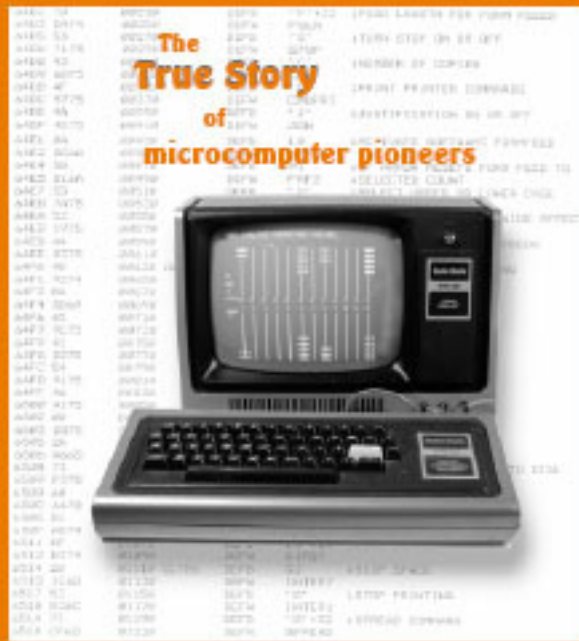


# Priming the Pump:

How TRS-80 Enthusiasts  
Helped Spark the PC Revolution



David Welsh & Theresa Welsh

348 page book or eBook

# Priming the Pump:

How TRS-80 Enthusiasts  
Helped Spark  
the PC Revolution

by

David Welsh & Theresa Welsh

[www.microcomputerpioneers.com](http://www.microcomputerpioneers.com)

# The First Complete Microcomputer



What was TRS-80's  
contribution to computing?

“ We primed the pump.”

- Steve Leininger



## The First TRS-80

Introduced August 1977

- The Apple II and the Commodore PET were also introduced in 1977
- The only serious microcomputers were the S-100 CP/M machines (IMSAI, SOL, Cromemco), which could connect to disk drives and run business software
- TRS-80 beat everyone on price -- \$599.95

# Radio Shack®

The biggest name in little computers™

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**Byte, July 1978** ➔

- The early micros tried to stimulate a business market
- They had floppy disk drives, 80 character screen and expandable S-100 slots

But IMSAI went out of business in September 1979.

# Microcomputer System Solution.

## Announcing the IMSAI VDP-40.



- Fully integrated video data processor in a single cabinet.
- Twin floppies, professional keyboard, S-100 expansion slots.
- 24 line by 80 char. CRT, insert/delete, programmable font, protected fields, inverse video.
- Handsome flip-top cabinet for easy access.
- Serial and parallel I/O ports included.
- FORTRAN IV, Extended and Commercial BASIC.
- IMDOS (enhanced CP/M<sup>®</sup>).
- ISAM.



You've decided you want a microcomputer system—but what to buy? The component system? A computer box here, a CRT box there, a keyboard box here, a floppy disk box there... Messy! The \$695 system? But... no disk; no way to add enough memory... and, if you could, it's not so cheap anymore, and you still wind up with an expensive box collection anyway. Messy!

The IMSAI VDP-40, a fully integrated Video Data Processing system that, in one handsome package, combines a professional keyboard, heavy-duty power supply, twin mini-floppies, multi-slotted motherboard and 9-inch CRT at a new low price.

System Expansion? The IMSAI VDP-40 was built for you. The extra slots in our S-100 bus motherboard and heavy-duty power supply allow almost unlimited expansion. Need more RAM? Add up to 1/2 MByte with our Intelligent Memory Manager and 64K RAM boards. Need more disk storage? A controller option of the VDP-40 will allow you to expand to nearly 5 megabytes! Add a line printer, an IBM-compatible tape drive, a MODEM! IMSAI has them all, with the interfaces and software to make it work for you. The standard of excellence IMSAI places at your disposal at a price/performance no one else has put together allows you to achieve the full potential of your imagination.

Check us out. IMSAI has what you want and what you need. Visit your dealer or write us directly. Ask about the IMSAI VDP-40 and the entire IMSAI line. Features and prices subject to change without notice. <sup>®</sup>CP/M is a trademark of Digital Research Corporation.

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### Price/Performance no one else has put together.

Circle 178 on inquiry card.



# Radio Shack had the Distribution & Marketing Clout

- TRS-80 was available in 3400 Radio Shack stores nationwide
- It used the Z80 microprocessor
- It came with a tape cassette player for storage
- It came with 4K memory but was expandable to 16K
- Unlike Apple II, it came with its own monitor



**The first complete low-cost microcomputer system for home, business or education!**

## Radio Shack TRS-80



The TRS-80 is for people who want to use a computer now—without the delay, work and problems of building one. The system is fully wired, tested and U.L. listed—ready for you to plug in and use! Program it to handle your personal finances, small business accounting, teaching functions, kitchen computations, innumerable games—and use Radio Shack's expanding line of prepared programs on cassettes. The Z80-based system comes with 4K read/write memory and Radio Shack Level-I BASIC stored in read-only memory. Memory expandable to 62K bytes. Includes CPU, memory, keyboard, display, power supply, cassette data recorder, 300-page manual, 2-game cassette program. Designed and built in USA by Radio Shack. Only \$99.95.



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# The Men Behind the TRS-80s

by Jonathan Erickson

It had all the ingredients of a top-secret project—which, incidentally speaking, it was. There were like three moved from place to place a less-than-sufficient number of people involved (all sworn to secrecy), night, weekend, and holiday spent in laboratories going over schematics and excessive and deadline that seemed impossible to meet.

Steve Leininger



When Steve Leininger joined Radio Shack in the fall of 1975, the company was still trying to decide whether to sell a microcomputer. No one at Radio Shack seemed to know what kind of computer it should be or even what it should look like, much less what it should do.

Today, six years and countless TRS-80s later, Radio Shack's Model I has found a comfortable niche in com-

puter history and Steve is director of product development for Radio Shack's computer division.

What happened in the interim? Simply, Steve designed and built a personal computer. Well, of course, no companying software. In less than a year. And it has been the backbone of the microcomputer pack from the start.

Steve might disagree the computer, but based on the popularity of the Model I TRS-80, you might argue that he's the "Calvin Klein" of microcomputers. Along the way, he opened the door to the second generation of popular-computer engineers—to people like Dale Chatham, who developed the TRS-80 Color Computer. But that comes later.

## In the Beginning

It began with an interest in electronics.

"When I was ten years old and growing up in South Bend, Indiana, my mom taught me electronics but she didn't have an instruction manual," Steve explains. "I had to figure out everything—what she gave me and how to put them together. That's really when I got into electronics."

By the time he entered high school, his interest in electronics was primarily focused on audio. During the day he studied electronics, and after school he experimented with practical applications (stereo guides and homemade amplifiers). The doctors that played more college-bound students—where to go and what to major in—posed no problem. "When" was *when* was *when*.

dec University. "What" was electronics.

Then his focus shifted. Leininger recalls, "I was interested in audio, as all of my preparation was in analog electronics. I wasn't until the last semester of my junior year that I took my first digital course. I was at the Engineering Library and picked up a magazine that had an advertisement for an Intel computer. I looked at that all the while and said to myself 'that's going to be a big thing'; then I signed up for some more digital courses. You might say it was love at first bytes."

In 1974, with bachelor's and master's degrees in electronics engineering, Steve headed west to the heart of the emerging microcomputer industry—California's Santa Clara Valley. There he divided his time between designing SC/MP (National Semiconductor's early microprocessor) and communicating long distances with Suzanne, the girl he left behind. "Six months of calls back to Indiana just about broke me. It was either get married and have her move to the West Coast, or move back to Indiana." She joined him on the West Coast.

## Discovered at Last

To earn a little extra cash, Steve began moonlighting as a computer store. One friend owning a couple of Teacoms from Radio Shack walked in, and—as luck would have it—Steve was behind the counter.

"Steve's computerstore experience was extremely valuable to him and to us," says Jack Sellers, one of the Teacoms who walked into the computer store

# Two Men are Given Credit For Developing the TRS-80

**Don French** worked for Tandy Corp. and suggested they capitalize on the latest electronic trend: home-built computers. Tandy hired **Steve Leininger** away from Silicon Valley to do the job.



A rare article about the TRS-80 creators appeared in the December 1981 issue of *Popular Computing*.

# Bill Gates, on the Role of TRS-80

“ ... three machines that came out in 1977: The TRS-80, the Apple II ...and a machine called the Commodore PET. ... all three of them went out and did very well. Several of them, when they first shipped, had BASICs that the company themselves did. [The TRS-80] had a Level I BASIC, that actually Steve Leininger enhanced off Wang's Tiny BASIC. But they knew that it was pretty inadequate. And so they licensed the BASIC from us ...**Radio Shack, with its distribution and its name, set the market on fire.** ”

*Bill Gates, from a interview in 1993 when he received the Price Waterhouse award*

{ **Leininger says Gates asked for \$50,000 and royalties for his BASIC.**  
**John Roach agreed to the \$50,000, but refused to pay royalties.** }



# The first low-cost data storage device: a cassette tape player

You typed CLOAD  
and waited ... and waited



But it was much  
cheaper than disk  
drives, tape punch,  
or retyping your  
programs

## TARBELL CASSETTE INTERFACE

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- Capable of Generating Kansas City tapes also
- No modification required on audio cassette recorder
- Complete Kit \$120, Assembled \$175, Manual \$4
- Full 6 month warranty on kit and assembled units

The Commodore PET also  
used a tape player.



