Concise User's Guide

Includes DoubleSpace

Microsoft MS-DOS 6

Operating System Plus Enhanced Tools

For sale only with a new PC

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The Authorized Editions on MS-DOS from Microsoft Press

Concise User's Guide

Microsoft® MS-DOS® 6

For the MS-DOS Operating System

Welcome

Welcome to the Microsoft® MS-DOS® operating system. MS-DOS 6 includes many new features that are described later in this introduction. If MS-DOS 6 is not yet set up on your computer, see the chapter "Getting Started' for information about how to use the Setup program.

About Your MS-DOS Documentation

MS-DOS 6 documentation consists of the Microsoft MS-DOS 6 Concise User's Guide, MS-DOS Help, and several other online documents.

This guide includes information for inexperienced computer users, and some advanced topics for users familiar with MS-DOS. MS-DOS Help is an online reference to MS-DOS commands. The reference includes information about how to type commands and their parameters and switches, notes about commands, and examples of how to use commands.

After you've set up MS-DOS 6 on your computer, you can display the MS-DOS Help table of contents by typing **help** at the command prompt and then pressing ENTER. You can also get information about a command by typing **help** and the name of the command at the command prompt.

When you install MS-DOS 6, Setup copies to your hard disk several online documents that contain information that was unavailable when this guide was printed. You can read (and print) the documents by using any text editor.

After you set up MS-DOS 6, you will find the following files in the directory that contains your MS-DOS files: the README.TXT file, which provides information about how MS-DOS 6 interacts with certain types of hardware and software, and the NETWORKS.TXT file, which provides information about making your network compatible with MS-DOS 6.

New Features of MS-DOS 6

If you have used earlier versions of MS-DOS, you will find many improve.
ments in MS-DOS 6:

▪ Microsoft DoubleSpace, integrated disk-compression that increases your
available disk space by compressing files. DoubleSpace increases avail-
able space on both hard disks and floppy disks. For more information, see
the chapter "Freeing Disk Space."

▪ A/c switch for the **dir** command that displays information about file com-
pression ratios on compressed DoubleSpace drives. For more information,
type **help dir** at the MS-DOS command prompt, and then press ENTER.

▪ Microsoft MemMaker, a memory-optimization program that moves device
drivers and memory-resident programs from conventional memory into the
upper memory area on computers that have an 80386 or higher processor.
For more information, see the chapter "Making More Memory Available."

▪ An enhanced EMM386 device driver that accesses more upper memory
blocks and uses extended memory to simulate expanded memory. For
more information, see the chapter "Making More Memory Available."

▪ An enhanced **mem** command that provides more information about the
memory your computer is using and the programs that are loaded in mem-
ory. For more information, type **help mem** at the MS-DOS command
prompt, and then press ENTER.

▪ Enhanced **loadhigh** and **devicehigh** commands that enable you to specify
the memory region in which you want to load a program. For more infor-
mation, type **help loadhigh** or **help devicehigh** at the MS-DOS command
prompt, and then press ENTER.

▪ Microsoft Backup, a program that backs up your data. For more informa-
tion, see the chapter "Managing Your System."

▪ Microsoft Anti-Virus, a program that can identify and remove more than
800 different computer viruses from your system. For more information,
see the chapter "Managing Your System."

▪ Microsoft Undelete, an enhanced program that enables you to choose one
of three levels of protection in case you accidentally delete a file. For more
information, see the chapter "Managing Your System."

▪ The ability to define more than one configuration in a CONFIG.SYS file.
For more information, see the chapter "Configuring Your System."

▪ The ability to bypass startup commands when you turn on your computer.
For more information, see the chapter "Configuring Your System."

- Microsoft Defragmenter, a program that optimizes file storage on your hard disk. For more information, see the chapter "Managing Your System."

- MS-DOS Help, an online reference to MS-DOS commands. For more information, see the chapter "MS-DOS Basics."

- An enhanced SMARTDrive program. For more information, see the chapter "Managing Your System," or type **help smartdrv** at the command prompt and then press ENTER.

- Microsoft Diagnostics (MSD), a program that gathers and displays technical information about your computer. For more information, type **help msd** at the MS-DOS command prompt, and then press ENTER.

- Interlnk, a program that enables you to easily transfer files between computers. For more information, see the chapter "Features for Your Laptop Computer."

- Power, a program that conserves battery power when applications and hardware devices are idle. For more information, see the chapter "Features for Your Laptop Computer."

- A **move** command that moves one or more files from one directory or drive to another. For more information, type **help move** at the MS-DOS command prompt, and then press ENTER.

- A **choice** command to prompt a user for input when running a batch program. For more information, type **help choice** at the MS-DOS command prompt, and then press ENTER.

- A **deltree** command that deletes a directory and all of its files and subdirectories. For more information, type **help deltree** at the MS-DOS command prompt, and then press ENTER.

- Fewer technical status messages appear when your computer starts.

Conventions

This guide uses document and keyboard conventions to help you locate and identify information.

Document Conventions

To help you locate and interpret information easily, this guide uses consistent visual cues and a standard key combination format. These conventions are explained as follows.

This	Represents
bold	Commands and the switches that follow them. You must type commands and their switches exactly as they appear.
italic	Placeholders that represent information you must provide. Italic type also signals a new term. An explanation precedes or follows the italicized term.
ALL CAPITALS	The names of computers, printers, directories, and files.

Microsoft documentation uses the term *MS-DOS* to refer to the MS-DOS and IBM® Personal Computer DOS operating systems.

Keyboard Conventions

Key combinations and key sequences appear in the following format:

Notation	Meaning
KEY1+KEY2	Hold down the first key while you press the second key. For example, "Press CTRL+C" means that you press CTRL and hold it down while you press C.
KEY1, KEY2	A comma (,) between key names means you must press the keys in sequence-for example, "Press ALT, F10" means that you press and release the ALT key, and then press and release the F10 key.

C H A P T E R   1

Getting Started

Most computers are sold with an operating system pre-installed. However, if your computer doesn't have the MS-DOS 6 operating system installed, you must run the Setup program. You cannot run MS-DOS directly from the Setup disks because the files on those disks are compressed. The Setup program expands MS-DOS files and copies them to your hard disk or floppy disks.

Running Setup

The Setup program detects the type of hardware and software you have on your computer and notifies you if your computer does not meet the minimum requirements.

▶ **To set up MS-DOS**

1. Insert Setup Disk 1 in drive A (your startup drive).
2. Start (or restart) your computer.
3. Follow the instructions on your screen.

Configuring Anti-Virus, Backup, and Undelete for Windows

After you install Microsoft Windows™ on your system, to use the Windows versions of Anti-Virus, Backup, or Undelete, you must run the MS-DOS 6 Setup program again.

▶ **To configure Anti-Virus, Backup, or Undelete for Windows**

1. Insert Setup disk 1 in drive A or drive B, and then type the following at the command prompt:

   a:setup /e   or **b:setup /e**

2. Follow the instructions on your screen.

Setup creates a Microsoft Tools group in Program Manager and adds the icons for these programs to the group. If you are running Windows version 3.1, Setup adds an Undelete command to the File menu in File Manager. Setup also adds a Tools menu, which includes commands for Anti-Virus and Backup, to the menu bar in File Manager.

C H A P T E R   2

MS-DOS Basics

This chapter explains the basics of using MS-DOS 6. The first section of this chapter is a tutorial. The second section explains in more detail some of the concepts described in the tutorial and provides information about using MS-DOS Help.

Learning MS-DOS Basics - A Tutorial

By following the procedures in this section, you will learn to view the contents of a directory, create and delete directories, change from one directory or drive to another, copy, rename, and delete files, and format a floppy disk.

The Command Prompt

When you first turn on your computer, you will see some information flash by. When the information stops scrolling past, you'll see the following:

C:\>

This is called the command prompt. The flashing underscore next to the command prompt is called the cursor. The cursor shows where the command you type will appear.

Typing a Command

This section explains how to type a command at the command prompt. After typing a command, you must press ENTER.

▶ **To type a command at the command prompt**

1. Type the following command at the command prompt (you can type the command in either uppercase or lowercase letters):   **ver**

2. Press ENTER.

   The following message appears on your screen:

   MS-DOS version 6.00

   The **ver** command displays the version number of MS-DOS. If you see the message "Bad command or file name," press the BACKSPACE key to erase the mistake, and then try again.

Viewing the Contents of a Directory

In this section, you will view the contents of a directory by using the **dir** command. The **dir** command stands for "directory."

▶ **To view the contents of a directory**

● Type the following at the command prompt: **dir**

A list similar to the following appears:

```
Volume in drive C is MS-DOS-6
Volume Serial Number is 1E49-15E2
Directory of C:\

WINDOWS        <DIR>        09-08-92   10:27p
CONFIG    SYS        278 09-23-92   10:50a
COMMAND   COM      53014 09-18-92    6:00a
WINA20    386       9349 11-11-91    5:00a
DOS            <DIR>        09-02-92    4:23p
AUTOEXEC  BAT        290 09-23-92   10:54a
    6 file(s)       62931 bytes
               8732672 bytes free
```

This is called a directory list. A directory list is a list of all the files and sub-directories that a directory contains. In this case, you see all the files and directories in the main or root directory of your drive.

Changing Directories

All the names that have <DIR> beside them are directories. You can see a list of the files in another directory by changing to that directory, and then using the **dir** command again. In this case, you will change to the DOS directory.

▶ **To change from the root directory to the DOS directory**

To change directories, you will use the **cd** command. The **cd** command stands for "change directory."

● Type the following at the command prompt: **cd dos**

The command prompt changes. It should now look like the following:

```
C:\DOS>
```

The command prompt shows which directory you are in. In this case, you know you successfully changed to the DOS directory because the command prompt displays the directory's name. Now the current directory is DOS.

Next, you will use the **dir** command to view a list of the files in the DOS directory.

▶ **To view a list of the files in the DOS directory**

- Type the following at the command prompt: **dir**

A list of the files in the DOS directory appears, but scrolls by too quickly to read. You can modify the **dir** command so that it displays only one screen of information at a time.

▶ **To view the contents of a directory one screen at a time**

1. Type the following at the command prompt: **dir /p**

One screen of information appears. At the bottom of the screen, you will see the following message: Press any key to continue . . . .

2. To view the next screen of information, press any key on your keyboard. Repeat this step until the command prompt appears.

When you typed the **dir** command this time, you included the **/p** switch after the command. A switch modifies the way MS-DOS carries out a command. Generally, a switch consists of a forward slash (/) that is followed by one or more letters or numbers. When you used the **/p** switch with the **dir** command, you specified that MS-DOS should pause after it displays each screen of directory list information.

▶ **To view the contents of a directory in wide format**

1. Type the following at the command prompt: **dir /w**

The directory list appears, with the filenames listed in wide format. Only filenames are listed. No information about the files' size or date and time of creation appears.

2. If the directory contains more files than will fit on one screen, you can combine the **/p** and **/w** switches as follows: **dir/w /p**

Changing Back to the Root Directory

Next, you will change from the DOS directory back to the root directory.

▶ **To change to the root directory**

- Type the following at the command prompt: **cd **

Note that the slash you type in this command is a backslash (\), not a forward slash (/). No matter which directory you are in, this command always returns you to the root directory of a drive. The root directory does not have a name. It is simply referred to by a backslash (\).

The command prompt should now look like the following: C : \>

Creating a Directory

In this section, you will create two directories. Creating a directory is helpful
if you want to organize related files into groups to make them easy to find. To
create a directory, you will use the **md** command. The **md** command stands
for "make directory."

▶ **To create and change to a directory named FRUIT**

1. Type the following at the command prompt: **md \fruit**

   You have now created a directory named FRUIT.

2. To change to the new FRUIT directory, type the following at the command
   prompt: **cd \fruit**

   The command prompt should now look like the following: C:\ FRUIT>

You will now create a directory within the FRUIT directory, named GRAPES.

▶ **To create and work with a directory named GRAPES**

1. Type the following at the command prompt: **md grapes**

   You will not see the new GRAPES directory until you carry out the **dir**
   command in the next step.

2. To confirm that you successfully created the GRAPES directory, type the
   following at the command prompt: **dir**

   Note that there are three entries in the FRUIT directory list. One is the
   GRAPES directory that you just created. There are two other entries--one
   looks like a single period (.) and the other looks like a double period (..).
   These directory entries appear in every directory.

   The GRAPES directory is a *subdirectory* of the FRUIT directory. A sub-
   directory is a directory within another directory.

3. To change to the GRAPES directory, type the following at the command
   prompt: **cd grapes**

   The command prompt should now look like the following:

   C:\ FRUIT\GRAPES>

4. To switch back to the FRUIT directory, type the following: **cd ..**

   The command prompt should now look like the following:

   C:\ FRUIT>

   When the **cd** command is followed by two periods (..), MS-DOS moves up
   one level in the directory structure. In this case, you moved up one level
   from the GRAPES directory to the FRUIT directory.

Deleting a Directory

You may want to delete a directory to simplify your directory structure. In this section, you will delete the **GRAPES** directory. To delete a directory, use the **rd** command. The **rd** command stands for "remove directory."

▶ **To delete the GRAPES directory**

1. Make sure the command prompt looks like the following: `C:\FRUIT>`

2. Type the following at the command prompt: **rd grapes**

3. To confirm that you successfully deleted the GRAPES directory, type the following at the command prompt: **dir**

   The GRAPES directory should no longer appear in the directory list.

Note   You cannot delete a directory if you are in it. Before you can delete a directory, you must type **cd..** at the command prompt.

Changing Drives

This section describes how to change drives. So far, you have been working with drive C. You have other drives you can use to store information. For example, drive A is your first floppy disk drive. The files and directories on drive A are located on the floppy disk in the drive. (You might also have a drive B, which contains the files and directories stored on the floppy disk in that drive.)

▶ **To change to and view files on a different drive**

1. Insert Setup Disk 1 (included with your copy of MS-DOS 6) in drive A label-side up. Then close the drive door or make sure the disk clicks into the drive.

2. Type the following at the command prompt: **a:**

   Note that the command prompt changed to the following: `A:\>`

   This message may appear:

   `Not ready reading drive A`
   `Abort, Retry, Fail?`

   If you see this message, the drive door may not be closed properly. Place the disk label-side up in the disk drive, and then close the drive door or make sure the disk clicks into the disk drive. Then, type **r** for Retry. There must be a floppy disk in the drive that you want to change to.

3. To view a list of the files on the floppy disk in drive A, type the following at the command prompt: **dir**

   A list of the files on the disk appears.

4. Change back to drive C by typing the following at the command prompt:

    c:

When you type a drive letter followed by a colon, you change to that drive. The drive letter that appears in the command prompt shows which drive is the current drive. Unless you specify otherwise, any commands you type are carried out on the current drive and in the current directory. For example, you can view the files on a disk in drive A without switching to drive A by following this procedure.

▶ **To view files on drive A when drive C is current**

●   Type the following at the command prompt: **dir a:**

    A list of the files on the floppy disk in drive A appears, even though your command prompt indicates that drive C is current.

By specifying **a:** after the **dir** command, you are indicating to MS-DOS that **you** want the **dir** command to show the list of files and directories on drive A instead of drive C. The **a:** you typed after the **dir** command is called a parameter. A parameter specifies what a command should act on.

Copying Files

This section describes how to copy a single file and a group of files. To copy a file, you will use the **copy** command. When you use the **copy** command, you must include two parameters: the location and name of the file you want to copy, or the source, and the location to which you want to copy the file, or the destination. You separate the source and destination with a space. The **copy** command follows this pattern: **copy** source destination

Copying a Single File

▶ **To copy the EDIT.HLP file from the DOS directory to the FRUIT directory**

1. Return to the root directory by typing the following at the command prompt: **cd **

2. Change to the DOS directory by typing the following at the command prompt: **cd dos**

3. To copy the EDIT.HLP file from the DOS directory to the FRUIT directory, type the following at the command prompt:

    copy c:\dos\edit.hlp c:\fruit

    The following message appears: 1 file(s) c o p i e d

The command you just typed copied the file from its source to its destination. By specifying C:\DOS\EDIT.HLP as the source, you indicated that MS-DOS would find the source file EDIT.HLP on drive C in the DOS directory. By specifying C:\FRUIT as the destination, you indicated that MS-DOS should place the copy of EDIT.HLP on drive C in the FRUIT directory.

Copying a Group of Files

In this section, you will use wildcards to copy a group of files from the DOS directory to the FRUIT directory. The asterisk (*) wildcard matches any character in that position and all the other positions that follow it. In this section, you will first view a group of files by using wildcards, and then copy the files using wildcards. Before you begin this section, make sure your command prompt looks like the following: C:\DOS>

▶   **To list all tiles ending with the extension .TXT and copy them from the DOS directory to the FRUIT directory by using wildcards**

1. View all the files in the DOS directory that end with the extension .TXT by typing the following at the command prompt: **dir *.txt**

    Note that there is a space before the asterisk (*), but not after it.

    This command lists all files and subdirectories in the current directory that end with the extension .TXT. The asterisk matches the first character of the filename and all other characters that follow it, up to the period (.) that separates the name from the .TXT extension.

2. To copy the files with a .TXT extension to the FRUIT directory, type the following at the command prompt: **copy *.txt c:\fruit**

    This command copies all the files that have the .TXT extension from the current directory (DOS) to the FRUIT directory.

Renaming Files

This section explains how to rename files. To rename a file, you will use the **ren** command. The **ren** command stands for "rename." When you use the **ren** command, you must include two parameters. The first is the file you want to rename, and the second is the new name for the file. You separate the two names with a space. The **ren** command follows this pattern:

ren *oldname newname*

Renaming a File

In this section, you will rename the README.TXT file that you copied into the FRUIT directory. Before you begin this section, make sure your command prompt looks like the following: C:\FRUIT>

▶ **To rename the README.TXT file to PEACH.TXT**

• Type the following at the command prompt: **ren readme.txt peach.txt**

You also can use wildcards to rename a group of files.

Deleting Files

This section explains how to delete, or remove, a file that you no longer want on your disk. To delete a file, you will use the **del** command. The **del** command stands for "delete."

Deleting a File

In this section, you will delete two files using the **del** command. Before you begin, make sure your command prompt looks like the following:

C:\FRUIT>

▶ **To delete the EDIT.HLP file**

1. Delete the EDIT.HLP file by typing the following at the command prompt: **del edit.hlp**

2. To confirm that you deleted the file successfully, type the following at the command prompt: **dir**

   The EDIT.HLP file should no longer appear in the directory list.

Deleting a Group of Files

▶ **To delete files in the current directory that end with the extension .TXT by using wildcards**

1. View all files that end with the extension .TXT by typing the following at the command prompt: **dir *.txt**

   A list of all the files that end with the extension .TXT appears. Make sure that these are the files you want to delete. When you are deleting files by using wildcards, this step is very important. It will prevent you from deleting files accidentally.

2. Delete all files ending with .TXT by typing the following at the command prompt: **del *.txt**

3. To confirm that all the files with the extension .TXT have been deleted, type the following at the command prompt: **dir**

   The FRUIT directory should contain no files.

   Now that the FRUIT directory is empty, you can delete it.

▶ **To delete the FRUIT directory**

1. Return to the root directory by typing the following at the command prompt: **cd **

2. You can see the FRUIT directory in the directory list by typing the following at the command prompt: **dir**

3. Remove the FRUIT directory by typing the following at the command prompt: **rd fruit**

4. To verify that the FRUIT directory has been removed, type the following at the command prompt: **dir**

   The FRUIT directory should not appear in the directory list.

Formatting a Floppy Disk

When you purchase new floppy disks, you must generally format them before you can use them.

Caution Any data already on the disk you format will be erased, so make sure you select a disk that does not contain information you may need later.

▶ **To format a floppy disk**

1. Type the following at the command prompt: **format a:**

   This command specifies that you want to format the disk in drive A. When you press ENTER, the following message appears:

   ```
   Insert new diskette for drive A:
   and press ENTER when ready...
   ```

   If you want to format a disk that fits only in drive B, type **format b: at** the command prompt and insert a disk in drive B when MS-DOS prompts you to do so,

2. Insert the disk you want to format in drive A label-side up. Then close the drive door or make sure the disk clicks into the drive. When you are ready, press ENTER. The following message appears:

   ```
   Checking existing disk format
   Saving UNFORMAT information
   ```

   As it formats the disk, MS-DOS displays the percentage of the disk that has been formatted. When the format is complete, the following message appears:

   ```
   Volume label (11 characters, ENTER for none)?
   ```

3. For this exercise, press ENTER to leave the disk without a label.

4. If you have another disk to format, press Y. If not, press N.

For more information about files, directories, drives, and paths, see the following sections. For more information about the commands discussed in this tutorial, use MS-DOS Help. Instructions for using MS-DOS Help are in the section "Getting Help" later in this chapter.

How MS-DOS Organizes Information

The preceding tutorial introduced the commands you will most often use to find and move information. It also introduced some important terms-file, directory, and drive-that you need to understand to use MS-DOS effectively. This section provides more information about these terms and explains how MS-DOS organizes information.

Files

A file is the primary unit of storage on your computer. A file enables MS-DOS to distinguish one collection of information from another. For example, when you use a word-processing program to write a letter, you store the letter in its own file. Every file has a name, which generally indicates what type of information the file contains.

The files on your computer come from various sources. Some files come with MS-DOS, while others come with applications such as a word processor. These files contain code and other information that is necessary to make your computer and applications run. Before long, there will be hundreds or even thousands of files on your computer. This can make it difficult to locate specific files.

Directories

Storing groups of files in different directories makes files easier to find. For example, all the files that come with MS-DOS are stored in a single directory that is usually named DOS. If you ever need to locate an MS-DOS file, you know where to look. Like files, directories can be created by you or by an application.

The Current Directory

Directories would be hard to use if you didn't know which one you were in. MS-DOS indicates which directory you are in by displaying the directory's name in the command prompt. For example, the following command prompt indicates that you are in the DOS directory: C:\DOS>

The directory you are in is called the current directory. Knowing which directory is current helps you find files and helps you move from one directory to another more easily. You do not have to be in the directory that contains the files you want to use, but the commands you type will be shorter if you are.

Subdirectories

Directories can contain other directories. A directory within another directory is called a subdirectory. By creating subdirectories, you can better categorize your files.

The Root Directory

Strictly speaking, all directories are subdirectories, except for one, which is called the root directory. In this guide, the term subdirectory is used only to emphasize the relationship between two directories. The root directory is the starting point from which all other directories branch out. The root directory does not have a name. Instead, it is represented by a backslash (\). When the root directory is the current directory, the command prompt appears similar to the following: C:\>

This prompt indicates that you are in the root directory of drive C. Because the root directory is the basis for all other directories, you cannot delete it. Avoid unnecessarily storing files in the root directory. There is a limit to the number of files and directories the root directory can hold.

Drives

Just as a directory is a group of files, a drive, which is always represented by a drive letter, is a group of directories. Drives are usually associated with a piece of hardware called a disk. A *disk* is a flat piece of metal or plastic on which data is stored. The most common types of disks are the *hard disk,* which is inside your computer, and the *floppy disk* and *compact disc,* which you insert into a slot either in or next to your computer.

Your first floppy disk drive is drive A. Your second floppy disk drive, if you have one, is drive B. Your hard disk, or at least part of it, is called drive C. The following command prompt indicates that drive C is the current drive and that the root directory, represented by a backslash (\), is the current directory:

C:\>

If the current drive is drive A and the current directory on that drive is SAMPLES, the command prompt would appear similar to the following:

A:\SAMPLES>

If you have more than one hard disk or you use compact (CD-ROM) discs or a network, you will have additional drive letters (D, E, and so on). Every drive, no matter what type it is, has one root directory.

Using Paths to Specify the Location of Files

A path is the course that leads from the root directory of a drive to the file you want to use. For example, to access the LASAGNA.TXT file in the ENTREES directory, MS-DOS must go from the root directory through the RECIPES directory to the ENTREES directory, as shown in the following illustration:
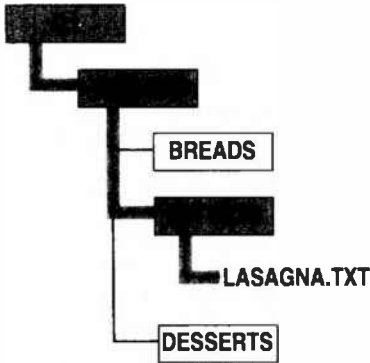
To specify the same path at the command prompt, you would type it as shown in the following illustration:
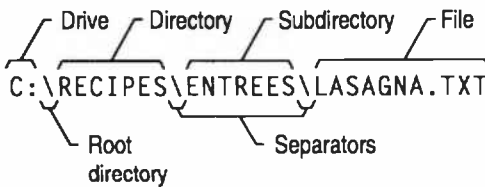
This is the path to the LASAGNA.TXT file. The first letter and colon (C:) represent the drive the file is on. The first backslash (\) represents the root directory. The second backslash separates the RECIPES directory from the ENTREES subdirectory. The third backslash separates the ENTREES sub-directory from the filename, LASAGNA.TXT.

