At the beginning, DEFAULT.SET supplies all the backup settings such as selected files, target drive type, and so on. Instead of having to change these settings for a different type of backup, you can save the current settings to a setup file and open it when you want to make those settings current. This can save time and simplify backup process.

The File menu can be used to manage setup files. It has these options:

Open Setup
Save Setup
Save Setup As
Delete Setup
Print
Printer Setup
Exit

Use Open Setup to change to another setup file. The available files will appear for you to select; the selected one will replace the current.

Save Setup saves the current settings after you have made changes. The file name will remain the same but the options may change. Save Setup As lets you save the current settings to another file; you will be asked to enter a file name, and SET will be added as the extension.

Delete Setup leads to a display of all the available setup files. You can choose to delete one or more.

Print lets you send a setup file to the printer. You can use Printer Setup to change to a different port or to a disk file. The disk file will have the TXT extension. If the current setup file is named DEFAULT.SET, this file will be DEFAULT.TXT. Both are ASCII files containing identical information.

After you save the current settings to a setup file, it becomes current and appears at the top left corner, under Setup File (see Figure 4.2). Selecting this file name leads to a new window showing all the available setup file names. You can select any to make it current.

— *TIPS & TRICKS* —

Speedy Backup

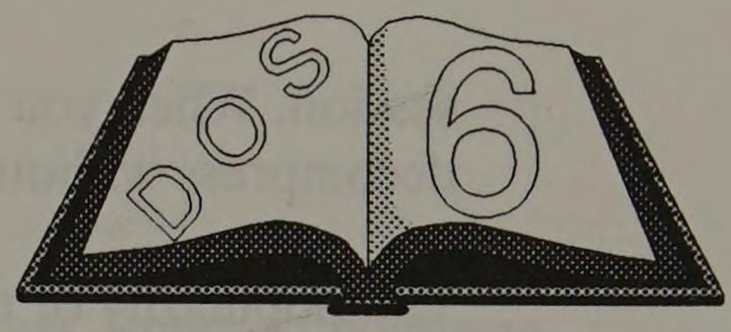
Judicious use of setup files can save you lots of time—if you use a variety of backup settings.

Let us assume that you write letters for your company and work on the company's budgets as well. The former needs incremental backup while the latter is suited for differential backup. Each type also backs up the files in a different directory. If you have to change all the different settings each time you back up, you will not only be confused and error-prone, but also be spending lots of time for trivial matters.

For the letters, select the C:\WP\LETTER directory for source files (deselect all other, if any), select Incremental type, make other necessary changes, select File and Save As to save the settings as LETTER.SET (the extension is optional). Next, select the C:\123\BUDGET directory (or whatever directory you use) for source files, deselect other source files, select Differential type, make other necessary changes, and save the settings to BUDGET.SET.

At the scheduled time for backup, just open a proper setup file and select Start Backup. That's all.

Chapter 5



DOUBLING DISK SPACE WITH DOUBLESPACE

(Coursebook Users: Insert this chapter before the section on p. 261)

FILE COMPRESSION OVERVIEW

As application programs and user-created files become larger, disks—no matter how larger they have become—are filled up more quickly than ever. Ingenious programmers came up with the idea of compressing data so that more of it can be stored on the same disk space.

The idea of data compression has been around for sometime. It involves using a token to represent repetitive characters. When a file is saved (or compressed), tokens are used to reduce space consumption. When the file is retrieved (or decompressed), the original characters are restored.

Bulletin boards have for a long time distributed a number of popular file-compression programs. These are useful for compressing your inactive files to reduce storage space or for vendors to reduce costs in distributing their packages. One problem is that DOS does not recognize them. Before you want to run a program or retrieve a data file, you must manually decompress it.

Then came two popular packages, Stacker and SuperStor, that can compress and decompress on the fly. They use a memory-resident program loaded by your CONFIG.SYS file at the beginning of each

session. When you save or retrieve a file, this program will compress or decompress without your doing anything.

The popularity of these two packages led Microsoft to license a similar technology from a relatively unknown company called Vertisoft and include it in DOS 6.[1] Known as DoubleSpace, this utility can—depending on the type of files involved—approximately double the storage capacity of a disk, hard or floppy. Once it is installed, it becomes transparent, meaning that you use it without noticing it too much.

The way DOS manages data compression and decompression is by loading a program called DBLSPACE.BIN right after IO.SYS is loaded. After your system is setup (explained in the next section), this program is loaded without your doing anything, not even tinkering with a CONFIG.SYS file. When your application such as WordPerfect or Lotus 1-2-3 saves a file, DOS compresses the data before sending it to disk. The data is also automatically decompressed when it is retrieved. Neither you nor your application will notice any thing difference, except a little extra time to save and retrieve a file.

COMPRESSING A HARD DISK

To set up DoubleSpace on your hard disk, run the DBLSPACE.EXE program that was copied to the C:\DOS directory by the SETUP program (see Appendix). There is a risk in compressing your hard disk—you could lose files. You should have backup copies of your vital files in case the compression goes awry.

The following steps illustrate how to compress your hard disk (actually compress the files on your hard disk) for the first time. Depending on your PC's speed and hard disk's size, you may need hours to complete these steps. So choose a proper time before you do it. *Do not do these unless you are using your own hard disk*; you need, however, to understand the concepts and techniques discussed here. You can do similar steps later when we explain how to compress a floppy disk.

---

[1] As soon as DOS 6 was released, Stacker filed a law suit against Microsoft for infringing on its patented technology.

1. Run DoubleSpace:

```
C:\DOS>dblspace
```

The initial screen appears. You are asked to press Enter to continue. You are then given two choices:

Express Setup (recommended)
Custom Setup

The first choice is highlighted; you can press Enter to proceed. (Choose Custom Setup if you do not want to compress the existing data, want to compress a drive other than C, or determine compression settings by yourself.)

2. The screen now shows the estimated time to compress the files on the hard disk. Press F1 if you need help; press PgUp or PgDn to see more. Press F3 if you want to quit. By now the program has run CHKDSK to check your hard disk. If an error is found, you will be advised to abort and run CHKDSK with the /F switch to repair the file allocation table. Restart DoubleSpace after you are through.

3. The program now restarts your system. You should not have a disk in drive A; otherwise, your PC will be rebooted from there. File compression now begins. The screen shows a running time that is needed to complete the job; a bar also displays the percentage completed. As each file is compressed, its name is also displayed. There is nothing for you to do except wait.

4. After all the files are compressed, the program runs the DEFRAG program to defragment the hard disk. The screen displays various moving characters as fragmented files are brought together. Again, more waiting.

5. After DEFRAG runs its course, the entire process is now completed. The final screen shows the disk spaces before and after compressing, the compression ratio, and the drive (usually H, depending on the number of drives you have) created to store the compressed files. You are also instructed to press Enter to restart your system. After your PC restarts, the DBLSPACE.BIN is loaded to memory. When you save a file to your hard disk from now on, it will be compressed.

In the above steps, DoubleSpace performs these acts:

- Creates a logical drive named H
- Compresses the files that can be compressed and stores them in a huge file named DBLSPACE.000
- Moves all the data from drive C to H—including DBLSPACE.000 and the files that cannot be compressed

DOS now begins to treat H as the physical drive and C as the logical drive. When you now save files to C, DOS will shuffle data to H and put them in the DBLSPACE.000 file.

If you go to drive H (enter H:) and use DIR, you will see nothing except the drive label, which was automatically added. If you add the /A switch, this is the result:

```
H:\>dir /a

 Volume in drive H is HOST_FOR_C
 Volume Serial Number is 1A97-264E
 Directory of H:\

IO       SYS      40470 03-10-93   6:00a
MSDOS    SYS      38138 03-10-93   6:00a
DBLSPACE BIN      51214 03-10-93   6:00a
DBLSPACE INI         91 04-24-93   8:45a
DBLSPACE 000   39604224 04-24-93   8:46a
        5 file(s)   39734137 bytes
                     2596864 bytes free
```

Notice that drive H is given the volume label of HOST_FOR_C. Drive C is now compressed and H uncompressed. All the compressible files in C are stored in DBLSPACE.000; this and the uncompressible files are also moved to drive H (think of H as host). The files in drive H are not compressed because DOS needs them to manage the disk.

