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10 9 8 7 6 5

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To Our Customers

Congratulations on selecting the **Tandy® Model 2000**. The Model 2000 is powerful and simple to use.

In addition, the Model 2000 offers several features that make it adaptable to almost any work environment.

Some of the features include:

- A space-saving main unit, containing high-capacity disk drives and the 80186 central processing unit
- An optional high resolution monitor, either monochrome or color
- A detached, low-profile keyboard, which can be positioned on a desktop or in the lap
- An ergonomically designed keyboard for hesitation-free typing
- An optional floor stand for the main unit, to save desk space
- An optional swivel pedestal to position the monitor for comfortable viewing

Your Model 2000 includes the popular MS™-DOS operating system. It can run a complete line of programs, including programs for:

- Business
- Word processing
- Personal finance
- Programming
- Entertainment
- Communication

Monitor signal cable 13-15
Monochrome Graphics Options Board 11
MORE..... 45
MS-DOS..... 3, 19-21, 58-59
  Messages..... 58-59
  Starting 19-21

O

Operator error 58-59
Option board, Installing..... 12
Output, Redirecting 43-44

P

Parallel printer..... 6-7
Pathname..... 48-49
Power switch..... 6-7
PRINT 45-46
Printer 1, 6-7
Printing
  All characters as displayed 22
  Current display 22
  Files in the background..... 45-46
Processor..... 2
Programs..... 1

R

RAM Upgrade, 128K..... 11
Random access memory (RAM)..... 1
Read only memory (ROM) 1
RECOVER..... 64
RENAME 45
Reset switch 6-7
RESTORE..... 35-36
RMDIR..... 50
Root directory 47
RS232 6-7

S

Screen 1
Software..... 2-3
SORT..... 44-45
Sound 11
Source diskette 26, 28
Storing information 1
SYS 64
System error 59
System prompt 21
Systems..... 1

T

Target diskette..... 26, 28
Time, Entering the..... 21
TYPE 44-45

V

Vertical hold..... 9
Video monitor 8-10, 14-15
Volume label 26, 33-34

W

Write-protect notch 17, 18
Write protecting a diskette 18

Changing 63-64
Cleaning the drive head 57-58
Using a second drive 50-51
Diskette 1, 17-18, 20, 63-64
Handling 17
Inserting 20
Recovering unflawed portions of flawed diskette 64
Write protecting 18
Disk operating system 2-3
Display, Freezing 24, 45
Drive latches 6-7
Drive lights 6-7

E

EDLIN 42-43
ERASE 46
Errors, Types of 58-59
External 128K Board 11

F

File 23, 41-46, 63-64
Copying 41
Creating 42-43
Creating batch file (file containing several commands) 63
Deleting 46
Editing 42-43
Finding information in 44-45
Listing 43
Printing while doing other tasks 45-46
Redirecting output 43-44
Renaming 45
Sorting the contents of 44-45
Transferring system files 64
Filename 24
FIND 44-45
FORMAT 25-26

H

Hard disk 2, 31-36
Advantages over floppy disk 31
Backing up files to floppy disk 34-35
Formatting 31-32
Restoring files to hard disk 35-36
Starting up under hard disk control 32
Hard disk system 31-36
Hardware 1
HFORMAT 31-32
Horizontal centering 10

I

Information loss, causes of 25
Internal 128K Board 11

K

Keyboard 1, 8, 22-23
Connector 6, 7, 14
Using 22-23

L

Languages 2
Assembler 63
Compiler 63
Interpreter 62
LIST 55
LLIST 55

M

MAILLIST 37-40
Add entry 38-39
Change entry 39
Delete entry 39-40
List to screen 39
List to printer 40
Main Menu 37
Return to MS-DOS 40
Main unit 6-7
Floppy disk system 6
Hard disk system 7
Memory 1
Increasing the amount of 11
Model 2000 ..... 13-15, 19
Setting up 13-15
Turning on 19
Turning off 19
Monitor 8-10, 14-15
Color (CM-1) 9-10, 15
Monochrome (VM-1) 8-9, 14
Monitor connector 6, 12, 14-15
Color monitor 12, 15
Monochrome monitor 6, 14

How to use this Manual

This manual shows how to start up the Model 2000 and gives examples of how to use many of its features.

When typing the examples in the manual, do not be concerned if you make an error. The computer "warns" you of the error by displaying a message such as those that follow:

Syntax error
Bad command or file name
File name

Simply retype the example correctly.

After you finish reading this manual, you can immediately begin running any Tandy application you have purchased.

Information about the more advanced features of the Model 2000 is provided in the other Model 2000 manuals.

***MS-DOS Commands Reference* manual.** This reference manual on the MS-DOS operating system gives complete details on the MS-DOS commands, and the editor, linker and debug programs.

***Model 2000 BASIC Reference* manual.** This manual gives complete details on the BASIC commands you can use to write programs on your Model 2000. If you are not familiar with BASIC, you may first want to read some introductory books on it. From there, you can go on to the *BASIC Reference Manual*.

Index

A

Application programs 2
BASIC 2
Communications 61
Computer spreadsheet 61
Data base management 61
Education 62
Error messages 58
General accounting 62
Languages 62-63
MAILLIST 37-40
Personal 62
Specialized 62
Word processing 61

B

Background printing 45-46
BACKUP 34-35
Backing up all files from hard disk 34
Backing up modified files from hard disk 34-35
BASIC 2, 53-55
Loading BASIC 53
Loading a program 55
Programming with 53-55
Running a program 55
Saving a program 54
Writing a program 53
Brightness 8, 10

C

Card cage 12
Central processing unit (CPU) 2, 12
Color 11
Color Graphics Option Kit 11
Commands, BASIC 53-55
Clearing the screen (CLS) 53
Listing the program (LIST) 55
Listing the program to the printer (LLIST) 55
Loading the program (LOAD) 55
Locating a point on the screen (LOCATE) 53-54
Printing text (PRINT) 53-54
Running the program (RUN) 54
Storing the program (SAVE) 54
Commands, Combining MS-DOS commands 44
Commands, MS-DOS 63-64
Backing up files from hard disk (BACKUP) 34-35
Comparing diskettes (COMPDUPE) 63
Copying a file (COPY) 41
Copying a disk (DISKCOPY) 26-27
Creating a directory (MKDIR) 48
Deleting a directory (RMDIR) 50
Deleting a file (ERASE) 46
Displaying information about files (DIR) 23-24
Finding information in a file (FIND) . . 44-45
Listing a file (TYPE) 43
Preparing diskettes (FORMAT) 25-26
Preparing hard disk (HFORMAT) 32
Printing files in background (PRINT) 45-46
Recovering unflawed portions of flawed diskette (RECOVER) 64
Restoring files to hard disk (RESTORE) 35-36
Sorting data (SORT) 44-45
Transferring system files (SYS) 64
COMPDUPE 63
CONFIGHD.BAT 31-32
Connecting Model 2000 to another computer 61
Contrast 8, 10
COPY 41

D

Data diskettes 27-29, 33-34
Copying 28-29
Preparing 27-28, 33-34
Using 28, 34
Date, Entering the 21
Device error 59
DIR 23-24
Directories 23-24
Changing 63-64
Creating 48
Removing 50
Using EDLIN to create files in directories 42
Using pathnames to access files in directories 48-49
Disk 2
Floppy disk 2
Hard disk 2
DISKCOPY 26-27
Disk drive 6-7

Contents

Chapter 1
How Computers Work 1

Chapter 2
About Your Equipment 5

Chapter 3
Setting Up Your Model 2000 13

Chapter 4
Getting to Know Your Model 2000 17

Chapter 5
Using Your Floppy Disk System 25

Chapter 6
Using Your Hard Disk System 31

Chapter 7
Running Application Programs 37

Chapter 8
Using MS-DOS Commands to Manage Files 41

Chapter 9
An Added Dimension: Multiple Directories 47

Chapter 10
Learning to Program with BASIC 53

Chapter 11
In Case of Trouble 57

Chapter 12
And That's Just the Beginning 61

Appendix A

Using RESET (F12)

If your screen is blank or frozen, it may be because you are using a monitor other than the one in the normal configuration. Follow these steps to reset the system:

1. Press **RESET**.
2. Watch the indicator light on the (CAPS) or (NUM LOCK) key. The light quickly flashes on and then off. When it goes off, immediately press and release the (F12) key.

Note: Another method is to press **RESET** and watch the Drive A light. When the light goes out momentarily, press and release (F12) immediately.

If your screen is still blank, repeat the procedure. Timing of the (F12) key depression is important. Also, tap the key as quickly as possible; do not hold it down.

Depending on your timing when you press (F12), the screen may go blank again when you enter BASIC. If this happens, simply press **RESET** and (F12) again as described.

Note: You must use this procedure every time you reset the system (every time you are instructed to press **RESET**).

directory. It also lets you use a drive other than your system drive as the default drive.

SYS. Transfers the MS-DOS system files to another disk, making it a system disk.

RECOVER. Recovers the unflawed portions of a flawed diskette.

BACKUP and RESTORE. Variations of these let you set up a file that contains the names of all files you want to backup or restore.

For More Information. *The* MS-DOS Commands Reference *manual that comes with your Model 2000 describes all the MS-DOS commands.*

And Now It's Your Turn

This chapter has touched on some popular applications of the Model 2000. As you grow accustomed to using the Model 2000, you'll think of ways to expand it to meet your own needs. Applications for the Model 2000 are limited only by the imagination!