MS-DOS recognizes paths up to 67 characters long (including the drive letter, colon, and backslashes).

Naming Files and Directories

Every file and directory, except for the root directory on each drive, must have a name. The following list summarizes the rules for naming files and directories. File and directory names:

▪ Can be up to eight characters long. In addition, you can include an extension up to three characters long.

▪ Are not case-sensitive. It does not matter whether you use uppercase or lowercase letters when you type them.

▪ Can contain only the letters A through Z, the numbers 0 through 9, and the following special characters: underscore (_), caret (^), dollar sign ($), tilde (~), exclamation point (!), number sign (#), percent sign (%), ampersand (&), hyphen (-), braces ({ }), at sign (@), single quotation mark (`), apostrophe ('), and parentheses (). No other special characters are acceptable.

▪ Cannot contain spaces, commas, backslashes, or periods (except the period that separates the name from the extension).

▪ Cannot be identical to the name of another file or subdirectory in the same directory.

Using Extensions

Most filenames have two parts: the name and the extension. These parts are separated by a period. The name (before the period) can be up to eight characters long and should reflect the contents of the file. The extension (after the period) can be up to three characters long. Extensions can also be used in directory names, but are not commonly used for that purpose.

The following are examples of commonly used extensions for filenames:

▪ .EXE, .COM, or .BAT

These extensions are used for files that contain programs. If you type the name of a file containing one of these extensions at the command prompt, MS-DOS will run the program that the file contains.

▪ .TXT
This extension is commonly used for unformatted text files.

▪ .SYS
This extension is commonly used for device drivers, which are files that enable your computer to communicate with hardware devices.

Many applications name files using an extension that is unique to that application.

Using Wildcards

If you want to carry out a task for a group of files whose names have something in common, you can use **one** or more wildcurds to specify groups of files. MS-DOS recognizes two wildcards: the asterisk (*) represents one or more characters that a group of files has in common, and the question mark (?) represents a single character that a group of files has in common.

You can use wildcards to replace all or part of a file's name or extension. The following table shows examples of wildcards:

Wildcard	What it represents	Examples
*.TXT	All files with a .TXT extension	JULY93.TXT, LASAGNA.TXT
REPORT.*	All files named REPORT with any extension	REPORT.TXT, REPORT.WRI
M*.*	All files beginning with the letter M, regardless of their extension	MEMO.TXT, MARCH.XLS
???.*	All files having 3-letter names, with any or no extension	SUN.BMP, WIN.INI, AUG

You can include multiple wildcards in a command. For example, the following command lists all the files from the current directory: **dir *.***

Getting Help

There are two types of online help for MS-DOS commands: MS-DOS Help, which is a complete online reference for MS-DOS commands, including syntax, notes, and examples; and Command-Line Help, which displays the syntax of a command without leaving the command line.

Using MS-DOS Help

MS-DOS Help provides an online reference to MS-DOS commands. You can start MS-DOS Help in two ways: you can display the table of contents and choose a topic from it; or you can bypass the table of contents and display information about a specific command.

▶ **To start MS-DOS Help and choose a topic from the table of contents**

 1. Type the following at the command prompt: **help**

    The MS-DOS Help table of contents appears.

 2. If you are using a mouse, click the name of the command you want infor-
    mation about. If the command does not appear on your screen, click the
    arrow at the bottom of the scroll bar on the right side of your screen until
    the command comes into view.

    If you are using a keyboard, press the key that represents the first letter of
    the command you want information about. The first command beginning
    with that letter is selected. If this is not the command you want, continue
    pressing the key until the command you want is selected, and then press
    ENTER. You can also u s e the TAB, UP ARROW, DOWN ARROW, PAGE UP,
    and PAGE DOWN keys to move between topics in the table of contents.

▶ **To start MS-DOS Help and display information about**
   a specific command

 • At the command prompt, type **help** followed by a space and the name of
   the command you want information about. For example, for help with the
   copy command, type the following at the command prompt: **help copy**

 Most commands have three associated topics: Syntax, Notes, and Examples.
 When you choose a command from the table of contents or type **help** followed
 by a command name at the command prompt, the Syntax topic appears first. If
 the topic has associated Notes or Examples topics, you can choose those top-
 ics by carrying o u t the following procedure.

▶ **To choose Notes or Examples**

 • If you are using a mouse, click the Notes or Examples button at the top of
   the help screen. If you are using a keyboard, press N for Notes or E for
   Examples. When the cursor is on the Notes or Examples button, press
   ENTER.

 When you are in a Notes or Examples topic, you can return to the Syntax topic
 by using either your mouse or your keyboard.

▶ **To choose Syntax**

 • If you are using a mouse, click the Syntax button at the top of the help
   screen. If you are using a keyboard, press S for Syntax. When the cursor is
   on the Syntax button, press ENTER.

The status bar at the bottom of the MS-DOS Help screen can help you navigate through the Help system.

▪ To return to the MS-DOS Help table of contents, press ALT+C, or choose the <ALT+C=Contents> button with your mouse.

▪ To view the next topic in MS-DOS Help, press ALT+N, or choose the <ALT+N=Next> button with your mouse.

▪ To view topics that were displayed previously, press ALT+B, or choose the <ALT+B=Back> button with your mouse.

For more information about using MS-DOS Help, press Fl.

You can search for a specific string of text in MS-DOS Help by using the Find command on the Search menu. The Find command conducts a full-text search -that is, it searches through all the topics in MS-DOS Help.

▶ **To search for text**

1. From the Search menu, choose Find. The Find dialog box appears.

2. In the Find What box, specify the text you want to search for. If you want to make the search case-sensitive, select the Match Upper/Lowercase checkbox. If you want to find only whole-word occurrences of the search text, select the Whole Word check box.

3. Choose OK. MS-DOS Help searches forward from the cursor position for the first occurrence of the text. When it finds an occurrence of the text you specify, it displays the topic in which the text was found.

4. To find the next occurrence of the search text, press F3.

▶ **To quit MS-DOS Help**

• If you are using a mouse, open the File menu, and then choose the Exit command by clicking its name on the File menu. If you are using a keyboard, press ALT, F, X.

Using Command-Line Help

You can get information about the syntax of a command without starting MS-DOS Help. This information is less detailed than MS-DOS Help, and appears directly at the command prompt.

▶ **To display the syntax of a command**

• At the command prompt, type the name of the command followed by a space and the /? switch. For example, to view the syntax of the **dir** command, type the following at the command prompt   **dir /?**

MS-DOS Shell

MS-DOS Shell provides a visual alternative to the MS-DOS command prompt. **On** a single screen, it can display the drives, directories, files, and applications that are available for you to use.

▶ **To start MS-DOS Shell**

• Type the following at the command prompt.   **dosshell**

A screen similar to the following will appear:
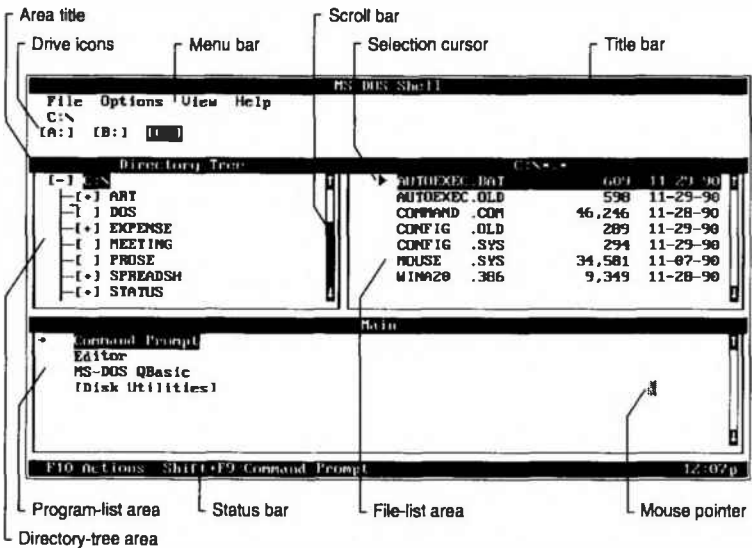
The commands in MS-DOS Shell are listed on menus. The names of these menus are located in the menu bar at the top of the screen.

▶ **To choose MS-DOS Shell commands by using your mouse**

1. In the menu bar, click the name of the menu that contains the command you want to use. The menu opens.

2. Click the name of the command or task you want to carry out.

▶ **To choose MS-DOS Shell commands by using your keyboard**

1. Press the ALT key.

2. Press the first letter in the name of the menu that you want to open. For example, to open the View menu, press v.

3. Press the DOWN ARROW key until the command or task you want to carry out is selected, and then press ENTER. Or press the highlighted letter that appears in the name of the command or task.

▶ **To quit MS-DOS Shell**

  • If you are using a mouse, open the File menu, and then choose the Exit command. If you are using a keyboard, press ALT, F, X.

Using MS-DOS Shell Help

MS-DOS Shell Help provides a quick way to get information about MS-DOS Shell basics and about using menus, commands, dialog boxes, dialog box options, and procedures. When you are using MS-DOS Shell, you can get help in three ways: press F1 for context-sensitive help, select the Help button that appears in most dialog boxes, or use the Help menu.

▶ **For information about MS-DOS Shell Basics**

  • If you are using a mouse, choose Shell Basics from the Help menu. If you are using a keyboard, press ALT, H, S.

A Help window containing information about the basics of using MS-DOS Shell appears. To scroll through the Help window, use the PAGE UP or PAGE DOWN key.

▶ **For information about using MS-DOS Shell Help**

  • If you are using a mouse, choose Using Help from the Help menu. If you are using a keyboard, press ALT, H, U.

A Help window containing information about using MS-DOS Shell Help appears. To scroll through the Help window, use the PAGE UP or PAGE DOWN key.

▶ **To close MS-DOS Shell Help**

  • If you are using a mouse, click the Close button at the bottom of the Help window. If you are using a keyboard, press ESC.

C H A P T E R   3

Managing Your System

MS-DOS 6 includes several programs that you can use to manage and protect your data and improve the performance of your computer. To keep your computer in top working order, you should use these programs on a regular basis.

Backing Up Your Files

Backing up your files safeguards them against loss if your hard disk fails or you accidentally overwrite or delete data. Using Backup, you can return to older file versions, move backed up files off your hard disk, and transfer files easily from one computer to another.

Overview of Backup

MS-DOS 6 includes two backup programs: Backup for MS-DOS, a program you can run from the MS-DOS command prompt, and Backup for Windows, a program you can run from Microsoft Windows. Backup includes extensive online help for commands, procedures, and dialog boxes.

▶   **To get Help**

* Press Fl when Backup displays the screen, window, or dialog box you want more information about.

You can back up your data in three ways: full backup, incremental backup, and differential backup. A *full* backup backs up all the files that you select before starting the backup. An incremental backup backs up only files that have changed since your last full or incremental backup. A *differential backup* backs up only the files that have changed since your last full backup.

For a backup strategy to be effective, you should back up your data in regular cycles. A backup cycle begins when you fully back up your files and includes all subsequent incremental or differential backups. A new backup cycle begins when you perform the next full backup of the same set of files.

Using Setup Files

Before you begin a backup, you must select files, settings, and options. YOU can store these selections in *setup files*. Setup files simplify the backup process by providing a standard set of options that reflect all the selections you made for a particular backup. You can create up to 50 setup files and save them with different names. Backup uses setup files to identify which files to back up and what type of backup to perform.

The DEFAULTSET file contains the default settings that appear in the main screen when you start Backup. The file also contains information that Backup gathered during the compatibility test, such as the size of the disks used in your floppy disk drive(s). If you have not created setup files or you don't specify a setup file, the DEFAULT.SET file is selected in the Setup File text box when you open the Backup dialog box.

For instructions on using setup files, carry out one of the following procedures:

- If you are using Backup for Windows, choose Index from the Help menu. When the index of help topics appears, press the PAGE DOWN key. Under the Miscellaneous section, choose Setup Files.

- If you are using Backup for MS-DOS, choose Index from the Help menu. When the Backup Help Topics screen appears, press the PAGE DOWN key until the Backing Up section comes into view. Under Backing Up, choose Backup Commands and Options. When the Backup Commands and Options screen appears, choose any of the first three topics.

Every full, incremental, or differential backup results in a backup set, which Backup creates and writes to floppy disks or other storage media. You can create any number of backup sets during a backup cycle.

As part of the backup process, Backup creates a backup catalog that contains information about the files you backed up. When you need to restore one or more files, you can load the backup catalog and easily select specific files from a backup set. Backup gives each backup catalog a unique filename. Each character in the catalog's filename contains information about a particular backup set.

Each time you perform a full backup using a specific setup file, Backup creates a *master* catalog. The master catalog keeps track of all the backup catalogs that were created during the backup cycle. When you begin a new backup cycle by performing the next full backup, Backup creates a new master catalog. You use the master catalog if you need to restore a complete backup cycle.

When you back up files, Backup places one copy of the backup catalog on your hard disk and a second copy on the medium that contains your backup set. If you delete the catalog from your hard disk or the catalog on your hard disk is damaged, you can retrieve the catalog from the backup set you created.

Using Backup

This section describes how to start a backup, use setup files, select which files to back up, and select Backup options. The first time you start Backup, you will receive a message about running a compatibility test that Backup uses to adjust to your computer's hardware. Backup program files must be located on your hard disk. You cannot start Backup from a floppy disk.

Note If you want to share backup sets between Norton Backup™ and Microsoft Backup, contact Symantec™ for an updated version of Norton Backup.

▶ **To start a backup by using Backup for MS-DOS**

1. To start Backup for MS-DOS, type the following at the command prompt:

   msbackup

2. Choose the Backup button.

   The following screen appears:
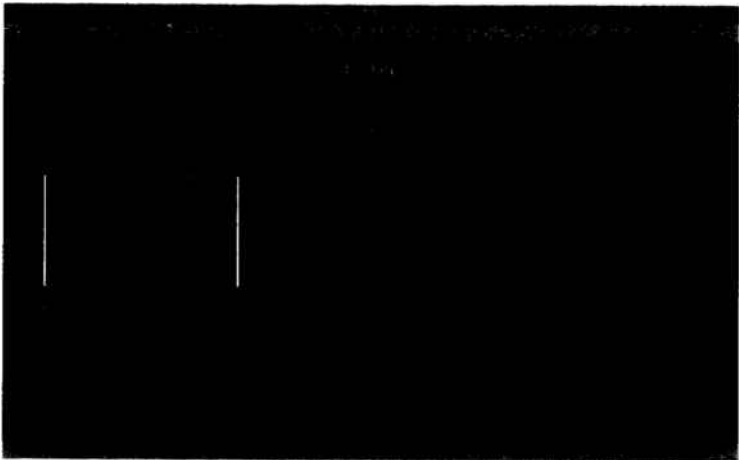
▶ **To start a backup by using Backup for Windows**

● Choose the Backup icon from the Microsoft Tools group in Program Manager. Or choose the Backup command from the Tools menu in File Manager. The following screen appears:
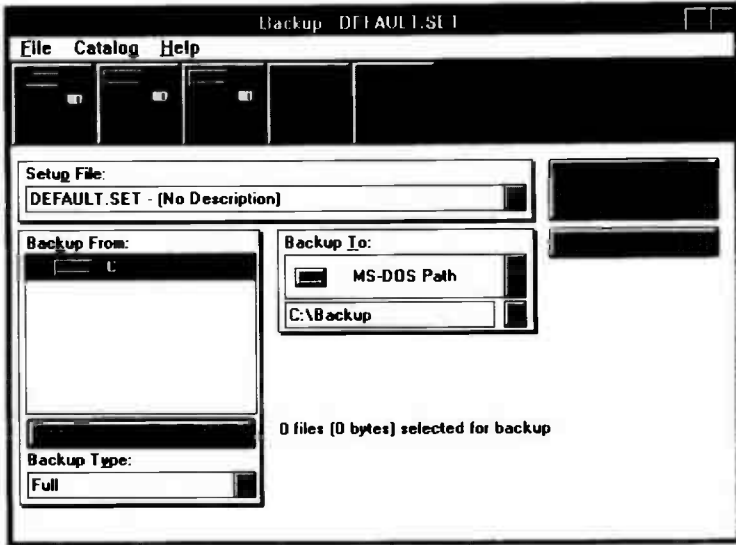
You specify which files Backup should back up by selecting one or more drives and indicating which files on those drives to include or exclude from a backup.

▶ **To back up all the tiles on a drive**

1. In the Backup From box, select the drive that contains the files you want to back up, and then press the SPACEBAR. A message appears stating that Backup is reading disk or directory information. When Backup has completed reading the disk, "All Files" appears next to the drive letter you selected.

2. Repeat step 1 for each drive you want to back up.

▶ **To back up selected directories or files**

1. Choose the Select Files button. The Select Backup Files screen appears.

2. If the drive you want is not displayed, select the correct drive, and then select the directory that contains the tiles you want to backup.

3. To select all the files in the selected directory, press the SPACEBAR.

   To specify some files in a directory, select a file you want to back up, and then press the SPACEBAR. Repeat this until you have selected all the files in the directory that you want to back up. A mark appears next to the directory name and the names of all the files in the directory that you selected.

4. Repeat steps 2 and 3 until you have selected all the files you want to backup. When you finish selecting files, choose OK.

Note If all the files are already selected, you can cancel the selection by pressing the SPACEBAR, or you can return to the previous screen by pressing ESC. The message "All Files" appears after the selected drive letter. Press the SPACEBAR to clear the selection, and then select individual files as described in the previous procedure. You can also deselect files individually or by directory by pressing the SPACEBAR.

You can select groups of files by using the Include, Exclude, and Special buttons on the Select Backup Files screen.

▶ **To select backup options**

1. In the Backup dialog box, choose the Options button. A Backup options dialog box appears.

2. Select the option you want, and then press the SPACEBAR. Repeat this until you have selected all the options you want. A mark appears in the check box beside each option you selected.

3. When you finish selecting Backup options, choose OK.

Configuring Backup

If you change your hardware configuration by adding a new video display adapter, mouse, or disk drive to your computer, you may need to change the configuration of Backup.

Configuring Backup for MS-DOS

If you use Backup for MS-DOS, you can choose video options, mouse options, and backup devices from the Configure dialog box.

▶ **To configure your video display and mouse**

1. From the main screen, choose the Configure button. The Configure dialog box appears.

2. In the Configure dialog box, choose the Video and Mouse button. The Video and Mouse Configuration dialog box appears.

3. Change the configuration of your video display and mouse, as necessary, and then choose OK.

4. To save your configuration changes so they can be used for later backup sessions, choose the Save button in the Configure dialog box. To apply these changes only to your current backup session, choose OK.

▶ **To configure backup devices**

1. From the main screen, choose the Configure button.

2. From the Configure dialog box, choose the Backup Devices button. The Backup Devices dialog box appears.

3. Change the configuration of your backup devices, as necessary, or choose the Auto Config button to configure your backup devices automatically, and then choose OK.

4. To save your configuration changes so they can be used for later backup sessions, choose the Save button in the Configure dialog box. To apply these changes only to your current backup session, choose OK.

Configuring Backup for Windows

If you use Backup for Windows, you can specify the types of floppy disk drives installed on your computer. The changes you make take effect immediately and remain in effect until you quit Backup.

▶ **To configure drives**

1. From the main Backup window, choose the Configure button. A screen similar to the following appears:
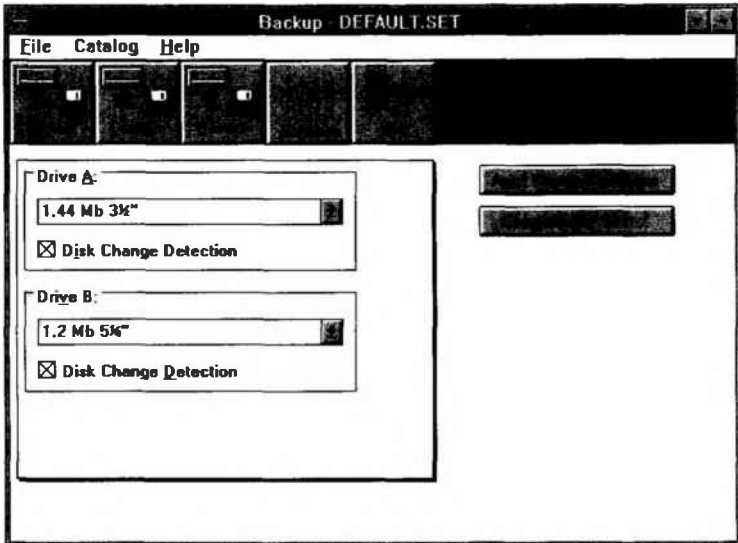
2. If you want Backup to configure your drives automatically, choose the Auto Floppy Configure button. Do not carry out the remaining steps in this procedure.

   If you want to configure drives yourself, select the first drive you want to configure.

3. Open the list box containing drive configurations, and select the configuration you want.

4. If you want to configure another drive, repeat the second half of step 2, and then repeat step 3.

5. To save the configuration for later backup sessions, quit Backup. The Exit Backup dialog box appears. Select the Save Configuration check box, and then choose OK.

Comparing Files

After you back up files, you can use the Compare command to verify that the backup set contains exact copies of the original files on your hard disk. You can compare one file, selected files, or all files in a backup set. For instructions on using Compare, choose the Compare button from the main screen or window, and then press F1.

Restoring Files

Restoring files transfers them from a backup set to the location you specify.

▶   **To restore a backup set**

1. In the main Backup screen, choose the Restore button. If you use Backup for MS-DOS, the following screen appears:

If you use Backup for Windows, the following screen appears:
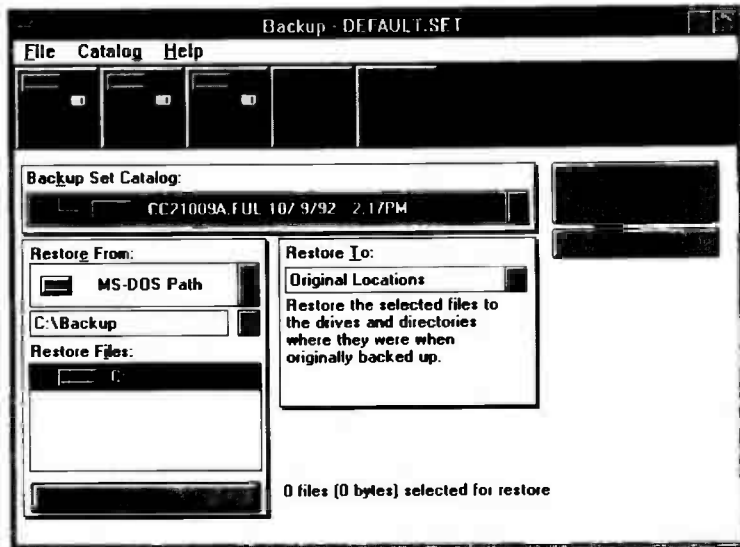
2. To specify the catalog that identifies the backup set you want to restore, open the Backup Set Catalog list box.

If you use Backup for MS-DOS, the Backup Set Catalog dialog box appears. Use the ARROW keys and the SPACEBAR to select the catalog you want to use, and then choose the Load button.

If you use Backup for Windows, a list of available catalogs appears. Select the catalog you want to use and then press TAB.

3. Open the Restore From list box.

If you use Backup for MS-DOS, the Restore From dialog box appears. Select the drive that contains the files you want to restore, and then choose OK. If you select MS-DOS Drive and Path, a text box appears in the main Restore screen. Type the path of the files you want to restore, and then press TAB.

If you use Backup for Windows, a list of drives appears. Select the drive that contains the files you want to restore, and then press TAB. If you select MS-DOS Path, a text box appears under the Restore From list box. Type the path of the files you want to restore, and then press TAB.

4. In the Restore Files box, choose the drive that contains the files you want to restore.

   If you want to restore all files on the drive, press the SPACEBAR. The words "All Files" appear next to the drive letter.

   If you want to restore selected files on the drive, press ENTER. The Select Restore Files screen appears. Select the directory that contains the files you want to restore. Backup displays a list of the files that are in the directory you selected. Select a file you want to restore, and then press the SPACEBAR. Repeat this until you have selected all the files in the directory that you want to restore.

5. To specify the destination for the files you want to restore, open the Restore To list box.

   If you use Backup for MS-DOS, the Restore To dialog box appears. Select the destination for the files you want to restore, and then choose OK.

   If you use Backup for Windows, a list of locations appears. Select the destination for the files you want to restore, and then press TAB.

6. If you want to change Restore options, choose Options. Select or clear the options you want to change, and then choose OK.