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Save Money**

You could spend hours  
typing in your programs,  
Or you  
could get

**LOAD 80**

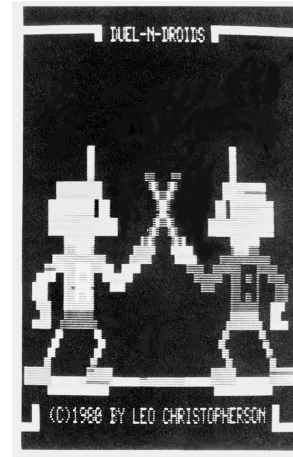
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PROGRAM LISTINGS  
FROM EACH MONTH!  
OF 80 MICRO ON  
CASSETTE OR DISK

**With LOAD 80  
you'll avoid all the hassles  
while enjoying all the benefits**



# Games Galore, all on tape

- “Level I” was the original tiny Palo Alto BASIC, available for free
- In the summer of 1978, John Roach made a deal with Bill Gates for a better BASIC, called “Level II”



# Books full of BASIC listings



David Ahl, who founded *Creative Computing* magazine, edited a series of popular books that were listings of games in BASIC



# The Exatron Stringy Floppy was an alternative to slow and unreliable tape



The stringy floppy was faster than a standard cassette player and cheaper than a disk drive. It consisted of tiny continuous loop tape. It cost \$249.50.

## TIRED OF WAITING?



Frustrating isn't it? No matter how much you speed up your program it still seems to take forever to save data onto a cassette. Wouldn't it be great if someone could design a mass storage system with the speed of a disk, but at half the cost? Exatron did, the *Exatron Stringy Floppy (ESF)*.

Totally self-contained, the ESF is an extremely fast, reliable, and economical alternative to cassette or disk storage of programs or data. All of the ESF's operations are under the computer's control, with no buttons, switches, knobs or levers to adjust or forget.

The ESF uses a miniature tape cartridge, about the size of a business card, called a wafer. The transport mechanism uses a direct drive motor with only one moving part. Designed to read and write digital data only, the ESF suffers from none of the drawbacks of cassettes - without the expense of disks.

Several versions of the ESF are available, for the TRS-80, Apple, PET, OS/7 and an RS 232 unit. Even the slowest of the units is 15 times faster than a cassette, and all are as reliable as disk drives - in fact a lot of users say they are more reliable!

To get further information about the ESF give Exatron a call on their Hot Line 800-538-8559 (inside California 408-717-7111).

If you can't wait any longer then take advantage of their 30 day money-back guarantee, you've nothing to lose but time!

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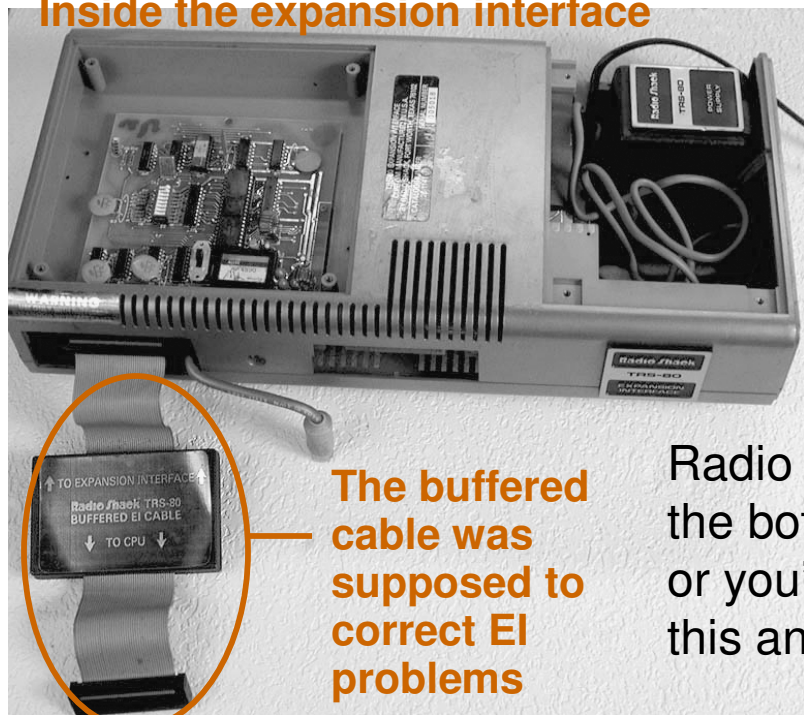
TRS-80, Apple and PET are trademarks of Tandy, Apple and Commodore respectively.



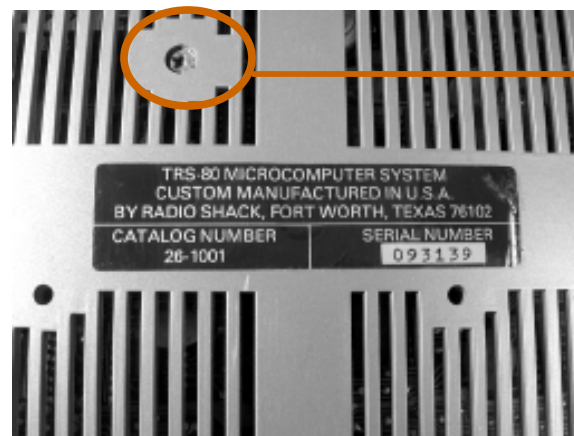
# The Expansion Interface gave the TRS-80 new capabilities

Buying an expansion interface for your Model I meant you could add more memory and connect a disk drive.  
... if you could get the EI to work properly

Inside the expansion interface



The buffered cable was supposed to correct EI problems



The infamous Seal on the back of the keyboard unit

Radio Shack provided a “seal” over a screw on the bottom of the case that had to remain intact or you’d void your warranty. Many users ignored this and opened the case to install more memory.



# Here Come the Clones!



Lobo made  
the Max-80

and the LX-80 clone  
expansion interface



The PMC-80 was  
another clone and,  
in Australia,  
a clone system  
was called the Dick  
Smith System 80.

## Expand your TRS-80\*

**With The LOBO LX-80 Expansion Interface**

Now you can realize all the power and potential of your TRS-80\*, Model 1. If it's add-on memory you need, your LX-80 can accommodate up to four 5 1/4-inch, single- or double-density 35, 40 or 90 track mini-floppies, four 8-inch floppies (single or double sided), and up to eight Winchester fixed disk-drives (5 1/4", 8", 14").

LOBO's powerful new LDOS™ operating system, provided with your LX-80, allows for the use of any eight drives, in any combination, single or double density.

And there's more ... lots more. There are two parallel ports (standard), two serial

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For the full story on how the LX-80 can expand your TRS-80, see your nearest LOBO dealer, or write or call:

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(805) 683-1576

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**PERFORMANCE** - Lift-off with a 4MHz Z80A CPU for twice the performance. The LNW80 outperforms all computers in its class.

**DEL I COMPATIBILITY** - The LNW80 is hardware and software compatible with Model I. Select from a universe of hardware accessories and software - from VisiCalc™ to ace games, your LNW80 will launch you a new world of computing.

**LY LOADED** - A full payload includes an onboard single and double density disk controller for 5 1/4" and 8" single or double disk drives, RS232C communications, cassette and parallel printer interfaces (standard features and ready to go. All memory is fully installed - 48K RAM, 16K chips RAM and 12K ROM complete with robust BASIC.

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Monitor and Disk drives sold separately.



LNW Research made  
the LNW-80



# Disk Drives Mean Business



TRS-80 Model III had  
2 built-in disk drives



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software. If you've gone from a TRS-80 Model I to a Model II/16 or an IBM PC, say, you get a full credit for whatever you paid me for your Model I systems. Just send me your old disks and I'll send you the new ones.

It's this simple. If you ever buy any of my software, you'll never lose your investment.

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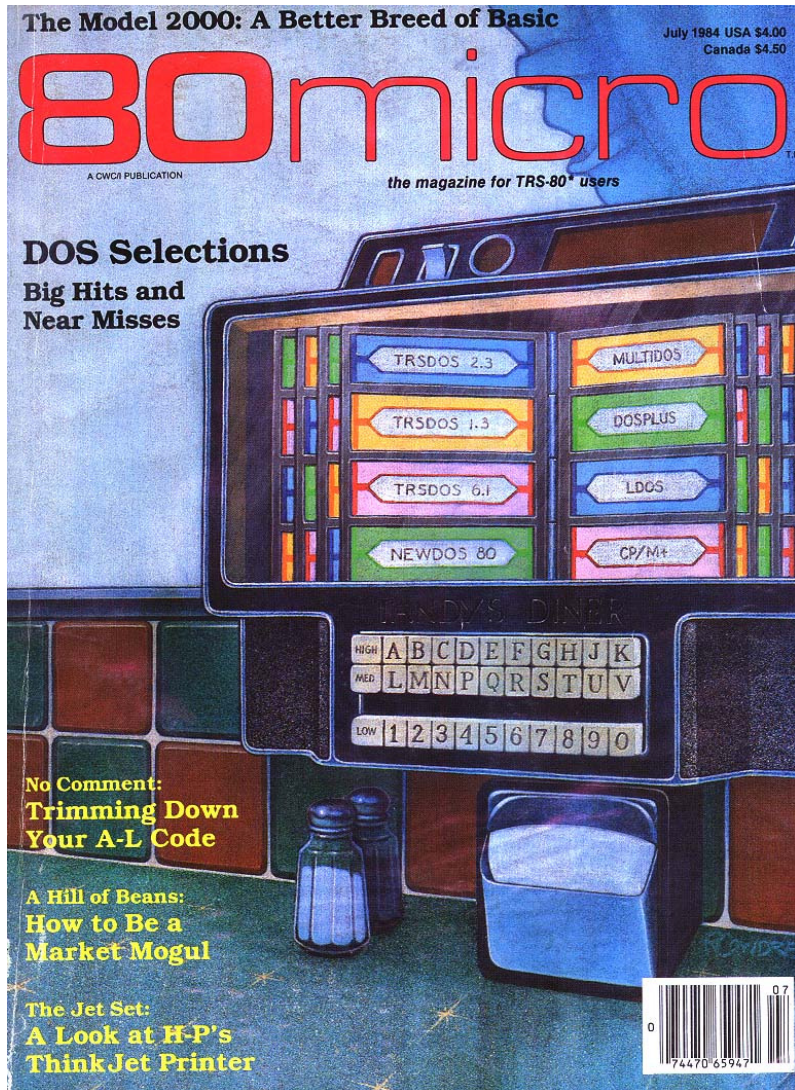
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\* See List of Advertisers on Page 322

80 Micro, September 1983 • 175

Business software came on disks  
**You couldn't get much done with tape**

# Once the TRS-80 got disk drives...



Tandy needed a Disk Operating System (DOS). They contracted with Randy Cook, who programmed TRSDOS.

