Radio Shack

INTRODUCTION TO YOUR DISK SYSTEM

TRS-80® Model 4P

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

To Our Customers...

Congratulations on purchasing the Model 4P Disk System. This computer, a portable version of the Model 4, is both powerful and efficient.

Using your 4P, you can run a complete line of application programs, including programs for:

- Business
- Education
- Personal finance
- Programming
- Entertainment

This includes all Radio Shack Model III and Model 4 programs.

How to use this Manual

This manual explains the important things you need to know about the Model 4P:

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

After you finish reading this manual, you can immediately begin running any Radio Shack Model III or Model 4 application programs you have purchased.

Later, when you become comfortable with the Model 4P, you may want to use more of its features. You can then read the *Disk System Owner's Manual* which gives complete details on the Model 4P commands and BASIC.

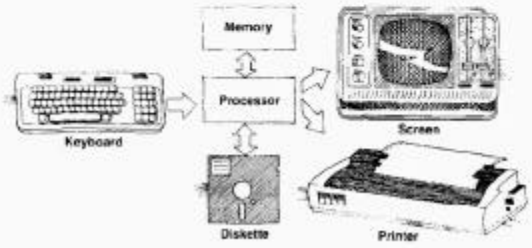
Contents

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 *programs* or *systems*. We refer to these programs and systems as software. As you can see, hardware and software are dependent on each other.

Computer Hardware

This picture shows the parts of the hardware and how they relate to one another:



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:

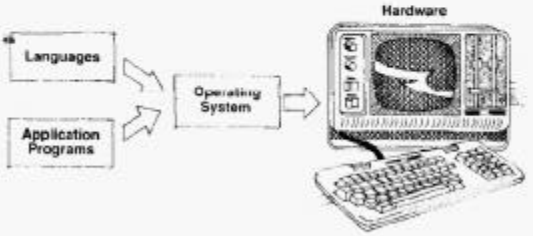
- ***Random access memory (RAM)*** — for temporary storage of information and software that you enter. When you turn off the computer, the contents of RAM disappear.
- ***Read-only memory (ROM)*** — for permanent storage of essential, built-in software, such as the software that tells the computer what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

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 the 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 application programs for such tasks as accounting, educating, and word processing.

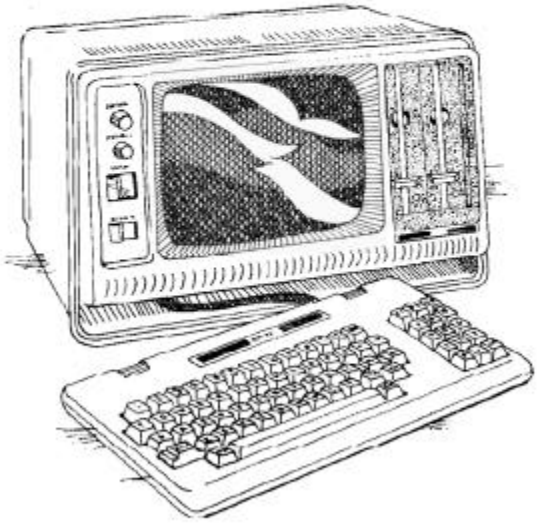
Languages. A programming language, such as BASIC, is one kind of application program. It has a set of codes you can use to write other application programs. The Model 4P comes with BASIC.

Disk Operating System. An application program seldom talks to the hardware directly. It talks through a disk operating system. The Model 4P's disk operating system is TRSDOS Version 6.1.1 (or any later version of TRSDOS 6.1). This is called simply "TRSDOS" ("Triss Doss") throughout this manual. TRSDOS is on the diskette that comes with your Model 4P.

To accomplish anything with your 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 set up your Model 4P and how to store information, using the Model 4P, TRSDOS, and an application program.

