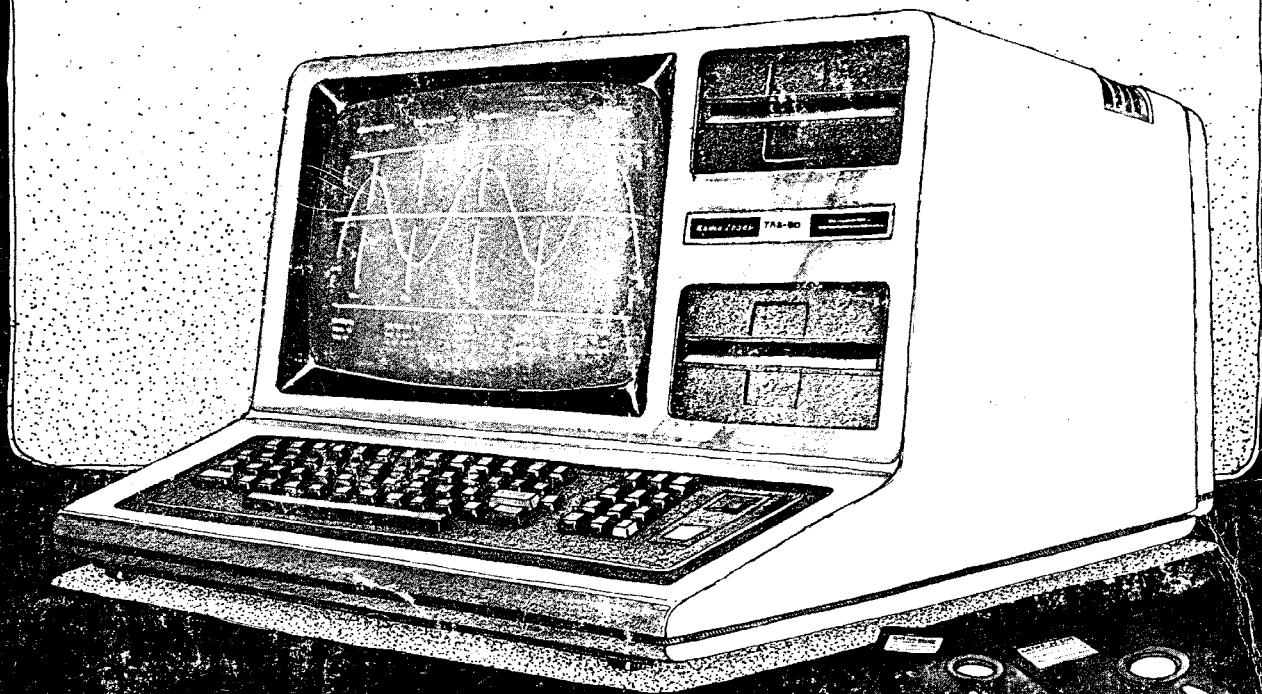


# TRS-80® Model III

## Disk System Owner's Manual

Mini-Disk Operation  
TRSDOS™ Disk Operating System  
Disk BASIC Programming Language



**Radio Shack®**  
The biggest name in little computers™

CUSTOM MANUFACTURED IN THE USA BY RADIO SHACK  A DIVISION OF TANDY CORPORATION

## The FCC Wants You to Know . . .

This equipment generates and uses radio frequency energy. If not installed and used properly, that is, in strict accordance with the manufacturer's instructions, it may cause interference to radio and television reception.

It has been type tested and found to comply with the limits for a Class B computing device in accordance with the specifications in Subpart J of Part 15 of FCC Rules, which are designed to provide reasonable protection against such interference in a residential installation. However, there is no guarantee that interference will not occur in a particular installation.

If this equipment does cause interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient the receiving antenna
- Relocate the computer with respect to the receiver
- Move the computer away from the receiver
- Plug the computer into a different outlet so that computer and receiver are on different branch circuits.

If necessary, you should consult the dealer or an experienced radio/television technician for additional suggestions. You may find the following booklet prepared by the Federal Communications Commission helpful: *How to Identify and Resolve Radio-TV Interference Problems*.

This booklet is available from the US Government Printing Office, Washington, DC 20402, Stock No. 004-000-00345-4.

### Warning

This equipment has been certified to comply with the limits for a Class B computing device, pursuant to Subpart J of Part 15 of FCC Rules. Only peripherals (computer input/output devices, terminals, printers, etc.) certified to comply with the Class B limits may be attached to this computer. Operation with non-certified peripherals is likely to result in interference to radio and TV reception.

**TRS-80<sup>TM</sup>**  
**Model III**

**Disk**  
**System**  
**Owner's**  
**Manual**

**Radio Shack<sup>®</sup>**

**T** A DIVISION OF TANDY CORPORATION  
**C** FORT WORTH, TEXAS 76102

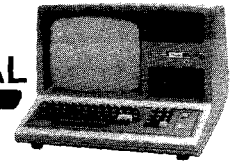
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**Model III BASIC Software: © 1980 Tandy Corporation and Microsoft. All Rights Reserved.**

The system software in the Model III microcomputer is retained in a read-only memory (ROM) format. All portions of this system software, whether in the ROM format or other source code form format, and the ROM circuitry are copyrighted and are the proprietary and trade secret information of Tandy Corporation and Microsoft. Use, reproductions, or publication of any portion of this material without the prior written authorization by Tandy Corporation is strictly prohibited.



