



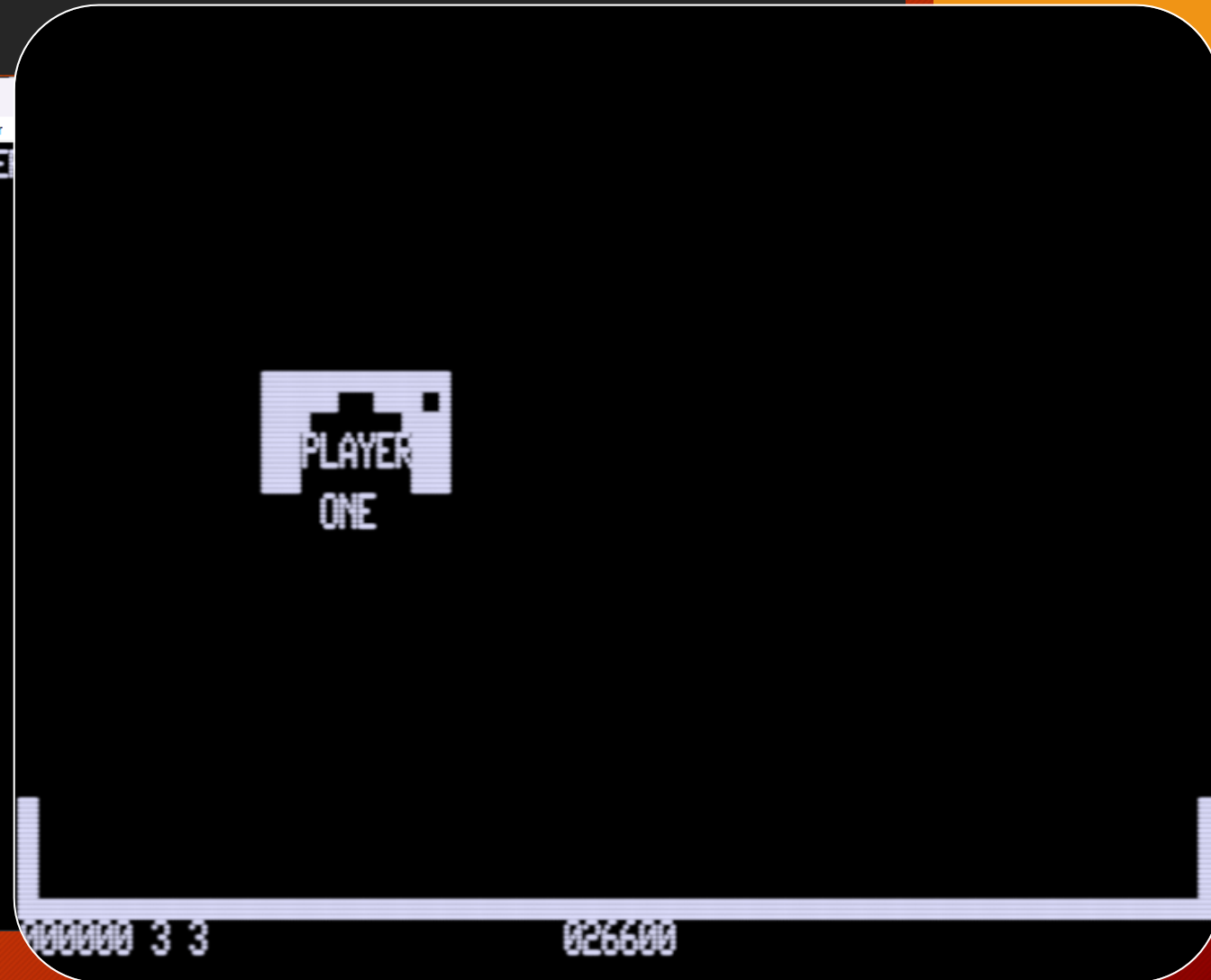
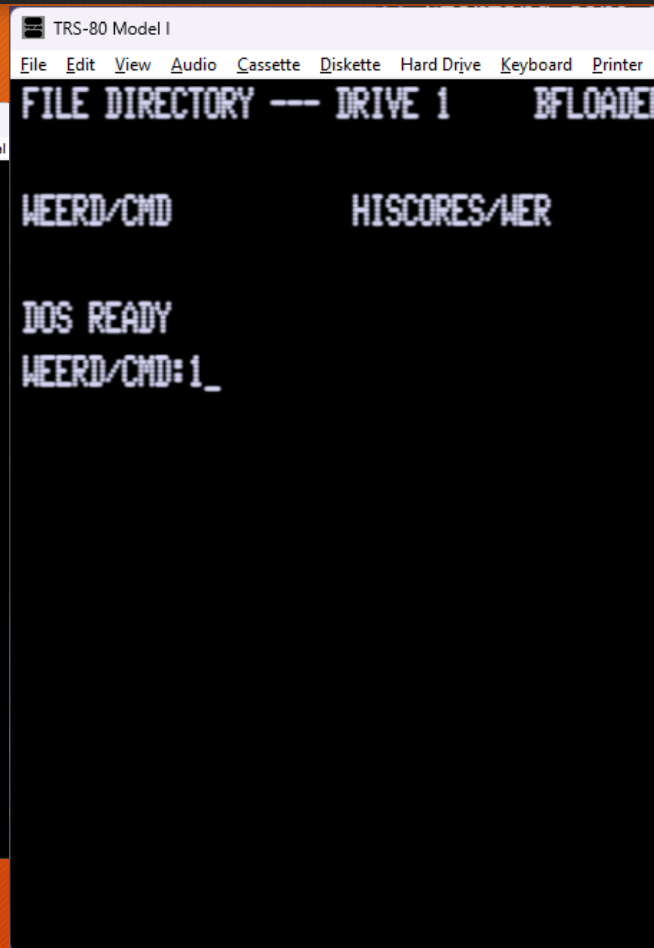
Using MULTIDOS™

