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THE PERCOM TFD-100
MINI-DISK SYSTEM FOR THE TRS-80
INSTALLATION AND OPERATING
INSTRUCTIONS

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1.0 INTRODUCTION

The Percom TFD-100 uses the most advanced MINI-DISK Drive available today. When used with the Radio Shack TRS-80 computer, a single TFD-100 can store 102,400 bytes of data on EACH side of a 5 1/4" mini-diskette. This extra capacity is achieved without any sacrifice in reliability by increasing the number of track on which data may be stored from 35 to 40.

The 40-track TFD-100 may be used in conjunction with either 35 or 40 track mini-disk drives. Diskettes recorded on the 35 track Radio Shack disk drives are fully compatible with the 40 track TFD-100 because the first 35 tracks are physically coincident.

Percom TFD-100 mini-disk systems are supplied with either PERTEC or SIEMANS 40-track minidisk drives. In addition to the extra storage capacity provided by 40 tracks, the PERTEC and SIEMANS disk drives permit data to be stored on BOTH sides of the diskette. To use this capability refer to Section 5.1 later in this manual.

2.0 SYSTEM REQUIREMENTS

To use the TFD-100 with the Radio Shack TRS-80 computer you will need a 1, 2, 3, or 4 disk drive interconnecting ribbon cable (available from Percom). You will also need the following items available from a Radio Shack or Tandy Computer store. The numbers in parenthesis are Radio Shack stock numbers.

- a) TRS-80 computer with Level II Basic and 16K RAM (26-1006)
- b) TRS-80 Expansion Interface (26-1140)

You have a choice of several Disk Operating Systems which you may use with the TFD-100. A Disk Operating System called MICRODOS is available from Percom. MICRODOS is faster than the Radio Shack DOS (TRSDOS) and does not require as much memory. If you wish to use the Radio Shack Disk Operating System (TRSDOS) you must obtain the following items from Radio Shack:

- c) TRSDOS Mini-Diskette Revision 2.3 (26-0310)
- d) TRSDOS/Disk BASIC User's Manual (26-2104)

BE SURE TO GET TRSDOS rev 2.3

The older version of TRSDOS (rev 2.1) is so full of bugs it is virtually worthless!

TRSDOS 2.3 is designed for operation on 35 track mini-disk drives and may be used with the TFD-100 without modification. Obviously operation will be limited to only 35 of the TFD-100s 40 tracks. If you wish to use all 40 tracks on the TFD-100, TRSDOS must be modified for 40 track operation. The modification is only slightly complicated and is performed using a program contained on the Percom PATCH-PAK diskette. The procedure will be described later.

*** TRS-80 SPECIAL NOTICE ***

The disk DATA SEPARATION circuitry in the TRS-80 Expansion Interface MAY NOT BE ADEQUATE for applications in which high disk data recovery RELIABILITY IS REQUIRED. We suggest that you install the Percom DATA SEPARATOR adapter if your application requires higher disk data reliability than the standard TRS-80 can provide.

PERCOM DATA CO. INC. cannot guarantee reliable operation of the TFD-100 if the Radio Shack Interconnecting ribbon cable is used to connect PERCOM disk drives to the TRS-80 Expansion Interface. The connectors on the Radio Shack Interconnecting cable are not arranged in accordance with GOOD ENGINEERING PRACTICES. The DRIVE #0 connector should be at the END of the interconnecting cable MOST DISTANT from the TRS-80 Expansion Interface to permit Proper Electrical TERMINATION of the interconnecting cable in all circumstances. A 2 or 4 DRIVE interconnecting ribbon cable especially designed for use with the TRS-80 is available from PERCOM. This cable places DRIVE #0 at the end of the cable most distant from the Expansion Interface thus assuring proper electrical termination of the cable.