The DBLSPACE.000 file is known as a **compressed volume file** (CVF). This huge file contains all the compressed files in drive C—like a bag containing your compacted garbage. Most of the time you need not pay attention to it. You can proceed to use DOS and drive C as usual. When a compressed file (one stored in DBLSPACE.000) is deleted or modified, the contents and date-time numbers of DBLSPACE.000 and DBLSPACE.INI will also change. If you delete this compressed volume file, all the compressed data stored in drive C will be lost.

To protect the files in drive H from tampering, they are all given system, hidden, and read-only attributes. You can use ATTRIB to show them:

```
H:\>attrib
     SHR      H:\IO.SYS
     SHR      H:\MSDOS.SYS
     SHR      H:\DBLSPACE.BIN
     SHR      H:\DBLSPACE.INI
     SHR      H:\DBLSPACE.000
```

If you use CHKDSK on drive C now, you will see a larger number in available disk space, plus two additional lines shown below:

```
C>chkdsk
. . .

DoubleSpace is checking drive C.
DoubleSpace found no errors on drive C.
```

You can ask DOS to tell you more about a compressed file by using DBLSPACE and /INFO on a specific drive letter as a parameter. If you use /INFO and no drive letter, the current drive is acted on; if you use a drive letter, the switch is optional. Either command below shows the same result, similar to this:

```
C:\DOS>dblspace /info
C:\DOS>dblspace c:

DoubleSpace is examining drive C.

Compressed drive C is stored on uncompressed drive H in the file
H:\DBLSPACE.000.

        Space used:                 39.50 MB
        Compression ratio:          1.7 to 1

        Space free:                 27.27 MB
        Est. compression ratio:     2.0 to 1

        Total space:                66.77 MB
```

When you compress the first drive, DoubleSpace uses a letter, such as H, as the host drive. The next drive may be assigned G, F, and so on. In case you get confused which host drive matches which physical drive, use the /LIST switch to show them.

The DIR command is also given additional switches to show compression information:

/C	Show compression ratio
/CH	Show host drive's compression ration
/OC	Show compression ratio from small to large files
/O-C	Same as above, except from large to small files

If you use /C on a drive that is not compressed, the switch is ignored and no compression information is shown.

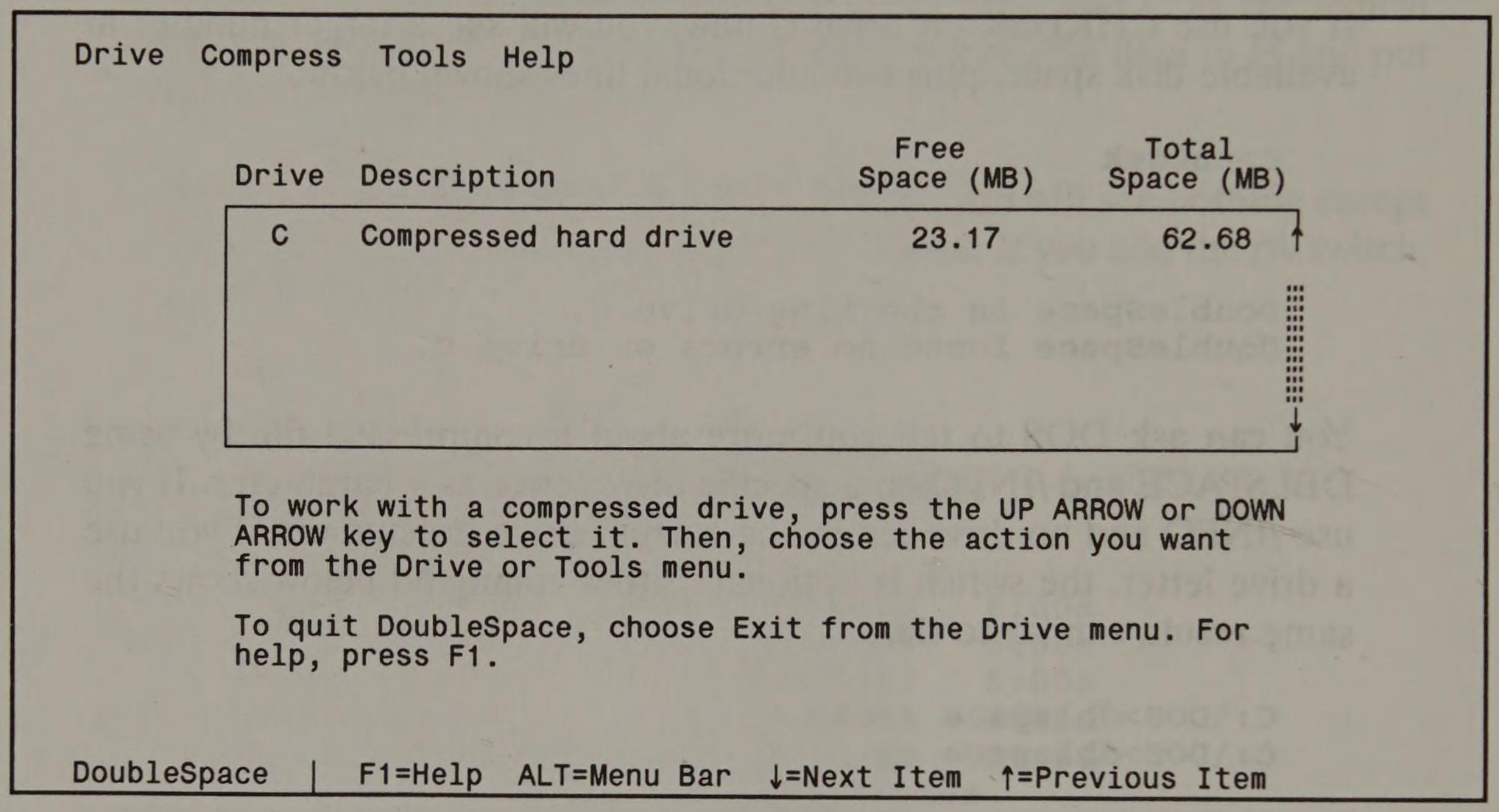


Figure 5.1 The DoubleSpace screen and menu

COMPRESSING A FLOPPY DISK

You can use DoubleSpace to compress a high-density floppy disk, in effect doubling the storage capacity. If you try to compress a double-density floppy disk, an error message appears telling you that you need at least 1.1MB disk capacity to proceed.

Place a proper disk in drive A and follow these steps to compress a floppy disk:

1. Run DoubleSpace:

```
C:\DOS>dblspace
```

The initial screen appears as shown in Figure 5.1. It shows that drive C is already compressed.

2. Select Compress (click it with a mouse; or press Alt, move the cursor to the menu and press Enter. Two options appear. Select Existing Drive and, if necessary, a specific drive.

3. Your system is scanned. A new display shows drive A's capacity and the projected disk space after compression. Press Enter to proceed.

4. A new screen appears with several options. Press C to continue.

5. A new screen shows various time numbers as described in step 3 earlier when we tried to compress a hard disk.

6. Figure 5.1 reappears, except with drive A and related information inserted at the top of the box, above C.

7. Select Drive and then Exit. The DOS prompt reappears.

The disk in drive A is now compressed and mounted (explained below). Any existing files are compressed and stored in the DBLSPACE.000 in drive G (the letter before H). If you now save a file to drive A, the data goes to this compressed volume file, as explained in the previous section. If you save a file to drive G, the uncompressed data will go to the uncompressed drive, which is likely to have limited space left.

If you use another disk in drive A and then return to the compressed disk, it becomes disconnected and the compressed volume file is no longer recognized by DOS, neither is drive G. If you use DIR on drive A, you will see a file named READTHIS.TXT. If you use TYPE to read it, you will find that it tells you to mount (link it to DOS or make DOS recognize it) by making that drive current and entering DBLSPACE /MOUNT, like this:

```
A:\>dblspace /mount
```

If the target drive is not current, you can use it as a parameter, such as:

```
C\DOS>dblspace /mount a:
```

After a while, a message tells you that drive A is mounted. If DOS cannot find DBLSPACE.EXE, use a proper prefix or PATH to direct DOS to where the command is stored. When a disk is mounted, you can access drive G and can see READTHIS.TXT only in drive G but not drive A.