## To Our Customers

Congratulations on your purchase of the Model III Disk System. We think it's a valuable tool which will save you work as well as give you hours of enjoyment (or maybe both at once). You'll have all the power of the non-disk Model III, plus the following features:

- Your Computer can now be controlled by TRSDOS<sup>™</sup>, the powerful TRS-80 Disk Operating System. TRSDOS is included on a diskette with the Disk System.
- Using TRSDOS, you can run a wide variety of programs, such as the Disk BASIC **interpreter** included on the TRSDOS diskette.
- Each "**system**" **diskette** has approximately 126,720 bytes of storage available for your own programs and data; each "**data**" **diskette** has 178,944 bytes available.
- You can load and save data at the approximate rate of 250,000 bits per second.
- Your system can continue to grow in power and convenience. When Radio Shack issues improvements and enhancements to the system programs, you can "install" them simply by obtaining a new release of the TRSDOS diskette.

## Model III Manuals

Publications related to the use of the Model III Disk System:

1. *Model III Disk System Owner's Manual* (this manual). We'll call it the "Disk Manual" for short.
2. *Model III Disk System Quick Reference Card*.
3. *Model III Operation and BASIC Language Reference Manual*, the "Model III Manual" for short.
4. *Model III BASIC Quick Reference Card*.

### For Disk Operation:

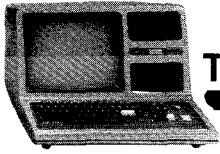
This Disk Manual supplements the Model III Manual. Use the *Disk Manual* as the primary source of information; we'll tell you when to refer to the non-disk Model III Manual.

### For Non-Disk Operation:

To use the Computer as a *non-disk* system, all you need is the Model III Manual.

### For Programming Information:

The Model III Manual contains most of the programming information, except that which pertains to disk input/output. In this manual, we will assume that you



## TRS-80 MODEL III DISK SYSTEM

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are familiar with the BASIC programming definitions and details given in the Model III Manual.

### About This Manual

The Model III Disk System is intended for use by novices as well as experienced computer operators and programmers. In designing and writing this Disk Manual, we've tried to define and satisfy the needs of both groups:

- Novices who might prefer a sequential presentation which emphasizes procedures and explains the purpose of various features.
- Experienced users who might prefer a more analytical presentation which makes it easy to find specific information.

In this manual, you'll find information that should satisfy your needs, whichever group you might belong to.

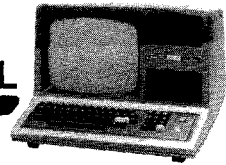
The "Sample Sessions" are especially geared for novices, while the Technical Information chapters are for the more experienced users.

Keep in mind, however, that it isn't necessary to read the entire manual to operate the Disk System. If you are only interested in Disk BASIC, for example, read the Operation section of this book and then turn directly to the Disk BASIC section. You can then go back to the TRSDOS section when you need to.

### Special Terms

Even in the non-technical sections of this manual, we've had to use numerous special terms. Rather than scattering and repeating definitions throughout the book, we have used the following convention which we hope you'll find helpful.

Special terms which are fully defined in another part of the manual are printed in **boldface**. Look up the word or phrase in the Index; this will tell you where the word is fully defined.



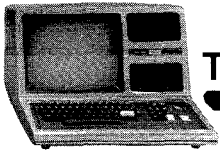
# Contents

## Operation

<b>Installation</b> .....	1
<b>Operation</b> .....	4
<b>Diskettes</b> .....	5
<input type="checkbox"/> Description <input type="checkbox"/> Care	
<b>System Start-Up</b> .....	6
<b>Important Disk Operations</b> .....	8
<input type="checkbox"/> BACKUP <input type="checkbox"/> FORMAT <input type="checkbox"/> Model I/III Conversion	
<b>Disk BASIC</b> .....	11
<input type="checkbox"/> Quick Instructions <input type="checkbox"/> Start-Up <input type="checkbox"/> Loading <input type="checkbox"/> Baud Rate	
<b>Troubleshooting and Maintenance</b> .....	13
<b>Notation and Abbreviations</b> .....	14
<b>Specifications</b> .....	15

## TRSDOS

<b>Description of TRSDOS</b> .....	17
<input type="checkbox"/> Roles <input type="checkbox"/> BASIC <input type="checkbox"/> RAM Use <input type="checkbox"/> Memory Map	
<b>Using TRSDOS</b> .....	20
<b>Commands</b> .....	20
<input type="checkbox"/> Entering <input type="checkbox"/> Syntax <input type="checkbox"/> Forms	
<b>File Specification</b> .....	22
<b>File Name</b> .....	23
<b>Drive Specification</b> .....	23
<b>Password</b> .....	24
<b>A Few Important Definitions</b> .....	24
<b>Library Commands</b> .....	26
<b>Utility Commands</b> .....	67
<b>Technical Information</b> .....	74
<input type="checkbox"/> Disk Organization <input type="checkbox"/> File Structure <input type="checkbox"/> Systems Routines (I/O)	
<b>TRSDOS Error Codes/Messages</b> .....	90



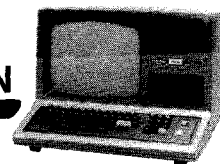
# TRS-80 MODEL III DISK SYSTEM

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## Disk BASIC

<b>Introduction</b> .....	<b>91</b>
<b>Enhancements to Model III Disk BASIC</b> .....	<b>93</b>
<input type="checkbox"/> Abbreviations <input type="checkbox"/> Commands	
<b>Disk-Related Features</b> .....	<b>116</b>
<input type="checkbox"/> File Manipulation <input type="checkbox"/> File Access	
<b>Methods of File Access</b> .....	<b>145</b>
<input type="checkbox"/> Sequential <input type="checkbox"/> Random	
<b>Disk BASIC Error Codes/Messages</b> .....	<b>155</b>
<b>Index</b> .....	<b>157</b>
<b>Customer Information</b> .....	<b>160</b>
<b>Warranty</b> .....	<b>Back Cover</b>





## Installation

First set up the Computer according to the instructions in the Model III Manual.