Chapter 2
Getting to Know Your Model 4P

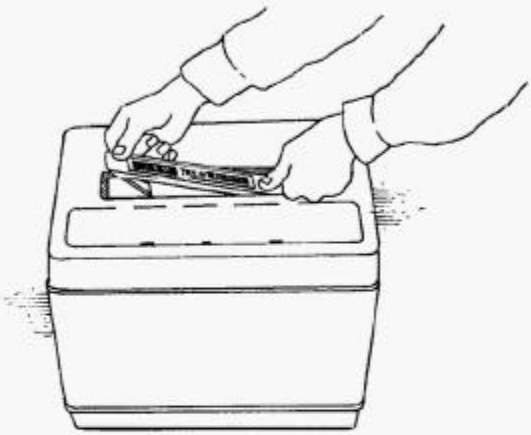


This chapter tells you how to set up the Model 4P, start up your computer, and load TRSDOS. It also helps familiarize you with the Model 4P keyboard.

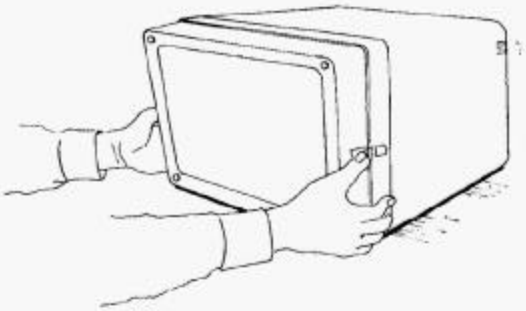
Setting Up the Model 4P

The Model 4P comes with the screen cover on so you can easily move the computer wherever you want. To lift the computer, press down on one end of the handle, then grasp the raised

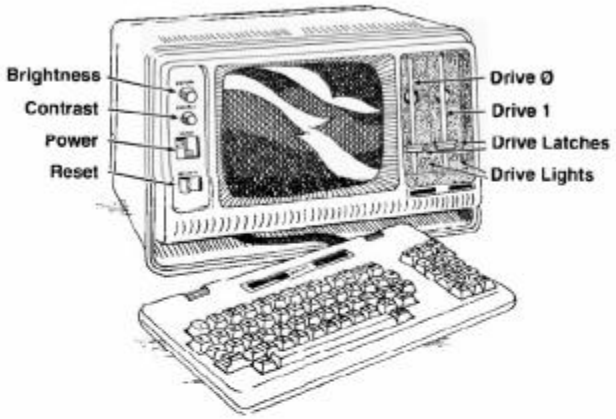
part of the handle with the other hand, as shown here:



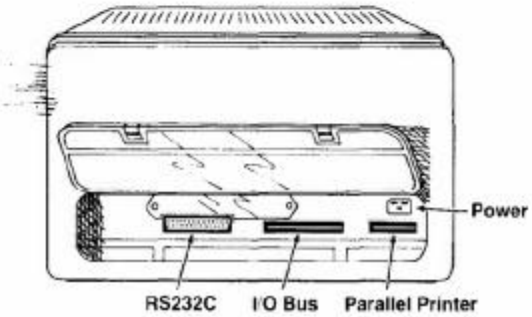
Set the computer where you'll be using it, near a grounded, 120 VAC, 3-prong outlet. Be sure the vents on the computer face up. Loosen the cover from the screen by pushing the latches back as shown here:



Carefully remove and set aside the cover. Then reach under the main part of the computer and pull out the keyboard. Be careful; the keyboard is permanently connected.



Open the panel on the back of the computer. Connectors for the power cord and additional equipment are shown below:



Connect the power cord to the power connector. Then plug the other end into the grounded, 120 VAC, 3-prong outlet. Because electrical interferences 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 appropriate connector on the back of your Model 4P. **Be sure to refer also to the manual that comes with the equipment.**

RS-232C Connector — Use to connect equipment such as a *modem* or a *serial printer*.

