

# 80 U.S.

THE TRS-80 USERS JOURNAL

Vol. V No. 3

\$3 per copy

March 1982

**Microcomputers  
and medicine merge**


**Generating laboratory  
reports with the TRS-80**





# NEWDOS/80 Version 2.0

## The Support Keeps Coming.



Apparat's newest disk operating system for the TRS-80<sup>®</sup>, NEWDOS/80 Version 2.0, has added many new enhancements and features to make your Model I or III computer more powerful. We've kept one thing the same. Our support.

Version 2.0 is our second upgrade of our original NEWDOS for the TRS-80. Each version builds and improves on the capabilities of the preceding versions. Just as important, Apparat's commitment to supporting our products makes a good product even better. By providing our customers with zaps on an ongoing basis, we're continually making NEWDOS/80 Version 2.0 a more powerful tool.

### Version 2.0...

#### High Performance DOS

NEWDOS/80 Version 2.0 builds even more performance into NEWDOS/80. The versatility and sophistication of Version 2.0 includes features like:

- Double density support on the Model I
- Enhanced compatibility between Model I and III
- Triples directory size
- Dynamically merge in basic (also allows merging of non ASC II format files)
- Selective variable clearing
- Can display basic listings page by page

- Automatic repeat function key
- Routing for peripheral handling
- Enhanced disassembler
- Command chaining
- Superzap to scan files
- Fast sort function in basic

These new features, added to the existing capabilities of NEWDOS/80, makes it one of the most powerful additions you can make to your system. And Apparat's commitment to support assures that you've purchased a superior product, both today and tomorrow. At just \$149.00 it could be the best investment you will make for your TRS-80.

If you're thinking about upgrading your system, call Apparat today. Dealer inquiries welcome.

## 303-741-1778

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ART 1981 - DON DIXON



# TRS-80\* COMPUTING EDITION

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The Percom Peripheral

35 cents

## Percom's DOUBLER II™ tolerates wide variations in media, drives

GARLAND, TEXAS — May 22, 1981 — Harold Mauch, president of Percom Data Company, announced here today that an improved version of the Company's innovative DOUBLER™ adapter, a double-density plug-in module for TRS-80\* Model I computers, is now available.

Reflecting design refinements based on both theoretical analyses and field testing, the DOUBLER II™, so named, permits even greater tolerance in variations among media and drives than the previous design.

Like the original DOUBLER, the DOUBLER II plugs into the drive controller IC socket of a TRS-80 Model I Expansion Interface and permits a user to run either single- or double-density diskettes on a Model I.

With a DOUBLER II installed, over four times more formatted data — as much as 364 Kbytes — can be stored on one side of a five-inch diskette than can be stored using a standard Tandy Model I drive system.

Moreover, a DOUBLER II equips a Model I with the hardware required to run Model III diskettes.

(Ed. Note: See "OS-80™: Bridging the TRS-80\* software compatibility gap" elsewhere on this page.)

The critical clock-data separation circuitry of the DOUBLER II is a proprietary design called a ROM-programmed digital phase-lock loop data separator.

According to Mauch, this design is more tolerant of differences from diskette to diskette and drive to drive, and also provides *immunity to performance degradation caused by circuit component aging*.



Percom DOUBLER II™

Mauch said "A DOUBLER II will operate just as reliably two years after it is installed as it will two days after installation."

The digital phase-lock loop also *eliminates the need for trimmer adjustments typical of analog phase-lock loop circuits*.

"You plug in a Percom DOUBLER II and then forget it," he said.

The DOUBLER II also features a refined Write Precompensation circuit that more effectively minimizes the phenomena of bit-and-peak-shifting, a reliability-impairing characteristic of magnetic data recording.

The DOUBLER II, which is fully software compatible with the previous DOUBLER, is supplied with DBLDOS™, a TRSDOS\*-compatible disk operating system.

The DOUBLER II sells for \$29.95, including the DBLDOS diskette.

~~\$29.95~~  
Now \$16.95!

## Circuit misapplication causes diskette read, format problems. High resolution key to reliable data separation

GARLAND, TEXAS — The Percom SEPARATOR™ does very well for the Radio Shack TRS-80\* Model I computer what the Tandy disk controller does poorly at best: *reliably separates clock and data signals during disk-read operations*.

Unreliable data-clock separation causes format verification failures and repeated read retries.

### CRC ERROR—TRACK LOCKED OUT

The problem is most severe on high-number (high-density) inner file tracks.

As reported earlier, the clock-data separation problem was traced by Percom to misapplication of the internal separator of the 1771 drive controller IC used in the Model I.

The Percom Separator substitutes a *high-resolution digital data separator circuit*, one which operates at 16 megahertz, for the low-resolution one-megahertz circuit of the Tandy design.

Separator circuits that operate at lower frequencies — for example, two- or four-

megahertz — were found by Percom to provide only marginally improved performance over the original Tandy circuit.

The Percom solution is a simple adapter that plugs into the drive controller of the Expansion Interface (EI).

**Not a kit** — some vendors supply an untested separator kit of resistors, ICs and other paraphernalia that may be installed by modifying the computer — the Percom SEPARATOR is a fully assembled, fully tested plug-in module.

Installation involves merely plugging the SEPARATOR into the Model I EI disk controller chip socket, and plugging the controller chip into a socket on the SEPARATOR.

The SEPARATOR, which sells for only \$29.95, may be purchased from authorized Percom retailers or ordered directly from the factory. The factory toll-free order number is 1-800-527-1222.

Ed. note: Opening the TRS-80 Expansion Interface may void the Tandy limited 90-day warranty.

The Percom DOUBLER II is available from authorized Percom retailers, or may be ordered direct from the factory. The factory toll-free order number is 1-800-527-1222.

Ed. note: Opening the TRS-80 Expansion Interface may void the Tandy limited 90-day warranty.

### All that glitters is not gold

## OS-80™ Bridging the TRS-80\* software compatibility gap

Compatibility between TRS-80\* Model I diskettes and the new Model III is about as genuine as a gold-plated lead Krugerrand.

True, Model I TRSDOS\* diskettes can be read on a Model III. But first they must be converted and re-recorded for Model III operation.

And you *cannot write to a Model I TRSDOS\* diskette*. Not with a Model III. You cannot add a file. Delete a file. Or in any way modify a Model I TRSDOS diskette with a Model III computer.

Furthermore, your converted TRSDOS diskettes cannot be converted *back* for Model I operation.

TRSDOS is a one-way street. And there's no retreating. A point to consider before switching the company's payroll to your new Model III.

Real software compatibility should allow the *direct, immediate* interchangeability of Model I and Model III diskettes. No read-only limitations, no conversion re-recording steps and no chance to be left high and dry with Model III diskettes that can't be run on a Model I.

What's the answer? The answer is Percom's OS-80™ family of TRS-80 disk operating systems.

OS-80 programs allow *direct, immediate* interchangeability of Model I and Model III diskettes.

You can run Model I single-density diskettes on a Model III: install Percom's plug-in DOUBLER™ adapter in your Model I, and you can run double-density Model III diskettes on a Model I.

There's no conversion, no re-recording. Slip an OS-80 diskette out of your Model I and insert it directly in a Model III.

And vice-versa. Just have the correct OS-80 disk operating system — OS-80, OS-80D or OS-80/III — in each computer.

Moreover, with OS-80 systems, you can add, delete, and update files. You can read *and write* diskettes regardless of the system of origin.

OS-80 is the original Percom TRS-80 DOS for BASIC programmers.

Even OS-80 utilities are written in BASIC. OS-80 is the Percom system about which a user wrote, in Creative Computing magazine, "...the best \$30.00 you will ever spend."<sup>2</sup>

Requiring only seven Kbytes of memory, OS-80 disk operating systems reside completely in RAM. There's no need to dedicate a drive exclusively for a system diskette.

And, unlike TRSDOS, you *can* work at the track sector level, defining and controlling data formats — in BASIC — to create simple or complex data structures that execute more quickly than TRSDOS files.

The Percom OS-80 DOS supports single-density operation of the Model I computer — price is \$29.95; the OS-80D supports double-density operation of Model I computers equipped with a DOUBLER or DOUBLER II, and OS-80/III — for the Model III of course — supports both single- and double-density operation. OS-80D and OS-80/III each sell for \$49.95.

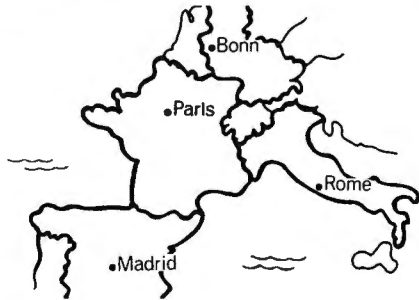
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# LANGUAGE TEACHER

By Cindy and Andrew Bartorillo

Learn the basics of foreign language with your TRS-80\* model I or III. Choose among French, Italian, German and Spanish, and do the essential vocabulary study in a manner more satisfying and interesting than the traditional format.

An enhanced skill-and-drill form of computer assisted instruction, each LANGUAGE TEACHER offers hundreds of word combinations, verb conjugations and phrases. You choose the topic of the drill and whether you wish foreign language-to-English or English-to-foreign language (e.g., phrases, Spanish-to-English). There is an option for having multiple-choice answers and for being retested on missed items. The program provides a running percentage of correct answers.

Full printer capability and a great deal of "human engineering" further enhance the programs. Teachers will appreciate the ample documentation and the ability to get printouts of quizzes.

Acorn publishes several foreign languages in the LANGUAGE TEACHER series. Currently available are French, Italian, German I & II, and Spanish I & II. Each program is \$29.95 on disk and requires a TRS-80\* model I or III with a minimum of 32K RAM and one disk drive.

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By Chuck Acree

A comprehensive genealogical program that lets you set up a data base of information about your ancestors. It will display/print a complete "pedigree" or a 3-generation ancestral chart. As a novelty, the program will display a U.S. migration map.

Information access is virtually unlimited, with full search capabilities on any key field. 16K RAM has space for 45-55 records. A 32K cassette system will hold about 175; a 48K, about 300. In all cases, a disk system will hold about 75 less. Available for TRS-80\* models I and III on tape or disk for just \$29.95.

## MONEY MANAGER



By Andrew P. Bartorillo

A complete management tool for the home budget, it accurately keeps track of your checkbook and provides an easy method of budget allocation.

You can store information on up to 100 entries per month (250 with 48K), specify automatic withdrawals, keep records of tax-deductibles, and record expenses by user-defined category. You can even divide charge account payments into multiple categories. Lineprinter output is supported.

Requires TRS-80\* model I or III with a minimum of 32K and one disk drive. Order now for only \$39.95.

## LOST COLONY

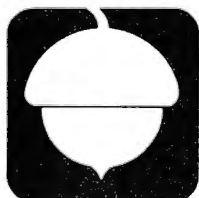


By David Feitelberg

It's the world's first deep space colony and you are the economic manager. A remarkable simulation, LOST COLONY arms you with maps and charts as tools for resource management. You assign human and robotic labor, explore new land, and set production quotas. At the same time you must determine equitable pay scales and taxes.

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Computer fairs are interesting events. No matter where you are located, there will probably be one within driving distance this year. The one we usually attend is the West Coast Computer Fair in San Francisco. This year it will take place Friday through Sunday, March 19-21.

The exhibitors start arriving the day before and the exhibition hall is a flurry of activity. Someone is always looking for an extension cord or a double plug. At this point, the hall usually looks a mess. As if by magic, all is in order by opening time the next morning, and the same people you saw putting up displays in their blue jeans on Thursday are now decked out in their finest, waiting for customers.

Every manufacturer, dealer or distributor eventually makes it to a fair. It is the place to display new products or services, see what the competition is doing, listen to speakers on various computer-related subjects and watch the presentation of assorted awards.

There is a decided difference between the crowds of attendees on Friday and the rest of the weekend. Friday finds the aisles packed with educators, business people and representatives of the various electronic companies. In many cases, companies will pay employees to attend the fair to keep up with the latest. It is a quiet crowd with serious questions.

On Saturday and Sunday, the crowd is larger and made up more of families and children. The noise level goes up a few decibels. Games with sound and music demonstrations abound. Almost everyone walks around with loads of free literature under their arm.

Most companies who exhibit at the fair will have a "fair special" in which they knock a few bucks off the regular price if you buy it now. It's a great place to shop — but be sure to wear comfortable shoes. Walking those aisles can become tiresome and there are always enough exhibits to keep you walking all day long.

Exhibitors find these three days to be very exhausting. Moving in, setting up, answering a million questions and then packing up to go home on Sunday evening can be a hassle. The San Francisco fair sets aside the hours from 9 a.m. to 11 a.m. on Sunday just for exhibitors to meet one another. It's a real nice touch, because as an exhibitor, you simply do not have the time during regular hours to visit with your counterparts in the industry.

As one who attends the fair, you benefit by seeing in real life all those marvels you read about in the magazines and advertisements. You may even make a good deal on one or two of them.

As an exhibitor, you have the opportunity to meet, face to face, the people you may have been dealing with by written or telephone communication all year long. You also make many new contacts and get all sorts of good ideas for the coming year.

As either exhibitor or observer, a visit to a computer fair can be a very rewarding experience. We highly recommend it.

**Mike**



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**The Cover**

The cover for this issue, which features the microcomputer and medicine, is the original artwork of Thomas Scott Nelson, of Upland, California.

**SUBSCRIPTION PRICE** in the United States is \$16 for one year, \$31 for two years and \$45 for three years.

**Canada & Mexico:** \$25 per year, no two or three year subscriptions are offered.  
**All other:** \$30 per year via surface mail, \$72 per year via airmail. Two and three year subscriptions are not offered.

**ISSN Publication # 0199-1035**

The 80-U.S. Journal is published monthly by 80-Northwest Publishing Inc., 3838 South Warner Street, Tacoma, Washington 98409-4698

**PRINTED IN THE UNITED STATES OF AMERICA**

**POSTMASTER:** Please send change of address form 3579 to 80-U.S. Journal, 5615 West Cermak Road, Cicero, Illinois 60650

**Second Class Postage PAID at Tacoma, Washington and at additional entry point.**

# 80 U.S.

## THE TRS-80 USERS JOURNAL

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**Volume V. Number 3**

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I have just received the latest update from Exador Software Solutions, 265 Hollyberry Court, Roswell, Georgia 30076, on its Maxi-Manager data system. It is the second within one year.

Dale Kubler is due congratulations for his commitment to quality at an affordable price. I also think that this update should be noted in your magazine, if not reviewed in detail.

Please note I have absolutely nothing whatsoever to do with his company, other than the fact that I have purchased his product.

Sidney L. Bloom  
Frederick, Maryland

While checking out the expanded Z-Subs of the January 1982 issue of *80-U.S.*, I came upon a minor error. If, when attempting to use the subroutine on line 41, the line number is 0, an illegal function call error is generated. If the offending line number 115 is changed to the following it will work:

```
115 Z = LEN(ZT$):IFZT = 0 THEN  
PZ = ABS (64*ZL-Z/2-32) ELSE PZ  
= ABS (64*(ZL-1)+ZT-1)
```

Hope this helps some of your many satisfied readers including myself.

John D. Chambers, M.D.  
Anacortes, Washington

Your January (1982) editorial is a cop out.

In the first place how can I convince my friends that micros are great for mailing labels compared to doing them by the many manual techniques still around, when the first thing that happens is that our editor friend goes and upgrades to a mainframe!

I have read the editorial twice and still do not understand why you abandoned your micro for your mailing list work. Why do you not publish your cost figures to prove that the IBM 370 route is the way to go? Are you sure that you just did

not cop out — rather than admit that your book is successful enough now that you can afford to and that you just got tired of the administrative burden of doing it in house?

You said you do not run a second shift and could not run a 15 hour label print out? Why do you have to print the labels in one day? You only print them once a month? Why not initialize your mailing list program twice, once with A-M and once with N-Z? Or if this has problems, why not use two microcomputers side-by-side? I do it all the time. One is in Electric Pencil and one is in BASIC, so I can get information from one for the other without having to have disk waits and rebooting, etc. It beats two time share terminals as regards speed and versatility and personalized programs. (Data processing really hates to have mucking around in the programming mode when the mini is opening and closing files like crazy...)

If this letter is confused, it is because your editorial leaves me confused. I have both a mini and many micros and my main job seems to be to keep from overloading the mini so it can do what it does best — day in and day out sales and accounting. I admit that it is great for labels too but it can be a burden to the regular routine. Hence, please consider this a serious letter.

Henry Lee, Ph.D.  
Lee Pharmaceuticals  
South El Monte, California

*(We do everything we possibly can with the microcomputers at 80-U.S. We have seven of them, all TRS-80, the largest being the 4-drive Model II. Back when there was only the Model I we had one zip code per 5-inch diskette. Some of the zip codes were further fragmented, especially the 0 and 9 zips. Eventually, we ended up with four diskettes for the 9 zip code alone and it was filling up fast. To update the file, the mail had to be presorted by hand into stacks for each diskette. Address changes from one zip to another were especially prone to being missed or put onto the wrong diskette. The*

*mailing labels for the magazine are printed out 4-across on standard 15-inch computer paper (Cheshire labels). These are applied by a machine at the bindery, and for the sake of being bundled properly for second class mailing, must be in continuous zip code order from 00000 to 99999. Our first transition was from the Model I with about 18 diskettes to the Model II with four diskettes acting as a single file. It held 10,000 records and worked beautifully until we reached the limit. It gave us a zone breakdown for the second class mailing from each issue and kept track of our deferred subscription income.*

*Having gone through this twice already has taught us that it can create a mess. At best, going to two computers or a hard disk simply puts off the problem for a little while, after which we would have to face it again. Each time there is a transition, it gets harder to handle because there are more names and addresses to transfer to the new system.*

*A mini would not solve the problem. Actually, it would, but the business decision of being a magazine publisher or a subscription fulfillment house would have to be made. We decided to stay in the publishing business. Without even considering the cost of a mini, or the software to run on it, or the space and possibly air-conditioning required to run it, the cost of the person to run it alone would be more than that charged by a fulfillment agent — and we don't give them two weeks vacation per year and pay their social security taxes.*

*Although we expect the micros will continue to serve us as well in the future as they have in the past, we certainly expect our subscriber lists to be well beyond the capacity of even a mini in the very near future. So we simply planned ahead. — Mike)*

*80-U.S. Journal has proved to be "must" reading for this novice TRS-80 Model III user. Time being my most valuable asset, I must learn what I can in those moments stolen from other tasks. Your magazine*



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EXIT:	!
WORD:	(Your error)
RESPONSE:	

**EASY TO USE:** Prepare your text on any Z-80 based micro-computer, using any of a number of popular word processing programs. When you are finished, enter the appropriate command, and ELECTRIC WEBSTER proofreads your document, displaying misspellings and typos on the screen. Then correcting ELECTRIC WEBSTER can display each error separately, requesting you to enter the correct spelling for each. You are also given the option of displaying errors in context or adding words to ELECTRIC WEBSTER's 50,000 word vocabulary. If you do not know the correct spelling you may also ask ELECTRIC WEBSTER to look it up for you and display the dictionary. Finally, ELECTRIC WEBSTER corrects your document. All in less than a minute.

**LOW PRICES:** Standard MICROPROOF is available for \$69.50 (TRS-80). Standard ELECTRIC WEBSTER is available for either \$89.50 (TRS-80 Model I or III, Apple) or \$149.50 (CP/M, TRS-80 Model II and all others). The optional correcting feature can be added at any time for an additional \$60. Correction feature can be ordered with patch to integrate with your word processing software. For each patch, optional Grammatical Checking feature, or optional Hyphenation feature, add \$35. (Integration patch not necessary for Wordstar.<sup>TM</sup>)

**SPEED** is the single most important factor in a dictionary program. All dictionary programs will find your potential errors but if the program is too slow, you are not likely to use it. ELECTRIC WEBSTER's speed is outstanding. It can proofread a several page letter in 20 seconds.

**ELECTRIC WEBSTER's FULL 50,000 WORD VOCABULARY** saves you time and allows you greater confidence in the lists of potential errors that ELECTRIC WEBSTER identifies. The mini-dictionary programs, with their 10,000 and 20,000 word vocabularies, have many correctly spelled words omitted from their vocabularies. Consequently, they identify as potential "errors" many words that are actually spelled correctly; five to ten times as many such words as does ELECTRIC WEBSTER. So, when you use ELECTRIC WEBSTER, you will have far fewer extra words to evaluate, a major time savings. There will be less need to look up words in order to verify that they are in fact spelled correctly. The extra 30,000 words in ELECTRIC WEBSTER's vocabulary assures you confidence in the error lists that Electric Webster generates.

## HERE'S WHAT THE REVIEWERS HAVE TO SAY ABOUT MICROPROOF:

"I have already found that the use of (MICROPROOF) has greatly enhanced the quality of my letters and reports. This is a very useful product and should be obtained by anyone who uses a word processor."

Michael Tannenbaum, CPA  
80 Microcomputing, August 1981

"The summary review of this program? One word — Excellent. I highly recommend it for anyone using a word processor for any need — articles, manuals, reports, and even letters of substantial length."

A. A. Wicks - Program Previews  
Computronics, September 1981

In a comparative review of proofreading programs (with smaller dictionaries), MICROPROOF was found to be considerably faster than all the others, when tested against a 400 word sample document.

Phillip Lemmons  
BYTE Magazine, November 1981

"(MICROPROOF) operates with good speed and efficiency. A 1500 word document took 26 seconds to load, process, and proof when the program was run on a TRS-80 Model II under CP/M."

"Once the program is integrated, it is very friendly and any person able to use a word processing program can master it in moments."

Frank Derfler  
Info-World, January 1982

See your local microcomputer dealer or write to:

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has filled this need admirably.

Owning an Epson MX-80 meant that Larry Krengel's article on this great printer was the first thing I read in my just arrived January issue. Imagine my distress to read about Dr. David A. Lien's "MX-80 Users Manual" and then vainly search for a source for this manual. Does Mr. Krengel want everyone to go through the week of frustration and phone calls in order to find it? Spare me, please.

**Larry E. Madole**  
Houston, Texas

*(To order the book, get in touch with the Epson dealer nearest you. We understand that it comes with the printer when you buy it. If that doesn't work, get in touch with the publishers of the book: CompuSoft Publishing, 1050 Pioneer Way, Suite E., El Cajon, California 92020 — Ed.)*

Your readers, especially Lowell Simons (see 80-U.S. Nov/Dec 81, page 6) of Littleton, Colorado, may be interested in knowing that *Robotics Age*, Robotics Publishing Corp. 10049 Commerce Avenue, Tujunga, California 91042, published a "Homebuilt computer controlled lathe" in a "how to" article in their May/June 1981 issue. Their back issues are \$3.00 plus \$1.25 postage.

**James A. Lisowski**  
Milwaukee, Wisconsin

...According to the U.S. Government, there are nearly 20 million people in this country with hearing disabilities, of which only 2 million are considered "deaf". However, even people with moderate hearing losses have difficulty with the telephone, and the market for a device or program which allows the use of a personal computer as a TTY device would appear to be a large one.

By the way, my TRS-80 is 48K, with 2 disks and printer. I am a professional computer systems consultant with over 22 years in the data processing business, so I could

write the necessary programs, if I could get the basic information. But like many other programmers, I am not interested in re-inventing the wheel; if there are products available that already do the job, I would rather buy what I need "ready-made".

Hoping that you publish this letter or otherwise respond to my request, I am, sincerely,

**Dick Burkhalter**  
2203 West Olive Avenue  
Burbank, California 91506

*(We don't have a suitable answer, but have you tried the advertisers in 73 Magazine? That magazine is principally for Hams, and deals in part with these problems. For information about that magazine, phone 1-800-258-5473. — Ed.)*

What's all this fuss I keep reading about keyboard debounce (e.g., your Nov/Dec 81 issue)? I thought everyone was familiar by now with the simple procedure for keyboard debouncing which takes only five minutes, requires no hardware or software modification, and is 100% effective. I used this procedure just once two years ago and haven't experienced a single duplicate character yet!

Simply remove the plastic keys from the keyboard with a paper clip and then get out that can of WD-40 or its equivalent. Spray just a dab on each key contact, replace the plastic keys and you're set. It's been so long that I've almost forgotten what it's like to receive up to seven extra characters with just one keystroke.

Please print this letter so that this matter can be laid to rest once and for all.

**Eric Wainwright**  
Aurora, Colorado

I enjoy 80-U.S. Since my subscription just started recently, I have read only two issues. Yesterday I decided to type in a program *Sundance*, from the Jul/Aug 81 issue. I spent several frustrating hours trying to figure

out why after I would run the program, lines would no longer list correctly past line 1000. (I am using disk on a Model I, so I made the changes indicated.) And why after I tried to list, then I would get missing line errors upon trying to run it again.

I finally found the problem in the sound routine in line 780. This routine pokes one byte of data into location 7F42H whether one is using the 16K tape version or the 32K disk version. Using the disk version, location 7F42H just happens to be smack in the middle of program space. What happens is that a binary zero gets written to this location after running the program. If anyone else has had this problem and saved the program to disk after running it, the damage is done. Lines after about 1000 will not list right and cannot be modified. BASIC thinks the program ends at the zero byte. If you have SUPERZAP or something similar, you can go into the disk file and change the offending byte to something besides zero. Then load the program into BASIC and correct the line around 1000 which should have an error in it now. Or you can just load the program back into memory, using PEEK find the offending byte, POKE something besides zero into it, and then save the program back on disk after correcting the line you poked into and after correcting line 780 as indicated below.

Here is how to fix the error that caused the problem in the first place. In line 780 there are three occurrences of 66,127. These must all be changed to 11,176 for 32K disk. This will move the one byte storage used by the sound routine up to just following the sound routine as was intended in the first place.

*Sundance* is a clever game. I suspect it would be pretty challenging with one of the 50% or 100% speed up modifications.

Hope this fix will help others who have had trouble with *Sundance*.

**David L. Johnson**  
Prince George, Virginia





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You are in command of the attack ship Valkyrie. Your mission is to battle your way against giant, laser-welding war birds and capture the island Fugloy. You must explore Fugloy's mountainous terrain and choose the proper mountain passes in order to reach the ten island castles. Definitely one of the finest graphics-based adventures for the TRS-80 Model I & III. Both versions include sound.

Cat. No. 3346 Model I & III, cass., 16K

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Cat. No. 3347 Model I & III, disk, 32K

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## THE CUSTOM TRS-80 & OTHER MYSTERIES

The book for TRS-80 owners who want to build it themselves! Projects include high-resolution graphics, music making & synthesizer control, real time clock, and more!

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### Estate planning software

Professional Data Corp., 6449 Goldbranch Road, Columbia, SC 29206, announces new Estate planning software for the TRS-80 Models I, II and III. Written by an estate planning attorney for use in a law office, accountant's office, life insurance agency or bank trust department, "Estax 81" will project estate taxes for a husband and wife under the new Economic REcovery Tax Act of 1981 for eight different marital deduction arrangements, completing all computations in less than 60 seconds. At least one disk drive, TRSDOS and 48K of RAM is required. Price is \$295.00. An operations manual is provided.

Circle #130

### New word games

Two new word games have been introduced by Shirley Software. They are mind boggling, brain-testers, new and different. They may be played by one person for high score or may be played opposite an opponent. The games are available on tape for TRS-80 Models I and III at \$9.95 each, plus \$1.50 postage. For further information contact Shirley Software, PO Box 417, Old Greenwich, CT 06870

Circle #131

### New diskette directory

Donald Fielding has announced the introduction of an advanced disk directory catalog system. Wildcat reads the disk directory directly from the diskette itself and includes the first line remark of all BASIC, Scripsit, Pencil and EDTASM type files. It also appends the first 50 characters of any data or other ASCII file. Four versions are available for the TRS-80 Model I, 48K, with at least two 5 inch drives and these operating systems: TRSDOS 2.3 35 track, NEWDOS 2.1 35 track, NEWDOS 80 version 1 single or zapped for double density up to 80 tracks and directories from 2 to 6 grans, NEWDOS 80 version 2 single or double density up to 160 track 1 or 2 sided and directories from 2 to 6 grans. Wildcat is available on diskette for \$39.95 plus \$2 shipping and handling (specify DOS) from Donald Fielding, 2207 N.W. 61st Place, Margate, FL 33063 (305) 972-6744

Circle #126

### MTI Hard disk

MTI, a manufacturer of Radio Shack compatible computer systems, announced the availability of a 5 and 7.5 Mb Winchester hard disk system for use with any MTI Model III plus series computer

system. The system has been designed to operate with the Micro Systems hard disk operating system software featuring full compatibility with TRSDOS and other DOS Plus products. The Model III plus/Winchester unitized desktop system (Model 1516) sells for \$5399. The Micro Systems DOS Plus hard disk operating system (Model 1507) sells for \$299. All products are available for immediate delivery. For more information, or the location of the dealer nearest you, contact Microcomputer Technology Inc., 3304 W. MacArthur Blvd., Santa Ana, CA 92704 (714) 979-9925

Circle #128

### TRS-80 More than BASIC

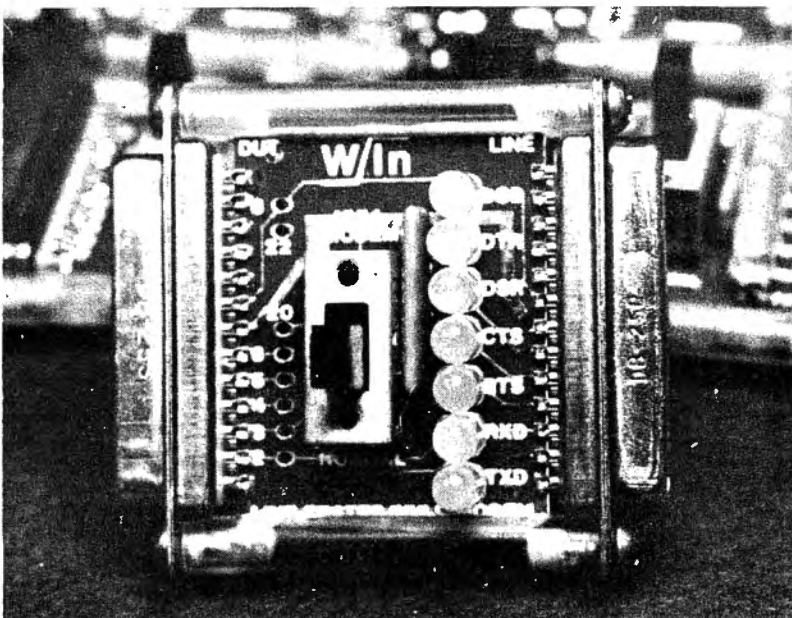
A 220-page textbook by John Paul Froelich presents a monitor program that changes the TRS-80 Model I or III into a development system. Conversion of the TRS-80 can be done by loading object code from a cassette or diskette or by replacement of the BASIC read-only-memory (ROM) unit. The monitor then executes valid instructions or commands and it flags errors. Over 26 commands are available to enable one to program in Z80 mnemonics. Complete documentation is given. The book is softbound, (book #21813) and costs \$10.95 plus \$1 shipping and handling. For further information contact Group Technology, Ltd., PO Box 87, Check, VA 24072 (703) 651-3153

Circle #129

### Data line tester

Anyone who has connected terminals, printers or modems to computers knows the frustration of finding out why certain hookups don't work. The W-DLT (Data line tester) is a portable device which will identify the 7 most commonly used RS-232 data lines and show the likely cause of the problem. Price per unit is \$59.95, from Warren Instrotech Ltd., PO Box 5739 Station F, Ottawa, Ontario, Canada K2C 3M1

Circle #137





**Property listing program**

Realty Software Co., 1116 'F' 8th St., Manhattan Beach, CA 90266 (213) 372-9419 has announced "Property Listing and Comparables" for the TRS-80 Model I or III at \$325. This program will create and maintain property listing information and provide screened property listings for prospective buyers as well as comparable listings for appraisals.

**Circle #135**

**Young person's computer guide**

SCELBI Publications, 35 Old State Road, Oxford, CT 06483, has announced a new book, A Young Person's Guide to Computers, which covers the history and elements of a computer, how it works, talking to a computer, the purpose of flow charts and a discussion of the uses of computers. Priced at \$7.95 plus \$1 shipping and handling by mail, or through many computer stores, soft cover.

**Circle #136**

**New educational programs**

Storybooks of the Future announced the release of their new 1.2 disk version of Space Waste Race for Models I and III. Space Waste Race is a computerized storybook — complete with learning games and imagination strategies — for preschoolers, Kindergarteners and primary level schoolchildren. Written by an experienced teacher, it is unlike any known computer-based educational material. Other programs include Look, Nod and Shake, Moon Drops, Fall Out, Moon Pass and Hole in the Moon. Space Waste Race is available for both TRS-80 Models I and III. The new 32K disk version 1.2 is available for \$24.95 and the new 16K tape version 1.1 sells for \$19.95. For further information contact Storybooks of the Future, 527 41st Ave., San Francisco, CA 94121 (415) 386-5184

**Circle #125**

**Payroll enhancement program**

Microcomputer Applications, 3485 Mock Orange Court South, Salem, OR 97302 (503) 364-1090, has announced an enhancement/documentation package for Radio Shack's Disk Payroll System (26-1556) for the TRS-80 Models I and III. Machine language sorts are used to reduce sort time with 100 employees from 15 minutes to 2 seconds. Another feature is perfectly aligned vertical spacing and top of forms on any 80 column or wider printer. It also enables changes to employee data without time-consuming reprinting of the entire screen. A 941a (quarterly report) option is also included. The package is sent on 2 data diskettes and includes documented data file layouts. All changes to your 26-1556 diskettes are made under program control so no special programming skills are required. It is priced at \$39.00.

**Circle #132**

**Diskette protectors**

Nepenthe Programs, 3014 Biggs Court, National City, CA 92050 has introduced a new and inexpensive way to protect diskettes when shipping them through the mail. The protector is made of white corrugated cardboard which is light weight and surprisingly sturdy. The cost for 100 or less is 32 cents each (fifteen cents each in quantities of over 2000). First class postage for a single protector containing one 5 inch diskette is 35 cents.

**Circle #133**

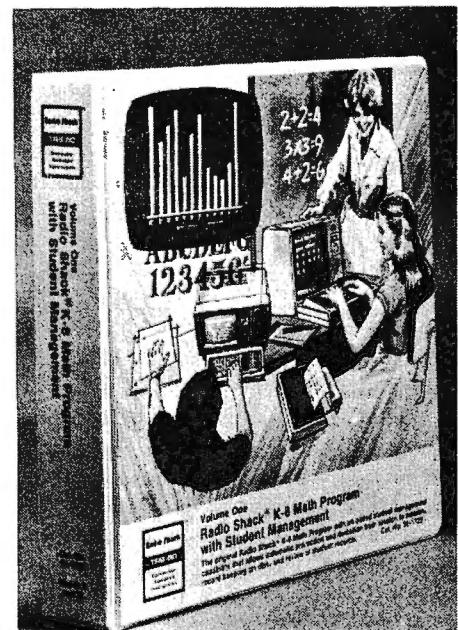
**QSO Log for Hams**

Manhattan Software, PO Box 1063, Woodland Hills, CA 91365 (213) 704-8495, has announced QSO Log, a data information and retrieval system for amateur radio operators. Available now on tape for \$14.95 (16K and 32K versions) and soon on diskette (price not announced).

