Radio Shack®

INTRODUCTION TO YOUR DISK SYSTEM

TRS-80® Model 4

Custom Manufactured in USA By RADIO SHACK, A Division of TANDY CORPORATION

To Our Customers . . .

Congratulations on purchasing the Model 4 Disk System. You'll find it powerful and simple to use.

The Model 4 can run a complete line of programs, including programs for:

- Business
- Education
- Personal finance
- Programming
- Entertainment

This includes all Radio Shack Model III programs, as well as all Model 4 programs.

How to use this Manual . . .

This manual is for beginners. It explains the important things you need to know about the Model 4:

- How to set up the Model 4
- How to use important commands
- How to run application programs
- How to store information
- What to do in case of trouble

After you finish this manual, you can immediately begin running any Radio Shack application programs you have purchased.

Later, when you become comfortable with the Model 4, you may want to learn how to use more of its features. You can then read the other Model 4 manuals:

Getting Started with TRS-80 BASIC. This is a simple and entertaining manual that teaches you to program in the BASIC language.

Disk System Owner's Manual. This is a reference manual on the Model 4. It gives complete details on the Model 4 commands and BASIC.

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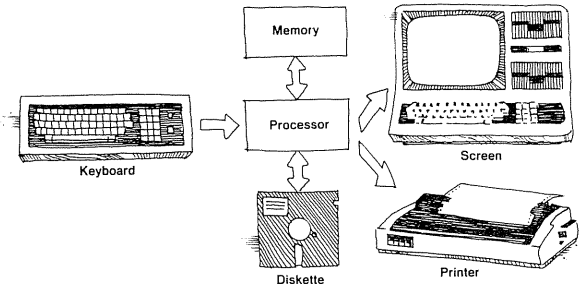
Chapter 1
How Computers Work

Your disk 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

This picture shows the parts of the hardware and how they relate to each other:



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. There are two kinds of memory:

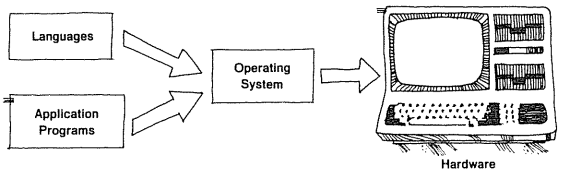
- ***Random access memory (RAM)*** — for temporary storage of information and software that you enter. When you turn off the computer, the contents of RAM disappear.
- ***Read-only memory (ROM)*** — for permanent storage of essential, built-in software, such as the software that tells the computer what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

Diskette. For permanently storing information and software outside the computer. A diskette has a magnetic coating that stores information in much the same way an audio tape stores sound.

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

Computer Software

This picture shows the kinds of software and how they relate to the hardware:



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, education, 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 4 comes with BASIC and a *Getting Started* manual that teaches you how to program in BASIC.

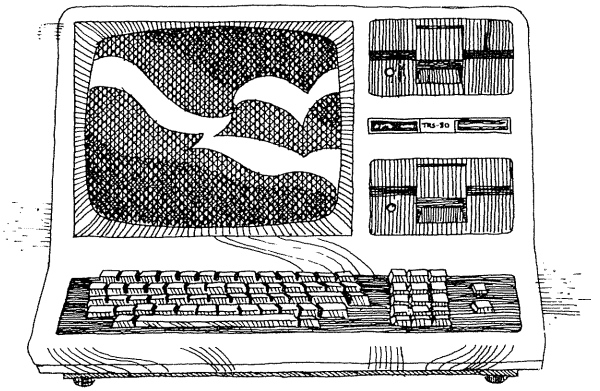
Disk Operating System. An application program seldom talks to the hardware directly. It talks through a disk operating system.

The Model 4's disk operating system is TRSDOS Version 6. This is called simply "TRSDOS" ("Triss Doss") throughout this manual. TRSDOS is on the diskette that comes with your Model 4.

To accomplish anything with your disk system, you need TRSDOS. For example, assume you want the computer to print a list of your checking transactions. Your application program decides what to print. It then leaves the operation of the printer to TRSDOS.

The rest of this manual shows you how to store information, using the Model 4, TRSDOS, and an application program.