If you have a one- or two-drive system, installation is now complete. The built-in drives should be ready for use.

If you have a three- or four-drive system, you need to connect the external drives.

### External Disk Drives

The two external drives are *not* interchangeable. They have different Radio Shack Catalog Numbers and a few internal differences.

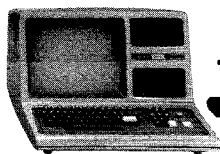
	System Name	Catalog Number
First External Drive Purchased (Includes Cable)	“Drive 2/3”	26-1164
Second External Drive Purchased	“Drive 2”	26-1161

The 26-1164 drive may be used as Drive 2 or 3, depending on the number of drives in the system. In a three-drive system, it is always Drive 2 (the last drive). In a four-drive system, it is always Drive 3 (again, the last drive).

The 26-1161 drive may only be used in a four-drive system, in which it must be Drive 2.

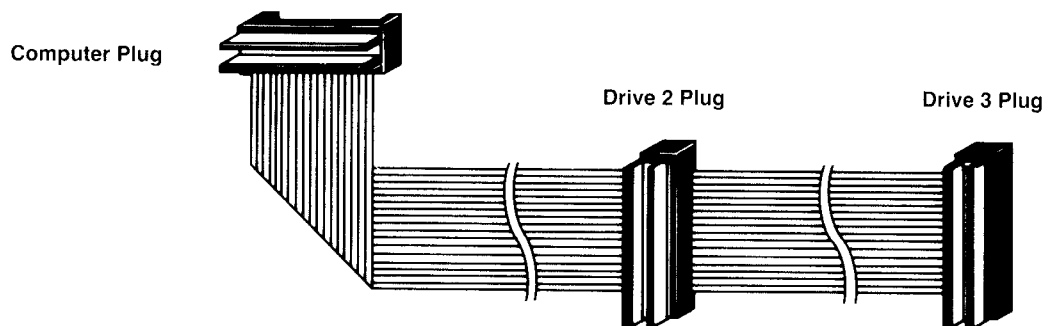
1. Locate the flat “ribbon” cable that was included with the 26-1164 drive. Notice that it has a single plug on one end, and two plugs clustered at the other end. See **Figure 1** for plug labels.
2. Connect the solitary “Computer” plug to the Disk Expansion Jack on the bottom rear of the Computer. See **Figure 2**.
3. Now refer to **Figure 3**. Connect the external drive(s) to the other end of the cable, as follows:
  - 3-A. If you have one external drive (26-1164):  
Connect it to the “Drive 2” plug near the middle of the ribbon cable.
  - 3-B. If you have two external drives (26-1164 and 26-1161):  
Connect the 26-1164 to the “Drive 3” plug on the end of the cable.  
Connect the 26-1161 to the “Drive 2” plug near the middle of the cable.
4. Plug the external drive(s) into an appropriate source of AC power. Power requirements are specified on the unit and in the specifications given in this manual.

You are now ready to start the Disk System.

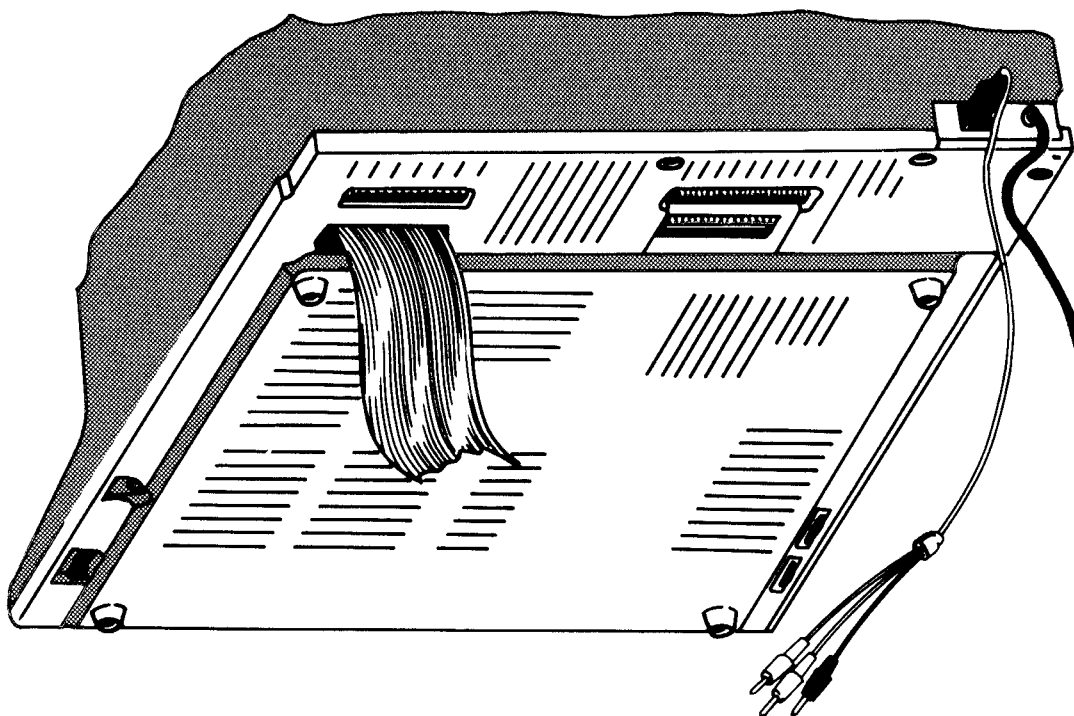


## TRS-80 MODEL III DISK SYSTEM

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**Figure 1.** External Disk Cable with Plugs Labeled.