**Circle #134**

**New additions to K-8 Math**

Radio Shack now offers two valuable new additions to the company's popular and successful series of K-8 Math courseware for the TRS-80. K-8 Math with Student Management, Volume I (26-1725) adds student management to the original kindergarten-through-grade 8 volume of self-paced drills in addition, subtraction, multiplication and division. In addition to student placement, drill and test modes, the program now monitors promotions and demotions and permits teacher review of scores. A 32K Model I or Model III computer is required, printer optional. This package is available now for \$199.00. The K-8 Math Worksheet Generator (26-2162) prints worksheets and answer sheets for exercises selected from problem sequences from K-8 Math. The teacher can choose headings, a lesson number and the number of problems to be included. A 32K TRS-80 Model I or III disk system is required, plus any TRS-80 line printer. This package is available now for \$89.95 at Radio Shack Computer centers, stores and participating dealers.



# THE PROGRAM STORE

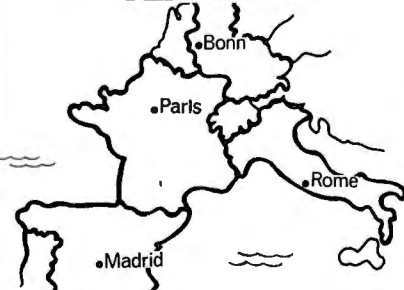


## TIME DUNGEON

By Howard Berenbon from AOS  
A delightful fantasy game with an educational slant. Explore the graphic dungeon, collecting gold and meeting alien travelers. When you enter a "Time Portal," you are transported to a special date in history. Should you answer the question posed you'll be rewarded in gold; a wrong answer costs you treasure. The questions may be true/false, multiple choice, or short answer, and they're not easy!

TIME DUNGEON - U.S. 16K tape \$24.95  
32K disk \$29.95  
TIME DUNGEON - WORLD 16K tape \$24.95  
32K disk \$29.95

## LANGUAGE TEACHER



By Cindy and Andrew Bartorillo  
Learn the basics of a foreign language. LANGUAGE TEACHER offers hundreds of word combinations, verb conjugations and phrases. There is an option for having multiple-choice answers and for being retested on missed items. Full printer capability and a great deal of "human engineering" further enhance the programs. Teachers will appreciate the ample documentation and the ability to get printouts of quizzes. Currently available languages are French, Italian, German I & II, and Spanish I & II.

\$29.95 for each program on 32K disks

## SPEAK!

By William Neville III  
Incredible new voice digitization/generation program that needs no voice synthesizer. You use your cassette recorder's microphone to input words or phrases. SPEAK! digitizes them and produces a disk file for later use in your own programs. The speech generated is sent out through the cassette port to any amplifier. Create your own talking games and voice prompted programs! While a model III is required for speech input, the resulting voice output will work with models I or III. You have to hear it to believe it!

48K disk...\$39.95

Visit our other stores: Seven Corners Center · Falls Church, VA & W. Bell Plaza · 6600 Security Blvd. · Baltimore, MD



NOW FOR MODELS I OR III!

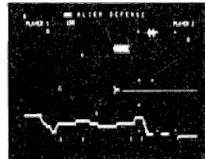


## -80 SPACE RAIDERS

From Bosen Electronics  
You are in command of the Starship "Defiant." The center of the screen is your "window" to the vastness of three dimensional space. Above and below it are readouts of critical information. Your orders are simple enough: Patrol the area and destroy all enemy spacecraft; return to base as needed for repairs and supplies. Carrying out these orders is more difficult!

An exciting and fast-paced game, -80 Star Raiders presents a flicker-free, animated view of the action from the pilot's perspective. Remarkably realistic.

16K tape...\$24.95



## ALIEN DEFENSE

By Larry Ashmun from Soft Sector  
Piloting your ship across the horizontally moving terrain, you must battle the various enemy spacecraft. You are under attack almost constantly from missiles and bombs, and to make matters worse, your ground patrol people are being picked up by the alien landers. To save them, you must shoot the landers and swoop down to "catch" the falling man. This fast action game requires skill and rapid reflexes. The model III version makes excellent use of that model's special graphic features.

Model I, Tape: \$19.95 Disk: \$24.95  
Model III, Tape: \$19.95 Disk: \$24.95

## JABBERTALKY



From Mind Toys  
A "programmable word game" that lets you compete against time or friends in solving your choice of anagram sentences or cryptograms. Skill levels range from simple to simply incredible! The sentences are generated by JABBERTALKY's "Language language," using the built-in vocabulary or your own.

16K tape...\$29.95 32K disk...\$29.95

## OmniTerm

From Linbergh  
An extraordinarily comprehensive smart terminal program for data communications. You can set all data transmission and reception parameters, define both input and output translation tables, and make all adjustments necessary to enable your TRS-80 to "talk" to just about any type of communications computer. Features include auto sign-on, prompted data transmission (a test editor is included), error checking & tabulation, autodialing (if your modem is so equipped), communication status checking, and much more. Also included are programs for preparing machine language for transmission, decoding received machine language programs, and special set-up tables for Compuserve, Source, and Dow Jones News Service. Complete with thorough documentation. Requires RS-232, modem.

32K disk...\$99.95

Also Available:  
ATERM 1.4 -- a less complicated smart terminal program...\$19.95



By Chuck Acree from Acorn  
A comprehensive genealogical program. It quickly and easily sets up a data base that holds name, date and place of birth, marriage and death information, plus a comment line for each ancestor.

YOUR FAMILY TREE will display/print a complete "pedigree" for any family member; a 3-generation chart may be displayed/printed showing the number of known ancestors beyond each branch of the tree. The program will also display a U.S. outline map showing migration across the country. You get full search capabilities on any key field. Capacities: 16K tape: 45-55 ancestors. 32K tape: 175, disk: 100. 48K tape: 300, disk: 225.

16K Tape or Disk...\$29.95

## MONEY MANAGER



By Andrew P. Bartorillo from Acorn  
A complete management tool for the home budget, it accurately keeps track of your checkbook and provides an easy method of budget allocation. You can store information on up to 100 checkbook entries per month (250 with 48K), specify any automatic withdrawals, keep records of tax-deductibles, and record expenses by category. You can even break up charge account payments into the proper categories.

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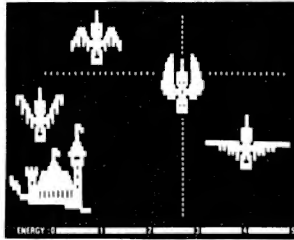


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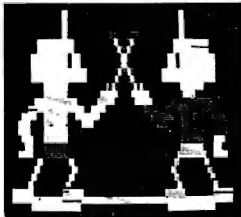
## VOYAGE OF THE VALKYRIE



By Leo Christopherson from AOS  
Combine the animation and music techniques pioneered by Christopherson with the challenge of his first fast-moving arcade game and you have VOYAGE TO VALKYRIE!

You speed through a magical maze guarded by ferocious birds that swoop down to attack if you don't get them first. To list all the play and options of this exciting game would take the 16 pages of instruction included.

Tape (TRS-80 16K) \$34.95  
Disk (TRS-80 16K, Apple 48K) \$39.95



## DUEL «N» DROIDS

By Leo Christopherson from Acorn  
Teach your "animated android" how to wield a laser sword! Leo Christopherson, author of "Android NIM," "Dancing Demon," "Voyage to Valkyrie" and other animations, has developed a new type of animation and high-quality sound in this work.

Starting out as a lowly clown, you teach your 'droid to use a laser sword by controlling its movements -- advance, attack, even retreat if necessary. Then you enter the tournament against the program's skilled 'droid. Revel in the fanfares of the victorious -- or hear the funeral dirges of the defeated! Entertainment for all ages.

16K protected tape...\$14.95  
16K protected disk...\$20.95

## SCARFMAN

From Cornsoft Group  
Action-filled arcade game that pits you against the monsters. Race your Scarfman around a maze, gobbling up scoring dots. You are pursued by five monsters: if you eat a "+" they'll lower their eyes and you can eat them, otherwise they'll eat you!

With exciting graphics and sound, SCARFMAN may be played using the keyboard or Alpha Product's Joystick. WARNING: MAY BE HABIT-FORMING!

Tape...\$15.95  
Disk (specify mod. I or III)...\$19.95



TRS-80  
Unless  
Otherwise  
Noted



From Med Systems  
You are sitting alone at 2 AM. Your eyes are bloodshot as you peer into your computer's screen and cry, "I must be CRAZY!" If this has never happened to you, you've never tried ASYLUM. It's Med Systems most ambitious 3-D graphics adventure yet!

ASYLUM places you on a cot in a small (padded?) room. Periodically the janitor lobs a hand-grenade through the window. What you do next could mean escape -- or disaster.

16K tape...\$14.95  
32K disk...\$19.95

Also order DEATHMAZE 5000, Med System's challenging 3-D maze game. Same prices as above.

## FORBIDDEN PLANET I

By Wm. Demas from Fantastic Software  
The first TALKING adventure! With skill, luck, and tenacity -- and a little help from your chatty TRS-80 -- you may survive Part One of this multipart adventure! You don't need a voice synthesizer, this program talks to you via the cassette port. And it's a good thing it does, 'cause otherwise you'd get mighty lonesome on desolate FORBIDDEN PLANET.

48K disk...\$39.95

## LOST COLONY

By David Feitelberg from Acorn  
It's the world's first deep space colony and you are the economic manager. A remarkable simulation, LOST COLONY arms you with maps and charts as tools for resource management. You assign human and robotic labor, explore new land, and set production quotas. At the same time you must determine equitable pay scales and taxes.

Communicate through your model I or III using full sentences or short commands. A challenging game, it might give you insight into real life management as well.

16K protected tape...\$19.95  
32K protected disk...\$19.95



## Crush, Crumble and Chomp!

From Epyx  
It's a monster movie, and you are the monster! You can be The Glob, Kraken, Mantra, Mechismo, Arachnis, or Goshilla -- or even design your own "custom" monster (disk version only). This hilarious action game is loaded with graphics and sound as you practice your villainy. With 6 monsters, 4 cities, and 5 game objectives, you get a choice of more than 100 possible scenarios. A monster's life is not all carnivorous crunching, though: The combined resources of the police, science, and armed forces are bent on your destruction.

TRS-80 (16K tape or 32K disk), Apple (48K disk)...\$29.95

## BATTLE OF SHILOH

From Strategic Simulations  
Now Civil War buffs can engage in a realistic simulation of a major battle. Marching through the war-torn countryside, strategically using the forests, creeks, hills for defense, you re-create every facet of the battle on a hex-grid map. If you had been in charge, would we still be whistling "Dixie?"

16K tape...\$24.95

Unbelievable Realtime 3-D Graphics!



## FLIGHT SIMULATION

Now for models I & III!

From Sub-Logic  
The wait is over! If 3-D graphics seem impossible on the low resolution TRS-80, you haven't seen this brilliant program. During FLIGHT SIMULATION, you instantly select instrument flight, radar, or a breathtaking pilot's-eye-view. But be sure to strap yourself in -- you're liable to get dizzy!

Once you put in some air time learning to fly your TRS-80, head for enemy territory and try to bomb the fuel depot while fighting off five enemy warplanes. Good Luck!

NOW FOR MODELS I & III!!  
16K tape...\$25.00  
32K disk...\$33.50

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All entries will be judged on originality, creativity and best use of computer equipment. They must be postmarked no later than May 1, 1982, and be accompanied by the software program, so we can recreate the winning entries for verification. Make sure the graphic is no larger than 8" x 10" and no smaller than 4" x 6". And remember, if you digitize art or a photograph, it must have been originally created by you.

So get busy and enter. You might be a winner. And your software could be your "softwear."



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- 1) Any computer equipment may be used to format the entry, but the graphics output must have been printed on an Epson MX-70, MX-80, MX-80 F/T or MX-100 printer with either built-in or optional GRAFTRAX. Winning entries will be re-created by Epson for verification.
- 2) Each entry must be accompanied by the software program used to create it. All entries and software and the rights to use them become the property of Epson America, Inc.
- 3) All entries must be at least 6"x 4" and no larger than 8"x 10" in size.
- 4) Art or photographs, if used, must have been created by the entrant.
- 5) All entries will be judged by an independent panel of judges on their creative merit, originality and best use of computer equipment. Decision of the judges is final.
- 6) This contest is valid from January 1, 1982 until May 1, 1982. Entries must be postmarked no later than May 1, 1982.
- 7) Participation in the Epson "Software" Sweepstakes is open to all except the following: employees of Epson America, Inc., its service agencies, or their families.
- 8) Winners will be notified by mail no later than June 1, 1982. A list of winners will be made available by sending a stamped, self-addressed envelope to Epson America, Inc., 3415 Kashiwa Street, Torrance, CA 90505.
- 9) Entries will be maintained on file at Epson America, Inc. until January 1, 1983.
- 10) Prizes are as follows: First prize includes round-trip economy air transportation for two to Tokyo, from the airport nearest the winner's place of residence, and six nights standard hotel accommodations, double occupancy. Trip does not include airport departure taxes, hotel service charges, cost of transportation or other expenses incurred before leaving the airport of initial departure, returning to Tokyo airport and returning home from the airport of initial departure; nor does it include meals or gratuities. Second prize consists of one Epson MX-100 Printer. Third prize consists of his and hers Seiko Quartz Watches. Additional prizes include 25 Micro-Nine Printheads, 50 Epson Digital Watches, and 100 Epson Ribbon Cartridges.
- 11) You may enter more than once, but each entry must be accompanied by the official entry coupon below.
- 12) Void where prohibited by law.

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PRINTER MODEL AND SERIAL NUMBER \_\_\_\_\_

T-SHIRT SIZE \_\_\_\_\_S \_\_\_\_\_M \_\_\_\_\_L \_\_\_\_\_XL

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**EPSON**  
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Have you had enough of the big, bad winter? So have we, but not to worry, the equinox is upon us about the 21st of the month and things should start looking up again.

We have had a ball putting this issue together. Our negatives from the previous issue were sent to Tim Buck Too. I don't know if that's a man or a place, but it sure put us behind schedule. There is a bright side to all of that, though. Because we were late, we had the opportunity to include in this issue the hot news from Tandy concerning their Model 16 and other related new products. Yes, it's nice, once in a while, to be on top of things — even if we are not a "news" magazine.

### Corrections

There are a few bugs from previous issues to be exterminated. For instance, in the January issue, on page 79, Spencer Hall alludes to a listing for a program called a "Label Writer", which presumably was supposed to be in that issue. It wasn't. And it wasn't in the next one either. It will be in a future issue, however.

In the Sep/Oct 81 issue on page 31, the Color Computer version of Keyword has an error in line 310. The ORE\$ in that line should be ORF\$.

### What's happening with the subscription service

Our move to Pub/Data, our subscription service in Cicero, Illinois, is just about complete. This can bring about some minor problems if you mix orders. Please send all correspondence related to new or renewal subscriptions and changes of address to: 80-U.S. Journal, Subscription Department, 5615 West Cermak Road, Cicero, Illinois 60650. Please include a current mailing label or copy of it when you write about your subscription. It makes for much faster and more accurate service.

All other correspondence should be addressed to our address in Tacoma, Washington, *including orders for back issues*. Mixing orders, like ordering a book or back issues and renewing your subscription will cause a delay in

your receipt of same. I'm sure it will all work out well in the end.

### In this issue

We didn't think it possible, but we got 22 features into this issue! There are also seven reviews and the usual departments.

Dr. Barry Shaw and Joseph M. Fettig show us some very interesting uses for the TRS-80 in medicine. Truman Krumholz, who has appeared in these pages several times before, shows how to get some extra RAM. Spencer Hall is back with More Tape, Less Tears and a rather tongue-in-cheek look at his first experience with the Exatron Stringy Floppy.

There are a couple of games — one of them for the Pocket Computer by Stephen Fournier.

Our editor, Don Scarberry, lays it on the line with an article on the LINE function of the Color Computer, while Jeffrey C. Ruble does a thing with a visible, on-screen sort that shows how it really works.

Anthony Raines shows how to convert system tapes to BASIC using a BASIC program, and David R. Canning tells how to modify the Host program for Model II.

Alan Simon shows how to run any program with a single keystroke with his "Menu 80" program, and Jim Klapproth evaluates Lazy Writer.

There is yet more about cleaning disk heads, a Tiny Typer program and, for the opening of baseball season, a program called Pinball Baseball, by U. F. Racine.

The hot news this issue is the release of Radio Shack's Model 16 and other products. You will find them all in Tandy Topics for this issue. We pulled the regular column by Mr. Juge to get this in at the last minute. All I can say at this point is that it looks like some kind of computer! The color change is especially welcome.

All in all, we feel we have packed a lot into this issue, and we hope you enjoy it. Tell them all you saw it in 80-U.S., and make yourself a nice day!

Mike

# Tandy topics

## *Radio Shack introduces new equipment*

January 19, 1982 marked the announcement by Tandy Corp./Radio Shack of several exciting new products to be released during 1982. The most prominent new addition is their ivory colored TRS-80 Model 16 Computer featuring 16 bit technology, dual processor architecture and a multi-user operating system. The new Model 16 is capable of 512K internal RAM memory storage and 2½ megabytes of disk memory using two built-in "thin line" double-sided 8-inch disk drives. Additional external disk storage may also be added. This combination of large RAM and disk memory capacity will allow the Model 16 to use more sophisticated, user-friendly software with large file capacities.

The Model 16 desktop computer will be available second quarter 1982 in two versions, both with 128K memory. A single drive version with 1¼ megabytes of disk storage (26-6001) will be available for \$4999. A two-drive version (26-6002) with a total 2½ megabyte storage capacity will be available for \$5798.

The new computer uses two microprocessors: the Z-80A (used in Models I, II and III); and a 16 bit microprocessor, the MC68000, developed by Motorola.

The Model 16 has been designed to permit its expansion to multi-user operation with the addition of one or two low-cost terminals which may be located remotely. This allows as many as three users access to programs and information at the same time.

Announced simultaneously is the TRS-80 DT-1 Video Data Terminal which may be used as a remote workstation for the Model 16 as may the Model II. Model II software compatibility means the Model 16 can put Model II software to work immediately. New software for the Model 16 will be announced soon.

The Model 16 also offers TRS-80 hardware compatibility. It's equipped with two RS-232C serial interface ports and a parallel interface port. One of its serial ports is capable of bisynchronous communications to IBM and other mainframes. A hard disk port may be added to permit the use of up to four of Radio Shack's 8.4 megabyte hard disk drives.

### **DT-1 Video Data Terminal**

The TRS-80 DT-1 Video Data Terminal (26-6050) will be available second quarter 1982 for \$699. The custom-programmed high speed 8-bit microprocessor inside the DT-1 is the basis of its high performance, flexibility and low price. The DT-1 can be configured to emulate any of four popular terminals: the Televideo 910, Lear-Siegler ADM-5, ADDS 25 or Hazeltine 1410. Its configuration is keyboard selectable. The selected protocol is maintained independently of power through the use of EEPROM (Electrically Erasable Programmable Read-Only Memory).

The 12-inch (diagonal measure) CRT provides a full 80 character by 24 line (80x24) video display. Upper (shift key) and lower case characters are available and control characters can be displayed without using special symbols. A variety of video features include normal, reverse, invisible, blinking, underlined and half-intensity. Four types of cursors may be selected from the keyboard—steady, blinking, block or underline.

### **PC-2 Pocket Computer**

The new TRS-80 Pocket Computer Model PC-2 (26-3601) will be available the second quarter of 1982 for under \$300. Among its advanced features are its capability for internal expansion with plug-in RAM and/or ROM modules, and for

external expansion through a 60-pin I/O bus connected. The PC-2 features a 16K (ROM) Extended BASIC language interpreter with the ability to process words and messages, programmable function keys and an LCD display with upper, lower case, scientific and user-definable characters.

The PC-2's central processing unit is a high speed 8-bit custom CMOS microprocessor. Built-in memory includes 16K of ROM and 2640 bytes of user memory. All memory information is retained even when power is off. This internal memory can be expanded with plug-in modules to add up to 16K bytes of RAM, ROM or both. A 4K RAM Expansion Module (26-3615) will be available mid-1982 for \$69.95.

The PC-2 Extended BASIC is compatible with Pocket BASIC, so programs prepared for the (original) Pocket Computer can be keyed into the PC-2 and run. Other features include a typewriter layout 65-key keyboard with alphabetic keys, a 10-key numeric pad and 52 special functions. Its display offers 26 upper and lower case alphabetic characters, numbers, graphics and characters. There's a programmable beeper and a real-time quartz clock.

A pass-along expansion connector on the Printer/Cassette Interface permits connection of additional peripherals. Radio Shack plans to introduce an RS-232C Interface and communications software for the PC-2 Pocket Computer late in 1982.

Radio Shack will be introducing a very unique peripheral for hard copy output—a four-color printer with graphic plotting capabilities and a dual cassette interface, all in one unit. The TRS-80 Model PC-2 Pocket Computer Printer/Cassette Interface (26-3605) will be available in mid 1982 for less than \$250. ■





# Microcomputers in medicine

Barry Shaw, M.D., Ph.D.  
Desert Pulmonary Consultants Medical Group, Inc.  
Rancho Mirage, CA



Medicine has long had a close relationship with computers. The most dramatic example is the Computerized Axial Tomograph or the CAT Scanner as it is more popularly known. This combines the latest in X-ray technology with the power of the computer to give detailed pictures of the body interior, previously not possible in some cases, even with surgery. The computer part of the device, although actually a minicomputer, does use 8-inch diskettes similar to those in the Model II micro-computer.

When personal computers became a reality you might have expected medical doctors to be among the first to buy them. In practice, remarkably few physicians have computers or have any familiarity with them except for the widespread use of computer billing services

which are regarded more with a mixture of awe and annoyance than with trust. Until very recently, there was little or no software available for use in a medical office setting and what was available was not advertised in media frequently read by physicians. Despite this, the most common use of microcomputers in medicine today is in the business end of office practice. Both the larger medical groups or clinics and solo practitioners have begun to appreciate the advantages of an "in-house" computer.

A few physicians have word processor programs, but they are rarely used to their full potential. In my office, we have been experimenting with ways to make use of a word processor as the basis of a medical record storage and retrieval system. We are enjoying considerable success in this regard with Scripsit for the Model II.

Current or active patient records are entered into a large single document. The global search utility is used to locate individual records or parts of a record, in a fraction of the time it takes to manually seek out the old record, and then look through it for the information needed.

Initially, we tried giving each patient his own individual document, but that was too cumbersome and highly inefficient in its use of available disk space. The data has to be typed in, but once entered, is available for review in ways that would never be practical otherwise. Finding out if one or more patients had ever had a particular drug prescribed or how many times the drug was prescribed is no problem.

C.M.E. (Continuing Medical Education) is an area where the



**Radio Shack TRS-80 computer used in mental health center by Martin B. Winston, Director of Publicity, Tandy Corp./ Radio Shack**

Radio Shack's TRS-80® computer is now working as a diagnostic aid in a Texas mental health facility. William Dossett, consultant for the Community Mental Health Center in Temple, Texas, has developed a computer-assisted diagnostic system for mental health clients. Using a series of questions with "yes" or "no" answers, the TRS-80 computer works through a decision sequence until a recommended diagnosis is achieved.

"Computers have been used in mental health centers for years to perform many management information functions," said Dossett, "but until recently, programs have either not been available or they have been ineffective in gathering and evaluating data for the purpose of treating clients." Dossett's system, called DSMY (based on the American Psychiatric Association's *Diagnostic and Statistic Manual*), documents its diagnosis with a printout of the decision sequence as well as reference manual page numbers to confirm the decision. This document becomes part of the client's record.

Dossett's program is being presented at the Society for Medical Decision Making meeting in Philadelphia in October.

Professional colleagues with TRS-80 computers and an interest in the DSMY program have formed a six-state network, sharing data with each other by linking their TRS-80 computers to their telephones. This enables them to achieve a more comprehensive study for large scale experiments.

microcomputer is beginning to find more use. For some time now, there have been programs available for physicians to maintain and improve their knowledge and skill base using personal computers. These programs may be an excellent means of improving a physician's education but, by virtue of being limited to a one-to-one interchange between doctor and computer, do not lend themselves to widespread exposure or acceptance.

At Eisenhower Medical Research and Education Center (E.M.R.E.C.), located in Rancho Mirage, California, we recently conducted what we believe was a unique and successful experiment in medical education. E.M.R.E.C. had recently participated in a new type of medical education conference. Experts from as far away as Chicago and Denver were heard discussing a problem in diagnosis and treatment. The speakers spoke

In addition to the DSMY program, the TRS-80 assists in many other areas of the clinic. Statistical analysis software is being used to correlate facts about people who drop out of the center in order to design a program to keep them involved. VisiCalc™, an "electronic spreadsheet" planning program, is being used to project expenditures for the year; this program shows a decision-maker the different possibilities for the budget outcome depending on various factors involved. In addition, the TRS-80 computer is being used to determine cost-outcome for individual clients, to collect and analyze client satisfaction information and to perform word processing for various reports and documents. Dossett states, "The bottom line is: the technology is here, it can be used, and it is cost effective. After one solid year of research, I have found this to be true."

Dossett says his TRS-80 computer is "the single best investment in my life."

to the assembled physicians and nurses and to each other over a conference phone hookup. Although the Teleconference (as it was called) was well received by the audience, I was struck by the complete lack of any slides or other visual data to illustrate the points the participants were trying to make. It seemed an ideal place for Videotex.

Less than two weeks after the Teleconference, I conducted the first Pulmonary Medical Conference for the year using a TRS-80 Color Computer, Videotex and a host Model II to show educational text material. The Model II was located in an office near Long Beach, over 100 miles away. The Model II contained demonstration programs transmitted to it over conventional phone lines from the Model II in my office the night before. These programs illustrated how a computer could be used to help interpret complex lab tests or evaluate data in a critically ill patient in the Intensive Care Unit. The programs were obtained from public domain sources and not unique themselves, but the demonstration using the relatively inexpensive 4K (actually only 2533 bytes of memory) Color Computer to run the programs and display the data was unusual. The 32-character lines on the Color Computer were also well suited for displaying the data to a room full of people. Obviously, we could just as easily have used the Model II in my office, but the long distance phone hookup helped to illustrate the ease of accessing the data.

As a result of this highly successful conference at the Eisenhower Hospital, we are considering using a similar approach to access the education files of the AMA (American Medical Association). The AMA has recently decided to place much of its vast store of educational material on computers. We anticipate that a kind of medical computer telephone network service may develop from this.

This has been a very brief view of some of the current and potential uses of microcomputers in medicine.

With the advent of relatively inexpensive hard disk drives for both rapid and extensive data storage and retrieval, medical use of computers is bound to increase. Improved data transfer techniques, at much higher baud rates than are

possible today, using both cable and satellite transmission are just around the corner. We may even see the development of a kind of reverse house call in which patients will communicate with the doctor electronically via Videotex. I foresee

the day when a doctor arrives at his office in the morning and has a printout of the night's phone calls. These might include such things as prescription refill requests or completed medical history questionnaires on new patients. ■

**AMA News Release  
July 27, 1981**

*Chicago*— The first nationwide electronic medical-health information system will be developed and operated under a long-term agreement announced today by the American Medical Association (AMA) and General Telephone and Electronics (GTE).

Thomas A. Vanderslice, president and chief operating officer of GTE, said, "When the system becomes operational in mid-1982, it will be a

major breakthrough in the dissemination of medical information in the United States. Information required for use in patient treatment will be instantly available on computer terminals at any location in the country."

The only equipment required to access the medical-health data is a basic computer terminal connected to an existing telephone line, Mr. Vanderslice noted. In many instances, physicians' offices, hospitals and related organizations will be able to use their existing terminals with this new system.

By dialing a local telephone number, the user will link his or her terminal, via the nationwide data communications network operated by GTE Telenet Communications, with the company's computers in Vienna, Virginia. Requested information will be transmitted within seconds and displayed on the user's terminal.

In early 1982, terminals will be installed at the AMA Headquarters building in Chicago, which will access the data on a test basis from GTE Telenet's computers in Vienna, Virginia. ■

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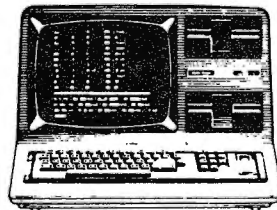
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**JOE McMANUS**





# Quality control in the medical lab

Joseph M. Fettig, B.S., MT, CLS (NCA)  
Palm Desert, CA

The price of microcomputers has come to such a level as to make them affordable for practically every lab. These powerful tools definitely have their place in the clinical lab, but at the present time, obtaining good quality, "state of the art" laboratory applications leaves a lot to be desired.

In searching for a commercially available computer program to do laboratory quality control statistics, it was found that most of the statistics programs available were not designed for the laboratory. If they were written for the lab, they were based on an outdated approach to handling laboratory data.

What is needed is a computer program that will look for shifts, trends, out-of-limits data and/or precision loss. At the same time, it must tell the technologist in "plain English" when one or any combination of these problems is occurring. This last item is of great importance. As you are probably aware, two people looking at the same statistical answers may interpret the results differently. If the computer interprets the data, there should be a minimum level of competency assured, as well as a standardization of the interpretation of the statistical answers generated from the quality control data.

The program should also be designed for ease of use with the non-computer oriented technologist. What we need is an R2D2-type technologist. In other words, the task at hand is to design an "artificial intelligence" that will monitor the quality control data with as little technologist time consumption as possible. Other factors to consider are the federal, state and other

regulatory agencies' requirements for quality control.

Before writing a quality control program, the main advantages and disadvantages of the conventional methods were reviewed. Each method had its good and bad points.

### **Periodic calculation of current statistical values**

When monitoring the statistical values for a one-month period, it is hard to see if you have had a very gradual deterioration of the test method you are evaluating. If your test method four months ago yielded a mean value of 90, but is now giving you a mean value of 80, something in the system may have changed. This may be significant, especially if the normal values were based on answers your test method was giving when first started. A month-to-month monitoring method may not show a gradual trend which has led to a shift.

At its best, this method offers a way of giving a statistically significant basis for evaluating average performance over a short period of time. The nicest item obtained from this method is the coefficient of variation. This allows you to see if imprecision is occurring in the system.

One serious drawback of this and other quality control evaluation methods is that problems may not be caught as they are occurring. If statistics are only generated once a week, bi-weekly or monthly, then you may not spot a problem until after the fact. By then, how many marginal results have you sent out?

### **Perpetual all-inclusive statistical method**

With this method, you include all

values from beginning to present when calculating the statistical answers. If only this method is used, you may be confronted with other problems. First, with a large data base, one value averaged with 200 other values will not change the statistics significantly. This, in effect, will not allow you to see any rapid changes that are occurring at the present time. The advantage of this system is that a very large data base is more reliable for predicting future expected values (ranges for your control materials). You should keep track of current values in addition to all cumulative values in order to see the entire picture.

### **Modified Cusum statistical approach**

Neither of the above methods check for current trends that may be occurring. The conventional method is to plot the data on a graph. This is accomplished easily with a computer, but it still takes a considerable amount of time for the technologist to review graphs each time a value is entered into the quality control records. It was decided that the best method for evaluating trends would be to use a modified Cusum method. This is essentially a substitute for the conventional Levey-Jennings plotting method. The difference is that you get a number to look at instead of an entire plot. You can set limits on this number to determine if a trend is occurring.

The problem we have found with this method is that it yields many situations where the trends it finds are not significant. This leads to a lot of extra time being spent to determine if there is indeed a true

problem. Another problem is that most technologists may not fully understand the statistics involved in this method and therefore tend to shy away from it altogether.

### Which method to use?

The solution to these problems is simple. Have the computer do all of these methods at once and take from each the information you need. The computer program that was written utilizes all of the above methods and interrelates them.

Each time the technologist enters a single value into the computer, the following takes place:

1. The value is checked to see if it is within the range specified (i.e., between plus or minus two standard deviations of the mean). If the value has exceeded the accepted limits you have set, a message will appear telling the technologist the situation. The large cumulative data base is used for this check since it will tend to be more stable and inclusive than a limited current file.

2. The computer takes the value entered, calculates a new mean, standard deviation and coefficient of variation (C.V.). This is done for both a cumulative and current file. After the new C.V. has been calculated, the precision of the system is checked to see if it is within acceptable limits. If an imprecision in the system is occurring, a message is printed on the CRT informing the technologist. You should note that the statistics are not done monthly or bi-weekly, but immediately with each value entered.

3. The next check that is made is for current trends which might be occurring. This is accomplished through an algorithm. If a trend is observed, the technologist is notified by a message on the CRT. The computer then goes through another algorithm to see if the trend is really significant and again prints a message on the CRT with the computer's evaluation of the significance of the trend. If the trend is significant, the computer will notify the technologist of the probability of a system problem. Using this method, the technologist



essentially gets a three-stage alert if a problem is occurring.

The real beauty of the above system is that there is really no need for the technologist to know any fancy statistics. This is good since many younger technologists may not have the experience of an older technologist in determining what the statistical numbers mean. These values are translated into messages that tell the technologist what is happening. Another advantage is that a minimal level of quality is established and every test is given equal attention by the computer.

### Hardware

The following computer equipment was utilized for this computer application: TRS-80 Model I with 48K memory (TRS-80 is a trademark of the Tandy Corporation), two 5 $\frac{1}{4}$ " floppy disk

drives with 40 track capability and a line printer.

### Operating system and language

The operating system that I prefer is the Lobo Disk Operating System (LDOS). Having evaluated numerous operating systems for the Model I, this operating system makes the computer behave as though it was a big mainframe.

The language used in programming is the Microsoft BASIC. This is the standard BASIC offered with the Tandy system. However, after the program is written and debugged, we use the Microsoft BASIC compiler to speed up the program execution. With this approach, you have the advantage of using the machine's interpretive language and debugging facilities and the speed associated with the compiler.

Sample of computer printout as described in text

..... DEPARTMENT LISTING .....

- 1.. CHEM1 KDA
- 2.. CHEM2 ACA
- 3.. CHEM3 ABG
- 4.. CHEM4 ASTRA
- 5.. CHEM5 MISC
- 6.. HEMATOLOGY1
- 7.. HEMATOLOGY2
- 8.. RIA PROCEDURES
- 9.. THERAPUTIC DRUGS
- 10.. COAGULATION
- 11.. MISC PROCEDURES
- 12.. OUTPATIENT TESTS
- 13.. STAT LAB TESTING
- 14.. ENDOCRINOLOGY
- 15.. URINE CHEMISTRIES

.....

SELECT DEPARTMENT NUMBER - PRESS <ENTER> ..<

08/25/81 08:40:35

..... TEST LISTING FOR CHEM2 ACA .....

- 1 .. GLUCOSE N
- 2 .. GLUCOSE 2
- 3 .. RUN 1
- 4 .. CALCIUM 1
- 5 .. CALCIUM 2
- 6 .. CREATININE 1
- 7 .. CREATININE 2
- 8 .. SODIUM 1
- 9 .. SODIUM 2
- 10 .. POTASSIUM 1
- 11 .. POTASSIUM 2
- 12 .. CHLORIDE 1
- 13 .. CHLORIDE 2
- 14 .. CO-2 1
- 15 .. CO-2 2
- 16 .. OSMOLALITY 1
- 17 .. OSMOLALITY 2
- 18 .. SGOT 1
- 19 .. SGOT 2
- 20 .. LDH 1
- 21 .. LDH 2
- 22 .. CPK 1
- 23 .. CPK 2
- 24 .. ALK PHOS 1
- 25 .. ALK PHOS 2
- 26 .. T. BILI 1
- 27 .. T. BILI 2
- 28 .. ACID PHOS 1
- 29 .. ACID PHOS 2
- 30 .. MISC 1

.....