Chapter 1

How Computers Work

Your computer system consists of *hardware* and *software*. The equipment is the hardware. The instructions that tell the hardware what to do are software, also called *programs* or *systems*. As you can see, hardware and software are dependent upon each other.

Computer Hardware

The following illustration shows the parts of the hardware and how they relate to one another:

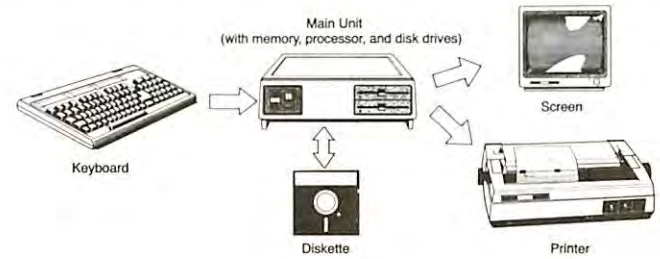


Figure 1.1

Keyboard. For "entering" information into the computer.

Screen and Printer. For receiving information from the computer.

Memory. For storing information and software inside the computer. The two kinds of memory are:

- ***Random access memory (RAM)*** — for temporary storage of information and software that you enter. When you turn off the computer, the contents of RAM disappear.
- ***Read-only memory (ROM)*** — for permanent storage of essential, built-in software, such as the software that tells the computer what to do when you turn it on. You cannot change the contents of ROM.

Floppy Disk. For permanently storing information and software outside the computer. A floppy disk, also called a "diskette," has a magnetic coating that stores information in much the same way an audio tape stores sound.

One version of the Model 2000 contains a hard disk, as well as a floppy disk. Hard disks can store more information than floppy disks.

Processor. For gathering, manipulating, and sending information within the computer. The processor ties together all other parts of hardware.

Computer Software

The following illustration shows the kinds of software and how they relate to the hardware:

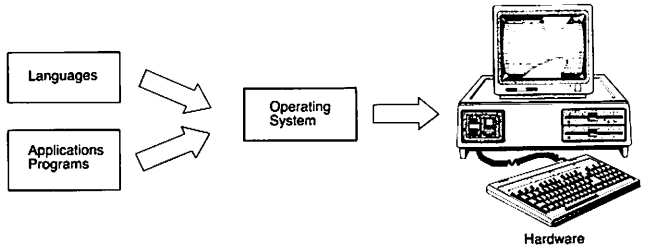


Figure 1.2

Application Programs. To get the computer to do something practical, such as compile a mailing list, you need an application program. Radio Shack has many applications for such tasks as accounting, electronic filing, and word processing.

Languages. A programming language, such as BASIC, is one kind of application program. It has a set of codes you can use to write other application programs. The Model 2000 comes with BASIC and a *Model 2000 BASIC Reference* manual.

Disk Operating System. An application program seldom talks to the hardware directly. It talks through a disk

Compiler. Compiles an entire program into machine code at one time. When you are ready to run the program, it is already in machine code. Tandy offers compilers for popular languages such as BASIC, COBOL, FORTRAN, and PASCAL.

Assembler. Assembles a program consisting of symbolic instructions into machine code. An assembler is best suited for an advanced programmer because its instructions talk directly to the computer.

For More Information. *All Tandy languages come with reference manuals.*

If you plan to use an assembler, you'll need technical information on the MS-DOS system calls. The system call information is in the Programmer's Reference Manual *(Catalog #26-5403); the hardware information is in the* Model 2000 Technical Manual *(Catalog #26-5404).*

MS-DOS Commands

This manual has discussed some of the most important MS-DOS commands. There are, however, many other commands and features available. In addition, many of the commands described in this manual have additional parameters you may want to use. Some examples are:

COMPDUPE. Copies a diskette from Drive A to Drive B, and then does a comparison to make sure that all the information was copied.

SORT. Sorts the lines in a file according to a particular column number. It also lets you sort lines in reverse order.

BATCH commands. Let you create files that contain series of commands so you can execute each series whenever you want. For example, you can create a file that shows you a directory, loads BASIC, and then runs a program — all automatically.

Changing Directories and Drives. Lets you use a subdirectory, rather than the root directory, as the "default"

General Accounting. Performs the routine accounting procedures required in most offices: payroll, accounts payable, accounts receivable, general ledger, and inventory.

Education. Provides another method of learning, which you can adapt to your own pace and interest.

Personal. Assists you in managing your home and finances, and lets you play electronic games.

Specialized. Performs the tasks required by a specialized group. Examples are real estate and agricultural problems.

More advanced application programs combine several useful functions into an integrated software package. For example, you may prepare a form letter, using a word processing function, and then combine it with information stored within a data base function.

For More Information: *Tandy offers a complete line of programs for the Model 2000, which you can find at any Radio Shack Computer Center, Expanded Computer Departments of Radio Shack stores, and participating dealers. Also, independent companies offer programs that will run on the Model 2000. To locate sources of software, you can use* Radio Shack's TRS-80 Sourcebook *listing or the* Directory of Reviewed Software, *available at Radio Shack Centers and Computer Departments.*

Languages

There is a large demand for innovative application programs. Should you decide to program, these are your tools:

Interpreter. Translates each instruction into machine code as you run the program. An interpreter is best suited for beginners, because it lets you see the results of your program immediately. The BASIC program that comes with the Model 2000 is an interpreter.

operating system. The Model 2000's disk operating system is MS-DOS. MS-DOS is on the diskette that comes with your Model 2000.

To use your system, you need MS-DOS. For example, assume you want the computer to print a list of your checking transactions. Your application program decides what to print and then leaves the operation of the printer to MS-DOS.

The rest of this manual shows how to set up your Model 2000 and how to store and manipulate information, using the Model 2000, MS-DOS, and a BASIC application program.

Chapter 12

And That's Just the Beginning

Tandy offers many popular MS-DOS application programs and is constantly developing more. In addition, products are available from a variety of independent suppliers.

Application Programs

The most popular applications fall in these categories:

Word Processing (an electronic typewriter). Lets you type information into the computer and then insert, delete, or replace the information. You can print as many copies of the information as you want and store it on diskette for future use.

Data Base Management (an electronic filing system). Lets you organize and store large amounts of related information on diskettes. You can quickly retrieve all or part of the information — as screen displays or printed reports.

Computer Spreadsheet (an electronic decision-making tool). Lets you type in varying information and formulas and immediately see the results. Depending on the program, you can see the results as a table or a chart.

Communications (an electronic telephone). Lets you connect your Model 2000 to another computer (by purchasing a modem) and communicate over a telephone line. A popular use of this is to receive information from a large computer network such as:

- Compuserve, which connects you to newspapers such as the New York Times and Washington Post.
- Dow Jones, which gives you daily information on the New York Stock Exchange.
- A bulletin board service, which lets you share information with other people, on a local or national basis.
- Data base services, which offer large amounts of information on a given subject.

Chapter 2

About Your Equipment

The three main parts of the Model 2000 are:

- The main unit, which contains the disk drives and the CPU
- The keyboard, which comes with the main unit
- The video monitor

Figure 2.1

The Main Unit

The Floppy Disk Model 2000 (Catalog #26-5103) contains two floppy disk drives, Drives A and B. The main power cord is packaged with the main unit.

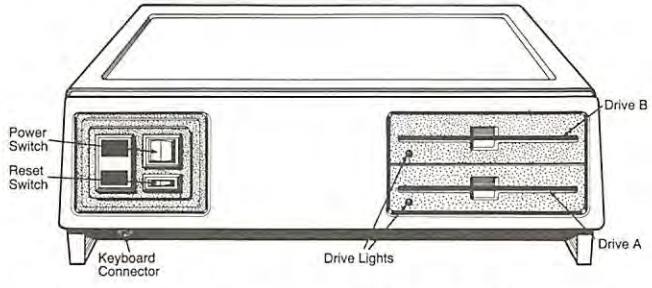


Figure 2.2 — Main Unit, Floppy Disk System (Front View)

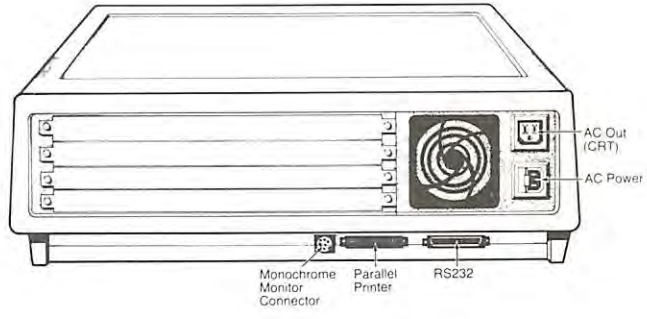


Figure 2.3 — Main Unit, Floppy Disk System (Back View)

Another common operator error is trying to store too much information on a diskette. For example, suppose you are in the middle of storing information and run out of disk space. MS-DOS warns you with this message:

Insufficient disk space

Either (1) use another diskette or (2) use the ERASE command to delete files, freeing disk space.

Another error that may be displayed is:

File not found

The file that you are specifying is not in your directory. You may have (1) misspelled the file's name, (2) given an incomplete filename, or (3) indicated the wrong directory.

A system or device error warns you of a system problem, usually a flawed diskette or faulty disk drive. For example, MS-DOS might display the message

Sector not found

Try the operation again, first using a new diskette and then using a different drive. If you still get the error, contact your Radio Shack Service Center.

For help in understanding MS-DOS messages, see Appendix A in your MS-DOS Commands Reference Manual.

