

TR880 to IBM PC and CPM
File interchange program
Instruction Manual



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INSTRUCTIONS FOR CP/M<>TRS<>PC FILE TRANSFER

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Notice

Hypersoft and the Author offer this program on an as-is basis only and assume no responsibility for any loss or consequential damage resulting from its use or misuse. If you have a problem, please submit a report using the standard form provided at the end of this manual and we will exert our best efforts to resolve it for you. You must be the original purchaser and have submitted a registration form if you did not buy it directly from us. In addition we will be pleased to add additional formats to the repertoire of this program. For this we need a sample disk of the format in question, properly formatted with a few arbitrary files placed on the disk to establish the sector interleave sequence and other parameters. Please use the form provided and submit it with the disk and specified remittance.

Program overview

This manual describes one program that comes in several different versions. It is designed to allow you to move data and program files freely between your own TRS80 disks and those of a number of other computers. You do this using only the hardware in your TRS80 and the supplied program thus eliminating the need for modems, terminal programs and access to a second non-TRS80 computer.

The program runs as a /CMD file under your own TRS80 DOS and will allow you to COPY files to and from the foreign DOS, and also to DIR, KILL and FORMAT. You can therefore format a blank disk and move some files to it that can subsequently be read by, for example, a Kaypro or an IBM PC. Note that you cannot run Z80 machine language programs on, for example, an IBM PC which uses an 8088 microprocessor. The same is true in reverse except that many CP/M computers use 8080 or Z80 microprocessors and the TRS80 uses a Z80 which is compatible with 8080 code. CP/M code would need some modification before it could be used on a TRS80, particularly with regard to I/O.

You can however copy a BASIC, PASCAL, FORTRAN, C or other high level language program and run it with very little modification unless it makes extensive use of memory mapped graphics or has system machine language calls. Data and text files of many types can also be usefully moved between machines. Medical records for example, could be prepared using a TRS80 and sent to another department which uses IBM PCs. Manuscripts could be prepared on a TRS80 and sent to a publisher who only has Sanyo CP/M computers in his

office. Machine code for a 68000 cp/m computer could be generated on a TRS80 using our XAS68K cross assembler and then put on a disk readable by the target machine.

At present the program comes in three versions: TRS80<>PC, TRS80<>CP/M and a combined CP/M<>TRS80<>PC version. Each of these, in turn is supplied in versions optimized for the TRS80 models I, III or IV. The model III version will run on a Model IV in model III mode under an appropriate model III DOS. Except for this, each version will only run on the model specified provided with the minimum hardware as given below.

1.0 Getting Started

To run the program you will need the following hardware as a minimum: TRS80 Model I, III or IV with 48k of memory (64k model IV) and two disk drives. Model I users also need a doubler and an appropriate double density DOS such as NEWDOS 80 from Apparat or DOS-Plus from Micro Systems. The model I version also runs on the LNW80 models 1 and 2 provided the clock speed is set at standard 1.77 MHz.

Among the formats you can read and write to are a number of double sided types. For this you will need a double sided drive as drive number 1, 2 or 3. (Drive 3 is not permitted on model I's as the drive 3 select line is used for side selection.) Similarly to use the 80 track cp/m formats you need an 80 track drive, double sided if appropriate.

If you have the capability of reading 8 inch disks, i.e. an 8 inch drive and a disk controller to match you may also be able to use the 8 inch standard cp/m ss sd option.

TRS80 DOS formats

The following TRS80 disk operating systems are supported:

Model I / LNW80:

NewDos 80 V 2.0	Double Density
DOSPlus 3.4,3.5	Double Density
MultiDos	Double Density

Model III:

DosPlus 3.4,3.5
LDOS
MultiDos
NewDos 80 V 2.0
TRSDOS 1.3

Model IV:

All above Model III DOS's in III mode
TRSDOS 6.0
DosPlus 4

The program is supplied as a command file (/CMD) on a data disk and to run it you will need to move it to the DOS of your choice using a copy command. Insert your DOS disk in drive 0 and reset the computer. Insert the data disk in drive 1 and type:

```
COPY TRSPC/CMD:1 :0
```

or

```
COPY TRSCPM/CMD:1 :0
```

or

```
COPY CPMPC/CMD:1 :0 as appropriate
```

Note that on the model 1 the program will be supplied on a single density TRSDOS 2.3 format data disk, on model III it will be on a double density TRSDOS 1.3 disk and on the IV it will be on a 6.0 data disk.