**Figure 2.** Connection of the External Disk Cable to the Model III.

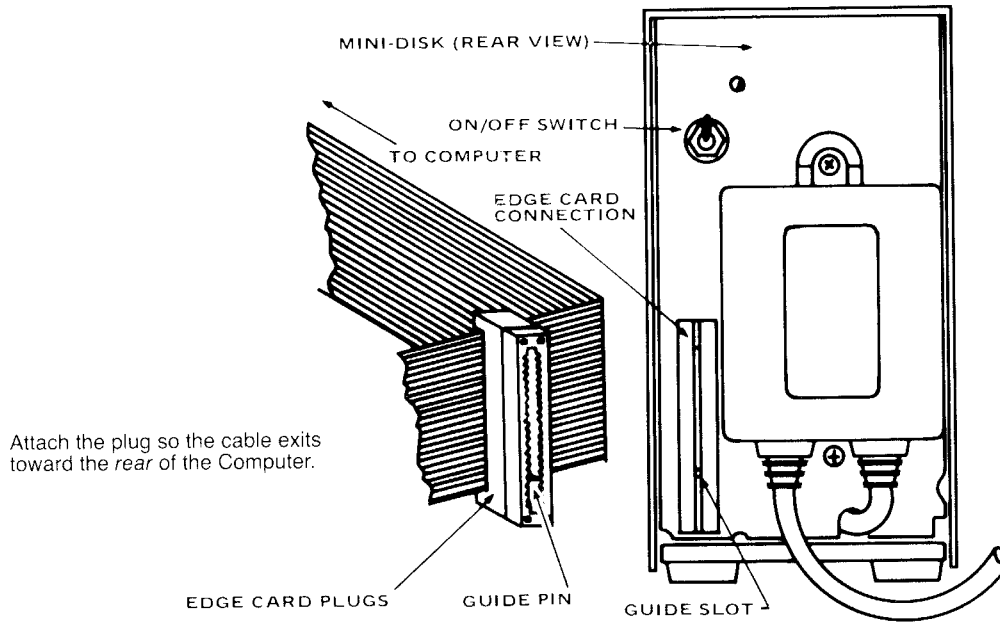
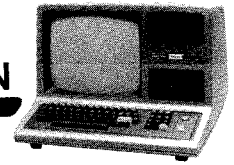
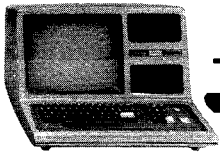


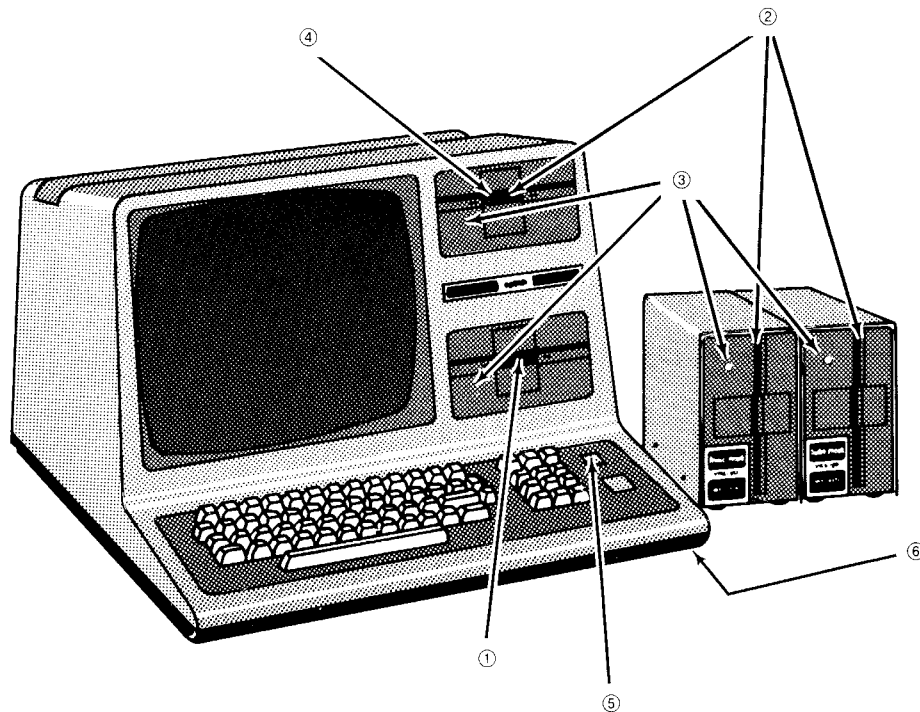
Figure 3. Connection of external disk drives.