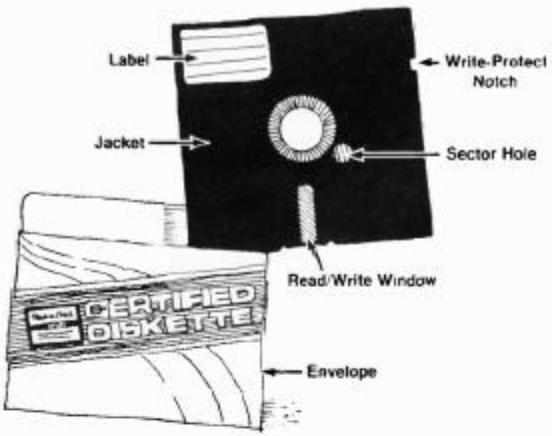
Parallel Printer Connector — Use to connect a *parallel printer*. Connect the cable so it exits to the bottom of the computer.

I/O Bus Connector — Use to connect one or more *hard disks* or other devices. Connect the cable so it exits to the bottom of the computer.

Handling Diskettes

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

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



Dos and Don'ts of Diskette 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 insert or remove a diskette while the drive light is on.

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.

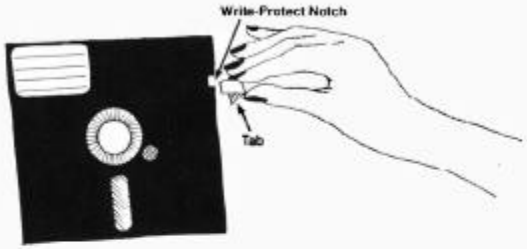
Store diskettes in an upright position, never in a stack. Never place anything on a diskette.

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 *Disk System Owner's Manual* is a diskette labeled "TRSDOS and BASIC Interpreter." 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.)



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.

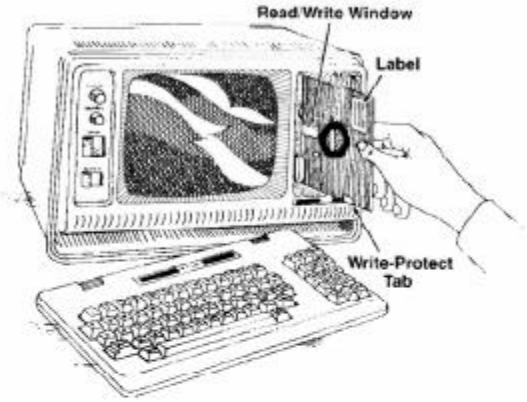
Starting Up the Model 4P

Turn on any additional equipment first. Then press the Model 4P's power switch to turn on the computer. The switch illuminates to indicate the power is on.

> **Note:** If you have a power strip, you can turn all equipment on at the same time by pressing the power switch on the strip.

Starting Up TRSDOS

In a few seconds, one of the messages listed in Appendix A is displayed. (Usually, the message is "The Floppy Disk Drive Is Not Ready"). When the drive lights go out, insert the TRSDOS and BASIC Interpreter diskette (TRSDOS System Diskette) into Drive 0 as shown below. Be sure the label faces the screen and the read/write window points into the drive. After fully inserting the diskette, close the drive latch.



To start up TRSDOS, press the **RESET** switch, then release it. (**Note:** Never press (SHIFT), (CAPS), or (CTRL) during startup.) The screen displays the TRSDOS startup message, which is similar to this:

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

> **Note:** If the screen shows a "No system" or "Not a SYSTEM disk" message, the diskette in Drive 0 does not contain the operating system. Remove the diskette and insert a system diskette, then press **RESET**.

At the bottom of the startup message, TRSDOS asks:

```
Date MM/DD/YY?
```

Enter today's date in the format specified. For example, for June 14, 1984, type:

```
06/14/84 (ENTER)
```

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

```
TRSDOS Ready
```

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

The Model 4P 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, 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 alphabet keys so you can enter them in upper-case only (or unlocks them 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 following chapters. At this time, ignore any messages, such as "Program not found." "TRSDOS Ready" should be the last line on your screen.