To run the program, type the filename - excluding the /CMD i.e. type, for instance:

```
TRSPC CPMPC
```

The program will run and offer you a menu of formats. You must choose one at this point although you may change it later using the SELECT command.

Once you have selected your format, you may place a disk in drive 1,2 or 3 and copy files to and from it, DIR it, FORMAT it and KILL files on it. You must retain a disk in drive 0 with a minimum disk operating system.

Type HELP to see a summary of available commands. These will be described in more details in Chapter 3. For the most part they must be typed exactly as shown although you may insert extra spaces between words.

2.0 Program Commands

This section gives detailed information on the use of each of the available commands in your program.

DIR

This command allows you to view the directory of one of the disks in your drives. Note you must have selected the correct format before you start or the program may hang trying to find sectors that don't exist on the disk.

Example:

DIR :1

Explanation:

Read the directory from the disk in drive 1.

Note: the colon (:) is mandatory.

COPY

This command allows you to transfer files between your own DOS in drive 0 and an alien disk in drive 1, 2 or 3. The direction of transfer is determined by the sequence of drives. The source drive is defined first and the destination second. Drive 0 is always your TRS80 DOS. If it is specified first then you are copying from a TRS80 DOS to the alien DOS. If it is shown second you are copying from the alien DOS to your TRS80 DOS.

You must type the command in full together with a valid switch option. A switch option tells the program what how to interpret the file as it is copied. If you type -I then an exact image is copied across without any changes. If you type -A then the file is assumed to be an ASCII (text) file and is converted so that it reads properly on the target machine. This includes fixing the carriage-return line-feed differences, the end of file mark and the non standard TRS80 characters. See the Section 3 for more on this.

Note that if you want to move BASIC programs they should have been saved in ASCII format first. On the TRS80 for instance, you do this by, from BASIC, typing SAVE "filename",A. If you don't do this then some of your programs may not be readable as when BASIC is saved to disk in the ordinary way, all the commonly used BASIC keywords are stored as one byte codes called tokens. These are different on CP/M, PC and TRS80 computers even though Microsoft probably wrote them all!

If you are copying files to IBM PC type disks you will probably want to ensure the date gets set correctly. Some TRS80 Dos's allow you to boot up without setting the date so set it first before you run this program. Simply type DATE 03/30/84 for example.

If you are working with CP/M disks then the default USER number is 0 unless you select another value. See the USER command below. Also note that you can only specify filenames that use legal ASCII characters. Some CP/M systems use the 8th bit of the letters of the extension (for instance the COM in BASIC.COM) to signify some special parameter. These are masked off by the directory read so that they are printable on the screen.

Example:

```
COPY TEXT/DOC:0 TEXT.DOC:1 -A
```

Explanation:

Copy the file TEXT/DOC from TRS80 DOS in drive 0 to the alien DOS in drive 1 using ASCII transfer mode. The same name is used.

Example:

```
COPY TEXT.DOC:1 TEXT/DOC.XYZ:0 -A
```

Explanation:

Copy the file TEXT.DOC on the alien disk in drive 1 to the TRS80 DOS disk in drive 0 using ASCII mode and adding the password XYZ.

Example:

```
COPY MODEM.COM:1 MODEM/CMD:0 -I
```

Explanation:

Copy the machine language program MODEM.COM from the the disk in drive 1 to the disk in drive 0 making an exact image copy. If it runs without changes it will be a miracle!

ERA or ERASE or KILL

This command is allowed in three forms corresponding to the same functions on CP/M, PC's and TRS80's respectively. Wouldn't you know it - some people are never satisfied TRSDOS 6.0 added another one - REMOVE !.

Example:

```
ERASE BIGONE.COM:2
```

Explanation:

Delete the file called BIGONE.COM from the alien disk in drive 2.

Example:

```
KILL MYFILE/BAS:0
```

Explanation:

Delete the file MYFILE/BAS from the TRS80 DOS disk in in drive 0.