Chapter 2
Getting to Know Your Model 4

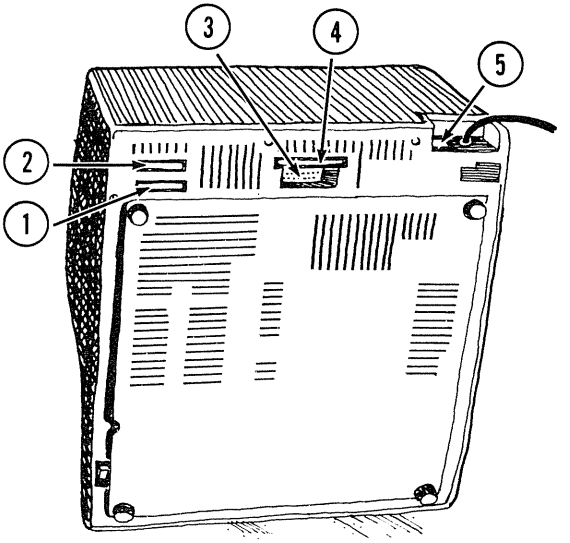


Plug your Model 4 into a grounded, 120 VAC, 3-prong outlet. Because electrical interference and surges can destroy data, do not use an outlet that powers other heavy equipment.

For the best protection against electrical surges, we suggest you use a grounded power strip. A good one to use is Radio Shack's Auto Control Power Strip and Surge Protector, Catalog #26-1429.

Installing Other Equipment

If you purchased additional equipment (such as a printer), connect it to the bottom of your Model 4. The connectors are shown on the next page. **Be sure to refer also to the manual that comes with the equipment.**

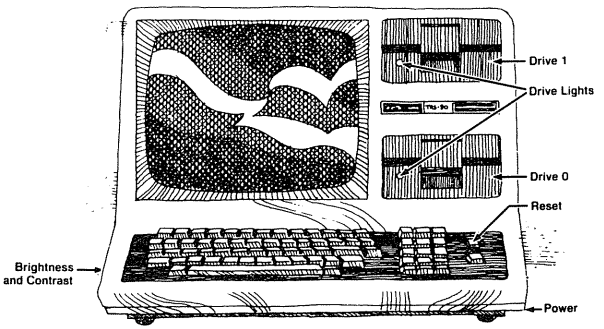


1. ***Floppy Disk Expansion Connector*** — Use to connect one or more *external floppy disk drives.* Connect the cable so it exits to the rear of the computer.
2. ***Parallel Printer Connector*** — Use to connect a printer. Connect the cable so it exits to the rear of the computer.
3. ***RS-232C Connector*** — Use to connect a *modem.*
4. ***I/O Bus Jack*** — Use to connect one or more *hard disks* or a *graphics board.* Connect the cable so it exits to the rear of the computer.
5. ***Cassette Jack*** — Use to connect a cassette recorder.

Starting Up the Model 4

Turn on any additional equipment first. Then push the Model 4's power switch forward to turn on the computer. The switch is on the bottom of the computer on the right side.

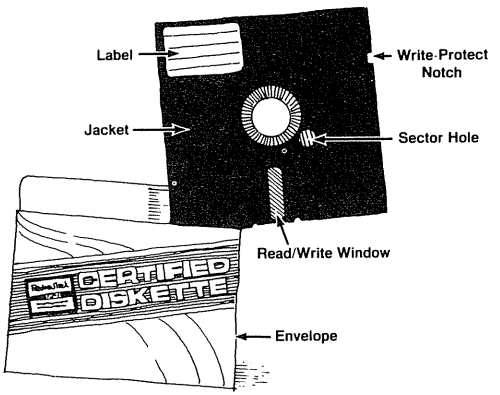
After turning on the computer, you'll hear a whir coming from the drive. The sound stops in a few seconds.



You are ready to insert a diskette and start up TRSDOS. Before you do, however, take a minute to read about how to handle diskettes.

Handling Diskettes

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



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 leave a diskette inserted in a drive — either fully or partially — when the computer is off.

Never insert or remove a diskette while the drive light is on.

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.

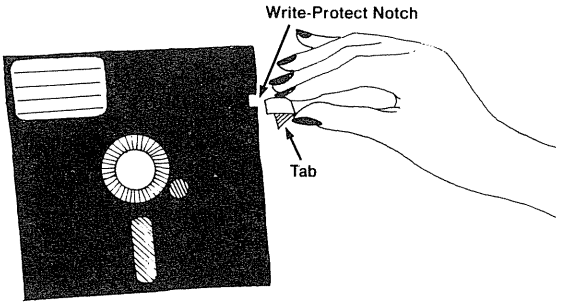
Always put the diskette back in its protective envelope after use.