Turning Off the Model 4P

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

1. To avoid losing any information, make sure "TRSDOS Ready" is the last message displayed.
2. Carefully remove any diskettes from the drives.
3. Then turn off any additional equipment.
4. Now turn off the Model 4P

   Note: If you have all the equipment connected to a power strip, then you can turn it all off at the same time, using the switch on the power strip.

Chapter 3
Using TRSDOS to Prepare Diskettes

TRSDOS's 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 4P 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 (ENTER)
```

TRSDOS displays the names of all "visible," non-system files that are stored on your diskette. Now type:

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

TRSDOS displays the names of **all** files on the diskette, including system files and invisible files.

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 a 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

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 TRSDOS System Diskette and **use the copy from now on.**

To make a copy of a diskette, you must first use the FORMAT command to organize a blank diskette into a filing system in which the system can store and retrieve disk files. Then you must use the BACKUP command to copy all files from your system diskette to the "formatted" diskette.

To format and back up your TRSDOS System Diskette, follow these steps:

1. Insert a blank diskette into Drive 1. (First, make sure the diskette's write-protect notch is not covered by a foil tab.)

2. 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.)

   Note: If you type only `FORMAT :1` (ENTER), TRSDOS asks several questions about how to format the diskette. By including the `Q=N` parameter (Query = No), you bypass the questions. (See your *Disk System Owner's Manual* for more information about how to customize the

FORMAT command for your use.)

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 :0 TO :1 (ENTER)
```

(Be sure to type a zero, not an upper-case 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 that a backup has been made.

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.

Preparing Data Diskettes

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 much more free space. You can use a data diskette in Drive 1 any time you have an operating system diskette in Drive 0.

Backing Up Data Diskettes

To copy all the files on a data diskette to another formatted data diskette, use the BACKUP command as follows.

1. Start up your system and load TRSDOS. At "TRSDOS Ready," insert the destination data diskette in Drive 1. Then type:

   ```
   BACKUP :0 TO :1 (X) (ENTER)
   ```

2. TRSDOS asks you to:

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

When the drive light goes out, remove the system diskette from Drive 0 and insert the source data diskette. Press (ENTER).

3. TRSDOS does the backup. When it is finished, it displays:

```
Insert SYSTEM disk <ENTER>
```

When the drive light goes out, remove the source diskette from Drive 0 and insert the system diskette. Press (ENTER). TRSDOS displays:

```
Backup complete
TRSDOS Ready
```

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 01.01.00
```

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, so that we can inform you of any major changes in the application program. For information on minor changes, contact 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 Smith` (ENTER)
`Addr. (Line 2):`	`1080 Lakeshore Drive` (ENTER)
`City, State, Zip Code:`	`Hollywood, CA 90028` (ENTER)
`Phone (nnn-nnn-nnnn):`	`213-555-1111` (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), type **CONT** (ENTER) to continue.

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:`	`Fran Stevens` (ENTER)
`Addr. (Line 1):`	`1339 Sandy Lane` (ENTER)
`Addr. (Line 2):`	(ENTER)
`City, State, Zip Code:`	`Fort Worth, TX 76110` (ENTER)
`Phone (nnn-nnn-nnnn):`	`817-555-9045` (ENTER)

Now add this entry to the list:

Todd Brent
50 Vine St., 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). Then list Entries 2 and 3. Now return to the Main Menu.

Change Entry

Suppose that Todd Brent 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:

`100 Main Street` (ENTER)

When asked if you want to change another line, press (Y). Change Line 4 to "Wall, SD 57701" and Line 5 to 605-555-1885. When asked if you want to change another line, press (N). Then return to the Main Menu.

Delete Entry

Now suppose Fran Stevens 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 (Y) (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
```

Fran Stevens is no longer on the list.