EXIT

This command allows you to leave this program and return to the DOS READY prompt.

Example:

EXIT

Explanation:

Terminate program and return to DOS.

FORMAT

This command allows you to put a blank disk in drive 1, 2 or 3 and format it so that it will be readable on a non TRS80 computer. Drive 3 is not permitted on Model 1s if you have double sided drives. Note you cannot format a disk in drive 0.

Example:

FORMAT :1

Explanation:

Format the disk in drive 1.

HELP

This command throws up a short summary of commands as an aid to memory.

Example:

HELP

Explanation:

I give up!

SELECT

This command allows you to redefine the format of the alien disk. A menu will be thrown up and you must choose one by typing a letter. In the CP/M version you will be also able, by pressing the Enter key, to page through several screens of alternative formats.

Example:

SELECT

Explanation:

Change the alien disk specifications.

USER

This command, only available in CP/M allows you to change a file flag called USER. At any time you will only be able to copy or kill files for the USER number you are currently set to. Permissible values for user are 0 to 15. The default value is 0 and most files will have this as their attribute.

Note that under CP/M a DIR will only show the files for the particular USER setting you are using. In this program all files are shown together with their user parameter so you can select which ones you want to transfer or delete.

Example:

USER 7

Explanation:

Set the USER attribute to 7

3.0 Technical Information

Bytes, Sectors, Grans, Blocks and Clusters

File sizes are described by different disk operating systems using different units of measurement. Among the more important to us are:

Byte almost the smallest unit of measurement, in fact a byte is an 8 bit binary number which can take on 256 different values sufficient to describe all the text characters plus some for graphics and other purposes. A text file usually uses one byte per character of text.

Sector A sector is a portion of a track of recorded data on a floppy disk and consists of a number of bytes, typically 128, 256, 512 or 1024. A sector is the minimum amount of information that can be read from, or written to, a disk. A sector on a standard TRS80 DOS is 256 bytes.

Grans TRS80 operating systems always read and write sectors in groups called granules. Files are therefore always multiples of the granule size. Consult your DOS manual for definite information on the size of a granule in your case. Typically, however, granules are 3,5, or 6 sectors, each sector being 256 bytes.

Blocks or Clusters - Another name for a group of sectors. MS and PC DOS uses the name 'cluster' which is only 1 sector big on single sided and 2 sectors on double sided. CP/M uses 'blocks' which are usually 1024, 2048 or 4096 bytes long. Files on CP/M and PC DOS's are multiples of blocks or clusters long.

End of File Markers

The end of a file can never be guaranteed to end exactly at the end of a sector, gran, block or cluster so some other means is used to show where the end actually is. On the TRS80 the directory information contains an EOF value which says which byte in the final sector is the last byte. Also there is a number given showing the total number of records (=256 byte sectors) in the file. There is some inconsistency in this with some DOS's counting sectors from 0 and some from 1.

On CP/M files are always multiples of 128 bytes long. The directory contains an entry defining the number of 128 byte records in the file and nothing else is available. So users have to resort to some other means within the file. Text files are terminated with a Control-Z character (hex 1A) and on ASCII file transfers (-A switch) this is used by this program to determine the proper end of file.

IBM PC files have a 4 byte directory entry defining the exact length which can be used for data files. On text files however this is not always exact and may be rounded up to the nearest whole sector or cluster. In this case the exact end of file is marked by a Control-Z as with CP/M.

Some TRS80 text editors use a 00 byte to mark the end of the files they create. To allow for this when copying from PC or CP/M files with the -A switch set the program automatically puts at least one 00 byte on the end instead of the CTRL-Z mark.

ASCII File Differences

There are some differences between the way text (ASCII) files are stored on disk by the TRS80 and CP/M or PC disk systems. Apart from the end of file mark as described above a major difference is the way the end of each line is marked. On the TRS80 a single carriage-return code (hex 0D) is used. In CP/M and PC files a line feed is added (hex 0A). If you were to copy a text file from say CP/M to TRS80 without making any changes you would find your printer double line spacing if you were to try and print it. The ASCII file copy switch takes care of this for you automatically removing the 0A's when copying to TRS80 formats and inserting 0A's in the right places when copying from TRS80 to CP/M or PC.