SELECT TEST NUMBER TO ENTER RESULTS OR OPTION ..<

OPTIONS: (N)EW DEPARTMENT . (E)XIT FROM PROGRAM

08/25/81 08:41:24

..... CURRENT PRECISION LOSS POSSIBILITY .....

DEPARTMENT..... CHEM2 ACA (-) TREND TOWARD HISTORIC MEAN

TEST..... CALCIUM 1 MAY BE DESIRABLE - CHECK GRAPH

CONTROL.....

STATISTIC	CURRENT	CUMULATIVE
MEAN	5.277	5.193
NUMBER OF ASSAYS	31	364
UPPER LIMIT	6.998	6.281
LOWER LIMIT	3.556	4.105
C.V. (%)	16.	10.

SELECT OPTION OR ENTER RESULT FOR TEST , .....

OPTIONS: (S)TORE ENTRIES , (N)EW TEST ,  
(E)DIT , (D)ATE CHANGE , (G)RAPH ,

08/23/81 09:03:14 ■



# Extra RAM

## *How to use that extra space between RAM and ROM*

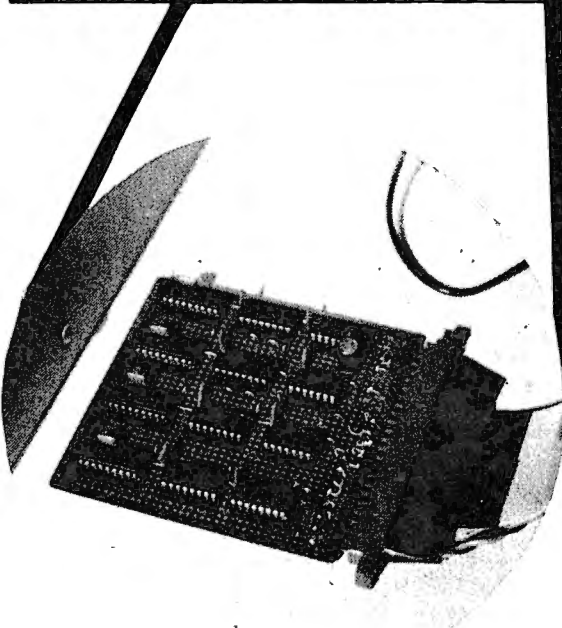
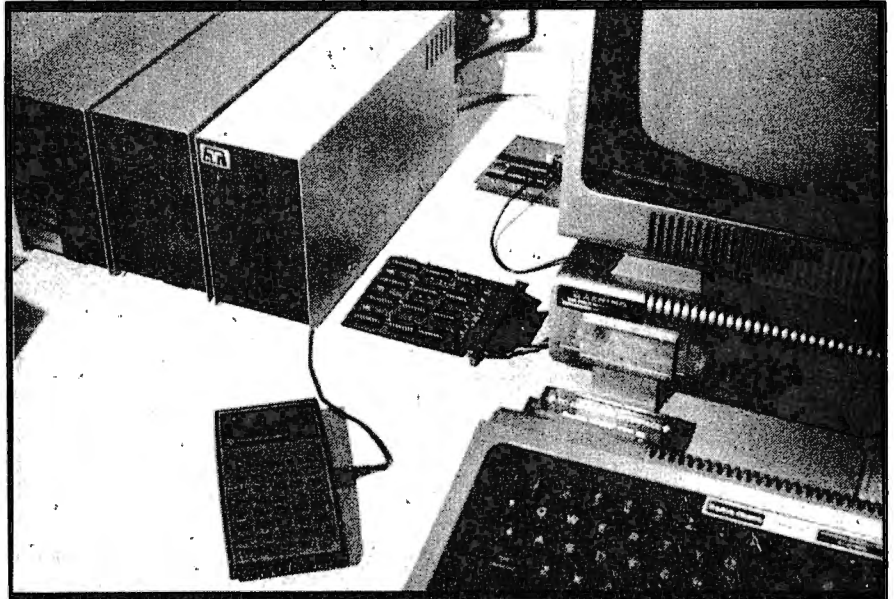
**Model I**

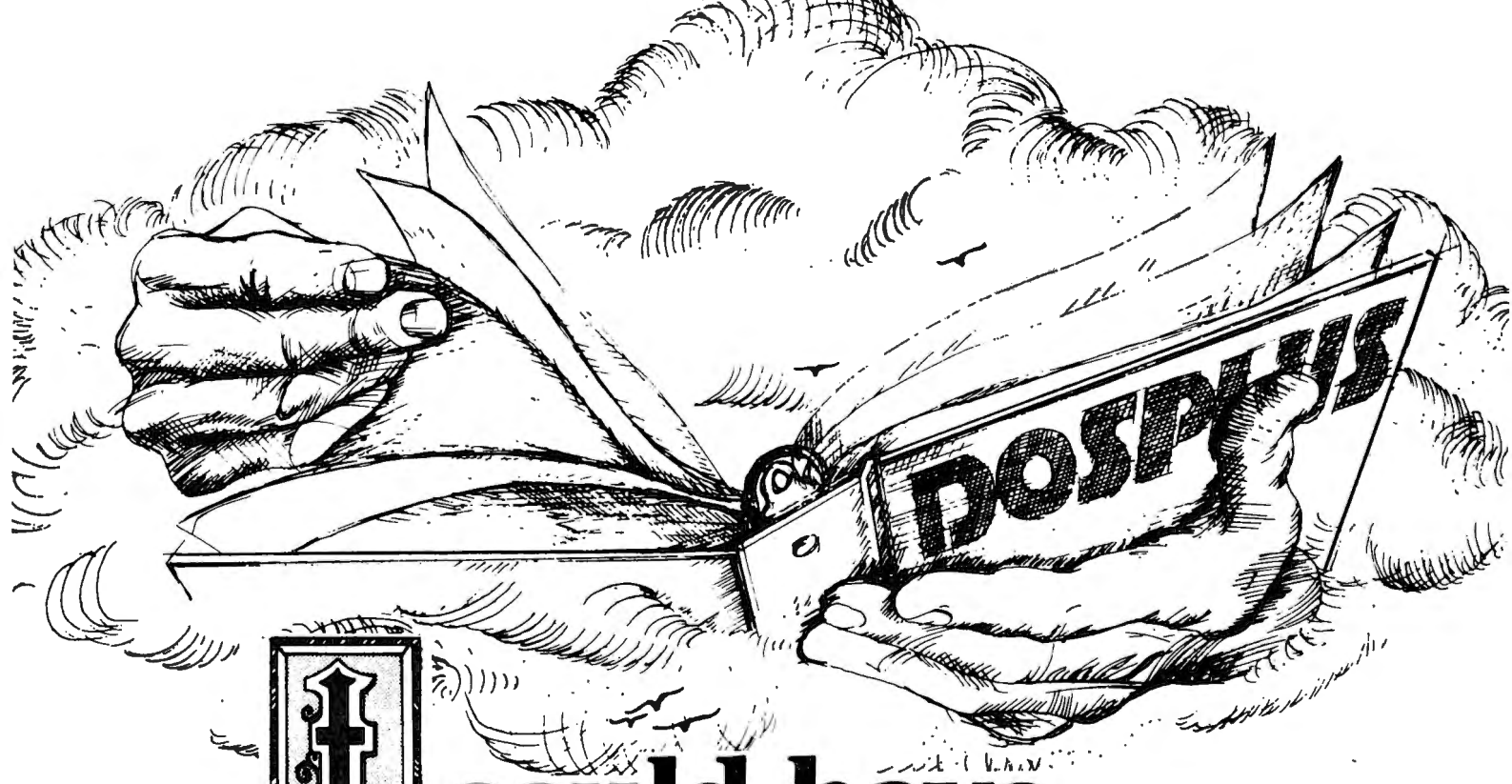
**Truman Krumholz  
Springfield, MO**

In this article I will attempt to briefly describe how I built a memory board to occupy the open space between the ROM and the port addresses just below the keyboard memory. I find this additional memory very useful for various utility type routines as they never interfere with anything in the system. Also, routines in this memory are not bothered by the system as it is not aware of its presence. I left the space from 3780H to 37DDH unaddressed for possible future ports because it was easier to decode by doing so. The resulting memory board contains 1920 bytes from 3000H through 377FH.

I built the memory on a Radio Shack digital epoxy-glass board (Cat. No. 276-156). The board is connected via the screen printer connector. I constructed the adaptor using a 44-pin socket (Cat. No. 276-1551) and an old cut-in-two keyboard to interface cable (the one left over when the pregnant cable was added). If you do not have one of these cables, then one will have to be made using a 40-pin connector which is available from Radio Shack or from any number of other sources. An external power supply is also connected to the 44-pin connector to supply the memory board. This power supply should be able to deliver a clean regulated +5 volts with at least a 400 ma. current capacity. The memory chips I used are 2114s (1024x4 static). I used 300 ns. chips.

The address decoding arrangement was designed to use, to the utmost, chips that I had on hand. Also, I buffered all lines between the





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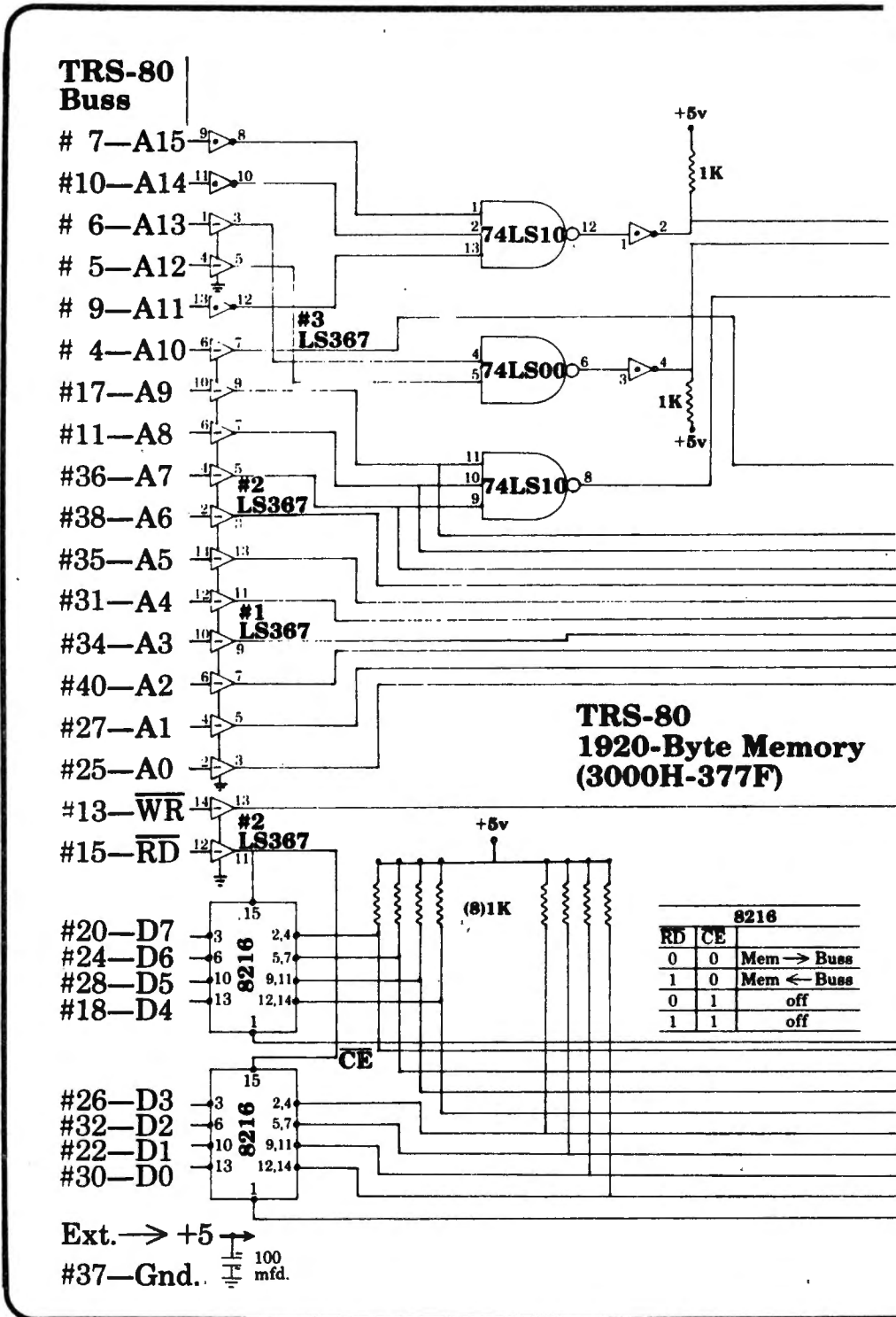
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board and the computer. The board actually worked the first time I tried it, but after a few runs with the memory test in RSM-2D, I found that I had occasional random errors in the lower half of the memory. These errors always indicated that the value read was less than the value put in and could be immediately corrected by a re-POKE at that location. This indicated to me that at random times, some of the highs on the data bus were not high enough. This is the reason for the pull-up resistors on the data lines and the three pull-up resistors in the address decoder. Since the addition of the resistors, I have run many memory tests and used many routines with no apparent errors. It is quite possible that with different chips or a different board arrangement, these resistors might not be needed.

The external power supply for my board consists of a 6 volt, 1 amp filament transformer, a bridge rectifier, a 3000 mfd. filter capacitor and a 7805 regulator. It is connected to one of the four unused pins of the 44-pin connector. The board on which the memory is constructed has numerous traces cut to allow 13 chips to be mounted on it. The arrangement of the chips on the board and the type board used are largely a matter of choice but lead length should be a consideration. I used wire-wrap wire for the wiring on the board and deglitched the 5 volt bus with a .1 mfd. capacitor at each chip. A 100 mfd. capacitor is also added to the 5 volt bus to further assure a clean +5 volts.

After construction of the board and power supply is complete, carefully trace and check all wiring and connections. Then, the power supply should be checked without the board connected and the memory board checked with an ohmmeter to assure there are no shorts on the 5 volt bus. If all is well, connect the board to the power supply (but not yet to the computer). Turn on the power supply and let the board burn in for awhile. During this period, use a volt meter to assure that +5 volts are present on



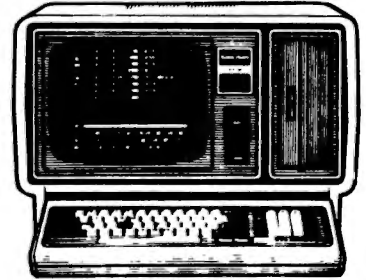
VCC of all the chips, and check all pins on the 40-pin connector that will go to the computer to see that there is no voltage below zero or above +5 volts on it.

After all of this comes the big moment. Plug it in, turn it on, turn

on the computer and see if it works. If it does, great! If not, it's time to carefully recheck all wiring and connections. Just don't plug and unplug it with the power on. With all lines buffered, it is highly unlikely that the computer could be



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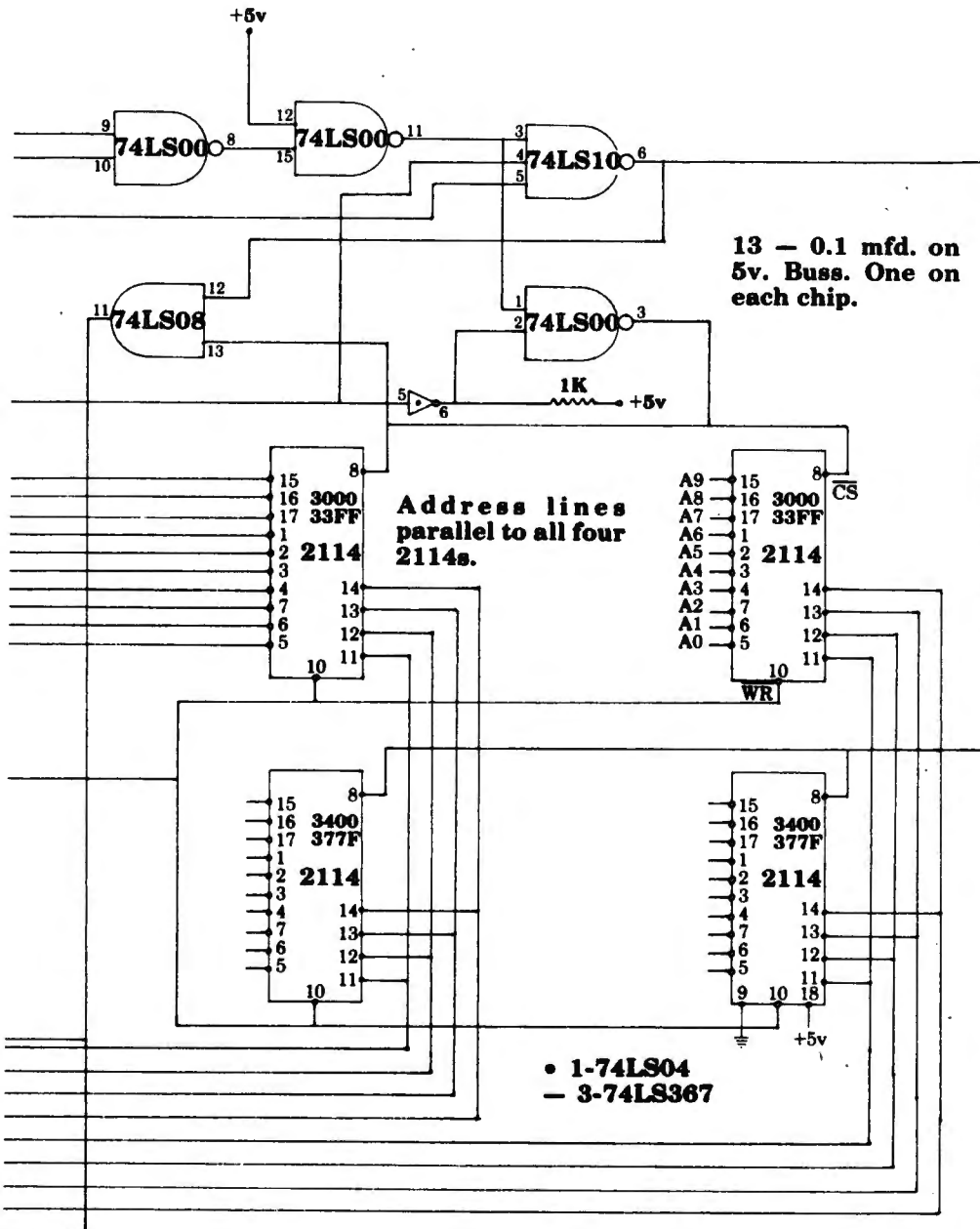
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damaged.

The adaptor and power supply which are now available may be used for other boards. One, for example, is the sound generator by Tim Lantz in the November-December issue of *80-U.S. Journal*. I built

this board and use it in the same 44-pin connector.

This may be too ambitious a project for some, but it does allow one to try his hand at a useful hardware project without any alteration to the computer. ■

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- Indicate end of page.
- Set tabs from one to many
- Clear tabs from one to all.
- Set temporary margins (wherever you like) as often as needed.
- Repeat all typing keys as needed
- Underline copy
- Print bold face and underline.
- Do reverse print (white on black), sort of "reverse Video".
- Allow alphabetic and decimal tabulation
- Indent paragraphs.
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- Often used phrases (up to 835 characters) in 10 "bins"
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- Up to 14,000 characters in an additional 26 "bins"
- Print perfectly spaced proportional letters
- Return to typing position after correction with relocation key
- Allow one character to overlap another (Ø)
- Right margin justification
- Print two columns with both right and left margins justified and the center ragged
- Lift off errors (from single character to entire line)

## **IT WILL EVEN:**

- Allow a carriage return without a linefeed or a linefeed without a carriage return
- Allow you to pre-set an impression control for high-quality carbon copies
- Allow both vertical and horizontal half-spacing
- Allow cancellation of copy before printing
- Allow express and normal backspacing
- Print in four different sizes: 10 pitch pica, 12 pitch elite, 15 pitch micron
- Allow insertion of a missing character in an already printed line.
- Accept paper up to 17" wide.



- Backspace 1/10, 1/12, 1/15 or even 1/60 of an inch
- Buffer and print out one word at a time, or one line or as many as 10 pages\*
- Print up to 198 columns
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## **IT HAS:**

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  - Number of lines left to end of page
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# TRS-80 goes to the hospital

## Diagnostic assistance with microcomputers

Joseph M. Fettig, B.S., MT, CLS (NCA)  
Palm Desert, CA

A patient comes to the emergency room of the hospital with a breathing problem. The doctor orders a blood gas determination and a blood specimen is rushed to the lab for testing. Using a sophisticated piece of instrumentation, the technologist performs the blood test and then types the results into the laboratory's computer. The computer prints an interpretation of what the results mean and the report is sent to the physician. The report that the computer has

generated confirms what the physician suspected and the patient is treated and released.

The use of computers in the hospital lab in aiding the physician to interpret lab results is nothing new, but in the past it required a substantial investment to acquire the necessary hardware to do this. With the advent of the TRS-80, this has changed. What used to require a fifteen thousand dollar investment is being duplicated by a TRS-80.

Figure one shows a printout from the arterial blood gas program mentioned above utilizing a 16K TRS-80 and printer. The machine only measures three parameters and the computer uses these to generate the rest of the information on the report.

The printout in figure two is a report from a lab test called lactic dehydrogenase isoenzymes. With the information from this test, you can see if the patient has had a

```

**** ARTERIAL BLOOD GAS REPORT ****
MEASURED PARAMETERS :          OBSERVED          EXPECTED
PH                               7.49           7.34-7.44
PCO2                             32            35-45
PO2                              92            > 98

CALCULATED PARAMETERS :
HCO3                             23            21-27
BASE EXCESS                       1.5           -2.5 TO 3.1
ALVEOLAR PO2                     110           > 100
ALVEOLAR-ARTERIAL DIF.           18            < 22
OXYGEN CONTENT                    19            20
OXYGEN SATURATION                 97            > 96
-----
OTHER PATIENT PARAMETERS RELATED TO ANALYSIS:
TEMPERATURE (C) : 37          HEMOGLOBIN : 14          FIO2 : .21
FIO2 COMMENT : PATIENT BREATHING ROOM AIR

```

\*\*\*\*\* SUGGESTED INTERPRETATION \*\*\*\*\*

#### OXYGEN AND VENTILATION STATUS:

THE PO2 DENOTES NORMAL OXYGEN TENSION ON ROOM AIR WITH THE ALVEOLAR OXYGEN GRADIENT APPEARING NORMAL. A PCO2 LEVEL OF 32 INDICATES MILD ALVEOLAR HYPERVENTILATION.

#### ACID BASE STATUS:

THE PH SHOWS A MILD LEVEL OF ALKALOSIS. A DECREASED PCO2 WITH A NORMAL BASE EXCESS WOULD INDICATE UNCOMPENSATED RESPIRATORY ALKALOSIS (MOST PROBABLE ACUTE HYPERVENTILATION.).

TECH .....

Figure 1

.....M.D.





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† Some features work only if your printer has the mechanical capability.

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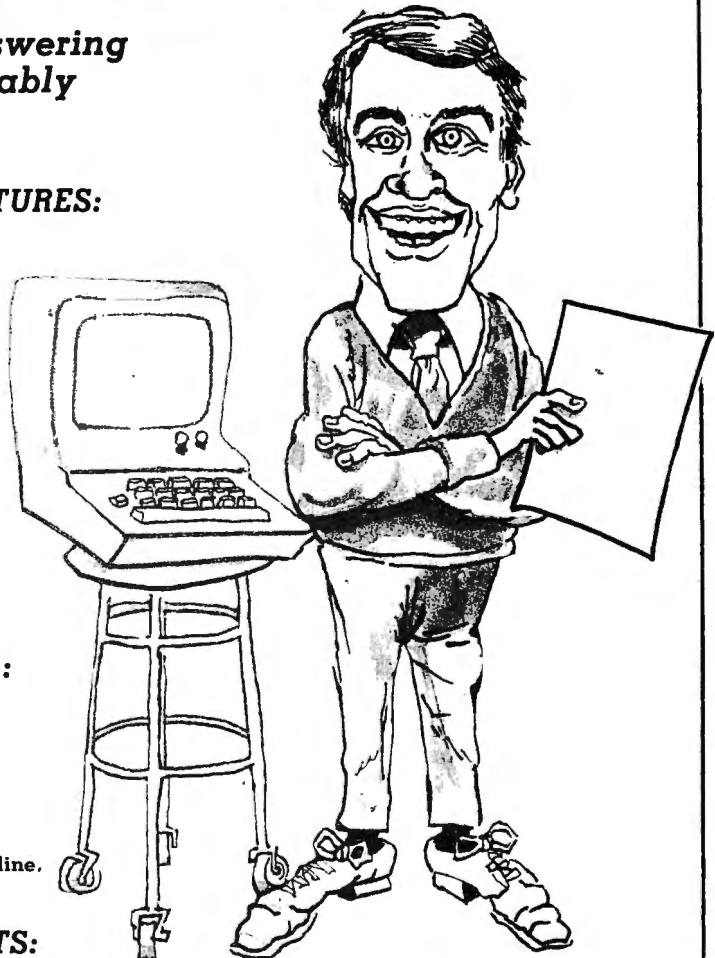
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control material was entered. It warns the lab personnel that the machine may require attention. This is important if you rely on that machine to be working 24 hours a day. It is far easier to schedule preventive maintenance than to have to make a call for service at three in the morning.

One application that most labs do is called workload recording. By recording how many lab procedures you have performed, you can predict your staffing needs, whether a new instrument should be purchased (and also if it is cost effective),

predict future revenue and determine pricing schedules for the lab tests. Quality control and repetition of abnormal test results complicate this picture. These all have to be taken into account. One application program for the TRS-80 does all of this. Figure six shows a sample printout from this program.

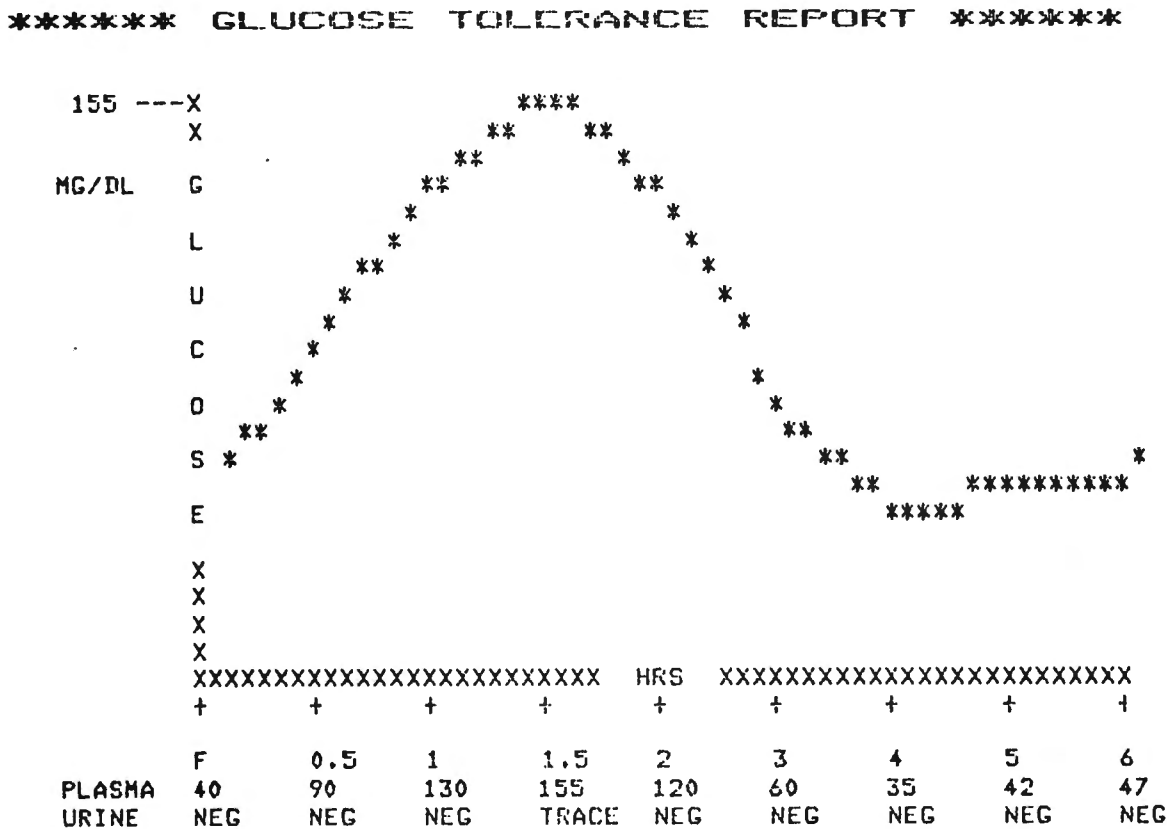
Needless to say, the TRS-80 has a place in the lab. Due to the highly technical areas involved in the lab, software availability for lab computers has typically lagged behind other industries. With the TRS-80, this is rapidly changing due

to the accessibility and ease of programming. Microcomputers such as the TRS-80 are becoming a more common item in the laboratory world. Some day a TRS-80 may be assisting in diagnosing your illness and helping to assure that those hundred thousand dollar instruments that do your blood testing are performing properly.

**Hardware and operating note**

Some of the applications mentioned above will run with a 16K machine. However, programs requiring information storage

Figure 3



SUGGESTED INTERPRETATION :

THE RESULTS OF THE GLUCOSE TOLERANCE TEST INDICATE THE PATIENT IS NEGATIVE FOR DIABETES MELITUS.

ADDITIONAL OBSERVATIONS AND COMMENTS :

THE PATIENT SHOWS HYPOGLYCEMIA IN THE FASTING STATE. FASTING HYPOGLYCEMIA USUALLY IMPLIES A DISRUPTION OF THE GLUCONEOGENIC MECHANISM AND MAY BE INDUCED BY DRUGS, ALCOHOL, OR INBORN ERRORS OF METABOLISM. IF THE ABOVE CAUSES CAN BE EXCLUDED, AN INSULINOMA MUST BE CONSIDERED.

TECH .....

PATHOLOGIST .....



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# Computer application

require a minimum of one 40-track disk drive. The system I use is as follows: 48K Model I, 2 disk drives, 40 track, 80-column printer and LDOS operating system.