7. To start restoring your files, choose Start Restore. Backup displays status information while it restores the files.

If the "DMA buffer size too small" Message Appears

If you have installed Windows or the EMM386 device driver on your computer, Backup for MS-DOS may display the following message when you run the compatibility test or start a backup:

```
DMA buffer size too small. You cannot back up,
compare, or restore files until you increase
the DMA buffer size.
```

If you receive this message while you are running Backup for MS-DOS from within Windows, carry out the following procedure:

▶ **To increase the size of the DMA buffer if you use Windows**

1. Open your SYSTEM.INI file, which is located in your Windows directory, by using any text editor.

2. Find the [386Enh] section of the file, and then add the following line:

   dmabuffersize=32

3. Save the changes to your SYSTEM.INI file, and then quit the text editor.

4. If you are running Windows, quit Windows.

5. Restart Windows.

Protecting Your Computer from Viruses

Computer viruses are programs designed to replicate and spread, sometimes without indicating that they exist. Computer viruses can produce a variety of symptoms on your computer. In extreme cases, viruses can damage files and hard disks.

If a virus infects your computer, you might need a startup disk to restart your computer. It's important to make the disk before your computer is infected by a virus. To create a startup disk, carry out the following procedure.

▶ **To create a startup disk**

1. Insert an unformatted floppy disk in drive A, and then type the following at the command prompt: **format a: /s**

2. Copy the Anti-Virus files to your startup disk by typing the following at the command prompt: **copy msav*.* a:**

   The Anti-Virus files are located in the same directory as your MS-DOS files.

Anti-Virus Help

Anti-Virus includes comprehensive help on dialog boxes, options, and tasks.

▶ **To get Help**

• When an Anti-Virus screen, window, or dialog box appears, press F1.

Scanning for Viruses

Anti-Virus protects your computer from viruses by scanning your computer's memory and disk drives.

▶ **To scan for viruses using Anti-Virus for MS-DOS**

1. Type the following at the command prompt: **msav**

   The Main Menu appears.

2. To scan the drive from which you started Anti-Virus, skip to step 5. To scan a different drive, proceed to step 3.

3. Choose the Select New Drive button. Drive letters appear in the upper-left area of your screen.

4. Select the drive you want to scan. Anti-Virus reads file information on the drive you selected.

5. To detect viruses and remove them from your computer, choose the Detect & Clean button. To detect viruses and have Anti-Virus prompt you if it finds one, choose the Detect button, and then choose the action you want to take.

6. A status screen appears after Anti-Virus has finished scanning your computer's memory and the drive you selected. Choose OK.

▶ **To scan for viruses using Anti-Virus for Windows**

1. From the Microsoft Tools group, choose the Anti-Virus icon. Or, from the Tools menu in File Manager, choose Anti-Virus.

2. When the screen appears, choose the drive in the Drives box you want to scan by clicking it with your mouse or by selecting it with the arrow keys and then pressing the SPACEBAR. Anti-Virus reads file information on the drive you chose.

3. Repeat step 2 for each drive you want to scan.

4. To detect viruses and remove them from your computer, choose the Detect and Clean button. To detect viruses and have Anti-Virus prompt you if it finds one, choose Detect, and then choose the action you want to take.

5. When Anti-Virus completes scanning your computer's memory and the drives you selected, a status screen appears. Choose OK.

Automatically Scanning for Viruses

If you are using Anti-Virus for MS-DOS, you can automatically scan your memory and disk drives for viruses each time you turn on your computer. If you are using Anti-Virus for Windows, you can automatically scan a drive you specify each time you start Anti-Virus.

▶ **To scan automatically using Anti-Virus for MS-DOS**

● To specify that Anti-Virus should scan your computer's memory and drives each time you start your computer, add the following command to your AUTOEXEC.BAT file: **msav /p**

If you use network drives, use the following command to limit scanning to local drives: **msav /p /l**

If your AUTOEXEC.BAT file includes this command, Anti-Virus searches your computer's memory and local drives for viruses each time you start your computer.

▶ **To specify a startup command for Anti-Virus for Windows**

1. From the Microsoft Tools group, select (but do not choose) the Anti-Virus icon.

2. From the Program Manager File menu, choose Properties. The Program Item Properties dialog box appears.

3. In the Command Line box, specify the drive you want Anti-Virus to scan automatically. The drive letter should follow the MWAV.EXE command that is already in the Command Line box. For example, to specify that Anti-Virus should scan drive C, make sure the text in the Command Line box looks like the following: mwav . exe c :

4. Choose OK.

Setting Anti-Virus Options

▶ **To set Anti-Virus options**

1. If you are using Anti-Virus for MS-DOS, choose the Options button from the Main Menu. If you are using Anti-Virus for Windows, choose the Set Options command from the Options menu. An Options dialog box appears.

2. Move to the check box you want to select or clear by pressing TAB.

3. To select or clear the box, press the SPACEBAR.

4. When you have finished setting options, choose OK.

Using VSafe

VSafe is a memory-resident program that constantly monitors your computer for activity that may indicate a virus infection. If VSafe detects suspicious activity, it displays a warning message. VSafe requires 44K of memory.

▶ **To start VSafe**

• Type the following at the command prompt: vsafe

This command loads VSafe into memory using default settings. You can load VSafe into memory every time you start your computer by adding the **vsafe** command to your AUTOEXEC.BAT file.

▶ **To change VSafe options**

1. Press ALT+V. The VSafe Warning Options screen appears.

2. To turn an option on or off, press the number that corresponds to the option.

3. When you have finished specifying the options you want, press ESC. VSafe saves the options you specified.

▶ **To unload VSafe from memory**

1. Press ALT+V. The VSafe Warning Options screen appears.

2. To unload VSafe from memory, press ALT+U. MS-DOS unloads VSafe from memory.

▶ **To set up VSafe and VSafe Manager for Windows**

1. From the File menu in Program Manager, choose Run.

2. In the Command Line text box, type **sysedit,** and then choose OK. The System Configuration Editor appears, with the following files open:

   AUTOEXEC.BAT
   CONFIG.SYS
   WIN.INI
   SYSTEM.INI

3. Add the following command to your AUTOEXEC.BAT file: **vsafe**

4. Add the following command to the **load=** line in the [Windows] section of your WIN.INI file: **mwavtsr.exe**

5. From the File menu, choose Exit, and then choose Yes to save your changes.

6. Quit Windows, and then restart your computer by pressing CTRL+ALT+DEL.

When you add the vsafe command to your AUTOEXEC.BAT file, you can include one or more switches that control how VSafe monitors your computer. For more information, type **help vsafe** at the command prompt.

If you use Windows 3.1, you can add VSafe Manager to the Startup group instead of adding the **mwavtsr.exe** command to the **load=** line in your WIN.INI file. To do this, carry out the following procedure.

▶ **To add VSafe Manager to your Startup group if you use Windows 3.1**

1. Open the Startup group. Then from the File menu, choose New.

2. The New Program Object dialog box appears. Choose OK, and the Program Item Properties dialog box appears.

3. In the Description box, type **VSafe Manager.**

4. In the Command Line box, type **mwavtsr.exe,** and then choose OK.

5. Quit Windows, and then restart your computer by pressing CTRL+ALT+DEL.

Caution   Do not run the MS-DOS 6 or Windows Setup program again unless you unload VSafe from memory.

Troubleshooting Anti-Virus

▶ **To reduce Anti-Virus messages after you upgrade software**

1. Use Anti-Virus to scan the manufacturer's disks before you install the software.

2. Write-protect the installation disks.

3. Install the software.

4. Scan the drive on which you installed the software. Doing so automatically updates Anti-Virus files.

"Virus Found" Message

If Anti-Virus for MS-DOS or Windows finds a virus, it displays a Virus Found dialog box.

When a Virus Found dialog box appears, you have the following options:

■ You can remove the virus from the file and restore the file to its original condition by choosing the Clean button. This minimizes the possibility of the virus infecting other files on your computer.

■ You can ignore the virus and continue scanning the remaining files by choosing the Continue button.

■ You can stop the scan and return to the Anti-Virus program by choosing the Stop button.

■ You can erase the infected file from your computer by choosing the Delete button.

"Verify Error" Message

If you selected the Verify Integrity and Prompt While Detect options, Anti-Virus alerts you when an executable file changes by displaying a dialog box The dialog box provides information about the executable file that changed.

Microsoft Anti-Virus displays information about the following: attribute (R-Read-Only, H-Hidden, S--System, A-Archive), time, date, and size, and checksum.

Anti-Virus offers you the following options:

■ If you know the change is legitimate, choose the Update button to avoid receiving this message during subsequent scans.

■ If the file size or checksum changed, choose the Delete button to delete the infected file.

- If you know about the change but don't want to update Anti-Virus, choose the Continue button.

- If you want to cancel the scan and return to the Anti-Virus screen, choose the Stop button.

"File was destroyed by the virus" Message

If a virus damaged or destroyed a file, Anti-Virus displays a dialog box. If a file is destroyed by a virus, you have the options:

- You can delete the infected file by choosing the Delete button.

- You can ignore the infected file and continue scanning for viruses by choosing the Continue button.

- You can stop the scanning process and return to the Anti-Virus screen by choosing the Stop button.

"invalid Signature - Checksum does not match" Message

If you receive this message, fill out and mail the coupon in the back of this guide.

"Program is trying to modify system memory" Message

If VSafe detects a program that is trying to modify your computer's memory without using standard MS-DOS calls for memory-resident programs, Anti-Virus displays this warning.

Modifying system memory in this way generally indicates that a virus is attempting to infect your computer. However, some network drivers may cause VSafe to display this message when they load.

▶ **If a program is modifying system memory**

1. If you know that a network driver is being loaded alter VSafe was loaded, choose the Continue button. If you do not know what may be causing the memory modification, choose the Stop button.

2. Run Anti-Virus to check for viruses.

"Program is trying to stay resident in memory" Message

If you have selected the Resident option in VSafe and VSafe detects another program trying to load into memory, VSafe displays this warning.

▶ **If a program tries to stay resident in memory**

1. If you are aware that a memory-resident program is being loaded into memory after VSafe was loaded, choose the Continue button. If you do not think a memory-resident program should be loading into memory, choose the Stop button.

2. Run Anti-Virus to check for viruses.

"Program is trying to write to disk" Message

If you select the General Write Protect option in VSafe and a program tries to write to a disk, VSafe displays this warning.

▶ **If a program tries to write to a disk**

1. If you expected the program to write to a disk, choose the Continue button. If you do not think a program should be writing to a disk, choose the Stop button.

2. Run Anti-Virus to ensure that the program trying to write to the disk is not infected.

"Resident programs were loaded after VSafe" Message

If one or more memory-resident programs were loaded after VSafe and you try to remove VSafe from memory, this message appears.

▶ **To remove other memory-resident programs from memory**

1. Choose the Stop button to leave VSafe resident in memory.

2. If possible, remove other memory-resident programs from memory in reverse order of their installation.

3. Remove VSafe from memory.

4. If you can't remove a program from memory, disable the command in your AUTOEXEC.BAT file that loads the program. Then, restart your computer by pressing CTRL+ALT+DEL.

"Since a virus was detected..." Message

When you quit Anti-Virus after it has detected a virus, a warning appears.

▶ **To quit Anti-Virus after a virus is detected**

● When Anti-Virus displays this warning message, choose the Reboot button to restart your system.

"The xxxxxx virus is known to infect DATA files..." Message

If you have not selected the Check All Files option and Anti-Virus detects a virus, a warning message appears.

Miscellaneous Problems

A program doesn't run correctly after a virus has been removed

▶ **To restore a file that doesn't run after a virus is removed**

1. Delete the program file from your computer.

2. Restore a non-infected backup copy of the program file to your computer or install a new file that you've obtained from your software vendor.

Windows does not start

Windows may not start if system files are infected. To detect and remove viruses from Windows system files, run Anti-Virus for MS-DOS.

Pressing ALT+V does not display the VSafe Warning Options screen

The ALT+V key combination works only if you are using Anti-Virus for MS-DOS and VSafe has been loaded into memory. If these conditions are met and you still cannot use the ALT+V key combination, another memory-resident program is probably using it. You can change the key combination that VSafe uses by specifying the /a switch **and** the letter you want to use with the ALT key after the **vsafe** command.

Your computer stops responding when you are using Anti-Virus

If the directory structure on your hard disk is damaged, your computer may stop responding when you use Anti-Virus.

▶ **To repair the directory structure of your hard disk**

1. Quit Anti-Virus. If you cannot quit, restart your computer by pressing CTRL+ALT+DEL.

2. To repair the directory structure, type the following at the command prompt: **chkdsk /f**

3. Run Anti-Virus again.

Using SMARTDrive

SMARTDrive reserves an area in extended memory in which it stores information that it reads from your hard disk. An application can access this information in memory faster than it can access the same information on a hard disk. If your computer can use SMARTDrive, MS-DOS Setup adds the **smartdrv** command to your AUTOEXEC.BAT file when you install MS-DOS.

Using the Defragmenter

Over time, as programs read from and write to your hard disk, information that is stored on the disk can become fragmented. It takes much longer for your computer to read and write fragmented files than it does to read and write unfragmented files.

▶ **To defragment the files on your hard disk**

1. Quit all programs that are running, including Windows. You cannot run the Defragmenter from an MS-DOS prompt within Windows.

2. Check for lost allocation units on your hard disk by typing the following at the command prompt: **chkdsk /f**

   If MS-DOS detects lost allocation units, a prompt similar to the following appears:

   ```
   10 lost allocation units found in 3 chains.
   Convert lost chains to files?
   ```

   Press Y to save the information in the lost allocation units.

3. Start the Defragmenter by typing the following at the command prompt:

   defrag

   The Defragmenter displays a list of the disk drives on your computer.

4. To select the drive you want to defragment, use the UP ARROW or DOWN ARROW key and then press ENTER. The Defragmenter analyzes the data on that drive and recommends a defragmentation option.

5. To begin defragmentation, press ENTER.

   If you want to change defragmentation settings or want more information about the current defragmentation settings before you begin, press TAB to select the Configure button, and then press ENTER. The Optimize menu appears.

Recovering Deleted Files

Undelete includes two undelete programs: Undelete for MS-DOS and Undelete for Windows.

Configuring Delete Protection

Undelete offers three levels of protection: Delete Sentry, Delete Tracker, and standard. Of these, Delete Sentry provides the highest level of protection. It requires a small amount of memory and disk space. Delete Tracker, the next level of protection, requires the same amount of memory, but minimal disk space. The lowest level of protection, standard, requires neither memory nor disk space, but still makes it possible to recover many deleted files. By default, MS-DOS 6 configures your computer for the standard level of delete protection.

▶ **To choose a level of delete protection using Undelete for MS-DOS**

● To choose the Delete Sentry level of protection on your current drive, type the following at the command prompt: **undelete /s**

To choose the Delete Tracker level of protection, include the **/t** switch and the drive you want to protect with the **undelete** command.

▶ **To choose a level of delete protection using Undelete for Windows**

1. Start Undelete for Windows by choosing the Undelete icon from the Microsoft Tools group in Program Manager, or choose the Undelete command from the File menu in File Manager.

2. From the Options menu in Undelete, choose Configure Delete Protection. The Configure Delete Protection dialog box appears. Select a delete protection method, and then choose OK.

3. If you choose Delete Sentry, a dialog box appears. Choose the Drives button. Select the drive(s) you want to protect, and then choose OK. When you finish changing options, choose OK.

   If you choose Delete Tracker, select the drives you want to protect, and then choose OK.

   The Update AUTOEXEC.BAT dialog box appears.

4. To implement the Delete Protection method you selected, choose OK.

   Before the method you selected can take effect, you must quit Windows and restart your computer by pressing CTRL+ALT+DEL.

Undelete for Windows

The successful recovery of deleted files depends on their condition. Files can be in perfect, excellent, good, or fair condition.

This condition	Indicates that the file
Perfect	Was protected by the Delete Sentry method of delete protection and can be recovered without difficulty.
Excellent	Was protected by the Delete Tracker method of delete protection. This file may be partially over-written by other data.
Good	Is fragmented on the disk. Some of the data in this file may be lost.
Poor	Cannot be recovered by using Undelete for Windows. You might be able to recover some data by using Undelete for MS-DOS.
Destroyed	Cannot be recovered.

▶ **To recover a file**

1. Start Undelete by choosing the Undelete icon from the Microsoft Tools group in Program Manager, or choose the Undelete command from the File menu in File Manager.

2. If the file you want to recover does not appear in the list displayed on the screen, choose the Drive/Dir button. Then choose the drive and directory that contained the deleted file.

    The Undelete screen displays files that were deleted from the directory you chose. If the condition of the file you want to recover is Excellent or Perfect, you can easily recover it.

    If the file is in Good condition, see the following section, "Recovering a File in Good Condition," before carrying out the rest of this procedure.

    If the file is in Poor condition, you cannot recover it by using Undelete for Windows. However, you might be able to recover some of the data in the file by using Undelete for MS-DOS.

    If the file is in Destroyed condition, you cannot recover it.

3. Select the file you want to recover, and choose Undelete.

4. If the first letter of the deleted file is a question mark (?), Undelete displays a dialog box prompting you to substitute the correct letter for the question mark. If this dialog box appears, type the missing letter, and then choose OK. The file is listed as Recovered in the Undelete screen.

▶ **To recover a file in Good condition**

1. From the Microsoft Tools group, choose the Undelete icon. The main Undelete screen appears.

2. To select the directory from which you want to recover a deleted file, choose the Drive/Dir button. Select the directory you want by using the arrow keys, and then choose OK.

3. Select the file you want to recover, and then choose Undelete To from the File menu. The Undelete To dialog box appears.

4. Select the drive and directory to which you want to recover the file, and then choose OK.

▶ **To recover a directory**

1. Start Undelete by choosing the Undelete icon from the Microsoft Tools group in Program Manager, or choose the Undelete command from the File menu in File Manager.

2. If Undelete does not list the directory you want to recover, choose the Drive/Dir button. Then choose the drive and directory that contained the directory you want to recover. The deleted directory appears with its file size listed as dir.

3. Select the directory you want to recover, and then choose the Undelete button. If Undelete can find all the parts of the directory, the directory is recovered and appears as Recovered in the Undelete window.

4. If the directory contains the group of files you want to recover, choose the Add button. If not, choose Skip. Undelete displays another group of files

5. Repeat step 4 until you have identified all the groups of files contained in the deleted directory. Then choose Undelete. The directory is recovered and is listed as Recovered in the Undelete screen.

If you cannot find deleted files by using the Change Drive and Directory dialog box, you can search for them by choosing the Find button.

When you select the Delete Sentry method of delete protection, you can specify how many days to save deleted files and a maximum percentage of disk space to allow for Delete Sentry's hidden directory. Delete Sentry files are purged automatically when these limits are reached or when the disk space they occupy is needed by MS-DOS.

When Delete Sentry purges files, it removes the oldest deleted files first. You can also purge deleted files yourself by using Undelete. Purging deleted files creates more room for protecting files, especially when disk space is at a premium.

▶ **To purge files protected by Delete Sentry**

I.   From the Microsoft Tools group, choose the Undelete icon. The main Undelete screen appears.

2.   To select the directory from which you want to purge files, choose the Drive/Dir button. Select the directory you want by using the arrow keys, and then choose OK.

3.   In the Undelete screen, select the files you want to purge. Files protected by Delete Sentry are in Perfect condition.

4.   From the File menu, choose Purge Delete Sentry File. A dialog box appears, prompting you to confirm the deletion.

5.   Choose OK. The selected files disappear from the Undelete screen.

Undelete for MS-DOS

▶ **To recover files**

I.   Make the directory that contained the deleted files current. For example, if the deleted files were in the DOS directory, type the following at the command prompt: **cd \dos**

2.   To recover the files, type the following at the command prompt:

undelete

3.   One by one, MS-DOS lists the deleted files it has found and prompts you to specify whether it should recover them. To recover a file, Press Y. MS-DOS may also prompt you to type the initial letter of a filename.

Using Advanced Undelete Methods

For information about using advanced methods of recovering files or about using **undelete** syntax, type the following at the command prompt:

help undelete

C H A P T E R   4

Configuring Your System

Most of your system's configuration information is stored in two files located in the root directory of your startup disk:

■ Your CONFIG.SYS file is a text file containing commands that configure your computer's hardware components (memory, keyboard, mouse, printer, and so on). When MS-DOS starts, it carries out the commands in your CONFIG.SYS file first.

■ Your AUTOEXEC.BAT file is a batch program that MS-DOS runs immediately after carrying out the commands in your CONFIG.SYS file. Your AUTOEXEC.BAT file contains the commands you want carried out when you start your system.

MS-DOS carries out the commands in both your CONFIG.SYS and AUTOEXEC.BAT files each time you start your computer. You can instruct MS-DOS to bypass the commands in these files if you need to.

When you install MS-DOS 6, MS-DOS Setup creates a basic system configuration that works for most computers. However, you might want to change this configuration. The rest of this chapter explains how to configure your system by using commands in your CONFIG.SYS and AUTOEXEC.BAT files.

Setting Your System's Startup Files

When you start your computer, MS-DOS first carries out the commands in your CONFIG.SYS file, and then carries out the commands in your AUTOEXEC.BAT file. These files are located in the root directory of your startup disk (usually drive C). You can edit your CONFIG.SYS file and AUTOEXEC.BAT as needed to add and change commands that configure your system.

Editing Your CONFIG.SYS and AUTOEXEC.BAT Files

To edit your CONFIG.SYS or AUTOEXEC.BAT file, use a text editor that saves files as unformatted (ASCII) text (for example, MS-DOS Editor).

MS-DOS reads your CONFIG.SYS and AUTOEXEC.BAT files only when you start your computer. Therefore, any time you change these files, you must restart your computer for your changes to take effect.

▶ **To make changes to your CONFIG.SYS or AUTOEXEC.BAT file**

1. Create a startup disk by inserting an unformatted floppy disk in drive A and then typing the following at the command prompt: **format a: /s**

2. Copy your CONFIG.SYS and AUTOEXEC.BAT files to the startup disk you just created by typing the following at the command prompt:

   copy c:\config.sys a:
   copy c:\autoexec.bat a:

3. Use a text editor such as MS-DOS Editor to open the CONFIG.SYS or AUTOEXEC.BAT file. To use MS-DOS Editor, type **edit** followed by the file name at the command prompt.

4. Add or change CONFIG.SYS or AUTOEXEC.BAT commands as necessary. Each command must begin on a separate line.

5. When you finish editing your CONFIG.SYS or AUTOEXEC.BAT file, save your changes and quit the text editor.

6. Remove any disks from your floppy disk drives, and then restart your computer by pressing CTRL+ALT+DEL.

Note   The settings in your CONFIG.SYS and AUTOEXEC.BAT files control basic components of your system. If the changes you made were incorrect, your system might be unable to start correctly. If this happens, insert the startup disk you created in drive A and press CTRL+ALT+DEL.

CONFIG.SYS Commands

The commands in your CONFIG.SYS file load special programs or determine how your hardware should work. A typical CONFIG.SYS file contains some, but not all, of these commands. The following table briefly describes the purpose of each CONFIG.SYS command. For more information, type **help** followed by the command name at the command prompt.

Command	Purpose
break	Specifies whether MS-DOS should check periodically for the CTRL+C or CTRL+BREAK key combination.
buffers	Specifies how much memory MS-DOS reserves for transferring information to and from disks.
country	Sets the language conventions for your system,
device	Loads an installable device driver-a program that controls a hardware component, such as a mouse or memory board.

Command	Purpose
devicehigh	Loads an installable device driver into upper memory.
dos	Specifies whether MS-DOS will use the high memory area (HMA) and whether it will provide access to upper memory blocks (UMBs).
drivparm	Sets the characteristics of a disk drive
files	Specifies how many files can be open at a time.
install	Loads a memory-resident program (also called a terminate-and-stay-resident program, or TSR).
lastdrive	Sets the number of valid drive letters.
numlock	Specifies whether the NUM LOCK setting of the numeric keypad is initially on or off.
rem or ;	Indicates that the text that follows is a descriptive remark, not a command.
set	Sets the value of environment variables such as PROMPT or TEMP.
shell	Configures COMMAND.COM or specifies that a command interpreter other than COMMAND.COM should be used.
stacks	Specifies how much memory to reserve for processing hardware interrupts.
switches	Specifies special options in MS-DOS.

Your CONFIG.SYS file can also contain the **include, menucolor, menudefault, menuitem,** and **submenu** commands.

Configuring Hardware Devices

Each of your computer's hardware components is called a device. Your computer's keyboard, mouse, monitor, printer, disk drives, and memory boards are all devices. MS-DOS uses a program called a device driver to control each device. MS-DOS has built-in device drivers for your keyboard, monitor, hard and floppy disk drives, and communication ports. You can customize certain features of these device drivers by using CONFIG.SYS commands.

Other devices, such as a memory board or a mouse, come with installable device drivers, so called because you install them by adding commands to your CONFIG.SYS file. MS-DOS comes with the following installable device drivers. For more information, type **help** followed by the device-driver name at the command prompt.