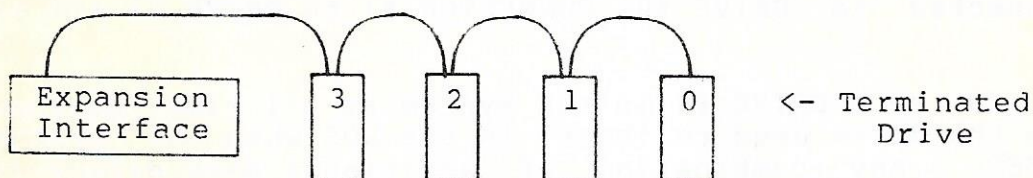


FIGURE 1

If you still wish to use the Radio Shack interconnecting ribbon cable, you may find the Radio Shack cable too short to reach the edge connector on the rear of the TFD-100 drives. If this is a problem, a connector extender is available from PERCOM. Ask for the DISK DRIVE EXTENDER.

3.0 ASSEMBLING THE SYSTEM

*** WARNING ***

During installation, all power must be removed from the computer and any connecting peripheral devices to avoid damage to the computer and the drive. The disk drive power cord must be connected to a 117 volts 50/60 Hz AC 3-wire grounded outlet. --DO NOT DEFEAT THE SAFETY PRONG ON THE POWER CORD--. In addition to the operator safety provided by the 3-wire power connection, the safety ground also shields the low level read electronics in the disk drive from error producing noise pickup.

The disk drives are packaged separately from the drive enclosure and power supply to provide maximum protection of the disk drives during shipment. Consequently it will be necessary to remove the drives from their shipping cartons and install them in the disk drive enclosure.

1. Remove the cover from the TFD-100 enclosure by removing the 4 Phillips head screws.
2. Plug the 'white' nylon power supply output connector into the mating socket from the disk drive. The connector and its mate are 'keyed' and can be put together only one way. Be sure the connector is pushed all the way in.
3. Push the grounding spade at the end of the green wire from the power supply onto the 'FASTON' lug at the rear of the disk drive.
4. Fasten the disk drive to the enclosure pan with two 6-32 x 3/8" machine screws through the bottom of the enclosure pan. The drive may be mounted with the front panel LED indicator either up or down in single drive enclosures and down in the dual or triple drive enclosures.
5. Push the proper ribbon cable connector onto the circuit card edge connector at the rear of the disk drive circuit card. Pins have been selectively removed from the various connectors on the ribbon cable such that CONNECTOR #0 must be connected to DRIVE #0; CONNECTOR #1 to DRIVE #1 and so on.

There must be a DRIVE #0 in the system at all times because this is the drive used to 'boot' in the DOS when the system is RESET. Any combination of additional disk drives is acceptable. The numeric designation of the drive (0, 1, 2, 3) is determined by its position on the drive interconnecting ribbon cable. The cable connectors are 'keyed' so the connectors may not be installed incorrectly.

Although you may wish to use the TFD-100 as a drive other than DRIVE #0, the system checkout instructions described later suggest that you initially configure the drive for operation as DRIVE #0. Refer to Section 4.0 for drive programming instructions.

6. Connect the free end of the interconnecting ribbon cable to the TRS-80 Expansion Interface. Refer to the Expansion Interface Instruction Manual for the Disk Drive connector location.
7. Do not mount the enclosure cover over the the disk drive until after initial system checkout.