The only Radio Shack approved method of head cleaning is the use of a Radio Shack Universal Disk Drive Head Cleaning Kit (Catalog Number 26-407). Regular cleaning with this kit will help prevent costly disk drive repair later.

The Computer's Warning System

When an error message is displayed, it comes from one of two sources: an application program or MS-DOS.

Application Program Messages

An application program error message warns you that you may be using the program incorrectly. For example, suppose you delete Entry 2 from your mailing list and then try to change Entry 2. MAILLIST displays the message

```
Entry 2 not found
```

For help in understanding application program messages, see your application program manual.

MS-DOS Messages

An MS-DOS error message warns you of an operator error or a system or device problem.

An operator error tells you that you are asking the computer to do something it can't do.

Perhaps the most common operator error is typing a command or program name incorrectly. For example, suppose you type this for the DIR command:

DIRE (ENTER)

MS-DOS displays either of these error messages:

```
Bad command or file name
Syntax error
```

You simply need to enter the command again, spelling it correctly:

DIR (ENTER)

The Hard Disk Model 2000 (Catalog #26-5104) contains one floppy disk drive, Drive A, and one hard disk drive, Drive C. The main power cord is packaged with the main unit.

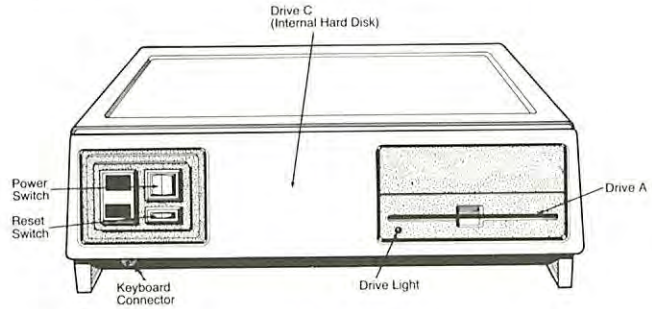


Figure 2.4 — Main Unit, Hard Disk System (Front View)

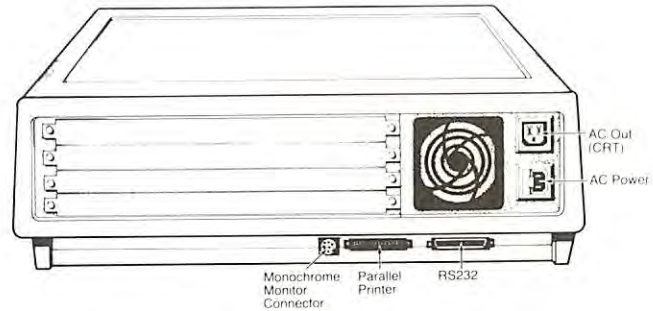


Figure 2.5 — Main Unit, Hard Disk System (Back View)

The Keyboard

The Model 2000 keyboard is designed for comfort and ease of use. For your convenience, key placement is similar to that on a typewriter. In addition, the keyboard is detached so you can position it where you want — on your lap or desktop. On a desktop, you may use the keyboard's flip-down legs to position it at a slight angle to the desk surface.

The Video Monitor

There are two kinds of video monitors you can use with the Model 2000 — the monochrome monitor and the color monitor.

The VM-1 Monochrome Monitor (Catalog #26-5111) has a high resolution green-on-black screen. The monitor signal cable is packaged with the monitor. This is the cable you use to connect the monitor to the MONOCHROME MONITOR connector on the back of the main unit.

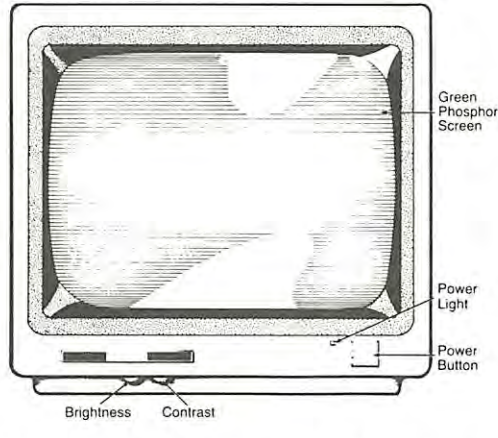


Figure 2.6 — Monochrome Monitor (Front View)

Chapter 11

In Case of Trouble

The first part of this chapter describes how to avoid losing important information. The second part tells you what to do in case of trouble.

The Keys to Keeping Information

Floppy Disk Backups

The best way to avoid losing important information is to use the DISKCOPY command to create a complete library of backup diskettes. Whenever you store information, keep at least two copies of it:

- Working — for daily use
- Backup — for copying your working diskette whenever you make significant changes to it.

Whenever you get a diskette containing a new operating system or application program, write protect it immediately (as shown in Chapter 4). Use this as a master diskette to make your working and backup copies. Then, store this master diskette in a safe place and use it only for making backups.

Hard Disk Backups

We recommend that you periodically use the BACKUP command to copy all files on your hard disk to floppy diskettes. Then, if you ever lose any information, you can use the RESTORE command to copy these files back to the hard disk.

Floppy Drive Maintenance

Floppy disk drives have "heads" that read from and write to the diskette. The head can become dirty from particles in the air, such as dust and cigarette smoke. Therefore, you must clean the head regularly. Failure to do so can result in data loss, damage to the diskette, and even damage to the drive head.

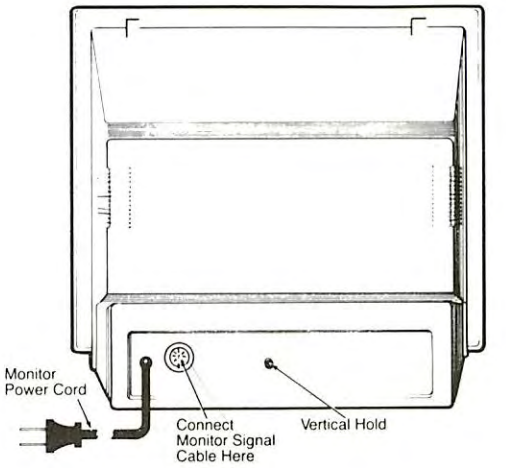


Figure 2.7 — Monochrome Monitor (Back View)

For instructions on how to adjust the tilt of the monitor, see your *VM-1 Operation Manual.*

The CM-1 Color Monitor (Catalog #26-5112) has a high resolution screen that is capable of displaying 15 colors — eight simultaneously. The monitor signal cable is packaged with the monitor. This is the cable you use to connect the monitor to the COLOR MONITOR connector on the Monochrome Graphics Option Board. (See "Other Equipment" for instructions on how to install this board in the main unit.)

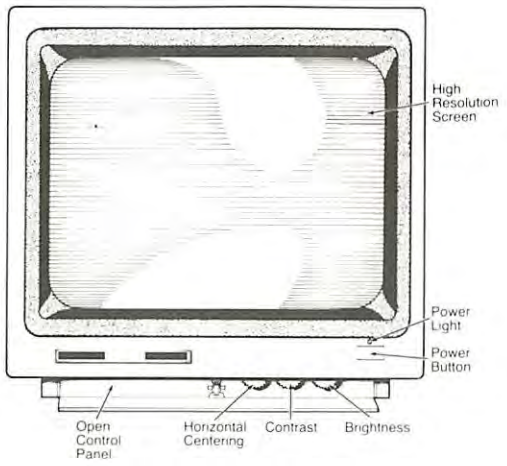


Figure 2.8 — Color Monitor (Front View)

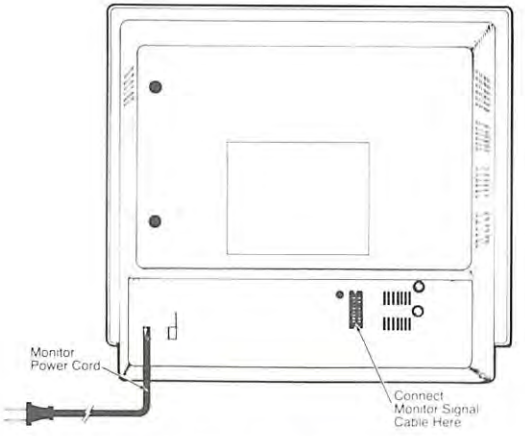


Figure 2.9 — Color Monitor (Back View)

For instructions on how to adjust the tilt of the monitor, see your *CM-1 Operation Manual*.

Then, at "Ok," load the program by typing:

LOAD "HELLO.BAS" (ENTER)

When "Ok" reappears, the HELLO program is in memory. To run the program, type:

RUN (ENTER)

Learning More about BASIC

Now that you have an idea of how to write a program, you may want to see the MAILLIST program. To do so, load the program again by typing:

LOAD "MAILLIST" (ENTER)

The MAILLIST program replaces the HELLO program in memory. To see the MAILLIST program, type:

LIST (ENTER)

You can freeze the display while it is listing the program, by pressing (HOLD). Press (SPACEBAR) to continue the listing.

If you have a printer, you can print the program by typing:

LLIST (ENTER)

This chapter showed how to use three words in the BASIC language: LOCATE, PRINT, and CLS. BASIC has more than 50 words that you can use to write a program. To learn how to use them, see your *Model 2000 BASIC Reference* manual.

screen, the LOCATE command moves the cursor to the specified position, and the PRINT command tells BASIC to print the text at the current cursor position.

If you type a line incorrectly, simply press (ENTER) and type it again, correctly. When finished typing the program, press (ENTER).