*These programs are available commercially on a limited basis. More information may be obtained by contacting Joe Fettig, J. F. Consulting, 74355 Buttonwood, Palm Desert, CA 92260, (714) 346-2051.*

**Figure 4**

DEPARTMENT.....	PAST	(TIME)	CURRENT	
CALCIUM 1	+3SD	-----	-----	7.7
	+2SD	-----	-----	6.9
ACCENTUATED LEVEY-JENNINDMCS PLOT	+1SD	-----	-----	6.1
	MEAN	-----	-----	5.3
	-1SD	-----	-----	4.5
	-2SD	-----	-----	3.7
	-3SD	-----	-----	2.9
ACTUAL VALUES OBTAINED VS CURRENT MEAN AND CALCULATED PRECISION LIMITS				
DEPARTMENT.....	CHEM2 ACA			
TEST.....	CALCIUM 1			
CONTROL.....				
STATISTIC	CURRENT	CUMULATIVE		
MEAN	5.354	5.198		
NUMBER OF ASSAYS	31	362		
UPPER LIMIT	6.977	6.280		
LOWER LIMIT	3.732	4.117		
C.V. (%)	15.	10.		
SELEC OPTION OR ENTER R				
OPTIONS: (S)TORE ENTRIES	(N)EW TEST			
(E)DIT	(D)ATE CHANGE	(C)GRAPH		08/23/81 09:01:53

**Figure 5**

DEPARTMENT.....	PAST	(TIME)	CURRENT	
CALCIUM 1	+3SD	-----	-----	7.1
	+2SD	-----	-----	6.3
ACCENTUATED LEVEY-JENNINDMCS PLOT	+1SD	-----	-----	5.5
	MEAN	-----	-----	4.6
	-1SD	-----	-----	3.8
	-2SD	-----	-----	3.0
	-3SD	-----	-----	2.1
ACTUAL VALUES OBTAINED VS CURRENT MEAN AND CALCULATED PRECISION LIMITS				
DEPARTMENT.....	CHEM2 ACA			
TEST.....	CALCIUM 1			
CONTROL.....				
STATISTIC	CURRENT	CUMULATIVE		
MEAN	4.745	5.160		
NUMBER OF ASSAYS	31	376		
UPPER LIMIT	6.491	6.290		
LOWER LIMIT	2.998	4.031		
C.V. (%)	18.	10.		
WARNING !!!! 95% PROBABILITY OF SYSTEM CHANGE				

**Figure 6a**

SUMMARY OF MONTHLY ACTIVITIES			APRIL, 1981			
DEPT.	IP TEST	OP TEST	TOTAL	IP CHG	OP CHG	TOTAL
CHEMISTRY	1251	485	1736	\$29013.60	\$9896.10	\$38909.70
HEMATOLOGY	767	530	1297	\$8556.80	\$6413.80	\$14970.60
MICROBIOLOGY	393	253	646	\$4729.30	\$2973.50	\$7702.80
TOTALS	2411	1268	3679	\$42299.70	\$19313.40	\$61613.10

**Figure 6b**

CHEMISTRY	TEST	I.P.	O.P.	CHARGE	IP. TOT.	OP. TOT.
ACETONE	1	0	0	\$5.00	\$5.00	\$0.00
ACID PHOS	4	1	0	\$19.50	\$78.00	\$19.50
ALBUMIN	15	0	0	\$9.40	\$141.00	\$0.00
ALK PH FR	0	0	0	\$24.00	\$0.00	\$0.00
ALK PHOS	9	4	0	\$15.80	\$142.20	\$63.20
AMYLASE	27	16	0	\$17.00	\$459.00	\$272.00
BILI MACRO	40	9	0	\$12.70	\$762.00	\$114.30
BUN	84	18	0	\$12.00	\$1008.00	\$216.00
CALCIUM	12	1	0	\$13.90	\$166.80	\$13.90
CARDIAC ENZ.	54	7	0	\$54.20	\$2926.80	\$379.40
CHEM 12	176	93	0	\$27.80	\$4892.80	\$2585.40
CHLORIDE	0	0	0	\$9.40	\$0.00	\$0.00
CHOLESTEROL	1	4	0	\$15.80	\$15.80	\$63.20
CHYLOMICRONS	0	0	0	\$8.90	\$0.00	\$0.00
CO2	0	0	0	\$13.90	\$0.00	\$0.00
CPK	16	4	0	\$19.50	\$312.00	\$78.00
CPK ISO	9	0	0	\$41.60	\$374.40	\$0.00
CREAT CLEAR	3	2	0	\$23.30	\$69.90	\$46.60
CREATININE	58	5	0	\$12.00	\$696.00	\$60.00
ELECTROLYTES	202	60	0	\$53.50	\$10807.00	\$3210.00
GASTRIC	1	0	0	\$29.00	\$29.00	\$0.00
GENTAMYCIN	11	0	0	\$37.90	\$416.90	\$0.00
GLU TOL 3M	0	1	0	\$29.00	\$0.00	\$29.00
GLU TOL 4H	0	0	0	\$34.60	\$0.00	\$0.00
GLU TOL 5M	1	2	0	\$40.30	\$40.30	\$80.60
GLUCOSE	311	180	0	\$7.60	\$2363.60	\$1368.00
IRONA TIBC	6	3	0	\$27.80	\$166.80	\$83.40
LDH	5	2	0	\$19.50	\$97.50	\$39.00
LDH ISO	5	0	0	\$37.90	\$189.50	\$0.00
LITHIUM	2	2	0	\$15.10	\$30.20	\$30.20
MAGNESIUM	17	1	0	\$12.70	\$215.90	\$12.70
OSMOLALITY	2	0	0	\$13.90	\$27.80	\$0.00
PANDY	7	0	0	\$6.90	\$48.30	\$0.00
PC/GLUCOSE	0	0	0	\$19.50	\$0.00	\$0.00
PHOSPHORUS	0	1	0	\$12.00	\$0.00	\$12.00
POTASSIUM	57	31	0	\$15.10	\$860.70	\$468.10
PROT ELECT	6	1	0	\$32.80	\$196.80	\$32.80
PROT(CSF)	11	0	0	\$6.90	\$75.90	\$0.00
SALICYLATES	2	1	0	\$13.90	\$27.80	\$13.90
SCOT	7	9	0	\$15.10	\$105.70	\$135.90
SCPT	1	4	0	\$15.10	\$15.10	\$60.40
SODIUM	53	9	0	\$15.10	\$800.30	\$135.90
THEOPHYLLIN	10	1	0	\$37.90	\$379.00	\$37.90
TOT PROT	1	0	0	\$9.40	\$9.40	\$0.00
TRIGLYCERID	0	6	0	\$21.40	\$0.00	\$128.40
UR PROT 24H	0	1	0	\$15.80	\$0.00	\$15.80
URIC ACID	4	6	0	\$15.10	\$60.40	\$90.60
GLUCOSE FRAC(UA)	0	0	0	\$30.00	\$0.00	\$0.00
		1251	485		\$29013.60	\$9896.10
			1736			\$38909.70

**Figure 6c**

CHEMISTRY	TEST	W/LD	IP	IPWK	OP	OPWK	OC	OCWK	N/C	N/C WK
ACC MISC	5.0	0	0	0	0	0	969	4845	1121	5605
ACC 12 STD	5.0	0	0	0	0	0	0	0	0	0
EXPERIMENT	7.0	0	0	0	0	0	0	0	255	1785
ACETONE	3.0	1	3	0	0	0	0	0	0	0
ACID PHOS	20.0	4	80	1	20	10	200	0	0	0
ALBUMIN	5.0	15	75	0	0	0	0	0	0	0
ALK PH FR	26.0	9	0	0	0	0	0	0	0	0
ALK PHOS	5.0	9	45	4	20	0	0	0	0	0
AMYLASE	5.0	27	135	16	80	0	0	0	0	0
BILI MACRO	5.0	60	300	9	45	30	150	17	85	
BUN	5.0	84	420	18	90	0	0	0	0	0
CALCIUM	5.0	12	60	1	5	0	0	0	0	0
CARDIAC ENZ.	15.0	54	810	7	105	0	0	0	0	0
CHEM 12	60.0	176	10560	93	5580	94	5640	45	2700	
CHLORIDE	4.0	0	0	0	0	167	668	137	548	
CHOLESTEROL	5.0	1	5	4	20	2	10	2	10	
CHYLOMICRONS	5.0	0	0	0	0	0	0	0	0	0
CO2	4.0	0	0	0	0	161	644	133	532	
CPK	5.0	16	80	4	20	0	0	0	0	0
CPK ISO	15.0	9	135	0	0	5	75	16	240	
CREAT CLEAR	12.0	3	36	2	24	0	0	0	0	0
CREATININE	5.0	58	290	5	25	3	15	3	15	
ELECTROLYTES	12.0	202	2424	60	720	0	0	0	0	0
GASTRIC	15.0	1	15	0	0	0	0	0	0	0
GENTAMYCIN	5.0	11	55	0	0	0	0	0	0	0
GLU TOL 3H	25.0	0	0	1	25	0	0	0	0	0
GLU TOL 4H	36.0	0	0	0	0	0	0	0	0	0
GLU TOL 5H	35.0	1	35	2	70	0	0	0	0	0
GLUCOSE	5.0	311	1555	180	900	0	0	0	0	0
IRONA TIBC	24.0	6	144	3	72	18	432	6	144	
LDH	5.0	5	25	2	10	0	0	0	0	0
LDH ISO	15.0	5	75	0	0	5	75	6	90	
LITHIUM	2.0	2	4	2	4	7	14	2	4	
MAGNESIUM	5.0	17	85	1	5	3	15	3	15	
OSMOLALITY	10.0	2	20	0	0	2	20	7	70	
PANDY	6.0	7	42	0	0	12	72	0	0	0
PC/GLUCOSE	12.0	0	0	0	0	0	0	0	0	0
PHOSPHORUS	5.0	0	0	1	5	0	0	0	0	0
POTASSIUM	2.0	57	114	31	62	175	350	145	290	
PROT ELECT	15.0	6	90	1	15	11	165	2	30	
PROT(CSF)	12.0	11	132	0	0	9	108	13	156	
SALICYLATES	5.0	2	10	1	5	8	40	6	30	
SCOT	5.0	7	35	9	45	0	0	0	0	0
SCPT	5.0	1	5	4	20	0	0	0	0	0
SODIUM	2.0	53	106	9	18	177	354	147	294	
THEOPHYLLIN	5.0	10	50	1	5	0	0	0	0	0
TOT PROT	5.0	1	5	0	0	0	0	0	0	0
TRIGLYCERID	21.0	0	0	6	126	15	315	0	0	0
UR PROT 24H	12.0	0	0	1	12	3	36	3	36	
URIC ACID	5.0	4	20	6	30	0	0	0	0	0
GLUCOSE FRAC(UA)	0.0	0	0	0	0	0	0	0	0	0
		1251	18080	485	8183	1886	14243	2069	12679	
TOTAL TESTS =	5691						53185			

The BASIC COMPILER TRS-80 PEOPLE HAVE BEEN WAITING FOR . . . . .

# ZBASIC 2.0

## ALL NEW FEATURES INCLUDE:

1. AVERAGE SPEED INCREASES OF 10-100 TIMES IS TYPICAL AFTER COMPILING!!!!
2. ZBASIC 2.0 code is fully relocatable. Move it anywhere!
3. ZBASIC 2.0 now supports STRING and NUMERIC ARRAYS to any dimension (Memory being the only limit)
4. ZBASIC 2.0 now supports all variable names. Variable names like AB, ZP, GROSS, E3, LENTH etc. are supported
5. ZBASIC 2.0 now supports DISK SEQUENTIAL FILES.
6. ZBASIC 2.0 now supports special CASSETTE I/O.
7. ZBASIC 2.0 IS STILL 100% INTERACTIVE! No need for tedious linking loaders or runtime modules. Jumping back and forth between BASIC and COMPILER is easy and fast.
8. DEBUGGING IS A BREEZE WITH ZBASIC 2.0.
9. ZBASIC 2.0 now supports STRINGS in DATA statements.
10. COMPILING A PROGRAM IS AS EASY AS TYPING IN 3 KEYS! (.../)
11. ZBASIC 2.0 now supports HIGH PRECISION MATH to 62 digit precision. (add, subtract, multiply, divide). There are no Binary rounding problems because ZBASIC 2.0 uses BCD!
12. ZBASIC 2.0 compiles the entire program! No partial compilation, like some other compilers.
13. TYPICAL COMPILATION TIME IS 10-15 SECONDS!
14. ZBASIC 2.0 NOW SUPPORTS MID\$, LEFT\$, RIGHT\$, STRING\$!
15. NO ROYALTIES IMPOSED ON PROGRAMS COMPILED BY ZBASIC!
16. ZBASIC 2.0 will LOAD and COMPILE existing BASIC programs, but almost all will require some modifications.
17. MOD I compiled programs will run on MOD III and VISA-VERSA!
18. Programs may be compiled and relocated to top of memory to be used as BASIC USR calls.
19. TRON/TROFF now supported!
20. Improved run-time error handling.
21. ZBASIC 2.0 saves object code to tape or disk. (Depending on version.)
22. 50+ page manual with many examples.
23. DISK CHAINING with VARIABLE SAVE subroutines in manual.
24. NEW FUNCTIONS IN ZBASIC THAT BASIC DOESN'T HAVE!
  - A. MUSIC AND SOUND EFFECTS COMMAND.
  - B. HIGH SPEED BLOCK MEMORY MOVE COMMANDS. (LDIR, LDDR)
  - C. HIGH SPEED INVERT COMMAND.
  - D. INTERRUPTS ON/OFF COMMANDS.
  - E. STACK POINTER CONTROL.
  - F. SPECIAL HIGH SPEED MULTIPLY/DIVIDE COMMANDS.
  - G. 16 bit PEEK.
  - H. Special USR calls. Pass parameters to DOS or ROM subroutines! Customized USR calls.
  - I. High accuracy delay loop command from .00005 sec. to 18 hours.

J. HIGH SPEED MEMORY SEARCH COMMANDS. (CPIR, CPDR)

K. ZBASIC (Disk version) comes with CMD/File program from MISOSYS for transferring machine language files from disk to tape!!

## \*\*\*ZBASIC 2.0 DIFFERS from BASIC in these ways:

1. NO RANDOM ACCESS DISK I/O OR COMMANDS.
2. NO SINGLE OR DOUBLE PRECISION VARIABLES or COMMANDS (Use ZBASIC 2.0's HIGH PRECISION INSTEAD)
3. The following SCIENTIFIC MATH functions are not supported: ATN, EXP, COS, SIN, LOG, SIN, or TAN (Subroutines to do these functions are included in the ZBASIC 2.0 manual)
4. Some ZBASIC 2.0 commands do not work exactly as BASICs commands work. For instance, END jumps to DOS, STOP jumps to BASIC READY. Other commands may also differ slightly
5. MEMORY LIMITATIONS. A simple equation to approximate memory required to compile a given BASIC program is your FREE MEMORY SIZE, MINUS 6000, DIVIDED BY TWO.
6. Since programs compiled by ZBASIC 2.0 are no longer in BASIC, DIRECT COMMANDS like EDIT, CONT, LIST, LLIST, MEM AUTO etc. are not supported. Although they may be used while in BASIC before compiling.
7. All other commands not supported by ZBASIC 2.0 not described above: CMD, DEF, FN, ERR, ERROR, ERL, RESUME, USING, FIX, FRE, INSTR, TAB, TIME\$, CDBL, CINT, CSNG

So if you'd like the high speeds and controls capabilities of assembly language, but want the ease of use of BASIC, ZBASIC 2.0 is the answer

ZBASIC 2.0 is available for TRS-80 MOD I or III or PMC-80 computers.

ZBASIC 2.0	16K/32K/48K TAPE VERSION and MANUAL	79.95
ZBASIC 2.0	32K/48K DISK VERSION and MANUAL	89.95
ZBASIC 2.0	TAPE and DISK VERSIONS and MANUAL	99.95
ZBASIC 2.0	MANUAL (APPLIES TO ZBASIC PURCHASE PRICE)	25.00

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Ver 1.5

**\*\* PROCESSOR \*\***

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- b. DELETE LINES/CHARACTERS
- c. EXTRA SIMPLE BLOCK MOVE. NO MARKERS TO DEFINE.
- d. PAGINATION
- e. FOOTERS/HEADERS
- f. AUTO KEY REPEAT
- g. FIND/REPLACE
- h. BLINKING CURSOR
- i. COMPLETE FORMAT CONTROL.
- j. JUSTIFICATION
- k. CENTERING

SCP IS FUN!



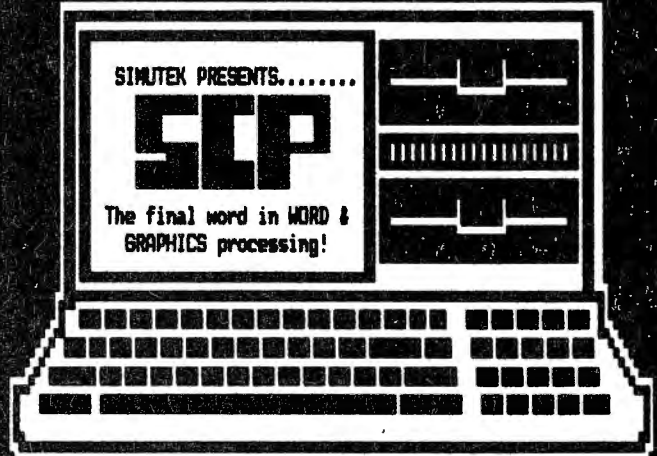
(CLEOPATRA?)

### SPECIAL FEATURES INCLUDE:

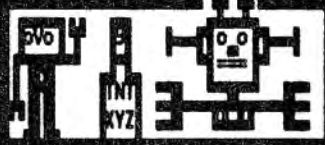
- a. GRAPHICS! SCP graphics use a special blinking pixel cursor that you control with the four arrow keys. Drawings of graphs, logos, cartoons borders, diagrams etc. can be drawn into the text easily and may be erased, deleted, block moved etc.
- b. SCP allows UNDERLINING on both EPSON and OKIDATA! (EPSONS REQUIRE EPSON TYPE TRS-80 CABLE)
- c. SCP allows you to change character size in the text at will, even on the same line!
- d. SCP allows full control of EMPHASIZED and DOUBLE EMPHASIZED printing, even on OKIDATA printers!
- e. Fast scrolling of screen left, right, up or down. Screen is like a window on your documents.
- f. Text or graphic files too large for memory may be chained from disk and allow full control of pagination, headers, footers etc. (DISK VERSION ONLY)
- g. Fast keyboard input for fast typists.
- h. All commands have been made to be remembered easily. For instance: Control I=insert, Control D=delete, Control B=block move etc.

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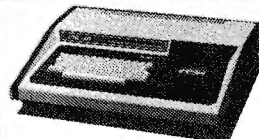
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# Menu-80

Run any program using a single keystroke

Model I/III 32K with NEWDOS or LDOS

Alan Simon  
Bergenfield, NJ

MENU-80 is essentially a small utility program that should be on every diskette. It allows the user to run any of the programs on the diskette with one keystroke using the CMD"DIR" function. Simply save the program on the diskette (save "MENU/BAS") and you have access to every program, machine language as well as BASIC, through just one program! If you wish,

you may automate your entire program library by substituting run "MENU/BAS" wherever the end statement is in any program you have.

For faster execution, delete these instructions before saving this program: (line 50, 350-510) press <ENTER> to exit the program.

```

10 '* MENU-N80 - FOR THE TRS-80
20 '* FOR USE WITH NEWDOS DOS ONLY
30 '* BY ALAN SIMON, BERGENFIELD NJ 0
   7621
40 '* VERSION 2.3 - WRITTEN 11/25/80
50 GOTO350
60 CLS: CLEAR1000: DEFINT A-Z: DEFSTR A-C, F,
   V
70 Z=0: Y=0: X=0: T=0: R=0: Q=0: P=0: N=0: M=0:
   L=0: K=0: J=0: I=0: D=0
80 DIM A(26): CMD"DIR"
90 FOR P=15488 TO 16256 STEP 64: FORT=0 TO 2
100 R=P+20*T: IF PEEK(R)=32 THEN N=N+1: GOTO
   130
110 FORM=RTOR+12: IF PEEK(M)<>32 THEN A(N)=
   A(N)+CHR$(PEEK(M)): NEXT M
120 N=N+1: NEXT T, P
130 D=PEEK(15385)-48
140 FOR I=15391 TO 15399: IF PEEK(I)<>32 THEN
   B=B+CHR$(PEEK(I)): NEXT I
150 FOR Y=15403 TO 15412: C=C+CHR$(PEEK(Y))
   : NEXT Y
160 CLS: F=STRING$(2,191): PRINT@0, CHR$(1
   91); STRING$(62,131);
170 FOR Z=63 TO 959 STEP 64: PRINT@Z, F; : NEXT
   Z
180 PRINT@193, STRING$(62,131);
190 PRINT@961, STRING$(62,176); : POKE1638
   3,191
200 PRINT@84, "* MENU-N80 FOR DRIVE"; D; "
   *";
210 B="DISK NAME: "+B: C="CREATED: "+C
220 PRINT@144-INT(LEN(B)/2), B; : PRINT@17
   6-INT(LEN(C)/2), C;
230 IF N=-1 THEN PRINT@533, "NO PROGRAMS ON
   DISKETTE"; : GOTO340
240 FOR J=260 TO 964 STEP 64: FOR K=0 TO 2
250 IFL=N+1 THEN 270 ELSE PRINT@J+K*20, CHR$
   (L+64); " "; A(L);
260 L=L+1: NEXT K, J
270 PRINT@901, "INDICATE CHOICE (a-"; CHR
   $(N+64); " ";
280 V=INKEY$: IF V="" THEN GOSUB320: GOTO280

290 Q=ASC(V)-64: IF Q<0 OR Q>N THEN 280
300 PRINT@924, V; : PRINT@930, "EXECUTING "
   ; A(Q);
310 IFRIGHT$(A(Q),4)="/CMD" THEN CMDA(Q) E
   LSERUNA(Q)
320 PRINT@923, " "; : FOR X=1 TO 75: NEXT: PRIN
   T@923, "?";
330 FOR X=1 TO 75: NEXT: RETURN
340 GOTO340
350 CLS: PRINTTAB(19); "MENU-N80 - FOR TH
   E TRS-80"
360 PRINTTAB(15) "FOR NEWDOS DOS ONLY -
   BY AL SIMON"
370 PRINT
380 PRINT"      MENU-N80 IS ESSENTIAL
   LY A SMALL UTILITY PROGRAM"
390 PRINT"      THAT SHOULD BE ON EVERY DI
   SKETTE. IT ALLOWS THE USER"
400 PRINT"      TO RUN ANY OF THE PROGRAMS
   ON THE DISKETTE WITH ONE "
410 PRINT"      KEYSTROKE USING THE CMD"CH
   R$(34)"DIR"CHR$(34)" FUNCTION. SIMPL
   Y SAVE THE"
420 PRINT"      PROGRAM ON THE DISKETTE (S
   AVE"CHR$(34)"MENU/BAS"CHR$(34)") AND
   NOW YOU"
430 PRINT"      CAN ACCESS EVERY PROGRAM,
   MACHINE LANGUAGE AS WELL AS"
440 PRINT"      BASIC, THROUGH JUST ONE PR
   OGRAM! IF YOU WISH, YOU MAY"
450 PRINT"      AUTOMATE YOUR ENTIRE PROGRA
   M LIBRARY BY SUBSTITUTING"
460 PRINT"      RUN"CHR$(34)"MENU/BAS"CHR$
   (34)" WHEREVER THE END STATEMENT IS I
   N ANY "
470 PRINT"      PROGRAM YOU HAVE."
480 PRINT"      FOR FASTER EXECUTION D
   ELETE THESE INSTRUCTIONS"
490 PRINT"      BEFORE SAVING THIS PROGRAM
   (LINES 50, 350-510)
500 PRINTTAB(12) "PRESS =ENTER= TO EXIT
   THE PROGRAM";
510 IF INKEY$<>CHR$(13) THEN 510 ELSE END

```





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# More tape less tears

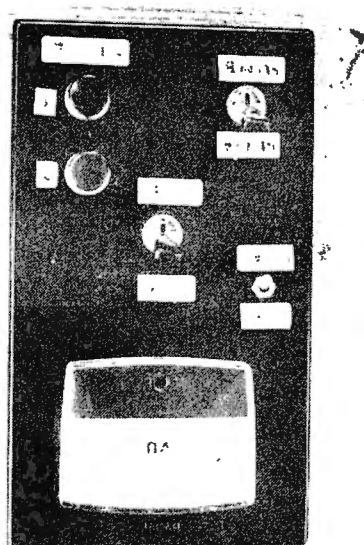
Eliminate tape load problems

**Model I/III**  
Spencer Hall  
Associate editor

In the July/August, 1981 issue of *80-U.S. Journal*, my article "Tape Without Tears," suggested that staying with a tape storage system might not be such a bad idea after all. If personal computing is a hobby with you and not a business, you might want to pass up the cost of an expansion interface and a disk drive. You might choose, instead, to spend what you can save this way on a printer and perhaps another 32K of RAM. Slower access time and loading is a small price to pay for these luxuries.

To make the tape system 99% reliable and generally easier to get along with, we advised readers to build a simple black box and mount a VU meter on it for monitoring the strength of the input signal, which the tape deck sends to the CPU during a CLOAD. With this simple setup, the volume can be adjusted to "please" your CPU no matter what the recorded level of the program tape may be—as long as the bits are all there and in good shape, of course.

Did it work? Of course it did! We'll



**Figure 1**

*Special note: When a toggle switch is thrown in one direction, the center (switchable) contacts are switched to the contacts on the opposite side of the switch from that toward which the handle is thrown. For this reason, labels on the switches in these diagrams appear to contradict the connections shown.*

assume that some of you constructed the black box we described and have tamed the CTR-80 (or CTR-41). You've had four months to do the job and if you're still fiddling with that infamous black dial, attempting to get a good load on the third, fifth or "nth" attempt, you have only yourself to blame.

This month we start over again and virtually rebuild the box from scratch. If you missed the previous article, it doesn't matter.

Byte for byte, tape is by far the least expensive storage medium for personal computers. Even more important, the largest, most varied and inexpensive selection of software for the TRS-80 is available on tape. However, the ultimate reliability of a cassette system comes only when you move up to a good tape deck, so here are some things to look for when you go shopping for one.

Consider only a top-of-the-line portable monophonic recorder. Any one of these will have a number of

very desirable and useful features. Not the least of these is durability. There should be a year's warranty, because you'll give your recorder some very heavy use. Then there is high fidelity. Circuitry in the better models can be depended on to generate the square wave your CPU simply must have in order to hear and count bits accurately.

When you go shopping for your recorder take a test tape with you. It should be short, probably a C-20 (ten minutes on a side) and should be entirely blank. Run it back to the very beginning in your present deck, zero the turn counter and accurately time a FAST FORWARD wind from one end to the other. Also, note the FAST WIND time and the number of counter turns when you set out.

Test any recorder you consider buying. If the dealer won't let you do this, move on. Look for a deck which rewinds the tape in a significantly shorter time and counts a significantly greater number of turns than your Radio Shack deck. Also, look for a shorter rewind time and greater number of turns counted. Such a machine will let you zip back to the start, zero the counter and find a particular program at a particular address in a minimum of time and, because of the greater counter sensitivity, with increased accuracy. This is important because it helps to prevent CLOADing at a spot where a program is already running.

Test also for spikes, or "pop"s. Start the tape in the play mode—completely rewound, with the counter set to zero—and run to a predetermined point on the counter, say 025, then press the stop lever. Now rewind the tape all the way and play it again, this time with the volume turned all the way up. Listen closely as the counter passes the point at which you stopped it previously. If you hear a trace of a sound at this point, forget that model.

Look for a model with an easy-to-see volume control. The so-called "glide path" control, on the top of the deck, is ideal but rather hard to find. This lets you see, adjust and

remember volume settings with great ease. Failing this, settle for a large and easily visible rotary control. The idea is to be able to mark this control with a dab of white enamel or typewriter opaque to identify the "point of balance" we're going to describe next.

Contrary to what you may have heard, automatic recording level is not essential. If the same volume control which determines output level also controls recording level, there will be a setting which I call the point of balance, at which a recording from your CPU can be made which will then load perfectly at that same setting. You will be able to find this without difficulty using the VU meter box which we'll assume you already have. You'll need this box, including the additions we're going to describe, with almost any quality recorder you buy. It's true of nearly all good recorders that when the motor is under control of your CPU, the rewind and fast forward functions cannot be operated without an override button which shorts the CPU relay circuit. What's more, nearly all other decks have a higher starting current than the CTR-80 and are likely to damage the relay in your CPU unless you add a hardware fix to your meter box. Fortunately, this is cheap and easy to do, as you will presently see.

Another handy feature is automatic counter memory, useful when you want to return to the start of a program or data recording whose exact location on a tape is uncertain. Tone control is helpful because it can be left at the highest setting. This optimizes the chance of a good load. The TRS-80 doesn't like baritone input. Choose a recorder with gentle key action. Besides being a bother to operate, my experience over the years has been that decks with stiff key actions tend to fail under constant use. There are few things as maddening as a "play" key that simply won't lock in place when it is depressed.

When you find a recorder which meets or approximates the specifications we have just laid

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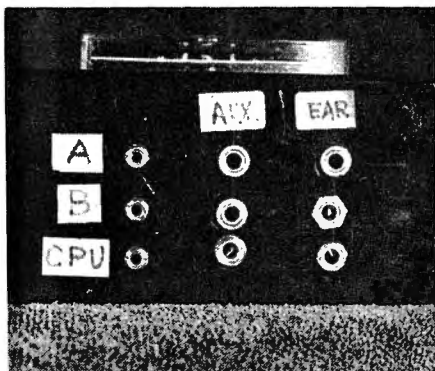


Figure 2

out—buy two! You'll never regret it.

Now, let's talk about upgrading your meter box to take advantage of these deluxe tape decks. To refresh your memory, figure one shows the top of your meter box. Figure two shows the back end with all nine jacks mounted. The bottom row consists of a subminiature jack and two miniature jacks accepting, from left to right, the REMOTE, AUX (gray) and EARPHONE (black) plugs from the CPU. The two rows above (one row for each tape deck) accept patch cords to the corresponding jacks on the tape decks.

Referring to figures 5 and 6, connect the two contacts on each side of the DPDT switch to the center contacts of the jacks which will accept the patch cords to earphone and aux of your two recorders. Be sure to keep the black (earphone) leads on one side of the switch and the gray (aux) leads on the other. Connect the plus side of the VU meter to the earphone side of the middle (switchable) contacts on the DPDT (Part # 275-652) switch. A wire running through the ground sides of all six miniature jacks (the negative side of the VU meter) completes the input/output switching system.

Now get a miniature relay requiring preferably six to nine volts to operate which draws 10 milliamps of current and mount it in any handy spot inside your black box. Radio Shack stock number 275-004 or equivalent will do. Mount another DPDT switch in the lower left of your box (see figure one). The

center (switchable) contacts on this switch are connected to the two switchable leads on the relay. Connect the two center contacts from the upper two subminiature jacks at the back (which accept patch cords to the two tape decks) respectively to the two outside pairs of contacts on the second DPDT switch. From the subminiature jack, which accepts the subminiature plug from your CPU, one wire connects directly to one coil lead on the relay. The other connects to one side of the external voltage jack. A

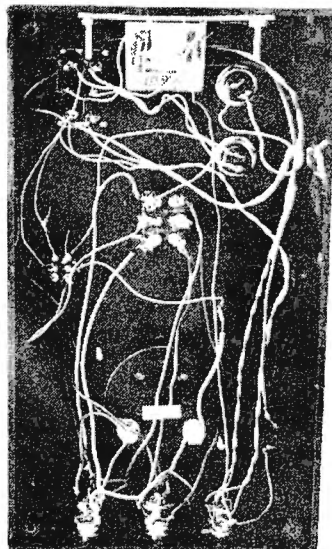


Figure 3

wire from the other side of the battery to the other coil lead of the relay completes the hookup. There's a diagram packed with the relay which shows the coil and the switchable leads coming from it. There is no polarity to worry about in the relay hookup.

The two momentary-on button switches visible at the lower right in figure one are simply wired across the subminiature jacks for the two decks—one button for each deck (figure five). These let you rewind and locate an address on a data file tape while the program which uses the file is being loaded on the other deck—a neat time saver.

Keep the above paragraphs handy as you work and execute each

instruction in sequence and you should have no trouble. If you promise not to laugh, you can look at figure three and see the amateurish workmanship with which I wired the whole box. I went heavy on the heat . . . there's nothing easily damaged and I'm proud to say that this thing really works!

When I built this box, the local Radio Shack store had only twelve volt relays in stock. Being an impatient sort, I bought and installed one. This required a twelve volt power source. What do do? My answer was two massive six volt lantern batteries bought at the local supermarket at 10:30 p.m.! These I taped together and wired in series. This voltage comes in through the jack you see at the left in figure three. A case of overkill if there ever was one. This power source is limited, I am sure, only by the shelf life of the two monsters hiding behind the tape recorders seen in figure four.

With a six to nine volt relay you can use a relatively tiny nine volt battery tucked somewhere inside your black box. How long will it last? Don't ask me! Anyway, you can replace it every month at no cost with a complimentary free battery card from your local Radio Shack store. With this setup your CPU relay should last indefinitely.

When your control box is complete, label the jacks on the end as shown in figure two assuming, of course, that you have wired it



Figure 4

Does your CP/M\*\* or TRS-80\* Word Processor need help?

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Aspen Software programs are professional quality, reliable software tools developed for the TRS-80 and CP/M by a Ph.D. in Computer Science. All software is protected by Aspen Software's low cost upgrade privilege for new versions. Other tools include:

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**IMPORTANT:** Specify computer model, operating system, memory size, and number of drives when ordering! For CP/M, currently only 8" single density CP/M versions available. Please inquire about other CP/M disk formats. All TRS-80 versions available. Manual only orders can be applied to final purchase. CP/M prices are introductory.

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correctly and inserted the patch cords as the labels indicate. Test play a tape you wish to input by using the override button (no plugs to pull out). Don't call CLOAD but "listen" to the tape on the VU meter. Adjust the volume for approximately -4 Db, rewind it and try a CLOAD. With a little experimentation you will be able to find the best setting for all your tapes. They will tend to differ. Most important of all is the setting for tapes you make yourself.

Visible in figure one is a miniature DPDT switch marked COPY and NORMAL. This is used to modify the connections as follows. When

the other switches are set to access and control deck B, setting this switch to COPY returns control of deck A to the operator. It also causes the CPU to "listen" to deck A even though it is recording on deck B. With a 45-byte machine language signal conditioner program resident in the computer, it is now possible to play a program tape on deck A and record it simultaneously on deck B, with greatly improved quality. I use this setup to make working copies of purchased software which are standardized in the "voice" of my computer. There is a secret circuit which causes the entire computer to

self destruct if this system is used to pirate software!

Figure four shows my tape-based computer setup. The homemade tape rack at the left contains many of the utilities one would expect to have on disk and I'm having a ball developing more. The two tape decks stand on a homemade rack fitted over 32K of additional RAM. The little honey at the right is a dot matrix printer (Microline-80). The monitor is at eye level on a rack which has space at the left for my major reference books and documentation. As I say—who needs disk? ■

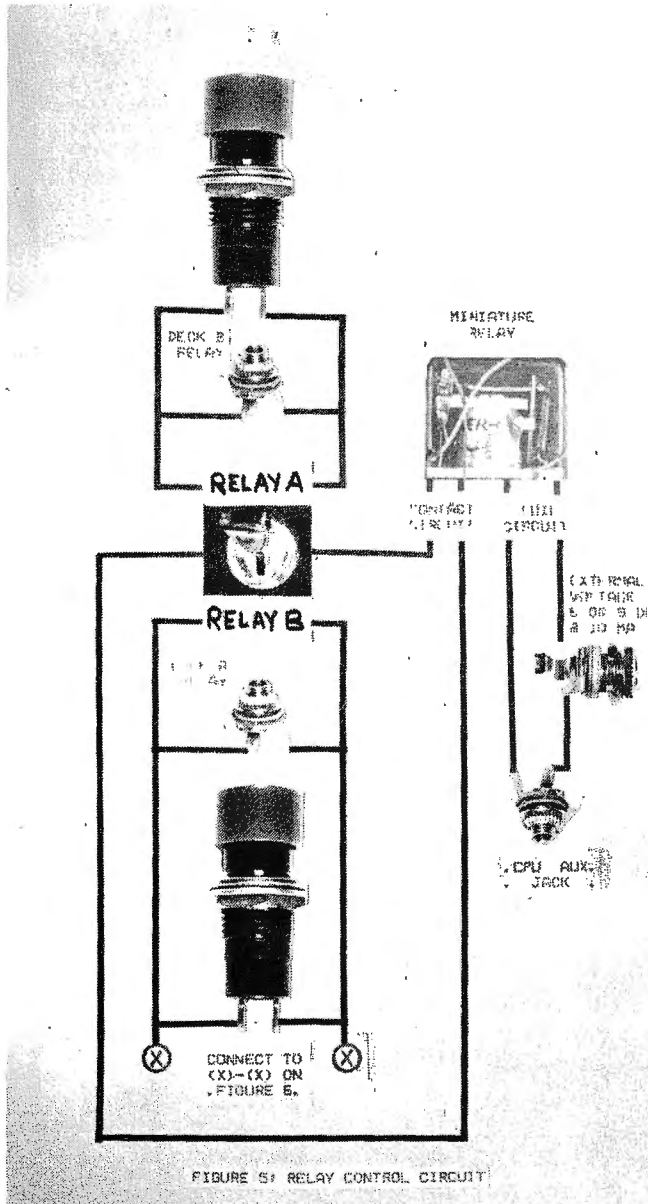


Figure 5

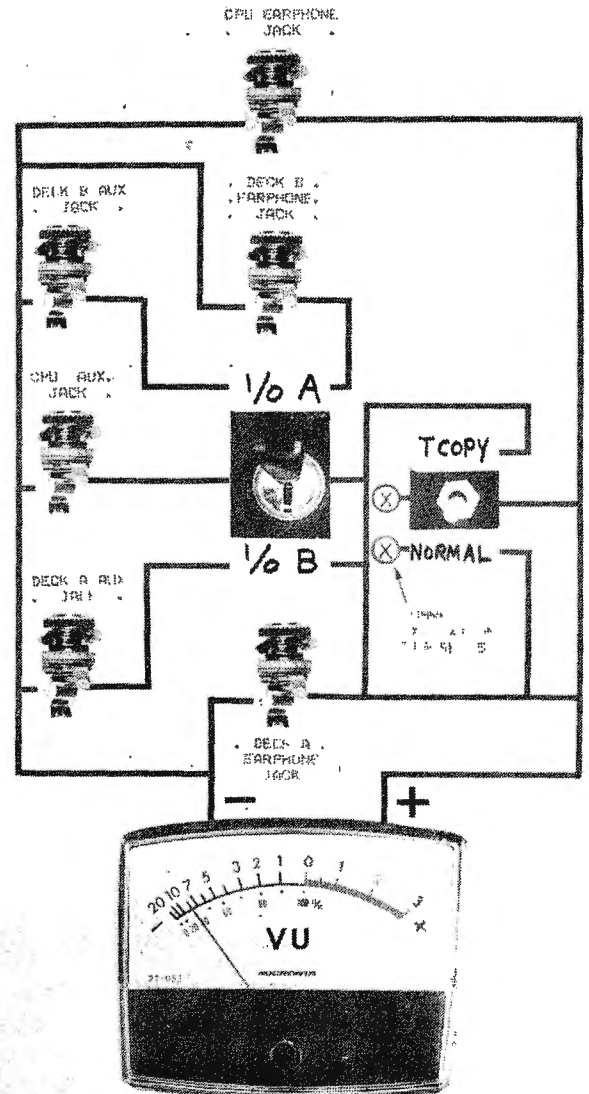
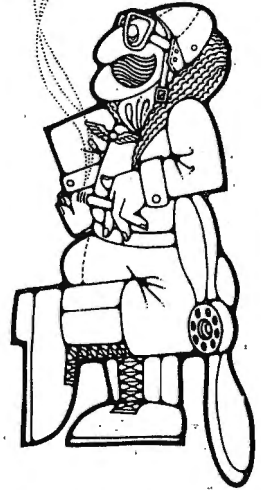


Figure 6



# Dog fight



Stephen Fournier  
Surrey, B.C., Canada

It seems inevitable with any computer system that game programs will multiply faster than rabbits. The prime difference between the Pocket Computer version of a game and the larger computer with a video display is the lack of flying saucers, shooting missiles or dancing demons. This causes most Pocket Computer games to be more mathematical in nature with a lot of number-juggling, both in the computer and in the players' minds. This last statement is not as bad as it may sound because in this day of inexpensive but smart computers, independent thinking is at a premium.