The idea of mounting a floppy disk can cause problem if you need to save two floppy copies of a file to the same drive. Suppose you use WordPerfect and save a file to two floppy disks, assuming both are compressed. If the first disk is mounted, there is no problem. If you take out the first disk and insert the second and save the same file again, you are likely to encounter insufficient disk space because DOS, not connected to the new compressed disk, tries to save to the uncompressed space which is likely to be very limited. At this point, the first disk is disconnected and the second is not yet mounted. If you now go back to the first disk, it is also not recognized. You have to go to the command line to mount each new floppy disk—a pain all over. This problem is less acute if you have two floppy drives and keep both mounted without changing disks.

MAINTAINING COMPRESSED DISKS

You can use DoubleSpace to maintain compressed disks, hard or floppy. If you examine Figure 5.1, you will find four menus at the top of the screen: Drive, Compress, Tool, and Help. Use Help the way you manage HELP as explained in Chapter 1. When a topic's window appears, you can use PgUp or PgDn to show more; you can also use a mouse to maneuver the scroll bar/box on the right side of the screen. In any particular screen, you may see a little arrow (→) pointing to a line. You can highlight such a line and press Enter to show more related information. You can also press Tab to point to any other item which may give you more help. If you have a mouse, you can click any highlighted item.

As shown in Figure 5.1, the mounted drive(s) are displayed in a separate box in the middle. Drive C is automatically mounted. You have to mount the removable drives manually. If several drives are mounted, you highlight the one you want to do something to and use a proper menu to do it.

Opening a menu is by pressing Alt or clicking it with a mouse, as explained when we covered HELP in Chapter 1. Opening the Drive menu displays the options shown in Figure 5.2. As you move the cursor up or down, notice the bottom of the screen showing a one-line explanation for the current item.

You are already familiar with Mount and Unmount. The former you can do on the command line and the latter by using another disk. Format removes all the data but retains the compressed volume file; this allows the disk to store new data. Delete removes everything; you can do also use DEL after using ATTRIB to remove all the protective file attributes.

Choosing Info is the same as pressing Enter when a mounted drive is highlighted. The new screen will display information about the current drive's compression. From this screen, you can choose the Size or Ratio button; these two are the same as choosing the second and third options from the Drive menu. If you choose Size, you are asked to enter a number for the uncompressed drive. If you enter a valid number, the number for the compressed drive will go up or down to increase or decrease the size accordingly. If the number you type is not acceptable, an *invalid* message appears instead. Press Enter to accept a valid number or Esc to abort.

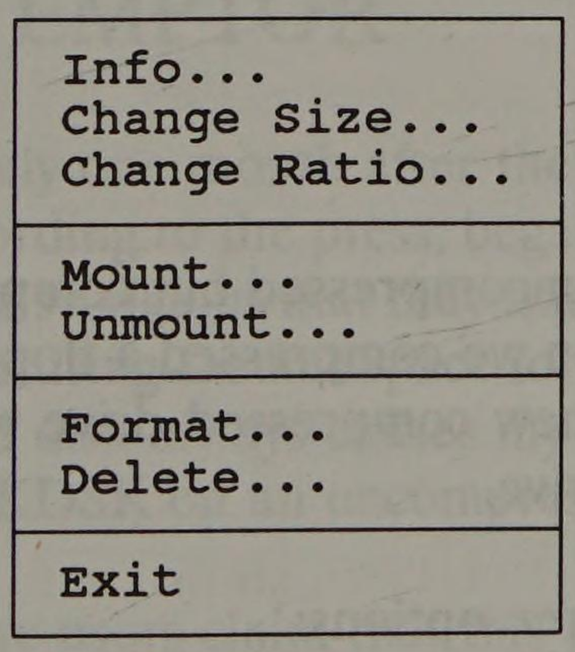


Figure 5.2 The Drive menu's options

Choosing Ratio (or Change Ratio) leads to another screen that shows compression ratio information and prompts you to enter a new ratio

number. Compression ratio is an estimate.[2] If the number estimated by DOS is not proper, you can change it. Keep in mind that increasing or decreasing compression ratio does not increase or decrease your disk's capacity to store data.

The compression ratio number may be important in some situations. Suppose you have a 30KB file. If this file can be compressed 3 to 1, then it takes up only 10KB disk space. If your disk has only 10KB free space left and you supply DOS the 3 to 1 ratio, this file can be successfully saved. If DOS estimates compression ratio to be 2 to 1, it will "see" only 20KB space available to save the file and issue an error message prematurely. On the other hand, if the compression ratio is set too high, DOS may proceed to save a file and then belatedly discover insufficient space.

To find out the average compression ratio of a type of files, enter a command like this on the command line:

```
C:\123>dir *.wk1 /c
```

This will show the compression ratio for each 1-2-3 worksheet file and, at the bottom, the average ratio. This last number can then be used to tell DOS what kind of compression ratio you want.
The Compress menu has two options:

Existing Drive
Create New Drive

Existing Drive is used to compress any uncompressed but compressible disk. This was demonstrated earlier when we compressed a floppy disk. Create a New Drive lets you create a new compressed drive with the available disk space in the designated drive.

If you open the Tools menu, you find three options:

Defragment
Chkdsk
Options

---

[2]Some types of files are more compressible than others. Compiled program files can be reduced very little but data, particularly graphic, files can be greatly reduced.

The first runs the DEFRAG program and the second CHKDSK; both were covered earlier when we compressed a hard disk. Options lets you designate the last (highest) drive letter for a compressed drive (normally H) and change the number for available removable drives.

Most of what you can do from the DoubleSpace screen can be done on the command line, which bypasses the menus and screen displays and can thus speed up an act. When a particular menu option is highlighted, Format in the Drive menu for example, press F1 to show help information and the option's command line equivalent. You can also enter DBLSPACE /? to find the available switches. For example, instead of choosing Format from the Drive menu, you can enter this command:

```
C:\DOS>dblspace /format a:
```

A warning message appears to prompt you for Y or N. This does not load the bulky menu and is executed quickly.

If you use a compressed floppy disk on two computers, both systems must be running DOS 6. If not, use an uncompressed disk.

CAVEAT EMPTOR

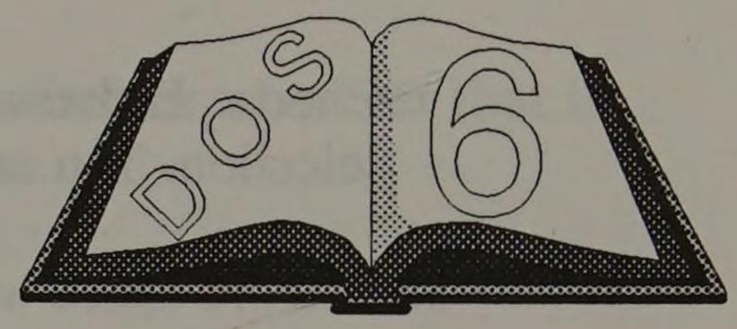
Barely one month after the Spring 1993 release of DOS 6, many users, according to the press, began to notice bugs in DoubleSpace. Some bugs were so vicious that they trashed files and crashed hard disks. In my case, after using DoubleSpace for a couple of weeks, checking my compressed hard disk always causes my PC to freeze. This does not happen if I use CHKDSK on an uncompressed floppy disk.

Some users claim that this problem is caused by SmartDrive. This disk-caching program has a new write cache which temporarily stores in RAM the data slated for saving—until when the CPU is not busy. It may not completely flush data from RAM to disk in some situations. This can corrupt files and directories. If this is true, one way to reduce risks is to delete the SMARTDRV.EXE line from your AUTOEXEC.BAT file (or add REM before the line.) If you must use SmartDrive, you should, before you shut off your PC, run SMARTDRV with the /C switch to save to disk any data remaining in the write cache.

If Microsoft can identify and fix these bugs, it is likely to follow its past practice by releasing a free bug-fix program to vendors and bulletin boards. If you encounter problems, you should be on the lookout for it. In the meantime, better be safe than sorry—save a copy of your most critical files to uncompressed floppy disks.

In most of Microsoft's ads, DoubleSpace was prominently touted as the most important reason for buying DOS 6. The feature proved to be quite seductive. More than three million copies were sold in the first few weeks. Now with so many irate users fuming over their trashed files and crashed disks, DoubleSpace may spell DoubleTrouble for Microsoft.

Chapter 6



MEMORY OPTIMIZING AND SYSTEM DIAGNOSTICS

(Coursebook Users: Add this chapter to the end of Chapter 9.)

NOTE: The ASSIGN and JOIN commands, discussed on pp. 323-328 in the Coursebook, are no longer available in DOS 6.