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

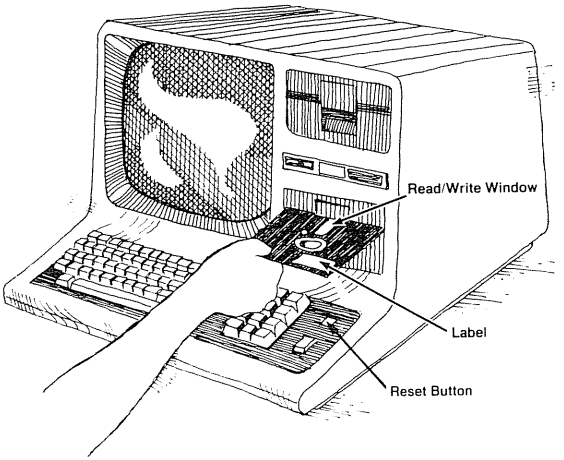
Inside your *Disk System Owner's Manual* is a diskette labeled "Model 4 TRSDOS and BASIC Interpreter." You'll find a foil, adhesive tab with this diskette. Cover the diskette's "write-protect notch" with the foil tab. (Do not pinch the tab into the notch.)



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

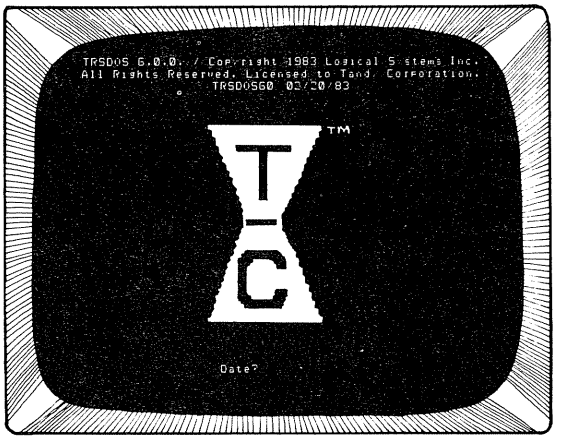
Starting Up TRSDOS

Insert the Model 4 TRSDOS and BASIC Interpreter diskette into Drive 0 as shown below. Be sure the label faces up and the read/write window points into the drive. After fully inserting the diskette, close the drive door.



Now, you can start up TRSDOS. To do this, press the reset button.

You hear the disk drive load TRSDOS from the diskette to memory. The screen then shows the TRSDOS startup message, which is similar to this:



Whenever you press reset, the system returns to this startup message.

At the bottom of the startup message, TRSDOS asks you for the date. Enter today's date in the form *mm/dd/yy*. For example, for June 14, 1983, type:

```
06/14/83 (ENTER)
```

TRSDOS displays the date in an expanded form and then displays the TRSDOS prompt:

```
TRSDOS Ready
```

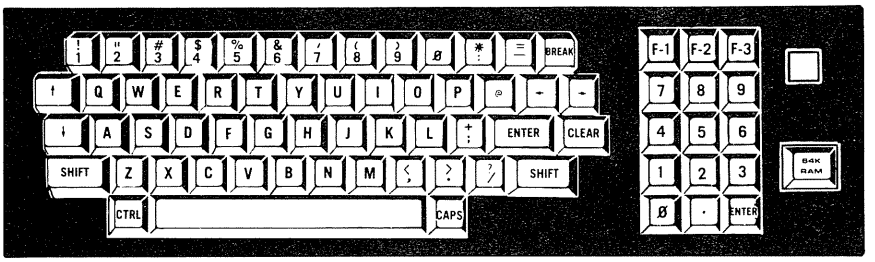
Your Model 4 is now under the control of TRSDOS and is ready for use.

Note: If no startup message is displayed, or if the screen shows a "No system," "Not a SYSTEM disk," or "Diskette?" message:

- The diskette may be in backwards or upside-down. Remove the diskette — even if the drive light is on — and correctly insert it.
- Adjust the brightness and contrast controls.
- Press reset.

Using the Keyboard

The Model 4 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.



At "TRSDOS Ready," type anything you like. When you reach the end of the line, the blinking *cursor* stops. Press (SHIFT)(←) to erase the line.

Continue typing, noting the uses of the following keys:

(←) — Backspaces and erases.

(→) — Moves the cursor to the next tab position, much like a typewriter's (TAB) key. Tab positions are at 0, 8, 16, 24, and so on.

(CAPS) — Locks the keyboard so you can enter the alphabet keys in upper case only (or unlocks it so you can enter them in either upper or lower case).

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 next chapters. Ignore any messages, such as "Program not found." "TRSDOS Ready" should be the last line on your screen.