Such is the case with the game "Dog Fight." The game is designed for two players or teams. Each player picks a secret number between 10 and 100, but it can't end in a zero. The object is to "shoot down" your opponent by multiplying or dividing your number to end with an answer that equals that of your opponent. The computer will round off your answer to the nearest integer. If you miss, your new answer becomes your opponent's new target. Addition and subtraction are strictly forbidden. If your answer equals or is less than zero, you lose. If your answer goes over one hundred, it is diminished until it is equal to or less than 100, e.g., 1045 will become 45.

A sample game may go as follows: Entering RUN displays DOG FIGHT. Push ENTER to begin play. Each player enters his/her initials and secret number, e.g., "S.F., 49." Then the second person's turn: "D.S., 71." The display will show that S.F. is (A) and D.S. is (B), so you always know whose turn it is. Push ENTER and you have (A), TARGET-71. Your . . . 49. It's S.F.'s turn and his target is 71. After thinking about it, he pushes ENTER, then types  $49 * 1.7$ . (Always start with your own number and multiply or divide.) The computer beeps once, then flashes "YOU MISSED" and displays (B), TARGET-85 YOUR . . . 71. D.S. shoots  $71 * 1.2$ , misses and now it's (A), TARGET-85 YOUR . . . 83. S.F. shoots  $83 * 1.06$  which leaves (B) TARGET-88 YOUR . . . 85. D.S. shoots  $85 / 8$ , but going to 106, becomes 6. (A) TARGET-6 YOUR . . . 88. S.F. tries to drop fast by  $88 / 11.3$ , but now it's (B) TARGET-8 YOUR . . . 6. D.S. tries  $6 * 1.3$  (equals 7.8, rounded to 8) and wins. You are then asked if you want to play again.

Some special features are that both players may not begin with the same numbers. If you forget to enter your

equation to shoot down your opponent, or accidentally push ENTER twice, you lose your turn without affecting the value of the numbers.

```

1 :PRINT"DOG FIGHT"
2 :PAUSE"COPYRIGHT 1981"
3 :PAUSE"BY STEVE FOURNIER"
10 :CLEAR :INPUT"1ST PERSONS INITIALS?"
    ;A$
20 :INPUT"ENTER YOUR NUMBER?";B
30 :INPUT"2ND PERSONS INITIALS?";C$
40 :INPUT"ENTER YOUR NUMBER?";D:E=B
50 :PRINTA$;"IS (A) ";C$;"IS (B) "
55 :IF D=B BEEP 1:GOTO150
60 :PRINT" (A),TARGET=";D;"YOUR..";B
70 :INPUT"EQUATION?";E:E=E+.5:E=INT E:I
    FE=D GOTO400
75 :IFE<0 THEN 200
80 :GOSUB 300
95 :B=E:E=D
100 :PRINT" (B), TARGET=";B;"YOUR..";D
110 :INPUT"EQUATION ?";E:E=E+.5:E=INT E
    :IF E=B GOTO 400
115 :IF E<=0 THEN 200
120 :GOSUB300
140 :D=E:E=B:GOTO60
150 :PRINT"SAME NUMBERS, TRY AGAIN":GOT
    010
200 :PRINT"DEFAULT! ANSWER IS <=0":GOTO
    410
300 :BEEP 1:PAUSE"          YOU MISSED":I
    F E>100 THEN 308
305 :RETURN
308 :BEEP1:PAUSE"YOU ARE NOW OVER 100"
310 :FOR W=E TO 0 STEP -100
320 :IFW<=100 THEN 330
330 :PRINT"YOU WERE ";E;" YOUR ";W
340 :E=W:RETURN
400 :BEEP 2:PRINT"          YOU WIN"
410 :PRINT"WANT TO PLAY AGAIN ? >"
420 :INPUT" (1)YES OR (2)NO ?";S
430 :IF S=THEN1 THEN 10
440 : END

```

# Enter The Soft Sector Marketing ARCADE CENTER

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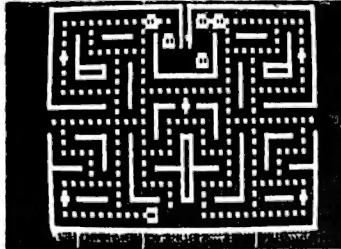
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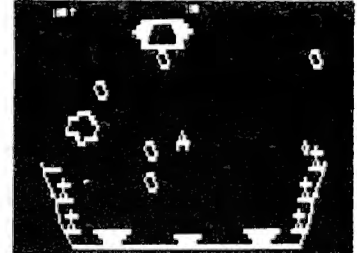


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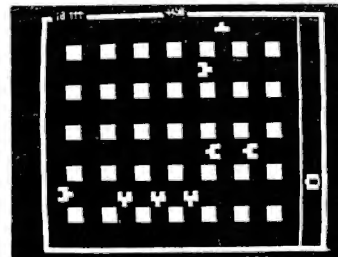
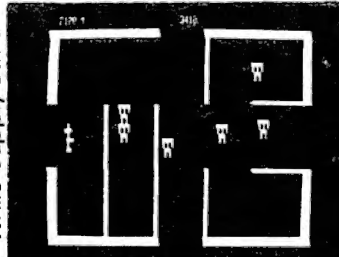
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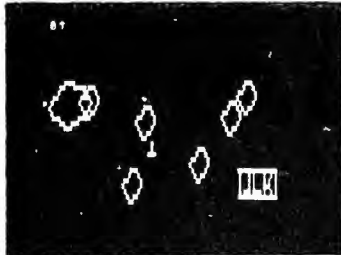
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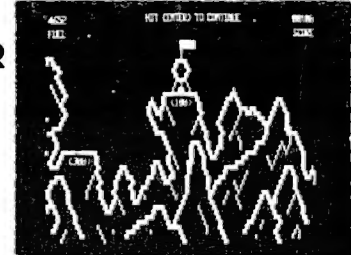


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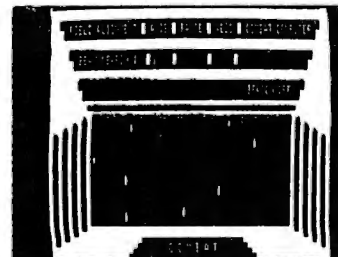
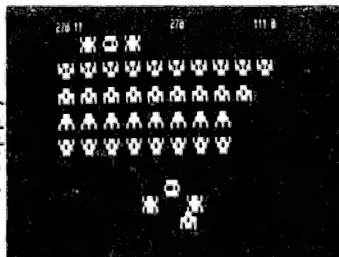
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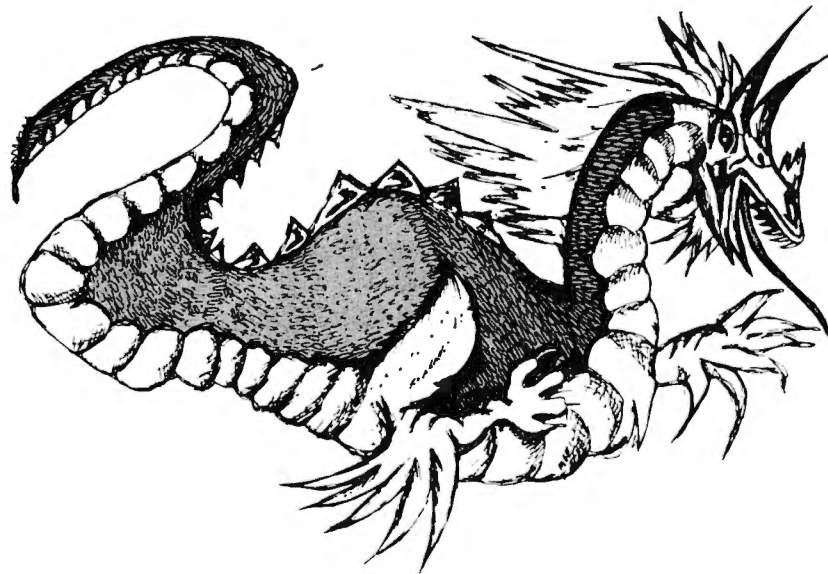
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---

# Captain 80



Bob Liddil  
© 1982

Here's Joe Journalist, reporter's badge in hand, at the home of A. Fearsome Dragon, freelance creature for fantasy simulations, computer games and parties. A. F. Dragon is generally reclusive and granted this interview only after receiving assurance that his privacy would not be disturbed by tourists.

**Joe:** Mr. Dragon, is it true that you plunder, pillage and ravish countrysides on a contract basis?

**A. F. D.:** Yes, Joe, that's correct. In my industry, I'm rated third in the world in plunder and pillage. Plus, last year, in the Slobbovian nationals, I placed first overall in princess snatching.

**Joe:** Very impressive. Tell me, how did you get started in this unusual business?

**A. F. D.:** I began with bit parts in books and legends with my first big break coming opposite a fellow called St. George. Later, with the advent of motion pictures, I became an international star. Of course, I lost a measure of privacy. Vacationing at Loch Ness, a lot of nosy tourists began cluttering up the place trying to take my picture. Dreadful.

**Joe:** Now, I understand, you've

entered the microcomputer game industry.

**A. F. D.:** Yes, and it's so exciting. The assignment I had last year with Microsoft was really cushy. All I had to do was lay around in a cavern, munch out on a few adventurers and pose for a publicity picture which turned out to be a rather good likeness.

**Joe:** Have you had any other assignments in computers?

**A.F.D.:** Oh, yes. As Smaegor the Terrible, in *The Programmer's Guild Dragonquest*, I kidnapped a princess and terrorized an entire kingdom. I must've gobbled hundreds of would-be rescuers—lovely fun. They've even asked me back for an encore performance in the sequel, *Dragonhunt*, though I suspect that one will be a bit more physical than the first.

**Joe:** As a creature of the world, what are your observations concerning this new industry, microcomputer fantasy?

**A.F.D.:** Well, to be perfectly honest, I think the entire concept of gaming on computers is getting sidetracked. Used to be, a dragon, basilisk or minotaur could get a good job in an adventure or dungeons-and-dragons simulation. There were towns to be toppled and

princesses to run off with. Life was a happy place for creatures of violence. Lately, trends have been turning toward mindless arcade games and (ugh) business programs. I chanced to stop by the union hall the other day and glanced at the bulletin board. Unemployment is here! Can you imagine a highly qualified dragon like myself stooping to take a job in an accounts receivable package? Osborne'll just have to get someone else. I'm not that broke!

**Joe:** What would you recommend to young dragons just getting started in microfantasy?

**A.F.D.:** Get a good agent! Otherwise you'll end up as a tank driver in a Big Five arcade game or as a pilot for an alien invasion. But most of all, whatever you do, whether it be traditional monster fare or the new hybrid stuff, do it well. After all, we creatures do have reputations to maintain.

**Joe:** Thank you A. F. Dragon, for that fascinating look at the world of microfantasy. And good luck with *Dragonhunt*!

Here's Joe Journalist, picking up his tape recorder after another grueling assignment. If the editor springs for a raise this year, I might be able to afford tape . . . ■



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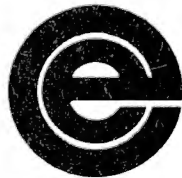
The *CCI* also contains a 2K machine-language monitor, with which you can examine (and change) memory, set break-points, set memory to a constant and block-move memory.

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# Laying it on the line

## Exploring the graphics *LINE* function

Color Computer

Don Scarberry  
Editor

The TRS-80 Color Computer with extended BASIC, is endowed with some very powerful commands. The *LINE* function, in particular, may be used for very fancy geometric artwork.

There are eight short listings included here which will help demonstrate the complex nature and power of the *LINE* function. The user's manual does not offer more than an elementary approach for the use of these functions, so you might find the techniques demonstrated here valuable in future programming efforts.

Each listing contains a single *LINE* function which uses variables instead of constants for the arguments. The variables are assigned values by setting them equal to predetermined values, then varying them with the use of *FOR . . . NEXT* loops. The objective is to have the program draw a line at some predetermined position. Change the values of the arguments in the *LINE* function and draw another line (without erasing the one previously drawn). Continue drawing lines at different locations on the screen until the desired geometric pattern has been obtained.

Line 100 in each listing is the familiar *LINE* function. Notice that the arguments are variables, not constants (numbers). Lines 60 and 70 of each listing establish constant locations for either the starting or ending points of each line being drawn. Lines 80 and 90 are nested *FOR . . . NEXT* loops. The loops are designed to increment up to the limit of the video screen's graphics location and step at different rates for each listing. Line 130 causes the geometric pattern to remain on the screen.

You should experiment with these listings by varying the *FOR . . . NEXT* loops and *STEP* functions, then select different values for lines 60 and 70. What you do with these listings is entirely up to you. An interesting question: What pattern would result if you vary lines 60 and 70 using repeatedly nested *FOR . . . NEXT* loops?

These techniques allow you to select a desired pattern and write a program to draw it. You will only need to determine parameters for all the variables used in these listings. Don't forget that more than one *LINE* function may be used in these listings to draw even more complex patterns. Are you beginning to see how powerful the Color Computer is?

### Listing 1

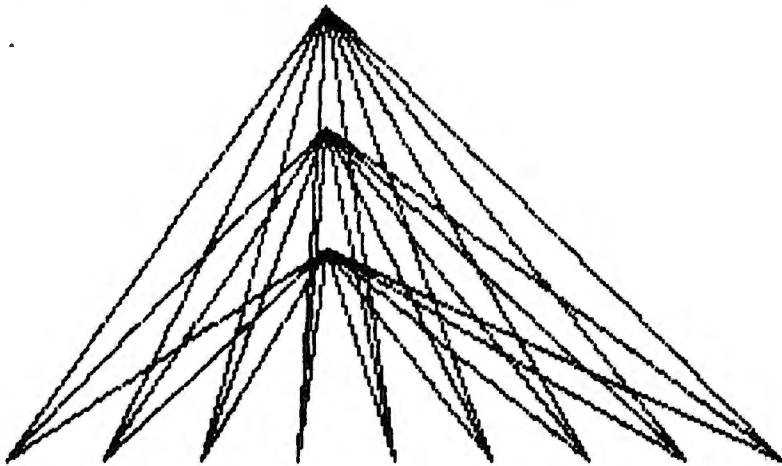
```
20 PCLEAR8
30 PMODE4,1
40 PCLS
50 SCREEN1,1
60 X2=100
70 Y1=150
80 FORX1=1T0255 STEP30
90 FORY2=1T0100STEP40
100 LINE(X1,Y1)-(X2,Y2),PSET
110 NEXT Y1
120 NEXT X2
130 GOT0130
```

### Listing 2

```
20 PCLEAR8
30 PMODE4,1
40 PCLS
50 SCREEN1,1
60 X2=125
70 Y1=191
80 FORX1=1T0255STEP10
90 FORY2=1T0100STEP40
100 LINE(X1,Y1)-(X2,Y2),PSET
110 NEXT Y1
120 NEXT X2
130 GOT0130
```

### Listing 3

```
20 PCLEAR8
30 PMODE4,1
40 PCLS
50 SCREEN1,1
60 X2=125
70 Y1=191
80 FORX1=1T0255STEP3
90 FORY2=1T0100STEP40
100 LINE(X1,Y1)-(X2,Y2),PSET
110 NEXT Y1
120 NEXT X2
130 GOT0130
```



Listing 4

```

20 PCLEAR8
30 PMODE4,1
40 PCLS
50 SCREEN1,1
60 X2=125
70 Y1=191
80 FORX1=1T0255STEP10
90 FORY2=1T0191STEP20
100 LINE(X1,Y1)-(X2,Y2),PSET
110 NEXT Y1
120 NEXT X2
130 GOT0130
    
```

Listing 5

```

20 PCLEAR8
30 PMODE4,1
40 PCLS
50 SCREEN1,1
60 X2=125
70 Y1=191
80 FORX1=1T0255STEP10
90 FORY2=1T0190 STEP50
100 LINE(X1,Y1)-(X2,Y2),PSET
110 NEXT Y1
120 NEXT X2
130 GOT0130
    
```

Listing 6

```

20 PCLEAR8
30 PMODE4,1
40 PCLS
50 SCREEN1,1
60 X2=125
70 Y1=191
80 FORX1=1T0255STEP10
90 FORY2=1T0190 STEP90
100 LINE(X1,Y1)-(X2,Y2),PSET
110 NEXT Y1
120 NEXT X2
130 GOT0130
    
```

Listing 7

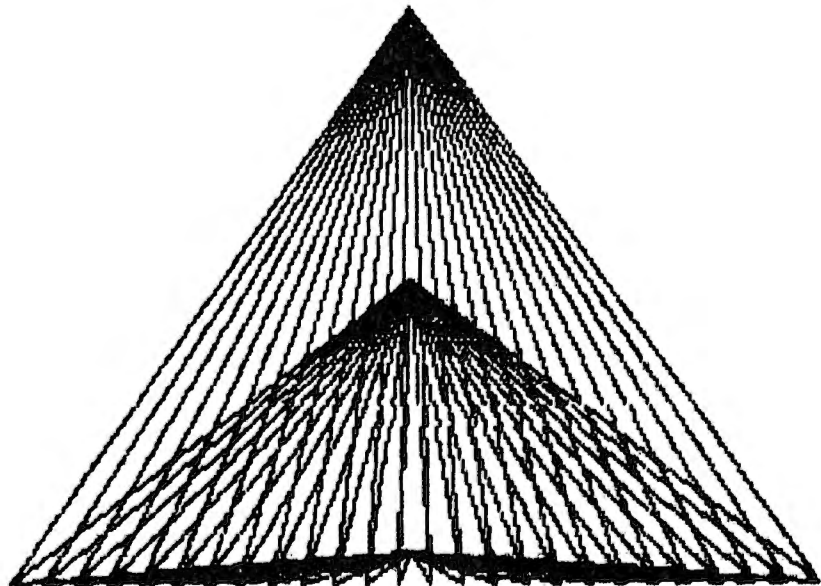
```

20 PCLEAR8
30 PMODE4,1
40 PCLS
50 SCREEN1,1
60 X2=125
70 Y1=191
80 FORX1=1T0255STEP10
90 FORY2=1T0190 STEP100
100 LINE(X1,Y1)-(X2,Y2),PSET
110 NEXT Y1
120 NEXT X2
130 GOT0130
    
```

Listing 8

```

20 PCLEAR8
30 PMODE4,1
40 PCLS
50 SCREEN1,1
60 X2=125
70 Y1=191
80 FORX1=1T0255STEP10
90 FORY2=1T0190 STEP10
100 LINE(X1,Y1)-(X2,Y2),PSET
110 NEXT Y1
120 NEXT X2
130 GOT0130 ■
    
```



# Visisort

## An on-screen demonstration of sorts

Jeffrey C. Ruble  
Port Angeles, WA

One of the topics covered in an introductory computer course which I teach is sort routines. In covering the Bubble Sort, the delayed replacement sort and the Shell Metzner sort, I usually put five or six unordered numbers on the blackboard. Then I proceed to erase, rewrite and reorder the numbers using the steps from each sort.

It would be more efficient, however, to write a program which essentially does the same thing on a video monitor. This could replace fumbling with the eraser and chalk on the blackboard. The resulting program is called *Visisort*.

The program is built around a menu which asks the user which sort routine he or she would like to see demonstrated. Once the choice is made, the user is asked how many items are to be sorted (up to 10), whether they are user or computer supplied and whether they are numbers or letters. The default values are 10, computer and numbers, respectively.

Once all of the preliminaries are out of the way, the computer displays the item list in a vertical format. Two pointers keep the user apprised of the items being compared. When an interchange is to be made, the elements in question interchange their positions on the screen. Thus, the user gets a visual demonstration of the sort routine being used. A count is also kept of the number of comparisons and interchanges necessary to complete the sort. Once the sort is complete, the user is given the option of resorting the original items list using a different routine. Thus, comparisons may be made between the three different sorting procedures.

The key to this program is the use of a subroutine called *switchem* which starts at line 2100. Whenever one of the sort routines calls for an interchange of items, *switchem* is called to do the job. Not only does *switchem* interchange the items in memory, it interchanges them on the screen as well.

```

1000 '*****
1010 '     VISISORT/BAS
1020 '     A SORT DEMONSTRATION
1030 '     PROGRAM
1040 '     FOR TRS-80 (I/III)
1050 '     AUTHOR: JEFF RUBLE
1060 '*****
1070 '
1080 '     BEGIN MAIN PROGRAM
1090 '
1100 CLS:PRINTCHR$(23):PRINTTAB(8)"# V
      I S I S O R T #":PRINT
1110 PRINTTAB(8)"1) BUBBLE SORT"
1120 PRINTTAB(8)"2) DELAYED REPLACEMENT
      ":PRINTTAB(12)"SORT"
1130 PRINTTAB(8)"3) SHELL-METZNER SORT"
1140 PRINTTAB(8)"4) EXIT PROGRAM":PRINT
1150 PRINTTAB(8)"WHICH CHOICE";:INPUTCH
      $
1160 CH=VAL(CH$):IFCH<1ORCH>4ORCH<>INT(
      CH)THEN1100
1170 '
1180 IF CH=4 THEN CLS:END
1190 CLS:PRINTCHR$(23):GOSUB1270
1200 FOR K=1 TO NS:AS(K)=S$(K):PRINT@64
      *K,AS(K);:NEXT
1210 NE=0:NC=0:PRINT@88,"# ITEMS ="NS;:
      PRINT@152,"# COMPARISONS ="NC;:PRINT@
      216,"# EXCHANGES ="NE;
1220 ON CH GOSUB 1500,1630,1810
1230 PRINT@896,"RESORT ORIGINAL LIST";:
      INPUTRF$:GOTO1100

```



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```

1240 '
1250 ' END MAIN PROGRAM
1260 '
1270 ' SAMPLE GENERATION
1280 '
1290 IF LEFT$(RF$,1)="Y"THEN1380
1300 NS$="10":INPUT"HOW MANY ITEMS TO S
    ORT <MAX=10>";NS$:NS=VAL(NS$):IFNS<2
    OR NS>10 OR NS<>INT(NS) THEN 1300
1310 F1$="C":INPUT"SUPPLIED BY (U)SER O
    R (C)OMPUTER";R1$
1320 IF LEFT$(R1$,1)="U"THEN1370
1330 R$="N":PRINT:INPUT" (N)UMBERS OR (L
    )ETTERS";R$
1340 FOR K=1 TO NS
1350 IF LEFT$(R$,1)="L"THEN S$(K)=CHR$(
    RND(26)+64) ELSE S$(K)=CHR$(RND(10)+4
    7)
1360 NEXTK:GOTO1380
1370 PRINT"1 CHAR. PER ITEM MAX":FOR K=
    1 TO NS:PRINT"ITEM # "K"="";:INPUTS$(K)
    :S$(K)=LEFT$(S$(K),1):NEXT
1380 RF$="N":CLS:PRINTCHR$(23)

```

```

1390 '
1400 RETURN:' END OF SAMPLE GENERATION
1410 '
1420 ' CONTINUE PROMPT
1430 '
1440 PRINT@768,"PRESS ANY KEY TO CONTIN
    UE":K1$=INKEY$
1450 K$=INKEY$:IFK$=""THEN1450
1460 PRINT@768,"
    ";
1470 '
1480 RETURN:' END CONTINUE PROMPT
1490 '
1500 ' BUBBLE SORT
1510 '
1520 PRINT@0,"BUBBLE SORT";:GOSUB1420
1530 FOR I=1 TO NS-1
1540 FOR J=I+1 TO NS
1550 X=I:Y=J:GOSUB2020:IFA$(I)<=A$(J)TH
    EN1570
1560 GOSUB2100:'SWITCHEM
1570 NEXTJ
1580 NEXTI
1590 PRINT@704,"SORT COMPLETE...."::GOS
    UB1420
1600 '
1610 RETURN:' END BUBBLE SORT
1620 '
1630 ' DELAYED REPLACEMENT SORT
1640 '
1650 PRINT@0,"DELAYED REPLACEMENT SORT"
    ;:GOSUB1420
1660 J=0:R=0:I=0
1670 I=I+1
1680 IF I=NS THEN 1770
1690 J=I:R=J+1
1700 X=J:Y=R:GOSUB2020 :IF A$(R)>=A$(J)
    THEN 1720
1710 J=R
1720 R=R+1
1730 IF R<=NS THEN 1700
1740 IF I=J THEN 1670
1750 GOSUB 2100:' SWITCHEM
1760 GOTO 1670
1770 PRINT@704,"SORT COMPLETE...."::GOSU
    B1420
1780 '
1790 RETURN:' END DELAYED REPLACEMENT
    SORT
1800 '
1810 ' SHELL METZNER SORT
1820 '
1830 PRINT@0,"SHELL-METZNER SORT";:GOSU
    B1420
1840 M=NS

```

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```

1850 M=INT(M/2)
1860 IFM=0THEN1980
1870 P=NS-M
1880 H=1
1890 I=H
1900 J=I+M
1910 X=I:Y=J:GOSUB2020:IFA$(I) <=A$(J) T
HEN 1950
1920 GOSUB2100: ' SWITCHEM
1930 I=I-M
1940 IF I>=1 THEN 1900
1950 H=H+1
1960 IF H>P THEN 1850
1970 GOTO 1890
1980 PRINT@704,"SORT COMPLETE....":GOSU
B1420
1990 '
2000 RETURN:' END OF SHELL-METZNER SO
RT
2010 '
2020 ' POINTER
2030 '
2040 NC=NC+1:PRINT@182,NC;
2050 PRINT@64*X+4,"<";:PRINT@64*Y+4,"<"
;:FORTI=1 TO 400:NEXT
2060 PRINT@64*X+4," ";:PRINT@64*Y+4," "
;
2070 '
2080 RETURN:' END POINTER
2090 '
2100 ' SWITCHEM
2110 '
2120 FOR K=0 TO 8 STEP 2
2130 PRINT@64*I+K," ";:PRINT@64*I+K+2,A
$(I);
2140 PRINT@64*J+K," ";:PRINT@64*J+K+2,A
$(J);
2150 NEXT K
2160 PRINT@64*I+10," ";:PRINT@64*I+12,A
$(I);:DF=J-I
2170 FOR K=1 TO DF
2180 PRINT@64*(I+K-1)+12," ";:PRINT@64*
(I+K)+12,A$(I);
2190 FOR TI=1 TO 100:NEXT
2200 PRINT@64*(J-K+1)+10," ";:PRINT@64*
(J-K)+10,A$(J);
2210 NEXTK
2220 FOR K=12 TO 2 STEP -2
2230 PRINT@64*J+K," ";:PRINT@64*J+(K-2)
,A$(I);
2240 PRINT@64*I+K," ";:PRINT@64*I+(K-2)
,A$(J);
2250 NEXT K
2260 NE=NE+1:PRINT@242,NE;
2270 TEMP$=A$(I):A$(I)=A$(J):A$(J)=TEMP
$
2280 '
2290 RETURN:' END SWITCHEM ■
    
```



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# Jumping jacks

*A fast, colorful one-player game with sound*

John Sinclair  
Salt Lake City, UT

Jumping Jacks is a fast, colorful single player game with sound. It's clever enough for adults but younger children will enjoy it more. The program will load in about 10K but requires 13K of RAM to run because of some array dimensions. To enjoy this game, simply type it into the computer and type RUN.

The title page will appear, followed by a prompt for instructions. A yes or no (Y or N) reply is required. The instructions are kept brief, using only one screenful, and are displayed until the player presses the ENTER key.

The program starts at line 100 and immediately goes to a subroutine at 1060 which is a half-second time delay loop referred to over and over in the program. The title page is a subroutine at lines 1100-1210. These are the only two subroutines used.

Line 410 clears the least amount of graphics memory needed, the least number of string spaces needed and calls the highest four-color PMODE. It looks neater when the PCLS is done before calling for the screen (SCREEN 1,0).

Lines 420 through 560 draw the nine-slot playing field, then read the numbers from data and draw them. The same read and draw routine is done with the words FROM and TO. The eight colored jacks are all on the same "Y" coordinate but the "X" coordinate and color of each circle are read from data line 1280.

Data line 1300 has the same "X" coordinates but the colors are reversed. This is how the game field looks in a finished game. So, after each move, the screen display is compared to this data to see if the game is over. Moves are counted in ZZ.

Each move consists of a "move from" number and a "move to" slot. These numbers are drawn on the screen next to the words FROM and TO.

PPOINT, in line 690, is used to see that it isn't the one empty slot you are trying to move and that the "move to" position is empty (color 1). Lines 730-750 look at the "move from" and "move to" numbers to be certain you are not moving two spaces in either direction.

Any wrong condition causes an error sound and the "move to" and "move from" numbers are redrawn with the background color to effectively erase them (lines 710-770). A wrong condition causes a request for new inputs (GOTO 610). The redraw with color 1 is also used

to erase the numbers after a correct move to get ready for the next move.

Lines 790-830 use GET and PUT to copy what is found in each slot and exchange their places on the screen. We GET both rectangles and store them in previously dimensioned numeric arrays FT and TF (DIM in line 480). Array "T" is always the blank slot. By copying it to where the piece is from, we erase the old position making it the blank slot.

Each color present in lines 910-930 is compared to the known correct colors in a finished game. A discrepancy will cause the program to jump to line 610 for another move. If all nine slots compare correctly, the game will be ended and the total number of moves will be displayed. You may then proceed with a new game by answering "Y" to the "Go Again" prompt.

## Pointers for the beginner

1. In any of the five graphics modes on the TRS-80 Color Computer, PPOINT returns the number of the color at the X and Y coordinates you specify.

2. Letters of the alphabet are translated into strings. Refer to the Extended BASIC manual, page 157 #7-5. The manual uses high resolution, so some slight modification is needed in lower graphics modes. Jumping Jacks uses the digits one through nine in mode three. Save this data for use in your own programs because this is presently the only way to mix text on a graphics screen.

3. The method (line 310) for determining PRINT @ locations, is a longer but easier method. You won't need grid type worksheets if you just express the number of 32-space lines down from screen top (32x15) and indent (+6 in this case) the number of spaces. I use this method throughout short programs so it is easier to make spacing changes.

4. You may call a graphics mode any time in a program but you won't see it until a SCREEN x,x statement is executed. Call for PMODE early in the program and do all the drawing while some other display occupies the screen. Then, when you do a SCREEN command, the graphics will appear instantly. This can speed up a sluggish graphics game or be used just to tidy up your video displays.



## Listing for Jumping Jacks

## Color Computer

```

0 ' FILE NAME "JUMPJACK"
1 '
2 ' *****
3 ' *      JUMPING JACKS      *
4 ' *      TRS-80 C          *
5 ' *****
6 '      BY JOHN SINCLAIR
7 '
8 ' 13K OF COLOR EXTENDED BASIC
9 '
10 '
11 ' >> ARRAYS AND VARIABLES <<
12 '
13 'ANS - ANSWER, USER INPUT
14 'MF$,MT$ - MOVE FROM,MOVE TO
15 'NNS$ - DRAWSTRING FOR NUMBERS
16 'SL$,OTS$ - DRAWS SLOTS
17 'FT$ - DRAWS WORDS "FROM TO"
18 'NNS$(MF) - DRAW 'FROM' NUMBER
19 'NNS$(MT) - DRAW 'TO' NUMBER
20 'ZZ - SCORE COUNTER
21 'TT - LOOP COUNTER
22 'F,T - ARRAYS HOLD PUT & GET
23 'Y - Y COORDINATE (CONSTANT)
24 'X(1-9) - X COORDINANTS
25 'MF,MT - VALUE OF 'FROM' AND
   'TO' INPUTS
26 'XF,XT - X COORDINANTS OF 'FR
   OM' AND 'TO' INPUTS
27 'ND,CL - POSITION AND COLORS
   OF FINISHED GAME
28 '
29 '
30 '
100 CLS:GOSUB 1060:GOSUB 1100
110 PRINT@ 32*5+1, "NEED INSTRUCTIONS (Y OR N)...?"
120 SOUND 200,1
130 AN$=INKEY$:IFAN$="" THEN 130
140 PRINT@ 32*6+15, AN$:SOUND 2.5*ASC(AN$),1
150 GOSUB 1060:IF AN$="N" THEN 390
160 CLS
170 PRINT " IN THIS GAME, YOU GET EIGHT"
180 PRINT " JACKS IN A NINE-SLOT BOARD...."
190 PRINT " FOUR YELLOW AND FOUR BLUE JACKS"
200 PRINT " YOU MUST REVERSE THE PLACES OF"
210 PRINT " THE COLORS IN AS FEW MOVES AS"
220 PRINT " YOU CAN BY USING THE ONE EMPTY"
230 PRINT " SLOT."
240 PRINT
250 PRINT " LEGAL MOVES ARE:"
260 PRINT " *TO EMPTY SLOT FROM ADJACENT"
270 PRINT "      SLOT..."
280 PRINT " *JUMP ONE JACK ONLY TO EMPTY"
290 PRINT "      SLOT..."
300 GOSUB 1060
310 PRINT@ 32*15+6, "PRESS enter TO PLAY";
320 AN$=INKEY$:IFAN$="" THEN 320
330 IF ASC(AN$)<>13 THEN 320
340 SOUND 242,1
350 '
360 '
370 '
380 '
400 '
410 CLS:PCLEAR 4:CLEAR 400:Pmode 3:PCLS:SCREEN 1,0
420 SL$="COBMO,140D40":OTS$="R28U40BD40"
430 DRAW SL$:FOR TT=1 TO 9:DRAW OTS$:NEXT TT
440 DIM NNS$(9), ND(9), CL(9)
450 DRAW "BM 14,184"
460 FOR TT=1 TO 9:READ NNS$(TT):DRAW NNS$(TT):DRAW "BR 28":NEXT TT
470 ZZ=0:Y=158
480 DIM FT(15,15), TF(15,15), X(9)
490 FOR TT=1 TO 9
500 READ X(TT),C
510 CIRCLE (X(TT),Y),8,C
520 PAINT (X(TT),Y),C
530 SOUND C*80,1
540 NEXT TT
550 GOSUB 1060:READ FT$:DRAW FT$:SOUND 200,1
560 FOR TT=1 TO 9:READ ND(TT),CL(TT):NEXT TT
570 '
580 '
600 '
610 MF$=INKEY$:IF MF$="" THEN 610
620 MF=VAL(MF$)

```

```

630 IF MF<1 OR MF>9 THEN SOUND 6
9,3:GOTO 610
640 XF=X(MF):DRAW "BM130,20; XNN
$(MF);"
650 MT$=INKEY$:IF MT$="" THEN 65
0
660 MT=VAL(MT$)
670 IF MT<1 OR MT>9 THEN SOUND 6
9,3:GOTO 650
680 XT=X(MT):DRAW "BM130,40; XNN
$(MT);"
690 IF PPOINT(XF,Y)>1 AND PPOINT
(XT,Y)=1 THEN GOTO 730
700 SOUND 69,3
710 DRAW "C1 BM130,20; XNN$(MF);
BM130,40; XNN$(MT);C4"
720 GOTO 610
730 FOR TT=-2 TO 2
740 IF MF+TT=MT THEN 790
750 NEXT TT
760 SOUND 69,3
770 DRAW "C1 BM130,20; XNN$(MF);
BM130,40; XNN$(MT); C4"
780 GOTO 610
790 GET(XF-8,Y-8)-(XF+9,Y+8),FT,
G
800 GET(XT-8,Y-8)-(XT+9,Y+8),TF,
G
810 SOUND XF,2
820 PUT(XF-8,Y-8)-(XF+9,Y+8),TF,
PSET
830 PUT(XT-8,Y-8)-(XT+9,Y+8),FT,
PSET
840 SOUND XT,2
850 DRAW "C1BM130,20; XNN$(MF);B
M130,40; XNN$(MT);C4":ZZ=ZZ+1
860 '
870 '
880 '
900 '
910 FOR TT=1 TO 9
920 IF PPOINT(ND(TT),Y)<>CL(TT)
THEN 610
930 NEXT TT
940 FOR TT=1 TO 7:SOUND 220,1:SC
REEN 1,1:SCREEN 1,0:NEXT TT
950 GOSUB 1060:SCREEN 0,0
960 PRINT@ 32*3+5, "YOU DID IT !
!"
970 PRINT@ 32*4+7, "...IN";ZZ;"M
OVES..."
980 GOSUB 1060
990 PRINT@ 32*7+7, "GO AGAIN???"
:SOUND 220,2

```

```

1000 AN$=INKEY$:IF AN$="" THEN 1
000
1010 PRINT@ 32*8+14, AN$:GOSUB 1
060:IF ASC(AN$)<>89 THEN END
1020 GOTO 100
1030 '
1040 '
1050 '
1060 FOR TT=1 TO 230:NEXT TT:RET
URN
1070 '
1080 '
1090 '
1100 JJ$="J U M P I N G J A C K
S"
1110 FOR TT=1 TO 460:NEXT TT
1120 FOR TT=1 TO 14
1130 J$=MID$(JJ$,TT,1):PRINT@ 16
8+TT, J$
1140 SOUND 220,1
1150 NEXT TT
1160 FOR TT=15 TO 23
1170 J$=MID$(JJ$,TT,1)
1180 PRINT@ 252+TT, J$
1190 SOUND 220,1
1200 NEXT TT
1210 FOR TT=1 TO 700:NEXT TT:CLS
:RETURN
1220 '
1230 '
1250 '
1260 ' DIGITS 1-9
1261 DATA BU1NG2D8NL3NR3BU8
1262 DATA L2ND2R5D2G3D3R5BL3BU8
1263 DATA L2R5D3NL3D4L5BR2BU7
1264 DATA D4ND4NR2L3U4BR3
1265 DATA NR3L2D3R2F2D2G2L2BU7BR
3
1266 DATA BU1NR1L2D7F1R3E1U3H1L3
BU3BR2
1267 DATA L2ND2R5D2G5BU7BR2
1268 DATA R3D1G5D1R5U1H5U1R2
1269 DATA R3D3NG4L5U3R2
1270 '
1280 DATA 15,2,43,2,71,2,99,2,12
7,1,155,3,183,3,211,3,239,3
1290 DATA "CO;BM60,20;NR5;D3;NR4
;D4;BR8;BU7;ND7;R4;F1;D1;G1;NL4;
F1;D3;BR3;BU7;BD1;D5;F1;R3;E1;U5
;H1;L3;G1;BU1;BR8;ND7;R4;ND7;R4;
D7;BM76,40;R4;ND7;R4;BR4;BD1;D5;
F1;R3;E1;U5;H1;L3;G1;"
1300 DATA 15,3,43,3,71,3,99,3,12
7,1,155,2,183,2,211,2,239,2.