Another problem with the TRS80 is that 4 of the ASCII codes are used in a non standard way. These are the codes:

Hex	True ASCII for	TRS80 uses it for	
		Model 1	Model 3/4
5B	[Up arrow	Up arrow
5C	\	Down arrow	
5D]	Left arrow	
5E	^	Right arrow	

To correct for this the -A switch will cause the copy program to change any occurrence of 5B hex in a TRS80 text file to a 5E when copying to a PC or CP/M disk. The reverse will be done when copying the other way.

Load File Formats

Apart from differences in ASCII file formats there are differences in the way other types of files are stored on disk by different computer operating systems. In particular the TRS80 stores /CMD files using a scheme which indicates where each section of the file is to be loaded in memory and the address where the program execution is to start.

By contrast CP/M load format is pretty dumb. All machine language files load and start running at 0100 Hex and must contain some kind of relocater if they are to run elsewhere in memory. Since CP/M programs are written for 8080 or 780 microprocessors they should, in many cases, be adaptable to TRS80 operation.

4.0 Formats Supported

The following formats are supported, note SS = single sided, DS = double sided, SD = single density, DD = double density, 35,40,80 etc = number of tracks.

IBM PC (PC-DOS, MS-DOS) formats:

PC/MS-DOS 1.1	SS DD	40
PC/MS-DOS 2.0	SS DD	40
PC/MS-DOS 1.1	DS DD	40
PC/MS-DOS 2.0	DS DD	40

CP/M formats:

Aardvark	SS DD	40
Access Matrix	SS DD	40
Access II	DS DD	40
Altos	DS DD	80
ATR 8000	SS DD	40
CCS	SS DD	40
Cromemco	SS SD	40
Cromemco	SS DD	40
Cromemco 4	DS DD	40
DEC VT180 Robin	SS DD	40
DEC Rainbow	SS DD	80
Eagle	SS DD	80
Epson	DS DD	40
Epson 2	DS DD	40
HP 125	DS DD	40
IBM PC CP/M-86	SS DD	40
Kaypro II	SS DD	40
Kaypro 4 & 10	DS DD	40
LNW-80	SS DD	40
Lobo Max-80	SS DD	40
Morrow uDecision	SS DD	40
Morrow	DS DD	40
NEC PC-8001	SS DD	40
Osborne-I	SS SD	40
Osborne-I / Exec.	SS DD	40
Otrona	DS DD	40
Sanyo 1	DS DD	40
Sanyo 2	SS DD	80
Sanyo 12	DS DD	80
SD Computers	SS SD	40
Superbrain	SS DD	40
Superbrain D	DS DD	35
Teletex System Mstr	SS SD	35
Teletex System Mstr	SS DD	35
Teletex System Mstr	DS DD	35

Televideo	DS DD	35
Televideo Q	DS DD	80
TRS80 1 Lifeboat	SS SD	40
TRS80 1 Omicron	SS SD	35
TRS80 3 Holmes V80	SS DD	40
TRS80 3 Hurr Comp	SS DD	40
TRS80 3 MM Shfl Bd	SS DD	40
TRS80 4 Montezuma	SS DD	40
TRS80 4 Montezuma	DS DD	40
TRS80 4 Mntzma 1.4	SS DD	40
TRS80 4 Mntzma 1.4	DS DD	40
Xerox 820-II	SS SD	40
Xerox 820-II	SS DD	40
Zenith-Heath HB9	SS SD	40
Zenith-Heath Z90	SS DD	40
Zenith Z100	SS DD	40
Zenith Z100	DS DD	40
Zenith Z100 EXM 00	DS DD	40
Zorba	DS DD	40
Zorba Z2000	DS DD	40
Zorba Q	DS DD	80
Zorba Z2000Q	DS DD	80
8 inch CPM standard	SS SD	77

We are always on the look-out for new formats to add to the list. If you have access to a format not listed here, format a disk and put some files on it and send it to us together with a completed copy of the New Format Submission form and we will endeavour to include it. If possible we will return your original disk with a new copy of the file transfer program containing all new additions to date including yours. If the disk is double sided, we need it to be more than half full with files so that we can determine how the back side is recorded. There are at least 3 different ways this can be done and we need a disk with something written on the back to be certain.