## TRS-80 MODEL III DISK SYSTEM

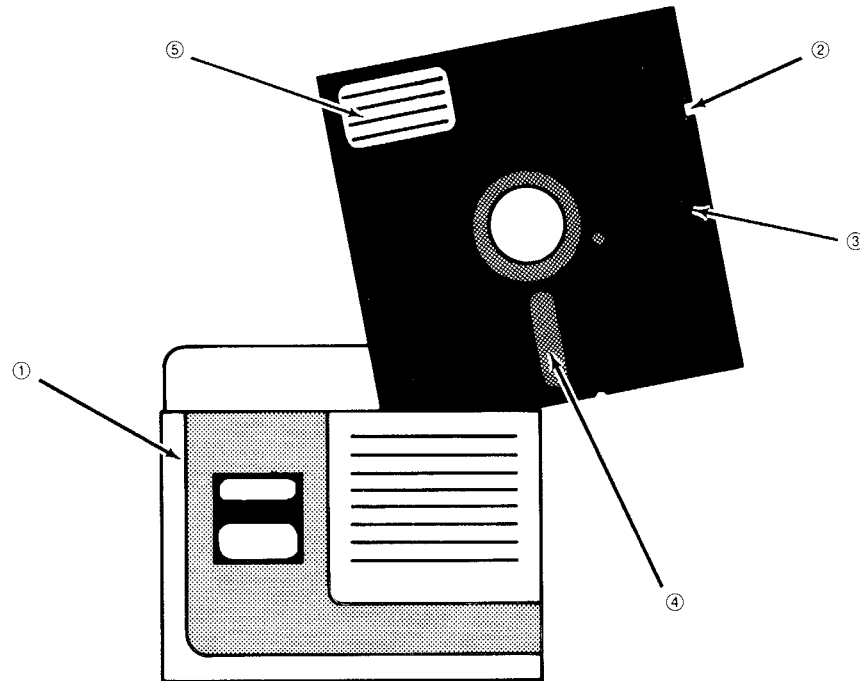
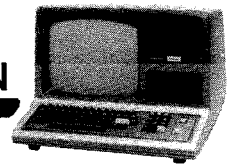
### Operation

First, take a few minutes to become familiar with the various elements of your Disk System. Refer to **Figures 4** and **5**. This is very important. If you try to use the Computer without having a little background information, you could damage a diskette.



**Figure 4.** The Model III Disk System with External Drives (optional/extra).

- ① **Drive 0.** The TRSDOS "system diskette" goes in this drive.
- ② **Drives 1, 2, and 3.** These drives may contain "data diskettes." Data diskettes are described briefly in this chapter.
- ③ **Drive Select LED.** When a drive is being accessed, its LED lights up.
- ④ **Drive Door.** To insert or remove a diskette, open this door. Never remove a diskette while the LED is lit, or while the diskette contains open files.
- ⑤ **Reset Button.** When you press this button, the Computer will attempt to load the operating system software from Drive 0. The TRSDOS diskette should be in Drive 0 when you press this button.
- ⑥ **Power Switch.** All drives should be *empty* when you turn the Computer on or off. Otherwise, the information on the diskettes could be destroyed.



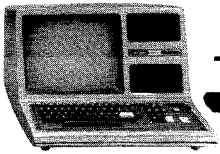
**Figure 5.** A Diskette. (Catalog Number 26-305, 26-405, or 26-406)

- ① **Storage Envelope.** While a diskette is not in use, keep it here.
- ② **Write Protect Notch.** When this is covered, the disk-drives cannot write (change information) on the diskette. *Do not pinch* the tab into the notch when you apply it. If the tab becomes indented, the disk drive may not sense that the disk is write-protected. Leave the notch uncovered if you want to save or change information on the diskette.
- ③ **Jacket.** The diskette is permanently sealed inside this protective jacket. Do not attempt to remove it.
- ④ **Read/Write Window.** The disk drive accesses the diskette surface through this window. Don't touch the diskette surface.
- ⑤ **Label.** To write on this label, use only a felt-tipped pen. Any other writing implement might damage the diskette.

## Diskettes

In general, handle diskettes carefully, using the same precautions you use with tape cassettes and high-fidelity records. A small indentation, dust particle, or scratch can render all or part of a diskette unreadable—*permanently*.

- Keep the diskette in its storage envelope whenever it is not in one of the drives.
- Do not place a diskette in the drive while you are turning the system on or off.
- Keep diskettes away from magnetic fields (transformers, AC motors, magnets, TVs, radios, etc.). Strong magnetic fields will erase data stored on a diskette.



## TRS-80 MODEL III DISK SYSTEM

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- Handle diskettes by the jacket only. Do not touch any of the exposed surfaces. *Don't try to wipe or clean the diskette surface; it scratches easily.*
- Keep diskettes out of direct sunlight and away from heat.
- Avoid contamination of diskettes with cigarette ashes, dust or other particles.
- Do not write directly on the diskette jacket with a hard point device such as a ball point pen or lead pencil; use a felt tip pen only.
- Store diskettes in a vertical file folder on a shelf where they are protected from pressure to their sides (just as phono records are stored).
- In very dusty environments, you may need to provide filtered air to the computer room.

### Tips on Labeling Diskettes

Each diskette has a permanent label on its jacket. This label is for "vital statistics" that will never change. For example, to help keep track of diskettes, it's a good idea to assign a unique number to each diskette. Write such a number on the permanent label. You might also put your name on the diskette, and record the date when the diskette was first put into use. Remember, use only a felt tip pen for marking.