List to Printer

Return to the Main Menu by pressing (M). 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 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 may not 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. Follow these steps:

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:0 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.

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)
```

You screen shows:

```
Syntax error
Ready
```

"Syntax error" indicates that BASIC doesn't understand the TRSDOS command.

> **Note:** 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 clears the screen and the PRINT @ command tells BASIC to display 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)
```

BASIC has more than 50 words that you can use to write a program. To learn how to use them, see your *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 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 2). 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.

Drive Maintenance

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 can result in data loss, damage to the diskette, and even damage to 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.

The Computer's Warning System

When a 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 specific application program manual.

Command Messages

Some TRSDOS commands give you a 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=01/12/84
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 displays 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 number.

For help in understanding TRSDOS errors, see your Model 4P Portable Reference Guide.

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 displays 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 drive tries to write to a disk when it is not supposed to. TRSDOS displays the message:

```
Write fault on disk drive
```

This indicates that you have a hardware problem.

Here is another example of a hardware error message:

```
Parity error during read
```

This usually indicates that the disk is worn or dirty or that the drive is dirty or out of alignment. Try the operation again, first using a different disk and then, if necessary, a different drive.

A software error warns you of a problem in your application program. For example, suppose your application 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 application programs and is constantly developing more. In addition, the Model 4P is compatible with Radio Shack's Model III. This means you can use any Radio Shack Model III or 4 software on the Model 4P.

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 — 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 a chart.

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

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 responses.

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.

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 Model 4P, which you can find at any Radio Shack Computer Center. Also, many independent companies offer programs that will run on the Model 4P. You can use Radio Shack's TRS-80 Sourcebook listing to locate sources of software.*

Languages

There is a large demand for innovative 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 4P is an interpreter.

Compiler. Compiles an entire program into machine code or pseudo code (P-code). 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 computer.

For More Information. *All Radio Shack languages come 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 the TRSDOS system calls, as well as on the Model 4P hardware. The system call 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 displayed on the screen is printed by 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 text while you are using the computer for another task.

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 4P operating system). See "Operating Systems" below.

COMM. Lets you connect your Model 4P 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. 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 4P describes all the TRSDOS commands.*

Operating Systems

Model III 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 1.3 (the floppy disk operating system) or the LDOS 5.1 series (the hard disk operating system), rather than TRSDOS Version 6.1.1 (or later).

On your TRSDOS System Diskette (Version 6.1.1) is a file called "MODELA/III," which contains information that was contained in the read-only memory (ROM) in the Model III. To run a TRSDOS Version 1.3 application program or an LDOS 5.1 series application program on your Model 4P, you must first move this file to the application program diskette.

Then, when you use the diskette, the hardware locates and loads the file. Once that is done, the system starts running the operating system that is on that diskette.

To copy the MODELA/III file to a TRSDOS 1.3 diskette, follow these steps:

1. Start up your system, using TRSDOS Version 6.1.1.

2. At "TRSDOS Ready," insert a blank diskette into Drive 1. (First, make sure the blank diskette's write-protect notch is not covered by a tab.) Now, format the Drive 1 diskette by typing:

   ```
   FORMAT :1 (SDEN,CYL=35,Q=N,ABS)
   ```
   (ENTER)

   This command makes the diskette identical to those formatted by the Model I disk operating system (TRSDOS Version 2.3). Later, you'll copy the file from this diskette to a TRSDOS Version 1.3 diskette.

3. Copy the MODELA/III file to the newly formatted diskette, by typing:

   ```
   COPY MODELA/III:0 :1 (ENTER)
   ```

4. Press **RESET**; then, within three seconds, press (F3) and a **lower-case** (P) at the same time. Pressing (F3) tells the hardware to load the Model III ROM; pressing (P) tells it that the diskette in Drive 0 contains the MODELA/III file, but that you want to use a program that is on another diskette.