4.0 DRIVE PROGRAMMING

4.1 DRIVE #0 PROGRAMMING

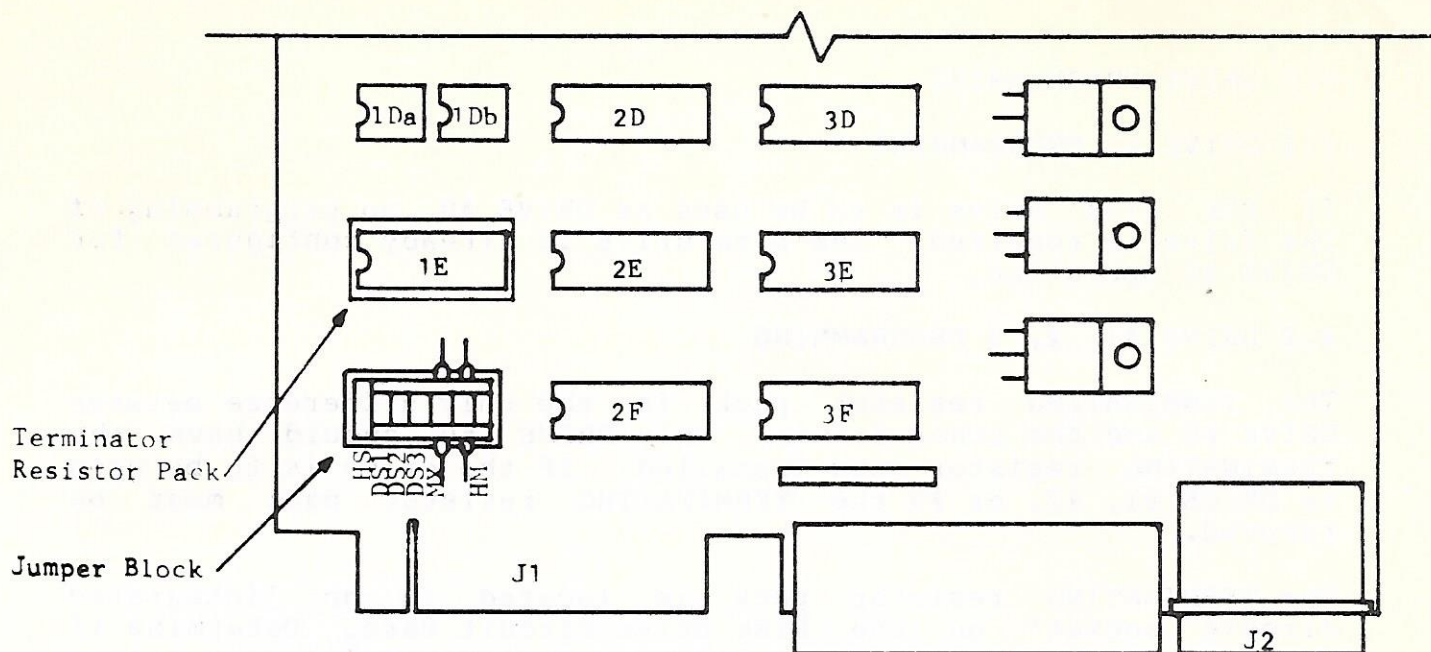
If the disk drive is to be used as DRIVE #0, no programming of the drive is required. The Disk drive is already configured for DRIVE #0 operation.

4.2 DRIVE #1, 2, 3 PROGRAMMING

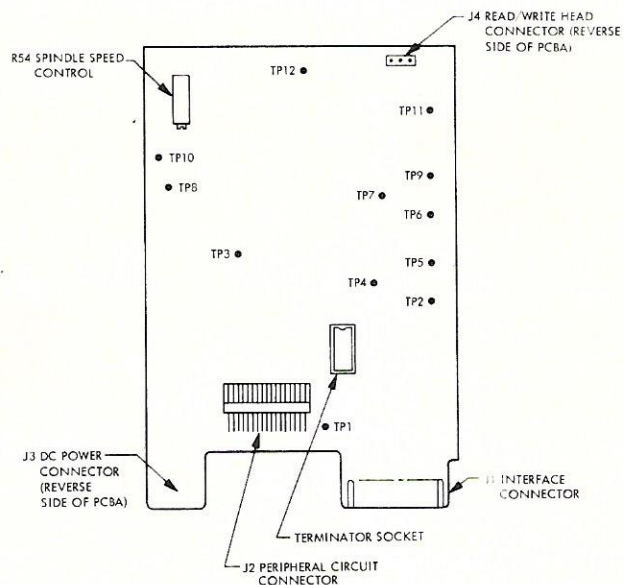
The TERMINATING resistor pack is the only difference between DRIVE #0 and the other drives. Only DRIVE #0 should have the TERMINATING resistor pack installed. If the drive is to be used as DRIVE #1, #2, or #3 the TERMINATING resistor pack must be removed.