Driver	Purpose
ANSI.SYS	Supports American National Standards Institute (ANSI) terminal emulation.
DISPLAY.SYS	Supports code-page switching for monitors.
DBLSPACE.SYS	Causes MS-DOS to move DBLSPACE.BIN to its final location in memory.
DRIVER.SYS	Creates a logical drive that you can use to refer to a physical floppy disk drive.
EGA.SYS	Saves and restores the display when MS-DOS Shell Task Swapper or Windows is used with an EGA monitor.
EMM386.EXE	Simulates expanded memory and provides access to the upper memory area on a computer with an 80386 or higher processor with extended memory.
HIMEM.SYS	Manages the use of extended memory on a computer with an 80286 or higher processor and extended memory.
RAMDRIVE.SYS	Simulates a hard disk drive by creating a virtual disk drive in your system's random access memory (RAM).
SETVER.EXE	Loads the MS-DOS version table into memory.
SMARTDRV.EXE	Performs double buffering for hard-disk controllers that cannot work with memory provided by EMM386 or Windows running in 386 enhanced mode.

Determining the Order of CONFIG.SYS Commands

Most CONFIG.SYS commands can appear in your CONFIG.SYS file in any order. The order of the **device** and **devicehigh** commands is important, however, because some device drivers enable devices that are needed by other drivers. For example, the HIMEM.SYS extended-memory driver must be loaded before any drivers that use extended memory.

The following list shows the order in which device drivers should appear in your CONFIG.SYS file:

1. HIMEM.SYS, if your computer has extended memory.

2. Your expanded-memory manager, if your computer has an expanded-memory board.

3. EMM386.EXE, if your computer has an 80386 processor and extended memory.

4. Any other device drivers.

Sample CONFIG.SYS File

The following is a typical CONFIG.SYS file for an 80386 computer with two or more megabytes of extended memory:

```
device-c:\dos\setver.exe
device=c:\dos\himem.sys
device=c:\dos\emm386.exe   ram
devicehigh=c:\mouse\mouse.sys
buffers=20
files-40
break-on
dos=high,umb
```

In this example:

■ The **device** commands load the SETVER.EXE, HIMEM.SYS, and EMM386.EXE device drivers. The SETVER.EXE driver manages the MS-DOS version table. The HIMEM.SYS driver manages extended memory. **The ram** switch directs the EMM386.EXE driver to provide access to the upper memory area and simulate expanded memory.

■ The **devicehigh** command loads the MOUSE.SYS device driver, which provides access to the mouse, into upper memory.

■ The **buffers** command reserves 20 buffers for transferring information to and from disks.

■ The **files** command gives MS-DOS access to 40 files at one time.

■ The **break** command checks frequently for the CTRL+C or CTRL+BREAK key combination.

■ The **dos=high, umb** command runs MS-DOS in the high memory area and gives programs access to the upper memory area.

AUTOEXEC.BAT Commands

A batch program is a text file that contains a series of commands. Your
AUTOEXEC.BAT file is a special batch program that runs every time you
start your computer. The following batch commands are commonly used in an
AUTOEXEC.BAT file. For more information, type **help** followed by the
command name at the command prompt.

Command	Purpose
prompt	Sets the appearance of your command prompt.
mode	Sets the characteristics of your input and output ports.
path	Specifies the directories that MS-DOS should search for executable files and the order in which the directories should be searched.
echo off	Directs MS-DOS not to display the commands in your batch file as they run.
set	Creates an environment variable that programs can use.

Another common use of the AUTOEXEC.BAT file is to start memory-resident
programs, also called terminate-and-stay-resident (TSR) programs, such as:

Command	Purpose
doskey	Provides keyboard shortcuts you can use at the command prompt.
vsafe	Monitors your system for the presence of viruses.
smartdrv	Speeds up access to your hard disk.

After MS-DOS finishes running all the commands in your AUTOEXEC.BAT
file, it displays the command prompt. (If your AUTOEXEC.BAT file starts
MS-DOS Shell, Microsoft Windows, or another program, you will see that
program's interface instead.)

Sample AUTOEXEC.BAT File

This sample AUTOEXEC.BAT file contains some commonly used
commands:

```
path   c:\;c:\dos;c:\utility;c:\batch
prompt $t$_$p$g
set  temp=c:\temp
doskey
smartdrv
```

In this example:

■ The **path** command directs MS-DOS to search for program files in the current directory and then in the following directories: the root directory of drive C, the C:\DOS, C:\UTILITY, and C:/BATCH directories. A semicolon (;) separates the names of the directories.

■ The **prompt** command sets the command prompt so that it shows the current time, drive and directory, followed by a greater-than sign (>).

■ The **set temp** command creates an environment variable named TEMP and sets it equal to the directory C:\TEMP. (The name you specify must be the name of an existing directory.) Many programs, including MS-DOS, use this variable when storing temporary files.

■ The **doskey** command loads the Doskey program into memory.

■ The **smartdrv** command loads the SMARTDrive program into memory.

Bypassing CONFIG.SYS and AUTOEXEC.BAT Commands

You can start your computer without running the commands in your CONFIG.SYS and AUTOEXEC.BAT files if you are experiencing problems that might be related to the settings in those files. You can bypass startup commands in the following ways:

■ You can bypass all the commands in both your CONFIG.SYS and AUTOEXEC.BAT files.

■ You can prevent MS-DOS from carrying out specific CONFIG.SYS commands and specify whether or not MS-DOS should run the AUTOEXEC.BAT file.

■ You can have MS-DOS prompt you to confirm a particular CONFIG.SYS command every time your computer starts. To do this, insert a question mark (?) after the command name but before the equal sign (=).

Completely Bypassing Your Startup Files

If you are having problems related to commands in your CONFIG.SYS or AUTOEXEC.BAT files, you might want to temporarily bypass both files.

▶ **To bypass your CONFIG.SYS and AUTOEXEC.BAT files**

1. Start or restart your computer. After your computer starts, MS-DOS displays the following text: `Starting MS-DOS...`

2. While the text is on your screen, press and release the F5 key or press and hold down the SHIFT key.

Your computer will start with a basic configuration instead of your usual configuration:

- MS-DOS might display the message "Bad or missing command inter-preter" and prompt you to specify the path to the COMMAND.COM file. Type the full path to the file and then press ENTER.

- MS-DOS will not load installable device drivers. As a result, any device that requires an installable device driver will not work.

- MS-DOS will set environment variables to their default values. The command prompt might not appear the way it usually does; it will display the current drive and directory. The search path will be set to C:\DOS.

Confirming Each CONFIG.SYS Command

If you are having problems that you suspect are related to a specific CONFIG.SYS command, you might want to have MS-DOS prompt you to confirm each command when your computer starts.

▶ **To confirm each CONFIG.SYS command**

1. Start or restart your computer. After your computer starts, MS-DOS displays the following text: `Starting MS-DOS...`

2. While the text is on your screen, press and release the F8 key.

   MS-DOS displays each command in your CONFIG.SYS file followed by a prompt. To carry out the current command, press Y. To bypass that command, press N. To carry out all remaining startup commands, press ESC. To bypass all remaining startup commands, press F5.

3. When MS-DOS finishes processing the CONFIG.SYS file, you will see the following prompt: `Process AUTOEXEC.BAT [Y, N]?`

   To carry out all the commands in your AUTOEXEC.BAT file, press Y. To bypass your AUTOEXEC.BAT file completely, press N.

Using Multiple Configurations

A single CONFIG.SYS file can define several different system configurations. The following provides an overview of the procedures for defining multiple configurations:

1. Define a startup menu in your CONFIG.SYS file.

2. Create a configuration block in your CONFIG.SYS file for each configuration you want. A configuration block is a labeled set of CONFIG.SYS commands that are carried out when the label is chosen from the startup menu.

3. You can also **use** batch commands such as **if** and goto to create conditional branches in your AUTOEXEC.BAT file.

Example: Defining Multiple Configurations

The following example shows the basic structure of a CONFIG.SYS file that defines a startup menu and two different configurations.

```
[menu]
menuitem=Green
menuitem-Orange

[green]
files=40
device=c:\device1.sys

[orange]
files=10
device=c:\device2,sys
```

In this example:

■ The first configuration block defines the choices that will appear on the startup menu. This startup menu contains two items, Green and Orange. Each menu item refers to a different configuration block.

■ When the computer starts with the Green configuration, MS-DOS sets the value for files to 40 and loads the DEVICE1.SYS device driver.

■ When the computer starts with the Orange configuration, MS-DOS sets the value for files to 10 and loads the DEVICE2.SYS device driver.

When the computer starts with this CONFIG.SYS file, the following menu appears:

```
MS-DOS 6 Startup Menu

1. Green
2. Orange

Enter a choice: 1
```

If you choose Green from this menu, MS-DOS runs the [green] configuration block: if you choose Orange, MS-DOS runs the [orange] configuration block.

Defining a Startup Menu

You must first define a startup menu by creating a configuration block with the block heading **[menu]**. The following table lists the commands a menu block can contain. For more information, type **help** followed by the command name at the command prompt.

Command	Purpose
menuitem	Defines a menu item. The command specifies the configuration block associated with that item and, optionally, the menu text for that item.
menudefault	Specifies the default menu item. This command is optional; if the **[menu]** block does not contain a **menudefault** command, the default is set to item 1.
menucolor	Sets the text and background colors for the menu.
submenu	Specifies a menu item that displays another set of choices. The command specifies another menu block that defines the choices on the submenu.
numlock	Specifies whether the NUM LOCK setting on the numeric keypad is initially set to ON or OFF.

Example: Defining a Sample [Menu] Block

The following is a sample **[menu]** block:

```
[menu]
menuitem-Net, Start the network
menuitem-No-Net, Do not start the network
menucolor=15,1
menudefault-Net
```

In this example:

- The two **menuitem** commands define the items that will appear on the menu. The first **menuitem** value, "Net," specifies the name of the associated configuration block. The second value specifies the menu text, "Start the network." If you don't specify any menu text, MS-DOS uses the name of the configuration block.

- The **menucolor** command sets the text color to 15 (bright white) and the background color to 1 (blue).

- The **menudefault** command specifies [net] as the default configuration.

Defining Configuration Blocks

A configuration block is a set of CONFIG.SYS commands to be run when a particular configuration is selected from the startup menu. A configuration block begins with a block header-the block name surrounded by brackets. The block name must be a single word, but can be as long as you want. A configuration block can contain any CONFIG.SYS command. The following commands can be particularly useful in configuration blocks. For more information, type **help** followed by the command name at the command prompt.

▪ The **set** command sets the value of an environment variable. This command can be used to set unique values for each configuration.

▪ **The include** command directs MS-DOS to carry out the commands in another configuration block as well as the commands in the current block.

Commands common to all configuration blocks can be placed in a block named **[common].** You might want to place a **[common]** block at the end of your CONFIG.SYS file, even if the block doesn't contain any commands. You can use as many **[common]** blocks as you want. MS-DOS runs **[common]** commands in the order in which they appear.

Example: Using [Common] Blocks

The following CONFIG.SYS file defines two configurations and includes several commands that are common to both:

```
[menu]
menuitem-Steve
menuitem-Lisa

[common]
dos-high
buffers-15
device=c:\dos\himem.sys

[steve]
files-20
device=c:\dos\emm386  2048

[lisa]
files-40
device=c:\net\network.sys

[common]
```

This CONFIG.SYS file configures the computer two ways. For both configurations, MS-DOS carries out the three commands in the first **[common]** block: **dos=high, buffers=15,** and **device=c:\dos\himem.sys.** In this case, the **[common]** block appears first because it contains the HIMEM.SYS command, which must be loaded before other commands. The **[common]** block at the end is for commands that might be added when you install applications.

Modifying Your AUTOEXEC.BAT File for Multiple Configurations

You can direct MS-DOS to carry out different AUTOEXEC.BAT commands for each configuration by using the batch commands **if** and **goto.** When a configuration is selected from the startup menu, MS-DOS defines an environment variable named CONFIG and sets it to the name of the selected configuration block. In your AUTOEXEC.BAT file, you can use the **goto** command to have MS-DOS carry out different sets of commands for different CONFIG values.

▶ **To define multiple configurations in your AUTOEXEC.BAT file**

1. Insert the following command after any commands you want MS-DOS to carry out for all configurations in your AUTOEXEC.BAT file:

   got0 %config%

2. Add labels to your AUTOEXEC.BAT file before the groups of commands for each configuration. Labels must match the names of the corresponding configuration blocks in your CONFIG.SYS file. For example, you would insert the following label before the group of commands for the [steve] configuration: **:steve**

3. Insert the following label at the end of your AUTOEXEC.BAT file: **:end**

4. After the group of commands for each configuration, add the following command: **goto end**

   This command directs MS-DOS to the line marked by the **:end** label. Any commands appearing after that line are carried out for both configurations.

Example: Using the Goto Command with the CONFIG Variable

The following AUTOEXEC.BAT file uses the **goto** command with the CONFIG variable to carry out different sets of commands:

```
c:\dos\smartdrv.exe
set  temp-c:\temp
c:\dos\msav
; Go to the section that matches the current
; value of the CONFIG variable
got0  %config%
```

```
:Steve
path   c:\dos;c:\deskpub;c:\typeset
c:\mouse\mouse.com
deskpub
;  now skip Lisa's section and go to end
goto end
:Lisa
path=c:\dos;c:\network;c:\utility
doskey
net logon lisa /y
goto end
:end
```

When MS-DOS runs this AUTOEXEC.BAT file, it starts SMARTDrive, sets the TEMP environment variable, and starts the MS-DOS Anti-Virus program. MS-DOS then goes to the section that matches the value of the CONFIG variable.

If the name of the selected configuration is "Steve," MS-DOS goes to the Steve section. It then sets the search path for Steve, loads the MOUSE.COM program from the C:\MOUSE directory, and runs the desktop publishing pro-gram. The goto **end** command instructs MS-DOS to skip to the line marked by the **:end** label, bypassing the commands in the Lisa section.

If the current configuration is "Lisa," the PATH variable is set differently, MS-DOS runs the Doskey program, and a **net logon** command reestablishes Lisa's persistent network connections.

C H A P T E R 5

Freeing Disk Space

You can make more disk space available by deleting unnecessary files and by using DoubleSpace to compress the data on your hard disk.

Deleting Unnecessary Files

To delete unnecessary files, use the **del** command. Use the following guide-lines to decide which files to delete:

■ Delete any temporary files created by your programs. Some programs store temporary files in a directory specified by the TEMP environment variable. To determine whether your computer has a directory designated for temporary files, type set at the command prompt, and then check the value that MS-DOS displays for the TEMP variable.

Periodically delete any files in the directory specified by the TEMP environment variable. To avoid deleting a temporary file that is currently in use, quit all programs (including Windows and MS-DOS Shell) before deleting files in the directory specified by the TEMP variable.

■ If you haven't used a file in a long time, consider copying it to a floppy disk and then deleting it from your hard disk.

■ If you are sure you will not need to restore your previous version of DOS, you can delete the OLD_DOG.x directory by typing **deloldos** at the com-mand prompt, and then following the instructions on your screen.

■ As a last resort, delete some MS-DOS files that you do not plan to use.

Caution Never delete the files COMMAND.COM, IO.SYS, MSDOS.SYS, or any file that has a name beginning with "DBLSPACE." If you delete any of these files, you might lose data or your system might not start.

Use the following table to determine which MS-DOS files you can delete.

Filename(s)	Description	When to delete
APPEND.EXE	Enables programs to open data files as if they were in the current directory	If you do not plan to use the **append** command
NLSFUNC.EXE, KEYB.COM, *.CPI, COUNTRY.SYS, DISPLAY.SYS, KEYBOARD.SYS	Provide international and character-set support	If you do not need inter-national (foreign lan-guage) support
RAMDRIVE.SYS	RAMDrive memory-disk program; speeds up your system	If you do not need a RAM disk, or if your computer has only con-ventional memory
DOSSHELL.* *.VID	The MS-DOS Shell program.	If you do not plan to use MS-DOS Shell
POWER.EXE	Conserves battery power on a laptop computer	If your computer is not a laptop
INTERLNK.*, INTERSVR.*	Connect two computers via parallel or serial ports so that they can share disks and printer ports	If you do not plan to use the Interlnk program
EMM386.EXE, MEMMAKER.*, SIZER.EXE, CHKSTATE.SYS	Manage and optimize memory on an 80386 or higher computer	If your computer is not an 80386 or higher, or if it has no extended memory
SMARTDRV.EXE	SMARTDrive disk-caching program; speeds up your system	If your computer does not have a hard disk, or extended memory

Using Chkdsk to Free Disk Space

You can use the **chkdsk /f** command to recover lost allocation units that are taking up space on your hard disk. An allocation unit is the smallest part of a hard disk that can be allocated to a file. Allocation units can get lost when a program unexpectedly stops running without saving or deleting temporary files properly. Over time, lost allocation units can accumulate and take up disk space.

When you use the **/f** switch with the **chkdsk** command, **chkdsk** converts lost allocation units to files that have a .CHK extension. You can then examine and delete these .CHK files.

▶ **To recover lost file allocation units**

1. Quit all running programs.

2. Change to the hard disk you want to check.

3. Type **chkdsk /f** at the command prompt, and press ENTER. Then type Y at the prompt.

4. The Chkdsk program converts any lost file allocation units to files with filenames such as FILE0000.CHK. It stores these files in your root directory.

5. To examine the contents of .CHK files, use the **more** command. Delete any .CHK files you don't want by using the **del** command.

Increasing Disk Space by Using DoubleSpace

DoubleSpace frees space on hard and floppy disks by compressing the data that is on them. After you set up DoubleSpace, you can maintain your compressed drives by using the full-screen DoubleSpace maintenance program or by typing commands at the MS-DOS command prompt.

Getting Help

DoubleSpace includes extensive online help for commands, dialog boxes, and procedures. DoubleSpace Help provides explanations of important DoubleSpace concepts. For more information, choose Index from the Help menu.

▶ **To get Help while running DoubleSpace**

• Press F1 when a DoubleSpace screen, dialog box, or error message appears.

▶ **To get Help about the dblspace command**

• Type **help dblspace** at the command prompt.

Setting Up DoubleSpace

When you run DoubleSpace for the first time, the DoubleSpace Setup program starts. DoubleSpace Setup compresses the data on the drive you select.

During DoubleSpace Setup, you can select either Express Setup or Custom Setup. To compress the existing files **on** drive C and have DoubleSpace determine the compression settings for you, choose Express Setup. To compress a hard disk drive other than drive C, or to use the empty space on an existing drive to create a new compressed drive, choose Custom Setup.

▶ **To install DoubleSpace by using Express Setup**

1. Quit all running programs (including Windows or MS-DOS Shell).

    If you use a network, start the network software and connect to any drives you usually use.

2. Type the following at the command prompt: **dblspace**

3. When the Welcome screen appears, press ENTER. DoubleSpace displays a screen that prompts you to choose between Express and Custom Setup.

4. Choose Express Setup by pressing ENTER. DoubleSpace displays a confirmation screen that estimates the amount of time it will take to compress drive C.

5. To compress drive C, press C. DoubleSpace defragments and compresses drive C. This process can take from several minutes to several hours, depending on the speed of your hard disk and processor and the amount of data your hard disk contains. During the compression process, DoubleSpace Setup restarts your computer twice. A final screen shows how long the compression process took and how much free space your new drive contains.

6. To quit DoubleSpace after it has compressed drive C, press ENTER.

After you set up DoubleSpace, your computer's drives will be configured differently:

■ Drive C will be compressed and will contain more free space than it did before. You will use drive C just as you did before you set up DoubleSpace.

■ Your computer will have a new drive that is not compressed. This drive is used to store files that must remain uncompressed, such as IO.SYS, MSDOS.SYS, DBLSPACE.BIN, DBLSPACE.INI, and DBLSPACE.000.

Caution Do not tamper with the hidden files on the new drive. If you change or delete these files, you might lose all files on drive C.

▶ **To install DoubleSpace by using Custom Setup**

1. Quit all running programs (including Windows or MS-DOS Shell).

    If you use a network, start the network software and connect to any drives you usually use.

2. Type the following at the command prompt: **dblspace**

3. When the Welcome screen appears, press ENTER. DoubleSpace displays a screen that prompts you to choose between Express and Custom Setup.

4. Select Custom Setup by pressing the DOWN ARROW key, and then press ENTER.

5. Select the compression method you want by pressing the UP ARROW or DOWN ARROW and then press ENTER. If your computer has more than one hard disk drive, DoubleSpace displays a list of drives. Select the drive you want to compress, and then press ENTER. DoubleSpace displays a screen that shows the default compression settings.

6. If necessary, change the compression settings to suit your needs. When all the settings are correct, press ENTER to continue DoubleSpace.

7. To begin the compression process, press C. DoubleSpace carries out the compression process with the settings you specified. This process can take from several minutes to several hours, depending on the speed of your hard disk and processor, the amount of data your hard disk contains, and whether you chose to compress existing data or create a new compressed drive. During the compression process, DoubleSpace Setup restarts your computer twice. A final screen shows how long the compression process took and how much free space your new drive contains.

8. To quit DoubleSpace after it has compressed the drive or free space you selected, press ENTER.

After you set up DoubleSpace, your computer's drives will be configured differently. The results differ, depending on whether you chose to compress an existing drive or create a new compressed drive.

Caution   Do not tamper with the hidden files on the new drive. If you change or delete these files, you might lose all files on drive C.

If you chose "Compress an existing drive" during Custom Setup:

- The drive you selected will be compressed and will contain more free space than it did before. You will use the compressed drive just as you did before you set up DoubleSpace.

- Your computer will have a new drive that is not compressed. This drive is used to store files that must remain uncompressed, such as IO.SYS, MSDOS.SYS, DBLSPACE.BIN, DBLSPACE.INI, and DBLSPACE.000.

If you chose "Create a new compressed drive" during Custom Setup:

- Your computer will have a new compressed drive that is currently empty.

- The drive that contained the free space you used to create the new compressed drive will contain less free space than it did before. This space is now being used by your new compressed drive.

Using DoubleSpace to Manage Compressed Drives

To maintain or modify compressed drives or to create additional compressed drives, use the DoubleSpace maintenance program. You can also manage compressed drives from the command prompt by using switches with the **dblspace** command. For more information, type **help dblspace.**

▶ **To start the DoubleSpace program**

• Type **dblspace** at the command prompt.

DoubleSpace starts and displays the main DoubleSpace screen, which lists your existing compressed drives. From this screen, you can carry out the following tasks:

▪ Work with a compressed drive. To do this, select the drive by clicking it with your mouse or by pressing the UP ARROW or DOWN ARROW key until the drive you want is selected. Then, choose the command you want from the Drive or Tools menu.

▪ Compress an existing drive. To do this, choose the Existing Drive command from the Compress menu. Use this command to compress files on a hard disk drive or floppy disk.

▪ Add a new compressed drive. You can create a new compressed drive by using free space on an existing drive; to do this, choose the Create New Drive command from the Compress menu.

The Drive menu includes commands you can use to work with the selected drive. The following table describes the commands on the Drive menu.

Command	Purpose
Info	Displays the Compressed Drive Information dialog box, which displays information about the selected drive. You can also display the Compressed Drive Information dialog box by double-clicking the name of the drive or by pressing ENTER. when the drive is selected.
Change Size	Enlarges or reduces the size of the selected drive.
Change Ratio	Changes the estimated compression ratio of the selected drive.
Mount	Establishes a connection between a compressed volume file and a drive letter, so you can use the files the CVF contains.
Unmount	Breaks the connection between the selected drive's compressed volume file and its drive letter. Unmounting a drive makes it temporarily inaccessible.

Command	Purpose
Format	Formats the selected compressed drive. Like formatting an uncompressed drive, formatting a compressed drive deletes all the files it contains.
Delete	Deletes the selected compressed drive and the associated compressed volume file. Deleting a compressed drive erases it and all the files it contains.
Exit	Quits the DoubleSpace program.

The Compress menu contains commands you can use to create additional compressed drives or to compress floppy disks.

The Tools menu includes commands you can use to maintain compressed drives. The following table describes the commands on the Tools menu.

Command	Purpose
Defragment	Defragments the selected compressed drive. Defragmenting a compressed drive consolidates the free space on it.
Chkdsk	Checks the structural validity of the selected compressed drive.
Options	Displays the DoubleSpace Options dialog box, in which you can specify the last drive letter you want DoubleSpace to use. You can also specify the number of additional drives you want to be able to mount after you start your computer.

Compressing Additional Drives

You can use DoubleSpace to compress the files on existing hard disk drives, floppy disks, or other removable media.

Note DoubleSpace cannot compress a drive that is completely full. Before compressing a hard disk drive, make sure it contains at least 1 MB of free space. A floppy disk must contain at least .65 MB of free space.

▶ **To compress an existing drive**

1. In the main DoubleSpace screen, choose the Existing Drive command from the Compress menu. (If you are compressing a floppy disk or other removable media, make sure it is formatted and is in the drive before you choose the Existing Drive command.) DoubleSpace scans your computer and then displays a list of drives that can be compressed.