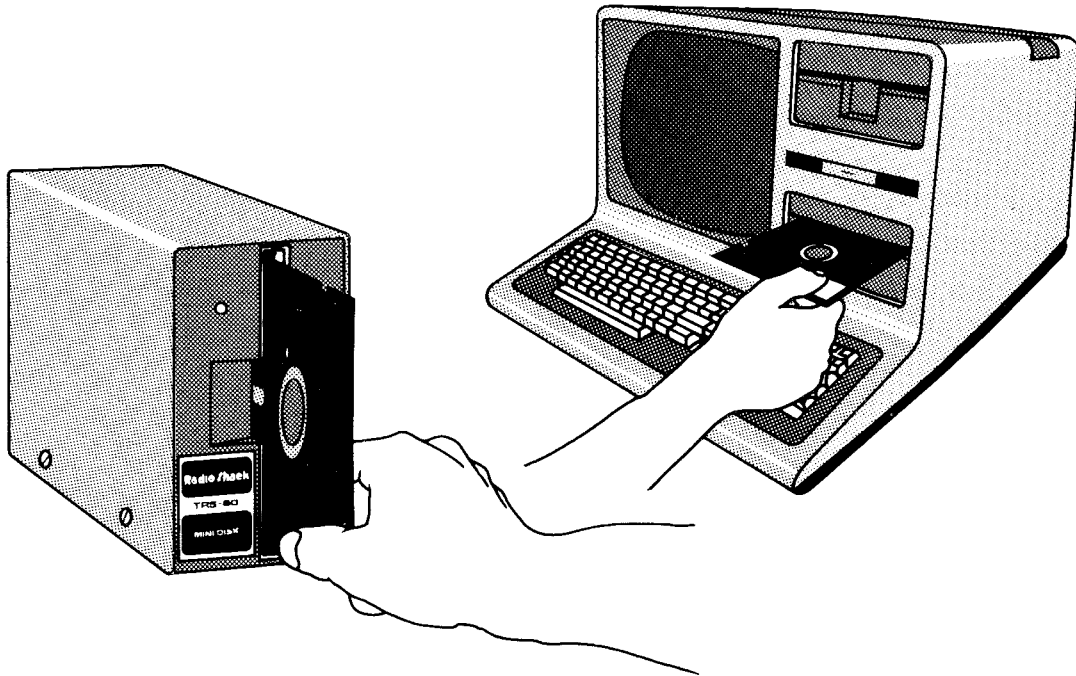
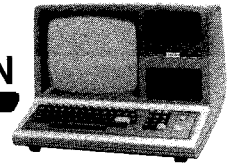
This "permanent" label is not a good place to record the contents of the diskette since that will change, and you don't want to be erasing or scratching out information from this label.

## System Start-Up

1. Turn all peripherals on.
2. Turn the Computer on. Wait until all disk drive motors stop.
3. Locate the TRSDOS diskette that was supplied with the Disk System. Insert it into Drive 0, with the label side facing up and the read/write window pointing into the drive slot. See **Figure 6**.
4. When the diskette is fully inserted, close the drive door.
5. Press RESET. The Computer should now load TRSDOS and begin the start-up dialog described in the next section.

If nothing happens on the Display, or if the message: DISKETTE? or NOT A SYSTEM DISK is displayed, check the following:

- Are you using a TRSDOS "system" diskette?
- Is the diskette properly inserted into Drive 0?
- If external drives are present, are they properly connected and turned on?



**Figure 6.** Inserting a Diskette.

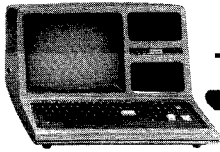
If you can't find the problem, refer to the **Troubleshooting and Maintenance** chapter for further suggestions.

## TRSDOS Start-Up Dialog

Whenever you reset the Model III Disk System, it loads TRSDOS and begins the start-up dialog.

1. The TRSDOS version number and date of creation will be displayed, followed by the amount of RAM (32K or 48K) and the number of drives in the system.
2. TRSDOS will prompt you to enter the date in the form MM/DD/YY. For example, 07/04/80 for July 4, 1980. Type in the correct date and press **(ENTER)**. TRSDOS will not continue until you type in the date correctly.
3. TRSDOS will prompt you to enter the time in 24-hour form HH:MM:SS. For example, 14:45:00 for 2:45 p.m. Type in the correct time and press **(ENTER)**. If you don't wish to set the time, simply press **(ENTER)** at the beginning of the line. TRSDOS will set the time to 00:00:00.
4. TRSDOS will now display the message, TRSDOS READY

Whenever this is displayed, you are in the TRSDOS READY mode, and you may type in a TRSDOS command.



# Important Disk Operations

In this section we will describe three very important operations:

1. Duplicating the TRSDOS diskette (BACKUP)
2. Initializing a data diskette (FORMAT)
3. Converting files from Model I to Model III TRSDOS (CONVERT).

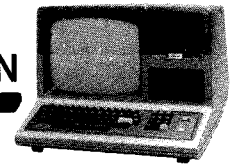
All new customers should complete the TRSDOS BACKUP procedure now; multi-drive customers should also complete the FORMAT operation for a few diskettes. Detailed information is provided later in this manual; here we will simply outline the procedures.

## Making a BACKUP (Duplicate) of TRSDOS

Your first operation should be to duplicate the TRSDOS diskette you received from Radio Shack. The TRSDOS diskette contains a utility program called BACKUP to accomplish this.