```



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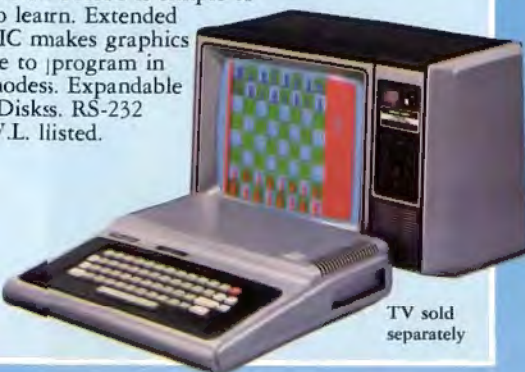
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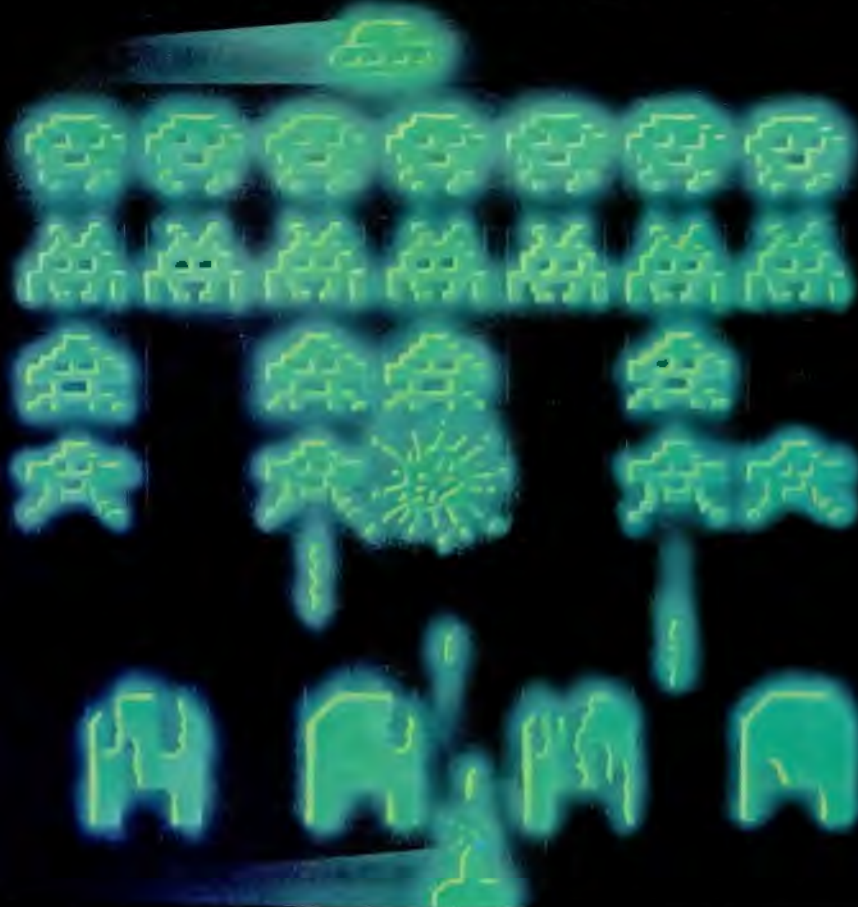
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# System to BASIC

## Convert machine language code to data statements

### Model I Level II 16K and up

Anthony Raines  
New Orleans, LA

Have you ever converted machine language code to data statements for use in a BASIC program? If so, then you must be aware of the amount of effort needed to tackle a project of this magnitude. The SBFC (System to BASIC Format Conversion) utility will speed the conversion process dramatically. It will automatically convert machine language code to DATA lines and works with Model I Level II 16K machines, Level III and BASIC 3 enhancements and Exatron's Stringy Floppy system.

The prompts (lines 20 and 30) require the starting and ending addresses of the machine language program you wish to convert. If the addresses reside above 32767 then use the following formula to determine the correct addresses to enter: Negative address =  $-1 * (65536 - \text{true address})$ .

#### How to use the program

1. Type the program, as listed, and save it on cassette, disk or wafer. Do not run it until you have made a copy. The program will have to be reloaded in order to be used a second time.
2. Set the memory size needed for the machine language program.
3. Load the machine language program and then SBFC. Type RUN and answer the questions.
4. After the program is finished running, DELETE lines 10-100. List the program and delete all data lines which do not have machine language code. Also, delete all exclamation marks (!) and commas remaining in the

last data line.

5. Type the following lines:

```
10 POKE 16553,255
20 FOR I = ---- TO ----
30 READ X : POKE I,X
40 NEXT I
```

Type the machine language start address into the first blank in line number 20 and the end address in the second blank.

6. Save the program. It is now a BASIC format of the original machine language version. You must repeat steps two through six each time a machine language program is to be converted.

#### A few comments

Each data line holds 10 bytes of machine language code. If the machine language program is too large for the BASIC program you have two options: 1) You may type more data lines using the same format. 2) Run SBFC, delete all lines which have machine code in them and save the new program. Reload SBFC and run it a second time, using the ending address of the first run as the starting address. Renumber the second program and merge the two together.

To use the newly converted program, set memory size, load and run the program, type SYSTEM and enter the starting address.

USR and DEFUSR may be used to execute the program from BASIC.

Listing for  
System to BASIC  
Model I/III

(Ed. Note— See KEYMAC, Jan/Feb, 1980, "System Command" for a utility to simplify entry of these data lines.)

```

10 CLS:A=PEEK(16549)*256+PEEK(16548):B=
  PEEK(16634)*256+PEEK(16633):X=48:I%=A

20 INPUT"ENTER MACH. LANG. START ADDRESS
  S":LO
30 INPUT"ENTER MACH. LANG. ENDING ADDRESS":EN
40 MC=PEEK(LO):IF LO=EN THEN 100
50 PRINT LO;:IF I%>B THEN STOP
60 AA%=MC*.01:BB%=(MC-(AA%*100))*1:CC%=MC-((AA%*100)+(BB%*10))
70 AA%=AA%+X:BB%=BB%+X:CC%=CC%+X
80 IF PEEK(I%)=33 AND PEEK(I+1)=33 AND
  PEEK(I+2)=33 THEN POKE I,AA%:POKE
  (I+1),BB%:POKE(I+2),CC%:LO=LO+1:
  I%=I%+3:IF I%>B THEN STOP ELSE GOTO
  40
90 I%=I%+1:GOTO 80
100 END
110 DATA!!!,!!!,!!!,!!!,!!!,!!!,!!!,!!!
  ,!!!,!!!
120 DATA!!!,!!!,!!!,!!!,!!!,!!!,!!!,!!!
  ,!!!,!!!
130 DATA!!!,!!!,!!!,!!!,!!!,!!!,!!!,!!!
  ,!!!,!!!
140 DATA!!!,!!!,!!!,!!!,!!!,!!!,!!!,!!!
  ,!!!,!!!
150 DATA!!!,!!!,!!!,!!!,!!!,!!!,!!!,!!!
  ,!!!,!!!
160 DATA!!!,!!!,!!!,!!!,!!!,!!!,!!!,!!!
  ,!!!,!!!
170 DATA!!!,!!!,!!!,!!!,!!!,!!!,!!!,!!!
  ,!!!,!!!
180 DATA!!!,!!!,!!!,!!!,!!!,!!!,!!!,!!!
  ,!!!,!!!
190 DATA!!!,!!!,!!!,!!!,!!!,!!!,!!!,!!!
  ,!!!,!!!
200 DATA!!!,!!!,!!!,!!!,!!!,!!!,!!!,!!!
  ,!!!,!!!
210 DATA!!!,!!!,!!!,!!!,!!!,!!!,!!!,!!!
  ,!!!,!!!
220 DATA!!!,!!!,!!!,!!!,!!!,!!!,!!!,!!!
  ,!!!,!!!
230 DATA!!!,!!!,!!!,!!!,!!!,!!!,!!!,!!!
  ,!!!,!!!

```

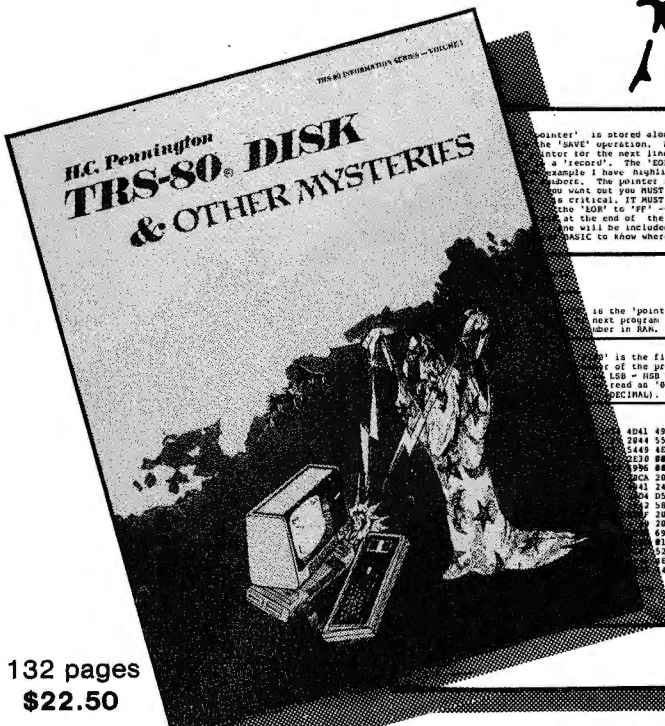
```

240 DATA!!!,!!!,!!!,!!!,!!!,!!!,!!!,!!!
  ,!!!,!!!
250 DATA!!!,!!!,!!!,!!!,!!!,!!!,!!!,!!!
  ,!!!,!!!
260 DATA!!!,!!!,!!!,!!!,!!!,!!!,!!!,!!!
  ,!!!,!!!
270 DATA!!!,!!!,!!!,!!!,!!!,!!!,!!!,!!!
  ,!!!,!!!
280 DATA!!!,!!!,!!!,!!!,!!!,!!!,!!!,!!!
  ,!!!,!!!
290 DATA!!!,!!!,!!!,!!!,!!!,!!!,!!!,!!!
  ,!!!,!!!
300 DATA!!!,!!!,!!!,!!!,!!!,!!!,!!!,!!!
  ,!!!,!!!
310 DATA!!!,!!!,!!!,!!!,!!!,!!!,!!!,!!!
  ,!!!,!!!
320 DATA!!!,!!!,!!!,!!!,!!!,!!!,!!!,!!!
  ,!!!,!!!
330 DATA!!!,!!!,!!!,!!!,!!!,!!!,!!!,!!!
  ,!!!,!!!
340 DATA!!!,!!!,!!!,!!!,!!!,!!!,!!!,!!!
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350 DATA!!!,!!!,!!!,!!!,!!!,!!!,!!!,!!!
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360 DATA!!!,!!!,!!!,!!!,!!!,!!!,!!!,!!!
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370 DATA!!!,!!!,!!!,!!!,!!!,!!!,!!!,!!!
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380 DATA!!!,!!!,!!!,!!!,!!!,!!!,!!!,!!!
  ,!!!,!!!
390 DATA!!!,!!!,!!!,!!!,!!!,!!!,!!!,!!!
  ,!!!,!!!
400 DATA!!!,!!!,!!!,!!!,!!!,!!!,!!!,!!!
  ,!!!,!!!
410 DATA!!!,!!!,!!!,!!!,!!!,!!!,!!!,!!!
  ,!!!,!!!
420 DATA!!!,!!!,!!!,!!!,!!!,!!!,!!!,!!!
  ,!!!,!!!
430 DATA!!!,!!!,!!!,!!!,!!!,!!!,!!!,!!!
  ,!!!,!!!
440 DATA!!!,!!!,!!!,!!!,!!!,!!!,!!!,!!!
  ,!!!,!!!
450 DATA!!!,!!!,!!!,!!!,!!!,!!!,!!!,!!!
  ,!!!,!!!
460 DATA!!!,!!!,!!!,!!!,!!!,!!!,!!!,!!!
  ,!!!,!!!
470 DATA!!!,!!!,!!!,!!!,!!!,!!!,!!!,!!!
  ,!!!,!!!
480 DATA!!!,!!!,!!!,!!!,!!!,!!!,!!!,!!!
  ,!!!,!!!
490 DATA!!!,!!!,!!!,!!!,!!!,!!!,!!!,!!!
  ,!!!,!!!
500 DATA!!!,!!!,!!!,!!!,!!!,!!!,!!!,!!!
  ,!!!,!!!

```

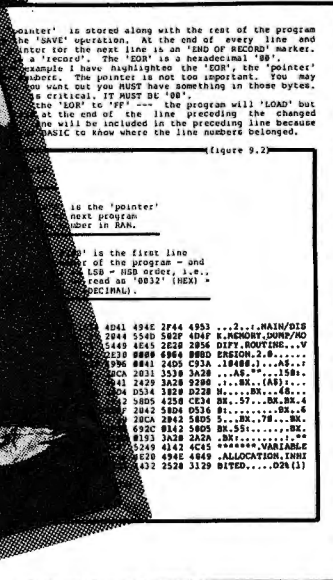


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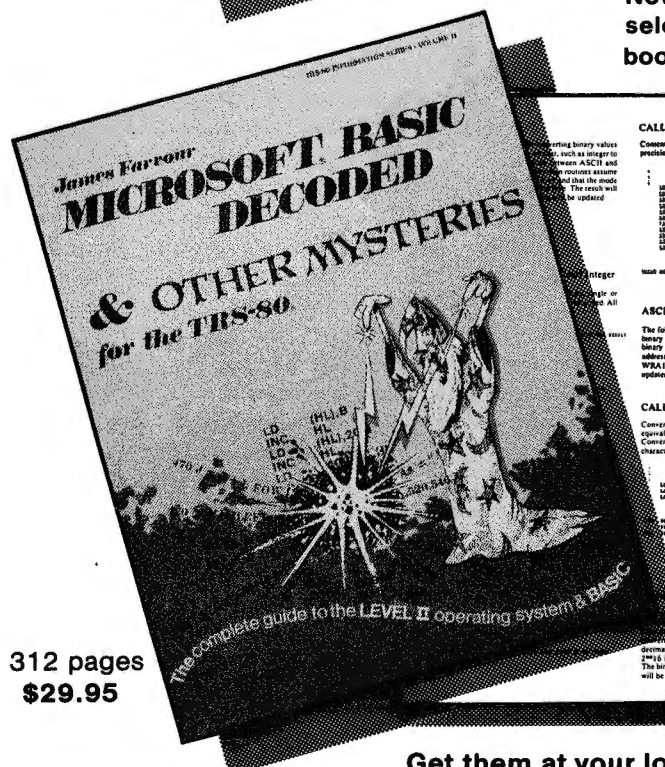
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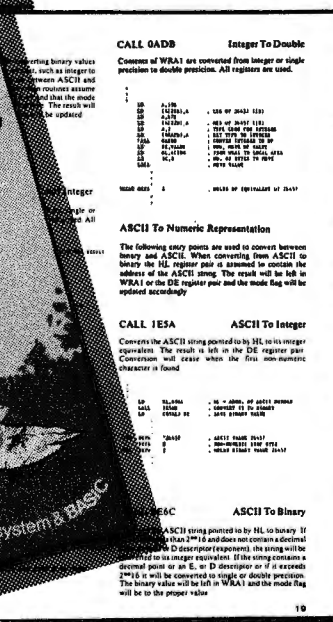
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Circle # 30

March, 1982 59

# Using the Radio Shack network with machine language

Madeline Fish, Sacramento, CA

This article is directed to the community of educators using the TRS-80. Many schools are now using the network system to manage multiple computer systems in the classroom. Our local Radio Shack Computer Center has trouble keeping up with the demand.

This article outlines a way to use non-BASIC programs with the network. The Radio Shack documentation makes no mention of this possibility. From conversations with faculty at other schools using the network, I realized they were unaware of how to augment this capability on their systems.

This article will suggest some additional capabilities and ways of using the Radio Shack Network system that are not described in the literature supplied with the network.

At Grant Union High School in Sacramento, California, we currently have 11 TRS-80 computers linked together via the network. The control computer is equipped with disk drives.

In our school, the computer has been used to teach programming skills and as a learning tool to increase our students' competency in mathematics and science.

When using the computer for drill exercises, the programs are loaded

out through the network system. The network instruction manual gives directions for sending programs to student computers with a CLOAD entered on the student computer and a CSAVE "A" entered on the master computer. This procedure only allows for the transmission of BASIC programs.

Several programs that were appropriate for use with an entire class were written in machine code. These programs very often made use of the graphics capability of the TRS-80. I have therefore developed a method of sending these programs through the network system.

The method can be used with either a disk or tape recorder on the controller system. The procedure requires the purchase of an additional piece of software. In order to use "SYSTEM" or "CMD" programs with the network, one must first load the control computer with a program that will load (from tape or disk) a machine language program and then send it out the cassette port. These programs are sold for the purpose of copying machine language programs onto tape. Before sending out the machine language program, the student computer has the usual SYSTEM command entered and it returns a "?". The name of the

program is entered at this point. After the student's computer is prepared, the master computer is instructed to save the already loaded program to tape, which in fact, now sends it out through the network.

I have experimented with two inexpensive duplicating programs. The first, "Duplik", from Instant Software's Utility I package, is for network setups loading programs from tape. The second program is DiskTape, available from Progressive Computer Products. This program allows the user to access his program from the disk and then transfer it out to the cassette port.

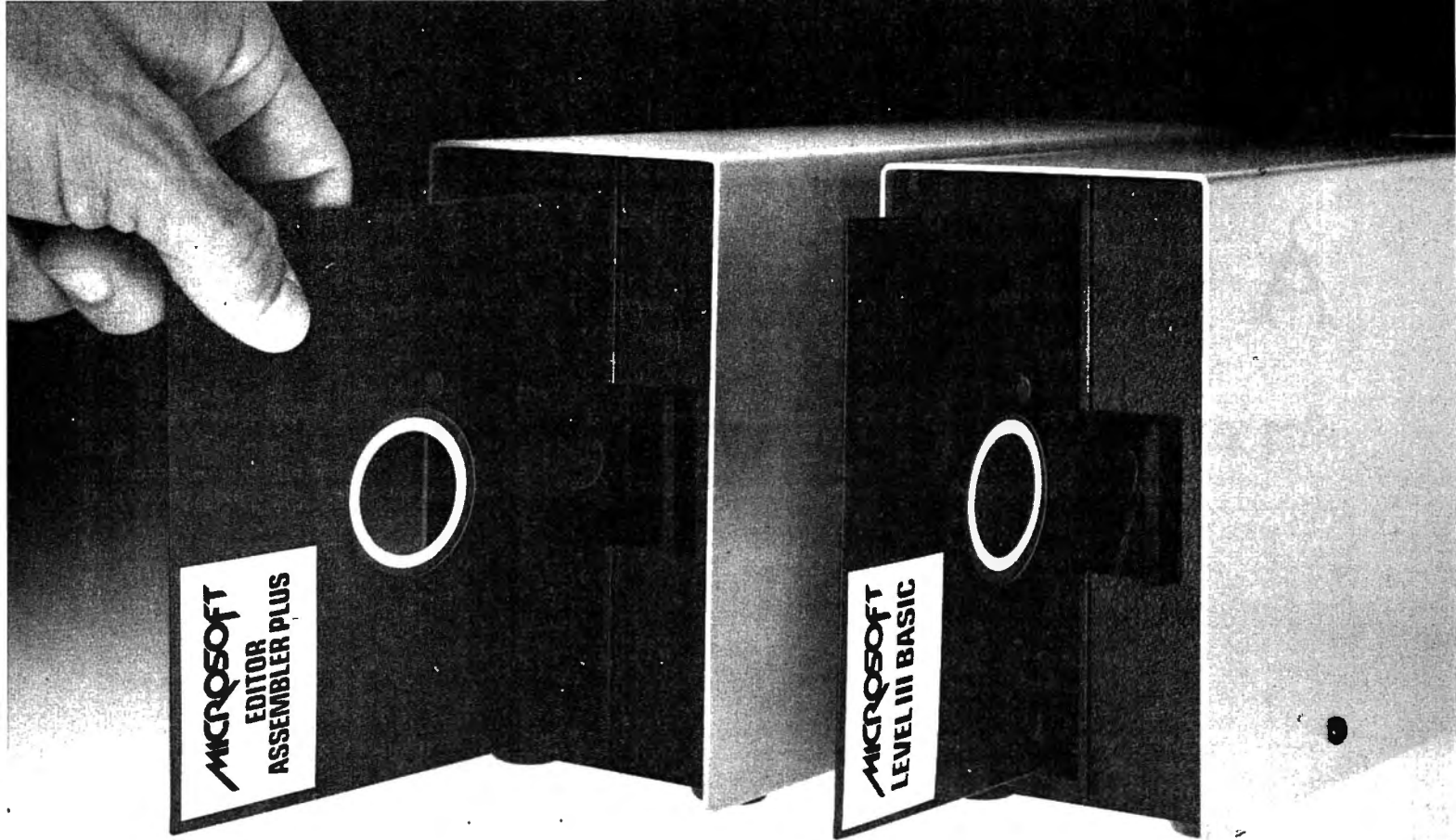
I might also note that in our physics class, students are required to write programs. At the end of the class period, their work in progress can be transmitted to the master computer and saved on diskette. A disk equipped computer system is available for student use in the school library so that they can continue projects outside of the classroom. ■

---

*Duplik* (\$7.95) Instant Software, Peterborough, NH 03458

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Spencer Hall  
Associate editor

Yes, friends, that is egg on my face. You have recently seen my name on two articles extolling the joys of a thoroughly dependable tape storage and retrieval system. Well, here I am about to suggest an alternative. Don't get me wrong. Tape still has its place, especially as inexpensive backup for everything and the cheapest way to purchase most software. But let me tell you how I got dragged, kicking and screaming, into the wonderful world of @LOAD and SAVE at 7200 baud.

To set the scene, you have to know what the offices of *80-U.S. Journal* are like on a Saturday. During the week everything is businesslike. Editors are editing, typesetters are typesetting, proofreaders are proofing . . . everyone doing his or her thing. On Saturdays there is a spooky quiet. There's usually just one person in the place—"Mike" Schmidt, the *man* himself. He roams around gaining inspiration and messing with all the computer gear as happy as a bear in a berry patch.

Knowing this, I took my super tape control box (the one you read about in a previous issue) over to demonstrate it for him. He's especially easy to talk to on Saturdays. After he was duly impressed (I could tell he was by the

way he said "HmMMM" when I finished), he asked if I had ever seen an Exatron Stringy Floppy. It was my turn to say, "HmMMM." Sure, I had seen the ads, but I simply never believed them. Ads that promised reliable save and load at 7200 baud on something as tiny as a business card that's not a cassette or a disk? A little gray box which had no switches and which cost less than the cheapest disk drive? There had to be a catch or, worse yet, hardware bugs! If the price had been five hundred dollars I might have believed the ads and still not bought the thing! I've had my share of headaches with hardware, so thanks but no thanks.

Mike pulled out a white box that seemed just a little large for a pair of stereo headphones and said, "Here . . . you'll like it."

"What'll it cost me?" I answered.

"Nothing, unless you decide to keep it. Then we can work something—a few articles, maybe."

Against my better judgment, I took the thing and went my way. That evening, I opened up the box and out came a collection of documents, wrapped in plastic, a black vinyl "organizer," a plug-in transformer, another white box full of little plastic gizmos called "wafers" and, oh yes, the "thing"

itself. A black and grey rectangular tin can with a grinning black mouth and two beady red eyes looking at me like something out of "Star Wars." I hooked it to my card edge, just like it said in the manual, plugged it in and typed SYSTEM, /12345. Like magic, the words appeared on my screen: "EXATRON STRINGY FLOP."

That's just what it was. The computer was hung up but good. I RESET and tried again. "EXATRON STRING." At least that was progress, even if it was in the wrong direction. After a half hour of repeated hangups, I gave up and went to bed.

Next day, I called the Exatron hot line (Sunday, mind you). It was answered, much to my surprise, and the voice said he was Bob Howell. Totally unimpressed, I told him my problem and he sympathetically pointed out that some TRS-80s have a weakness that causes problems like mine. I cross-examined him about the solution and he patiently coped with my technical ignorance for about half an hour. Days later I realized that I was getting all this tender loving care from the chairman of the board of Exatron!

At the time I wasn't impressed, but decided to cart the thing over to my friend, Madam X, who shares

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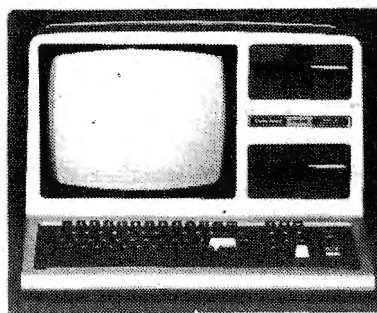
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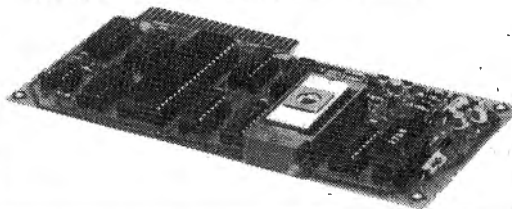
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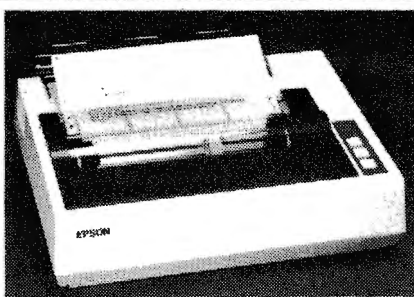
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Ease of Use	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
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## Feature

my "thing" about the TRS-80. That afternoon we hooked the little android up to her rig and zap, EXATRON STRINGY FLOPPY VERSION 4.1 appeared on the screen instantly. This, on an antique TRS-80 that had been upgraded from one of the first Level I machines! From there on it was a ball. We loaded programs from tape in minutes and saved them to wafers in seconds then reloaded them from wafers in even less time. The little android hummed contentedly while it was doing our bidding, staring at us with both LED eyes when it was saving our stuff and winking at us with just one while it was automatically verifying that the save was good . . . which it invariably was.

Next day, it was off to the Radio Shack Computer Center after making an appointment for surgery on my CPU. When I told him that I couldn't patch in my Exatron Stringy Floppy, the manager winced as if I had said some very dirty words. He agreed to test the input/output buffers as Bob Howell had suggested and I got permission to stay and watch. They were all fine. Now what? They suggested, and I agreed, to replace my logic board for fifty-five dollars. When the deed was done I wanted to test my Stringy Floppy right there. No way!

"I owe you fifty-five dollars and you've got my CPU that might not do what I want it to. Maybe we should just leave it that way."

The manager caught my drift and allowed that if they made room in a dusty corner of the shop and set things up, I could bring in my S---- F---- and they would pretend I wasn't there. Well, they did, I did and IT did—work like a charm!

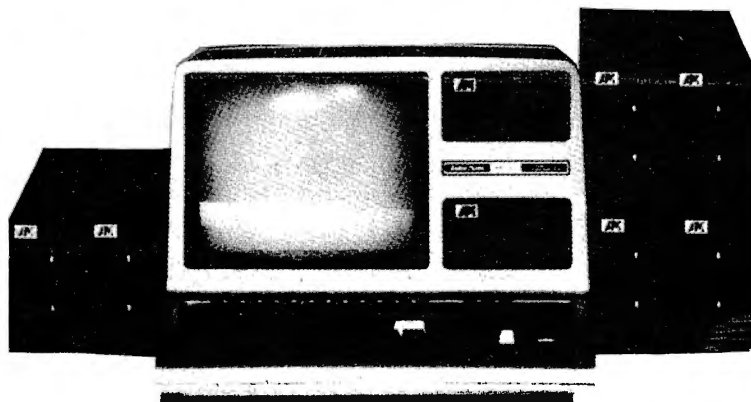
And so it has ever since. Bad loads? What are they? Scripsit, Level III, my personal utilities, everything burps into RAM in seconds and I'm off and running. My tape decks are for making backup copies of everything I write, for loading the software I buy on cassette and for off-loading wafers when I run short . . . which I chronically do.

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# Arrays

## Part II: Two-dimensional arrays

### For all models

T. R. Dettmann  
Associate editor

We have previously introduced arrays as a way to make some of your programming easier. By taking advantage of the fact that an array can hold many similar items, all indexed with an integer array location, we found that a FOR . . . NEXT loop could be used to help do things that couldn't be done otherwise.

This time we'll extend our ability to use arrays by adding another dimension to them. This gives us the ability to enter tables into our program in a very simple manner.

Why bother increasing the complexity of programs with another dimension in an array? The answer is that we shouldn't. If adding another dimension to an array makes the program more complex, don't add it! Anything added should simplify the problem. In many cases, that's exactly what a two-dimensional array will do.

Consider this problem. You want to write a program that will figure shipping costs from your location. You know that you can divide all towns into a series of zones centered on your location (see figure three).

Once you know the zone of a town and the weight of the package in pounds, use a table like the one shown in figure one to obtain the shipping cost. Unfortunately, there may be no simple mathematical formula to compute the cost. (This is exactly the way it works with UPS shipping tables in case you're interested.)

To set up the computer to do this, you could use a whole series of single arrays, say Z0, Z1, Z2 . . . that would contain the cost for a given zone. Set it up so that the index of each array

represents the weight and the number in the array name indicates the zone. If you want to find out the cost for going to zone two with a weight of five pounds, use the statement: COST = Z2(5). This will work, but it's inconvenient. Adding another dimension to the array will simplify the problem.

How does a two-dimensional array work? Look at figure two. Last time we thought of a one-dimensional array in terms of a section of memory "cubbyholes," each indexed by a number. The same kind of picture applies to a two-dimensional array, except that it is a little more complex. Now we have to look at memory as if it has rows and columns of cubbyholes.

When assigning the array name "Z," we are specifying the name of the row zero, column zero cubbyhole. As before, we now use an index to find more elements. We need two indices—one for the row and one for the column. It doesn't matter which one is used if you are consistent. For the moment, assume the first number represents the column and the second represents the row.

Once this is decided, you can locate any element of the array by specifying its column and row numbers. Since you can't have half a cubbyhole, these numbers must be integers (either that or they are truncated to make integers). If you want column 5, row 3, ask for Z(5,3). Easy, isn't it?

To add the second dimension to an array, you must initialize it in the DIMension statement. Let's say you want array Z to represent the cost. Use the first index to indicate the

zone and the second index to indicate the weight. If the zones go from zero to nine and the weights go from zero to 50, you can dimension the array as follows: DIM Z(9,50). This will set aside space in memory for locations with indices running from zero to nine (10 of them) and zero to 50 (51 of them) for a total of 510 cubbyholes. Each space will take up four bytes for single precision numbers.

To obtain the cost for zone two, five pounds, simply write: COST = Z(2,5). This can be more general than one-dimensional arrays since now we can write a little program to give us the cost:

```
10 DIM Z(9,50)
20 REM Read in the values to the Z
   array
100 INPUT "What zone do you
   want to send to"; ZONE
110 INPUT "What is the weight of
   the package"; WEIGHT
120 PRINT "The cost of shipping
   the package is:"; Z(ZONE,
   WEIGHT)
130 GOTO 100
```

This program is a starting point for other applications such as billing for shipping, invoice preparation, etc. A program using two-dimensional arrays has been in use at *80-U.S. Journal*. It figures UPS shipping costs for magazines given the number of magazines, weight per magazine and number of copies to a dealer. It computes the most efficient packaging, weights of the packages, UPS cost and prepares the invoice (including shipping charges).