Turning Off the Model 4

Before continuing to the next chapter, please note the proper way to turn off your Model 4:

1. To avoid losing any information, make sure "TRSDOS Ready" is the last message displayed. If it isn't already, press (ENTER); "TRSDOS Ready" should now be displayed.
2. Carefully remove any diskettes from the drives.
3. Then, turn off any additional equipment.
4. Now, turn off the Model 4.

Chapter 3
Using TRSDOS to Prepare Diskettes

TRSDOS' 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.

TRSDOS 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 TRSDOS also puts on the diskette.

The DIR and FREE Commands

If you turned off your Model 4 at the end of Chapter 2, turn it on again. Then, insert your master TRSDOS System Diskette as before.

To let you see what files are on your diskette, TRSDOS has a directory (DIR) command. Start up TRSDOS and at "TRSDOS Ready," type:

```
DIR (S,I) ENTER
```

TRSDOS displays the names of all the files that are stored on your diskette.

Study these files for a moment. In particular, note the BACKUP and FORMAT files. You will use them later in this chapter.

TRSDOS also has a FREE command, which shows how much "free" (available) space you have on the diskette.

At "TRSDOS Ready," type:

```
FREE ENTER
```

At the right side of the screen, TRSDOS shows the free space and the total amount of space on the diskette.

The FORMAT and BACKUP Commands

When you put important information on paper, you always make a copy. When you put important information on diskette, it is even more important to make a copy. 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 this, copy your master TRSDOS System Diskette and **use the copy from now on.**

To make a copy, you need to:

1. Use the FORMAT command to organize a blank diskette into a filing system in which you can put disk files.
2. Use the BACKUP command to copy all the files on one diskette to another.

How you do this depends upon the number of disk drives you have.

Multi-Drive Users:

1. Get a blank diskette. Be sure the write-protect notch is not covered by a foil tab.
2. Insert the blank diskette into Drive 1. At "TRSDOS Ready," type:

   ```
   FORMAT :1 (Q=N) ENTER
   ```

   (Be sure to type the number "1," not a lowercase letter "L." This tells TRSDOS to format the diskette in Drive 1.)
3. When the formatting is complete, the computer displays:

   ```
   Formatting complete
   TRSDOS Ready
   ```

4. To copy all the files from the *source* diskette in Drive 0 to the *destination* diskette in Drive 1, type:

   ```
   BACKUP :Ø TO :1 (ENTER)
   ```

   (Be sure to type a zero, not an uppercase letter "O".)

   TRSDOS displays the message:

   ```
   Destination disk ID is
     different: Name=DATADISK
     Date=mm/dd/yy
   Are you sure you want to
     backup to it <Y,N>?
   ```

   Don't worry about this message. It is not an error. It's simply an extra precaution to keep you from backing up over information you may need. Press (Y)(ENTER) to continue.

5. When the backup is complete, the system displays:

   ```
   Backup complete
   TRSDOS Ready
   ```

   It also displays:

   ```
   Source disk is write
   protected; MOD flags not
   updated
   ```

Don't worry about this message. It is not an error. It simply means the source diskette (master TRSDOS System Diskette) was not updated to record the date of the backup.

6. Type:

   ```
   DIR :1 (S,I) (ENTER)
   ```

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

Insert your backup diskette into Drive 0. Press reset. From now on, use your backup as your working diskette. Put your master TRSDOS System Diskette in a safe place. Never use it, except to make copies. Never remove the write-protect tab from this master diskette.

Single-Drive Users:

1. Get a blank diskette. Be sure the write-protect notch is not covered by a foil tab.
2. At "TRSDOS Ready," type:

   ```
   FORMAT :Ø (Q=N) (ENTER)
   ```

   (Be sure to type a zero, not an uppercase letter "O". The zero tells TRSDOS to format the *destination* diskette that you are going to put into Drive 0.)
3. The computer asks you to:

   ```
   Load destination diskette
   <ENTER>
   ```

   When the drive light goes out, remove the master TRSDOS System Diskette (*source* diskette) from Drive 0 and insert the blank destination diskette. Press (ENTER).
4. After formatting and verifying, the computer asks you to:

   ```
   Load SYSTEM diskette <ENTER>
   ```

   When the drive light goes out, remove the destination diskette and insert the master system diskette. Press (ENTER).
5. When the formatting is complete, the computer displays:

   ```
   Formatting complete
   TRSDOS Ready
   ```
6. To copy all the files from the master system diskette to the destination diskette, in Drive 0, type:

   ```
   BACKUP :Ø TO :Ø (ENTER)
   ```
7. TRSDOS asks you to:

   ```
   Insert SOURCE disk <ENTER>
   ```

   In this case, the master system diskette is the source diskette; press (ENTER).
8. TRSDOS then asks you to:

   ```
   Insert DESTINATION DISK
   <ENTER>
   ```

When the drive light goes out, remove the source diskette and insert the destination diskette. Press (ENTER).