OPTIMIZING MEMORY WITH MEMMAKER

DOS 6 has a memory optimizer called MemMaker. It will analyze your CONFIG.SYS and AUTOEXEC.BAT files and alter them (if necessary) in an attempt to load TSR programs to the UMA so that more conventional memory can be made available for your applications.

NOTE: Do not do what is described here unless you are using your own computer that has a 386 or higher CPU.

Here are the steps you need to follow to use MemMaker:

1. Run MemMaker:

   C:\DOS>**memmaker**

   The initial message appears. Press Enter to continue.

2. You are asked to choose between Express or Custom setup. The former is highly automatic, and the latter gives you more control.

Choose Express to start. You can press the space bar to change a selection. You can also press F1 for help and F3 to exit.

3. You are asked whether your applications use EMS. After you make a selection, you are instructed to remove floppy disks so that MemMaker will reboot from your hard disk.

If your PC freezes, reboot by pressing the Reset button (or Ctrl-Alt-Del). MemMaker will pick up where it left off. If it freezes again, reboot another time. You will be asked whether your system works properly. If yes, the screen shows the available memory before and after the optimization. If not, you will be asked to exit or undo changes. If the process fails, the above steps may be repeated.

Whether MemMaker succeeds or fails, examine your CONFIG.SYS and AUTOEXEC.BAT files carefully. Your original files now have UMB extensions added to them and moved to the C:\DOS directory. The new ones may have lots of commands added. If you are satisfied with the new files, boot with them from now on. If not, feel free to restore the original. You can also ask MemMaker to restore your original files with the /UNDO switch, like this:

```
C:\DOS>memmaker /undo
```

The above steps will create in the C:\DOS directory a file named MEMMAKER.STS. Examine this ASCII file to see what the program has done. You will find lots of numbers, the results of calculating your memory and trying to match your TSRs to the available upper memory blocks. If you encounter problems, also examine the MEMMAKER.INF file in the C:\DOS directory; it comes with the DOS package.

If you choose Custom setup in step 2 above, you will be asked to set Yes or No for six questions. You can also choose Yes or No to optimize each TSR program. If you are knowledgeable about your PC, you can change the values. Otherwise, just accept the default values.

In my old system with a 386 CPU and 1MB memory, MemMaker asks me whether my applications use EMS. If I say No, my PC always freezes and displays a 8237 ERROR message. If I say Yes to EMS, MemMaker proceeds to successfully optimize the system without any problem. So, if your optimizing attempt fails, try various combinations; one of them may work.

If you have tried various ways and nothing works, you may want to give up on MemMaker. Perform a clean boot by pressing F5 when the Starting MS-DOS message appears. This bypasses the CONFIG.SYS and AUTOEXEC.BAT files (see the second half of Chapter 7 for more

related ideas). You can then use the /UNDO switch or whatever that is necessary to restore your original configuration.

SYSTEM DIAGNOSIS

DOS 6 includes a new diagnostic program called MSD.EXE (Microsoft Diagnostics). It will give you a slew of information about your system.

To run the program, just enter the name on the command line, like this:

```
C:\DOS>msd
```

A display like Figure 6.1 appears.

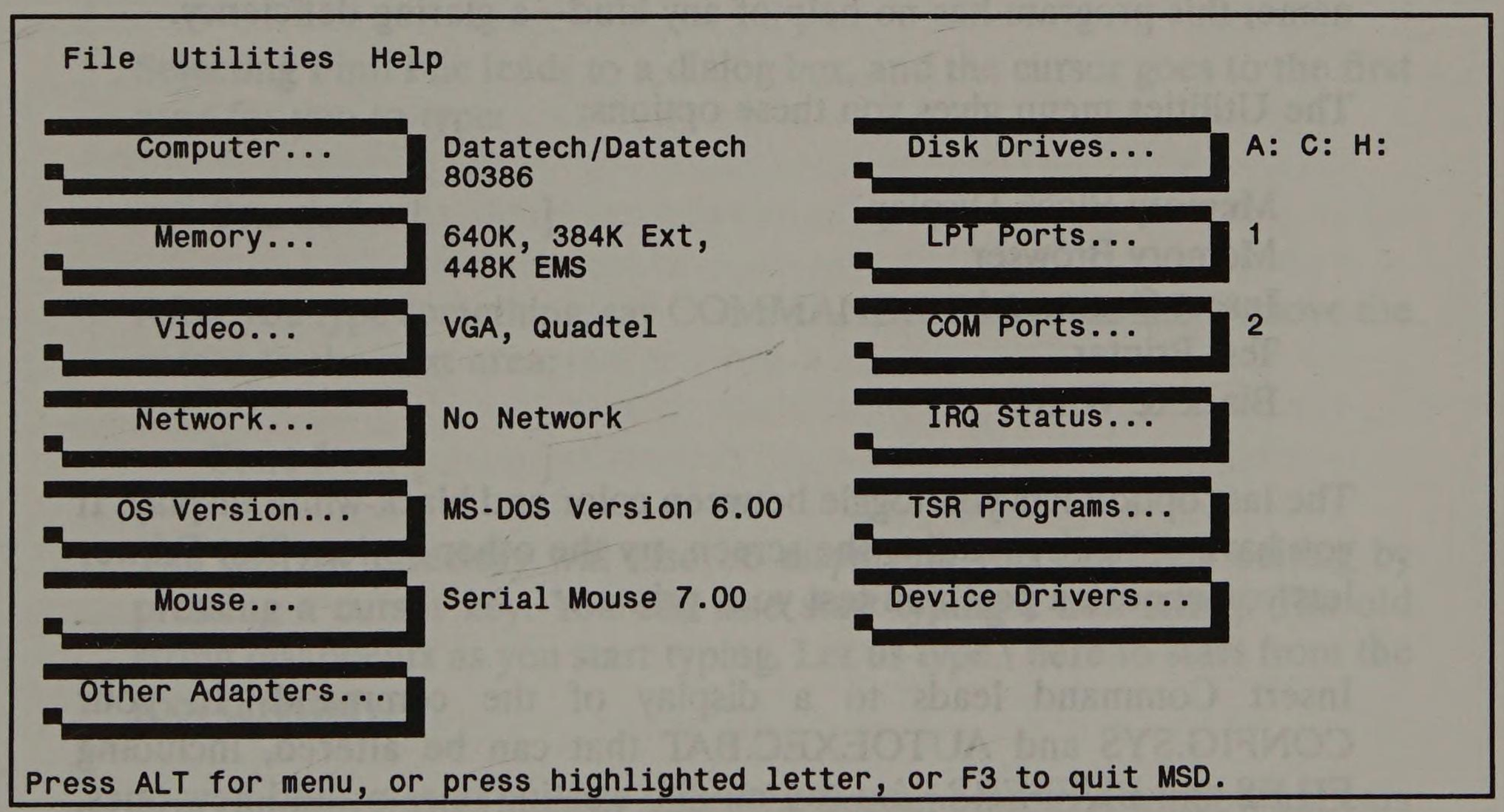


Figure 6.1 The initial MSD screen

The middle of the screen contains various items showing how your computer is equipped, plus 8 options through which more related information is available. To select an option, just click it with your mouse or use Tab to highlight it and press Enter. Another screen appears. Click the OK button or press Enter or Esc to return to the initial screen.

Of the 8 options, Memory, TSR Programs, and Device Drivers provide lots of useful information. They show what programs are loaded in RAM, where in RAM, and how much RAM for each.

If more information is available, a scroll bar appears on the right side; this happens, for example, when you choose Memory. You can press PgUp or PgDn to scroll up or down. You can press Home (or Ctrl-Home) or End (or Ctrl-End) to go to the top or bottom of the display. You can click the ↑ or ↓ arrow shown at the top and bottom of the scroll bar; they are the equivalent of pressing comparable keys on the keyboard. You can also drag the scroll box inside the scroll bar—move the mouse pointer to the box, hold down the left mouse button, and move the box up or down to scroll the screen text.

The top of the screen in Figure 6.1 shows a menu bar with three options. You can open a menu by pressing Alt and a pertinent letter or using a mouse to click a displayed menu. Help gives no help except the program's name; this program has no help of any kind—a glaring deficiency.

The Utilities menu gives you these options:

Memory Block Display
Memory Browser
Insert Command
Test Printer
Black & White

The last option lets you toggle between color and black-white display. If you have difficulty reading the screen, try the other option. Test Printer lets you choose a port and test your printer.