   If the message "Loading ROM Image - Please Wait" is not displayed within 10 seconds, repeat this step. After several seconds, you should see the prompt telling you to swap diskettes. If this message is not displayed, repeat this step.

5. At the prompt, remove the TRSDOS Version 6.1.1 diskette from Drive 0 and insert a TRSDOS 1.3 diskette. (First, make sure the 1.3 diskette's write-protect notch is not covered by a tab.) Close the drive door and press (ENTER). (Note: Leave the Drive 1 diskette in the drive.) The TRSDOS 1.3 operating system should load and ask you for the date and time.

6. After entering the date and time, type:

   ```
   CONVERT (ENTER)
   ```

When CONVERT asks for the source drive, respond by typing 1 (ENTER). When it asks for the destination drive, respond by typing 0 (ENTER). CONVERT then reads the diskette in Drive 1 and moves the file to the TRSDOS 1.3 diskette.

7. At "TRSDOS Ready," remove the diskettes from the drives and and turn off the computer. When you turn it on again, you can start up under TRSDOS 1.3.

If there is not enough room on the TRSDOS 1.3 diskette for the MODELA/III file, an error message is displayed. If this happens, either (1) use the KILL command to remove files to make enough space on the diskette, or (2) use two disks to start the operating system (see "Two-Disk Startup").

Once you have a copy of the MODELA/III file on a TRSDOS 1.3 diskette, you can move it to other TRSDOS 1.3 diskettes, using the TRSDOS 1.3 COPY command. You may now reuse the diskette created in Step 2, as it is no longer required.

To copy the MODELA/III file to an LDOS 5.1 series diskette, follow these steps:

1. Start your system using TRSDOS Version 6.1.1.
2. At "TRSDOS Ready," insert an LDOS 5.1 series application program diskette into Drive 1. (First, make sure the diskette's write-protect notch is not covered by a tab.)
3. Copy the file by typing:

```
COPY MODELA/III:0 :1 (ENTER)
```

If there is not enough room on the LDOS diskette for the MODELA/III file, an error message is displayed. If this happens, either (1) use the KILL command to remove files to make enough space on the diskette, or (2) use two disks to start the operating system (see "Two-Disk Startup").

Two-Disk Startup. Follow these steps to start up LDOS 5.1 or TRSDOS 1.3 using two disks:

1. Turn on the Model 4P.

2. After one of the error messages listed in Appendix A is displayed, insert into Drive 0 a TRSDOS 6, LDOS 5.1, or TRSDOS 1.3 diskette that contains the file MODELA/III.

3. Press **RESET**; then, within three seconds, press (F3) and a **lower-case** (P). Pressing (F3) tells the hardware to run the Model III operating system. Pressing (P) tells TRSDOS to prompt you when it is ready for the disk you want to use.

4. When the prompt to swap diskettes is displayed, remove the diskette from Drive 0 and insert the Model III diskette you want to use.

5. Press (ENTER).

After doing this procedure once, you need not do it again unless you turn off the Model 4P or you run a Model 4 operating system, such as TRSDOS 6.1.1 or CP/M®. In any case, your Model 4P will inform you if you need to perform the above procedure.

Running Model III Programs. If your Model III application program diskette contains the MODELA/III file, simply insert the diskette and press **RESET**. If the file is not on the diskette, either (1) copy the file to the diskette as described above or (2) use the 2-disk startup procedure described above.

To run the application program, follow the instructions in your application program manual. The few differences you will notice are:

- An application program running under TRSDOS Version 1.3 can display 64 characters on 16 lines. A program running under TRSDOS Version 6.1.1 can display 80 characters on 24 lines.

- TRSDOS Version 1.3 and LDOS 5.1 commands work slightly differently from TRSDOS Version 6.1.1 commands. Follow the instructions in your application program manual, and you'll have no problems.