9. TRSDOS displays the message:

```
Destination disk ID is
  different: Name=DATADISK
  Date=mm/dd/yy
Are you sure you want to
  backup to it <Y,N>?
```

Don't worry about this message. It is not an error. It's simply an extra precaution to keep you from backing up over information you may need. Press (Y)(ENTER) to continue.

10. During the backup, the system asks you to swap the source and destination diskettes several times. Follow the prompts, making sure the drive light is out before you insert or remove a diskette.

11. When the backup is complete, the system displays:

```
Backup complete
TRSDOS Ready
```

It also displays:

```
Source disk is write
protected; MOD flags not
updated
```

Don't worry about this message. It is not an error. It simply means the source diskette (TRSDOS System Diskette) was not updated to record the date of the backup.

Remove the master system diskette and insert your backup. Press reset so that the computer can recognize the new diskette. Then type:

```
DIR (S,I) (ENTER)
```

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

From now on, use your backup as your working diskette. Put your master TRSDOS 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

> Note: The rest of this chapter is for people with more than one drive. If you have only one drive, go to the next chapter.

Because your computer system has more than one disk drive, you can save storage space by using *data diskettes*. A data diskette is a formatted diskette that does not contain an operating system (TRSDOS). To create a data diskette, simply format a blank diskette by repeating Steps 1-3. This time, do not back up the system diskette.

After formatting the diskette, check its directory by typing:

```
DIR :1 (S,I) ENTER
```

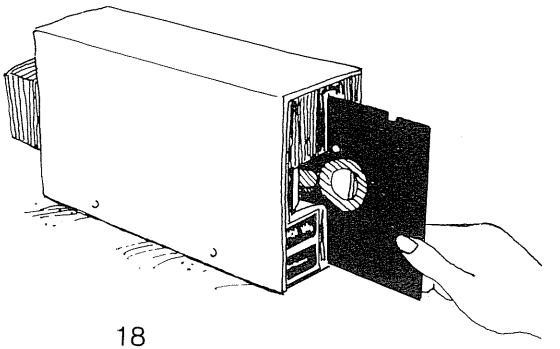
As you can see, the diskette contains only the files BOOT/SYS and DIR/SYS.

Now, check the free space by typing:

```
FREE ENTER
```

Because the diskette does not contain an operating system, it has plenty of free space.

If you have expansion drives, you can format data diskettes for them, also. Insert a formatted data diskette into the expansion drive as shown:



Note the drive's number. The numbers are:

Drive 0 — lower built-in drive
Drive 1 — upper built-in drive
Drive 2 — first expansion drive
Drive 3 — second expansion drive

To see the directory of the diskette, simply type the DIR command, using the appropriate drive number. For example, to see the directory of the diskette in Drive 2, type:

```
DIR :2 (S,I) ENTER
```

To see the free space of the diskette, simply type:

```
FREE ENTER
```

Chapter 4
Running Application Programs

You have used TRSDOS to copy diskettes and see what is on them. Now you will see how TRSDOS interacts with an application program to help you do something practical.

In this chapter, you will run a sample application program. After running the program, you will learn how to copy the file to another diskette and how to remove it from the diskette.

Running MAILLIST

Make sure you do not have a write-protect tab on your backup system diskette. Then, insert the diskette into Drive 0 and start up TRSDOS. At "TRSDOS Ready," type `DIR (S,I)` **ENTER** to look at the directory. As you can see, your diskette contains the application program MAILLIST.

At "TRSDOS Ready," 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:

```
        Model 4 - Mailing List
              Main Menu

    1. Add Entry
    2. Change Entry
    3. Delete Entry
    4. List to Screen
    5. List to Printer
    6. Return to TRSDOS

    Enter Selection....
```

Add Entry

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

When the screen shows:	You type:
Name:	Acme Manufacturing ENTER
Addr. (Line 1):	attn.: Marian Rich ENTER
Addr. (Line 2):	1000 Easy Street ENTER
City, State, Zip Code:	Hollywood, CA 90028 ENTER
Phone (nnn-nnn-nnnn):	213-555-1234 ENTER

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

If you accidentally press BREAK, press reset to return to TRSDOS Ready. At "TRSDOS Ready," type: RESET MAILLIST/DAT ENTER. Then, load and run MAILLIST again.