Insert Command leads to a display of the commands in your CONFIG.SYS and AUTOEXEC.BAT that can be altered, including FILES and BUFFERS. You can modify existing ones or add new ones. When you select the OK button, what you change will be saved over the original files. So do not do this unless you are using your own computer.

Memory Block Display shows memory use. Two parallel windows appear, each with a separate scroll box. The left, titled Allocated Memory, lists loaded programs; the right, titled Memory Map, shows the location of memory for the highlighted program. You can use your mouse to scroll either box. From the keyboard, press Tab to make a window active before you press PgUp or PgDn to scroll it.

Memory Browser lets you snoop at the system BIOS and video BIOS. Again, two parallel windows appear to show memory use. When you select the OK button, more information will be shown about the selected BIOS.

The File menu has these options:

Find File
Print Report
. . .

Exit

The middle part of the menu shows a series of system files, including your CONFIG.SYS, AUTOEXEC.BAT, and files with the INI extension. You can select any to read the contents. You can read other files by using the first two options in the menu.

Selecting Find File leads to a dialog box, and the cursor goes to the first area for you to type:

Search for [ ]

After you type something, say COMMAND.COM, press Tab to move the cursor to the next area:

Start from [ ]

The current directory will also be displayed, you can start editing by pressing a cursor key. You can also start typing a new string. The old string disappears as you start typing. Let us type \ here to start from the root directory.

You can now press Enter or select the Search button. A window appears with the matching files displayed. Since we do not use a wild card, only one file is displayed, namely COMMAND.COM. Press Enter or select the Display File button. Another screen appears to show the contents of the file. You can now scroll the screen up or down to see more. Press Esc to return to the initial screen.

Selecting Print Report leads to another dialog box. The top portion, titled Report Information, displays all the items whose reports are available. You can click inside each pair of brackets to show X or clear it. Or you

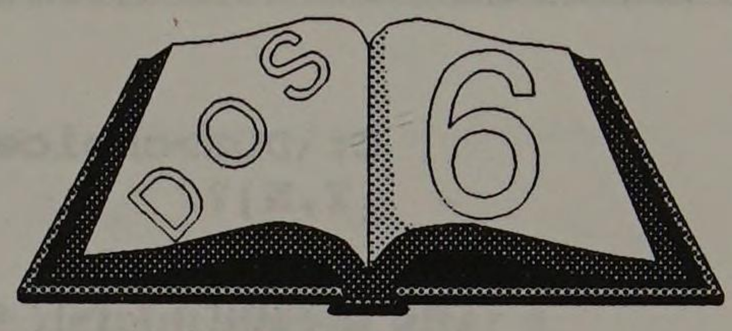
can tab to each and press the space bar to enter or clear an X. The items marked with an X will have their reports generated.

The bottom portion of the screen , titled Print To, lets you choose the destination of the report. You can choose a printer port (LPT1-3 or COM1-4) or File. To make a selection, click the desired item with your mouse; it will be marked with a bullet (●). From the keyboard, tab (Tab or Shift-Tab) to this area and then use ↑ or ↓ to move the bullet to the desired option. When you are satisfied with the selections, select the OK button to print. (If you choose a nonexisting printer port or your printer is not turned on, nothing happens, not even an error message.)

If you select File in the above procedure, you will be asked to enter a file name, including a directory prefix if necessary. The default file name is REPORT.MSD and it will be saved to the current directory—unless you change either. If you have chosen Customer Information in the top half of the screen, another screen will appear for you to fill in a series of information which will be included in the printed or saved report.

If your system malfunctions and you need long-distance help from your vendor, MSD can be an invaluable tool. Just follow the above procedure to save or print a report. Then mail, fax, or transmit the report. The technicians on the other side may be able to solve your problem by reading your report. Some mail-order PC vendors have been doing this for some time. They include a modem and a diagnostic program with every system sold. If the system fails, the program will generate a report, which the modem will transmit to the vendor to solve your problem. No more long delays or shipping bulky packages back and forth!

Chapter 7



BATCH AND CONFIGURATION TOOLS

(Coursebook Users: Add this chapter to the end of Chapter 12.)

CHOICE FOR USER INTERACTION

DOS 6 has an new external program called CHOICE.COM that can be used in a batch file to handle user interaction. This program can replace KEY.COM discussed on p. 503 in the Coursebook. Keep in mind that CHOICE is an external program—quite unlike the other batch commands. If you use it in a batch file, you must copy it to your floppy disk or provide a path for DOS to find this program.

Basic Rules

We will first discuss and demonstrate how this command works on the command line. Then we will apply it to the last batch file in Chapter 12 in the Coursebook.

Entering CHOICE /? on the command line leads to this syntax:

```
CHOICE [/C[:]choices] [/N] [/S] [/T[:]c,nn] [text]
```

Notice that all the parameters are optional, enclosed in brackets.

If you enter CHOICE alone, this is the result:

```
C:\DOS>choice
[Y,N]?
```

The default [Y,N]? prompt appears and a pause begins. If you press Y, y, N, or n, the pause ends and the DOS prompt reappears. Pressing anything else leads to a beep and no budge in the cursor.

You can use the /C (or /C:) switch, followed by the characters that will end the pause. This arrangement limits the choices to the characters placed after /C:. The following two commands are identical and legal:

```
C:\DOS>choice /c:abcde
[A,B,C,D,E]?A

C:\DOS>choice /cabcde
[A,B,C,D,E]?A
```

Notice that the colon makes no difference, but it does enhance readability. In either case, when a permissible key is pressed, the pause ends. Otherwise, a beep is heard and the pause continues.

Notice that the choices are displayed in uppercase. If you include the /S (sensitive in case) switch anywhere after CHOICE, the choices will be displayed in the specified case, lowercase in our case. In that case, only pressing a permissible letter in the right case will end the pause; a corresponding letter in the other case will no longer be acceptable.

If you use /N (no prompt), the choice prompt and the ending question mark will not be shown during the pause. This allows you to substitute the standard prompt with one designed by yourself. You can also add your own message to the standard prompt. Here are two examples:

```
C:\DOS>choice Here are the choices--/s/c:abc
Here are the choices--[a,b,c]?c

C:\DOS>choice Here are the choices--a, b, c--/n /c:abc /s
Here are the choices--a, b, c--b
```

In the first example, the standard prompt is augmented with an extra message; in the second, it is totally replaced due to the addition of the /N switch. The /S switch causes the standard prompt in the first case to display the choices in lowercase; user responses, c and b in the above examples, are also displayed in lowercase.

You message text can be placed anywhere, as long as it is separated from switches. Here we place it at the end and use numbers as options:

```
C:\DOS>choice /c:123 Make a choice:
Make a choice:[1,2,3]?1
```

You can use /T (time) to automatically supply the default choice after a specified number of seconds (0 to 99). Here is an example:

```
C:\DOS>choice Here are the choices--/s/c:abc /t:a,5
Here are the choices--[a,b,c]?a
```

If no response is supplied after 5 seconds, a is automatically provided as the default. You must use /C to provide choices if you have /T. This example will thus lead to an error:

```
C:\DOS>choice /ta,2
CHOICE: Timeout default not in specified (or default) choices.
```

You can use /C to supply the choices before or after the /T switch. Either arrangement below is legal:

```
C:\DOS>choice /cabc /ta,2
[A,B,C]?A

C:\DOS>choice /ta,2 /cabc
[A,B,C]?A
```

If the user presses a key not included in the choice list, the pause becomes indefinite; the specified time is no longer valid.

— *TIPS AND TRICKS* —

Be Sensitive To Your Cases

If you use the /S switch, you restrict legal responses to the characters of the specified case. If you use it alone, the default prompt is displayed in uppercase, like this:

```
C:\DOS>choice /s
[Y,N]?
```

The legal responses are now limited to Y or N, but not y or n. What if you want to limit to lowercase characters? Specify them with the /C switch, like this:

```
C:\DOS>choice /s /c:yn
[y,n]?
```

If you take out the /S, the default prompt will reappear in uppercase, so all the parameters become redundant.

Can you use /S with choices consisting of numbers, like this?

```
C:\DOS>choice /s /c:123
[1,2,3]?
```

Yes, but you are wasting your time because numbers are not case sensitive.

You can make the displayed options different from the legal responses by using different cases. This may prevent another person from using your menu batch file (see below) to access a program. On the command line, it may look like this:

```
C:\DOS>choice Make a choice--a, b, c: /n /s /c:ABC
Make a choice--a, b, c: A
```

Even though the displayed choices are a, b, or c, the only legal choices are A, B, or C.