1. Locate the TRSDOS diskette and a new, blank diskette. The TRSDOS diskette will be referred to as the "source," while the blank one will be called the "destination," during BACKUP.
2. Start TRSDOS as explained in the previous section. TRSDOS READY should be displayed.
3. Type: BACKUP (ENTER)
4. TRSDOS will now load and start BACKUP. It will ask you:  
SOURCE DRIVE NUMBER?  
Specify the drive which contains the original TRSDOS diskette by typing:  
0 (ENTER)
5. Next TRSDOS will ask: DESTINATION DRIVE NUMBER?  
Now specify the drive which will be used for making the duplicate TRSDOS. If you have two or more drives in your system, type: 1(ENTER)
6. TRSDOS will ask: SOURCE DISK MASTER PASSWORD?  
Type: PASSWORD (ENTER)  
(PASSWORD is the password of the supplied diskette.)
7. Now the duplication process will begin.  
If the destination diskette is not formatted, BACKUP will format it before continuing. (Before any diskette can be used, it must be initialized or "formatted" — the data regions defined and labeled, and a table of contents or "directory" created.)





If you are using a single-drive system, TRSDOS will prompt you to swap source and destination diskettes several times during the formatting/backup process.

After a single-drive BACKUP, TRSDOS will display the message:

```
INSERT SYSTEM DISKETTE (ENTER)
```

Be sure you have a TRSDOS diskette in Drive 0, then press (ENTER).

The duplication process is now complete. We suggest you save the original TRSDOS and use the duplicate as your working copy. If anything happens to the working copy, you can make another one from the original.

## Making a Data Diskette (FORMAT)

*This section applies to multi-drive systems only.*

Drive 0 must always contain a TRSDOS diskette, so the Computer can have access to the system programs stored there. Much of the storage capacity of this diskette is taken up by the system programs.

However, the other drives in the system may contain "data" diskettes which have no system programs. All of the storage capacity of such diskettes is available for your programs and data.

The FORMAT utility program takes a diskette and initializes or "formats" it. If the diskette was previously formatted, all prior information can be lost. The resultant diskette contains no system files and may only be used in Drive 1, 2 or 3.

1. In the TRSDOS READY mode, type: FORMAT (ENTER)
2. TRSDOS will start the formatter program and ask you a series of questions:

```
FORMAT WHICH DRIVE?
```

Insert a blank diskette into Drive 1. Type: 1 (ENTER)

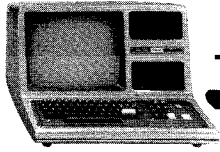
```
DISKETTE NAME?
```

This name will serve as an internal label for the diskette. Type in any appropriate name of one to eight letters and numbers, starting with a letter. Press (ENTER) at the end of the name.

```
MASTER PASSWORD?
```

The password may be from one to eight letters and numbers, starting with a letter. Press (ENTER) at the end of the password.

Use of the password allows BACKUP, PROT, and PURGE access to all non-system files. Unless special protection is needed, we suggest you use the password PASSWORD. Whatever password you select, don't forget it!



## TRS-80 MODEL III DISK SYSTEM

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If the diskette contains data, TRSDOS will warn you:

```
DISKETTE CONTAINS DATA, USE DISK OR NOT?
```

The warning is needed since `FORMAT` erases all previous information from the diskette. Type `N` **(ENTER)** to cancel `FORMAT`; type `Y` **(ENTER)** or `U` **(ENTER)** to continue it.

3. TRSDOS will now format and verify the diskette. The data diskette will then be ready for use in Drive 1, 2, or 3.

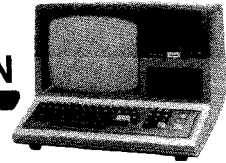
### Model I/III Conversion (CONVERT)

In general, Model I TRSDOS diskettes cannot be used in a Model III Disk System. However, Model III TRSDOS includes a special program, `CONVERT`, to read a Model I TRSDOS diskette and copy its non-system files onto a Model III TRSDOS diskette.

In two-drive systems, the files must be copied onto a Model III system diskette; in three- or four-drive systems, the files may be copied onto a data diskette.

Here are abbreviated instructions for using this program. For further details, see `CONVERT`.

1. Using a Model I Disk System, remove all passwords from the diskette to be converted. You can do this with the `PROT` command, described in the *Model I TRSDOS/Disk BASIC Owner's Manual*.
2. Start Model III TRSDOS.
3. Place the Model I diskette in Drive 1, 2 or 3. (In two-drive systems, use Drive 1; in three- or four-drive systems, Drive 2.)
4. In three- or four-drive systems, place a Model III data diskette in Drive 1.
5. Type: `CONVERT` **(ENTER)**
4. The conversion program will start by asking for the source drive number. Type in the number of the drive containing the Model I diskette, then press **(ENTER)**.
5. Next, the conversion program will ask for the destination drive number. Type in the number of the drive containing the Model III diskette, then press **(ENTER)**. (In two-drive systems, use Drive 0; in three- or four-drive systems, Drive 1.)
6. Now all the non-system files will be converted and copied onto the destination diskette. As each file is copied, its name will be displayed.
7. When the process is completed, you may remove the Model I diskette. It is unchanged by the `CONVERT` program. The destination diskette contains the converted files.
8. To restore password protection to the converted files, you may use the `PROT` or `ATTRIB` command.



## Disk BASIC

### Quick Instructions for Using Disk BASIC

In this section we'll "walk you" through the following procedures:

1. Starting Disk BASIC
2. Running a simple program
3. Saving a program in a disk file
4. Loading a program from a disk file

For programming information, see the **Disk BASIC** section of this manual. Here we are showing procedures only.