Test the program by typing BASIC's RUN command:

RUN (ENTER)

Your screen shows:

```
HELLO!
I SEE WE SPEAK THE SAME LANGUAGE . . .
BASICALLY SPEAKING

Ok
```

Saving and Loading a Program

Your program is stored in temporary memory. You can run it whenever you wish until you exit the BASIC program. (MS-DOS resumes control.) To run it later, you must first store it permanently on disk.

To save a permanent copy of the program for future use, type (at "Ok"):

SAVE "HELLO.BAS" (ENTER)

To return to the system prompt, type (at "Ok"):

SYSTEM (ENTER)

If you type DIR (ENTER), you see that the HELLO.BAS program is now in the directory.

You can run HELLO.BAS whenever you wish. To do so, use the diskette you are using now. At the system prompt, load BASIC by typing:

BASIC (ENTER)

Other Equipment

The parallel printer connector on the back of the main unit lets you add a printer to your system. The RS232 connector on the back of the main unit lets you add a modem or other devices, such as a serial printer.

Using the remaining slots on the back of your main unit, you can expand your Model 2000 to suit your needs. Here is a list of Tandy options that you can buy.

- Monochrome Graphics Option Board (Catalog #26-5140), which provides 640 x 400 points on a monochrome monitor.

  Note: The greater the number of points (on a given monitor), the sharper the picture.

- Color Graphics Option kit (Catalog #26-5141), which you can add to your Monochrome Graphics Option Board to display color. This kit provides 640 x 400 points in 15 colors; eight colors may be diplayed simultaneously. (Installation by Radio Shack is recommended.)
- VM-1 Monochrome Monitor (Catalog #26-5111).
- CM-1 Color Monitor (Catalog #26-5112).
- Internal 128K Board (Catalog #26-5160), to increase the amount of available memory. (This board requires Radio Shack installation.)
- External 256K Board with 128K RAM installed (Catalog #26-5161), to increase the amount of available memory.
- 128K RAM Upgrade (Catalog #26-5162), to enable you to expand the External Board to a full 256K RAM. (Installation by Radio Shack is recommended.)

You can install many of the options yourself. This is how to install option boards:

1. **Warning: Turn all equipment off.** If it is on, you could damage the CPU, as well as the board you're inserting.
2. Option boards are installed in the card cage at the back of the main unit. If you have a Monochrome Graphics Option Board, you must install it in the lowest slot. For any other board, see the instructions that come with it.
3. Pull the lock buttons on either side of the cover panel. (Do not try to remove them.) Then remove the panel.
4. Pull the lock buttons on the new board's panel. Then slide the board into the slot. Push it all the way in, making sure it connects with the connectors in the computer. Then push the lock buttons in to "lock" the board into position.

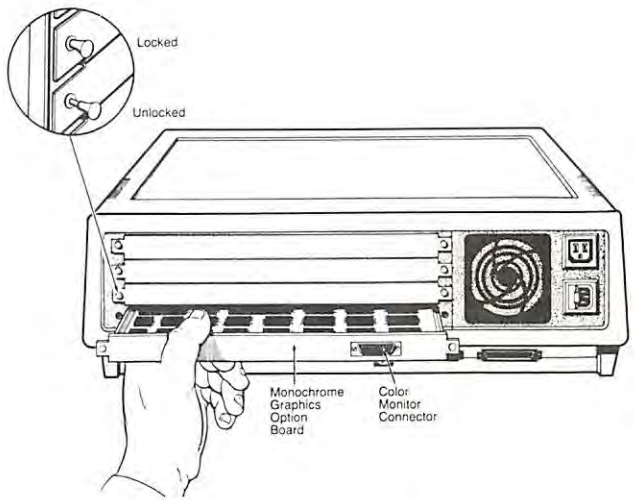


Figure 2.10 — How to Install an Option Board

For further installation instructions, always check the manual(s) provided with each kit.

Chapter 10

Learning to Program with BASIC

You have used the operating system and an application program. This chapter helps you **write** your own application program.

Loading BASIC

Load BASIC by typing:

BASIC (ENTER)

BASIC displays its startup message and this prompt:

```
Ok
```

"Ok" indicates that BASIC, not MS-DOS, is ready to accept a command or program statement.

You cannot directly execute an MS-DOS command from within an application program, such as BASIC. For example, type:

DIR (ENTER)

Your screen shows:

```
Syntax error
Ok
```

"Syntax error" indicates that BASIC doesn't understand the MS-DOS command.

Writing and Running a Program

Write a BASIC program by typing:

```
10 CLS (ENTER)
20 LOCATE 8,37: PRINT "HELLO!" (ENTER)
30 LOCATE 10,23: PRINT "I SEE WE SPEAK THE
   SAME LANGUAGE . . ." (ENTER)
40 LOCATE 12,31: PRINT "BASICALLY
   SPEAKING." (ENTER)
```

When you run this program, the CLS command clears the

Chapter 3

Setting Up Your Model 2000

Setting up your Model 2000 varies according to the kind of equipment you have. If you have a floor stand or monitor pedestal, refer to the instructions that come with the equipment, in addition to those given here.

Illustrations of each monitor/main unit setup (one with monochrome monitor and one with color monitor) follow the instructions. Other helpful illustrations are listed for individual steps.

1. Make sure all equipment is turned off.
2. Install any additional equipment, such as a printer or a graphics board (Figure 2.10).
3. If you have a monitor pedestal, mount the monitor as instructed in the information provided with the pedestal.

4a. **Monochrome Monitor Users:** Connect one end of the monitor signal cable to the back of the monitor (Figure 2.7). Connect the other end to the MONOCHROME MONITOR connector on the back of the main unit (Figure 2.3).

4b. **Color Monitor Users:** Connect one end of the monitor signal cable to the back of the monitor (Figure 2.9). Connect the other end to the COLOR MONITOR connector on the Monochrome Graphics Option Board (Figure 2.10).

5. Plug the monitor's power cord into the AC OUT (CRT) connector on the back of the main unit (Figure 2.3).

   Note: If you have set your monitor too far from the main unit to do this, you may plug the monitor's power cord into a separate, grounded 120 VAC 3-prong outlet. The CRT connector is preferred, however; it acts as a filter, giving you a cleaner screen image.

6. Plug the main power cord into the AC POWER connector (Figure 2.3). Then plug the other end into a grounded, 3-prong outlet of the appropriate voltage. (Voltage requirements are on a label attached to your unit.) Because electrical interference and surges can destroy data, do not use an outlet that powers other heavy equipment.

7. Plug the keyboard cable directly into the keyboard connector on the front of the main unit (Figure 2.2).

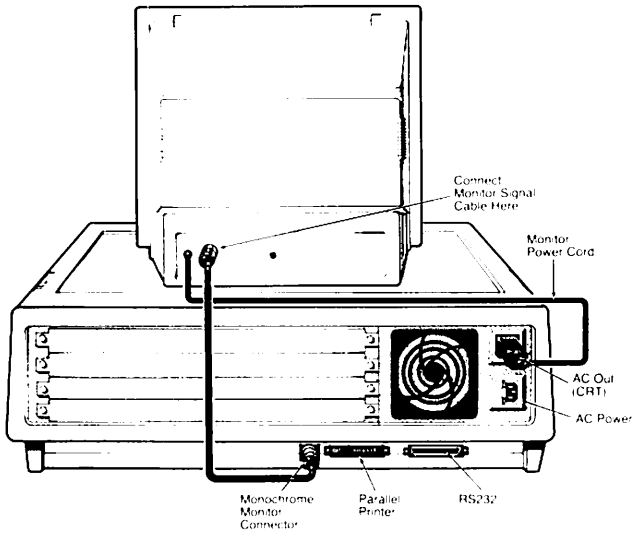


Figure 3.1 — Complete System with Monochrome Monitor (Back View)

Hard Disk System Users:

The C in the C> prompt refers to Drive C. MS-DOS assumes this is the drive you want to use, unless you specify otherwise.

If you have a diskette in Drive A, you must include its drive specification (A:) in the pathname. For example, to see the root directory of the disk in Drive A, type:

```
DIR A:\
```

To create the STORE1 directory in Drive A, type:

```
MKDIR A:\STORE1 (ENTER)
```

To copy the INVTY1.DAT file into the STORE1 directory of Drive A, type:

```
COPY \INVTY1.DAT A:\STORE1\SUPPLIES.DAT
(ENTER)
```

To verify that the file is copied, type:

```
DIR A:\STORE1\SUPPLIES.DAT
(ENTER)
```

Deleting Directories

The RMDIR command lets you delete a directory. Before you can delete a directory, however, it must be "empty" (it must contain no files or subdirectories).

To remove the SALES directory from the disk, first remove the DEPT1.DAT file. Do this by typing:

ERASE \STORE1\SALES\DEPT1.DAT (ENTER)

Now that the SALES directory is empty, you can delete it. Type:

RMDIR \STORE1\SALES (ENTER)

Using a Second Drive

You can organize files into multiple levels on other disks, as well as your system disk. This section shows how:

Floppy Disk System Users:

The A in the A> prompt refers to Drive A. MS-DOS assumes this is the drive you want to use, unless you specify otherwise.