CHOICE and Batch files

A user choice corresponds to an errorlevel number, the first being 1, the second 2, and so on; this number is different from an ASCII value expected by KEY.COM. These numbers can be used for branching in a batch file. We can now modify (and simplify) the menu on p. 506 in the Coursebook this way:

```
1: @echo off
2: rem MENU5.BAT--use CHOICE for user interaction
3: cls
4: echo Select: W (WordPerfect), L (Lotus), D (DBase), None
5: echo/
6: c:\dos\choice /c:wldn /t:n,10
7: if errorlevel 4 goto NONE
8: if errorlevel 3 goto DBASE
9: if errorlevel 2 goto LOTUS
10: if errorlevel 1 goto WP
11: :WP
12: wp.bat
13: :LOTUS
14: 123.bat
15: :DBASE
16: db.bat
17: :NONE
```

After running MENU5.BAT, line 4 displays a one-line message and line 5 shows the [W,L,D,N]? prompt. If no key is pressed in 10 seconds, the pause ends because the default option of N will be chosen and line 7 will branch batch execution to line 17.

— *TIPS AND TRICKS* —

Unusual CHOICE Characters

CHOICE recognizes extended ASCII characters shown in Appendix B in the Coursebook. You can use them to encrypt your menu options. Lines 4 and 6 of MENU5.BAT can thus be modified this way:

```
4: echo Select: WordPerf (201), Lotus (202), DBase (203)
5: echo/
6: c:\dos\choice /n /c:╔╦╠ /t:╠,10
```

The four characters shown after /C: are obtained by holding down Alt and pressing a number shown in line 4. These characters are not displayed because of the /N switch. Thus a user has to press Alt-201 in order to run WordPerfect. This could deter an amateur from using your menu.

If you want to use some fun characters, try the following on the command line:

```
C:\DOS>choice /c^A^B^D^E^L
[☺,●,♦,♣,♀]?☺
```

To enter the characters on the command line as well as in response, press Ctrl and a proper character, or Alt with a proper number on the numeric keypad where Alt-1 equals Ctrl-A, Alt-2 equals Ctrl-B, etc.

Here is another example:

```
C:\DOS>choice Quo Vadis /c^X^Y^Z
Quo Vadis [↑,↓,→]?
```

These characters are Ctr-X (Alt-24), Ctrl-Y (Alt-25), and Ctrl-Z (Alt-26). Alt-27 (←) is Esc and cannot be used here.

CHOICE and Redirection

Have you wondered whether CHOICE can have its input or output redirected? After experimenting for a while, I can give you a definite yes. Here is an example:

```
C:\DOS>echo y ¦ choice
[Y,N]?Y
```

Y is automatically supplied and no pause awaits you. The output, however, is displayed on the screen. We can hide the output this way:

```
C:\DOS>echo n ¦ choice > nul
```

This command in effect does nothing. N is automatically piped in where an answer is expected and the output is redirected to the NUL device.

An expected response can also be supplied by a redirected input. If a legal choice is provided, CHOICE will not pause to wait for a response. If you have a file named Y which contains nothing but a Y character, this is what happens:

```
C:\DOS>choice < y
[Y,N]?Y
```

Is there a practical use for any of these? Maybe. One thing I can think of is using redirection to record the outputs produced by your menu batch file by using a mechanism like this:

```
C:\DOS>choice >> record
```

This shows no prompt during the pause. An illegal response leads to no noticeable response from DOS, not even a beep. A legal response, Y or N, is sent to the file named RECORD.

You can use the following batch file to record the selections made by anyone using the menu.

```
1: @echo off
2:*rem MENU6.BAT--to record menu selections
3: cls
4: echo Select: WordPerfect, Lotus, DBase, None
5: echo Press--W, L, D, or N
6: c:\dos\choice /c:wldn >> record
7: if errorlevel 4 goto NONE
8: if errorlevel 3 goto DBASE
9: if errorlevel 2 goto LOTUS
```

```
10: if errorlevel 1 goto WP
11: :WP
12: wp.bat
13: :LOTUS
14: 123.bat
15: :DBASE
16: db.bat
17: :NONE
```

After using this batch file a few times, you can examine what has been saved to RECORD. You can also add the date-time stamp by adding these lines after line 2:

```
3: echo/ ¦ date ¦ find "C" >> record
4: echo/ ¦ time ¦ find "C" >> record
```

The RECORD file may include lines like these to indicate the date, time, and selection:

```
Current date is Tue 05-11-1993
Current time is  8:10:12.82a
[W,L,D,N]?W
```

MANAGING STARTUP

As PCs become more powerful and versatile, more and more TSR programs and device drivers are now being loaded by your CONFIG.SYS file. Things become so complicated that DOS 6 now provides a variety of ways and tools to manage your PC's startup. You can now:

- Have a clean startup—bypassing the CONFIG.SYS and AUTOEXEC.BAT files.
- Select certain lines in the CONFIG.SYS file to skip or execute.
- Program the CONFIG.SYS file to let the user choose one of multiple configuration blocks to execute.
- Tie the AUTOEXEC.BAT file to the selection made by the user during the CONFIG.SYS file's execution.

Some of these items can be understood and implemented by a novice, but most require considerable computer savvy. For that reason we have saved

the beginning issue to be covered at the end, after you have gained some knowledge of programming.

Clean Boot and Selective Configurations

When your PC starts, it races to execute the CONFIG.SYS and then AUTOEXEC.BAT files. The latter can be aborted if you hold down Ctrl-C. But the former cannot be stopped. If you want a different configuration, you have to edit the CONFIG.SYS file, adding REM before certain lines to prevent their execution. After saving the file, you can then reboot to get a new configuration.

You no longer have to do those in DOS 6. You can do a clean boot or select certain configuration commands to skip. To have a clean startup, press F5 or hold down Shift when the following message appears at the beginning of booting:

```
Starting MS-DOS...
```

This message appears after a while:

```
MS-DOS is bypassing your CONFIG.SYS and AUTOEXEC.BAT files.
```

This approach may help you identify some problems related to your PC or TSR programs. Since device drivers and programs are not loaded, don't expect your PC to behave the same way. The following variables, however, are automatically entered into the DOS environment:

```
PATH=C:\DOS
PROMPT=$P$G
COMSPEC=C:\COMMAND.COM
```

Instead of F5, you can press F8 to let you determine which lines to execute. You will see a prompt like this:

```
DOS=HIGH [Y,N]?
```

You can press Y to execute the line, or N to skip it. During a pause, you can press Esc to execute all the remaining lines or F5 to skip all of them.

After all the configuration lines are taken care of, this final prompt appears:

```
Process AUTOEXEC.BAT [Y,N]?
```

You can now press Y or N to execute or skip the file.

You can also use ? in certain lines in your CONFIG.SYS file, like this:

```
device?=c:\dos\ramdrive.sys
```

When this line is slated for execution, you will be prompted with [Y,N]. Lines without a ? are executed automatically.

Normally, when DOS is booted, there is a 2 second delay to wait for you to press F5 or F8. If you want no delay, include SWITCHES=/F command in your CONFIG.SYS file. You can also disable these keys by using /N. In the following example (it can be placed anywhere in your CONFIG.SYS file),

```
switches=/f /n
```

the startup is not delayed and the user cannot use F5, F8, or Shift to halt or abort execution.

After discussing all the confusing keystrokes and techniques, a summation is in order. The following table can serve as a quick reminder:

F5/Shift	Clean boot
F8	Selective boot
Esc	Execute all remaining
F5	Bypass all remaining
device?	Prompt for [Y,N]
switches=/n	No bypassing

Multiple Configurations

There are occasions when a PC needs to be configured differently—to run different programs or be used by different persons. Each person or program may require different configuration commands for the PC to run efficiently. For example, when you do not intend to use a RAM disk, you may want to skip loading the program so as not to waste memory. In addition to the techniques discussed in the previous section, you can now get your CONFIG.SYS file to display a menu so that the user can choose a block of items to execute and skip the rest. Using a configuration menu is a preferred approach if the CONFIG.SYS file becomes complicated. A CONFIG.SYS file may look like this:

```
device=c:\dos\himem.sys
dos=high
files=30
buffers=20
numlock=off
device=c:\dos\setver.exe

rem--This is a menu block:--
[menu]
menuitem=ram,Create a RAM disk
menuitem=ansi,Load ANSI.SYS

rem--This is a configuration block:--
[ram]
device=c:\dos\ramdrive.sys

[ansi]
device=c:\dos\ansi.sys
```

After running the above file, this menu appears:

```
MS-DOS 6 Startup Menu
=====================

   1. Create a RAM disk
   2. Load ANSI.SYS

Enter a choice: 1
```

The bottom of the screen also tells you that you can press F5 to bypass execution or press F8 to toggle between [Y] and [N] for selective execution. [N] is the default. If [Y] is selected, you will be prompted with [Y,N] before a selected line is executed.