2. Select the drive you want to compress by pressing the UP ARROW or DOWN ARROW key, and then press ENTER. A screen appears, giving you the opportunity to change the settings DoubleSpace will use to compress the drive. DoubleSpace displays a confirmation screen stating that it is ready to compress the drive.

3. Change the settings as needed. For more information about changing settings, press F1. When you have finished changing settings, press ENTER. A confirmation screen appears.

4. To compress the drive, press c. DoubleSpace defragments and compresses the selected drive, and then restarts your computer so your new drive configuration can take effect.

▶ **To convert free space into a new compressed drive**

1. From the main DoubleSpace screen, choose the Create New Drive command from the Compress menu. DoubleSpace scans your computer and then displays a list of uncompressed drives that contain free space.

2. Select the drive that contains the space you want to use, and then press ENTER. A screen appears, giving you the opportunity to change the settings DoubleSpace will use when it creates the new compressed drive.

3. Change the settings as needed. For more information about changing settings, press F1. When you have finished changing settings, press ENTER. A confirmation screen appears.

4. To create the new compressed drive, press C. DoubleSpace creates the new compressed drive, and then updates the list of drives on the main DoubleSpace screen to include the new compressed drive.

Using DoubleSpace with Floppy Disks

Compressing a floppy disk is similar to compressing a hard disk drive.

Note Make sure the floppy disk is formatted and has at least .65 MB of free space. DoubleSpace cannot compress a 360K disk, an unformatted disk, or a disk that is completely full.

▶ **To compress a floppy disk**

1. Insert a formatted disk in a floppy disk drive.

2. In the main DoubleSpace screen, choose the Existing Drive command from the Compress menu. DoubleSpace scans your computer and then displays a list of drives that can be compressed.

3. Select the drive that contains the floppy disk you want to compress by pressing the UP ARROW or DOWN ARROW key, and then press ENTER. DoubleSpace displays a confirmation screen stating that it is ready to compress the drive you selected.

4. To compress the floppy disk, press C. DoubleSpace defragments, compresses, and mounts the floppy disk, and then updates the list of drives on the main DoubleSpace screen to include the newly compressed disk.

In general, you use a compressed floppy disk just as you would a normal floppy disk. The main difference is that you must mount a compressed floppy disk before you can use it. When you first compress a floppy disk, DoubleSpace mounts it for you. However, if you change floppy disks or restart your computer, you must remount the floppy disk before you can use it again.

Note Before it is mounted, a compressed floppy disk appears nearly full. If you change to the floppy disk drive and carry out the **dir** command, MS-DOS usually lists one file: a text file named READTHIS.TXT, which briefly explains how to mount the floppy disk. The **dir** command usually reports that the floppy disk contains almost no free space, since most of the space is used by the compressed volume file. The compressed volume file is a file with Hidden, Read-Only and System attributes named DBLSPACE.000.

To gain access to the contents of a compressed floppy disk, mount it from the main DoubleSpace screen or at the MS-DOS command prompt.

▶ **To mount a compressed floppy disk from the main DoubleSpace screen**

1. Insert the compressed floppy disk in a drive.

2. In the main DoubleSpace screen, choose the Mount command from the Drive menu. DoubleSpace searches your computer for unmounted compressed volume files, and lists the ones it finds.

3. Select the CVF that is located on your compressed floppy disk by using the UP ARROW or DOWN ARROW key, and then press ENTER.

4. DoubleSpace mounts the CVF and then updates the list of compressed drives on the main DoubleSpace screen to include the newly mounted floppy disk.

The compressed floppy disk remains mounted, and the files on it remain available, until you change floppy disks or restart your computer.

▶ **To mount a compressed floppy disk at the MS-DOS command prompt**

1. Insert the compressed floppy disk in a drive.

2. At the command prompt, type **dblspace /mount** and the letter of the drive the floppy disk is in.

The compressed floppy disk remains mounted until you change floppy disks or restart your computer.

Getting Information About Compressed Drives

You can display information about your compressed drives in several ways:

■ In DoubleSpace, choose the Info command from the Drive menu to display detailed information about a compressed drive. For more information, press F1 while the Compressed Drive Information dialog box is on your screen.

■ At the MS-DOS command prompt, change to the compressed drive you want information about, and then type **dir/c.** MS-DOS lists the files in the current directory and displays the actual compression ratio for each file. It also shows the average compression ratio for the entire list of files. (If the compressed drive is empty, **dir/c** does not display compression informa-tion) For more information, type **help dir** at the command prompt.

■ At the MS-DOS command prompt, type **dblspace /list** to see a list of your computer's drives and their compression s t a t u s .   Use this command to get a more complete picture of your computer's drive configuration.

■ If you use Windows, choose DoubleSpace Info from the Tools menu in File Manager. For more information, press F1 while the DoubleSpace Info dialog box is on your screen.

Troubleshooting DoubleSpace

If you encounter problems while running DoubleSpace, or if you encounter problems with y o u r   compressed drives, see the DoubleSpace section of the README.TXT file. The README.TXT file is located in the directory that contains your MS-DOS files. You can view this file by using any text editor.

C H A P T E R   6

Making More Memory Available

The amount of available memory affects which programs you can run, how fast they run, and how much data a program can work with at one time. If you're having trouble running programs because your computer doesn't have enough memory, you can install additional physical memory or optimize the memory your computer already has.

Identifying Your Computer's Memory Configuration

To display information about your computer's memory, type **mem** at the command prompt. The **mem** command displays a summary of your computer's memory configuration. It shows how much of each kind of memory your computer has, how much is currently in use, and how much is currently free. The following table describes the kinds of memory your computer might have:

Type of memory	Description
Conventional memory	Up to the first 640K of memory on a computer. All MS-DOS-based programs require conventional memory.
Upper memory area	The 384K of memory above your computer's 640K of conventional memory. The upper memory area is used by system hardware, such as your display adapter. Unused parts of the upper memory area are called upper memory blocks (UMBs). On an 80386 or higher computer, UMBs can be used for running device drivers and memory-resident programs.
Extended memory (XMS)	Memory beyond 1 MB on computers with 80286 or higher processors. Extended memory requires an extended-memory manager, such as HIMEM.
High memory area (HMA)	The first 64K of extended memory. On a computer with extended memory, Setup conserves conventional memory by installing MS-DOS to run in the high memory area.

Type of memory	Description
Expanded memory (EMS)	Memory in addition to conventional memory that some MS-DOS-based applications can use. Expanded memory is installed on an expanded-memory board and comes with an expanded-memory manager. Because an expanded-memory manager gives access to a limited amount of expanded memory at a time, using expanded memory is slower than using extended memory.

Freeing Conventional Memory

You can free conventional memory in several ways:

▪ If you have an 80386 or higher computer with extended memory, you can run MemMaker to move device drivers and other memory-resident programs from conventional memory to the upper memory area.

▪ You can streamline your CONFIG.SYS and AUTOEXEC.BAT files so that they don't start unnecessary memory-resident programs.

▪ If your computer has extended memory, you can run MS-DOS in the high memory area instead of in conventional memory.

Optimizing Memory by Using MemMaker

MemMaker modifies your CONFIG.SYS and AUTOEXEC.BAT files so that your device drivers and other memory-resident programs use less conventional memory. MemMaker frees conventional memory by loading some of those device drivers and programs into the upper memory area, the range of memory addresses normally set aside for hardware expansion cards. The unused areas of upper memory are called upper memory blocks (UMBs). You can use UMBs for running installable device drivers and other memory-resident programs.

To prepare your computer to run MemMaker, do the following:

● Make sure your system's hardware and memory work properly, and that your CONFIG.SYS and AUTOEXEC.BAT files do not start any unnecessary programs.

▪ Quit any programs that are running.

▪ Start any hardware or memory-resident programs that you usually use.

Running MemMaker Using Express Setup

When you run MemMaker, you will **be** prompted to choose between Express and Custom Setup. The following procedure explains how to run MemMaker using Express Setup.

▶   **To run MemMaker using Express Setup**

1. Type **memmaker** at the command prompt. MemMaker displays the Welcome screen. Choose the Continue option by pressing ENTER. MemMaker displays a screen that prompts you to choose between Express and Custom Setup.

2. Choose Express Setup by pressing ENTER. MemMaker displays a screen that prompts you to specify whether you use any programs that require expanded memory.

3. If none of your programs require expanded memory, or if you are not sure whether your programs require expanded memory, choose No by pressing ENTER. If you use programs that require expanded memory, select Yes by pressing the SPACEBAR, and then press ENTER. Press ENTER to restart your computer.

4. After your computer has restarted, MemMaker optimizes the memory configuration for your computer. When its calculations are complete, MemMaker makes the necessary changes to your CONFIG.SYS and AUTOEXEC.BAT files, and then displays a screen stating that it is ready to restart your computer using the new configuration.

5. To restart your computer with its new configuration, press ENTER. After your computer has restarted, MemMaker displays a screen that prompts you to specify whether your system appears to be working properly.

6. If you did not see any error messages during startup and your system appears to work properly, choose Yes by pressing ENTER. If you suspect that your system is not working properly, press the SPACEBAR to select No, and then follow the instructions on your screen.

    If you indicated that your computer is working properly, MemMaker displays a final screen that shows the amount of each type of memory available before and after you ran MemMaker.

Running MemMaker Using Custom Setup

The following list describes the situations in which you should use Custom Setup.

▪ If you have an EGA or VGA monitor (but not a Super VGA monitor), choose Custom Setup, and answer Yes to the advanced option "Use monochrome region (B000-B7FF) for running programs?"

If you have a Super VGA monitor, see the MemMaker section in the README.TXT file, located in your DOS directory, for more information about freeing conventional memory. You can view it by using any text editor.

▪ If a device driver or program has been causing problems when you run MemMaker (for example, if it causes your computer to stop responding), choose Custom Setup, and then answer Yes to the advanced option "Specify which drivers and TSRs to include in optimization?"

▶ **To run MemMaker using Custom Setup**

1. Type **memmaker** at the command prompt. MemMaker displays the Welcome screen. Choose the Continue option by pressing ENTER. MemMaker displays a screen that prompts you to choose between Express and **Custom** Setup.

2. Select Custom Setup by pressing the SPACEBAR, and then press ENTER. MemMaker displays a screen that prompts you to specify whether you use any programs that require expanded memory.

3. If none of your programs require expanded memory, or if you are not sure whether your programs require expanded memory, choose No by pressing ENTER. If you use programs that require expanded memory, select Yes by pressing the SPACEBAR, and then press ENTER. For more information about this screen, press F1.

   The Advanced Options screen appears. The settings on this screen determine how MemMaker configures your computer's memory during optimization.

4. Change the settings on the Advanced Options screen as necessary. To change an option, press the UP ARROW or DOWN ARROW key until the Yes or No beside that option is highlighted. Then press the SPACEBAR to change the answer. For information about each setting, press F1.

5. When you have finished changing settings, press ENTER to continue. If
    MemMaker prompts you to provide more information, follow the instruc-
    tions on your screen.

    MemMaker displays a screen stating that it is ready to restart your com-
    puter. Press ENTER. After your computer has restarted, MemMaker opti-
    mizes the memory configuration for your computer. When its calculations
    are complete, MemMaker makes the necessary changes to your
    CONFIG.SYS and AUTOEXEC.BAT files, and then displays a screen
    stating that it is ready to restart your computer using the new
    configuration.

6. Restart your computer with its new configuration by pressing ENTER.

    After your computer has restarted, MemMaker displays a screen that
    prompts you to specify whether your system appears to be working prop-
    erly. If you did not see any error messages during startup and your system
    appears to work properly, choose Yes by pressing ENTER. If you suspect
    that your system is not working properly, press the SPACEBAR to select
    No, and then follow the instructions on your screen.

Undoing the Changes MemMaker Made

MemMaker changes your system's memory configuration by editing the
commands in your CONFIG.SYS, AUTOEXEC.BAT, and (sometimes)
SYSTEM.INI files. Before changing these files, MemMaker makes backup
copies. If you encounter problems during the optimization process, you can
have MemMaker undo the changes it made by restoring previous versions of
these files. You can undo changes even after quitting MemMaker.

▶ **To undo MemMaker's changes**

1. Quit any running programs.

2. Start MemMaker by typing the following at the command prompt:

    memmaker /undo

    A screen appears, prompting you to choose between restoring your origi-
    nal system files and quitting MemMaker.

3. To restore your original files, press ENTER. MemMaker displays a confir-
    mation screen.

4. If the screen shows that MemMaker has finished restoring your startup
    files. press ENTER to restart your computer with its original configuration.

Fine-Tuning Your Memory Configuration

You can fine-tune your memory configuration with the following techniques:

- Run MemMaker again and change some memory-configuration options.

- Change the order of device drivers and programs in your CONFIG.SYS and AUTOEXEC.BAT files.

- Remove unnecessary device drivers and memory-resident programs from your CONFIG.SYS and AUTOEXEC.BAT files.

Freeing Additional Memory by Changing MemMaker Options

To try to free additional memory, you can run MemMaker again and change some memory-configuration options.

If you do not use programs that require expanded memory

If none of your programs require expanded memory, run MemMaker again, and when MemMaker asks you whether you use any programs that require expanded memory, choose No.

If your computer has an EGA or VGA monitor

If your computer has an EGA or VGA monitor (but not a Super VGA monitor), run MemMaker again and choose Custom Setup. When MemMaker displays the Advanced Options screen, answer Yes to the question "Use monochrome region (B000-B7FF) for running programs?"

If your computer has a Super VGA monitor

If your computer has a Super VGA monitor, see the MemMaker section in the README.TXT file, located in your DOS directory, for more information about freeing conventional memory. You can view it by using any text editor.

Freeing Additional Memory by Changing the Order of Commands in Your Startup Files

You can fine-tune your memory configuration by changing the order of the commands in your CONFIG.SYS and AUTOEXEC.BAT files.

▶ **To optimize the order of device drivers and memory-resident programs**

1. Open the MEMMAKER.STS file by using a text editor such as MS-DOS Editor. The MEMMAKER.STS file is located in the same directory as the MEMMAKER.EXE file.

2. Find the [SizeData] section in the MEMMAKER.STS file. This section lists the memory requirements of each driver or memory-resident program started by your CONFIG.SYS and AUTOEXEC.BAT files. For each driver or memory-resident program, examine the MaxSize line.

3. Print the MEMMAKER.STS file or write down the name of each driver or program and its MaxSize value. Then quit the text editor.

4. Open your CONFIG.SYS file and move commands that load device drivers or programs with larger MaxSize values before those with smaller MaxSize values. Save the changes to your CONFIG.SYS file, and then open your AUTOEXEC.BAT file.

5. In your AUTOEXEC.BAT file, move commands that start programs with larger MaxSize values before those with smaller MaxSize values. Save the changes to your AUTOEXEC.BAT file, and then quit the text editor.

6. Remove any disks from your floppy disk drives, and then restart your computer by pressing CTRL+ALT+DEL.

7. If your system starts properly, run MemMaker to optimize your revised CONFIG.SYS and AUTOEXEC.BAT files.

Using MemMaker with Multiple Configurations

If your CONFIG.SYS file defines multiple startup configurations, run MemMaker by carrying out the procedures in this section.

▶ **To optimize your computer's memory for multiple configurations**

1. Create a separate set of CONFIG.SYS and AUTOEXEC.BAT files for each configuration on your startup menu. Each set should contain only the commands for that configuration.

2. Run MemMaker separately for each configuration.

3. Combine the optimized CONFIG.SYS files into a single multiple-configuration CONFIG.SYS file; combine the AUTOEXEC.BAT files into a single AUTOEXEC.BAT file.

Creating CONFIG.SYS and AUTOEXEC.BAT Files for Each Configuration

▶ **To create separate startup files for each configuration**

1. In the root directory of your startup drive (usually drive C), make one copy of your CONFIG.SYS and AUTOEXEC.BAT files for each item on your startup menu, and give each copy a name with a filename extension that matches the corresponding item number. For example, the files for menu item 1 would be named CONFIG.1 and AUTOEXEC.1.

2. Open each copy of your CONFIG.SYS file by using a text editor such as MS-DOS Editor. Edit the file so that it can be used as a single-configuration CONFIG.SYS file. Delete the menu-definition commands (the commands in the **[menu]** section) and any commands that do not apply to the configuration that corresponds to the file's extension. Save the file when you have finished.

   Repeat this step for each copy of your CONFIG.SYS file. In each file, keep only the commands that are necessary to start the computer with that configuration.

3. Open each copy of your AUTOEXEC.BAT file. Delete any **goto config** commands and any commands that do not apply to the configuration that corresponds to the file's extension. Save the file when you have finished.

   Repeat this step for each copy of your AUTOEXEC.BAT file. In each file, keep only the commands that are necessary to start the computer with that configuration.

4. Quit the text editor.

When you have carried out this procedure, the root directory of your startup drive should contain your original CONFIG.SYS and AUTOEXEC.BAT files, as well as one set of CONFIG.x and AUTOEXEC.x files for each startup menu item.

Running MemMaker for Each Configuration

▶ **To optimize memory for each configuration**

1. Rename your original CONFIG.SYS and AUTOEXEC.BAT files, changing their filename extensions to .BAK.

2. Rename one set of the CONFIG.x and AUTOEXEC.x files to CONFIG.SYS and AUTOEXEC.BAT.

3. Restart your computer by pressing CTRL+ALT+DEL.

4. To optimize the current CONFIG.SYS and AUTOEXEC.BAT files, run MemMaker by typing **memmaker** at the command prompt, and then follow the instructions on your screen.

5. When MemMaker is complete, rename the current CONFIG.SYS and AUTOEXEC.BAT files to their original filenames.

6. Repeat steps 2 through 5 for each additional set of CONFIG.x and AUTOEXEC.x files you created.

Combining the Optimized Files into New CONFIG.SYS and AUTOEXEC.BAT Files

Once you have optimized each configuration separately, you need to combine the separate files into a single set of CONFIG.SYS and AUTOEXEC.BAT files. The exact procedure for this will depend on the contents of your files. The following tips can help you construct a new CONFIG.SYS file:

▪ Start with a blank CONFIG.SYS file rather than trying to edit your original file.

▪ Copy the menu-definition commands from the CONFIG.BAK file and paste it into your new CONFIG.SYS file.

▪ Create a separate configuration block for each item on the menu, and paste the commands from each CONFIG.x file into the corresponding configuration block.

▪ Avoid using [common] blocks or **include** commands. Instead, each configuration block should contain a complete set of commands for that configuration.

The following tips can help you construct a new AUTOEXEC.BAT file:

▪ Start with a blank AUTOEXEC.BAT file rather than trying to edit your original file.

▪ Add a **goto %config%** command to the beginning of your new AUTOEXEC.BAT file.

▪ For each item on your startup menu, add a label to your AUTOEXEC.BAT file with the same name as the corresponding configuration block in your CONFIG.SYS file. Paste the commands from each AUTOEXEC.x file into your new AUTOEXEC.BAT file after the label that corresponds to that configuration.

▪ Add a **goto end** command to the end of each section in your AUTOEXEC.BAT file that starts with a label.

▪ Add an :**end** label to the end of your AUTOEXEC.BAT file.

▪ For the best results, each section of your AUTOEXEC.BAT file should contain a complete set of AUTOEXEC.BAT commands for that configuration.

Troubleshooting While Using MemMaker

Your computer stops responding while you are using MemMaker.

If your computer stops responding while you are running MemMaker, first try using more conservative settings. MemMaker restarts your computer twice. If your computer stopped responding when MemMaker restarted it the first time, carry out procedure 1. If your computer stopped responding after MemMaker restarted it the second time, carry out procedure 2.

▶ **Procedure 1   To use more conservative settings**

1. When your computer stops responding, restart it by pressing CTRL+ALT+DEL, and then choose the "Try again with conservative settings" option by pressing ENTER. Your computer restarts, and then processes your CONFIG.SYS and AUTOEXEC.BAT files.

2. If your computer runs successfully, follow the instructions on your screen. If your computer stops responding again, carry out the procedure in the section "Your computer stops responding again after the 'MemMaker will now restart your computer' message appears" later in this chapter.

▶ **Procedure 2   To use more conservative settings by using Custom Setup**

1. When your computer stops responding, restart it by pressing CTRL+ALT+DEL, and then select the "Exit and undo changes" option by pressing the SPACEBAR, and then press ENTER. Your computer restarts with its original memory configuration.

2. Restart the MemMaker program by typing **memmaker** at the command prompt. When the "Welcome to MemMaker" screen appears, press ENTER.

3. When the second MemMaker screen appears, press the SPACEBAR to select "Custom Setup," and then press ENTER. Continue with the MemMaker program until the Advanced Options screen appears. Then press the DOWN ARROW key until the "Yes" beside "Scan the upper memory aggressively?" is selected.

4. Press the SPACEBAR to select "No," and then press ENTER. Follow the instructions on your screen.

   If your computer stops responding again, carry out the procedure in the section "Your computer stops responding again after the 'MemMaker will now restart your computer to test the new memory configuration' screen appears" later in this chapter.

Your computer stops responding again after the "MemMaker will now restart your computer" message appears.

▶ **To determine whether your computer stops responding while MemMaker is loading EMM386**

1. When your computer stops responding, restart it by pressing CTRL+ALT+DEL, and then display the 'Cancel and undo all changes" option by pressing the SPACEBAR twice, and then pressing ENTER. Your computer restarts with its original memory configuration.

2. Restart MemMaker by typing **memmaker** at the command prompt. Follow the instructions on your screen. After MemMaker restarts your computer, MS-DOS displays the following text: `Starting MS-DOS...`

3. While the text is on your screen, press and release the F8 key. The following text appears:

   `MS-DOS will prompt you to confirm each CONFIG.SYS command.`

   As MS-DOS processes the commands in your CONFIG.SYS file, it displays each command, followed by a prompt.

4. Carry out all the commands in your CONFIG.SYS file by pressing Y each time you are prompted.

   If your computer stops responding when it is trying to load EMM386.EXE, carry out the procedure in "You have tried the trouble-shooting procedures, and your computer still stops responding when you run MemMaker" later in this chapter.

   If your computer stops responding when it tries to load a device driver other than EMM386, skip the rest of this procedure and carry out the procedure in the following section.

   If your computer runs successfully, continue to step 5.

5. When MS-DOS finishes processing the commands in your CONFIG.SYS file, press Y at the prompt to process the AUTOEXEC.BAT file. When your computer stops responding, note which program it is trying to load and carry out the procedure in the following section.

Your computer stops responding while MemMaker is loading a program or device driver other than EMM386.

▶ **To load your program or device driver properly**

1. When your computer stops responding, restart it by pressing CTRL+ALT+DEL, and then display the "Cancel and undo all changes" option by pressing the SPACEBAR twice, and then pressing ENTER. Your computer restarts with its original memory configuration.

2. Restart the MemMaker program by typing **memmaker** at the command prompt. When the "Welcome to MemMaker" screen appears, press ENTER.

3. When the second MemMaker screen appears, press the SPACEBAR to select "Custom Setup," and then press ENTER. Continue with the MemMaker program until the Advanced Options screen appears. Press the SPACEBAR to change the "No" beside "Specify which drivers and TSRs to include during optimization?" to "Yes."

4. Press ENTER. If you use Windows, MemMaker might prompt you to provide more information. If it does, follow the instructions on your screen.

5. One by one, MemMaker prompts you to include device drivers and programs in the optimization process. Press ENTER each time you are prompted, except when you are prompted to include the device driver or program that caused your computer to stop responding. When you are prompted to include this device driver or program, press the SPACEBAR to select "No," and then press ENTER. Follow the instructions on your screen.

6. MemMaker will restart your computer. If your computer stops responding when MemMaker tries to load a different program or device driver, repeat steps 1 through 5.

    If your computer stops responding again, carry out the procedure in "You have tried the troubleshooting procedures, and your computer still stops responding when you run MemMaker" later in this chapter.

Your computer stops responding again after "the MemMaker will now restart your computer to test the new memory configuration" screen appears.

▶ **To properly load the program or device driver that causes your computer to stop responding**

1. Restart your computer by pressing CTRL+ALT+DEL, and then choose the "Exit and undo changes" option by pressing the SPACEBAR, and then pressing ENTER. Your computer restarts with its original memory configuration.

2. Restart the MemMaker program by typing **memmaker** at the command prompt. When the "Welcome to MemMaker" screen appears, press ENTER.

3. When the second MemMaker screen appears, press the SPACEBAR to select 'Custom Setup," and then press ENTER. Continue with the MemMaker program until the Advanced Options screen appears. Press the SPACEBAR to change the "No" beside "Specify which drivers and TSRs to include during optimization?" to "Yes."

4. Press ENTER. If you use Windows, MemMaker might prompt you to provide more information. If it does, follow the instructions on your screen.