If you have a diskette in Drive B, you must include its drive specification (B:). For example, to see the root directory of the disk in Drive B, type:

DIR B:\

To create the STORE1 directory in Drive B, type:

MKDIR B:\STORE1 (ENTER)

To copy the INVTY1.DAT file into the STORE1 directory of Drive B, type:

COPY \INVTY1.DAT B:\STORE1\SUPPLIES.DAT (ENTER)

To verify that the file is copied, type:

DIR B:\STORE1\SUPPLIES.DAT (ENTER)

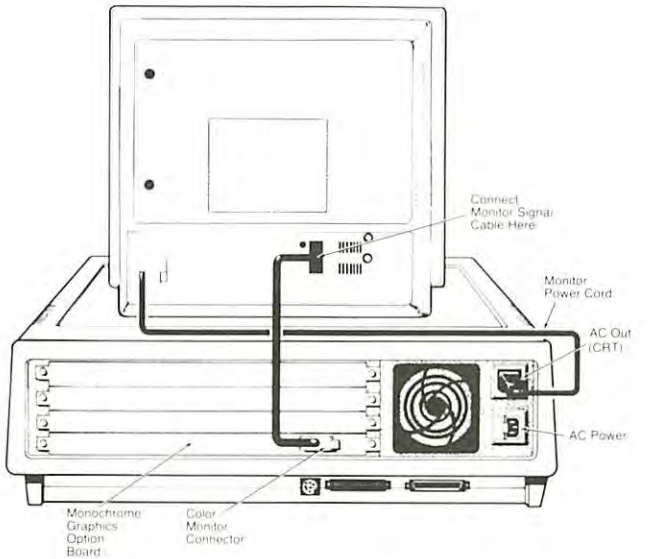


Figure 3.2 — Complete System with Color Monitor (Back View)

The pathname for SUPPLIES.DAT is \STORE1\SUPPLIES.DAT. MS-DOS looks for SUPPLIES.DAT in the STORE1 directory of the root directory of the system disk.

If you want to list the contents of SUPPLIES.DAT, type:

TYPE \STORE1\SUPPLIES.DAT (ENTER)

More Levels of Directories

You can create a subdirectory for every directory on your disk. To create the subdirectory SALES in the STORE1 directory, type:

MKDIR \STORE1\SALES (ENTER)

To verify that STORE1 contains the SALES subdirectory, type DIR \STORE1 (ENTER).

Using EDLIN, create a file in the SALES directory. Type:

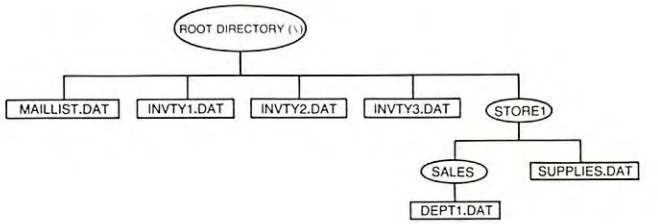
EDLIN \STORE1\SALES\DEPT1.DAT (ENTER)

At the * prompt, type I (ENTER) and then the lines:

```
1:*This is a sample file of sales information
2:*To show how to use multiple directories
3:*(CTRL) (Z) (ENTER)
```

When finished, type E (ENTER) to return to the system prompt.

Your disk structure now looks like this:



A Second-Level Directory

Using the MKDIR command, you can create a "second-level" directory. Type:

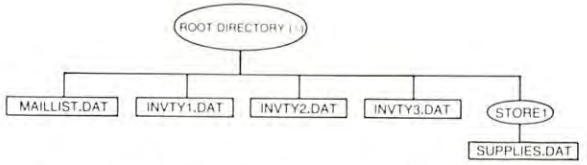
MKDIR \STORE1 (ENTER)

Then type DIR \ (ENTER) to see that STORE1 is now on your system disk's root directory. The directory listing shows the <DIR> notation next to STORE1. This indicates that STORE1 is a directory, rather than a program or data file.

To copy a file into the STORE1 directory, use the MS-DOS COPY command. Type:

COPY \INVTY1.DAT \STORE1\SUPPLIES.DAT (ENTER)

This copies INVTY1.DAT, a file in your system disk's root directory, to a new file in your system disk's STORE1 directory. MS-DOS names the new file SUPPLIES.DAT. Your disk structure now looks like this:



To verify that SUPPLIES.DAT is part of the STORE1 directory, type:

DIR \STORE1 (ENTER)

Pathnames

When referencing a file, you must specify the file's "pathname." MS-DOS must know what "path" of directories to use to locate a file.

In the above example, the pathname for the INVTY1.DAT file is \INVTY1.DAT. MS-DOS looks for INVTY1.DAT in the root directory of the system disk.

Chapter 4

Getting to Know Your Model 2000

You are ready to insert a diskette and load MS-DOS. Before you do, however, take a minute to read about handling diskettes and caring for your disk drives. (Note: Use only Radio Shack Model 2000 diskettes with your Model 2000.)

Handling Diskettes

Diskettes are sensitive. To avoid losing information, handle them with care.

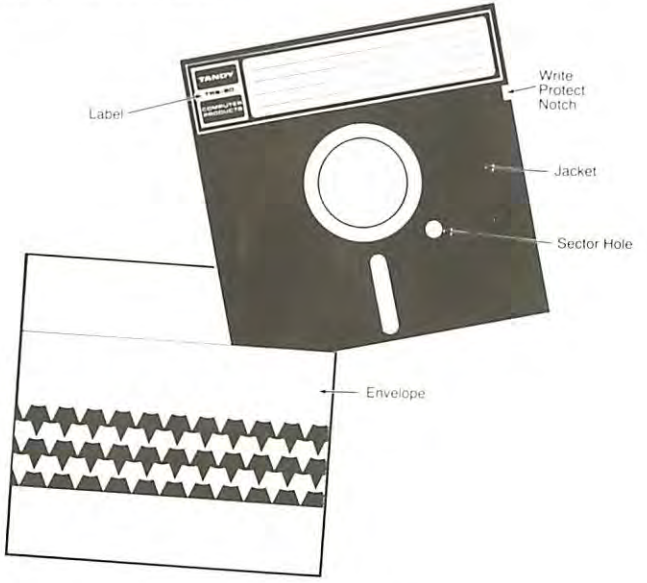


Figure 4.1 — Diskette

Never touch a diskette's exposed shiny surfaces.

Never turn the computer on or off while a diskette is in a drive. Doing so can destroy data.

Never insert or remove a diskette when you hear the sound of the drive motor.

Never leave a diskette inserted in a drive — either fully or partially — when the computer is off.

Keep diskettes away from heat, direct sunlight, dust, cigarette ashes, other particles, and magnetic fields (such as transformers, AC motors, magnets, TVs, radios, and the computer's display console).

Do not bend diskettes.

Do not write on the diskette label with a ball point pen or lead pencil. Use a felt-tip pen only.

Always put the diskette back in its protective envelope after use.

Store diskettes in an upright position, never in a stack. Never place anything on a diskette.

We recommend that you keep your diskettes either in the manual in which they came or in a diskette storage box, such as those available from Radio Shack.

Write Protecting a Diskette

Inside your *MS-DOS Commands Reference* manual is a diskette labeled MS™-DOS Operating System and BASIC Language. You'll find a foil, adhesive tab with the diskette. Cover the diskette's "write-protect notch" with the foil tab. (Do not pinch the tab into the notch.)

Figure 4.2 — Write Protecting a Diskette

Chapter 9

An Added Dimension: Multiple Directories

With MS-DOS, you can organize disk files in multiple levels, similar to the branches of an upside-down tree. Each directory can contain subdirectories.

Hard disk users will find this feature particularly helpful. Although all information may be on the same disk, it can be organized into small, easy-to-handle groups.

Floppy disk users, as well, can take advantage of the multiple-level disk structure. Suppose, for example, several people use your computer. Each department might have a separate directory, each user a separate subdirectory. Everyone can privately organize information without affecting anyone else's information.

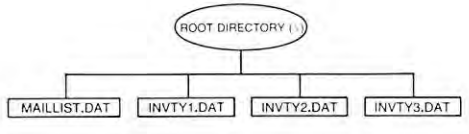
The Root Directory

All formatted disks have a main directory, which is called the "root" directory. To see your system disk's root directory, type the DIR command followed by a backslash (\), the symbol for the root directory. Type:

DIR \ (ENTER)

This is the same directory you've seen by simply typing DIR (ENTER). Until now, you didn't need to tell MS-DOS which directory you want to use.

The root directory contains the system files and the files you've created. This diagram shows the structure of your root directory (excluding system files):



is called "background printing." Type:

PRINT INVTY1.DAT INVTY2.DAT INVTY3.DAT MASTER.DAT (ENTER)

The first time you use the PRINT command, MS-DOS asks:

Name of list device [PRN]:

PRN is displayed in brackets to indicate that the printer is the default device (the device MS-DOS uses if you don't specify one). Therefore, to print the contents of the four files, simply press (ENTER). While the files are being printed, you are free to use the computer for other tasks.

Deleting Files

The ERASE command deletes a file from a disk, removes that file's information from the directory, and frees the space allocated to it. Delete MASTER.DAT by typing:

ERASE MASTER.DAT (ENTER)

Check the directory see that MASTER.DAT is deleted.

When the write-protect notch is covered, you cannot change the contents of this "master" diskette. In the next chapter, you will make copies of the master diskette.

The steps below outline the proper way to turn your Model 2000 on and off. Always follow these steps.

Turning On the Model 2000

1. Turn on any peripheral equipment, such as a printer.
2. Press the POWER switch on the main unit. The switch illuminates, indicating the power is on.
3. Make sure that the monitor is turned on.

Turning Off the Model 2000

1. Carefully remove any diskettes from the drives.
2. Turn off any peripheral equipment (and the monitor, if it is not connected to the main unit).
3. Press the POWER switch on the main unit.
4. Make sure the monitor is turned off.