An Introduction for Today's TRS-80 Enthusiast

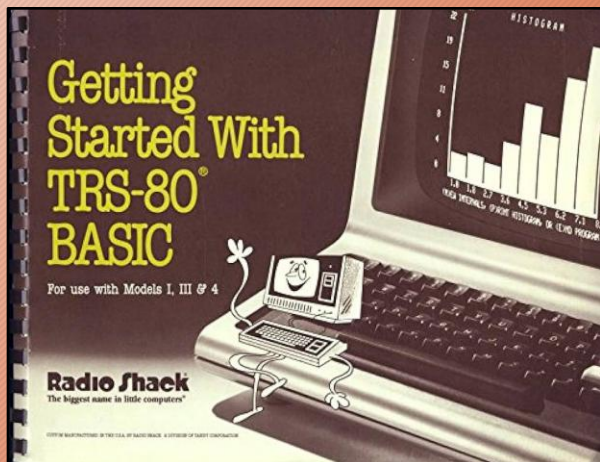
Tim Halloran
Tandy Assembly 2023



Is this your typical DOS user journey?



Or maybe this?



Why investigate a DOS on the TRS-80?

- **Learning** - an interesting part of TRS-80 history and our hobby
- **Competition** - the TRS-80 had many DOSs
- **Independent** - DOSs were not all controlled by Radio Shack
- **Variety** - an “anything goes” attitude in DOS capabilities
- **Fun** - getting a DOS to do something cool is satisfying
- **Convenience** - you don't need a TRS-80 - you can use trs80gp

MULTIDOS and me

- Disks from Ira
 - MULTIDOS reads most disks
- Got FreHD from Ian
 - No MULTIDOS 😞
- Read *Priming the Pump*
- @TA'19 met David & Theresa Welsh
 - Where is Vernon?
- Vernon Hester comes to Trash Talk Live
- Vernon's FreHD is working...





@TA'22 - Vernon's MULTIDOS port to FreHD

This talk

- Introduce using MULTIDOS
- Cover a bit that applies to all TRS-80 DOSs
- Show off a few cool (to me) examples
- Get you started on your way to MULTIDOS mastery
- Explain ESOTERIC

Getting started

cat (h) // get help on the command with (H) [M4/MAX-80]

***Repeat last command with ENTER** (handy if you forgot to close a disk door)

cat :1 | cat :0 | cat (a) | cat (i,s)

dir (h) | dir | dir (z) | dir (x)

config // see your drives - also configures drives

devices (h) | devices // see your I/O devices

trs80gp -m3 -frehd -frehd_patch -frehd_menu

Have whatever
FreHD images in
directory you run
this trs80gp
command



:0 is
MULTIDOS
system
hard disk

MULTIDOStm MODEL III, Version 5.10
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MULTIDOS