- Randy Cook was working for Xerox, but had worked with NASA and with Datapoint for whom he had commissioned a chip from Intel, sold to the public as the 8008
- TRSDOS was a side project; his contract with Tandy stated he was to retain rights to the DOS
- Cook says Tandy violated their agreement, never paid him beyond the \$10,000 for Model I TRSDOS, so he began selling his own product (VTOS)

Software authors went to work creating alternatives to TRSDOS.

# Destiny?

Both Don French and Randy Cook say Bill Gates offered them jobs at Microsoft. Both turned him down.

**Randy Cook** had a sick son. Because of the medical needs of his son, Cook says, he turned down Bill Gates' offer to make him the head of Microsoft's operating system efforts in Albuquerque because it would have meant moving away from the medical facilities his son needed.

**Don French** ended up leaving Tandy because he never got the Vice-Presidency and bonus that Charles Tandy had promised him. Charles Tandy died a month before he could deliver, and Lew Kornfeld told French, "There's no young punk going to be a Vice President of this company." French resigned and started a company to create CP/M and MP/M for the TRS-80 rather than go to Microsoft and take a pay cut.

**And they could have been Microsoft millionaires!**

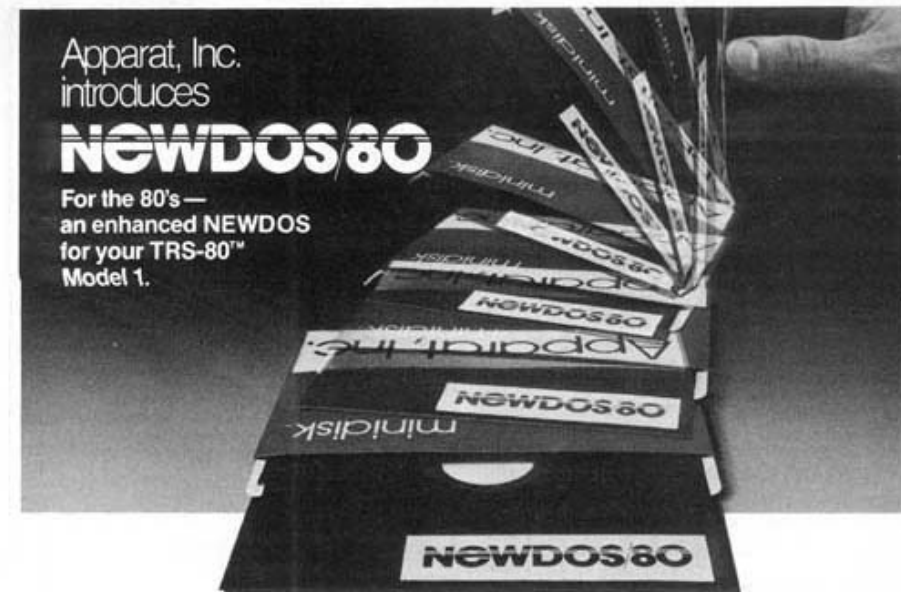


# First there was NewDOS, later upgraded to NewDOS/80

NewDOS was originally a series of fixes for TRSDOS, but became a stand-alone product. It used arcane commands like this:

```
COPY,0,1,10/06/81,FMT,NDMW  
DUMP,PROGFILE/CMD:0,5200H,6  
3F3H,5530H
```

Other DOS authors thought  
they could do better.



Apparat, Inc., announces the most powerful Disk Operating System for the TRS-80®. It has been designed for the sophisticated user and professional programmer who demands the ultimate in disk operating systems.

NEWDOS/80 is not meant to replace the present version of NEWDOS 2.1 which satisfies most users, but is a carefully planned upward enhancement, which significantly extends NEWDOS 2.1's capabilities. This new member to the Apparat NEWDOS' family is upward compatible with present NEWDOS 2.1 and is supplied on Diskette, complete with enhanced NEWDOS + utility programs and documentation. Some of the NEWDOS/80 features are:

- New BASIC commands that supports files with variable record lengths up to 4095 Bytes long.
- Mix or match disk drives. Supports any track count from 18 to 80. Use

35, 40 or 77 track 5" mini disks drives or 8" disk drives, or any combination.

- A security boot-up for BASIC or machine code application programs. User never sees "DOS READY" or "READY" and is unable to "BREAK", clear screen, or issue any direct BASIC statement including "LIST".
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- Powerful chaining commands.
- Print Spooler.
- DFG function; simultaneous striking of the D, F and G keys will allow the user to enter a mini-DOS to perform some DOS commands without disturbing the resident program. (e.g. dir while in script.)

- Upward compatible with NEWDOS 2.1 and TRSDOS 2.3.

- Includes machine language Superzap/80 and all Apparat 2.1 utilities.
- Enter debug any time by pressing 123 keys. Also allows disk I/O.
- Diskette "Purge" command.
- Specifiable system options (limited system type commands).
- Increased directory capacity.
- Copy by file commands.

NEWDOS/80 with all of the NEWDOS + utility programs, many of which have been enhanced, is priced at just \$149.00 and is available at most TRS-80 dealers.

As with 2.1, NEWDOS/80 relies on the TRSDOS and Disk Basic Reference Manual published by Radio Shack. NEWDOS/80 documentation supports its enhancements and upgrades only.

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Those of you who liked us before will love us now. You will be amazed by DOSPLUS 3.4. It is jam-packed with powerful options—you get maximum features and reliability at an incredibly low price. And you get a company with the guts to back up its product with a lifetime warranty. So, if you're looking for the fastest, smoothest, easiest to use Disk operating system for your TRS-80, look no further. Become a believer! Get your hands on the new DOSPLUS 3.4 now!

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- ★ Most **EFFICIENT** Disk Basic Interpreter!  
A true Z-80 Basic. Others claim to have a NEW Basic, but their cumbersome archaic code cannot measure up to the speed and size of **SUPER-BASIC**. Seeing Is Believing!
- ★ Most **COMPATIBLE** Operating System!  
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**MULTIDOS** Model I Single Density LDOS Model I Single Density  
**MULTIDOS** Model I Double Density LDOS Model I Double Density  
**DOSPLUS** Model I Double Density NEWDOS 80 Model I Double Density  
**DOSPLUS** Model III Double Density NEWDOS 80 Model III Double Density  
**PHICOM DIBUDOS**

**UTILITY TO READ TRSDOS MODEL III, VERSION 1.3.**

Other Model I Single Density Operating Systems Must Be Altered (via System Utility) To Be Read By **MULTIDOS** Model III  
**MULTIDOS** Model I Doesn't Care! It Just Reads 'Em  
(Hardware Modification Required To Read Double Density Diskettes)

- ★ Most **PORTABILITY**  
**Mix & Match Model I and Model III MULTIDOS Diskettes.**

MOD I # 1-81 - \$79.95  
MOD III # 1-82 - \$79.95

DOSPLUS was the fastest

LDOS had “massive volume”

MULTIDOS was cheap



# The Ads Got More Creative



## "They shouldn't have touched my Dosplus"

"I only left my keyboard for a few minutes... when I returned, I found Stamitz from accounting and Miss Sashshay from the secretarial pool fondling my DOSPLUS 3.4. Now if I've told them once, I've told them a hundred times... use my coffee cup. Borrow my key to the employee lounge. Bend my paper clips but, leave my DOSPLUS alone!! Did they listen? Nooooo!! Well, I guess I lost my head. Both Stamitz and Sashshay are doing fine. They should be released from the hospital any day now. For me, it's an entirely different story." Signed,

0076697

Why DOSPLUS creates such fanatically touchy users is not so hard to understand. DOSPLUS 3.4 turns the TRS-80 into something altogether better.

DOSPLUS 3.4 lets your TRS-80 work a lot faster — 5-12 times faster with more accuracy, efficiency and dependability. DOSPLUS 3.4 also has a lot of features that users such as 0076697 find positively

endearing. For instance, the ability to read 40 track disks in 80 track drives, and an easy to read operating guide that makes using DOSPLUS as easy as... well, bending a paper clip.

So to increase productivity, to increase the speed and accuracy of your TRS-80. DOSPLUS 3.4 Only \$149.95! Still the best DOS for the cost!