5. One by one, MemMaker prompts you to include device drivers and programs in the optimization process. Press ENTER each time you are prompted, except when you are prompted to include the device driver or program that caused your computer to stop responding. When you are prompted to include this device driver or program, press the SPACEBAR to select "No," and then press ENTER. Follow the instructions on your screen.

6. MemMaker will restart your computer. If your computer stops responding when MemMaker tries to load a different program or device driver, repeat steps 1 through 5.

    If your computer stops responding again, carry out the procedure in the following section.

**You have tried the troubleshooting procedures, and your computer
still stops responding when you run MemMaker.**

▶ **To try an additional troubleshooting technique**

1. When your computer stops responding, restart it by pressing
   CTRL+ALT+DEL, and then select the "Cancel and undo all changes" option
   or the "Exit and undo changes" option, and then press ENTER.

2. When the MS-DOS command prompt appears, open your CONFIG.SYS
   file in a text editor. Look for a command that loads EMM386.EXE. If your
   CONFIG.SYS file does not contain the command that loads EMM386,
   insert it on a new line below the **device** command that loads HIMEM.SYS.

3. Save your changes and quit the text editor.

   For additional information, see the section "You installed a hardware
   device and you computer stopped working correctly" in the chapter
   "Diagnosing and Solving Problems." You should also refer to the
   README.TXT file in your DOS directory.

There is not enough memory to continue MemMaker.

▶ **To free enough conventional memory to run MemMaker**

1. When MemMaker displays the "MemMaker cannot continue because there
   is not enough free conventional memory" message, press ENTER to restart
   your computer. After MemMaker restarts your computer, MS-DOS dis-
   plays the following text: `Starting MS-DOS...`

2. While the text is on your screen, press and release the F8 key. The follow-
   ing text appears:

   `MS-DOS will prompt you to confirm each CONFIG.SYS command.`

3. Bypass all the commands in your CONFIG.SYS file by pressing N each
   time you are prompted, except when you are prompted for HIMEM.SYS,
   EMM386.EXE, and SHELL.

4. When MS-DOS finishes processing the commands in your CONFIG.SYS
   file, press N at the prompt to bypass the AUTOEXEC.BAT file.

5. When the MS-DOS command prompt appears, type the following:

   find /i "memmaker" autoexec.bat

   At the command prompt, type the entire line exactly as **find** displays it.
   MemMaker should continue normally.

6. Follow the instructions on your screen.

After running MemMaker, a program or device driver that was loaded into the upper memory area does not work.

▶ **To load properly the program or device driver that does not work correctly**

1. Restore your computer to the memory configuration it had before you ran MemMaker by typing the following at the command prompt:

   memmaker /undo

2. When MemMaker starts, choose the "Restore files now" option by press-ing ENTER. When MemMaker displays a screen confirming that it has restored your original CONFIG.SYS and AUTOEXEC.BAT files, restart your computer by pressing ENTER.

3. Restart MemMaker by typing **memmaker** at the command prompt. When the "Welcome to MemMaker" screen appears, press ENTER.

4. When the second MemMaker screen appears, press the SPACEBAR to select "Custom Setup," and then press ENTER. Continue with the MemMaker program until the Advanced Options screen appears. Press the SPACEBAR to change the "No" beside "Specify which drivers and TSRs to include during optimization?" to "Yes."

5. Press ENTER. If you use Windows, MemMaker might prompt you to pro-vide more information. If it does, follow the instructions on your screen.

6. Press ENTER. One by one, MemMaker prompts you to include device drivers and programs in the optimization process. Press ENTER each time you are prompted, except when you are prompted to include the device driver or program that does not work correctly. When you are prompted to include this device driver or program, press the SPACEBAR to select "No," **and** then press ENTER. Follow the instructions on your screen.

Streamlining Your CONFIG.SYS and AUTOEXEC.BAT Files

The following basic recommendations can help you conserve conventional memory by streamlining your CONFIG.SYS and AUTOEXEC.BAT files:

▪ Whenever possible, load programs that require extra memory during startup before those that do not.

▪ If your computer has expanded memory, your CONFIG.SYS file should include a **device** command for the expanded-memory manager that came with your memory board.

▪ If your computer has extended memory, your CONFIG.SYS file should include the **dos=high** command as well as a **device** command for the HIMEM.SYS extended-memory manager.

- If your computer has extended memory, disable any commands in your CONFIG.SYS or AUTOEXEC.BAT files that start the Fastopen program.

- Disable any **append /e or append** c:\dos commands in your AUTOEXEC.BAT file.

- If your CONFIG.SYS file contains a command that loads the double-buffering feature of SMARTDrive, you might be able to disable this command. To find out whether you need to use double buffering, type **help smartdrv** at the command prompt and choose <smartdrv.exe> in the second paragraph. Then, follow the procedure in the section "Determining whether you need to use double buffering."

Running MS-DOS in the High Memory Area

When MS-DOS is installed in a computer with an 80286 or higher processor and extended memory, it is automatically configured to run in the High Memory Area (HMA). To determine whether MS-DOS is running in the HMA, type **mem** at the command prompt.

If MS-DOS is not running in the HMA, you can add commands similar to **device=c:\dos\himem.sys** and **dos=high** to your CONFIG.SYS file.

Freeing Extended Memory

To use extended memory, your computer must have physical extended mem-ory, and your CONFIG.SYS file must contain a **device** command for the HIMEM.SYS extended-memory manager or another memory manager that conforms to the Lotus/Intel/Microsoft/AST extended Memory Specification (XMS). If you have extended memory but it is all being used, try the following:

- If your CONFIG.SYS or AUTOEXEC.BAT file starts programs that use extended memory, reduce the amount of extended memory you allocate for each program.

- If your CONFIG.SYS file contains an EMM386 command line that does not include the **noems** switch, add the **min=0** switch to the command line.

- If you are using RAMDrive and creating a RAM disk in extended memory, use SMARTDrive instead.

- If you are conserving conventional memory by running programs in upper memory, try running them in conventional memory instead. Although running programs in upper memory conserves conventional memory, it uses some extended memory.

- If Windows won't start because not enough extended memory is available, try disabling the EMM386 command line and the **dos=high** command in your CONFIG.SYS file.

Freeing Expanded Memory

Some programs require additional expanded memory to run. If you are having
trouble running such a program, do the following:

■ Make sure your system contains as much physical expanded memory as
the program needs, and that your CONFIG.SYS file contains a **device**
command for the expanded-memory manager that came with your memory
board.

■ If you are using EMM386 with the **noems** switch, expanded memory
will be unavailable. On the EMM386.EXE command line in your
CONFIG.SYS file, change the **noems** switch to the **ram** switch. For
information about EMM386, type **help emm386.exe** at the command
prompt.

■ If your CONFIG.SYS or AUTOEXEC.BAT file starts programs that use
expanded memory, reduce the amount of expanded memory you allocate
for each program. For information about how to do this, see the documen-
tation that accompanied each program.

Using MS-DOS Memory Managers

To use your computer's extended memory, expanded memory, or upper
memory area, your CONFIG.SYS file must contain a command that loads a
memory manager. MS-DOS includes the following memory managers:

■ HIMEM, which provides access to extended memory.

■ EMM386, which provides access to the upper memory area.

MS-DOS does not include an expanded-memory manager for physical
expanded memory, since each expanded-memory board requires its own
memory manager. To use physical expanded memory, you must install the
memory manager that came with your expanded-memory board.

Using the EMM386 Memory Manager

EMM386 is a dual-purpose memory manager for 80386 and 80486 computers
that have extended memory. EMM386 provides access to the upper memory
area and uses extended memory to simulate expanded memory.

▶ **To install EMM386**

1. Run the MemMaker program by typing **memmaker** at the command prompt. When MemMaker displays a Welcome screen, choose the Continue option by pressing ENTER. MemMaker displays a screen prompting you to choose between Express and Custom Setup.

2. Choose Express Setup by pressing ENTER. MemMaker displays a screen that prompts you to specify whether you use any programs that require expanded memory.

3. If none of your programs require expanded memory, or if you are not sure whether your programs require expanded memory, choose No by pressing ENTER. If you use programs that require expanded memory, select Yes by pressing the SPACEBAR, and then press ENTER.

4. Complete the MemMaker program by following the instructions on your screen.

C H A P T E R 7

Features for Your Laptop Computer

With the Interlnk program and a cable that connects two computers, you can use a laptop computer to access data and run programs on a desktop computer. You use the laptop computer to type commands that control both it and your desktop computer. The desktop computer displays the status of the connection; you use its keyboard only to break the connection between the two computers.

Using Interlnk to Connect Two Computers

The computer you use to type commands is called the client. The computer connected to the client is the **server.** Generally, the laptop computer is the client and the desktop computer is the server. The client uses the server's drives and printers, and the server displays the status of the connection between the computers.

For example, suppose you have connected a laptop and a desktop computer. The laptop computer has three drives: a floppy disk drive (A) and two hard disk drives (C and D). The desktop computer also has three drives: two floppy disk drives (A and B) and a hard disk drive (C). The following table lists the drives on each computer.

Laptop drives	Desktop drives
A	A
C	B
D	C

When the computers are connected using Interlnk, the drives on the desktop computer (the server) appear as additional drives on the laptop computer (the client). In addition to drives A, C, and D, the laptop computer now includes drives E, F, and G.

The following illustration shows how the drives of each computer are redirected.
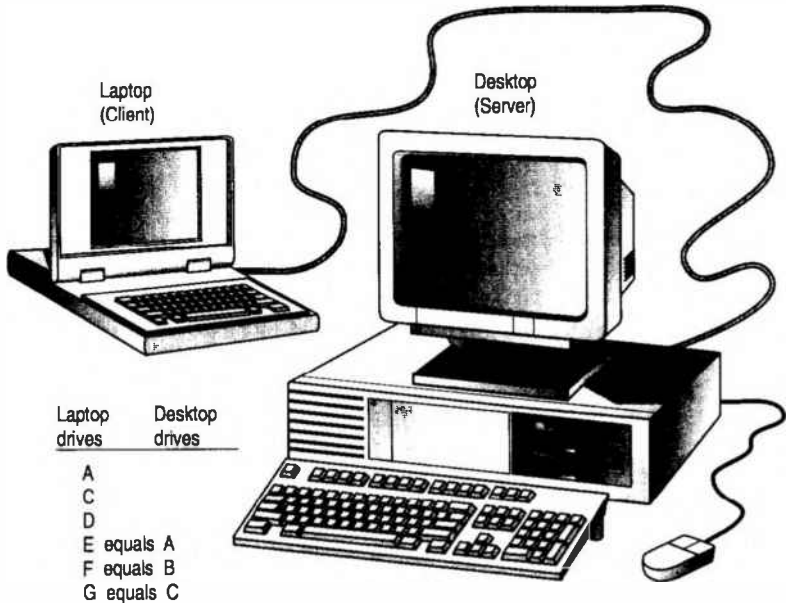
Drive E of the laptop computer (client) represents drive A of the desktop computer (server). If you make drive E current on the laptop computer, the commands you type affect drive A of the desktop computer. For example, if you type the following command on the laptop computer, MS-DOS displays a list of the files in the root directory of the desktop computer's hard drive:

dir g:

The drives on your laptop and desktop computers will probably be redirected differently than the ones in this example. When you connect your computers and get Interlnk running, the server will display the way your drives are redirected.

What You Need to Use Interlnk

Before you use Interlnk, make sure you have the following hardware, software, and available memory:

- A free serial port on both computers or free parallel port on both computers

- A 3-wire serial cable, 7-wire null-modem serial cable, or bidirectional parallel cable

- MS-DOS version 6 on one computer and MS-DOS version 3.0 or later on the other

- 16K of free memory on the client and 130K of free memory on the server

Setting Up the Client

▶ **To set up INTERLNK.EXE on the computer(s) you plan to use as a client**

1. Make sure the INTERLNK.EXE file is located on the computer's hard disk.

   If the client's hard disk does not contain the INTERLNK.EXE file, see "Using the Remote Copy Procedure" later in this chapter for instructions on copying Interlnk files from one computer to another.

2. Open your CONFIG.SYS file by using a text editor.

3. Add a **device** command that specifies the location of the INTERLNK.EXE file. The following example specifies that the INTERLNK.EXE file is located in the DOS directory on drive C: **device=c:\dos\interlnk.exe**

4. Save the changes to your CONFIG.SYS file, and then quit the text editor.

5. Restart your computer by pressing CTRL+ALT+DEL.

After you add the **device** command for INTERLNK.EXE to your CONFIG.SYS file, Interlnk displays the status of redirected drives and ports each time you start the client computer. You can also view the status of redirected drives and ports by typing **interlnk** at the command prompt. For more information about the INTERLNK.EXE device driver, type **help interlnk.exe** at the command prompt.

Starting the Server

To start the server, type **intersvr** at the command prompt of the computer you are using as the server. Interlnk displays information about redirected drives and printer ports on the server's screen. The column labeled "This Computer" lists all drives and ports on the server. The column labeled "Other Computer" lists the drives and ports on both. A status bar at the bottom of the screen displays the status of the Interlnk connection. For more information about the Interlnk server, type **help intersrv** at the command prompt.

Note   You cannot switch between tasks in Microsoft Windows or MS-DOS Shell while Interlnk is running.

Establishing a Connection Between Computers

Interlnk establishes connections between all redirected drives and ports when you restart the client computer when the server is running, type **interlnk** at the command prompt of the client computer, or make one of the redirected drives on the client computer the active drive.

Breaking the Connection Between Computers

To break the Interlnk connection between computers, stop the server by pressing ALT+F4 on the server's keyboard. To restart the server, type **intersvr** at the server's command prompt.

Using the Remote Copy Procedure

If only one of the two computers you want to connect has the Interlnk files on it, you can use the Interlnk copy procedure instead of a floppy disk to **copy** the files to the other computer.

▶   **To copy Interlnk files from one computer to another**

1.   Make the directory to which you want to copy files the current directory.

2.   If you are using a port other than COM1 on the computer you are copying files to, make sure that you are not running the Share program on that computer.

3.   At the command prompt of the computer containing the Interlnk files, type the following: **intersvr /rcopy**

     The remote installation screen appears. Follow the instructions that appear on your screen.

     As Interlnk copies the files, it displays the status at the bottom of each computer's screen.

Conserving Power on Your Laptop Computer

The Power program conserves battery power on your laptop computer when applications and hardware devices are idle. If your hardware conforms to the Advanced Power Management (APM) specification, your power savings can be up to 25 percent, depending on your hardware. If your hardware does not conform to the APM, your power savings will be about 5 percent.

▶ **To use the Power program**

1. Open your CONFIG.SYS file by using a text editor.

2. Add a **device** command that specifies the location of the POWER.EXE file to the end of your CONFIG.SYS file.

   The following example specifies that the POWER.EXE file is located in the DOS directory on drive C, and that the default setting should be used:

   device=c:\dos\power.exe

3. Save the changes to your CONFIG.SYS file, and then quit the text editor.

4. Restart your computer by pressing **CTRL+ALT+DEL** .

To display the current power setting, type the following at the command prompt: **power**

For more information about the POWER.EXE device driver, type **help power.exe** at the command prompt.

C H A P T E R   8

Diagnosing and Solving Problems

This chapter explains how to solve the most common problems you might encounter while using MS-DOS. If you encounter a problem with one of the programs included with MS-DOS 6, consult the following table to find the troubleshooting help you need:

For problems with this program	See this source	In this location
Anti-Virus	The chapter "Managing Your System"	Earlier in this guide
Backup	The chapter "Managing Yom System"	Earlier in this guide
MemMaker	The chapter "Making More Memory Available"	Earlier in this guide
Undelete	The chapter "Managing Your System"	Earlier in this guide
DoubleSpace	The README.TXT file	The directory that con- tains your MS-DOS files

If you do not find the troubleshooting information you need in this guide, view the README.TXT file on Setup Disk 1 by using any text editor.

Troubleshooting While Running MS-DOS

If your computer stops running and you cannot restart it without its stopping repeatedly, carry out the following procedure to start your computer. Carrying out this procedure causes your computer to bypass your CONFIG.SYS and AUTOEXEC.BAT files when it starts.

▶ **To restart your computer**

1. Press CTRL+ALT+DEL. If your computer does not respond, wait at least 10 seconds, turn the power off, wait at least 30 seconds, and then turn the power back on. After your computer starts, MS-DOS displays the follow- ing text: Starting MS-DOS...

2. While the text is on your screen, press and release the F5 key. A command prompt appears on your screen.

Your computer will start with a basic configuration instead of your usual configuration. For more information, see the chapter "Configuring Your System" earlier in this guide.

You receive a message that HIMEM.SYS is missing or not loaded.

▶ **To load HIMEM.SYS properly**

1. To confirm that HIMEM.SYS did not load properly, start the Microsoft Diagnostics program by typing **msd** at the command prompt.

2. Choose the Memory option by pressing M. If Microsoft Diagnostics does not display an "XMS Information" section on the right side of your screen, HIMEM.SYS did not load properly.

3. Choose OK by pressing ENTER, and then quit Microsoft Diagnostics by pressing ALT, F, X. For more information about Microsoft Diagnostics, type **help msd** at the command prompt.

4. Open your CONFIG.SYS file by using any text editor. Determine whether your CONFIG.SYS file contains a **device** command for HIMEM.SYS. The command should appear before any other device commands and should look similar to the following:

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

   If your CONFIG.SYS file does not contain this command, add it. If your MS-DOS files are in a directory with a name other than DOS, substitute its name for "DOS" in the **device** command line for HIMEM.SYS.

5. Add the **/cpuclock:on** and **/v** switches to the **device** command for HIMEM.SYS. The command should now appear similar to the following:

   `device-c:\dos\himem.sys /cpuclock:on /v`

   Save your CONFIG.SYS file, and then quit the text editor.

6. Restart your computer by pressing CTRL+ALT+DEL. To determine whether HIMEM.SYS is now loaded properly, repeat steps 1 through 3. If Microsoft Diagnostics displays XMS information, HIMEM.SYS started successfully. If you still don't see this information, continue to step 7.

7. Open your CONFIG.SYS file again. Locate the **device** command for HIMEM.SYS, and add the **/machine** switch to it. The **/machine** switch specifies the type of computer you have. The switch should be followed by a colon (:) and your machine number. (To determine which machine number you should use, see the table following this procedure.) For example, the following **device** command specifies that your computer is a Toshiba 1600, 1200XE, or 5100 (machine number 7):

   `device=c:\dos\himem.sys /cpuclock:on /v /machine:7`

   Save your CONFIG.SYS file, and then quit the text editor.

8. Restart your computer **by** pressing CTRL+ALT+DEL. To determine whether HIMEM.SYS is now loaded properly, repeat steps 1 through 3. If Microsoft Diagnostics displays XMS information, HIMEM.SYS started successfully. If you still don't see this information, repeat steps 7 and 8, specifying a different machine number.

If your computer stops running when you are experimenting with machine numbers, carry **out** the following procedure.

▶ **To restart your computer and specify a different machine number**

1. Restart your computer by pressing CTRL+ALT+DEL. After your computer starts, MS-DOS displays the following text:

   `Starting MS-DOS...`

2. While the text is on your screen, press and release the F8 key.

3. MS-DOS prompts you to confirm each line in your CONFIG.SYS file. Carry out each command by pressing Y after the prompt, except when you are prompted for the HIMEM.SYS command. When you are prompted for this command, press N.

4. When MS-DOS finishes processing your CONFIG.SYS file, press Y at the prompt to process your AUTOEXEC.BAT file.

5. Open your CONFIG.SYS file by using any text editor, and carry out step 7 of the previous procedure to specify a different machine number.

6. Save your CONFIG.SYS file, quit the text editor, and then restart your computer by pressing CTRL+ALT+DEL.

The following table lists machine types in alphabetic order and shows the corresponding number to specify with the **/machine** switch.

Machine type	Number	Machine type	Number
Abacus 386	1	Acer 1100	6
AT&T 6300 Plus	5	Bull Micral 60	16
Chaplet	1	COMPUADD 386 systems	1 or 8
CSS Labs	12	Datamedia 386/486	2
Everex AT Plus 1800	1	Everex Notebook ELX	1
Excel Computer Systems	13	Hitachi HL500C	8
HP Vectra	14	HP Vectra (A and A+)	4
IBM PC/AT	1,11,12, or 13	IBM PS/2	2
Intel 301z or 302	8	JDR 386/33	1
OPT 386-25 motherboard	1	Pak 386SX	

Machine type	Number	Machine type	Number
PC Limited	4	PC 380/33C, PC 350/33C, or PC 300/33C BIOS revision 1.14	2
Philips	13	Phoenix Cascade BIOS	3,1, or 8
Toshiba 1600 and 1200XE	7	Toshiba 5100	7
Tulip SX	9	UNISYS PowerPort	2
Wyse 12.5 MHz 286	8	Zenith ZBIOS	10

If your computer is not on the list, you are not sure which number to use, or the machine number for your computer doesn't solve the problem, try these machine numbers in the following order: 1, 11, 12, 13, 8, 2 through 7, 9 through 10, and 14 through 16.

You installed a hardware device, and your computer stopped working correctly.

If you installed a new network card or a card for a device, EMM386 may be using the same memory address as the new card. Symptoms of a conflict with EMM386 include the following:

- Your computer stops responding when you restart it.

- MS-DOS won't load EMM386. To determine whether EMM386 is loaded, type emm386 at the command prompt. If "EMM386 driver not installed" appears on your screen, EMM386 did not load. If "EMM386 Active" appears, the problem may be an incorrectly configured device. For more information, contact the manufacturer of the device.

If your computer stops responding when you restart it or if EMM386 doesn't load, carry out the following procedure.

▶ **To make sure EMM386 and another device driver or program don't conflict**

1. If your computer stops responding when you restart it, press CTRL+ALT+DEL. If your computer runs when you restart it, skip to step 5 After your computer starts, MS-DOS displays the following text:

   `Starting MS-DOS...`

2. While the text is on your screen, press and release the F8 key. One at a time, MS-DOS displays each command in your CONFIG.SYS file, followed by a prompt. Carry out all the commands in your CONFIG.SYS file by pressing Y each time you are prompted, *except* when you are prompted for the EMM386.EXE command. When a prompt such as the following appears, press N to bypass it: `DEVICE=C:\DOS\EMM386.EXE`

3. When MS-DOS finishes processing your CONFIG.SYS file, press Y at the prompt to process your AUTOEXEC.BAT file, and then start MemMaker by typing **memmaker** at the command prompt. When the "Welcome to MemMaker" screen appears, press ENTER.

4. When the second MemMaker screen appears, press the SPACEBAR to select "Custom Setup," and then press ENTER.

5. Continue with the MemMaker program until the Advanced Options screen appears. Press the SPACEBAR to change the "No" beside "Specify which drivers and TSRs to include during optimization?" to "Yes."

6. Press the DOWN ARROW key until the "Yes" beside "Keep current EMM386 exclusions and inclusions?" is highlighted. Press the SPACEBAR to select "No," and then press ENTER. If MemMaker prompts you to provide more information, follow the instructions on your screen.

7. One by one, MemMaker prompts you to include device drivers and programs in the optimization process. Press ENTER each time you are prompted, and follow the instructions on your screen.

For more information, see the earlier chapter "Making More Memory Available," or type **help memmaker** at the command prompt.

MS-DOS Shell won't start or switch between programs.

MS-DOS Shell does not work properly if the following files are incorrect or corrupt: DOSSHELL.EXE, DOSSHELL.GRB, DOSSHELL.INI, DOSSWAP.EXE, DOSSHELL.COM, or DOSSHELL.VID. If you have problems using MS-DOS Shell, try decompressing these files from your Setup disks.

▶   **To decompress MS-DOS Shell files**

1.   Preserve your current DOSSHELL.INI file by renaming it.

2.   Use the **expand** command to decompress the DOSSHELL.EX_,
     DOSSHELL.CO_, and DOSSWAP.EX_ files and copy them to your DOS
     directory. To determine the location of these files, open the
     PACKING.LST file on Setup Disk 1 by using any text editor.

     For example, if the files you want to decompress are on a disk in drive A
     and you want to decompress the files and copy them to the DOS directory
     on drive C, you would type the following at the command prompt:

     expand a:\dosshell.ex_ c:\dos\dosshell.exe
     expand a:\dosshell.co_ c:\dos\dosshell.com
     expand a:\dosswap.ex_ c:\dos\dosswap.exe

3.   Find your monitor type in the following list, and then decompress and
     rename the following files by typing the specified commands at the com-
     mand prompt. If your MS-DOS files are in a directory with a name other
     than DOS, substitute its name for "DOS" in the following command lines.