The first option in the menu is also highlighted. You can press 1 or 2 to highlight an option. When you press Enter, the highlighted option is executed.

Let us now discuss our CONFIG.SYS file. The first four lines have been explained in previous sections. NUMLOCK is a new configuration command that lets you specify ON or OFF to determine the beginning state of the Num Lock key. Loading SETVER.EXE lets you use previous DOS programs; without this I cannot use EDLIN from version 5 (version 6 no longer includes EDLIN).

The remainder of the file contains three blocks, each beginning with a block header and ending with another header or the end of the file. The first block is known as a **menu block** and always headed with the [menu]

header. It serves the same purpose as the main() function in C. It contains menu items which are used to display messages and branch execution to a selected block. The last two blocks are known as **configuration blocks**. Each is like a function in C to be branched to when a selection is made.

The MENUITEM command contains two items separated by a comma. The first must match the header of a configuration block, and the second provides the text string for display. If the second item is missing, the first is used for display as well. Each item can have a string up to 70 characters long. MENUITEM can be included only in a menu block, not a configuration block.

You can use the INCLUDE command to include one configuration block in another. This can serve as a shortcut to repetitive typing. You can also use the [common] header to mark a configuration block, which tells DOS to always execute the lines included in such a block. In our example, the beginning lines are executed before [menu] is encountered. You can include them in a [common] block and place them in any part of the file. You can have multiple [common] blocks placed in various parts of the file. They will be executed in the order of their locations from top down.

This modified file includes examples of INCLUDE and [common]:

```
device=c:\dos\himem.sys
dos=high

[menu]
menuitem=ram,Create a RAM disk
menuitem=ansi,Load ANSI.SYS
menuitem=both,RAM disk & ANSI

[ram]
device=c:\dos\ramdrive.sys

[ansi]
device=c:\dos\ansi.sys

[both]
include=ram
include=ansi

[common]
files=30
buffers=20
numlock=off
device=c:\dos\setver.exe
```

The third menu item includes all the commands from both [ram] and [ansi]. Even though [common] is placed at the end, it will be executed regardless of what option the user chooses.

A menu block can contain up to nine menu items. If you need more, you can use the SUBMENU command to provide for more choices. This is comparable to branching to a subroutine, which in turn branches to another. Here is an example:

```
device=c:\dos\himem.sys
dos=high

[menu]
menuitem=ram,Create a RAM disk
menuitem=ansi,Load ANSI.SYS
submenu=ems,Choose EMS or No EMS

[ram]
device=c:\dos\ramdrive.sys

[ansi]
device=c:\dos\ansi.sys

[ems]
menuitem=win,No EMS--to run Windows
menuitem=dos,EMS--to run DOS

[win]
device=c:\dos\emm386.exe noems

[dos]
device=c:\dos\emm386.exe ram

[common]
files=30
buffers=20
numlock=off
device=c:\dos\setver.exe
```

The menu block now contains a SUBMENU item. It will be displayed as the third option when the menu is shown. When option 3 is chosen, another menu appears with two options. If the user chooses 1, the [win] block is executed and no expanded memory is created. (Most DOS applications use expanded memory but Windows needs extended memory.)

We have so far discussed [menu], [common], MENUITEM, SUBMENU, NUMLOCK, and INCLUDE. Let us now cover the other available commands: MENUDEFAULT and MENUCOLOR.

MENUDEFAULT is placed in a menu or submenu block to automatically supply the default choice after a specified time elapses—similar to the /T switch in CHOICE discussed earlier in this chapter. MENUCOLOR sets values for text and background colors. Consider this example:

```
[menu]
menuitem=ram,Create a RAM disk
menuitem=ansi,Load ANSI.SYS
submenu=ems,Choose EMS or No EMS
menucolor=1,8
menudefault=ansi,10
. . .
```

The background will be changed to gray and text to blue. If no selection is made after 10 seconds, [ansi] will be executed.

In setting colors, the first value is for text and the second (optional) for background. You can choose among these values:

0	black	8	gray
1	blue	9	bright blue
2	green	10	bright green
3	cyan	11	bright cyan
4	red	12	bright red
5	magenta	13	bright magenta
6	brown	14	bright brown
7	white	15	bright white

If you specify no color, the default is white on black. If you use the same value for both text and background, the display becomes invisible.

Integrating CONFIG.SYS and AUTOEXEC.BAT

If you use a menu for multiple configurations, DOS 6 creates an environment variable called CONFIG. This variable has the value of the header of the configuration block selected by the user. This value can be used by the AUTOEXEC.BAT file to branch to a line to automatically load a selected program. This arrangement can keep your CONFIG.SYS and AUTOEXEC.BAT in sync.

Suppose you use Windows and WordPerfect for DOS. The configuration for each is different. You can set up a menu in the CONFIG.SYS file to let you choose to run either package. If you choose to run Windows, the

related configuration block will be executed. Then the Windows section in the AUTOEXEC.BAT file will be run.

The CONFIG.SYS file may look like this:

```
device=c:\dos\himem.sys
dos=high,umb

[menu]
menuitem=wp,Start WordPerfect
menuitem=win,Start Windows

[win]
device=c:\dos\emm386.exe noems

[wp]
device=c:\dos\emm386.exe ram

[common]
files=30
buffers=20
numlock=off
devicehigh=c:\dos\setver.exe
```

The AUTOEXEC.BAT file may resemble this:

```
@echo off
lh c:\dos\smartdrv.exe
prompt $p$g
path=c:\dos
goto %config%

:WP
cd\wp
wp
goto END

:WIN
lh c:\mouse\mouse.com
cd\win
win

:END
```

We have added UMB in the first file so that we can access the UMA, and SEVER.EXE is loaded to the area. The second file uses LH to load SmartDrive (for disk caching) and MOUSE.COM (newer mouse drivers have the COM extension and are loaded from AUTOEXEC.BAT) to the UMA.

After the first file is executed and a menu displayed, you can choose between *Start WordPerfect* and *Start Windows*. If you choose the first, the [wp] block is executed to create expanded memory and the CONFIG=wp variable enters the environment. This variable is then used by the second file to do automatic branching. The *goto %config%* command in line 5 is translated to *goto wp* when executed. WordPerfect will then be loaded.

If you choose Windows when the menu is shown, the [win] block is run to configure the RAM differently and *goto %config%* becomes *goto win*. Windows will run after the mouse driver is loaded.

This arrangement of integrating your CONFIG.SYS and AUTOEXEC.BAT can achieve a high degree of automation. If your system is set up properly, a user needs to do little work during the startup and the system will be optimally configured. Setting up such a system or altering it, however, requires considerable savvy and effort.

Here is one more complication. If you use multiple configurations with MemMaker, you need to go through these elaborate steps to optimize your memory use for each configuration:

1. Retrieve your CONFIG.SYS file to a text editor.

2. Save each configuration block (together with all the commands to run a program) as a separate file, maybe CONFIG.1, CONFIG.2, and so on; these files should not contain any commands used in menu display or branching—just plain configuration commands.

3. Change CONFIG.SYS to something else and CONFIG.1 to CONFIG.SYS.

4. Run MemMaker.

5. Repeat steps 3 and 4 with another configuration file until all are covered.

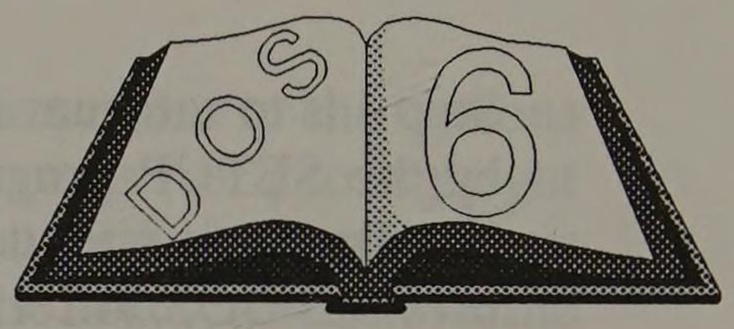
6. Combine all the configuration files into one.