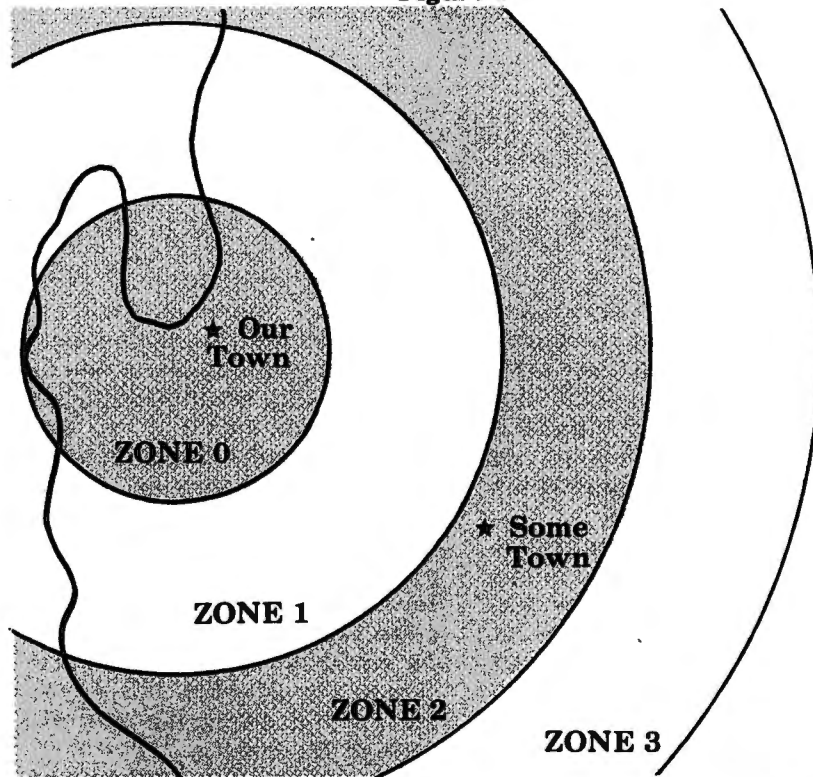
Figure 1

Wt.	Zone				
	0	1	2	3	4
0	0.00	0.00	0.00	0.00	0.00
1	0.50	0.75	0.80	0.95	1.02
2	0.60	0.75	0.83	0.99	1.05
3	0.73	0.79	0.85	1.02	1.09

Figure 2

Row	Column					
	0	1	2	3	4	5
0						
1	Z(0,0)					
2						
3						Z(5,3)
4						
5						
6						

Figure 3



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# Lazy Writer

Jim Klaproth  
Associate editor

Lazy Writer, written by David Welsh, is one of the new breed of word processors hitting the market for the TRS-80 Model I/III computers. The ads claim that it is easy to use and that "there is nothing even close." Perhaps, but let's take a close look at Lazy Writer and then you may decide.

Lazy Writer is written entirely in machine language, making it very fast! It supports numerous types of printers, including serial types. However, if you own a Line Printer IV, Line Printer VIII, Centronics 737/739 or Daisy Wheel II, you will be disappointed to find that Lazy Writer does not support full right justification of the proportional spacing font at this time. This is my main objection to the program, as I am currently using the Line Printer IV.

The user's manual for the Model I version consists of about 60 pages of printed information in an inexpensive binder. The Model III version is packaged more elegantly in a hard binder, which may help justify the fifty dollar difference in price. The manual begins with an introduction explaining that if your needs are simple you will find Lazy Writer easy to use. If your needs are more sophisticated, then you will have to spend some time learning and experimenting with the program. A few of the features were difficult to understand and some of them were completely undocumented. Much experimentation was necessary to get a proper print format.

There are two modes of operation: text entry and editing. The BREAK key toggles back and forth between the modes quickly and easily. The advantage to this approach is that no special control keys are needed,

making editing simple and rapid. This is what makes Lazy Writer so easy to use in relation to other word processors. For example, to delete a character while in edit mode, simply press "d" and then a "d" for each character to be eliminated. To delete a word, use "d" and "w", or "d" and "period" to erase a whole sentence. To delete an entire paragraph, use "d" and "p." The "!" key deletes all material from the present cursor position to the end of the text. Similarly, the cursor may be moved by using the "w" for word, the "p" for paragraph and the "period" for sentence.

The scrolling features are very simple. ENTER scrolls to the end of the text and shift-up arrow takes you to the top. Capital "Z" scrolls up one page, while lower case "z" scrolls down a page. Up arrow and down arrow scroll the display up or down one line at a time. Tabs are set and cleared with ease. To underline, simply move the cursor to the point to begin underlining and press "u" for each character to be underlined. Each character is then replaced with a dash to indicate it is to be underlined. By pressing the ";" key, you may see the normal characters again.

Lazy Writer has global find and replace commands that, again, are easy to use. Let's say that you wish to replace the word "computer" with "microcomputer." Just type "F computer<microcomputer" and then ENTER. The first occurrence of "computer" will be replaced with "microcomputer" and by pressing "f," the next occurrence will be replaced. There is a block move routine that allows portions of text to be moved to a new area or deleted completely. You may even name a particular block with any character,

word, number or symbol for easy identification.

Hyphenation is similar to Scrispit. The program indicates where the line may be hyphenated and gives the operator the option to hyphenate. Lazy Writer will allow a printer to print in lower case even if the video lower case modification is not installed in the computer. For lazy people, there is a command that automatically capitalizes the first letter of each sentence and all free-standing occurrences of the word "I." This allows the operator to type most copy without shifting. There is also a command that causes a case change to occur.

Additional features include headers, footers, automatic page numbering, bold face, double width, automatic centering, entry of non-displayable characters and the ability to send control codes to the printer for special functions. This gives the ability to subscript and superscript, half-space, backspace and any other special features that the printer will support. There are 10 user-definable commands that enable the operator to predefine a series of changes to the text. One keystroke will then carry out the changes. There is even a help file that displays the more common commands and their functions.

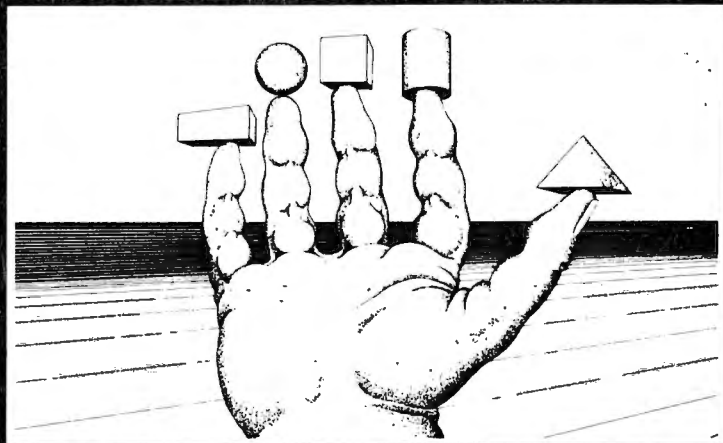
File handling is very easy to use. To save text, press the "s" key in edit mode and then type the file name. Loading is the same except "l" is used. One may also list a file without it going into memory and files may be appended. A disk directory may be obtained at any time and an exit to DOS is provided. The text will remain intact as long as BASIC is not loaded or memory above 7000H is not used. BASIC programs may be edited if they are saved as ASCII

files. Editor/Assembler files may also be edited. Electric Pencil and Scripsit files may be loaded and edited according to the manual. There is a utility program that allows the recovery of a file accidentally lost in memory. Another utility allows resetting the memory size and yet another strips all non standard characters from the file.

There are three print drivers on the supplied diskette. One is the standard parallel driver, another is for the Small System Software's TRS232 interface used with a serial printer and the third is a serial printer-driver. Instructions are given for inserting your own special driver. Provision is made for customizing your copy of Lazy Writer to accommodate your particular printer. The printer program is a separate file on the disk that is accessed by hitting CLEAR-p. The program loads and then displays the current print parameters which include margins, text width, page width, justification on or off, and number of copies. If the current parameters are suitable, the text may be printed in its entirety from the cursor, to the cursor or return to edit mode. File chaining is allowed to enable large documents to be printed. RS-232 communications capability is also a standard feature with both send and receive modes. This feature was not tested.

Lazy Writer is the sort of program that invokes mixed feelings. The editor is truly fantastic and without equal for simplicity. However, the lack of proportional spacing support bothers me. The manual is only fair, which means better than most documentation but not up to par for a package with this price tag. A most welcome addition would be additional information about which features of specific printers are supported. Also, the section on customizing the program to the printer is a bit confusing concerning the use of double width and underlining. A welcome enhancement would be simple commands for subscript and superscript functions. Another handy feature would be form letter support. Oh well, you can't have everything, I guess. ■

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# One-arm Charlie

Model I/III

C. P. Knight  
Arlington, TX

There is a certain charm and appeal about a Las Vegas casino and several long rows of slot machines. There always seems to be a crowd around them even though they don't offer much chance of winning a lot of money. This is probably because you can play them all day and not lose your shirt, or perhaps it's just the appeal of the mechanical monster eating your change—pausing once in awhile to spit enough of it back to keep you interested.

Even though the TRS-80 isn't equipped with a coin slot or payoff tray, it does have a charm of its own. It is also endowed with a video monitor and the decision capacity and graphics to do a pretty fair simulation of the old one-arm bandit. Playing games isn't the primary purpose of buying a computer, but judging from the inventory on software dealers' shelves, a lot of people are playing them.

This program does a good job of graphically simulating a slot machine, but does not attempt to present an accurate payoff probability. It was written for fun, but it is hard to play for long without losing all of your money. At least it is only imaginary money—you know, the kind the government spends when it can't afford what it buys.

The program comes up with a slot machine drawn on the right side of the machine—on the front is a partial payoff table. Because of limited room on the video, all possible combinations of three are not shown, but they pay off at rates similar to those shown on the machine.

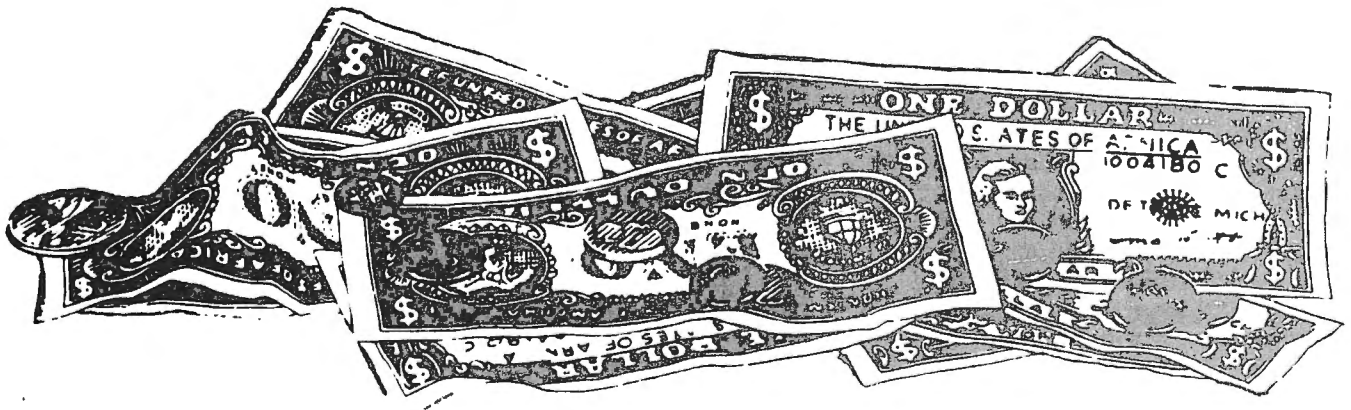
First, you must input the amount you wish to play for.

This is done by pressing one of the keys (from one to five) as shown in the lower left screen. The computer will have something to say about each bet you make, but the final choice is up to you. The possible winnings range from \$11,000 to \$20,000 for the big jackpot to ten cents. The casino advances you \$50.00 to start playing because you have a good name and credit standing in the community. To pull the handle, press the enter key and watch the machine go into action.

The handle goes down and the wheels spin. When the handle comes up and the wheels stop, the message "Loser!" will flash in the upper left corner and your money will have been lost. If you win, payoff odds will be displayed and you will be informed accordingly. If you wish to play again with the same bet, you only need to press enter again. You may change your bet at any time by pressing keys one through five. The amount of today's jackpot is displayed in the upper left corner; beneath it is the cash you have left.

The program was written for a 16K Level II machine, but with the deletion of a few REM statements and lowering of the cleared string space, you can probably get it to run in 4K. However, with the price of memory as low as it is now, you should rush out and buy some more anyway.

Lines 120 to 180 initialize the values and strings for the beginning of the program. Because my machine has 48K, I have not bothered to dimension the arrays, preferring to settle for the default of 10. Lines 200 to 520 print the graphics on the screen. The use of CHR\$ writes



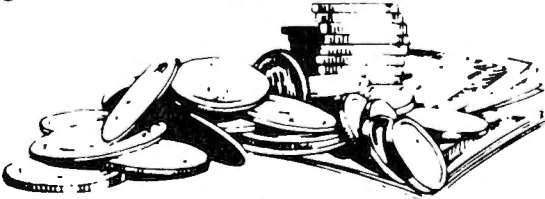
them much faster than SET would, so this method is used in most of my programs. POKE works faster still, but the large amount of typing involved usually isn't worth it.

Lines 540-960 are in the main INKEY\$ loop of the program. Line 540 tests to see if you're broke and kicks you out of the casino if you are. The variable "D" in line 560 is used to toggle back and forth between A\$(zero) and A\$(1) in lines 640, 760 and 900. These are the flashing asterisks at the bottom of the screen. Line 680 causes the word "ENTER" to flash off at the bottom of the screen. It is turned back on at line 940. Line 720 prints the computer's opinion about your bet. That comment is determined by your bet in lines 740-840. By checking to see if your bet is more than you have in line 860, the machine avoids being cheated. See! You can't win for losing here any more than you can in Vegas.

Line 920 tests for the enter key and to see if you have placed your bet. This is the only branch out of this loop other than the test for no cash at the start. Line 1000 and 1020 make the handle pull down. Lines 1040 and 1060 raise it back up. These are written as subroutines and are called when needed. Line 1120 selects the three random numbers to determine where the wheel will stop. The test for a winner is done in lines 1480 to 1680. If you haven't won, line 1680 returns you to the INKEY\$ routine to try again.

Line 1700 tests for the big jackpot winner and branches to line 1820 in that rare event. The other payoffs are handled in this routine and you are returned to the INKEY\$ loop in line 1800 with your cash increased according to your luck.

This program is a great eye catcher at club meetings and when demonstrating the capabilities of your computer to friends. Inevitably, someone will ask, "Is that all it will do?" but that's a better response than you'll get if you run one of your financial accounting packages or a Fibonacci number generator. The kids can be kept amused for hours with this sort of program—even the kids with kids of their own.



```

20 REM ONE ARM CHARLIE
30 REM COPYRIGHT (C) 1981 BY
40 REM CHARLES P. KNIGHT
50 REM ALL RIGHTS RESERVED
80 REM FOR 16K LII MOD I/III
120 CLEAR1000:RANDOM:AS(0)="*":AS(1)="
":DEFINTA,D-Z
140 BS(1)=CHR$(143)+" J "+CHR$(143):BS(
2)=CHR$(143)+"BAR"+CHR$(143):BS(3)=CH
R$(143)+"***"+CHR$(143):BS(4)=CHR$(14
3)+"###"+CHR$(143):BS(5)=CHR$(143)+"
* "+CHR$(143)

```

```

160 BS(6)=CHR$(143)+" "+CHR$(143)+" "+C
HR$(143):BS(7)=CHR$(143)+" ? "+CHR$(1
43):BS(8)=CHR$(143)+">>>"+CHR$(143):B
S(9)=CHR$(143)+"==="+CHR$(143):BS(10)
=BS(5)
180 W1=289:W2=W1+9:W3=W2+9:JP=10000+(RN
D(100)*100):CMS="Place your bet!":C=5
0
200 CLS:PRINT@20,CHR$(191) " "CHR$(
188)STRING$(32,191)CHR$(188);
220 PRINT@84,CHR$(191)STRING$(5,32)STRI
NG$(2,191);:PRINT@124,STRING$(2,191);

240 PRINT@148,CHR$(191)STRING$(4,32)STR
ING$(2,191) " "STRING$(32,176) " "STRIN
G$(2,191);
260 PRINT@212,CHR$(191)STRING$(3,32)CHR
$(191)STRING$(3,32)CHR$(191);:PRINT@2
51,CHR$(191)STRING$(3,32)CHR$(191);:P
RINT@276,CHR$(191)STRING$(3,32)CHR$(1
91)STRING$(3,32)CHR$(191);
280 PRINT@315,CHR$(191) " "CHR$(191);:
PRINT@340,CHR$(191)STRING$(3,32)CHR$(
191)STRING$(3,32)CHR$(191)STRING$(30,
176)CHR$(191)STRING$(3,32)CHR$(191);
300 PRINT@404,CHR$(191)STRING$(3,32)CHR
$(191)STRING$(38,176)CHR$(191);:PRINT
@468,STRING$(5,191);
320 PRINT@511,CHR$(191);:PRINT@536,CHR$
(191);:PRINT@575,CHR$(191);:PRINT@600
,CHR$(191);:PRINT@639,CHR$(191);:PRIN
T@664,CHR$(191);:PRINT@703,CHR$(191);
:PRINT@728,CHR$(191);:PRINT@767,CHR$(
191);:PRINT@792,CHR$(191);
340 PRINT@831,CHR$(191);:PRINT@856,CHR$
(191);:PRINT@895,CHR$(191);:PRINT@920
,CHR$(191);:PRINT@959,CHR$(191);:PRIN
T@984,STRING$(39,191);:POKE16383,191
360 PRINT@291,"Copyright (C) 1981";
380 PRINT@2,"Charlie's Casino";:PRINT@6
4,"JACKPOT ";:PRINT@101,"One-arm Char
lie";
400 PRINT@539,BS(1) " "BS(1) " "BS(1) " pa
ys JACKPOT";
420 PRINT@603,BS(2) " "BS(2) " "BS(2) " pa
ys 100 to 1";
440 PRINT@667,BS(3) " "BS(3) " "BS(3) " pa
ys 50 to 1";
460 PRINT@731,BS(4) " "BS(4) " "BS(4) " pa
ys 30 to 1";
480 PRINT@795, " "BS(5) " "BS(5) " pa
ys 5 to 1";
500 PRINT@859, " "BS(5) " pays
2 to 1";

```



## Fun 'n games

```

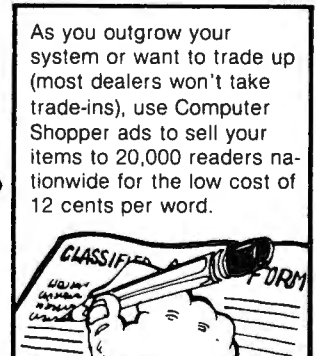
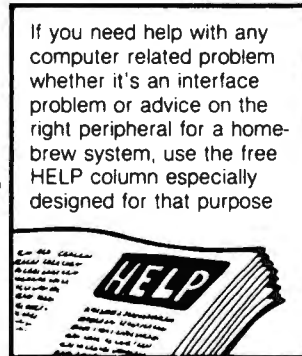
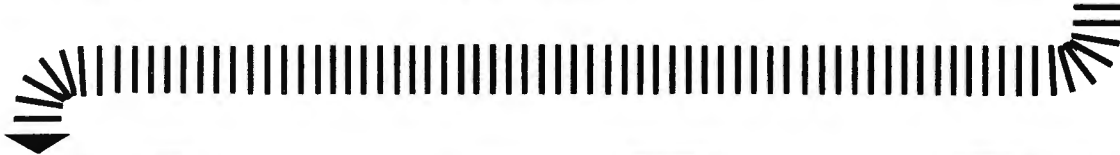
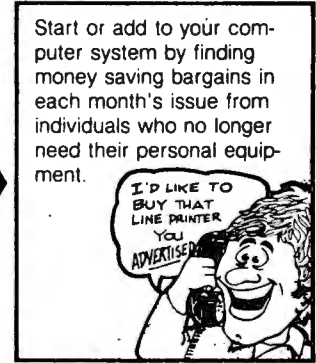
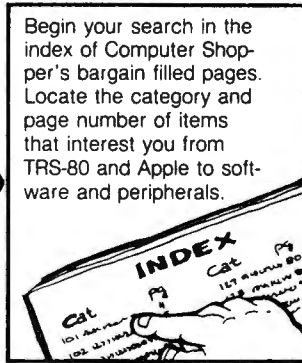
520 PRINT@640,"1 bets $ .05";:PRINT@704
,"2 bets $ .10";:PRINT@768,"3 bets $
.25";:PRINT@832,"4 bets $ .50";:PRINT
@896,"5 bets $1.00";:PRINT@960,"<ENTE
R> pulls arm";
540 IFC<.05THENCLS:PRINT@512,"You've sh
ot your wad. Better luck next time!":
END
560 D=D+1:IFD>32766THEND=0
580 PRINT@192,L3$;:PRINT@384,L3$;
600 PRINT@256,L1$;:PRINT@320,STRING$(15
,32);
620 IK$=INKEY$
640 PRINT@939,A$( (D/2=INT(D/2))+1);
660 PRINT@128,USING"Cash = $$###,###.##
";C;
680 PRINT@961," ";
700 PRINT@64,USING"JACKPOT  $###,###.##"
;JP;
720 PRINT@576,CM$;
740 IFIK$="1"THENBT=.05:CM$="You cheaps
kate! "
760 PRINT@929,A$( (D/2<>INT(D/2))+1);
780 IFIK$="2"THENBT=.1:CM$="Whatsamatte
r? "
800 IFIK$="3"THENBT=.25:CM$="Is that al
l? "
820 IFIK$="4"THENBT=.5:CM$="Aw, c'mon b
et $1 "
840 IFIK$="5"THENBT=1:CM$="You'll lose
it! "
860 IFC<BTTHENBT=C
880 PRINT@512,USING"Bet = $#.##";BT;
900 PRINT@949,A$( (D/2<>INT(D/2))+1);
920 IFIK$=CHR$(13)ANDBT>0THEN1080
940 GOSUB980:PRINT@256,STRING$(15,32);:
PRINT@320,L2$;:PRINT@961,"ENTER";:GOS
UB980:PRINT@576,STRING$(20,32);:GOSUB
980
960 GOTO540
980 FORWL=1TO20:NEXTWL:RETURN
1000 FORX=20TO412STEP64:PRINT@X," ";
:NEXTX:RETURN
1020 FORX=532TO941STEP64:PRINT@X,CHR$(1
91);:NEXTX:RETURN
1040 FORX=20TO412STEP64:PRINT@X,CHR$(19
1);:NEXTX:RETURN
1060 FORX=916TO532STEP64:PRINT@X," ";
:NEXTX:RETURN
1080 C=C-BT:GOSUB1000:GOSUB1020:PRINT@W
1,STRING$(25,32);
1100 L1$="L o s e r !":L2$="":L3$=STRIN
G$(15,32):FORX=192TO448STEP64:PRINT@X
,STRING$(16,32);:NEXTX
1120 FORT=1TO3:WN(T)=RND(10):NEXTT:IFWN
(1)=1ANDWN(2)=1ANDWN(3)=1ANDRND(5)<>4
THENWN(3)=5
1140 IFWN(1)=5ANDWN(2)=5THENWN(1)=RND(4
)
1160 W1$=B$(WN(1)):W2$=B$(WN(2)):W3$=B$(
WN(3))
1180 FORX=1TO25+RND(15)
1200 PRINT@W1,B$(RND(10));:PRINT@W2,B$(
RND(10));:PRINT@W3,B$(RND(10));
1220 NEXTX
1240 PRINT@W1,W1$;
1260 FORX=1TO10+RND(15)
1280 PRINT@W2,B$(RND(10));:PRINT@W3,B$(
RND(10));
1300 NEXTX
1320 PRINT@W2,W2$;
1340 FORX=1TO5+RND(15)
1360 PRINT@W3,B$(RND(10));
1380 NEXTX
1400 PRINT@W3,W3$;
1420 GOSUB1060:GOSUB1040
1440 FORWL=1TO3:IFWN(WL)=10THENWN(WL)=5

1460 NEXTWL
1480 IFWN(1)=1ANDWN(2)=1ANDWN(3)=1THENP
O=JP:GOTO1700
1500 IFWN(1)=2ANDWN(2)=2ANDWN(3)=2THENP
O=100:GOTO1700
1520 IFWN(1)=3ANDWN(2)=3ANDWN(3)=3THENP
O=50:GOTO1700
1540 IFWN(1)=4ANDWN(2)=4ANDWN(3)=4THENP
O=30:GOTO1700
1560 IFWN(2)=5ANDWN(3)=5THENPO=5:GOTO17
00
1580 IFWN(3)=5THENPO=2:GOTO1700
1600 IFWN(1)=6ANDWN(2)=6ANDWN(3)=6THENP
O=10:GOTO1700
1620 IFWN(1)=7ANDWN(2)=7ANDWN(3)=7THENP
O=10:GOTO1700
1640 IFWN(1)=8ANDWN(2)=8ANDWN(3)=8THENP
O=10:GOTO1700
1660 IFWN(1)=9ANDWN(2)=9ANDWN(3)=9THENP
O=10:GOTO1700
1680 GOTO540:REM no winner
1700 IFPO=JPTHEN1820ELSEAW=PO*BT
1720 L1$="W i n n e r !"
1740 L2$=STR$(PO)+" to 1 payoff":L2$=RI
GHT$(L2$,LEN(L2$)-1)
1760 L3$=STRING$(15,143)
1780 C=C+AW
1800 GOTO540
1820 L1$="JACKPOT WINNER":C=C+JP:L2$=ST
R$(JP)+" PAYOFF!":L3$=STRING$(15,143)

1840 GOTO540

```

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# Modified "Host" for the Model II

Improve your Model II's communication skills

Model II

David R. Canning  
Oak Creek, CO

Computers are wonderful tools in the office or home. However, they never seem to be around when you really need them. I use my TRS-80 Model II for engineering calculations and financial planning. Often, I find myself in the field miles away from my TRS-80 doing calculations by hand, wishing I could take the computer with me. I reasoned that a portable hard-copy terminal and a modem would let me talk to my TRS-80 from wherever I happened to be.

I purchased a used TI Silent 700 terminal and Radio Shack's Modem I. It was then that I discovered the Host program supplied on TRSDOS 2.0 and my terminal weren't compatible. Specifically, Host required modification for the following terminal requirements:

1. The terminal required up to 6 nulls to be sent following a CR to allow time for the print head to return.

2. The terminal required a LF following a CR.

3. The terminal required a LF, CR and nulls to be sent following the 80th character on any line to match the printing width of the terminal.

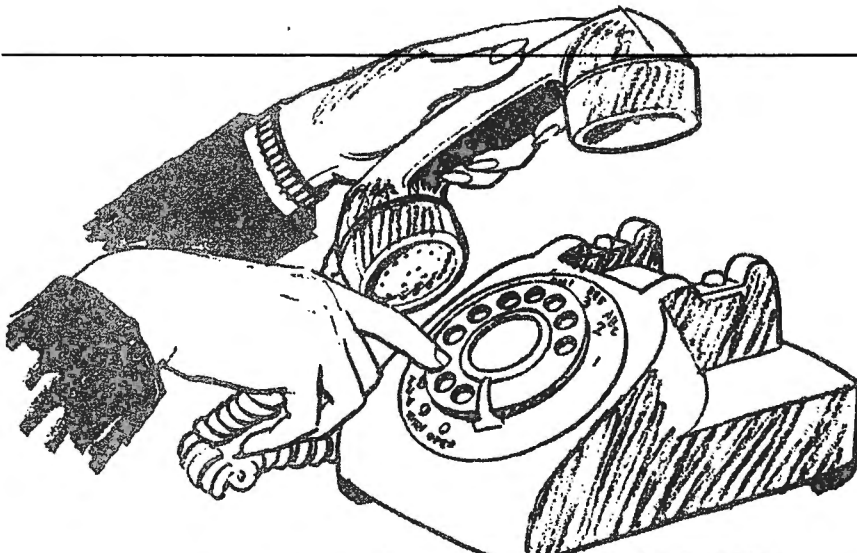
In addition to these "must do's," I wanted to make a diskette containing the modified Host program which required as little operator input as possible to boot up. Then, whoever answered the phone

### Host Stock BEFORE Patches

```
0 05 18 00 01 FE 00 F4 C3 76 F4 11 00 00 21 09 F5 01 03 00 *.....V.. ..!.....*
10 E5 C5 ED B0 11 00 00 C1 E1 ED B0 21 00 00 11 00 *......* ..!.....*
20 00 F3 73 23 72 21 00 00 11 00 00 73 23 72 23 36 *.s#r!... ..s#r#6#
30 11 FB 06 06 3E 64 CF 21 43 00 CB B6 B7 ED 62 22 *....>d.! C...b#*
40 00 00 21 49 F4 46 23 0E 0D 3E 09 CF C9 0F 48 4F *...!F#. .>...HO#
50 53 54 20 69 73 20 6E 6F 77 20 4F 46 46 C5 B5 E5 *ST is no w OFF...#
60 F5 3E A1 CE 38 0F 28 04 CR 57 20 F5 3E 0D B8 20 *...>a.8.(. .W .>. .#
70 04 06 0A 18 EC F1 E1 D1 C1 C9 C5 D5 E5 F5 AF 21 *......* ..!.....*
80 0C F5 46 B8 28 3F 23 F6 00 20 1D E5 C5 3E 03 BE *.F.(?#. .>...#*
90 28 0D 23 CB 7E 20 05 23 10 F5 18 0A 36 00 2B 36 *(.#. " .# ....6.+6#
A0 83 21 00 00 CB F6 C1 E1 E5 21 40 00 CB F6 CB 56 *.!.....* ..!.....V#
B0 E1 28 12 3E 00 BE 28 06 23 23 10 F9 18 07 36 80 *(.>.(. #. ....6.#
C0 21 40 00 CB FE 21 00 00 CB F6 F1 E1 D1 C1 C9 C5 *!@...!.. ..#.....*
D0 D5 E5 AF 47 21 0C F5 F3 4E B9 28 2A 0B 71 23 56 *...G!... N.(#.a#V#
E0 23 5E D5 78 B1 28 0A 54 5D 23 1B CB 21 CB 10 ED *#t.x.(.T ]#...!...#
F0 B0 FB F1 FA CE F4 FE 80 28 B8 E6 7F FE 03 28 D2 *.....* (... ..!..*

0 05 19 00 01 FE FC F4 E1 D1 C1 47 AF C9 FB E1 D1 C1 C3 00 *......G .....*
10 00 00 00 00 00 21 D9 F5 0E 02 11 0D F5 0D 0F F6 *......* .....*
20 04 01 FE 59 28 0B 06 00 FE 4E 28 05 CD 15 F6 18 *.Y(... ..N(...*
30 EF 78 32 84 F4 2A 64 00 11 0E 00 19 5E 23 56 ER *.x2..#d. ....t#V.#
40 11 15 00 19 5E 23 56 21 06 00 19 22 18 F4 21 0A *...t#U! ...!..*
50 00 19 22 22 F4 2A 64 00 11 12 00 19 5E 23 56 ED *. " .#d. ....t#V.#
60 53 9E F4 21 09 00 19 22 C2 F4 CB BE 23 36 00 23 *S...!... ..#6.#
70 36 F4 2B 2B CB FE 21 FA F5 CD 41 F4 ED 5B 62 00 *$+...!.. ..A..E.b.#
80 D5 21 10 00 19 5E 23 56 ED 53 04 F4 21 09 F6 01 *...t#V .S...!...#
90 03 00 C5 ED B0 C1 E1 11 08 00 19 5E 23 56 ED 53 *.....* ....t#V.S#
A0 11 F4 21 0C F6 ED B0 ED 53 07 F5 21 43 00 CB F6 *...!... S...!C...#
B0 2A 64 00 11 14 00 19 22 3C F4 36 03 23 36 F4 F3 *#d... ..<.6.#6.#
C0 11 0B F5 2A 18 F4 4E 73 23 46 72 ED 43 1B F4 1B *...*.N# #Fr.C...#
D0 2A 22 F4 4E 73 23 46 72 ED 43 25 F4 23 36 8D FR *...N#Fr .C%.#6.#
E0 C9 20 44 69 73 61 62 6C 65 20 52 65 6D 6F 74 65 *. Disabl e Remote#
F0 20 3C 42 52 4B 3E 20 6B 65 79 3F 20 28 59 2F 4E * <BRK> k ey? (Y/N#

0 06 01 00 01 30 F8 F5 29 20 0E 48 4F 53 54 20 69 73 20 6E *.0..) .H OST is n#
10 6F 77 20 4F 4E CD 59 F4 C3 CB F4 46 23 ED 43 1B *ow ON.Y. ...F#.C.#
20 F6 01 00 00 3E 0C CF 78 3D 2B F6 79 B7 28 F2 AF *...x# =(.y(.#.#
30 1A C9 02 02 0D F5 E5 E5 E5 E5 E5 E5 E5 E5 *.....* .....*
40 E5 E5 E5 E5 E5 E5 E5 E5 E5 E5 E5 E5 E5 E5 *.....* .....*
50 E5 E5 E5 E5 E5 E5 E5 E5 E5 E5 E5 E5 E5 E5 *.....* .....*
60 E5 E5 E5 E5 E5 E5 E5 E5 E5 E5 E5 E5 E5 E5 *.....* .....*
70 E5 E5 E5 E5 E5 E5 E5 E5 E5 E5 E5 E5 E5 E5 *.....* .....*
80 E5 E5 E5 E5 E5 E5 E5 E5 E5 E5 E5 E5 E5 E5 *.....* .....*
90 E5 E5 E5 E5 E5 E5 E5 E5 E5 E5 E5 E5 E5 E5 *.....* .....*
A0 E5 E5 E5 E5 E5 E5 E5 E5 E5 E5 E5 E5 E5 E5 *.....* .....*
B0 E5 E5 E5 E5 E5 E5 E5 E5 E5 E5 E5 E5 E5 E5 *.....* .....*
C0 E5 E5 E5 E5 E5 E5 E5 E5 E5 E5 E5 E5 E5 E5 *.....* .....*
D0 E5 E5 E5 E5 E5 E5 E5 E5 E5 E5 E5 E5 E5 E5 *.....* .....*
E0 E5 E5 E5 E5 E5 E5 E5 E5 E5 E5 E5 E5 E5 *.....* .....*
F0 E5 E5 E5 E5 E5 E5 E5 E5 E5 E5 E5 E5 E5 E5 *.....* .....*
```



could easily hook me up to the computer.

The following 13 patches will modify Host to accommodate a TTY-type terminal by: sending LF and nulls after a CR, sending LF/CR/nulls after a given number of characters are sent on any one line, and disabling the prompt concerning the remote break key (remote break key is always enabled).

These patches may be entered exactly as shown for an otherwise unmodified "SYSTEM64" on TRSDOS 2.0 *only*. If Racet's "Ryen's Debug" is installed, you must add three to the record number (i.e., R=24 becomes R=27, R=25 becomes R=28, etc.). The indicated digits (\*\*) are to be entered to accommodate your terminal width and number of nulls required.