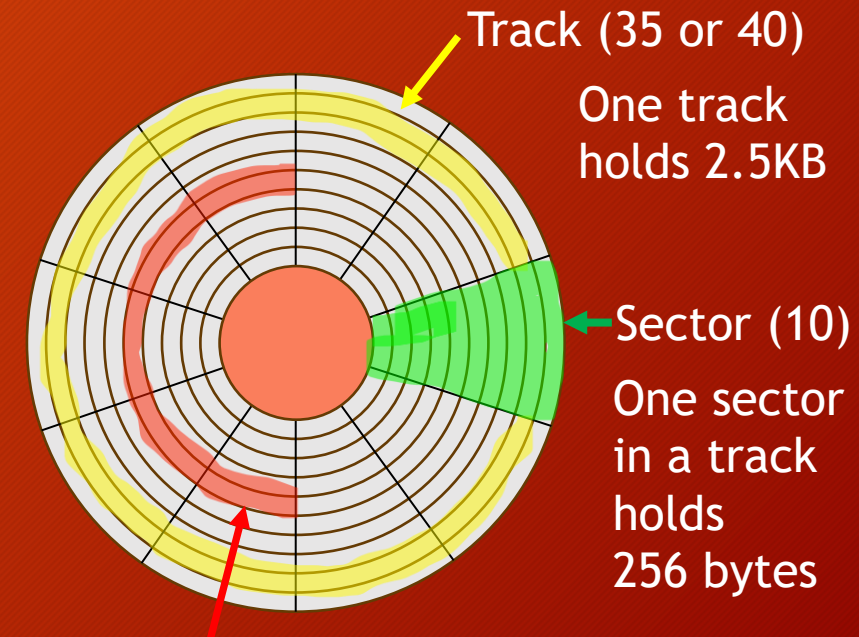


Model III
w/FreHD

TRS-80 floppy disks (my simple view)

- Sidedness
 - single sided “ss” (one side used)
 - double sided “ds” (both sides used)
- Density
 - Single density “sd” - 35 tracks
 - Double density “dd” - 40 tracks
- So “ss-dd” is single-sided double-density (40 tracks, 10 sectors)

Granules are weird, but you need to understand them on a TRS-80 DOS
Originally the smallest chunk making up a file



Granule is 5 sectors on a track
(2 granules fills 1 track)
A granule is 1,280 bytes or **1.25KB**
(I remember: **4 granules is 5k**)

TRS-80 hard disks (different!)

- 32 sectors per granule (a lot more!)
 - $32 \times 256 \text{ bytes} = 8192 \text{ bytes} = 8\text{KB per granule}$
- 6 granules per cylinder
 - This is $6 \times 8\text{KB} = 48\text{KB per cylinder}$
- If we consider hard disk :0
 - It has 140 cylinders
 - $140 \times 48\text{KB} = 6,720\text{KB} = \sim 6.6\text{MB}$
- Free space report is 695 granules
 - $695 \times 8\text{KB} = 5,560\text{KB}$ as reported by MULTIDOS

```
MULTIDOS
config
:0, Phy = 0, head offset = 0, cylinder offset = 0,
    sides = 6, cylinders = 140, step code = 0.
:1, Phy = 0, head offset = 0, cylinder offset = 140,
    sides = 6, cylinders = 140, step code = 0.
:2, Phy = 0, head offset = 0, cylinder offset = 280,
    sides = 6, cylinders = 140, step code = 0.
:3, Phy = 0, head offset = 0, cylinder offset = 420,
    sides = 6, cylinders = 140, step code = 0.
:4, Phy = 0, head offset = 0, cylinder offset = 560,
    sides = 6, cylinders = 140, step code = 0.
:5, Phy = 0, head offset = 0, cylinder offset = 700,
    sides = 6, cylinders = 140, step code = 0.
:6, Phy = 0, Floppy, double density,
    one sided, one volume, step rate = 6 mS.
:7, Phy = 1, Floppy, double density,
    one sided, one volume, step rate = 6 mS.
```

```
Logical drive: 0    Name: MULTIDOS    Date: 01/30/22
Media: HARD, 140 log, 140 phy cyls, 6 side(s) at 6 grans/cyl
Free space: 695 granules at 32 secs/gran = 5560.00 Kilobytes
```



Model 4
w/FreHD

MULTIDOS filespecs

Not part of
filespecs
uniqueness

is a drivespec modifier
to access side 1 of a
diskette when it is
configured as two
volume.

filename[/ext][.password][:drivespec][']

ZEUS/CMD:0

wonder.boy:0

wonder.full:0

Wonder:1

Same file

Different file

Multidos searches all the
drives so ZEUS is the same as
ZEUS:0 (unless there are two
thunder gods on your disks)

/CMD is special you don't
need to key this to run the
program: ZEUS and
ZEUS/CMD run the utility

Installing Lazy Writer on the MULTIDOS FreHD

- How to get programs from a floppy to the FreHD. This can run into some problems. Let's use Lazy Writer as an example
 - Insert the *Lazy Writer 3.4a Model III* floppy into :6
 - Try `copy l/cmd:6 to :1` (:1 is a empty hard disk)
 - This will fail, so we use two commands to fix up the floppy
 - `fixdate :6` - This fixes the date format for MULTIDOS
 - `prot :6 (unlock)` - this unlocks the files, needs PASSWORD
 - We try the copy again and it works fine
 - Running *Lazy Writer* not right (better look at the documentation!)