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:`	`Ulysses S. Marshal` (ENTER)
`Addr. (Line 1):`	`Star Route 1, Box 1` (ENTER)
`Addr. (Line 2):`	(ENTER)
`City, State, Zip Code:`	`Fort Worth, TX 76110` (ENTER)
`Phone (nnn-nnn-nnnn):`	`817-555-3665` (ENTER)

Now, add this entry to the list:

Sonny Day
7398 Springview Road
Fairhaven, MA 12273
617-555-2906

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). Then, list Entries 2 and 3. Now, return to the Main Menu.

Change Entry

Suppose that Sonny Day moves to Missouri. 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:

```
1080 Peach St. (ENTER)
```

When asked if you want to change another line, press Ⓨ. Change Line 4 to "Springfield, MO 65802" and Line 5 to 417-555-2321. When asked if you want to change another line, press Ⓝ. Then, return to the Main Menu.

Delete Entry

Now, suppose Ulysses S. Marshal asks to be crossed off your mailing list. Press ③ to select "Delete Entry." When asked what entry you want to delete, press ②(ENTER). MAILLIST shows the entry and asks:

```
Are you sure you want to
delete Entry 2? (Y/N)
```

Press Ⓨ and (ENTER). MAILLIST responds:

```
Entry 2 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 ②(ENTER) to see Entry 2. MAILLIST responds:

```
Entry 2 not found
```

Ulysses S. Marshal 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 Ⓨ or Ⓝ, MAILLIST prints your list.

Return to TRSDOS

When finished, return to the Main Menu and press ⑥ to exit the program. At "TRSDOS Ready," TRSDOS again has control of the computer.

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

COPY and REMOVE

You have created a disk file named MAILLIST/DAT, composed of your mailing list. At "TRSDOS Ready," type:

```
DIR (S,I) (ENTER)
```

and you can see that MAILLIST/DAT has been added to your directory.

Now, we will show how to use two useful TRSDOS commands to copy MAILLIST/DAT to another diskette and then remove it. How you do this depends upon the number of drives you have.

Multi-Drive Users:

1. In Chapter 3, you formatted a data diskette. Insert this diskette into Drive 1.
2. The TRSDOS COPY command lets you copy a single file from one diskette to another. To copy the MAILLIST/DAT file from the system diskette to the data diskette, type:

   ```
   COPY MAILLIST/DAT:Ø TO
   MAILLIST/DAT:1 (ENTER)
   ```

3. To see if MAILLIST/DAT is now on the diskette in Drive 1, type:

   ```
   DIR :1 (S,I) (ENTER)
   ```

4. The TRSDOS REMOVE command deletes a file from a disk, removes that file's information from the directory, and frees the space allocated to it. Remove MAILLIST/DAT by typing:

   ```
   REMOVE MAILLIST/DAT:1 (ENTER)
   ```

   Check the directory of the diskette in Drive 1 to be sure that MAILLIST/DAT is removed.

Single-Drive Users:

1. At "TRSDOS Ready," format a blank diskette and back up your original TRSDOS System Diskette onto it. (Do not back up the diskette that contains MAILLIST/DAT.) This new diskette is your *destination* diskette.

2. Insert the diskette that contains MAILLIST/DAT into Drive 0. This is your *source* diskette.

3. The TRSDOS COPY command lets you copy a single file from one diskette to another. To copy the MAILLIST/DAT file from the system diskette in Drive 0 to the other system diskette, type:

   ```
   COPY MAILLIST/DAT:0 (X) ENTER
   ```

4. TRSDOS asks you to insert the source diskette. Since it is already in the drive, press ENTER.

   During the copy, the system asks you to swap the system, source, and destination diskettes several times. Follow the prompts, making sure the drive light is out before you insert or remove a diskette.

   When asked for the system diskette, use the source diskette.

5. When the copy is complete, use the DIR command to make sure MAILLIST/DAT is on the destination diskette. Insert that diskette into Drive 0 and press ENTER. Then type:

   ```
   DIR (S,I) ENTER
   ```

6. The TRSDOS REMOVE command deletes a file from a disk, removes that file's information from the directory, and frees the space allocated to it. Remove MAILLIST/DAT by typing:

   ```
   REMOVE MAILLIST/DAT ENTER
   ```

   Check the directory to be sure that MAILLIST/DAT is removed.

Chapter 5

Learning to Program with BASIC

You have used the operating system and an application program. This chapter gives you a feel for how you would **write** your own application program.

Loading BASIC

Load BASIC by typing:

```
BASIC (ENTER)
```

BASIC displays its startup message and:

```
Ready
```

"Ready" indicates that BASIC, not TRSDOS, is ready to accept a command or program statement.

You cannot directly execute a TRSDOS command from within an application program, such as BASIC. For example, type:

```
DIR (S,I) (ENTER)
```

Your screen shows:

```
Syntax error
Ready
```

"Syntax error" indicates that BASIC doesn't understand the TRSDOS command. (To view the directory from within BASIC you must type `SYSTEM "DIR (S,I)" (ENTER)`.)

Writing and Running a Program

Write a BASIC program by typing:

```
10 CLS (ENTER)
20 PRINT @ 672, "HELLO!" (ENTER)
30 PRINT @ 818, "I SEE WE
   SPEAK THE SAME
   LANGUAGE..." (ENTER)
40 PRINT @ 986, "BASICALLY
   SPEAKING." (ENTER)
```

When you run this program, the CLS command will clear the screen. The PRINT @ command will tell BASIC to print the text at the specified 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.

Ready
```

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 (TRSDOS resumes control). To run it later, you must store it permanently on disk.

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

```
SAVE "HELLO" (ENTER)
```

To return to TRSDOS, type (at "Ready"):

```
SYSTEM (ENTER)
```

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

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

```
BASIC (ENTER).
```

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

```
LOAD "HELLO" (ENTER)
```

When "Ready" reappears, the HELLO program has been loaded into 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 (SHIFT) and (@) at the same time. Press any key to continue the listing.

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

```
LLIST (ENTER)
```

This chapter showed how to use two words in the BASIC language: 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 *Getting Started with BASIC Manual* and *Disk System Owner's Manual*.

Chapter 6
In Case of Trouble

The first part of this chapter describes how to avoid losing important information. The second part describes *error messages*, the computer's way of warning you about trouble.

The Keys to Keeping Information

Backups

The best way to avoid losing important information is to have a complete library of backups. Whenever you store information, keep at least two copies of it:

- Working — for daily use
- Backup — for backing up 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 2). Use this as a master diskette to make your working and backup diskettes. Then, store this master diskette in a safe place and use it only for making backups.

Drive Maintenance

Proper care of your disk drives also is essential to keeping information. Disk drives have small, fragile "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 may cause not only information loss, but damage to the diskette or even the drive head.

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 appears on your screen, it can come from one of three sources: an application program, a TRSDOS command, or TRSDOS.

Application Program Messages

An application program gives you an error message to warn 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.

TRSDOS Command Messages

Some TRSDOS commands give you an error message to warn you that you are misusing the command. These messages tell you exactly what to do about the problem.

For example, suppose you try to format an old diskette; this would erase all its information. So that you do not unknowingly do this, FORMAT displays a message similar to:

```
Disk contains data --
Name=DATADISK
Date=01/12/83
Are you sure you want to
format it?
```

Press (Y)(ENTER) if you are sure you want to format the diskette (and erase all its information). Press (N)(ENTER) if you've changed your mind.

For help in understanding TRSDOS command messages, see your Disk System Owner's Manual.

TRSDOS Messages

TRSDOS gives you an error message if there is an operator error or a hardware or software problem. Usually, TRSDOS displays a complete error message, but sometimes it displays only a decimal or hexadecimal error number.

For help in understanding TRSDOS errors, see your Model 4 Quick Reference Card.

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)
```

TRSDOS gives you this error message:

```
Program not found
```

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

```
DIR (ENTER)
```

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. TRSDOS warns you with this message:

```
Disk space full
```

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

One other common error is leaving a disk file *open* by not exiting the application program properly. When you try to use the file again, TRSDOS displays the message:

```
File already open
```

Use the RESET command to close the file. For example, if the file's name is MAILLIST/DAT, type (at "TRSDOS Ready"): RESET MAILLIST/DAT (ENTER).

A hardware error warns you of a hardware problem, usually a flawed diskette or faulty disk drive. For example, suppose the diskette does not receive your information within the allotted time. TRSDOS displays the message:

```
Lost data during write
```

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

A software error warns you of a problem in your application program. For example, suppose your application program tries to access information beyond the end of the disk file. TRSDOS warns you by displaying the message:

```
End of file encountered
```

Notify your programmer if you get a software error.

Chapter 7
And That's Just the Beginning

Radio Shack offers many Model 4 programs and is constantly developing more. Also, the Model 4 is 100% compatible with Radio Shack's Model III. This means you can use any Radio Shack Model III software on the Model 4 **without changing it**.

Application Programs

The most popular application programs 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 the 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 — in many combinations.

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 chart.

Communications (an electronic telephone). Lets you connect your Model 4 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.

(The Model 4 has its own communication program that you can immediately begin using. It is the TRSDOS COMM command, which we'll talk about later.)

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

Education. Teaches by asking questions and giving immediate feedback on the answers.

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 programs.

For added possibilities, many new programs accept information from another program. For example, a word processing program might let you use information that you stored with a data base management program.

For More Information: *Radio Shack offers a complete line of programs for the Models 4 and III, which you can find at any Radio Shack Computer Center. Also, many independent companies offer programs for these computers. You can use Radio Shack's TRS-80 sourcebook listing to locate sources of software.*

Languages

There is large demand for innovative new application programs. Should you decide you want 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 that comes with the Model 4 is an interpreter.

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

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 hardware.

For More Information. *All Radio Shack languages comes with reference manuals. Also, Radio Shack sells tutorials that teach you how to program.*

If you plan to use an assembler, you'll need technical information on Model 4 hardware, as well as on TRSDOS SVC *routines you must use. This information is contained in the* Model 4 Technical Reference Manual *(Catalog #26-2110).*

TRSDOS Commands

Many TRSDOS commands are useful programs in and of themselves. Some commands you might want to use are:

ROUTE/LINK. Lets you connect one part of the hardware to another. For example, you can connect your screen to your printer. By doing this, all information normally printed on your screen is printed on the printer.

BUILD/DO/JCL. Lets you create a disk file consisting of a group of TRSDOS commands and programs. For example, you could create a file that shows you a directory, loads BASIC, and then runs a program — all automatically.

FORMS. Lets you change your printer's settings, such as the characters per line or lines per page.

SPOOL. Lets you print reports while you are using the computer.

MEMDISK. Lets you store information in memory in the same way you store information in a disk file. You will want to use this command if you purchase the extra 64K memory. It offers speed and convenience.

CONV. Moves information from a diskette formatted by TRSDOS Version 1 (the Model III operating system) to a diskette formatted by TRSDOS Version 6 (the Model 4 operating system). See "Operating Systems" below.

COMM. Lets you connect your Model 4 to another computer and use the other computer's hardware and software.

KSM/FLT. Lets you save TRSDOS and BASIC instructions that you most often use and quickly "recall" them from the keyboard. For example, you can reprogram the "D" key to represent the DIR :1 (directory) command.

SET/FILTER. If you are an assembly language programmer, lets you change the programs that control each part of the hardware.

For More Information. *The* Disk System Owner's Manual *that comes with your Model 4 describes all the TRSDOS commands.*

Operating Systems

If you purchase an application program for the Model III, you'll find it comes with a different version of TRSDOS than the one we've described in this manual. Model III programs run under TRSDOS Version 1, rather than TRSDOS Version 6.

You need not be concerned about this during normal operation of the program, since the Model 4 is 100% compatible with TRSDOS Version 1. Simply follow the instructions in your

application program manual. The few differences you will notice are:

- An application program running under TRSDOS Version 1 prints larger (and fewer) characters on the screen than a program running under TRSDOS Version 6.
- TRSDOS Version 1 commands work slightly differently from TRSDOS Version 6 commands. Follow the instructions in your application manual, and you'll have no problems.

One other difference could concern you, but only in a rare situation. The two versions of TRSDOS format diskettes differently. They cannot read each other's diskettes.

For example, you stored a mailing list on a TRSDOS Version 6 diskette (in Chapter 4). You cannot use this mailing list with an application program running under TRSDOS Version 1.

TRSDOS Version 6 offers a CONV command that moves files stored on a TRSDOS Version 1 diskette to a TRSDOS Version 6 diskette. Check your *Disk System Owner's Manual* for details. **But remember, you are not required to do the conversion to run a Model III program on your Model 4.**

For More Information. *The* Model III Disk System Owner's Manual *(Catalog #26-2111) contains complete information on TRSDOS Version 1.*

And Now It's Your Turn

This chapter has touched on some popular applications of the Model 4. As you grow accustomed to using the Model 4, you'll think of more ways of expanding it to meet your own needs. Applications for the Model 4 are limited only by the imagination!

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