### Starting Disk BASIC

Under TRSDOS READY, type: BASIC **(ENTER)**

The Computer will load and start BASIC. First, it will ask two questions. Press **(ENTER)** in response to each of them.

HOW MANY FILES? **(ENTER)**

MEMORY SIZE? **(ENTER)**

A heading will be displayed, followed by:

READY

>

You may now begin using Disk BASIC.

### Saving a Program

You should have a program in memory, and be in BASIC's READY mode. Type:

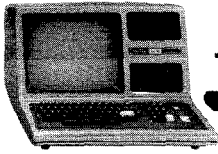
SAVE "PROGRAM" **(ENTER)**

BASIC should now save the program in a disk file we arbitrarily named "PROGRAM." Any other suitable **file name** would do.

### Loading a Program

For this sample session, we will load the program just saved.

First type: NEW **(ENTER)** to erase it from memory. (This is to prove that it *can* be retrieved from the disk file.)



## TRS-80 MODEL III DISK SYSTEM

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Now type: `LOAD "PROGRAM" ENTER` and BASIC will load the specified program.

You may now list it and run it.

For further information on using Disk BASIC, see Section 3 of this manual.

### Setting the Cassette Baud Rate under Disk BASIC

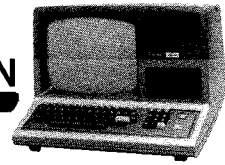
TRSDOS sets the cassette baud rate to High. If you would like to change this, use the following TRSDOS command:

```
PATCH BASIC/CMD (ADD=5202, FIND=00, CHG=FF) ENTER
```

Consequently, you will be prompted with: `CASS?` whenever you start Disk BASIC.

You may then type either H (High) or L (Low) to choose the rate you need.

To change the system diskette back to its original state (i.e., no `CASS?`), simply use the TRSDOS `PATCH` command again but reverse the `FIND` and `CHG` values.



## Troubleshooting and Maintenance

If you have problems operating your Model III Disk System, please check the following symptoms and cures, and check the corresponding table in your Model III Manual.

If you can't solve the problem, take the unit to your local Radio Shack. We'll have it fixed and returned to you as soon as possible.

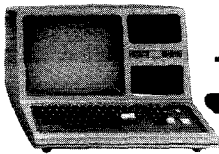
Symptom	Cure
Disk drive motors run continuously when the Computer is turned on.	Check external drive connection sequence. Drive 26-1164 must always be the last external drive.
Computer will not load TRSDOS.	<ol style="list-style-type: none"> <li>1. Make sure you have inserted the TRSDOS diskette properly in Drive 0.</li> <li>2. Make sure all peripherals are properly connected.</li> </ol>
Error Messages	Look up the message in the <b>TRSDOS</b> or <b>BASIC Error Message</b> Section. The "cure" should be listed.
Frequent disk I/O errors	<ol style="list-style-type: none"> <li>1. Diskette is partially erased. Backup the diskette, then re-format it.</li> <li>2. Diskette is worn out. Use backup copy, if available, to make a new working copy.</li> <li>3. Disk drives need cleaning or alignment by Radio Shack service technicians.</li> </ol>

## Maintenance

For reliable operation, the disk drives must be kept clean and properly aligned. These procedures should be done by Radio Shack service technicians, according to the following schedule:

Degree of Use	Maintenance Interval
Commercial data processing environment	Every month for medium use.
Occasional home use	Every 8-10 months; more often if needed.

For further instructions, see the **Troubleshooting and Maintenance** section in your Model III Manual.



# Notation and Abbreviations

For the sake of clarity and brevity, we've used some special notation and type styles in this book.

CAPITALS and punctuation

indicate material which must be entered exactly as it appears. (The only punctuation symbols not entered are ellipses, explained below.) For example, in the line:

**DUMP LISTER (START = 7000, END = 7100, TRA = 7004)**

every letter and character should be typed as indicated.

*lowercase italics*

represent words, letters, characters or values you supply from a set of acceptable values for a particular command. For example, the line:

**LIST *filename***

indicates that you can supply any valid **file specification** after LIST.

...

Ellipsis indicates that the preceding items can be repeated. For example:

**ATTRIB *filename (option, . . .)***

indicates that several options may be repeated inside the parentheses.

**b**

This special symbol is used occasionally to indicate a blank-space character (ASCII code 32 decimal, 20 hexadecimal).

**PRINT "bHb!b!"**

**X'nnnn'**

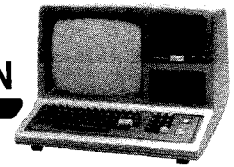
Indicates that *nnnn* is a hexadecimal number. All other numbers in the text of this book are in decimal form, unless otherwise noted.

**X'7000'**

indicates the hexadecimal value 7000 (decimal 28672).

COMPUTER TYPE

Any words, letters, or numbers that are displayed on the screen will be in computer type (dot-matrix). Uppercase letters are used; however, your screen at times may display lowercase letters instead.



## Specifications

Diskettes	5¼" mini-diskettes Radio Shack Catalog Number 26-305, 26-405 (package of three), or 26-406 (package of 10)
Diskette Organization (Formatted Diskette)	Single-sided Double-density 40 Tracks 18 Sectors/Track 256 Bytes/Sector
Operating Temperature	55 to 80 Degrees Fahrenheit 13 to 27 Degrees Celsius
Power Requirements (External Drives)	120 VAC, 60 Hz, 28 VA (240 VAC, 50 Hz, Australian; 220 VAC, 50 Hz, European)