PS. "Get your own DOSPLUS" 0076697

### DOSPLUS

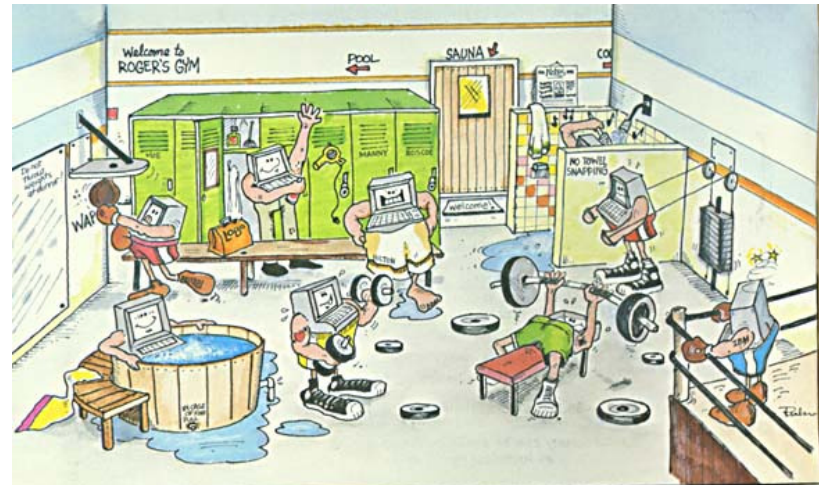
DOSPLUS first in quality! First in the industry!

Call Toll Free 1-800-327-8724 ext. 207



**MICRO SYSTEMS SOFTWARE, INC.**  
Specializing in the Tandy Line

5845 Funston Street, Hollywood, FL 33023  
Outside of Florida phone toll free 1-800-327-8724 ext. 207  
For Visa/MasterCard/C.O.D. Orders  
Toll free lines will accept orders only!  
For applications and technical information, call (305) 963-3390 or drop us a card. Dealers inquiries invited.



## LOBO'S NEW LDOS™ Puts muscle in your TRS-80\*

LOBO DRIVES' new LDOS™ Disk Operating System is loaded with outstanding features that will enable you to realize the full power and potential of your TRS-80. With LDOS, you can support up to eight drives (5 1/4 and 8-inch drives, double-sided drives, double-density drives, 80-track drives), including the new 8-inch and 5 1/4-inch Winchester fixed disk drives, in any combination.

Other LDOS muscle building features include: ISAM accessing techniques; keyboard typeahead; Graphic string packer; Dated files, Marked files; File transfer by class; Built-in

\* TRS-80 is a registered trademark of Radio Shack, a Tandy Company.



LOBO DRIVES, INT'L  
354 South Fairview Ave.  
Goleta, CA 93117  
(805) 683-1576

lower case display drivers;  
Non-breakable AUTO and DO  
commands, and many, many more.

LDOS is the perfect operating system to use with your LOBO DRIVES LX-50 or LX-80 expansion interface and disk drive subsystems. There's even an 800 number for instant service. To find out how you can put more muscle into your TRS-80, contact your nearest LOBO Drives dealer or call or write.

- LDOS is available:
- A. Operating System Diskette with Master Reference Manual \$139
  - B. Master Reference Manual Only \$25





# The Percom Doubler

Time to replace your  
“single-density system”

## A Short History of Disk Drives

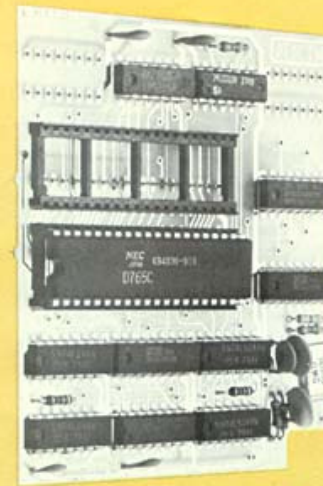
- single-sided, single-density
- double-sided, single-density
- “floppy” disks
- double-sided double-density
- 35 track, 40 track, 80 track



And with the Percom Doubler you got yet another DOS — DBLDOS

TRS-80® Model I Computer Owners . . .

## Store Up to 350 Kbytes on a 5" Disk



FORMATTED DISK STORAGE CAPACITY  
IN KBYTES



**The DOUBLER™.** It packs almost twice the data on a disk track as your single-density system. Depending on the type of drive, you can store up to **four** times more data on one side of a minidiskette than you can store using a standard Model I mini-disk drive.

- The DOUBLER™ reads, writes and formats **either** single- or double-density minidiskettes.
- Proprietary design allows you to continue to run TRSDOS®, NEWDOS®, Percom OS-80™ or other single-density software **without making any changes** to software or hardware. Switch to double-density operation at any convenient time.
- Includes DBLDOS™, a TRSDOS® compatible double-density disk operating system.

- **CONVERT** utility, on DBLDOS™ minidiskette, converts files and programs from single- to double-density or double- to single-density.
- The DOUBLER™ circuit card includes **high performance data separator, write precompensation** circuits for reliable disk read operations — even with 80-track drives.
- **Plug-in Installation** — The DOUBLER simply plugs into the disk controller socket of your Expansion Interface, requiring no strapping or trace cutting. Expansion Interface disk controller may be completely restored to original configuration by simply removing the DOUBLER™ and re-installing the original disk controller chip.

- Works with standard 35-, 40-, 77- and 80-track mini-disk drives rated for double-density operation.
- Introductory price, including DBLDOS™ and format conversion utility on minidiskette, **only \$219.95.**

### Mini-Disk Systems



track format

\$399.

More storage capacity, higher reliability — from Percom, the industry leader. One-, two- and three-drive configurations in either 40- or 77-track format. Fully burn-in. From only

### Double-Density Software

(On diskette — with instruction manual.)  
**OS-80™ Double-Density Disk Operating System** — This double-density upgrade version of Percom's acclaimed OS-80™ resides entirely in RAM — requiring only 7.5-Kbytes! A BASIC programmer's "dream operating system," even utilities are in BASIC.

**DOUBLEZAP-II/80** This program modifies Apparat's NEWDOS/80 to run either double- or single-density programs — even to run a mix of the two formats on one system!

**DOUBLEZAP-III/V** This program modifies Virtual Technology's VTOS 4.01+ to provide the same capability as DOUBLEZAP-II/80 provides for NEWDOS/80.

Call toll-free, 1-800-527-1592, for the address of your nearest authorized Percom dealer, or to order directly from Percom.



PERCOM DATA COMPANY, INC.  
211 N. KIRBY, GARLAND, TEXAS 75042  
(214) 272-3421

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† trademark of Apparat Company, Inc. ‡ trademark of Virtual Technology, Inc.

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PRICES DO NOT INCLUDE SHIPPING AND HANDLING CHARGES.

# Even Better ... Hard Drives

But look at the price!

A \$5000 add-on for a  
\$600 microcomputer.

And the DOS writers  
rushed to create new  
versions that would work  
with a hard drive.



**26 MEGABYTES**  
**\$4995.**

**DRIVE A HARD BARGAIN!**

Suddenly, S-100 microcomputer systems can easily handle 100 million bytes. Because Morrow Designs™ now offers the first 26 megabyte hard disk memory for S-100 systems—the DISCUS M26™ Hard Disk System.

It has 26 megabytes of useable memory (29 megabytes unformatted). And it's expandable to 104 megabytes.

The DISCUS M26™ system is delivered complete—a 26 megabyte hard disk drive, controller, cables and operating system—for just \$4995. Up to three additional drives can be added, \$4495 apiece.

The DISCUS M26™ system features the Shugart SA4008 Winchester-type sealed media hard disk drive, in a handsome metal cabinet with fan and power supply.

The single-board S-100 controller incorporates intelligence to supervise all data transfers, communicating with the CPU via three I/O ports (command, status, and data). The controller has the ability to generate interrupts at the completion of each command to increase system throughput. There is a 512 byte sector buffer on-board. And each sector can be individually write-protected for data base security.

The operating system furnished with DISCUS M26™ systems is the widely accepted CP/M\* 2.0.

See the biggest, most cost-efficient memory ever introduced for S-100 systems, now at your local computer shop. If unavailable locally, write Morrow Designs:™ 5221 Central Avenue, Richmond, CA 94804. Or call (415) 524-2101, weekdays 10-5 Pacific Time.

\*CP/M is a trademark of Digital Research.

Circle 32 on inquiry card.



**MORROW DESIGNS™**  
**Thinker Toys™**



# Corvus Hard Drives came with NewDOS/80-C

“Corvus delivers the most advanced combination of hardware and software to serious TRS-80 users.”

The price?  
Only **\$3750**

{ But few TRS-80 owners  
bought hard drives at this price }

## Your Ticket to Expanded TRS-80 Capability

Now, Corvus delivers the most advanced combination of hardware and software to serious TRS-80\* users. Corvus is the world's largest supplier of Winchester disk systems and local networks for microcomputers.

**The Hardware.** A compact 5-million byte 5¼-inch Winchester in an attractive package at a break-through price of \$3750. Combines hard disk speed with proven Winchester reliability. Expandable to 80 million bytes.

**The Software.** For TRS-80 Model I and Model III, Apparat's high performance NEWDOS/80-C, the most powerful TRS-80 operating system. For the Model II, TRSDOS\* in a new Corvus version, as well as OASIS and CP/M. Now your existing programs will run faster and more reliably than ever before. And, you'll enjoy 5 to 80 million bytes of mass storage without changing floppies.



**Networking.** Using the Corvus OMNINET™ or CONSTELLATION network and your computer's unmodified single user operating system, you can connect up to 64 TRS-80's in a state-of-the-art multi-processor network. Corvus networks allow all computers to share a large data base and expensive printer or modem peripherals, and communicate interactively over distances of thousands of feet.

Contact Corvus today for the full story.