If you are willing to go through that, as suggested in the DOS 6 printed manual, you deserve an award for dedication.

Here is probably a better idea. Edit your CONFIG.SYS file and add REM before all the lines except the block you want MemMaker to

optimize. Run MemMaker to optimize the resaved CONFIG.SYS. Repeat with each new block. After each block is tested, make a final arrangement in the CONFIG.SYS file. This is still an elaborate procedure, but it is less complicated than the previous.

Appendix



Installing Version 6

Unlike version 5, DOS 6 is sold in only upgrade but not standard package. You can purchase it in either 3.5-inch or 5.25-inch disk format; both are on high-density disks. If you have only double-density drives, you can fill out a coupon inside the package and wait for Microsoft to mail your the proper disks.

Each package contains on Disk 1 a file named PACKING.LST telling you all the file names in the package. You can use the TYPE command to read it. If you have unusual hardware or software or encounter problems using DOS 6, make sure to read README.TXT on Disk 1.

If your hard disk has no previous version of DOS installed, start the PC with Disk 1 in drive A. The AUTOEXEC.BAT file will run the BUSETUP.EXE program to begin the installation procedure. If this program detects the existence of a previous version of DOS, it will advise you to choose an option to abort or let you choose the other option to replace the existing files with new ones.

If you are using a previous version of DOS, the standard installation procedure involves these steps:

1. Have ready one or two (if 360KB) formatted and unused disks. You should label these Uninstall #1 and Uninstall #2.

2. Start your PC without memory-resident programs.

3. Run the SETUP.EXE program on Disk 1, which can be in drive A or B, depending on the disk format you have.

Step 1 is to safeguard against a failed installation. The disks will be used by the SETUP program to store the previous version of DOS. If the installation is not successful, you can use them to start and restore the previous DOS. After you have completed the installation, these files can be erased—or restored in case you don't like DOS 6.

Step 2 is to avoid conflict between the SETUP program and the programs automatically loaded by your CONFIG.SYS and AUTOEXEC.BAT. To start your PC without these programs, use a text editor such as EDLIN or EDIT and add REM to the beginning of each pertinent line; save the edited files over the old ones and restart your PC. After you have completed installation, edit CONFIG.SYS and AUTOEXEC.BAT and take out the REM commands, resave the files, and restart the PC.

Step 3 involves making drive A or B current, inserting Disk 1 in that drive, and running SETUP.EXE. The initial screen appears, showing you that you can press F3 to exit, F1 for more information, and Enter to continue.

Most of version 6's original files are compressed; these are shown with an underscore (_) at the end. To make them useful, you must use the SETUP program to decompress and then copy to a target disk. You can also use the provided EXPAND program to decompress one file at a time, as explained below.

After the SETUP program is started, you will be asked to insert the first blank disk (Uninstall #1) in drive A. If you are installing from drive A, take out Disk 1 and put in your disk. The old DOS information will be copied to your disk. If there is not enough space, you will be prompted to insert Uninstall #2.

You are now instructed to insert each sequential disk. the screen shows a series of options and asks for your approval. If you agree with the choices made by the program, just press Enter to proceed. At the beginning, you will be asked these options:

```
Setup will use the following system settings:

DOS Type:              MS-DOS
MS-DOS Path:           C:\DOS
Display Type:          VGA

The settings are correct.
```

The last line in the box will be highlighted. If you agree to the options the program has chosen, just press Enter. If not, press ↑ or ↓ to highlight a desired line and press Enter. You will then be asked to enter your desired item. After this screen is taken care of, the next screen shows the programs to be installed:

```
Backup:                 MS-DOS only
Undelete:               MS-DOS only
Anti-Virus              MS-DOS only

Install the listed programs.
```

The right side of each program shows the number of bytes (not shown here) required of your hard disk. The bottom of the screen also shows the available hard disk space and the total bytes required. The above display appears when the SETUP program does not find Windows installed on your hard disk. If Windows is detected, the *MS-DOS only* message will be replaced by *Windows only*. If you agree with the selections, just press Enter to accept. If not, press ↑ or ↓ to highlight the option and press Enter. You will be given these choices:

Windows and MS-DOS
Windows only
MS-DOS only
None

As you move the cursor up and down, the right side and the bottom of the screen show different numbers. If you choose *Windows and MS-DOS*, you can later access these features from both Windows and the DOS command line; you will also need lots of disk space. You cannot install the Windows version of these programs unless Windows has previously been installed. If you install Windows after running SETUP, you can use the SETUP /E command to install the Windows version. After installing the Windows version, a group called Microsoft Tools will be created. You can later click this group icon to access these features; their proper icons will appear for you to click.

SETUP now begins to copy files from each floppy to the hard disk. When a floppy disk is completed, you will be prompted to insert the next disk. The middle of the screen shows the percentage of completion and the bottom displays each file being read and written. While you are waiting and idle, you can read the top part of the screen telling you some of the new features in the new version.

After all the files (more than 100) are copied, you are given a final message and instructed to press Enter to start the new version. Remove the disk in drive A, if any, and press Enter to start DOS 6.

If installation fails or if you just want to return to the previous version, you can insert the Uninstall #1 disk in drive A and press the Reset button on your PC (or press Ctrl-Alt-Del). This disk saves all the information about the old version with a series of files with the DAT extension. If you no longer need the old version, you can delete these files.

The SETUP program also creates a directory named OLD_DOS.1 (may be other directories with 2 or 3 as its extension) and saves the old DOS files in the C:\DOS directory to this directory. An ASCII file named README.NOW is also created. It tells you that these files can be deleted with the DELOLDOS command entered on the command line; you can also use the DEL command to do the job. Most of these external commands can no longer be used; if you try to run them, you will likely get the *Incorrect DOS Version* message.

The C:\DOS directory may still contain some old files. EDLIN and sample BASIC programs, both of which came with version 5 but are no longer included in version 6, are good examples. You can keep these files or delete them as you see fit.

The CONFIG.SYS and AUTOEXEC.BAT files will also be modified by the SETUP program. The old ones are changed to the BAK extension and the new ones may have additional lines added at the beginning or end of the file. If necessary, you can modify these files.

Many of the files decompressed and copied to your hard disk by the SETUP program are not essential. If you need to use the disk space for other purposes, you can erase many of them. If you need to use any of them in the future, you can use the EXPAND program to decompress them.

For example, if you do not have an EGA system, you can erase the two related files this way:

```
C:\DOS>del ega.*
```

This deletes EGA.SYS and EGA.CPI. Should you need those files later, you can place the right disk in drive A and enter these two commands:

```
C:\DOS>expand a:ega.sy_ ega.sys
C:\DOS>expand a:ega.cp_ ega.cpi
```

These commands run the program (EXPAND.EXE) in the current directory, decompresses EGA.SY_ and EGA.CP_ stored in drive A and sends the decompressed files with proper extensions to the current directory. If you are not sure what extension you should provide for a decompressed file, check the PACKING.LST file.

The EXPAND program does not accept wild card characters. You cannot use * or ? in either the source or the target. If you enter EXPAND alone (no parameter), you will be prompted to enter a source and a target.

To convert another hard disk (perhaps the one in your home or office), you can copy version 6's SYS.COM to a boot disk (formatted with /S). Take this disk to the new computer and boot the system with the floppy in drive A; your PC is now running DOS 6. Then enter this command:

```
A>sys c:
```

This will transfer the three hidden files (IO.SYS, MSDOS.SYS, DBLSPACE.BIN) and COMMAND.COM to your hard disk; the old files of the same names will be replaced. If you now reboot with drive A's door open, the new version will be booted from the hard disk. If you need to transfer some external DOS commands to the new PC, use EXPAND as explained earlier.

If you have an existing floppy disk formatted (with or without the /S switch) by a previous version, you can also use SYS to transfer DOS 6's system files to it, like this:

```
C:\DOS>sys a:
```

You can use SETUP /F to install a minimal version of DOS 6 on a floppy disk. SETUP has 9 switches all together. You need to insert Disk 1 in drive A and enter SETUP /? from drive A to show them. SETUP.EXE is not copied to C:\DOS during the installation and you cannot show the switches from this directory; nor can you show anything pertinent from the HELP program.

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