Starting Up MS-DOS

1. Turn on your Model 2000.
2. If Drive A is closed, open it by turning the drive latch or by pressing the lower part of the drive door.
3. Insert the MS-DOS System Diskette into Drive A as shown.

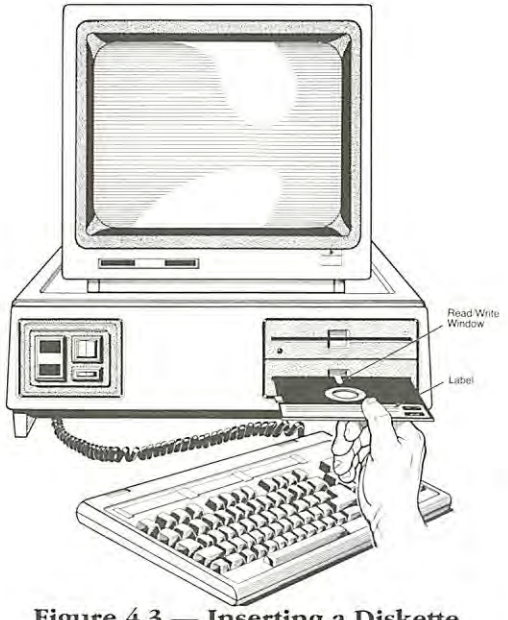


Figure 4.3 — Inserting a Diskette

After fully inserting the diskette, close the drive latch or door.

4. Press the **RESET** switch. (Or, if the main unit is not within reach, hold down (CTRL) and press and hold (ALT) and (DELETE) at the same time.) MS-DOS loads into memory. This loading takes about five seconds. Then the screen shows a startup/copyright message. (Whenever you press **RESET**, the system returns to this message.) The message ends with this prompt:

   Enter new date:

If the screen is blank or shows an error message, instead of the startup message . . .

- The diskette may be in backwards. Remove the diskette — even if the drive light is on — and correctly insert it.
- Adjust the video controls that are on the front of the monitor.
- Press **RESET** to load MS-DOS.

If INVTY1.DAT contains more lines than can be displayed at one time, combine the TYPE and MORE commands:

TYPE INVTY1.DAT | MORE (ENTER)

MS-DOS displays a screenful of lines and then prompts you before displaying the next screenful.

You may want to combine some of these commands with the DIR command. For example:

DIR | FIND "DAT"

This displays only those files in your directory that have filenames that contain DAT.

DIR | SORT >PRN

This sorts the contents of the directory and prints the output.

Combining Files

In the last chapter, you used the COPY command to copy a file to another disk. You can also use COPY to combine files. Type:

COPY INVTY1.DAT+INVTY2.DAT+ INVTY3.DAT INVTY4.DAT (ENTER)

The information in INVNTY1.DAT, INVNTY2.DAT, and INVNTY3.DAT is now combined into a new file — INVNTY4.DAT.

Renaming Files

To use the RENAME command to rename INVTY4.DAT to MASTER.DAT, type:

RENAME INVTY4.DAT MASTER.DAT (ENTER)

Printing Files in the Background

MS-DOS has a PRINT command that lets you print up to 10 files while you are doing other tasks on the computer. This

TYPE INVTY1.DAT >PRN (ENTER)

This MS-DOS feature "redirects" a command's "output" from the screen to another device — in this case, the printer (PRN).

You can redirect output to a disk file, also. Type the command again, this time using the redirect output sign (>) and a name of a new disk file (INVTY2.DAT):

TYPE INVTY1.DAT > INVTY2.DAT

MS-DOS creates the file INVTY2.DAT and outputs the contents of INVTY1.DAT to it. To verify, type:

TYPE INVTY2.DAT (ENTER)

Finding Information in Files

MS-DOS lets you combine two or more commands by separating each command with a vertical bar (|). Type:

TYPE INVTY1.DAT | SORT (ENTER)

This combines the TYPE command with another command — SORT. The contents of INVTY1.DAT are displayed, with the lines sorted alphabetically.

Enter the command again, this time redirecting output to a disk file named INVTY3.DAT. Type:

TYPE INVTY1.DAT | SORT > INVTY3.DAT (ENTER)

MS-DOS creates the file INVTY3.DAT and writes the sorted contents of INVTY1.DAT to it. You can verify this by typing TYPE INVTY3.DAT (ENTER).

Another command that is useful with TYPE is FIND. Type:

TYPE INVTY1.DAT | FIND "ribbons" (ENTER)

MS-DOS finds only those lines in INVTY1.DAT that contain "ribbons" and displays them.

If you are using a monitor other than the one in the normal configuration, your screen may be blank after you start up the system or later — after you enter BASIC. This is because the computer is sending the output to a screen that you don't have. For example, you may have a monochrome monitor, and the computer may be trying to send output to a color monitor. To reroute the output to **your** monitor, you must use the special resetting procedure that is described in Appendix A.

5. Enter the current date in the *mm-dd-yyyy* format. For example, for June 7, 1984, type either of the following:

   6-7-84 (ENTER)
   06-07-1984 (ENTER)

6. The screen shows the time elapsed since you loaded MS-DOS and asks for the new time:

   Current time is 0:00:11.59
   Enter new time:

   You can skip this question by pressing (ENTER). If you want to set the time, enter it in the 24-hour format, *hh:mm:ss.cc*. (*cc* represents hundredths of a second.) Include as much or as little of the time as you want.

   For example, type:

   14:30 (ENTER)

   for 2:30 p.m.

   MS-DOS then displays its system prompt (the letter of the drive you are in, followed by a greater-than sign): Because you are currently using the diskette in Drive A, the prompt is:

   A>

   Your Model 2000 is now under the control of MS-DOS and is ready for use.

Using the Keyboard

The Model 2000 keyboard is much like a typewriter keyboard, except for a few different keys. Now's the time to find out what some of these keys do.

Figure 4.4 — Model 2000 Keyboard

At the system prompt, type anything you like. When you have typed about half of a line, press (CTRL) and (ENTER) at the same time. The "cursor" moves to the beginning of the next line.

Continue typing, noting the uses of the following keys:

(BACKSPACE) — Backspaces and erases.

(CAPS) — Locks the display into either upper or lower case; affects only the alphabet keys.

If you have a printer, note the uses of these keys:

(PRINT) — Turns on a "dual" function that prints each character as it is displayed. Press again to turn off the function. ((CTRL) (P) serves the same function.)

(SHIFT) (PRINT) — These keys, when pressed at the same time, print whatever is currently displayed.

(ALT) (→) — Turns on the "smooth scroll" function. Press again to turn off the function.

(NUM LOCK) — Locks/unlocks the numeric keypad. When the NUM LOCK function is on, each key, when pressed,


```
*2D (ENTER)
*2I (ENTER)
    2:*ribbons (TAB) (TAB)  35 (ENTER)
    3:*(CTRL) (Z) (ENTER)
*
```

You can list the file by typing 1,3 L (ENTER), which lists Lines 1-3. Once satisfied with the file, exit EDLIN by typing **E** (ENTER).

You are at the system prompt. Type DIR (ENTER) to verify that INVTY1.DAT is in your directory.

Should you want to edit INVTY1.DAT, simply type EDLIN INVTY1.DAT (ENTER) again. Then use the I, D, and L commands to insert, delete, and list lines.

Whenever you edit a file, EDLIN saves the earlier version giving it the "extension" .BAK (for "backup"). For example, when you edit INVTY1.DAT, EDLIN saves the earlier version of this file as INVTY1.BAK. You cannot edit a file that has the .BAK extension.

Listing Files

The MS-DOS TYPE command lets you display the contents of any file in your directory. To display the contents of INVTY1.DAT, type (at the system prompt):

TYPE INVTY1.DAT (ENTER)

To display the contents of MAILLIST.DAT, type:

TYPE MAILLIST.DAT (ENTER)

The contents of some files (such as DISKCOPY.COM and FORMAT.COM) seem to be meaningless codes and even beeps. These files contain programs, rather than data.

Redirecting Output

Rather than displaying INVTY1.DAT, you may want to print it. Type the command as above, this time adding >PRN.

Creating and Editing Files

The MS-DOS EDLIN program lets you create and edit files. At the system prompt, type:

EDLIN INVTY1.DAT (ENTER)

EDLIN loads so that you can create or edit a file named INVTY1.DAT. EDLIN displays:

```
New file
*
```

New file tells you that EDLIN created the file INVTY1.DAT. The asterisk (*) is the EDLIN prompt; it indicates EDLIN is ready for you to enter a command. To begin inserting lines, type EDLIN's I command:

*I (ENTER)

EDLIN displays the first line number, followed by a colon and asterisk:

```
1:*
```

This is to reference the line you are inserting. Type diskettes (TAB) 100 (ENTER).

```
1:*diskettes (TAB) 100 (ENTER)
```

EDLIN displays the second line number. Type Lines 2 and 3, as shown below; then press (CTRL) and (Z) at the same time, followed by (ENTER), to return to EDLIN's * prompt:

```
2:*ribbons (TAB) (TAB) 35 (ENTER)
3:*paper (TAB) (TAB) 50 (ENTER)
4:*(CTRL) (Z) (ENTER)
*
```

If you make a mistake, use EDLIN's D command to delete the line. Then, use the I command to insert the line correctly. For example, to change Line 2, type:

produces the number shown on the lower half of the key. When NUM LOCK is off, each key, when pressed, produces the function or the symbol shown on the upper half of the key.