The TERMINATING resistor pack is located in an 'integrated circuit socket' on the Disk Drive Circuit Card. Determine if your TFD-100 was supplied with PERTEC or SIEMANS mini-disk drives and refer to the appropriate drawing in Figure 2 for the location of the TERMINATOR pack.

To remove the TERMINATOR pack, slip a small screwdriver between the TERMINATOR pack and the socket in which it is installed and gently pry the TERMINATOR from the socket. DO NOT PRY the IC socket from the circuit card!



SIEMANS MINI-DISK DRIVE



PERTEC MINI-DISK DRIVE

FIGURE 2.

5.0 OPERATING PROCEDURES

The TFD-100 uses 'soft-sectored' 5 1/4" mini-diskettes. (Percom Part No. MD525-01). Diskettes must be handled very carefully to insure reliable operation. Creases, bends, scratches, dust and oil contamination will cause data errors and may damage the drive read/write head.

1. When not in use, the diskette should be stored vertically in its protective jacket.
2. Never bend, flex, or snap the diskette. When sending a diskette through the mails pack the diskette in a rigid carton to prevent the diskette from bending. Mark the parcel MAGNETIC SENSITIVE MATERIAL and hope postal employees can read!
3. Never touch the magnetic media.
4. The diskette temperature must not exceed 10-52 degrees (C).
5. Keep the diskette away from transformers, speakers, motors, and other magnetic fields. Keep in mind that many steel objects and appliances carry residual magnetization which may be destructive to the data on a diskette.
6. Never clean the magnetic media. The diskette jacket is designed to perform this function automatically.
7. Do not write on the diskette with a pencil or pen. Use a felt-tipped or other soft marker and write only on the label area of the diskette jacket.
8. To protect a diskette from the possibility of accidental erasure or undesired recording, apply a 'gummed tab' over the WRITE PROTECT notch along the edge of the diskette jacket. If the WRITE PROTECT notch is covered, the diskette is protected.
9. NEVER-EVER switch power to ANY part of the TRS-80 system 'on' or 'off' with a diskette mounted in a drive. The power 'transient' may write 'garbage' on the diskette even if the diskette is 'write protected'.
10. NEVER use the computer power switch to 're-boot' the DOS. ALWAYS use the SYSTEM RESET button instead. You may wish to glue an extension onto the SYSTEM RESET button to make it easier to reach.
11. NEVER insert a diskette into the TFD-100 unless power to the disk drive is 'on'.

5.1 INSERTING A DISKETTE IN THE TFD-100 DRIVE

The TFD-100 disk drives permit data to be stored on BOTH sides of the diskette. Although the diskette manufacturers sell diskettes designed for two-sided recording (floppy-disks), nearly all 'single-sided' diskettes work just as well and are less expensive. Since the TFD-100 contains dual 'index' and 'write protect' sensors it is not necessary to modify or punch holes in the diskette. If you have punched additional 'index' and 'write protect' holes in the jacket of your diskettes, these holes must be covered for the diskette to function properly in the TFD-100.

Diskettes are inserted into the drive with the 'long oval' cutout entering the drive first. To read and write on SIDE A (normal or front side) insert the diskette into the drive with the label AWAY from the LED. To read and write on SIDE B (back side) insert the diskette into the drive with the diskette label on the same side of the diskette as the LED.

Remember that the Radio Shack TRSDOS is on SIDE A of the diskette. If you are sending diskettes to other TRS-80 users, record the data on SIDE A only because they may not be using TFD-100 drives and would be unable to read the data on SIDE B without punching holes in the diskette jacket.