  Note: Some Model III packages are distributed on disks that are in a non-

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standard format. If you find that the Model 4P does not boot these disks consistently, be sure that you press (F3) every time you use that disk. This will inform the hardware that the disk is a Model III package.

For More Information. *The* Model III Disk System Owner's Manual *(Catalog #26-2111) contains complete information on TRSDOS Version 1.3.*

Earlier Versions of TRSDOS 6. If you have an earlier version of the TRSDOS Version 6 series (one prior to 6.1.1), you can easily run it on your Model 4P. Simply insert any diskette that contains the operating system; then, press **RESET** and a lower-case (N). Pressing (N) (for "noload") tells the hardware not to try to load the Model III ROM-image, even if the diskette seems to need it.

An alternative is to move the contents of a TRSDOS 6.0.0 or TRSDOS 6.1.0 diskette to a later version diskette. To do so, follow these steps:

> **Note:** Do not use this procedure on a diskette that is labeled "backup-limited."

1. Start up your system with the latest version of TRSDOS 6 in Drive 0.
2. At "TRSDOS Ready," insert a blank diskette into Drive 1. (First, make sure the diskette's write-protect notch is not covered by a tab.) Then, format the diskette by typing:

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

3. Back up the diskette in Drive 0 to the diskette in Drive 1 by typing:

   ```
   BACKUP :0 :1 (ENTER)
   ```

4. At "TRSDOS Ready," remove the diskette that is in Drive 0 and move the other diskette from Drive 1 to Drive 0. Insert the diskette you want to update into Drive 1.
5. Type:

   ```
   BACKUP :1 :0 (SYS,INV,NEW) (ENTER)
   ```

This command tells TRSDOS to back up system files and invisible files, as well as visible files. The NEW parameter tells it to back up only those files that do not already exist on the destination diskette. The diskette in Drive 0 now contains the latest version of the operating system, as well as all the files that were on the diskette in Drive 1.

And Now It's Your Turn

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

Appendix A
Model 4P Hardware Commands

When you press **RESET** on the Model 4P, the keyboard is scanned for a few seconds to see if you have selected any options.

If you don't press a key, the hardware tries several ways to start the system:

1. It tries to load the operating system from a hard disk drive.
2. If your system does not have a hard disk drive or if the drive is not ready for use, the hardware tries to load the operating system from a diskette in Drive 0.
3. If this doesn't work, the hardware tries to enter the Model III ROM BASIC. If the ROM-image is not present, an error message is displayed.

By pressing keys, you can cause the hardware to alter the above procedure.

> **Note: Never use (SHIFT) or (CAPS) during startup. (Type all keys in lowercase.) In addition, never use (CTRL) during startup. If you do, the hardware misinterprets the command.**

The keys are:

- (F1) or (1) — tells the hardware to try to load the operating system from hard disk only.
- (F2) or (2) — tells the hardware to try to load the operating system from floppy disk only.
- (F3) or (3) — tells the hardware that you want the Model 4P to emulate a Model III. The hardware tries to load the contents of the MODELA/III file, if it needs to be loaded.

Here are some other special keys you can use at startup:

- (P) (for "prompt") — Use this if you need to run a Model III operating system but the file MODELA/III does not exist on the disk you want to use. The hardware loads the ROM-image off the diskette that is in Drive 0 and then prompts you to switch diskettes. You can then press (ENTER) to run a disk operating system or (BREAK) to run Model III ROM BASIC. You can use (P) with any other option.
- (L) (for "load") — Use this with **RESET** if the ROM-image is damaged. **RESET** (L) tells the hardware to load the Model III ROM-image even if it appears to be already loaded. You can use this key combination with any other option, except (N).
- (N) (for "noload") — This key tells the hardware not to try to load the Model III ROM image, even if the diskette seems to require it. Pressing (N) lets you use modified or non-Radio Shack Model III operating systems on the Model 4P. You can use (N) with any other option, except (L).