(SHIFT) — When used with the "typewriter" keys, (SHIFT) operates the same as the (SHIFT) key on a typewriter. When used with the numeric keypad, (SHIFT) "toggles" the keypad. Thus, even when NUM LOCK is on, you can produce symbols by using (SHIFT).

Some keys have a function only when you are using an application program. If so, the application manual explains how to use the keys.

When finished, press (ENTER). This moves the cursor to the beginning of the next line. It also executes a command or program, as we'll show in the following chapters. Ignore any messages, such as "Bad command or file name." The system prompt should be the last line on your screen.

Using the MS-DOS Directory

MS-DOS' major role is that of a file clerk. It organizes each diskette like a file cabinet and stores your information in "disk files," similar to file folders.

MS-DOS stores the disk files wherever there is space. Files and even parts of files may be stored almost anywhere on the diskette. The key to where the files are located is the *directory*, which MS-DOS also puts on the diskette.

To let you see what files are on your diskette, MS-DOS has a directory (DIR) command. Type:

DIR /P (ENTER)

MS-DOS first displays the "volume label" (a name assigned to the diskette). If the diskette has no label, MS-DOS displays a message to that effect.

It then displays:

```
Directory of A:\
```

The backslash (\ ) indicates that you are looking at files in the main directory of Drive A. At present, this is the only directory on that diskette. Chapter 9 shows how to create other directories.

MS-DOS displays information about each file in the main directory. For example, for the FORMAT.COM file, MS-DOS displays:

```
FORMAT   COM   5844   3-08-83   12.00p
```

In addition to the "filename," MS-DOS includes the amount of space the file takes (in bytes), followed by the date and time the file was created.

Including /P makes the display stop scrolling and prompt "Strike any key when ready . . ." To view the rest of the listing, press (SPACEBAR) as needed.

At the bottom of the directory listing, MS-DOS tells the number of files and the amount of free space on the diskette.

Study the files for a moment. The next chapters show how to use the files to prepare disks and store information on them. If you have a floppy disk system, read Chapter 5. If you have a hard disk system, read Chapter 6 instead.

Chapter 8

Using MS-DOS Commands to Manage Files

MS-DOS commands are small, but useful programs in themselves. This chapter shows how to use the power of these commands, as well as the MS-DOS editing program, EDLIN, to manage your disk files.

Copying Files

The MAILLIST program in the last chapter created a file called MAILLIST.DAT. You can see this file on your directory by typing, at the system prompt:

DIR (ENTER)

The MS-DOS COPY command lets you copy a file from one disk to another. How you do this depends on whether you have a floppy disk system or a hard disk system.

Floppy Disk System Users:

In Chapter 5, you formatted a data diskette. At the system prompt, insert this diskette in Drive B. Then type:

COPY MAILLIST.DAT B:MAILLIST.DAT (ENTER)

This copies MAILLIST.DAT from your system drive (Drive A) to the diskette in Drive B. To verify that the file is copied, type:

DIR B: (ENTER)

Hard Disk System Users:

In Chapter 6, you formatted a data diskette. At the system prompt, insert this diskette in Drive A. Then type:

COPY MAILLIST.DAT A:MAILLIST.DAT (ENTER)

This copies MAILLIST.DAT from your system drive (Drive C) to the diskette in Drive A. To verify that the file is copied, type:

DIR A: (ENTER)

asked what entry you want to delete, press 1 ENTER. MAILLIST shows the entry and asks:

Are you sure you want to delete Entry 1? (Y/N)

Press Y ENTER. MAILLIST responds:

Entry 1 has been DELETED from your mailing list.
Press <ENTER> to delete another entry or <M> to return to the Main Menu.

Return to the Main Menu. Press 4 to select "List to Screen." Then press 1 ENTER to see Entry 1. MAILLIST responds:

Entry 1 not found

Charlie Jones is no longer on the list.

List to Printer

Return to the Main Menu. If you have a printer, you may want to print your mailing list. Be sure the printer is "ready" (see your printer manual). Then press 5. MAILLIST asks if you want to include phone numbers. After you press Y or N, MAILLIST prints your list.

Return to MS-DOS

When finished, return to the Main Menu by pressing M; then press 6 to exit the program. At the system prompt, MS-DOS again has control of the computer.

It is important to exit any program properly. If you do not, the program does not send the remaining information to the disk file and close the file.

Chapter 5

Using Your Floppy Disk System

It is important to protect information that you store on diskettes. In an instant, you can lose weeks of work as a result of:

- Worn-out or mishandled diskettes
- Mishandled equipment
- The power going out while you're using the computer

To avoid losing important information, you should copy all diskettes. Copy your master MS-DOS diskette and **use that copy from now on.**

The FORMAT and DISKCOPY Commands

To make copies, first use the FORMAT command to organize a blank diskette into a filing system in which you can put disk files. Then use the DISKCOPY command to copy all files from your system diskette to the "formatted" diskette. Follow these steps.

1. If you turned off your Model 2000, turn it on again and start up MS-DOS as described in Chapter 4.
2. Insert a blank diskette into Drive B. (First, make sure the diskette's write-protect notch is not covered by a foil tab.) At the system prompt, type:

   FORMAT B: /V ENTER

   FORMAT displays this message:

   Insert new diskette for drive B:
   and strike any key when ready

3. Press SPACEBAR. FORMAT begins formatting the Drive B diskette. The screen shows:

   Formatting tracks

When the format is done without error, each dash, which represents an area on the disk, becomes a period. A question mark in place of a period indicates that a portion of the diskette contains flawed areas. FORMAT locks out the flawed areas so that MS-DOS never writes to them.

4. When FORMAT is finished, it asks if you want to label your new diskette:

   Volume label (11 characters, ENTER for none)?

   Type a label of up to 11 characters and then press ENTER, or press ENTER if you don't want to label the diskette. For example, to give the diskette the label DISKONE, type:

   DISKONE ENTER

5. Now FORMAT displays all or a portion of this message:

   Format complete

   nnnnnn bytes total disk space
   nnnnnn bytes in bad sectors
   nnnnnn bytes available on disk

   Format another (Y/N)?

   Press N. MS-DOS exits the FORMAT command and returns to the system prompt.

6. To copy all files from your system diskette onto the Drive B diskette, type:

   DISKCOPY A: B: ENTER

   (Be sure you have a blank space between A: and B:)

   MS-DOS displays:

   Insert source diskette into drive A:

   Insert formatted target diskette into drive B:

   Press any key when ready

Phone (nnn-nnn-nnnn): 817-555-9045 ENTER

Now add this entry to the list:

Terry Brown
50 Green Lake Rd., Apt. 2-C
Lincoln, NE 68504
402-555-1976

Do not press ENTER after typing the last entry. Instead, press M to return to the Main Menu.

List to Screen

Press 4 to select "List to Screen." MAILLIST asks you to:

Enter the number of the entry you want to see or press <M> <ENTER> to return to the Main Menu.

List Entry 1 by pressing 1 ENTER. To list Entries 2 and 3, you need press only ENTER; the program automatically lists the next entry. Now return to the Main Menu.

Change Entry

Suppose that Terry Brown moves to South Dakota. Press 2 to select "Change Entry." When the program asks for the entry number, press 3 ENTER. MAILLIST shows Entry 3 and asks what line you want to change. Press 2. Change the line by typing:

1018 Racine Street ENTER

When asked if you want to change another line, press Y. Change Line 4 to "Rapid City, SD 57701" and Line 5 to 605-555-1900. When asked if you want to change another line, press N. Then return to the Main Menu.

Delete Entry

Now suppose Charlie Jones asks to be crossed off your mailing list. Press 3 to select "Delete Entry." When

5. List to Printer
6. Return to MS-DOS

Enter Selection . . . .

Add Entry

There are no names in the list, yet. Press 1 to "add" names.

When the screen shows:	You type:
Name:	Ace Manufacturing ENTER
Addr. (Line 1):	attn: Charlie Jones ENTER
Addr. (Line 2):	1080 Riverside Road ENTER
City, State, Zip Code:	Hollywood, CA 90028 ENTER
Phone (nnn-nnn-nnnn):	213-555-1111 ENTER

Remember, if you make a mistake use BACKSPACE or ← to backspace, then correct the line. When the line is correct, press ENTER.

After you enter the phone number, MAILLIST asks you to:

Press <ENTER> to add another entry or <M> to return to the Main Menu.

Press ENTER.

When the screen shows:	You type:
Name:	Christie Miller ENTER
Addr. (Line 1):	1339 Owen Avenue ENTER
Addr. (Line 2):	ENTER
City, State, Zip Code:	Fort Worth, TX 76110 ENTER

The diskettes are already in the drives. Press SPACEBAR to continue.

Note: If MS-DOS has trouble making the copy and asks you to Abort, Retry, or Ignore, press R for retry.

7. When DISKCOPY is finished, it displays this message:

   Copy complete

   Copy another (Y/N)?

   Press N. MS-DOS exits the DISKCOPY command and returns to the system prompt.

8. Type:

   DIR B: ENTER

   The directory should show that all the information from the master diskette is copied onto the "backup" diskette.

Remove your master system diskette from Drive A and replace it with your backup diskette. From now on, use your backup as your working diskette. Put your master MS-DOS system diskette in a safe place. Never use it, except to make copies. Never remove the write-protect tab from this master diskette.

Preparing Data Diskettes

A data diskette is a formatted diskette that does not contain an operating system (MS-DOS) or any system files. To create a data diskette, turn on your Model 2000 and start up MS-DOS with your backup system diskette in Drive A; then repeat Steps 2 through 5 to format a diskette. This time, however, do not use DISKCOPY to copy the system diskette.