Some users have reported difficulties with diskettes binding when diskettes are inserted in new drives. When inserting a diskette into a drive make sure the diskette is 'free' before closing the drive door. When closing the drive door, press the door latch until it 'bottoms' but not hard enough to latch closed. Release the pressure on the door slightly then press the door latch again to lock the door closed. This permits the centering hole in the diskette to 'walk' up the diskette centering hub without binding. The problem diminishes with time as the diskette centering hub is 'polished' by repeated use.

6.0 INITIAL SYSTEM CHECKOUT

Although you may wish to use the TFD-100 with other 35/40 track disk drives we suggest you first bring up the system with only one TFD-100 connected to the computer at a time. This permits a checkout under circumstances which contain the fewest unknowns.

1. Connect a TFD-100 to the DRIVE #0 connector on the Disk Drive Interconnecting Ribbon cable. For initial checkout the TFD-100 drive must be configured as a DRIVE #0. Disconnect the ribbon cable from all other disk drives.
2. Turn on the disk drive(s) power switch.
3. Power up the TRS-80 and Expansion Interface.
4. Insert a TRSDOS 2.3 System diskette in the TFD-100 (drive #0).
5. RESET the TRS-80 using the RESET button at the left-rear of the keyboard. DO NOT USE THE POWER SWITCH!
6. The Indicator lamp on the front of DRIVE #0 should turn on as the disk drive 'boots' in the Disk Operating System.
7. The Indicator lamp should go out a few seconds after a successful boot. If the Indicator stays on and the TRS-80 fails to indicate a successful 'boot', the drive interconnecting cable may be installed incorrectly on the expansion interface. Turn the connector over and try again.
8. From this point on read and follow the instructions in the Radio Shack TRSDOS/DISK BASIC USER'S MANUAL (Radio Shack part number 26-2104).

PROGRAMMING INFORMATION

Disk operation is quite complex. Before you begin using the disk carefully study the TRSDOS/DISK BASIC USER'S MANUAL (Radio Shack part number 26-2104). This manual is NOT available from PERCOM and must be obtained from a Radio Shack store.

7.0 ADAPTING TRSDOS FOR 40 TRACK OPERATION

TRSDOS was written for 35 track drives and requires several modifications to use all 40 tracks on the TFD-100. A diskette called PATCHPAK is supplied with the TFD-100 or is available from your Percom dealer. PATCHPAK contains programs which modify TRSDOS 2.3 for 40 track operation. The modification procedure requires two disk drives; one for the TRSDOS diskette and one for the PATCHPAK diskette. If you do not have two disk drives collaborate with a friend who has a disk drive.

7.1 35 TRACKS VS 40 TRACKS

If you do not intend to use 35 track drives in the same system with 40 track drives you should have no complications after TRSDOS is modified by PATCH-PAK and backed up on a 40 track diskette. However, if you intend to use both 35 and 40 track disk drives in the same system or if you intend to distribute diskettes for use on 35 track disk systems we suggest that you NOT MODIFY TRSDOS for 40 track operation but instead use TRSDOS in its original 35 track form. Unless you are thoroughly familiar with the TRSDOS Formatting, Backup, and sector allocation procedures you will experience numerous difficulties if you attempt to intermix 35 or 40 track formatted diskettes!

If you must have 40 track operation we suggest that you sell your 35 track drives and replace them with 40 track TFD-100 disk drives. You will still be able to read all of your 35 track diskettes and operate with a 35 track version of TRSDOS at any time.

7.2 BACKING UP A DISKETTE:

Following is a discussion of some of the hazards which can result from mixing 35 and 40 track diskettes.

Unless you are very clever and thoroughly understand the inner workings of the TRSDOS BACKUP program DO NOT attempt to backup a 35 track diskette to a 40 track diskette or vice-versa. Use the COPY command to transfer files from one diskette to the other.