★★ CORVUS SYSTEMS  
★ 2029 O'Toole Avenue  
★ San Jose, California 95131  
408/946-7700 TWX: 910-338-0226



# Radio Shack offered new models

**Radio Shack®**

**Presenting TRS-80 for 1982  
The Broadest Line of Microcomputers  
in the World—and all from Radio Shack**



1982 TRS-80 MICROCOMPUTER CATALOG NO. RSC-7

## **TRS-80 Family:**

Model III

Model 4

Model 4p

Model II

Model 16

Color Computer

Pocket Computer

Model 100

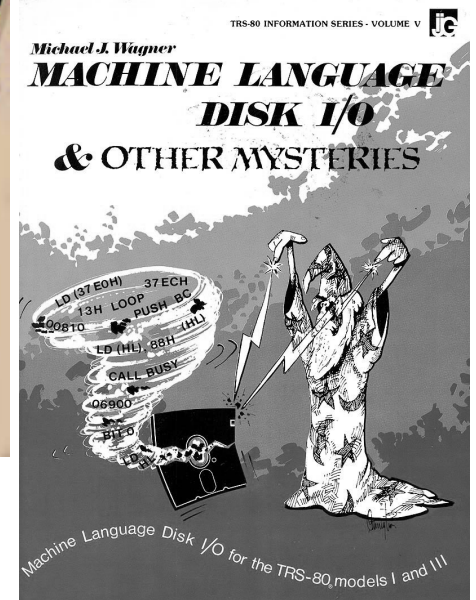
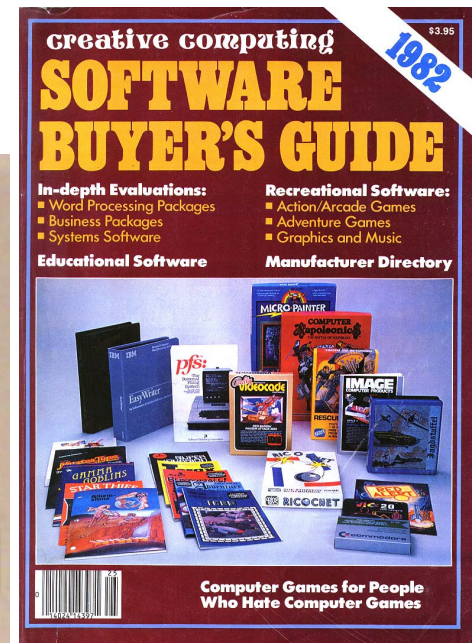
**The Model I was  
retired in 1981**



# Magazines bulged with ads!



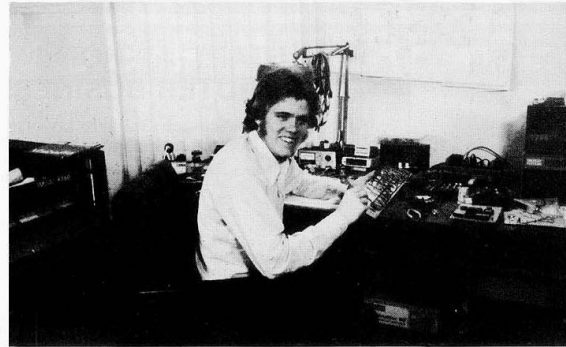
Magazines and specialty books and software guides were an important source of information for new computer users.





# Some of them were scams...

This ad, which appeared in 1979 in *Kilobaud*, was a complete fraud. A company calling itself World Power Systems promised products for your TRS-80 that were too good to be true. A scam artist and escaped convict who used names like “Colonel Winthrop” or “Colonel Whitney” was behind it, and he’d run this type of scam before.



**HELLO FELLOW  
COMPUTERIST...**

At this time I wish to introduce myself. I am PERRY POLLOCK, the owner, manufacturer and designer of the products advertised in this issue of this fine magazine. In the issues to come, I will be introducing more powerful interfaces for the various popular computers.

To take advantage of this opportunity, I would like to tell you a little about my beliefs, aims and policies. Starting out as a hobbyist, I realize your needs, concerns and most of all the requirements of a good, well designed and fairly priced interfaces for your computer. It is my goal to supply you with the most for your investment and the highest quality possible.

All the products are designed by me. They are first drawn out and logically analyzed. Then they are wire wrapped and tested. When I am satisfied that it functions well, then I will etch a sample printed circuit board, then and only then, will I commit the design to a mass production run.

All the parts used in our products are of the highest quality. The manuals are written so you can understand all the phases of construction and operation. How many times have we bought a product and it lacked for a good, understandable manual, or has it had so many flaws that we could swear that we were re-designing the product. ALL OF THIS IS IN THE PAST. These products are not offered unless they are right!!!!

Another one of my aims is to let you know who you are dealing with. How many times have we ordered a product and wondered who we were really dealing with. Then... if we had problems, how difficult was it to contact them? Because of all this, I have chosen to publish a picture of myself (I'm not vain, really) and a picture of my wife Korrine (pictured below). I am available 24 HOURS A DAY. I have a telephone answering service that will put your call through to me anytime day or night, or if you wish you can call me at home. (602) 886-5037. If you have a problem, question or just want to talk, give me a call.

I have many exciting new products under development. It will be an exciting year and I hope you will enjoy the interfaces designed for you and I. I know these interfaces have made my computer more enjoyable for me and hopefully for you.

Sincerely,

Perry and Korrine Pollock  
Your fellow computerists  
WORLD POWER SYSTEMS, INC.

P.S.: My guarantee... If you are not satisfied with the product, return it to your dealer or me for a full refund within 5 days of purchase.


W24



# We\* Go Into Business

\* And lots of other people

An innovative word processing system for TRS-80\* MOD I & MOD III



**Lazy Writer®**

Now accepting orders for MOD III version

© 1980 by David Welsh

It is time to put your word processing program away and use a Word Processing System

**MOD I - \$125**  
**MOD III - \$175**  
\*Requires 2 disks for conversion only.

\*Lazy Writer is the product of ABC Sales

**LAZY WRITER Takes on Scripsit® by Radio Shack® and Electric Pencil®**



Has all the things that other word processing programs should have. Easy to use, written all in machine code. / It permits the inserting and deleting by characters, words, sentences, and paragraphs / Page scrolling up and down / Search ahead of the cursor or behind the cursor for any character / The cursor can be moved up, down, left and right / You can seek top of file and bottom of file / Block move of text / Block delete of text / Search and replace or search delete / Unlimited insert (to the limit of your machines memory) / Permits use with lower case /

Has things that other programs should have, but don't. Upper and lower case output to your printer (if your printer accepts lower case) without having your computer modified. ON UPPER CASE ONLY MACHINES. This program marks the capital letters so you can see which letters are CAPITALS and which are not. / Will change all upper characters text to lower case or all lower case to upper. A SINGLE COMMAND / Will capitalize the first letter of all sentences and all proper nouns. WITH A SINGLE COMMAND / LOADS ANY ELECTRIC PENCIL FILE. ASCII SAVED FILES. EDIT/SAVE FILES or BASIC PROGRAMS SAVED ASCII / Permits installing special control characters in your text for your printers special features, like double wide or condensed print / Definable s, ten length and definable print length to 255 characters wide / Screen editing that is not final till your command. This means that you can edit your file on the screen and if you don't like how it reads you can cancel and leave it the way it was / You can append files (which means that you can put one file to the end of another file) / No lost characters at the end of the line, even for the fastest typist / A directory of all your files is available to the user without leaving the program / Saving programs to disk easy enough for the non-computer user / To save memory, not all the program modules are in memory at one time but are called from the disk as needed / You can set tab positions like on a typewriter / 10 CUSTOM COMMAND KEYS for the experienced user there is a command file that permits many special functions that are all user defined (not enough space for better explanation in ad, send for complete overview) / Program has HELP file that is a short review of the commands that are available /

**Standard Printer Module.** This printer module is provided for the user as a standard feature. Optional special printer routines for custom printer will be available in the near future. In this original release, it has the following printer drivers and will support the following printing devices: RS232, TRS232 and PARALLEL printer ports. You have the following format commands: Justifies Text, Centers Text, Centers Title, Line Spacing, Line Length from 3-255 characters and Set Margins / Also send any ASCII code to any printer from the text / Save formatted text to the disk for spooling later / Information for customer to load his own special printer driver / Printing can be stopped and started by the user at any time and then restarted where you left off / You can print entire file or just print to bottom of the page /

**Communication Package.** RS232 COMMUNICATION TERMINAL PROGRAM permits you to communicate with other computers. Transfer files from one machine to another. Permits dumping memory across the phone lines. Receive files from other TRS-80's and "Shake Hands" with larger computers. This is the complete system called LAZY WRITER. There is no package written for the TRS-80\* that is as comprehensive. This package is available for the TRS-80\* MOD I, 32K or larger with at least a single disk drive. List price is from

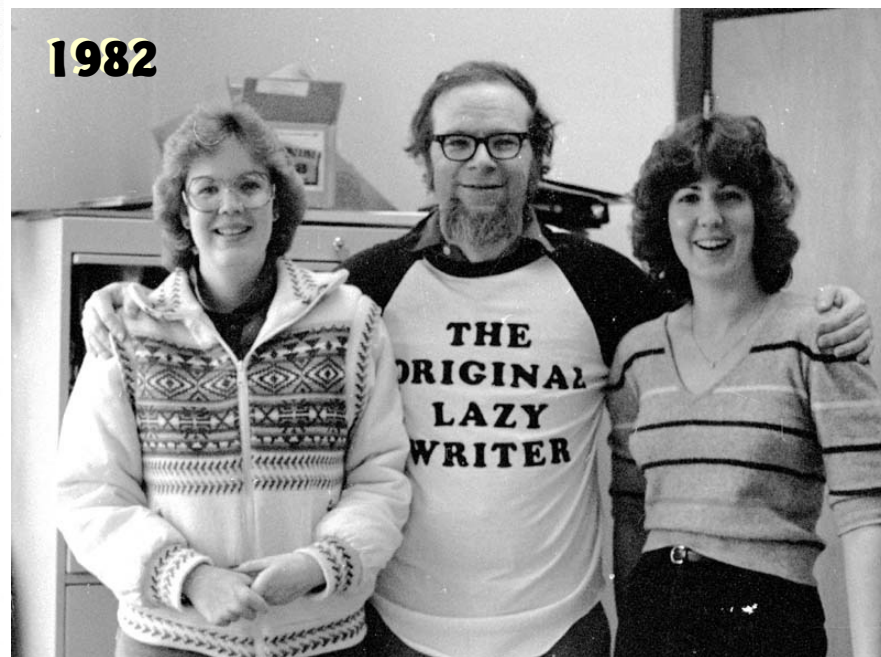
**\$125.00**

**Dealer inquiries invited**

**ssm SOFTWARE MARKETING INCORPORATED**  
c250 Middlebelt • Garden City, MI 48135  
(313) 425-4020

C.O.D. - Certified Check, M.O. or Cash only. Sorry, no C.O.D. over \$50.00. Most orders shipped next day. All orders must have shipping included. Please add 2% or \$2.50, whichever ever is higher for shipping. Michigan residents, please add 4% tax. Add \$2.00 with \$1.50 for C.O.D. Personal checks take 3 weeks to clear. Send \$1.00 for catalog - get \$2.00 credit on next order.