Format a data diskette now, giving it the volume label DATADISK1. You'll use the diskette in Chapter 8.

Note: Labeling diskettes during formatting is a good habit to develop. Merely by entering the DIR command, you can make sure you're using the correct diskette. You need not remove the diskette from the drive to check the physical label.

After formatting the diskette, check its directory by typing:

DIR B: (ENTER)

MS-DOS displays this message:

```
Volume in drive B is DATADISK1

Directory of B:\

File not found
```

As you can see, the data diskette contains no files and is ready for use. From now on, you may use it in Drive B, as long as you have an operating system diskette in Drive A.

Copying Data Diskettes

If something happens to a data diskette and you don't have a copy of it, you might spend hours re-entering information. To avoid this, copy your data diskettes periodically, following the steps below.

1. Turn on your Model 2000.
2. Insert your backup system diskette into Drive A and start up MS-DOS. At the system prompt, type:

   DISKCOPY A: B: (ENTER)

   MS-DOS displays this message:

   ```
   Insert source diskette into drive A:

   Insert formatted target diskette into drive B:

   Press any key when ready
   ```


Chapter 7

Running Application Programs

You have used MS-DOS to prepare disks for use. Now, you'll use the sample application program, MAILLIST, to do a practical application (create a mailing list).

Running MAILLIST

If you have turned off your Model 2000, turn it on again and start up MS-DOS. (Floppy disk users: Be sure to use your backup system diskette without a write-protect tab.) At the system prompt, type DIR (ENTER) to view the directory. As you can see, your system disk contains the MAILLIST program.

At the system prompt, load and run MAILLIST by typing:

BASIC MAILLIST (ENTER)

The screen shows:

```
Mailing List

Version 01.00.00
```

Radio Shack assigns version numbers to all programs. The version number indicates how many times the program has been changed. Be sure to keep a record of all changes.

Note: Whenever you purchase a Radio Shack application program, a Software Registration Card is included. Complete and return this card immediately. If a change is major, we will mail you the information you need. If a change is minor, you can get the information from our customer services department.

Next your screen shows the program's main menu:

```
Tandy Model 2000 - Mailing List
Main Menu

1. Add Entry
2. Change Entry
3. Delete Entry
4. List to Screen
```

Backing Up Modified Files. Often you may want to copy only those files modified since the last backup. To do so, follow these steps:

1. Turn on your Model 2000 and start up MS-DOS under hard disk control.
2. At the system prompt, insert the diskette containing your backup files into Drive A. Type:

   BACKUP C:*.* A: /M (ENTER)

   MS-DOS copies to the diskette all files that are in the current directory and that have been modified since the last backup. (See the *MS-DOS Commands Reference* manual for an explanation of "current directory.")

Restoring Files to Hard Disk

If you keep a complete set of backup diskettes, restoring your hard disk system is straightforward. Simply follow these steps:

1. Turn on your Model 2000 and start up MS-DOS under hard disk control.
2. At the system prompt, insert a backup diskette into Drive A and type:

   RESTORE A: C:\ /S (ENTER)

RESTORE copies all files from the diskette to Drive C. The RESTORE command works only with diskettes that have been created using the BACKUP command.

3. When the drive light goes out, remove the system diskette from Drive A and insert the data diskette to be copied (your "source" data diskette). Insert a blank, formatted diskette in Drive B. (First, make sure the diskette's write-protect notch is not covered by a tab.) Press (SPACEBAR).
4. When DISKCOPY is finished, it displays:

   Copy complete

   Copy another (Y/N)?

5. If you don't want to copy another diskette, press (N). If you do, press (Y); MS-DOS performs another copy in the same drives.

Chapter 6 is for users with hard disk systems only. If you have a floppy disk system, skip to Chapter 7.

MS-DOS displays this message:

```
Volume in drive A is DATADISK1
Directory of A:\
File not found
```

As you can see, the data diskette contains no files and is ready for use. You may use it in Drive A, as long as the operating system diskette is on Drive C.

You are now ready to use your hard disk. The rest of the information in this chapter is for reference only.

Backing Up Hard Disk Files

Loss of information stored on hard disk, although not likely, can be disastrous — simply because of the amount of information. Therefore, you should always keep and update floppy disk copies of all hard disk information.

To make copies, first format several data diskettes, as described in the last section. Then use either of the following versions of the BACKUP command to copy files from hard disk.

Backing Up All Files. To copy all files from the hard disk to the diskette in Drive A, follow these steps:

1. Turn on your Model 2000 and start up MS-DOS under hard disk control.
2. At the system prompt, insert a data diskette into Drive A. Type:

   BACKUP C:\ A:/S (ENTER)

   The BACKUP command begins copying the files from hard disk. Whenever it fills a diskette, it prompts you to insert another. Follow the prompts until BACKUP is finished.

3. Press (SPACEBAR). FORMAT begins formatting the Drive A diskette. It displays:

   Formatting tracks

   When the format is done without error, each dash, which represents an area on the disk, becomes a period. A question mark in place of a period indicates that a portion of the diskette contains flawed areas. FORMAT locks out the flawed areas so that MS-DOS never writes to them.

4. When FORMAT is finished, it asks if you want to label your new diskette:

   Volume label (11 characters, ENTER for none)?

   At this time, you can type a label of up to 11 characters and then press (ENTER), or press (ENTER) if you don't want to label the diskette. Label this diskette by typing:

   DATADISK1 (ENTER)

   Note: Labeling diskettes during formatting is a good habit to develop. Merely by entering the DIR command, you can make sure you're using the correct diskette. You need not remove the diskette from the drive to check the physical label.

5. Now FORMAT displays all or a portion of this message:

   Format complete

   nnnnnn bytes total disk space
   nnnnnn bytes in bad sectors
   nnnnnn bytes available on disk

   Format another (Y/N)?

   Press (N). MS-DOS exits the FORMAT command and returns to the system prompt.

After formatting the diskette, check its directory by typing:

DIR A: (ENTER)

Chapter 6

Using Your Hard Disk System

Your hard disk offers these advantages over floppy disks:

- Speed
- Much greater storage capacity
- Ease of use

Because of these advantages, you'll probably want to store most of your information on your hard disk. You can then use floppy disks for extra information and copies.

This chapter tells how to prepare your hard disk system for use and how to protect your hard disk files.

Formatting Your Hard Disk

Before using your hard disk the first time, you must organize it into a filing system and copy the system files to it. To do this, run the "batch" file CONFIGHD.BAT. This file contains all the commands needed to automatically "format" the hard disk and copy all files — system and non-system — to it.

Follow these steps:

1. Locate the "Media Error Map" provided with your computer. Then, if you turned off your Model 2000, turn it on again and start up MS-DOS as described in Chapter 4.

2. At the system prompt, A>, run CONFIGHD.BAT by typing:

   CONFIGHD (ENTER)

   The first command, HFORMAT, needs information to "lock out" flawed areas on the hard disk so that MS-DOS never writes to them. It repeatedly prompts:

   Enter next head, track pair or press <ENTER> to quit.

Enter information from the "Media Error Map." For example, if the map indicates flaws on Track (Cylinder) 123, Head 02 and Track 312, Head 03, type the numbers and (ENTER) as follows:

```
Enter next head, track pair or press <ENTER> to
quit. 2,123 (ENTER)
Enter next head, track pair or press <ENTER> to
quit. 3,312 (ENTER)
Enter next head, track pair or press <ENTER> to
      (ENTER)
```

If the map is blank, simply press (ENTER). HFORMAT displays:

```
Press any key to begin formatting C:
```

3. Press (SPACEBAR) to format the hard disk, Drive C. HFORMAT displays:

```
Formatting cylinders
----------------------------------------------------------------
----------------------------------------------------------------
----------------------------------------------------------------
----------------------------------------------------------------
----------------------------------------------------------------
----------------------------------------------------------------
```

HFORMAT begins formatting Drive C and transfers the system files from Drive A to Drive C. When the format is done without error, each dash, which represents an area on the disk, becomes a period. A question mark in place of a dash tells you that a portion of the disk contains flawed areas. These areas are already locked out.

Now HFORMAT displays all or a portion of this message:

```
Format complete

nnnnnnnn bytes total disk space
nnnnnnnn bytes in bad sectors
nnnnnnnn bytes available on disk
```


CONFIGHD.BAT exits the HFORMAT command and enters the COPY command, which copies the non-system files. As each file is copied, its filename is displayed.

After copying the files, CONFIGHD.BAT exits; MS-DOS returns and displays the system prompt, C>. The new prompt indicates that you are operating under hard disk control.

From now on, if you want your computer to automatically start up or reset under hard disk control, be sure there is no diskette in Drive A. If there **is** a diskette in Drive A, your computer starts up or resets under floppy disk control, and MS-DOS displays the A> prompt. To return to hard disk control, remove the diskette and press **RESET.**

Preparing Data Diskettes

Occasionally, you will want to copy hard disk files to diskettes for safekeeping. So that the diskette has plenty of room for the file, you should use a *data diskette*, a formatted diskette that does not contain an operating system (MS-DOS) or any system files.

Format a data diskette now. You'll use it in Chapter 8.

1. If you have turned off your Model 2000, turn it on again and start up MS-DOS under hard disk control.
2. At the system prompt, insert a blank diskette into Drive A. (First, make sure the diskette's write-protect notch is not covered by a foil tab.) Type:

   FORMAT A: /V (ENTER)

   FORMAT displays this message:

   ```
   Insert new diskette for drive A:
   and strike any key when ready
   ```