     ▪   For a VGA or other high-resolution monitor, type:

         expand a:\vga.gr_ c:\dos\dosshell.grb
         expand a:\ega.in_ c:\dos\dosshell.ini
         expand a:\vga.vi_ c:\dos\dosshell.vid

     ▪   For a VGA or other high-resolution monochrome monitor, type:

         expand a:\vgamono.gr_ c:\dosklosshell.grb
         expand a:\mono.in_ c:\dos\dosshell.ini
         expand a:\vga.vi_ c:\dos\dosshell.vid

     ▪   For an EGA monitor, type:

         expand a:\ega.gr_ c:\dos\dosshell.grb
         expand a:\ega.in_ c:\dos\dosshell.ini
         expand a:\ega.vi_ c:\dos\dosshell.vid

     ▪   For an EGA monochrome monitor, type:

         expand a:\egamono.gr_ c:\dos\dosshell.grb
         expand a:\mono.in_ c:\dos\dosshell.ini
         expand a:\ega.vi_ c:\dos\dosshell.vid

     ▪   For a CGA monitor, type:

         expand a:\cga.gr_ c:\dos\dosshell.grb
         expand a:\cga.in_ c:\dos\dosshell.ini
         expand a:\cga.vi_ c:\dos\dosshell.vid

     ▪   For a monochrome monitor, type:

         expand a:\mono.gr_ c:\dos\dosshell.grb
         expand a:\mono.in_ c:\dos\dosshell.ini

         Note that a monochrome monitor does not require a .VID file.

■ For an 8514 color monitor, type:

expand a:\vga.gr_ c:\dos\dosshell.grb
expand a:\ega.in_ c:\dos\dosshell.ini
expand a:\8514.vi_ c:\dos\dosshell.vid

■ For an 8514 monochrome monitor, type:

expand a:\vgamono.gr_ c:\dos\dosshell.grb
expand a:\mono.in_ c:\dos\dosshell.ini
expand a:\8514.vi_ c:\dos\dosshell.vid

■ For a Hercules monitor, type:

expand a:\herc.gr_ c:\dos\dosshell.grb
expand a:\mono.in_ c:\dos\dosshell.ini
expand a:\herc.vi_ c:\dos\dosshell.vid

You need to restore files you backed up by using an earlier version of the backup command.

▶ **To restore files you backed up by using an earlier version of the backup command**

1. Insert the floppy disk that contains the backed-up files in drive A or drive B.

2. To restore the files to drive C, type the following at the command prompt:

   restore a: c:*.* /s   or   restore b: c:*.* /s

   To restore the files to a drive other than C, substitute the drive letter you want for the "C" in the preceding example.

3. Follow the instructions on your screen.

An MS-DOS program displays an out-of-memory message.

If your computer is an 80386 or higher, carry out Procedure 1. If your computer is an 80286, carry out Procedure 2.

▶ **Procedure 1   To prevent out-of-memory errors by using MemMaker**

● Optimize your computer's use of memory by running the MemMaker program. To start MemMaker, type **memmaker** at the command prompt.

For more information about using MemMaker, see the chapter "Making More Memory Available" earlier in this guide, or type **help memmaker** at the command prompt.

If out-of-memory messages continue to appear when you try to run MS-DOS programs, carry out Procedure 2.

▶ **Procedure 2   To prevent out-of-memory errors by not loading other programs**

1. Restart your computer by pressing CTRL+ALT+DEL. After your computer starts, MS-DOS displays the following text: Starting MS-DOS...

2. While the text is on your screen, press and release the F8 key. One at a time, MS-DOS displays each command in your CONFIG.SYS tile followed by a prompt. Bypass any program or device driver you don't need when running your MS-DOS application by pressing N when you are prompted.

3. When MS-DOS finishes processing your CONFIG.SYS file, press Y at the prompt to process the AUTOEXEC.BAT file.

4. If out-of-memory messages continue to appear when you try to run MS-DOS programs, repeat steps 1 through 3 and bypass additional programs or device drivers. If you don't need the commands or programs specified in your AUTOEXEC.BAT file, press N when you are prompted to process the file.

C H A P T E R 9

Customizing for International Use

The language conventions, keyboard layouts, and character sets of 24 countries or regions are available in MS-DOS. You can change:

- The country-specific conventions for displaying dates, times, and currency; conventions that determine the order in which characters are sorted; and conventions that determine which characters can be used in filenames.

- The layout of characters on your keyboard to fit the standard keyboard layout for another language.

- The character set (code page), so you can type and display the characters of other languages.

MS-DOS can use language conventions, keyboard arrangements, and character sets for the following languages (countries):

Belgian	French (Switzerland)	Norwegian
Canadian-French	German (Germany)	Polish
Croatian/Serbian/ Slovenian	German (Switzerland)	Portuguese (Brazil)
Czech (Czechoslovakia)	Hungarian	Portuguese (Portugal)
Danish	English (International)	Slovak (Czechoslovakia)
Dutch	English (United Kingdom)	Spanish (Latin America)
Finnish	English (United States)	Spanish (Spain)
French (France)	Italian	Swedish

Changing Country-Specific Conventions

When you change languages, you may need to change the country settings on your computer to specify the following:

- How the date and time are displayed
- Which symbol is used for currency
- The sort order used when alphabetizing files
- The characters that can be used in filenames and directory names

To change the country setting, include a **country** command in your CONFIG.SYS file with a three-digit country code. Information about country conventions is stored in the **COUNTRY.SYS** file located in the directory that contains your MS-DOS files.

For more information about changing country-specific conventions, type **help country** at the command prompt. For an example of using the **country** command, see "Changing All Your Country-Specific Settings" later in this chapter.

Changing the Keyboard Layout

The **keyb** command enables your keyboard to emulate the keyboards that are used with other languages. You do not have to physically exchange your key-board for a keyboard that is designed for the language you want to use. You can specify the **keyb** command in your AUTOEXEC.BAT file or at the command prompt.

When you use the keyb command, you must include a keyboard code to specify which keyboard you want to use. Keyboard codes are stored in the KEYBOARD.SYS file located in the directory that contains your MS-DOS files.

If you change keyboard layouts, you can switch back to the United States key-board layout by pressing **CTRL+ALT+F1**. To return to the keyboard layout you were using, press **CTRL+ALT+F2**.

Note If you are changing both the keyboard layout and the character set, you must load the character set before you change the keyboard layout.

For more information, type **help keyb** at the command prompt. For an example, see "Changing All Your Country-Specific Settings" later in this chapter. For illustrations of available keyboard layouts, see the appendix "Keyboard Layouts and Character Sets."

Changing Character Sets

MS-DOS can use up to 256 different characters. Different languages use dif-ferent combinations of these characters. The exact set of characters used at one time is known as the *character set* or the *code page*.

By default, MS-DOS uses the character set that comes with your computer. This character set is called a *hardware character set.* Your computer includes a hardware character set for your keyboard and your monitor.

If you want to use characters that are not provided by your hardware character set, load one of the MS-DOS character sets included with MS-DOS. An MS-DOS character set is a set of 256 characters that are stored in code-page information (.CPI) files. You can use an MS-DOS character set instead of your hardware character set by including several commands in your CONFIG.SYS and AUTOEXEC.BAT files.

MS-DOS provides six character sets that you can use in addition to, or instead of, the hardware character set that comes with your computer: Canadian-French, Multilingual (Latin I), Nordic, Portuguese, English, and Slavic (Latin II). All MS-DOS character sets have the first 128 standard ASCII characters in common. Each character set has a different set of national language characters.

You can load more than one character set into memory, but only one character set can be active at a time. For each of the countries supported by MS-DOS, you can use two MS-DOS character sets: a preferred character set and an alternate character set.

An Overview of the Procedures for Changing Character Sets

The following is an overview of the procedures you must carry out to change character sets. There are detailed instructions on each step later in this chapter.

▶ **To change character sets**

1. In your CONFIG.SYS file, include a device command that loads the DISPLAY.SYS device driver.

2. In your AUTOEXEC.BAT file, include the **nlsfunc** command, which starts the Nlsfunc program. Nlsfunc is a memory-resident program that loads country-specific information for national language support (NLS).

3. In your AUTOEXEC.BAT file, include the **mode con cp prep** command, which loads the character-set (code-page) information (.CPI) file.

4. Use the **chcp** command to make the character set active.

For an example of changing character sets, see the section "Changing All Your Country-Specific Settings" later in this chapter.

Preparing Your Monitor for Character Sets

To display MS-DOS character sets on an EGA, VGA, or LCD monitor, you must install the DISPLAY.SYS device driver. EGA and VGA monitors can display up to six MS-DOS character sets; LCD monitors can load only one MS-DOS character set; monochrome and CGA monitors cannot display MS-DOS character sets.

You load the DISPLAY.SYS device driver by including a **device** command in your CONFIG.SYS file. The **device** command line that loads the DISPLAY.SYS device driver provides the following information:

▪ The kind of monitor you have: EGA or LCD. (The EGA parameter supports both EGA and VGA monitors.)

▪ The hardware character set your computer uses and includes the appropriate information in your CONFIG.SYS file. If you omit this parameter, you will be unable to switch between your hardware character set and your MS-DOS character set.

▪ The number of MS-DOS character sets you want to use. For a VGA or EGA monitor, this number can be 1 through 6; for an LCD monitor, it must be 1. If you omit this parameter, the default number, 1, is **used.**

For more information, type **help display.sys** at the command prompt. For an example, see "Changing All Your Country-Specific Settings" later in this chapter.

Loading National Language Support for Character Sets

MS-DOS cannot recognize and switch between character sets unless you load the Nlsfunc program into memory. To do this, include the **nlsfunc** command in your AUTOEXEC.BAT file. The **nlsfunc** command must appear before any commands that load or switch character sets. For more information, type **help nlsfunc** at the command prompt. For an example, see "Changing All Your Country-Specific Settings" later in this chapter.

Loading a Character Set into Memory

To load a character set, use the **mode con cp prep** command. The **mode con cp prep** command retrieves the character set you want from the code-page information (.CPI) file in which it is stored and loads it into memory. After the character set is in memory, you can make it active and use it.

For more information about the **mode con cp prep** command, type **help mode** (**set device code pages**) at the command prompt. For an example, see "Changing All Your Country-Specific Settings" later in this chapter.

Making a Character Set Active

After you install the DISPLAY.SYS device driver, load the Nlsfunc program, and load the character set into memory, you must make the character set active. To make a character set active for all devices, use the **chcp** (change code page) command. For more information on character-set codes, see the section "Country, Keyboard, and Character-Set Codes" later in this chapter.

You can use the **chcp** command to make a character set active for every device that can use it. For example, to make character set 8.50 active for every device, type the following at the command prompt: **chcp 850**

For more information about the **chcp** command, type **help chcp** at the command prompt. For an example, see "Changing All Your Country-Specific Settings" later in this chapter.

Viewing Information About Character Sets

If you have specified a keyboard layout using the **keyb** command, you can view information about the character sets your keyboard and monitor are using by typing the following at the command prompt: **keyb**

MS-DOS then displays a message indicating which character sets **your keyboard** and monitor are using. To view the number of the active character set. type the following at the command prompt: **chcp**

The **mode** command also lists the active character set and the hardware character set for all your devices. To view information about the character sets. type the following at the command prompt: **mode**

Country, Keyboard, and Character-Set Codes

When you change your country settings, you must specify the country-specific conventions, keyboard layout, and character set(s). You indicate which settings you want to **use** by specifying an alphabetic or numeric code:

Language/ Country	Country Code	Keyboard Code	Preferred Character Set	Alternate Character Set
Belgian	032	be	850	437
Canadian-French	002	cf	863	850
Croatian/Serbian/ Slovenian	038	yu	852	850
Czech (Czechoslovakia)	042	cz	852	**890**
Danish	045	dk	850	865
Dutch	031	nl	850	437
English (International)	061	+	437	850
English (United Kingdom)	044	uk	437	**850**

Language/ Country	Country Code	Keyboard Code	Preferred Character Set	Alternate Character Set
English (United States)	001	us	437	850
Finnish	358	su	850	437
French (France)	033	fr	850	437
French (Switzerland)	041	sf	850	437
German (Germany)	049	gr	850	437
German (Switzerland)	041	sg	850	437
Hungarian	036	hu	852	850
Italian	039	it	850	437
Norwegian	047	no	850	865
Polish	048	pl	852	8.50
Portuguese (Brazil)	055	br	850	437
Portuguese (Portugal)	351	po	850	860
Slovak (Czechoslovakia)	042	sl	852	850
Spanish (Latin America)	003	la	850	437
Spanish (Spain)	034	sp	850	437
Swedish	046	sv	850	437

Configuring Your Computer for International Use

To use country-specific conventions; to prepare, load, activate, and display different character sets; and to use the keyboard layout for another language, you must carry out all the procedures in the following table.

To do this	Use this command	In this file
Change country-specific conventions	country	CONFIG.SYS
Prepare your monitor to display different character sets	device	CONFIG.SYS

To do this	Use this command	In this file
Load National Language Support for character sets	**nlsfunc**	AUTOEXEC.BAT
Load the character set into memory	**mode con cp prep**	AUTOEXEC.BAT
Make the character set active	**chcp**	AUTOEXEC.BAT or command prompt
Change the layout of char- acters on your keyboard	**keyb**	AUTOEXEC.BAT or command prompt

Changing All Your Country-Specific Settings

▶ **To change all your country-specific settings**

1. Add the following commands to your CONFIG.SYS file:

country = country code,,[drive] [path]country.sys
device = [drive][path]display.sys con =(monitor,hardware character
set,number of character sets)

For *country code,* specify the code for the country-specific conventions you want to use. For *drive* and *path,* specify the drive letter and path of the COUNTRY.SYS file. For *drive* and *path* in the **device** command line, specify the drive letter and path of the DISPLAY.SYS file. For *monitor,* specify EGA or LCD. For *hardware character set,* specify the hardware character set your computer uses. For *number of character sets,* specify how many MS-DOS character sets you want to be able to use.

2. Add the following commands to your AUTOEXEC.BAT file:

nlsfunc
mode con cp *prep=((character set)[drive][path]character set*
information file)
chcp *character set*
keyb *keyboard* code,,[drive][path]keyboard.sys

For *character set,* specify the code(s) of the character set(s) you want to load, separated by a space. For *[drive][path]character set information file,* specify the drive, path, and filename of the character-set (code-page) information file. The EGA and VGA character sets are stored in the EGA.CPI file; the LCD character sets are stored in the LCD.CPI file. For *character set,* specify the code for the character set you want to make active. You must specify one of the character sets that you specified in the **mode** command line. For *keyboard code,* specify the code for the key- board layout you want to use. For *drive* and *path* in the **keyb** command line, specify the drive and path of the KEYBOARD.SYS file. Note that two commas separate the keyboard code from the drive and path of the KEYBOARD.SYS file.

For example, suppose you want to use the country-specific conventions, keyboard layout, and character set for Germany. The table in "Country, Keyboard, and Character-Set Codes," earlier in this chapter, shows the following codes for Germany:

Language/ Country	Country Code	Keyboard Code	Preferred Character Set	Alternate Character Set
German (Germany)	**049**	gr	**850**	**437**

Suppose you have a VGA monitor, your hardware character set is 437, and the COUNTRY.SYS, DISPLAY.SYS, KEYBOARD.SYS, and EGA.CPI files are all located in the C:\DOS directory. You would add the following commands to your CONFIG.SYS file:

country=049,,c:\dos\country.sys
device=c:\dos\display.sys con=(ega,437,1)

You would add the following commands to your AUTOEXEC.BAT file:

nlsfunc
mode con cp prep=((850)c:\dos\ega.cpi)
chcp 850
keyb gr,,c:\dos\keyboard.sys

For more information about editing your CONFIG.SYS and AUTOEXEC.BAT files, see the chapter "Configuring Your System."

Explanation of Error Messages

This section lists some of the most common error messages you may receive when you customize your international settings and describes how to correct each error.

Code page specified has not been prepared

If you receive this error message, the keyboard code you specified with the **keyb** command is incompatible with your active character set.

For each language, there are two valid character sets: a preferred character set, which is the default, and an alternate character set. When you specify the **keyb** command, MS-DOS checks to see if the active character set matches the preferred character set for the new keyboard layout.

When you see the "Code page specified has not been prepared" message, you can change to the preferred character set for that keyboard layout or, if the active character set is the alternate character set for the keyboard layout you chose, you can specify it with the **keyb** command. To identify which character set is active, type the following at the command prompt: **chcp**

A message similar to the following appears: Active code page: 437

Consult the table in "Country, Keyboard, and Character-Set Codes," earlier in this chapter, to determine which two character sets are compatible with the keyboard layout you want to use. Include the number of the alternate character set with the **keyb** command.

For example, to specify the keyboard layout for France and use alternate character set 437, you would type the following command:

keyb fr,437,c:\dos\keyboard.sys

Invalid code page

The character set, or code page, you selected is not valid with the keyboard layout you selected. If you want to change both the keyboard layout and the character set, make sure you change the character set to one that is compatible with the keyboard code before changing the keyboard layout. If you are changing your international settings in your AUTOEXEC.BAT file, make sure the commands that change your character set appear before the **keyb** command.

Code page operation not supported on this device

If this message appeared after you specified the **mode con cp prep** command, make sure your CONFIG.SYS file includes a **device** command that loads the DISPLAY.SYS device driver.

Code page number not prepared for all devices

The character set you specified has not been loaded into memory, so you cannot use it yet. Before you can use this character set, you must load it into memory using the **mode con cp prep** command.

Failure to access code page font file

The .CPI (character-set information) file, also called a font file, specified in the **mode con cp prep** command is incorrect. For example, you may have typed VGA.CPI instead of EGA.CPI for your VGA monitor or specified the path or filename incorrectly. Check the command to make sure you typed the correct path and filename.

Font file contents invalid

Most likely, you typed the wrong name for your .CPI (character-set informa-
tion) file, also called a font file. Make sure the font file you specified in the
mode con cp prep command is either EGA.CPI or LCD.CPI. If you specified
the correct file, there may be something wrong with it, in which case you
should copy the original file from your MS-DOS distribution disks to your
hard disk. Files copied from your MS-DOS distribution disks must first be
decompressed.

Device error during prepare

You may have specified too many character sets with the **mode con cp prep**
command. You can specify only the number of character sets that are reserved
by the **device** command that loads the DISPLAY.SYS device driver in your
CONFIG.SYS file.

A P P E N D I X   A

Accessibility to MS-DOS for Individuals with Disabilities

This appendix provides information about the following products and services that make MS-DOS more accessible for people with disabilities:

■ Microsoft support services for individuals who are deaf or hard-of-hearing.

■ AccessDOS, a product that makes using MS-DOS easier for people with motion or hearing disabilities.

■ Keyboard layouts designed for people who type with only one hand.

■ Microsoft software documentation on audio cassettes and floppy disks.

■ Information about other products and services for people with disabilities.

Note The information in this appendix applies only to MS-DOS users in the United States. If you are outside the United States, your MS-DOS 6 package contains a subsidiary information card listing telephone numbers and addresses for Microsoft Product Support Services. Contact your subsidiary to find out whether products and services similar to those described in this appendix are available in your area.

Support Services for Individuals Who Are Deaf or Hard-of-Hearing

Through a text telephone (TT or TDD) service, Microsoft provides users who are deaf or hard-of-hearing with complete access to Microsoft's product and customer support services. You can contact Microsoft support services by using a text telephone by dialing (206) 635-4948 between 6:00 A.M. and 6:00 P.M. Pacific time. Microsoft's product support services are subject to Microsoft's prices, terms, and conditions in place at the time the service is used.

AccessDOS Features

AccessDOS includes utilities that:

▪ Provide for single-fingered typing of SHIFT, CTRL, and ALT **key** combinations.

▪ Ignore accidental keystrokes.

▪ Adjust the rate at which a character is repeated when you hold down a key, or turn off character-repeating entirely.

▪ Prevent extra characters from being typed if you unintentionally press **a** key more than once.

▪ Enable you to control the mouse cursor by using the keyboard.

▪ Enable you to control the computer's keyboard and mouse by using an alternate input device.

▪ Provide a visual cue when a computer makes sounds.

AccessDOS is available on the MS-DOS Supplemental Disk. You can down-load MS-DOS Supplemental Disk components from one of the user-group bulletin boards (such as the bulletin-board services on the Association of PC User Groups network), CompuServe®, GEnie™, Microsoft OnLine, or the Microsoft Download Service (MSDL). You can reach the MSDL using a modem by calling (206) 936-6735 any time except between 1:00 A.M. and 2:30 A.M. Pacific time (1200, 2400, or 9600 bps, no parity bit, 8 data bits, and 1 stop bit).

In the United States, you can order the MS-DOS Supplemental Disk by calling Microsoft Customer Sales and Service at (800) 426-9400 (voice) or (206) 635-4948 (text telephone). AccessDOS is currently available only in English.

Keyboard Layouts for Single-Handed Users

A file on the MS-DOS Supplemental Disk contains three Dvorak layouts: one for two-handed users, one for left hand-only users, and one for right hand-only users. The following illustrations show the three Dvorak keyboard layouts:

Two-Handed Dvorak
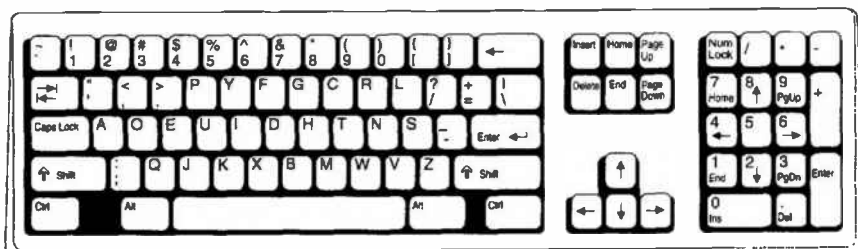
Left Single-Handed Dvorak
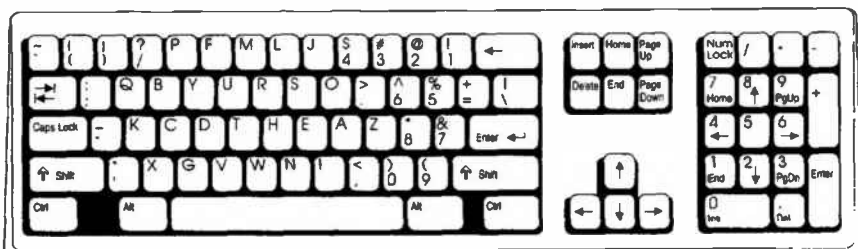
Right Single-Handed Dvorak
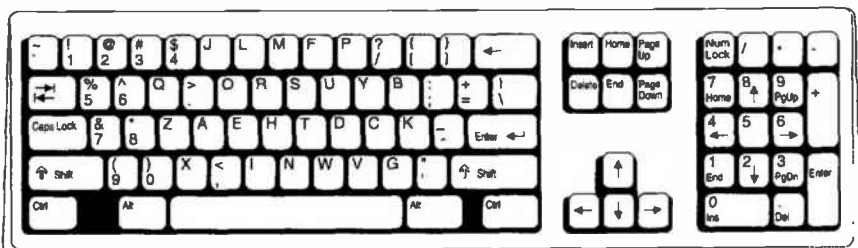
Documentation on Audio Cassettes and Floppy Disks

Recording for the Blind, Inc. distributes most of Microsoft's publications to registered members of their distribution service on audio cassettes or floppy disks. You can contact Recording for the Blind at the following address:

Recording for the Blind, Inc.
20 Roszel Road   Telephone: (800) 221-4792
Princeton, NJ 08540   Fax: (609) 987-8116

Getting More Information About Products and Services

For more information about Microsoft products and services for people with disabilities, contact Microsoft Customer Sales and Service at (800) 426-9400 (voice) or (206) 635-4948 (text telephone).

The Trace R&D Center at the University of Wisconsin-Madison produces *Trace ResourceBook,* a book that provides descriptions and photographs of about 2,000 products, and a compact disc with a database of more than 17,000 products and other information for people with disabilities. The compact disk should be available in early 1993.

Contact the Trace R&D Center at the address listed below:

Trace R&D Center
S-151 Waisman Center
1500 Highland Avenue   Voice telephone: (608) 263-2309
Madison, WI 53705-2280   Text telephone: (608) 263-5408

In the United States, you can obtain information in English about resources in your area by contacting the National Information System, a referral center for people with disabilities, at the following address or telephone numbers:

National Information System (NIS)
Center for Developmental Disabilities
University of South Carolina, Benson Bldg. 9
Columbia, SC 29208

Location	Voice/Text Telephone	Fax
United States (excluding South Carolina)	(800) 922-9234	(803) 777-6058
South Carolina	(800) 922-1107	(803) 777-6058
Outside the United States	(803) 777-6222	(803) 777-6058

APPEN.DIX   B

Keyboard Layouts and Character Sets

This appendix contains nine keyboard layouts and explanations of how to use keys that contain more than two characters, as well as how to type control characters and extended characters. There are also tables that illustrate the code pages for English and most other European languages. For information on changing your keyboard layout or active code page, see the chapter "Customizing for International Use."