David Welsh, Lazy Writer creator, is shown with his staff, Valerie Pugh and Debbie Turchan, both college students

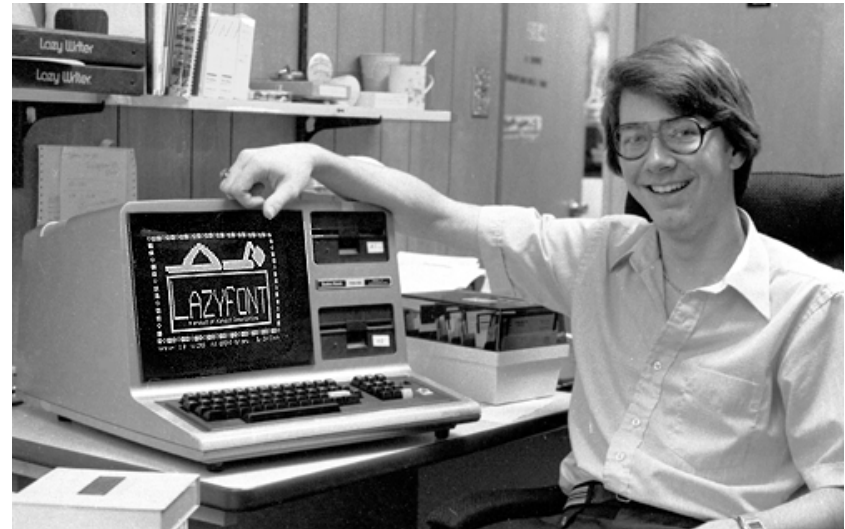
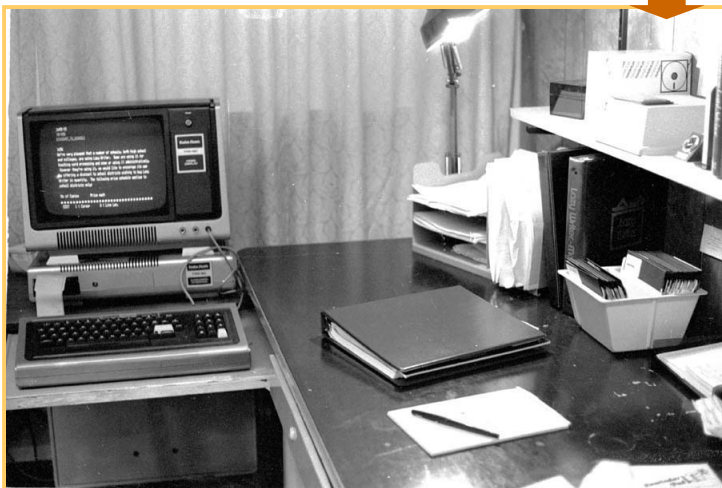
TRS-80 owners learned to program out of necessity, then found that other TRS-80 owners wanted the same software.



# The early 1980s....



Theresa worked in this office



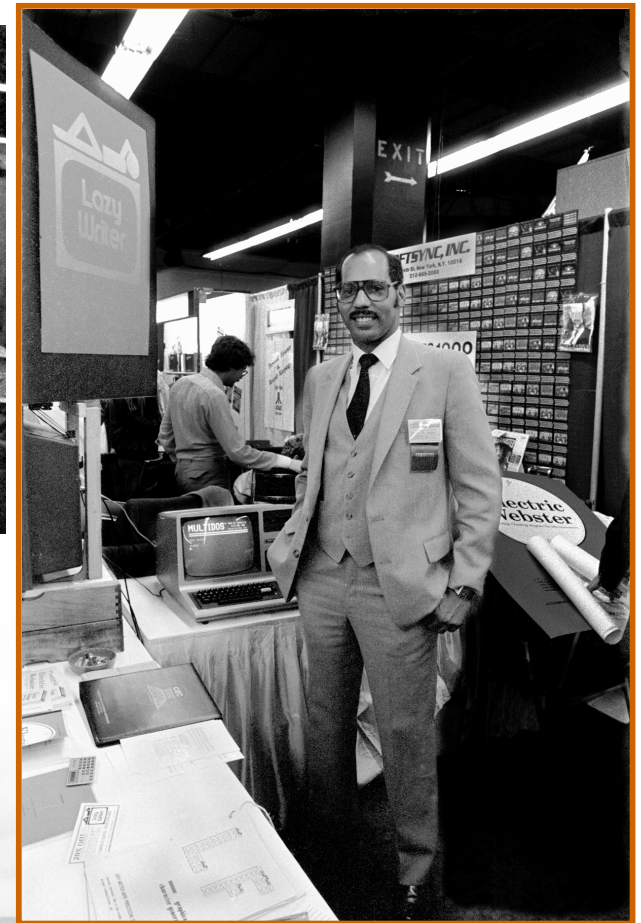
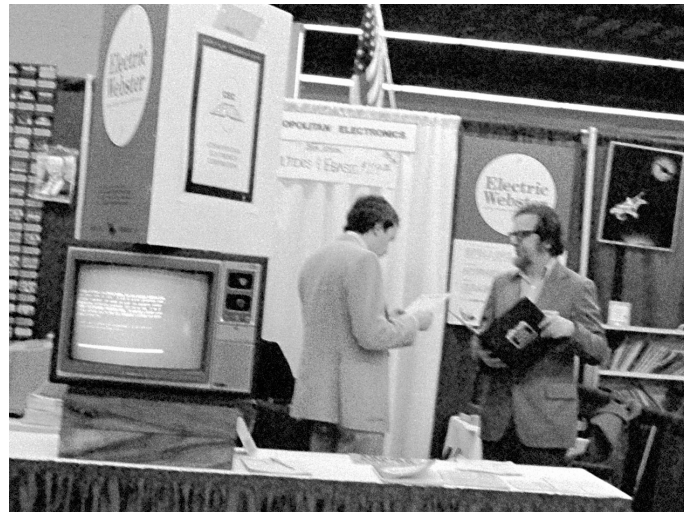
We hired Don Elmore, age 17, as a programmer

← We sponsored a seminar in Dearborn

...and here she is at a seminar sponsor's store in Chicago



# 1983 West Coast Computer Faire



David at  
the Faire  
and at the  
beach



Vern Hester,  
author of Multidos

We shared a booth  
with Multidos and  
Electric Webster



# Word Processing was Hot!

**SELECTRA-TERM™**

**Mates with TRS-80\*  
INSTANTLY!**



## Turn your TRS-80 into a complete word processing system.

Just hook up the cables and connectors supplied with your SELECTRA-TERM and you're ready to run. Input your text and type the single command: LPRINT. The SELECTRA-TERM automatically outputs clear, clean high fidelity copy.

Incredibly simple!

Brand new, \$1925\*  
Fully assembled and tested.  
Delivery five weeks.  
Many options available.  
\*115 VAC, 60 Hz Model.

Direct international sales inquiries to  
International Sales Division  
17648 Orma Drive  
Granada Hills, CA 91344 USA

Discounts Available to  
**EDUCATIONAL ACCOUNTS**  
Contact Delores Sun  
P. O. Box 8394 • Ann Arbor, MI 48105  
(313) 665-8514

COMPARE THIS  
DOT MATRIX OUTPUT  
with the  
SELECTRA-TERM high  
fidelity impact  
print!

SELECTRA-TERM can also be connected to the parallel port of PET • Apple II • Heath H8 • IMSAI • Cromemco • Alpha Microsystems • Space Byte • North Star Horizon • SWTP • Vector Graphic • Sol • Polymorphic • Digital Group • Ohio Scientific • Altair • Sorcerer • Xitan • Rex • KIM • Versatile CRT • EXORcisor

micro  
computer  
devices  
inc.



960 E. Orangethorpe, Bldg. F  
Anaheim, California 92801  
Telephone (714) 992-2270

\*TRS-80 is a product of Radio Shack

"Innovators to the Microcomputer Industry"

**The Paper Tiger.™**  
At \$995, why settle for less.



The Paper Tiger sets a new standard for low-cost impact printers. More capability. More versatility.

- Eight software-selectable character sizes.
- 80 and 132 column formats.
- Full forms control.
- DotPlot™ graphics option.
- Connects directly to Apple II, TRS-80, and other personal computers.

Plus, for more. For a free brochure, print sample, or the name of the Paper Tiger dealer nearest you, write or call: Integral Data Systems, 14 Tech Circle, Natick, Massachusetts 01760.  
**Call toll-free 800-343-6412.**  
In Massachusetts, Alaska, and Hawaii call (617) 237-7810.