Backup is complicated by the sector allocation table maintained on each diskette and the interaction this table has with TRSDOS. The allocation table on a 35 track diskette flags the sectors on the tracks above track 35 as unavailable and will not permit disk space to be used in this area because on a 35 track drive these sectors physically do not exist.

If you backup a 35-track disk to a 40-track formatted diskette, the sector allocation table is transferred just as it exists on the 35 track diskette. Although the 40-track diskette has been formatted for 40 tracks, the sector allocation table will only permit disk allocation on the first 35 tracks.

Percom PATCH-PAK modifies the sector allocation table to permit disk space allocation on all 40 tracks. Since TRSDOS may now store data (or programs) on tracks above track 35, a 40 track to 35 track BACKUP will fail even if the total amount of data on the 40 track diskette will fit on the 35 track diskette.

7.3 PROCEDURE FOR CONVERTING TRSDOS FOR 40 TRACKS

- 1) Configure and connect a 35/40 track drive as Drive #0
- 2) Configure a TFD-100 (40 track drive) as Drive #1
- 3) Make a backup of the TRSDOS (rev 2.3) diskette using Drive #0 as both source and destination. Follow the standard TRSDOS instructions for making a Single Drive Backup.

USE ONLY A RADIO SHACK ORIGINAL 'TRSDOS' 2.3 DISKETTE. Do not trust the quality of a TRSDOS copy. The equipment on which the copy was made may not be properly aligned resulting in a copy which may not function properly in your system.

THE PREVIOUS WARNING IS VERY IMPORTANT AND HAS BEEN THE CAUSE OF DIFFICULTIES EXPERIENCED BY MANY TRS-80 DISK USERS.

The TRSDOS Backup diskette will be referred to from here on as DISKETTE 'A'. TRSDOS modifications will be made on this diskette.

- 4) Insert Diskette 'A' in Drive #0. Insert the PATCH-PAK diskette in Drive #1.
- 5) BOOT the system (using the TRS-80 RESET button), Load up BASIC, and RUN "PATCHPAK".
- 6) Follow the instructions supplied by the PATCH-PAK program.
- 7) The final instruction in the PATCH-PAK program calls for a blank diskette to be inserted in Drive #1 and for the modified TRSDOS (Diskette 'A' in Drive #0) to be BACKED UP to the blank diskette in Drive #1. The Diskette in Drive #1 will thus become a properly modified 40 track TRSDOS 2.3 SYSTEM DISKETTE. Diskette 'A' is of no further value. Do not attempt to store data on Diskette 'A' because its sector allocation table thinks it has 40 tracks (it is formatted for only 35 tracks).

8.0 THINGS YOU SHOULD KNOW

The TRS-80 has several CHARACTERISTICS which become very apparent when a Floppy Disk is added to the system. Following is a collection of known problems (and remedies if known). This is by no means the last word on the subject but it may help you avoid some of the problems others have experienced.

8.1 IF AT FIRST YOU DON'T 'BOOT' TRY-TRY AGAIN

The TFD-100 has more tracks than the disk drives for which the TRS-80 was designed. Consequently the disk drive motor timer in the Expansion Interface may time out before the TFD-100 can HOME the read/write head during system boot. It may occasionally be necessary to RESET the computer twice before the DOS 'Boots up'. This is not a problem and will cause no difficulty during normal operation.

8.2 PINK PEARL'S ALMOST AS GOOD AS GOLD

We have traced many TRS-80 disk problems to faulty connections at the TRS-80 connectors. Apparently to save money, Tandy decided not to gold plate the edge connector contacts on either the keyboard or the Expansion Interface. Consequently an insulating film will build up on the contacts over a period of time preventing good electrical contact with the mating connectors and cables. The problem is most severe if connectors are removed and reinstalled frequently.

We have found that the insulating film can be removed by rubbing a 'Pink-Pearl' eraser (available at any department store) across the edge connector contacts of the TRS-80 keyboard and Expansion Interface several times. After cleaning the contacts notice the dark residue on the eraser!