If you want to use Model III ROM BASIC, press (F3) and (P). Then, when prompted, press (BREAK).

Appendix B
Startup Error Messages

Several error messages may be displayed when you start up your Model 4P. This appendix lists each message and its possible causes. The actions to take to solve the problem are given in the order in which you should try them.

The Hard Disk Drive Is Not Available

Cause:

You pressed (F1), but a hard disk drive is not connected or turned on.

Action:

- Turn on the hard disk drives and try again.
- Check the hard disk cable to make sure it is properly connected to the hard disk and the Model 4P.
- Use an option other than (F1).

The Hard Disk Drive Is Not Ready

Cause:

- The Hard Disk Controller reported that the primary hard disk drive was not ready for use. If the drive was just turned on, it may not have reached its operating speed. If you have just connected secondary hard disk, this may indicate that one or more cables are incorrectly connected. This may also indicate a hardware problem.

Action:

- Press **RESET** and try again.
- Press **RESET** and select a startup option other than (F1).
- Consult your *Hard Disk Owner's Manual* for more information.
- Contact your Radio Shack Service Center (RSSC).

The Floppy Disk Drive Is Not Available

Cause:

- There is a hardware problem.

Action:

- Contact RSSC.

The Floppy Disk Drive Is Not Ready

Causes:

- The diskette is not in Drive 0.
- The diskette is inserted improperly.
- There is a hardware problem.

Action:

- Insert a diskette correctly into Drive 0 and try again.
- Try another diskette.
- Contact RSSC.

Close the Floppy Drive Door And Try Again

Cause:

- There is a diskette in Drive 0, but the door is open or the disk is inserted upside-down.

Action:

- Check the disk, close the drive door, and press **RESET**.

The ROM Image Was Not Found On Drive 0

Causes:

- The file MODELA/III does not exist on the diskette in Drive 0.
- The diskette is not a TRSDOS or LDOS diskette.
- The hardware cannot read the directory of the diskette.

Action:

- Use a diskette that contains the file MODELA/III or use the 2-disk procedure described in Chapter 7.

- If you are using an "alien" operating system, you must use the 2-disk procedure, and the disk containing the file MODELA/III must be a TRSDOS- or LDOS-formatted disk.
- Try another disk. The entire directory must be error-free for the hardware to find the ROM-image file.

The ROM Image Can't Be Loaded - Floppy Disk Drive Is Not Ready

Causes:

- There is no diskette in Drive 0.
- The Drive 0 door is open.
- The diskette in Drive 0 is upside-down.
- The diskette in Drive 0 is not formatted or is flawed.

Action:

- Insert the diskette into Drive 0 correctly, close the door, and try again.
- Use another diskette.
- Clean Drive 0.
- Contact RSSC.

ROM Image Can't Be Loaded - Too Many Extents

Cause:

- The file MODELA/III was added to a disk when the free space was highly fragmented and subsequently it used several extents. The Boot allows only six extents for TRSDOS 1.3 diskettes and four extents for TRSDOS 6 and LDOS diskettes. (Extents are described in the *Model 4 Technical Reference Manual.*)

Action:

- Use the COPY command (**not** the BACKUP command) to copy MODELA/III to another disk, thus reducing fragmentation. Then move the rest of the files on the first disk to the new disk.

CRC Error, Try Again Or Use Another Disk

Causes:

- The floppy disk drive heads are dirty.
- Youre using detective or old disks.
- The hardware is failing.

Action:

- Clean the disk drive.
- Use another disk.
- Contact RSSC.

Seek Error, Try Again Or Use Another Disk

Causes:

- The floppy disk drive heads are dirty.
- You're using defective or old disks.
- You opened the disk drive door while the drive light was on.
- The hardware is failing.

Action:

- Clean the disk drive.
- Use another disk.
- Do not open the door while the drive light is on.
- Contact RSSC.

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