Integral Data Systems, Inc.

Dot matrix printers – cheaper,  
but not “letter quality”

1978 – printer cost? \$1925

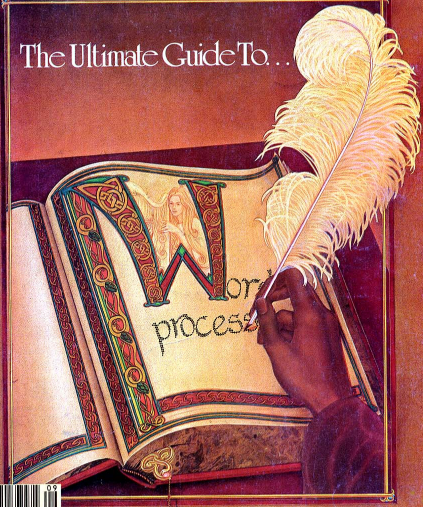
But printing was a major problem

Explore Color Graphics With The MX-80

80micro

A WATKINS GREEN PUBLICATION the magazine for TRS-80® users

The Ultimate Guide To...



The Colorful Computer Part II  
Model II Word Processors Compared

The IBM Selectric typewriter was state-of-the-art printing, and computer printers could not match its quality.





# Wayne Green's magazine empire

These magazine supported a cottage industry in add-on hardware and innovative software

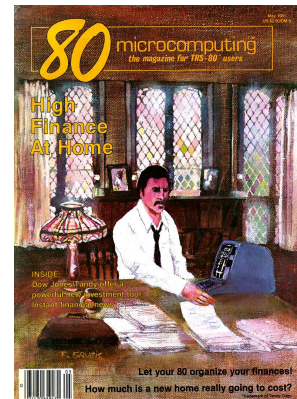
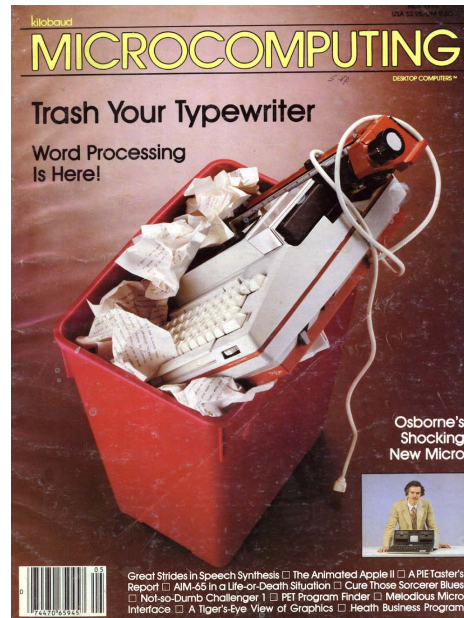


First there was *Kilobaud*

Then there was  
*Microcomputing*

“ It’s not the ‘trash-80’;  
it’s the ‘cash-80.’ ”

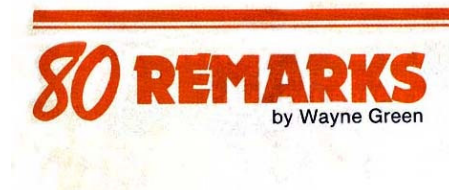
-- Wayne Green



*80 Microcomputing*



Finally, *80 Micro*

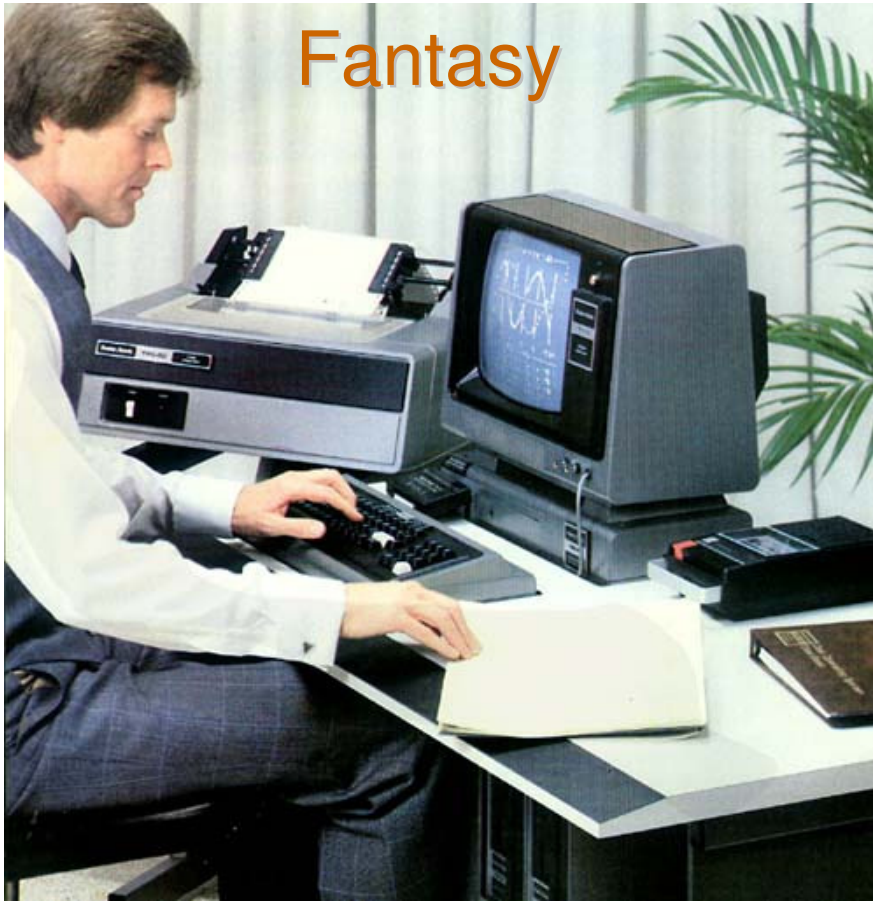


While he made money off his magazines, Wayne Green regularly lambasted Tandy and John Roach in his *80 Remarks* column.



# A Real Business Machine?

Fantasy



A Radio Shack illustration – Is this guy working with a Model I tape system? He's also got a printer with tractor feed. Huh?

Real life



Here's a happy Lazy Writer customer with a Model III and a daisy wheel printer.

(we took this picture for an ad)



# The 1980s – “The Robotics Age”

## But what happened to it ??



**TOMY** would bring you a drink



**Hubot** ↑  
every household would want one



Our daughter Amy at VCF 2000 with the lovable Heathkit Hero



Too silly?  
Too threatening?  
**OR** Too much work to program?



**RB5X**  
(or maybe R2D2?)



Remember  
Nolan Bushnell's  
Androbot Company?