It is not necessary to clean the contacts on the disk drive because they are gold plated. Ain't it amazing what a little gold will do?

8.3 NOISE AIN'T NICE

The TRS-80 is very sensitive to POWER-LINE NOISE. This is primarily the result of inadequate power supply and grounding circuit design internal to the TRS-80. We have found a high quality properly grounded power line filter to help considerably. The CORCOM 10R filter has been used by many TRS-80 owners with good result. The filter is easily mounted in a readily available Mini-Box and has a 10 amp capacity. The filter is available from Percom for \$19.95 unmounted. When ordering ask for the TRS-80 power-line filter.

BE SURE TO GROUND THE CASE OF THE FILTER OTHERWISE IT WILL NOT BE EFFECTIVE. A THREE-WIRE POWER CORD IS A MUST (GREEN WIRE IS GROUND) OR CONNECT THE FILTER CASE TO A COLD WATER PIPE.

*** THE ABOVE INFORMATION IS VERY IMPORTANT ***

8.4 FORGETTIN' AIN'T FORGIVIN'

Memory causes many problems primarily because of inadequate design within the TRS-80. Be very careful about the quality of memory chips you buy if you are adding memory yourself. The TRS-80 is not very tolerant! We have had the best luck with MOSTEK and NEC memory chips. Periodically run a good memory diagnostic to assure yourself that the memory is 'ok'.

8.5 BEWARE OF COPIES

Some TRS-80 disk users obtain their software from friends or acquaintances. Such copying may violate legal copyrights and will inevitably diminish the availability of low cost QUALITY software for the TRS-80.

There is another problem which may arise from 'copies'. Producers of high quality software frequently monitor the alignment of the disk drives used to duplicate diskettes for distribution. Because the alignment equipment is specialized and expensive it is unlikely that the disk drives used to make 'friendly' or 'low budget' copies are as carefully maintained. Consequently you may find that diskettes obtained from such sources will not function reliably on your system.

8.6 LEFT SIDE'S NOT THE RIGHT SIDE

Do not place your disk drives on the LEFT side of the TRS-80. The transformer which creates the high voltage for the CRT display is located on the left side of the CRT enclosure. The high frequency radiation from this transformer will cause disk errors if the disk drives are located near the left side of the CRT display. Locate the disk drives on the RIGHT side of the TRS-80 as far from the computer as possible.

8.7 CRC ERROR - TRACK LOCKED OUT!

If when formatting a diskette, tracks above track 25 are locked out; you are the victim of yet another Tandy design short cut! To correct this problem Percom has developed an improved Disk Data Separator circuit for the TRS-80 Expansion Interface. It plugs into the socket occupied by the disk controller in the Expansion Interface. When ordering ask for the DATA SEPARATOR (\$29.95).

8.8 TURN THE CABLE AROUND

Make sure the short ribbon cable connecting the TRS-80 computer (keyboard) to the Expansion Interface is oriented correctly. Unfortunately Radio Shack failed to 'key' the connectors and failed to mention which way they should be installed. If your cable is like ours, look for the uninsulated 'shield drain' wire on the top side (smooth side) of the ribbon cable near one end of each connector. The connector should be oriented so this 'drain' wire is closest to the SYSTEM RESET button (not the POWER SWITCH) when the connector is plugged into the computer (keyboard). If not properly installed, the 'shield drain' will be connected to the 'system reset' line and will cause spurious random system resets (the disk will 're-boot').

MAINTAINANCE AND SERVICE

The TFD-100 requires very little preventive maintenance. Most malfunctions are caused by interconnecting cables and connectors. Do not attempt to adjust or repair the disk drive. Special equipment and tools are required. Considerable damage can be done by attempting to work on the TFD-100 disk drives without proper training. Clean the read-write head periodically with a high quality tape head cleaner.

Out-of-warranty repairs are performed for a labor charge plus parts and shipping.