Keyboard Layouts

France
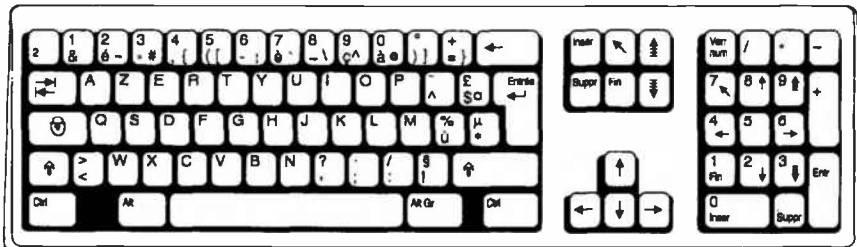
Germany
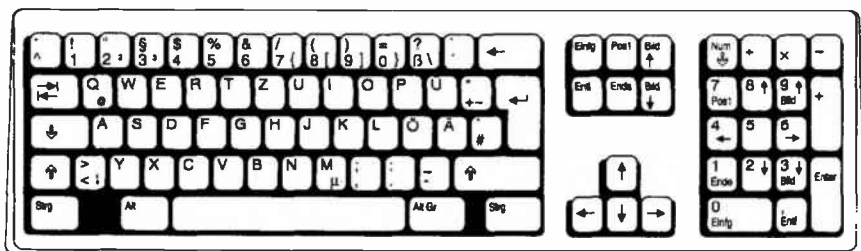
Italy
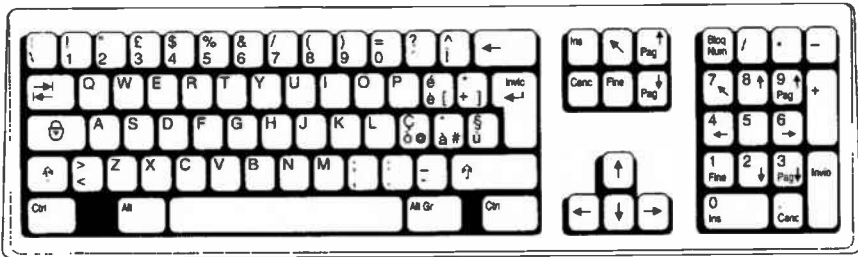
Netherlands
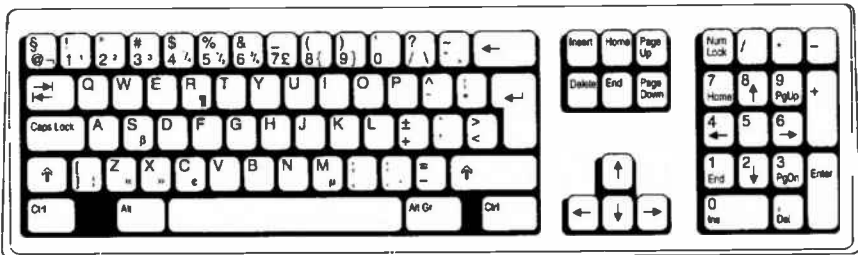
Portugal
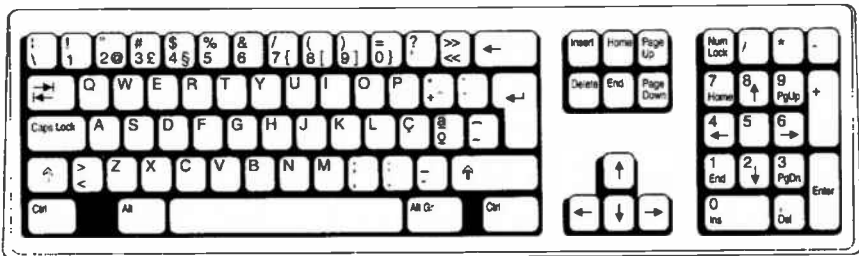
Spain

Sweden/Finland
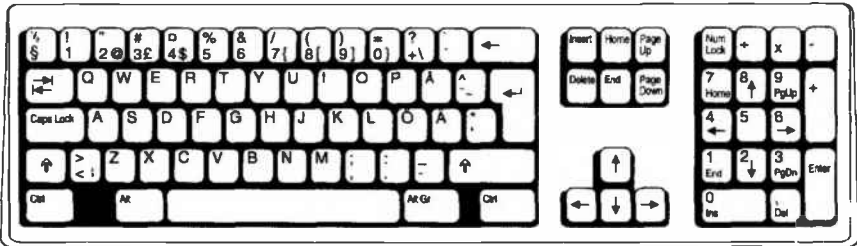
United Kingdom
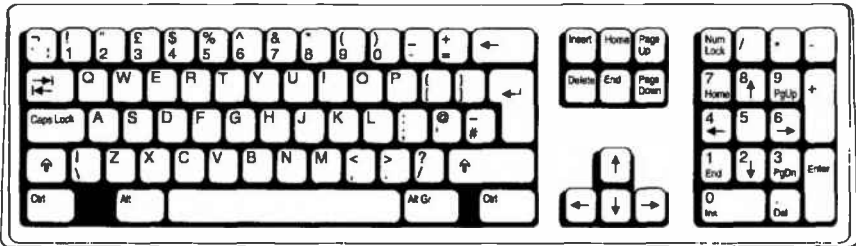
United States
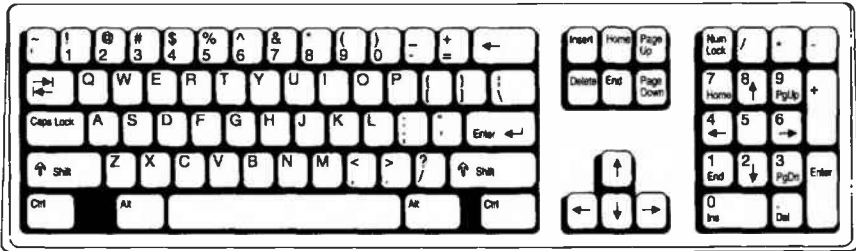
Using Keys That Have More Than Two Characters on Them

Some keyboards include individual keys that you can use to type three differ-
ent characters. To type the lower-left character, press the **key.** To type the
upper-left character, press SHIFT and the character key. To type the lower-
right character, use the key combinations listed in the following table.

Keyboard	Lower-right character (standard keyboard)	Lower-right character (enhanced keyboard)	Upper-right character (all keyboards)
Canada	ALT+SHIFT	ALT+GR	None
Denmark	ALT	ALT+GR	ALT+SHIFI
Norway	ALT	ALT+GR	ALT+SHIFT
Sweden/Finland	ALT	ALT+GR	ALT+SHIFT
All others	ALT+CTRL	ALT+GR	None

Character-Set (Code-Page) Tables

MS-DOS can use up to 256 different characters when you are displaying, printing, and working with text. MS-DOS includes six sets of 256 characters, which are called *character sets* or code pages. You refer to each character set by a number. For example, the English character set is number 437.

Each character in a character set is also numbered. MS-DOS reserves characters 0 through 31 for control characters. The keys on your keyboard represent characters 32 through 126. Characters 127 through 255 *are extended characters*. To type extended characters and the control characters that MS-DOS uses, carry out the following procedure.

▶   **To type an extended or control character**

●   Locate the character on the character-set table that matches the active character set. To display the active character set, use the **chcp** command. Hold down **ALT** and use the numeric keypad to type the number that corresponds to the character you want.

You can type only the characters that are available in the active character set. For information on changing the active character set, see the chapter "Customizing for International Use."

The following tables show the characters that are available for character sets 437 and 850. If you need information on the remaining character sets, you will need to refer to the full version of the *Microsoft MS-DOS 6 User's Guide*.

437 United States

#		#		#		#		#		#		#		#	
0		32		64	@	96	`	128	Ç	160	á	192	└	224	α
1	☺	33	!	65	A	97	a	129	ü	161	í	193	┴	225	ß
2	☻	34	"	66	B	98	b	130	é	162	ó	194	┬	226	Γ
3	♥	35	#	67	C	99	c	131	â	163	ú	195	├	227	π
4	♦	36	$	68	D	100	d	132	ä	164	ñ	196	─	228	Σ
5	♣	37	%	69	E	101	e	133	à	165	Ñ	197	┼	229	σ
6	♠	38	&	70	F	102	f	134	å	166	ª	198	╞	230	µ
7	•	39	'	71	G	103	g	135	ç	167	º	199	╟	231	τ
8	◘	40	(	72	H	104	h	136	ê	168	¿	200	╚	232	Φ
9	○	41	)	73	I	105	i	137	ë	169	⌐	201	╔	233	Θ
10	◙	42	*	74	J	106	j	138	è	170	¬	202	╩	234	Ω
11	♂	43	+	75	K	107	k	139	ï	171	½	203	╦	235	δ
12	♀	44	,	76	L	108	l	140	î	172	¼	204	╠	236	∞
13	♪	45	-	77	M	109	m	141	ì	173	¡	205	═	237	φ
14	♫	46	.	78	N	110	n	142	Ä	174	«	206	╬	238	ε
15	☼	47	/	79	O	111	o	143	Å	175	»	207	╧	239	∩
16	►	48	0	80	P	112	p	144	É	176	░	208	╨	240	≡
17	◄	49	1	81	Q	113	q	145	æ	177	▒	209	╤	241	±
18	↕	50	2	82	R	114	r	146	Æ	178	▓	210	╥	242	≥
19	‼	51	3	83	S	115	s	147	ô	179	│	211	╙	243	≤
20	¶	52	4	84	T	116	t	148	ö	180	┤	212	╘	244	⌠
21	§	53	5	85	U	117	u	149	ò	181	╡	213	╒	245	⌡
22	▬	54	6	86	V	118	v	150	û	182	╢	214	╓	246	÷
23	↨	55	7	87	W	119	w	151	ù	183	╖	215	╫	247	≈
24	↑	56	8	88	X	120	x	152	ÿ	184	╕	216	╪	248	°
25	↓	57	9	89	Y	121	y	153	Ö	185	╣	217	┘	249	·
26	→	58	:	90	Z	122	z	154	Ü	186	║	218	┌	250	·
27	←	59	;	91	[	123	{	155	¢	187	╗	219	█	251	√
28	∟	60	<	92	\	124	¦	156	£	188	╝	220	▄	252	ⁿ
29	↔	61	=	93	]	125	}	157	¥	189	╜	221	▌	253	²
30	▲	62	>	94	^	126	~	158	₧	190	╛	222	▐	254	■
31	▼	63	?	95	_	127	⌂	159	ƒ	191	┐	223	▀	255	

850 Multilingual (Latin I)

0		32		64	@	96	`	128	Ç	160	á	192	L	224	Ó
1	☻	33	!	65	A	97	a	129	ü	161	í	193	┴	225	ß
2	■	34	"	66	B	98	b	130	é	162	ó	194	T	226	Ô
3	♥	35	#	67	C	99	c	131	â	163	ú	195	├	227	Ò
4	♦	36	$	68	D	100	d	132	ä	164	ñ	196	─	228	õ
5	♣	37	%	69	E	101	e	133	à	165	Ñ	197	┼	229	Õ
6	♠	38	&	70	F	102	f	134	å	166	ª	198	ã	230	µ
7	•	39	'	71	G	103	g	135	ç	167	º	199	Ã	231	þ
8	◘	40	(	72	H	104	h	136	ê	168	¿	200	╚	232	Þ
9	○	41	)	73	I	105	i	137	ë	169	®	201	╔	233	Ú
10	◙	42	*	74	J	106	j	138	è	170	¬	202	╩	234	Û
11	♂	43	+	75	K	107	k	139	ï	171	½	203	╦	235	Ù
12	♀	44	,	76	L	108	l	140	î	172	¼	204	╠	236	ý
13	♪	45	-	77	M	109	m	141	ì	173	¡	205	═	237	Ý
14	♫	46	.	78	N	110	n	142	Ä	174	«	206	╬	238	¯
15	☼	47	/	79	O	111	o	143	Å	175	»	207	¤	239	´
16	►	48	0	80	P	112	p	144	É	176	░	208	ð	240	-
17	◄	49	1	81	Q	113	q	145	æ	177	▒	209	Ð	241	±
18	↕	50	2	82	R	114	r	146	Æ	178	▓	210	Ê	242	=
19	‼	51	3	83	S	115	s	147	ô	179	│	211	Ë	243	¾
20	¶	52	4	84	T	116	t	148	ö	180	┤	212	È	244	¶
21	§	53	5	85	U	117	u	149	ò	181	Á	213	ı	245	§
22	▬	54	6	86	V	118	v	150	û	182	Â	214	Í	246	÷
23	↕	55	7	87	W	119	w	151	ù	183	À	215	Î	247	¸
24	↑	56	8	88	X	120	x	152	ÿ	184	©	216	Ï	248	°
25	↓	57	9	89	Y	121	y	153	Ö	185	╣	217	┘	249	¨
26	→	58	:	90	Z	122	z	154	Ü	186	║	218	┌	250	·
27	←	59	;	91	[	123	{	155	ø	187	╗	219	█	251	¹
28	∟	60	<	92	\	124	¦	156	£	188	╝	220	▄	252	³
29	↔	61	=	93	]	125	}	157	Ø	189	¢	221	¦	253	²
30	▲	62	>	94	^	126	~	158	×	190	¥	222	Ì	254	■
31	▼	63	?	95	_	127	⌂	159	ƒ	191	┐	223	▀	255	

A P P E N D I X   C

Obtaining New Virus Signatures

Anti-virus programs use a series of hexadecimal codes called a virus signature to detect known computer viruses. **By** periodically updating your signature file, you can enable Microsoft Anti-Virus to detect new viruses. It is important to use only signature files written for Microsoft Anti-Virus. Signature files written for other anti-virus programs may cause incorrect results.

Updating Your Virus Signatures

As new viruses are discovered, their signatures are posted on a bulletin board system (BBS) that is constantly available. New signatures only update the ability of Microsoft Anti-Virus to *detect* new viruses; they do not enable you to *remove* new viruses. To fully protect your computer from unknown viruses and enable Microsoft Anti-Virus to remove them, you must update the Anti-Virus program. A coupon for a special Anti-Virus update offer is included at the back of this guide.

You must have a user identification code for the BBS to get an update. If you do not have a user identification code, carry out both the following procedures. Otherwise, skip to the next procedure.

▶ **To obtain a user identification code for the BBS**

1. Change your communications settings to the following: 8 data bits, no parity, and 1 stop bit. You can select any speed up to 9600 baud.

2. Dial (503) 531-8100.

3. The first screen prompts you for information about your ANSI graphics, display. If you want ANSI graphics, select Y and then press ENTER.

4. When you are prompted for a user identification code, type **new** at the command prompt.

5. The screen prompts you to indicate if the word "ANSI" is blinking. If the word is blinking, select Y; otherwise select N. Then press ENTER.

6. Type your full name, your company name (if applicable), your mailing address, and your daytime telephone number (including the area code). This information is used if it is necessary to contact you regarding your BBS account.

7. Choose your computer type.

8. Type the user identification code and password you want to use.

   Your user identification code can be 3 to 29 characters long, including spaces, numbers, and punctuation. Your password will be displayed after you type it. Make a record of your password when you are prompted to do so. You cannot get password information if you forget or lose the password you have chosen. However, you can change your user account information at any time, including your password.

▶ **To obtain new virus signatures from the BBS**

1. If you have not logged on to the BBS, change your communications settings to the following: 8 data bits, no parity, and 1 stop bit. You can select any speed up to 9600 baud.

2. Dial (503) 531-8100.

3. Type your user identification code, and press ENTER. Then type your password, and press ENTER.

4. From the list that is displayed, choose option D (Download Anti-Virus Signature Files).

5. From the Download Signature Files list, choose one of the following options:

   ▪ R (Readme First)-Lists options for obtaining instructions on using the signature files after you download them.

   ▪ W (Windows)-Displays protocols you can choose from to download the signature files for Anti-Virus for Windows.

   ▪ D (MS-DOS)-Displays protocols you can choose from to download the signature files for Anti-Virus for MS-DOS.

6. After selecting the W (Windows) or D (MS-DOS) option, select a download protocol supported by your modem, and then download the file.

7. After you have downloaded the file, press X and then ENTER to exit the BBS. Or, press C to display the Download Signature Files list again. To log off, press Y. When the NO CARRIER message appears, quit your communications program.

8. Use the downloaded signature files as instructed in the Readme First file.

Index

Microsoft, MS-DOS. 6
Resource Kit and Supplemental Disks Offer

1. Print your name, shipping address, and phone number:

Name

Company name
(if company licenses product)
Shipping address

City   State/Prov.   ZIP/PC

Daytime phone (   )
(in case we have a question about your order)

2. Check the Supplemental disk feature(s) that prompted your order:

Microsoft QuickBasic™ games and programs
Files for use with IBM® ProPrinter® or IBM PC convertible
Utilities to assist persons with disabilities
Batch file for creating a bootable DoubleSpace floppy disk
MS-DOS commands (included in earlier versions of MS-DOS):

ASSIGN.COM	GRAFTABL.COM
BACKUP.EXE	JOIN.EXE
COMP.EXE	MIRROR.COM
CV.COM	MSHERC.COM
EDLIN.EXE	PRINTFIX.COM
EXE2BIN.EXE	

3. Calculate cost and indicate method of payment:

Microsoft MS-WS 6 Resource Kit-including the Supplemental disks (U.S. $19.95 or CDN $24.95, plus freight and tax)
5.25" low-density disks (Kit No. 147-099-185)
3.5" low-density disks (Kit No. 147-095-185)

Supplemental disks only (U.S. $5.00 or CDN $7.50)
5.25" low-density disks (Kit No. 147-099-135)
3.5" low-density disks (Kit No. 147-095-135)

cost (see above)	$
Sales tax* (multiply cost by the sales tax rate)	$
Freight ($5.00 U.S./$7.50 CDN)	$
Total cost	$

* Add the applicable sales tax in the following states: AZ, CA, CO, CT, DC, FL, GA, HI, IA, ID, IL, IN, KS, KY, LA, MA, MD, ME, MI, MN, MO, MS, NC, ND, NE, NJ, NM, NV, NY, OH, OK, PA, RI, SC, TN, TX, UT, VA, WA, WI, WV, and WY. In Canada, add 7 percent GST (all provinces). Manitoba residents add 7 percent PST. Microsoft reserves the right to correct tax rates and/or collect the sales tax assessed by additional states as required by law, without notice.

Method of Payment**

Check or money order enclosed   VISA (13 or 16 numbers)
MasterCard (16 numbers)   American Express (15 numbers)

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16

Expiration date

Cardholder's signature

**Please send payment in U.S. or Canadian funds. Do not send cash or purchase orders. Make checks payable to Microsoft. Note: Your check will be deposited immediately upon receipt by Microsoft.

4. Send the completed order form to:

Microsoft MS-DOS 6 Disk Offer
P.O. Box 3024
Bothell, WA 98041-3024
U.S.A.

- O R -

Microsoft Canada Inc.
320 Matheson Blvd. West
Mississauga, ON L5R 3R1
Canada

Microsoft

Microsoft, MS-DOS® 6
Resource Kit and Supplemental Disks Offer

You can use this coupon to order the MS-DOS 6 Resource Kit and the MS-DOS 6 Supplemental disks. The Resource Kit contains the following:

- *The MS-DOS 6 Technical Reference,* which includes a printed reference for all MS-DOS 6 commands as well as technical information about DoubleSpace and MemMaker. It also includes the specification for the Microsoft Real-Time Compression Interface, or MRCI. The MRCI specification is a compression-interface standard designed to make it easy for software and hardware vendors to take advantage of the disk compression technology included with MS-DOS 6.

- The Supplemental disks, which include files and tools (see item 2 on the following page for disk contents). You can also order the Supplemental disks separately.

You can download the data on the Supplemental disks from the Microsoft Product Support Download Service (MSDL). To reach the MSDL, call (206) **936-6735** in the United States or (416) 507-3022 in **Canada.**

When you call the MSDL, use the following communications settings:

For this setting	specify
Baud rate	1200, 2400, or 9600
Parity	none
Data bits	8
Stop bits	1

How to Order

To order the Resource Kit or Supplemental disks, fill out the form on the following page and send it, with your MS-DOS 6 registration card (if you haven't already sent it in), to the address on the following page. **Offer limited to one Resource Kit or set of Supplemental disks per order.**

Microsoft

Protect your PC against new viruses. Get two anti-virus updates for as little as $9^{95}*each!

Microsoft' MS-DOS" 6 includes a powerful virus protection program that detects and removes more than 800 viruses. Unfortunately, new viruses appear frequently. That's why you need an ongoing plan to keep your data safe.

To keep your virus protection current, Microsoft is pleased to offer you two anti-vim software updates for as little as $9.95 each. (Price for U.S. residents; see reverse side for prices in your country.)

Plus you'll also receive information about ongoing service plans. It's our way of making sure we take care of your data-protection needs today and tomorrow.

To order your low-cost anti-virus update, just complete and send the attached coupon to the address for your country as indicated on the reverse side.

Microsoft®
Making it easier

*Price for U.S. residents only; other destinations additional. You must pay in the currency appropriate for your country. (See chart on reverse side for details.) Microsoft and MS-DOS are registered trademarks and Windows is a trademark of Microsoft Corporation.

Virus Protection Update Order Form

Order your anti-virus update(s) now and save money! (See reverse side for your price.)

• Yes! Please send me my anti-virus update(s). I understand the first will ship now and the second will follow in 3-4 months. (Please allow 2-3 weeks for initial delivery.)

_____

_____

company	Department

Street Address
_____

City	Country

Zip Code/Postal Code
_____

Daytime Phone	Fax

PC Make	Model

**CA, CT, IL, MA, MD, MI, MN, NJ, NY, TX, VA, add applicable sales tax. Canadian buyers add applicable GST. Our GST code is 129820296.

Choose one disk size: • 5.25 inch 360K • 3.5 inch 720K
Choose version: • MS-DOS • Windows™ [ENG]

Please find your price on reverse side and enter below:

• Price for One Update   _____

• Price for Two Updates   _____

Applicable Sales Tax**   _____

Total   _____

• Sales Tax Number: (if applicable) _____

Payment Method:

• Check/Eurocheque/Money Order Enclosed

(Make checks payable to "Am-Virus Update")

• **VISA**   • **MasterCard**   • **EuroCard**

• **BankCard**   • **American Express**

• **P.O.#** _____

Card#:| | | | | | | | | | | | | | | | |

Exp.Date: | | | - | | |

Signature _____

Anti-Virus Update Offer Price Chart

Prices below include shipping, handling, and local sales tax where applicable

United States	US	US$	9.95/19.90	VISA, MC, AMEX, Personal Check
Canada	US	US$	14.95/29.90	VISA, MC, AMEX, Personal Check (U.S. funds)
Germany	Germany	DM	39,00/70,00	VISA, MC, EuroCard, AMEX, Personal Check, Eurocheque
France	France	FF	139,90/279,80	VISA, MC, AMEX, Personal Check
UK	UK	£	14.95/29.90	VISA, MC, AMEX, Personal Check
Finland, Norway, Denmark, Sweden, Holland, Luxembourg, Belgium, Spain, Portugal, Greece, Ireland	UK	£	14.95*/29.90* (See approx. local currency equiv. below)	VISA, MC, EuroCard, AMEX, Eurocheque
Italy	Italy	Lira	37,000/75,000	VISA, Personal Check, Eurocheque
Austria	Germany	AS	279/500	VISA, MC, EuroCard, AMEX, Eurocheque
Switzerland	Switzerland	SF	37,90/68	VISA, MC, EuroCard, AMEX, Eurocheque
Eastern Europe	Germany	DM	39,00/70	Eurocheque
Australia, New Zealand, Asia/Pacific	Australia	US$	33.90/67.80	VISA, MC, BankCard, Money Order, Personal Check (Checks accepted from Australia and New Zealand only)
South America, Central America, Mexico	US	US$	14.95/29.90	VISA, MC, AMEX, Money Order
Africa, Middle East (except Israel)	UK	£	13.90/25	VISA, MC, EuroCard, AMEX, Eurocheque, Money Order
Israel	Israel	IS	35.00/60.00	VISA, MC, Personal Check

Please send your order to the address for your country as listed Mow:

UNITED STATES
AV Update
15220 Greenbrier Parkway #200
Beaverton, OR 97006-9937 • USA
Or fax credit orders to: 800-626-2778

UNITED KINGDOM
AV Update
PO. Box 15 • Twyford • Reading
Berkshire RG10 9LZ • U.K.

FRANCE
AV Update
1, Rond-Point de l'Europe
92257 La Garenne Colombes Cedex
France

AUSTRALIA
AV Update
P.O. Box 660 • Brookvale • NSW 2100
Australia

ITALY
AV Update
Via Vittorio Veneto 24
20124 Milano • Italy

GERMANY
AV Update
Hoferstr. I/II • P.O. Box 83 01 49
D-W-8000 Munich 83 • Germany

SWITZERLAND
AV Update
Lebrigstrasse • CH-8583 Goetighofen
Switzerland

ISRAEL
AV Update
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