They made **Topo** →  
And went broke trying to find customers

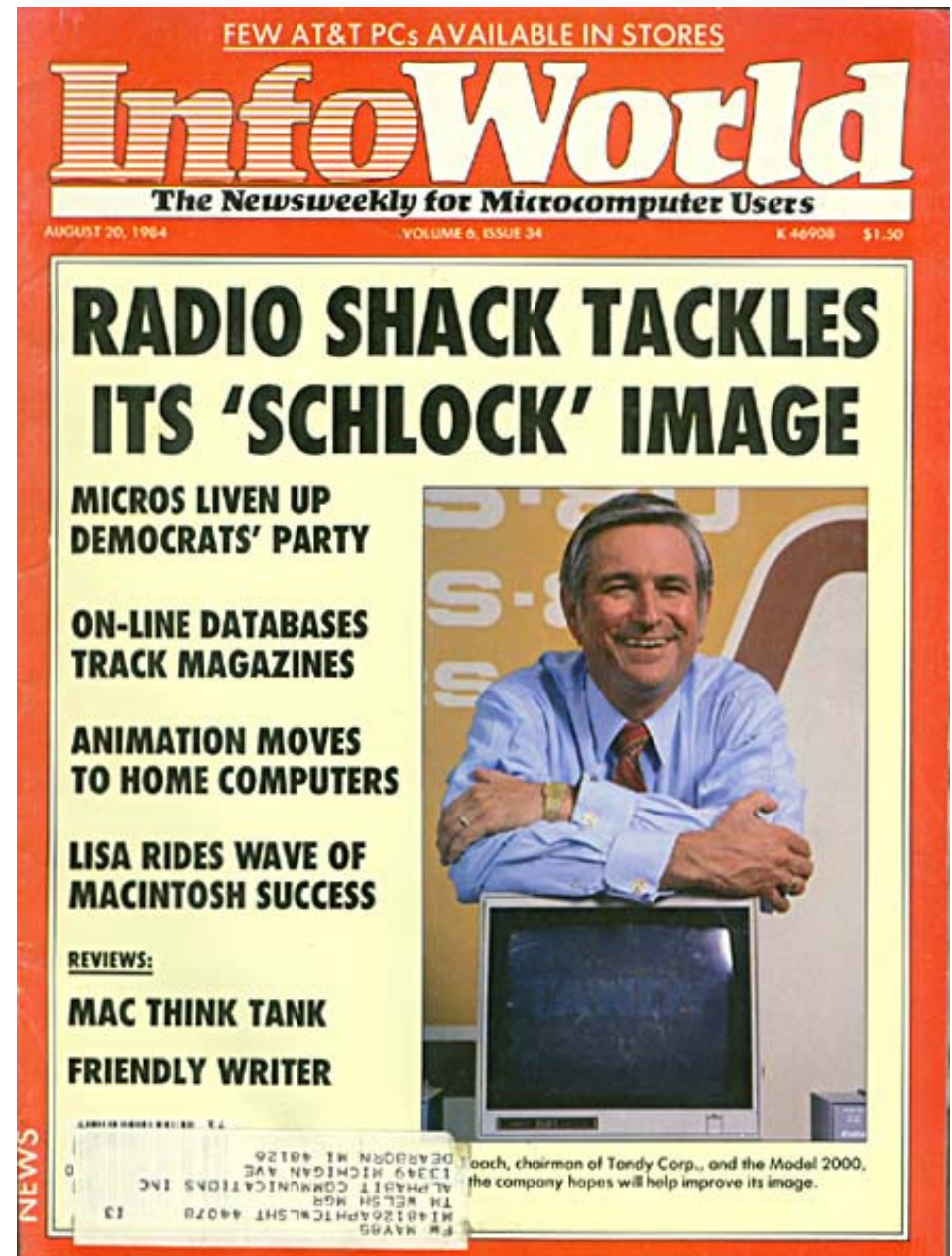


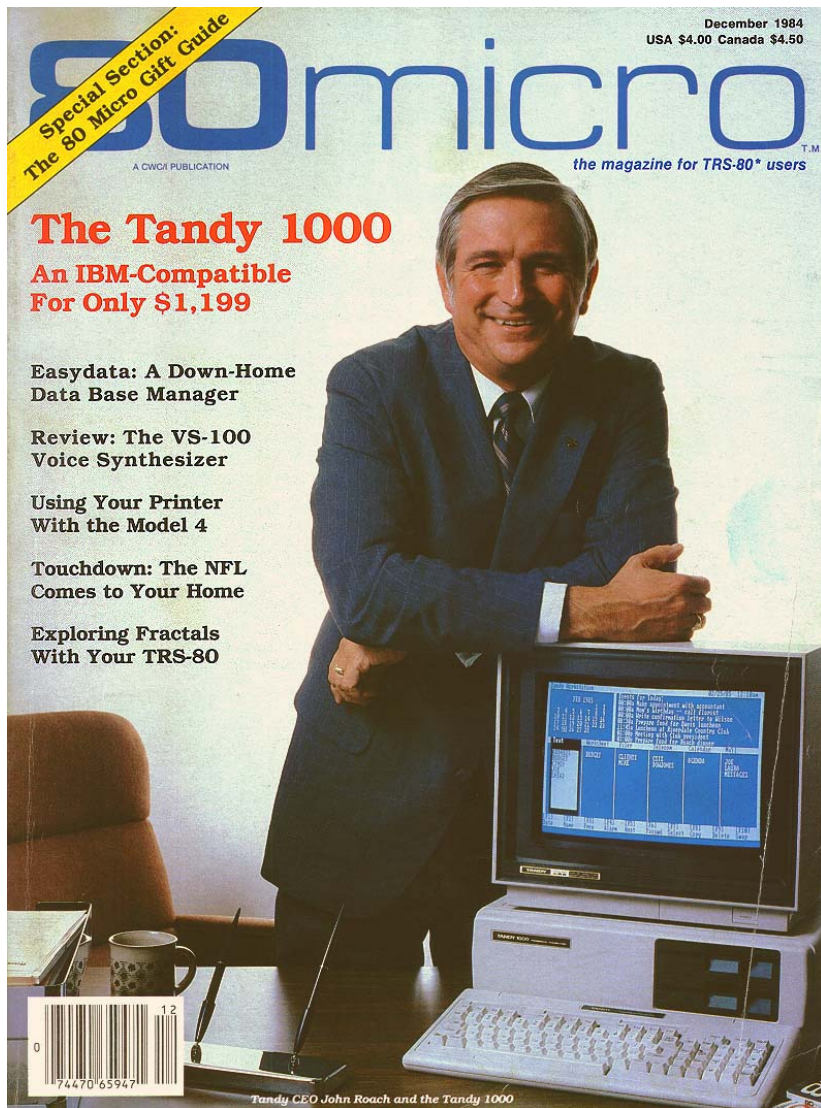


# Radio Shack had an image problem

Infoworld, August 20, 1984  
featured John Roach on the cover

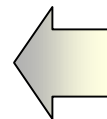
“The name Radio Shack tends to conjure up visions of diodes, vacuum tubes, and cheap Japanese transistor radios.”





## By 1984, Tandy Abandoned the TRS-80 Name

The Tandy 2000 was an expensive almost-compatible IBM look-alike that did not sell well



The Tandy 1000 was less expensive and found some customers who were ready for an upgrade from their Model III or Model 4.

And here's John Roach, on another magazine cover



# What Caused the Death of TRS-80?

- The IBM PC with its marketing clout?
- The lack of an upgrade path from the Z80 processor?
- Tandy's failure to capture the business market?
- Customers lured away to better products?

By 1985, the customers were disappearing. Tandy finally gave up making computers in 1993, selling their computer division to AST, and over 500 people lost their jobs.

Theresa's last office, with the Model 4p, the best TRS-80 Tandy ever made!  
(the baby was born February 1, 1985)



# Not everyone thought the IBM PC was a winner

“ I had a [TRS-80] machine that had a 10 or 15 MB hard drive, internal double-sided 80 track drives, speed kit, custom monitor... this machine was tricked out, a state-of-the-art computer, and we looked over at the IBM PC and we said, *this machine has no chance.*”

-- Mark Lautenschlager,  
commenting on his first impression of the IBM PC



# The TRS-80 led to many careers and is remembered with fondness

**W**ith the TRS-80, as soon as you pressed a key, the results were right there. While this is so commonplace these days, it was fascinating back then, and I became instantly addicted to my TRS-80, spending many hours writing code of no commercial value and little practical use.

-- Howard Brown

**W**OW! I remember my first program... of course it was the probably universal two-liner that everyone must write...

```
10 PRINT "Hello there!"
```

```
20 GOTO 10
```

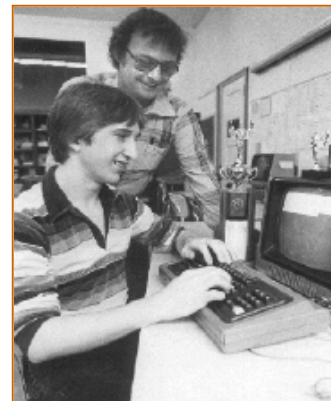
```
-- "Robert"
```

(from Ira Goldklang's TRS-80 website)



**I** would often go to the mall, and spend time playing with the TRS-80 in Radio Shack, until the salespeople would kick me out ...

--Pat Barren

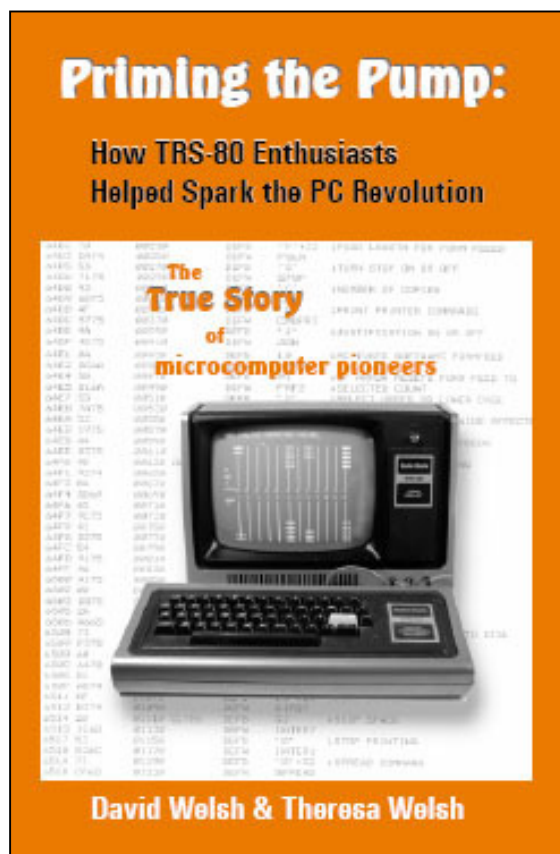


**I**n fact, I have an old picture of me in front of my TRS-80 after I won 2 different programming contests as a kid. So I have a BIG soft spot for the TRS-80!

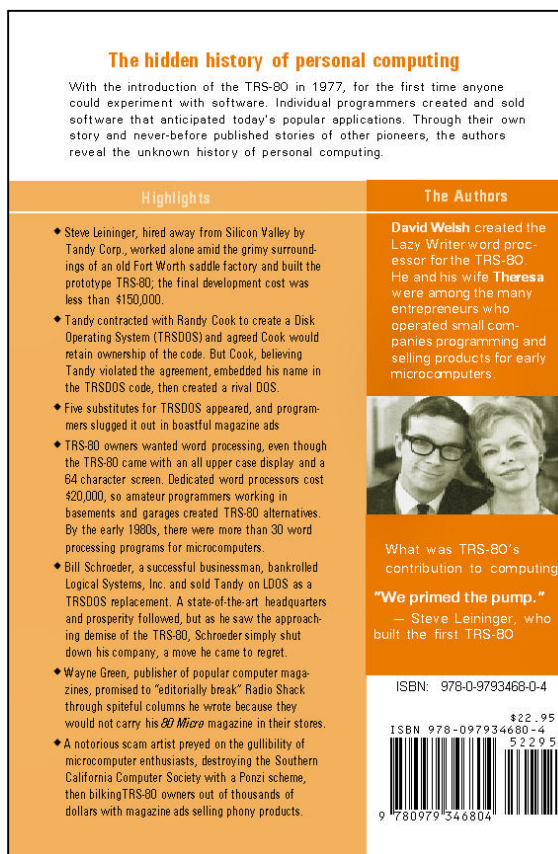
-- Eric J. Rothfus

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**Dr. Dobbs Journal, August 2007**

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**Don French, co-creator of the TRS-80**

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