	LABOR CHARGE

POWER SUPPLY	\$10.00
DISK DRIVE	39.50

If a unit is functioning properly as received and does not require service, the checkout charge is \$10.00 plus return shipping. Do not enclose any payment. The unit will be returned C.O.D. for authorized repairs.

When returning a unit for repair, pack in a large carton with at least 3" of padding on all sides. We will not attempt to service if there is any shipping damage until the claim is settled. Ship prepaid by UPS or INSURED PARCEL POST to:

PERCOM DATA CO.
211 N. KIRBY
GARLAND, TX 75042

A confirmation sheet will be sent upon receipt of unit. Most repairs are turned around within one week.

MICRODOS and PATCH-PAK are trademarks of Percom Data Co. Inc. TRS-80 and TRSDOS are trademarks of Tandy Corporation which has no relationship with Percom Data Co. Inc. Percom Data Co. Inc. does not endorse the use of the TRS-80 Computer in any manner for any specified purpose.

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STATEMENT OF LIMITED WARRANTY

For a period of 90 days from the date of delivery, Percom Data Co. Inc. warrants to the original purchaser that the computing equipment described herein shall be free from defects in material and workmanship under normal use and service. During this period, if a defect should occur, the equipment must be returned to the Percom Data Co. Service Facility at the above address for repair. The purchaser must prepay all shipping and insurance charges and must supply proof of purchase from Percom Data Co. or an authorized Percom dealer or distributor. Purchaser's sole and exclusive remedy in the event of defect is expressly limited to the correction of the defect by adjustment, repair or replacement at Percom's election and sole expense, except there shall be no obligation to replace or repair items which by their nature are expendable. No representation or other affirmation of fact, including, but not limited to, statements regarding capacity, suitability for use, or performance of the equipment, shall be or be deemed to be a warranty or representation by Percom Data Co. Inc., for any purpose, nor give rise to any liability or obligation of Percom Data Co. Inc. whatsoever.

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TOLL-FREE ORDER NUMBER
1-800-527-1592

DECEMBER 1, 1979
PRICE LIST FOR
TRS-80 MINI-DISK
COMPONENTS and
ACCESSORIES

PRICE LIST

NOTICE: THE FOLLOWING PRICES ARE SUBJECT TO CHANGE WITHOUT NOTICE.

40-TRACK MINI-DISK DRIVE(S) FOR THE TRS-80:

Includes TFD-100 Mini-Disk Drive(s), Enclosure, and Power Supply.
Single Drive System.....\$ 399.00
Dual Drive System.....795.00
Triple Drive System.....1195.00

77-TRACK MINI-DISK DRIVE(S) FOR THE TRS-80:

Includes TFD-200 Mini-Disk Drive(s), Enclosure, and Power Supply
Single Drive System.....\$ 675.00
Dual Drive System.....1350.00
Triple Drive System.....2025.00

POWER SUPPLY: Powers One Drive.....55.00

ENCLOSURES:

For One Drive.....\$ 29.95
For Two Drives.....44.95
For Three Drives.....69.95

INTERCONNECTING RIBBON CABLES:

For Two Drives.....29.95
For Four Drives.....39.95

DISK DRIVE EXTENDER:

Permits TFD-100 Disk Drives to be connected to Radio Shack
Interconnecting Ribbon Cable. This Disk Drive Extender is
NOT required when using the PERCOM Interconnecting cables....15.00

MINI-DISKETTES (5 1/4" Soft-Sector for TRS-80):.....Each 4.95
Box of 10 with Organizer.....44.95

POWER-LINE FILTER:.....19.95

DATA SEPARATOR ADAPTER:

Improves the reliability of TRS-80 disk operation. Plugs
into the disk controller IC socket inside the TRS-80
Expansion Interface.....29.95

MICRODOS DISK OPERATING SYSTEM:

A faster, more compact alternative Disk Operating System
for TRS-80 Computers. Operates entirely within TRS-80
Level II BASIC. Requires less than 7K bytes of RAM.....29.95