:6 floppy
has
Lazy Writer



:1 is an
empty
hard disk

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MULTIDOS



Model III
w/FreHD

NOT WORKING
Read the manual

- Copying all this with **copy** will be a pain
- MULTIDOS has a better way
- Use **vf**u the “Versatile File Utility”

ESOTERIC this utility is **fu** not **vf**u

INSTALLING LAZY WRITER/PAGE 3

Put a disk containing only the stripped TRSDOS 6 in your #0 drive and a disk containing the Lazy Writer files into your #1 drive. Now COPY the following files from the #1 to the #0 drive.

L/CMD	UTILITY/CLW	DIR/CMD	PRINTGEN/CLW
EDIT/CMD	P1/CMD	LPNT/CMD	FT

These are the main program files. The rest of the files are less frequently needed and could remain on a data disk. You might want to also copy the HELP file to the system disk. See the pages at the end of this section containing a listing of all files on the disk.



:6 floppy
has
Lazy Writer



:1 is an
empty
hard disk

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MULTIDOS



Model III
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Running “stuff” at startup in MULTIDOS

- This is simple using the `auto` command
 - We’ll do an example where we run the `free` command at boot
 - We also demonstrate the `boot` command which reboots the system
- To setup running free at each MULTIDOS restart we use
 - `auto free`
- To stop running free at each MULTIDOS restart we use
 - `auto`



:0 is
MULTIDOS
system
hard disk

FreHD

Firmware 9.08 Loader 7.06

FREHD.ROM Ver. 0999H

TRS-80 Hard Disk Emulator

```
md_m1  
==> md_m3  
md_m4
```



Model III
w/FreHD

Redirecting devices

- The `devices` command has `link` and `route`
- Let's route the printer to the serial output and list FRAC/BAS to a real Televideo 912c terminal
 - `setcom (baud=9600,pd)`
 - `route pr to so`
 - `list frac/bas (p)`

```
MULTIDOS
devices
KI = I at X'4BCE'
DO = 0 at X'4275'
PR routed to SO = 0 at X'4C50'
SI = I at X'4C39'
SO = 0 at X'4C50'
```



:1 floppy
MULTIDOS
Utilities



:0 floppy
MULTIDOS
Boot



MAX-80



Comparing two files

- The `comp` command allows you to compare two files
 - `build t1/txt:2 // enter "This is a test"`
 - `build t2/txt:2 // enter "This is a text"`
 - `comp :2 t1/txt t2/txt`



:0 is
MULTIDOS
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hard disk

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MULTIDOS



Model III
w/FreHD



TRS-80 Model III

File Edit View Audio Cassette Diskette Hard Drive Keyboard Printer Serial Record Debug Help

```
RAM Test Utility Version 4.0
(c) 1993 V. B. Hester, All Rights Reserved.
---> Testing.

RAM OK from 4000H to TOPMEM.
```

Testing memory

The `mem` command allows you to test your memory

SUPERBASIC (but just type **basic**)

- Basic is “super” under MULTIDOS
- We’ll demo a few features
- Authoring a (really) simple program
- Then we’ll renumber it
- Then we’ll show an index of the variables



:0 is
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MULTIDOS



Model III
w/FreHD

ASTROCAL (more than a calculator!)

- Vernon authored a 100-page manual on this - documentation is amazing
- More than just a calculator, but can be used as just that
- A fully programmable calculator; like a little VM
- I typically press “6” at startup (simple setup used in tutorial)



:0 is
MULTIDOS
system
hard disk

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MULTIDOS



Model III
w/FreHD

ZEUS (Editor assembler)

- Vernon authored a 200-page manual on this - documentation is amazing
- For a demo I'll enter and edit a small program that prints "Hello TA23"
- Model 4: I'm using the **v64** command to get 64 characters
 - Use **v80** to go back to 80 characters



:0 is
MULTIDOS
system
hard disk

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MULTIDOS



Model 4
w/FreHD

What is ESOTERIC?

- From trs-80.com (Ira)
 - “In June 1998 Vernon decided he wanted to take advantage of a different Model 4 memory map which would afford 2048 more free bytes for applications, so he developed ESOTERIC”
 - Saves 2k of memory
 - Its pretty similar
 - fu (not vfu)
 - no v64
 - different entry pts
 - Memory savings good for new software



Questions



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Tim Halloran
Tandy Assembly 2023