- 1) PATCH SYSTEM64 R=24 B=114 F=060A18EC C=C326F600
- 2) PATCH SYSTEM64 R=25 B=30 F=CD0FF606 C=AFC32AF5
- 3) PATCH SYSTEM64 R=26 B=2 F=30 C=6B
- 4) PATCH SYSTEM64 R=26 B=22 F=CD59F4 C=CD3FF6
- 5) PATCH SYSTEM64 R=26 B=51 F=02020DF5 C=06\*\*C506\*\*= number of nulls to be sent (01 to FF Hex)
- 6) PATCH SYSTEM64 R=26 B=55 F=E5E5E5E5E5E5E5E5 C=003E61CFCB5720F7
- 7) PATCH SYSTEM64 R=26 B=63 F=E5E5E5E5E5E5E5E5 C=C110F3AF3261F606
- 8) PATCH SYSTEM64 R=26 B=71 F=E5E5E5E5E5E5E5E5 C=0AC35DF400F57832

9) PATCH SYSTEM64 R=26 B=79 F=E5E5E5E5E5E5E5E5 C=60F63A61F63C3261

10) PATCH SYSTEM64 R=26 B=87 F=E5E5E5E5E5E5E5E5 C=F6FE\*\*3809060DCD \*\*= line width (01 to FF Hex)

Modified Host AFTER Patches

```

0 05 18 00 01 FE 00 F4 C3 76 F4 11 00 00 21 09 F5 01 03 00 *.....V. .!.....*
10 E5 C5 ED B0 11 00 00 C1 E1 ED B0 21 00 00 11 00 *.....!.....*
20 00 F3 73 23 72 21 00 00 11 00 00 73 23 72 23 36 *..s#r!.. ..s#r#k
30 11 FR 06 06 3E 64 CF 21 43 00 CR R6 R7 ED 62 22 *....>d! C.....b**
40 00 00 21 49 F4 46 23 0E 0D 3E 09 CF C9 0F 48 4F *..!I.F#..>.....HO#
50 53 54 20 69 73 20 6E 6F 77 20 4F 46 46 C5 D5 E5 *ST is no w OFF...*
60 F5 3E 61 CF 3B 0F 28 04 CB 57 20 F5 3E 0D R8 29 *..a.(. W >..*
70 04 C3 26 F6 00 F1 E1 D1 C1 C9 C5 D5 E5 F5 AF 21 *..k.....!.....*
80 0C F5 46 B8 2B 3F 23 F6 00 20 1B E5 C5 3E 03 RE *..F.(?# . .>..*
90 28 0D 23 CB 7E 20 05 23 10 F5 18 0A 36 00 2B 36 *(.#." # ..6.+k#
A0 83 21 00 00 CB F6 C1 E1 E5 21 40 00 CR F6 CR 56 *..l.....!.....*
B0 E1 28 12 3E 00 BE 28 06 23 23 10 F9 18 07 36 80 *..l.)..( # ..6.#
C0 21 40 00 CB FE 21 00 00 CB F6 F1 E1 D1 C1 C9 C5 *!@.....!.....*
D0 D5 E5 AF 47 21 0C F5 F3 4E R9 28 2A 0B 71 23 56 *..G!... N.(.g#V#
E0 23 5E D5 7B B1 2B 0A 54 5D 23 1B CR 21 CR 10 ED *#t.x.(.t ]#...*
F0 B0 FB F1 FA CE F4 FE 80 28 D8 E6 7F FE 03 28 D2 *.....( . .(k#

0 05 19 00 01 FE FC F4 E1 D1 C1 47 AF C9 FR E1 D1 C1 C3 09 *.....G .....*
10 00 00 00 00 00 21 09 F5 0E 02 11 0D F5 AF C3 2A *.....!.....*
20 F5 01 FE 59 28 0B 06 00 FE 4E 28 05 CD 15 F6 18 *.....).....N.....*
30 EF 78 32 84 F4 2A 64 00 11 0E 00 19 5E 23 56 EB *x?..#d. ....t#V.#
40 11 15 00 19 5E 23 56 21 06 00 19 22 18 F4 21 0A *.....t#U! ..".....*
50 00 19 22 22 F4 2A 64 00 11 12 00 19 5E 23 56 ED *..".#d. ....t#V.#
60 53 9E F4 21 09 00 19 22 C2 F4 CR RE 23 36 00 23 *S.!.....".....#.#
70 36 F4 2B 2B CR FE 21 FA F5 CD 41 F4 ED 5B 62 00 *#.+.+.! ..A.[h.#
80 D5 21 10 00 19 5E 23 56 ED 53 04 F4 21 09 F6 01 *..l..t#U ..S.!.....*
90 03 00 C5 ED B0 C1 E1 11 08 00 19 5E 23 56 ED 53 *.....t#V.S#
A0 11 F4 21 0C F6 ED B0 ED 53 07 F5 21 43 00 CR F6 *..!..... S..!C.....*
B0 2A 64 00 11 14 00 19 22 3C F4 36 03 23 36 F4 F3 *#d.....<.6.#.#
C0 11 0D F5 2A 18 F4 4E 73 23 46 72 ED 43 1B F4 1B *..*..Ns #Fr.C...#
D0 2A 22 F4 4E 73 23 46 72 ED 43 25 F4 23 36 8D FR *".Ns#Fr .C%.#.#
E0 C9 20 44 69 73 61 62 6C 65 20 52 65 6B 6F 74 65 *..Bisebl e Remote#
F0 20 3C 42 52 4B 3E 20 6B 65 79 3F 20 28 59 2F 4E *<BRk> k es? (Y/N#

0 06 01 00 01 6B F8 F5 29 20 0E 4B 4F 53 54 20 69 73 20 6E *..k..) .H DST is n#
10 6F 77 20 4F 4E CD 3F FA C3 CR F4 46 23 ED 43 16 *ow DN.? ..#f.C.#
20 F6 01 00 00 3E 0C CF 78 3D 2B F6 79 R7 28 F2 AF *....>.x =(e.(...#
30 1A C9 06 06 C5 06 00 3E 61 CF CR 57 20 F7 C1 10 *.....>.w ...#
40 F3 AF 32 61 F6 06 0A C3 5D F4 00 F5 78 32 60 F4 *..2...>.j...2).#
50 3A 61 F4 3C 32 61 FA FE 50 3B 09 06 00 00 59 FA *!a.<2a. PB...Y.#
60 3A 61 F4 47 F1 CD 59 FA C9 00 00 00 00 02 02 0B *!..G..Y. ....*
70 F5 E5 E5 E5 E5 E5 E5 E5 E5 E5 E5 E5 E5 E5 E5 *.....*
80 E5 E5 E5 E5 E5 E5 E5 E5 E5 E5 E5 E5 E5 E5 E5 *.....*
90 E5 E5 E5 E5 E5 E5 E5 E5 E5 E5 E5 E5 E5 E5 E5 *.....*
A0 E5 E5 E5 E5 E5 E5 E5 E5 E5 E5 E5 E5 E5 E5 E5 *.....*
B0 E5 E5 E5 E5 E5 E5 E5 E5 E5 E5 E5 E5 E5 E5 E5 *.....*
C0 E5 E5 E5 E5 E5 E5 E5 E5 E5 E5 E5 E5 E5 E5 E5 *.....*
D0 E5 E5 E5 E5 E5 E5 E5 E5 E5 E5 E5 E5 E5 E5 E5 *.....*
E0 E5 E5 E5 E5 E5 E5 E5 E5 E5 E5 E5 E5 E5 E5 E5 *.....*
F0 E5 E5 E5 E5 E5 E5 E5 E5 E5 E5 E5 E5 E5 E5 E5 *.....*
    
```



CAPTAIN 80's

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---

### VOLUME I, ISSUE I

Features as selection one ARCTIC ADVENTURE by fifteen-year-old Harry McCracken, his debut magnetically. Selection two is a classic of early pro-adventure, Teri Li's SPIDER MOUNTAIN. Selection three, a TRAPMAZE, Charles Forsythe's GAUNTLET OF DEATH. Finally, as a **Micro-Fantasy Bonus**, Jake Commander's acclaimed STAR TREK 4.0.

---

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# Cross reference utility

## Model II

Yvon Kolya  
Peterborough, NH

Before Racet's XREF release, users of the Radio Shack Model II computer had great difficulty finding good software to use on the machine. Programmers of the Model II have had an even rougher time finding good utilities that would ease programming.

This has been especially difficult because of the differences between the 1.2, the 2.0 and the 2.0a versions of TRS-DOS. Some differences make utilities that work on 1.2 incapable of working on 2.0 and 2.0a.

Fortunately, now there is one company that does cater to the Model II programmer: RACET Computes, 1330 N. Glassel Suite M, Orange, CA 92665.

Racet Computes has several packages available for the Model II. There is one that I have used and highly recommend to all programmers of the Model II computer.

This is the TRS-80 Model II Reference/Model II BASIC Cross Reference, which retails for \$49.95. For some reason, utilities and programs for the Model II cost substantially more than the equivalent programs and utilities on the Model I or Model III TRS-80.

Loading the BASIC Cross Reference proved to be a perplexing chore. The instructions in the booklet detailing how to load the program were very inaccurate. The utility is sold on a special Racet distribution disk which cannot be read or copied by TRS-DOS.

The procedure followed to transfer the program from Racet's disk to yours is supposed to be simple:

1. Put the Racet disk in drive zero.
2. Toggle the reset switch.
3. Wait until prompted by the screen to remove the Racet disk from the drive and replace it with your

TRS-DOS disk.

4. Toggle the reset switch.

At this point, you have loaded the Racet distribution program into your computer's memory and then reloaded TRS-DOS. Now, all that is necessary is to transfer control of the computer to the Racet program. This can be done by using the TRS-DOS Debug program and this is where the Racet instructions begin to deviate from what you really need to do to transfer control.

When the DOS READY prompt appears, you are supposed to type Debug ON and press ENTER, followed by typing Debug and pressing ENTER again. This loads the Debug monitor and transfers control to it.

The instructions, at this point, tell you to press J-key (in the Debug monitor this means to jump to the hex address that is going to be typed in next). Debug responds with A=----. The instructions continue by saying "type F000." At this point, control is supposed to be transferred to Racet's distribution program to load the cross reference program and save it to your TRS-DOS disk.

Unfortunately, this doesn't work. After repeating the procedure several times, I read the Debug instructions in the TRS-DOS manual. According to these instructions, to transfer control you're supposed to type a "C" after typing the address. Alas, this also failed to work.

In desperation, instead of typing "J" and address, I typed a "C" immediately after getting into Debug. Success! The video screen displayed: "RACET Computes Distribution System — Copyright 1980, MOUNT DISKETTE \* RACET IN DRIVE 0."

I put the Racet disk in drive zero and pressed ENTER. After a few moments, I was prompted to: "MOUNT DISKETTE \* DOS IN DRIVE 0," which I did.

Once more the directions deviated from fact. The instructions list a series of eight programs that are supposed to be loaded onto your TRS-DOS disk. In fact, only five programs are loaded, only two of which are in the list in the instructions. The programs loaded are: \*BuildREF, Biorhth/BAS, Piglatin/BAS, Snoopy/BAS and \*Cat.

Of the five loaded, only the second and the last were listed in the instructions. No explanation of the asterisks was given.

The instructions indicate that Biorhth/BAS has been included as a sample program which you are supposed to use to explore the possibilities of the cross reference utility. The other four are not mentioned at all.

After examining them, it is found that the Piglatin/BAS and Snoopy/BAS are BASIC programs included for your enjoyment. Cat, however, is a utility program for making patches to machine language programs on the TRS-DOS disk. Its use is restricted to updating and/or patching Racet programs. The exact syntax of the commands to do this will be revealed by Racet when there is a need to patch one of their programs.

BuildREF is the master program that custom tailors the cross reference utility to fit anywhere you specify in memory. Fortunately, the program is simple to use and primarily self-explanatory, since there are no instructions in the booklet on how to use it.

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The original setup, as explained in the manual, involved the use of five separate cross reference utilities, each of which loaded into a different location in memory.

The first module, REF, loaded from FA20 to FEFF. The second module was located between ED30 and F2FF, which leaves room for Debug in memory and is located between F300 and FFFF. The third locates itself between EA30 and EFFF below the TRS-DOS RS-232 drivers and Debug. The fourth, REF3, is located between E130 and E6FF, leaving room for the RS-232 drivers, Debug and any other machine language modules that might be used. The last module, REF4, was for the 32K system.

BuildREF renders all of these other REF utilities obsolete. BuildREF lets you specify the address where you wish the cross reference to begin. It then calculates the ending location, tells you what it is and asks if this is correct, i.e.: ENTER DESIRED STARTING ADDRESS FOR REF (IN HEX)? F92D RESULTING HIGH ADDRESS = FEFE, IS THIS OK? (Y/N).

This process lets you locate the cross reference almost anywhere you want it to be in memory (except below the address of 2800 hex, a limitation of TRS-DOS, not BuildREF). To locate REF without interfering with the machine language programs in the computer's memory is a cinch. Once you have settled upon the correct starting and ending parameters for your needs, you are told by the BuildREF program to use the TRS-DOS DUMP command to save the program to disk by using the starting and ending addresses specified. DUMP will not work below 2800 Hex.

The only problem at this point is that you are not told what the transfer address is supposed to be. I guessed that the transfer address was the same as the start address: DUMP REF:0 START = F92D, END = FEFE, TRA = F92D. Luckily, I was right.

Once I had my version saved to disk, I loaded BASIC and began to play with the cross reference utility

and put it through its paces.

At this point, the instructions became very accurate and the program performed exactly as indicated. This indicates that the methods of loading the programs had been changed but that new documentation has not been printed. While the new methods are simpler and better, the old documentation should have had new loading and setup instructions included, even if they were only handwritten or photocopies.

Before you can use the REF utility, it has to be loaded into memory and initialized. This can ONLY be done from BASIC and is accomplished by entering SYSTEM"REF." Whenever you do this, the copyright notice is displayed, signifying that the reference utility has loaded properly and is ready to use.

After it has been initialized, pressing the control and "R" keys simultaneously will invoke the utility, which responds: REF?.....

The Racet cross reference is one of the most powerful utilities of its type that I have seen. Not only can you get a cross reference of the BASIC program lines containing variables, or the lines which are targets of IF.. THEN's, GOTO's and GOSUB's, but you can also find ASCII strings and BASIC keywords.

Unlike some cross reference utilities, you can terminate a reference listing by pressing the break key, which returns you to the BASIC READY prompt. The commands that may be given are:

1. REF? VA— Any variable name can be used. Only the first two letters need to be given and type declarations or array notations may be left out. In this example, all lines containing the variable names VA, VA\$, VA#, VA(X,Y), VALIUM, VA%(C,V,B), etc., would be listed.

2. REF? 3010— Any integer number from zero to 99999 may be used. In this example, all references to the line number 3010 or to the number 3010 would be listed.

3. REF? PAPER/S— Any ASCII string of one to 12 characters may be used as a search key. This example would result in the listing of all lines that contain the ASCII string

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# Clean those disk heads

## Model I/III

William H. Scott, Jr.  
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How many of you out there have purchased a disk head cleaning kit? Well, sooner or later you are going to need it—especially when those nasty disk errors start to crop up. Hopefully, you haven't waited this long to get one.

The kit I purchased came with two cleaning diskettes and a plastic bottle of cleaning solution. The diskettes are identical in size to the regular 5¼-inch version, but the actual diskette inside the protective sleeve is made of a pressed fibrous material. One side of each diskette (in the head area) has a large cutout where the cleaning solution is to be applied. On the reverse side of the diskette is a smaller punch-out area which can be removed for use on dual headed drives.

The kit is easy to use. Just squirt the recommended amount of cleaning solution (about 2 ml.) onto the diskette surface and insert it into the drive.

Now what? The directions say to access the drive for about 30 seconds. This seems easier said than done. One particular cleaning kit suggests entering the DIR:X command (where X=the drive number where the cleaning disk was inserted). This command, which will attempt to read the disk directory, will only cause disk access for about four seconds. Depending on the operating system you are using, the computer will either hang up or issue some sort of error message since no readable disk is available. Obviously, in the case of the hangup, you will have to reset the system.

There is a very simple way to accomplish the 30-second disk access without resetting the system or typing multiple entries. Type in the short program shown in figure one. With this program you will be able to keep the diskette rotating for whatever time is desired and also make maximum use of the cleaning surface of the cleaner diskette.

The value that is poked into address 14304 in lines 40, 80 and 160 selects the appropriate disk drive. This value may be 1, 2, 4 or 8 which will select relative drives zero, 1, 2 and 3 respectively. This memory location is the Drive Select Latch used by DOS to control disk selection. The proper value poked here tells the Floppy Disk Controller (FDC) in the expansion interface to select the required disk for about two seconds. The drive will be kept running by continuously poking the desired value here in the FOR . . . NEXT loop at the end of the program.

The length of time that the diskette is kept rotating

may be controlled by varying the loop value in the FOR statement in line 150. Set it to suit your own needs. A value of 3300 more or less, will give you a time of 30 seconds.

The program performs a "seek" operation at line 100 to step the head to a specified track. This will allow you to select a different area of the cleaner diskette every time it is used. The track number desired is assigned in line 30. If you have a 35-track drive, the allowable range is zero-34. For 40- or 77-track drives, use zero-39 or zero-76. The program example uses track 35. Track 35 is the innermost track (near the hub) of a 35-track drive. Prior to the actual seek operation at line 100, the head will be moved (restored) to track zero in line 50 to provide a reference point. The two PEEK operations in the program will check for FDC "not busy" status; that is, to see if the disk operation has been completed.

When the seek is complete, the prompt to insert the cleaning diskette will be displayed on the screen. Remove the current diskette and insert the cleaning diskette. Hit <ENTER>, and the drive will be selected for about 30 seconds. When the operation is finished, the cleaning diskette may be removed and the previous diskette reinserted.

When you pull the cleaning diskette out of the drive, you may notice a circular brown streak in the cleaning area. This is the oxide that has been removed from the head. It accumulates over a period of time and can cause problems if the head is not cleaned regularly. What is the recommended cleaning interval? That depends on the amount of use that your disk drives get from day to day and how clean you keep your drives and diskettes.

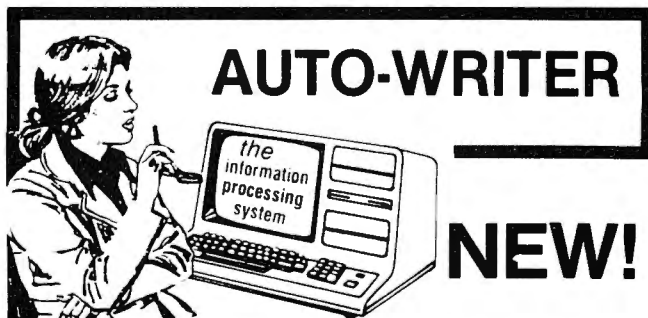
You may use this program with any disk drive of your system. Be sure to change the drive selected in line 20 and the track value in line 30 when needed. For the first two cleaning operations, use the first and last tracks of the disk. Examine the diskette after the second operation. You should be able to see where the tracks reside by the residue left on the cleaning surface. For subsequent cleaning operations, select tracks between these locations. You might want to keep a chart with the date and track used on the cleaner disk. This way you can get maximum use from the kit.

Don't wait! Go out and buy that cleaning kit and keep those heads clean! You will be happier in the long run and your system operation will be a lot smoother.

Listing for Clean those disk heads

```

10 CLS
20 DR=1
30 TR=35
40 POKE 14304,DR
50 POKE 14316,3
60 ST=PEEK(14316)
70 IF (ST AND 1)=1 THEN 60
80 POKE 14304,DR
90 POKE 14319,TR
100 POKE 14316,19
110 ST=PEEK(14316)
120 IF (ST AND 1)=1 THEN 110
130 PRINT "REMOVE DISKETTE AND INSERT CLEANER DISKETTE."
140 INPUT A
150 FOR I=1 TO 3300
160 POKE 14304,DR
170 NEXT I
180 PRINT "CLEANER COMPLETE. REMOVE CLEANER DISKETTE AND INSERT PREVIOUS DISKETTE."
    
```



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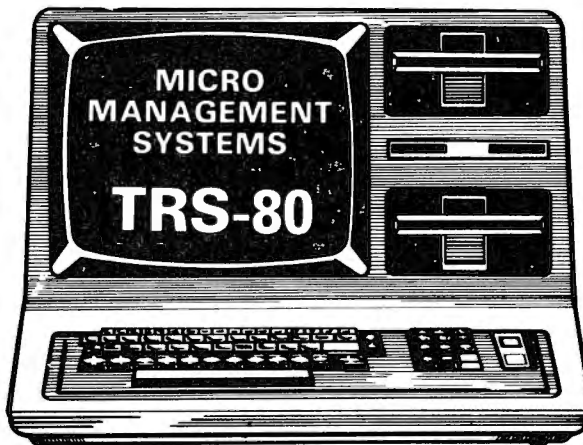
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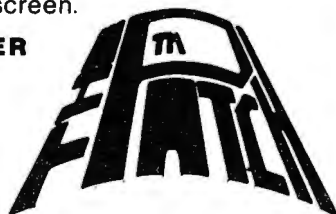
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Circle # 83

# JKL patch

## *JKL graphics with the MX-80 printer*

### Model I

John T. Phillip, M.D.  
Glendora, CA

NEWDOS 2.1 and NEWDOS80 1.0 are very popular operating systems for the TRS-80 Model I because of the advantages they offer over TRSDOS. One of those enhancements is the "JKL" screen dump feature by which the contents of the CRT screen can be sent to the printer by pressing the "J", "K" and "L" keys simultaneously.

If you try this when there are graphics characters on the screen, though, you will find that the JKL routine substitutes a period (.) for any graphics character (CHR\$ 128 to CHR\$ 191) that it encounters. This is done so the routine will be compatible with printers which cannot recognize the graphics characters used by the TRS-80.

Many printers, such as the Microline-80, will print TRS-80 graphics without modification. The Epson MX-80 will print TRS-80 graphics, but in its usual operating mode it requires that 32 be added to the CHR\$ number of each graphics character. The MX-80 character set moves the TRS-80 graphics to CHR\$(160)-CHR\$(223) to avoid printer control codes placed at CHR\$(128)-CHR\$(155). The MX-80 may be placed in a "TRS-80" mode by manipulating an internal switch. This leaves the graphics characters at their normal values, but prevents the use of "double printing" and "enhanced printing."

The following BASIC program will patch the JKL routine to provide graphics with printers capable of printing the TRS-80 graphics codes or with the MX-80 in its usual operating mode.

To use the program, put a NEWDOS 2.1 or NEWDOS80 1.0 system diskette without write protect into drive zero. Use a backup copy because you will be writing to the disk!! Enter BASIC, type in the program and run it. The patch will be added to the JKL routine on

the disk and the system will return to DOS. From then on, pressing JKL will dump the screen, graphics and all, to your printer.

#### Listing 1

```
10 ' "JKLGRAF" - JKL GRAPHICS FOR THE M
    X-80 PRINTER
20 ' ** THIS PATCH WILL ONLY WORK WITH
    NEWDOS 2.1 **
30 '
40 ' JOHN T. PHILLIPP, MD
50 ' 118 WEST ALOSTA #2
60 ' GLENDORA, CA 91740
70 ' OCTOBER, 1981
80 '
99 ' FILE BUFFER #1 FOR NEWDOS 2.1
100 H=&H6575
110 OPEN"R",1,"SYS1/SYS"
119 ' GET THE FIFTH SECTOR OF SYS1/SYS
    INTO THE BUFFER
120 GET1,5
129 ' MODIFY IT
130 FORI=138T0171
140 READX
150 POKEH+I,X
160 NEXTI
169 ' PUT IT BACK ON THE DISK
170 PUT1,5
```

```

180 CLOSE: CMD"S"
189 ' THE PATCH TO BE APPENDED TO SYS1/
    SYS
190 DATA 1,15,201,81,254,128,56,3,6,32,
    128,205,59,0,195,216,67
199 ' THE JUMP TO THE PATCH FROM THE JK
    L ROUTINE
200 DATA 1,11,207,67,195,201,81,0,0,0,0
    ,0,0
209 ' THE START OF SYS1/SYS
210 DATA 2,2,0,78
220 END
    
```

Listing 2

```

10 ' "JKL" GRAPHICS
20 ' ** MODIFICATIONS TO NEWDOS 2.1 AND
    NEWDOS80.1.0 **
30 '     FOR THE MX-80 AND OTHER GRAPHIC
    S PRINTERS
40 '
50 ' JOHN T. PHILLIPP, MD
60 ' 188 W. ALOSTA, #2
70 ' GLENDORA, CA 91740
80 '
100 CLS:PRINT@448,"DO YOU HAVE AN MX-8
    0 (1) OR OTHER GRAPHICS PRINTER (2)";
    :INPUTPR
110 CLS:PRINT@448,"ARE YOU MODIFYING T
    HE JKL FUNCTION OF NEWDOS 2.1 (1) OR
    NEWDOS80 1.0 (2)";:INPUTDOS
118 ' FILE BUFFER #1 FOR NEWDOS 2.1 = 6
    575 HEX
119 ' FILE BUFFER #1 FOR NEWDOS80 1.0 =
    66EB HEX
120 IFDOS=1THENH=&H6575+&H7F:SCTR=2:ELS
    EH:&H66EB+&HB9:SCTR=3
129 ' ADD 32 TO GRAPHICS FOR MX-80, ELS
    E LEAVE THEM ALONE
130 IFPR=1THENX1=&HC6:X2=&H20:ELSEX1=00
    :X2=00
140 OPEN"R",1,"SYSO/SYS"
149 ' GET THE 2ND SECTOR OF SYSO/SYS IN
    TO THE BUFFER FOR NEWDOS2.1, OR THE 3
    RD SECTOR FOR NEWDOS80 1.0
150 GET1,SCTR
159 ' MODIFY IT FOR THE CHOSEN PRINTER
160 POKEH,X1:POKEH+1,X2
169 ' PUT IT BACK ON THE DISK
170 PUT1,SCTR
180 CLOSE: CMD"S" ■
    
```

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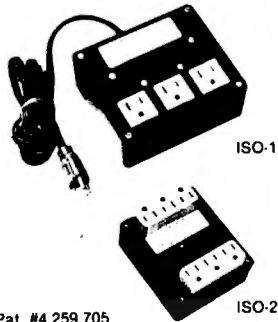
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## HOW ACCEL2 WORKS, PART 2

TRS-80 Model I/III BASIC Compiler

The ACCEL2 program has worked fine! I used it to compile a BASIC WORD PROCESSOR that was published in 80 MICROCOMPUTING in their MAY 1980 issue. It was necessary to go through all of the for-next loops because of the many jumps out of them and make corrections, but when that job was done the program worked fine. I am using it to write you this letter. The final program fits into a 32K machine.

ACCEL2 is amazing! I had bought an Othello game a couple of years ago, but never played it because of the interminably long time (2-3 minutes) it took the computer to make each move - no fun at all. Just for the heck of it I ran ACCEL2 on it, making NO changes whatsoever to the program, and the whole thing compiled at once with no linker! It then took about 10 seconds per move, so I added a single statement at the beginning to DEFINT A-Z, recompiled, and the result is just as good as an assembly-language program - only a couple of seconds per move!

I also wish to state that I think that ACCEL2 is an excellent product. I have modified Scott Adams' Backgammon game to compile under ACCEL2 as an example. The original BASIC program takes 30 to 40 seconds for the average move and can take as much as 4 minutes. The compiled version averages 2 to 3 seconds per move with a maximum move time of 9 seconds (all integer variables). That is significant!!

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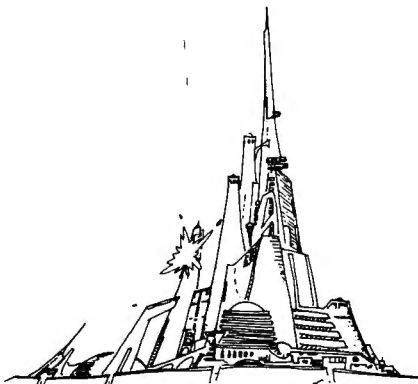
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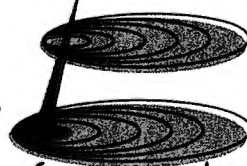
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# Tiny typer

## Model I/III

Woody Pope  
Garland, TX

This program began accidentally when my friend James Talley made a comment to me one Saturday at the DALTRUG (Dallas TRS-80 Users Group) meeting. We were talking about word processor programs and James suggested I write a routine that turns the keyboard and lineprinter into a typewriter. Later, at home, I was playing around at the keyboard and decided to give James's idea a try.

First came a 12-line program which printed a line across the top of the screen and when ENTER was pressed, the line was sent to the printer. Okay, but then I got the idea that maybe the code could be compressed into a smaller number of lines: it reduced to five. I decided to try to put it all in one line similar to the "one liners" in other magazines. This took awhile, but I finally succeeded.

Everything was fine until I discovered that each time the ENTER key was pressed, the cursor would jump down a line and the printer did a line feed. Cute, I thought. I enjoyed doing this so much that I kept doing it until the cursor was on the bottom line of the screen. The next ENTER bombed the program because I had used PRINT@ + 64. When this number exceeded 1023, the program bombed! Something had to be changed.

Why not print the line at the bottom of the screen and let it scroll up each time ENTER is pressed? Then the top line would be shifted up and off the top just like a real typewriter. A rewrite with this feature fixed the problem.

Next, I discovered that a space for the beginning character on a line caused the program to bomb. A fix was discovered, but all of the necessary information wouldn't fit onto one line. A comma could be substituted for THEN, and since the BASIC interpreter counts characters per line, more room was obtained. The finished form is shown in listing two.

The program allows typing up to 63 characters per line but will not accept the 64th, forcing the operator to press ENTER. An asterisk is placed at the end of the line to show the 64th character position so that the operator will know how much space is left on a line. The backspace/erase key is active and all editing must be done using it before entering the line. The line will not go to the printer until ENTER is pressed. If double

spacing is desired, the operator just presses ENTER an extra time between lines.

The program works as follows:

POKE 16382,42 puts an asterisk at the lower left of the screen. IF F=0:CLS:CLEAR 999:DEFSTR A-B:PRINT @960, CHR\$(14);:F=1GOTO 1 is the initial setup. The first time through, F will be zero, since all values are zeroed and strings nulled, when you run a program. Notice that F=1:GOTO 1 sets the F flag to nonzero then returns to the beginning of the line. The asterisk will be printed but the setup will be skipped. The screen is cleared during setup and string space is assigned. Letters A and B are defined as strings so that they may be written in the line without a \$ and therefore, save character space. PRINT @ 960,CHR\$(14); turns on the cursor at the bottom left of the screen.

A=INKEY\$:IF A="" ,1 ELSE D=ASC(A) forms the keyboard scan loop. If no key is pressed, A will be null and the program goes to the beginning of the line (commas replace THEN'S), prints over the asterisk and keyscans again. When a key is pressed, the ASCII value is found and assigned to the variable D.

IF D=13, PRINT A; :PRINT B:B="" : C=0: GOTO 1: If the ENTER key is pressed, A scroll occurs, then the string B is printed and nulled. The character count is zeroed and the program returns to the beginning of the line. A new asterisk will be printed and the keys will be scanned again.

ELSE IF C=63 ,1 : If the character count is 63, don't print, just return to the beginning of the line.

IF D=8, IF C=0, 1 ELSE B=LEFT\$(B,LEN(B)-1): C=C-1 PRINT A; : GOTO 1 : If the backspace/erase key is pressed and the character count is zero, return to the beginning of the line. If the character count is between one and 63, then chop off the last character of the string B, decrement the character count, print the backspace to the screen and return to the line beginning.

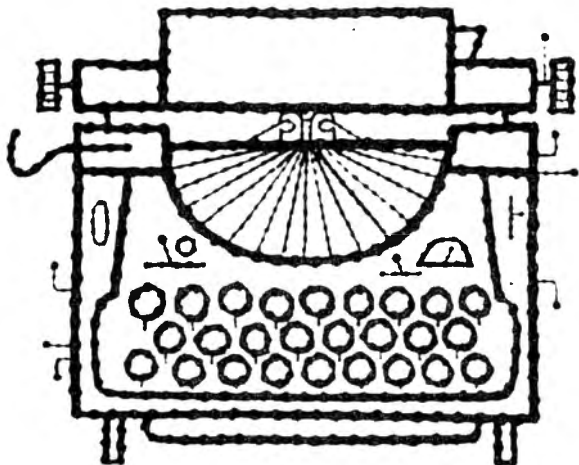
ELSE PRINT A; B=B+A: C=C+1 GOTO1: Print any other key not previously deferred to the screen, add it to the B string, increment the character count and return to the beginning of the line.

You may not be able to enter the entire line in the command mode. To get it all in, enter the edit mode and

## Technique

press X to finish the line. Another hint: I often think something is wrong with the program when the computer seems to hang up and no keys work, but everything goes back to normal when I put the lineprinter back ON LINE. Happy typing!

*If your TRS-80 will not allow you to enter a full 256 character line, type in as much as you can and press <ENTER>. Edit the line by using the "X" command. This places you at the end of the line. You may now enter the remaining characters. —Ed. note*



Listing 1

```
0 REM      TINY TYPER 1.0
           BY
           WOODY POPE
           GARLAND, TEXAS
1 AS=INKEY$: IFF=0 THEN CLS: CLEAR999: X=62:
  PRINT@X, "*" : PRINT CHR$(28) + CHR$(14) ; : F
=1: GOTO1 ELSE IF A$="" THEN GOTO1 ELSE PRINT
A$ ; : IF A$=CHR$(13) THEN LPRINT B$ : B$="" : X
=X+64: PRINT@X, "*" + CHR$(29) ; : GOTO1 ELSE
IF A$=CHR$(8) THEN B$=LEFT$(B$, LEN(B$)-1
): GOTO1 ELSE B$=B$+A$: GOTO1
```

Listing 2

```
0 REM      TINY TYPER 1.0
           BY
           WOODY POPE
           GARLAND, TX.
1 POKE16383,42: IFF=0, CLS: CLEAR999: DEFST
RA-B: PRINT@960, CHR$(14) ; : F=1: GOTO1 ELS
EA=INKEY$: IFA="" , 1 ELSE D=ASC(A) : IFD=13
, PRINTA ; : LPRINT B$ : B$="" : C=0: GOTO1 ELSE IF
C=63, 1 ELSE IFD=8, IFC=0, 1 ELSE B=LEFT$(B,
LEN(B)-1) : C=C-1: PRINTA ; : GOTO1 ELSE PRIN
TA ; : B=B+A: C=C+1: GOTO1 ■
```



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# Pinball baseball



**Model I**  
U. F. Racine  
Topeka, KS

Pinball Baseball is a game I wrote nearly two years ago for my TRS-80 Model I. It is a simulation of the mechanical baseball games still occasionally found in arcades.

The game is designed for two players with the computer acting as the pitcher for both sides and unofficial scorer. The level of difficulty can be set for each player by selecting fast or slow pitches for each of the three types (fastball, slider and change-up) thrown by the TRS-80. This allows players of different abilities and ages to compete on an equal basis.

The pitch is initiated by pressing the "T" key and the bat is swung by pressing the space bar. At the end of each half inning of play, the scoreboard and the current batting average of each player is displayed. If the score is tied after nine innings, the game will allow up to nine additional innings to break the tie.

The game is written totally in BASIC and uses a variety of graphic techniques I was learning at the time I wrote the program. The playing field, scoreboard and batting average grid are constructed using string variables. The playing field is then printed on the screen. This method allows the screen to be refreshed quickly.

The motion of the ball is displayed using the SET and RESET functions. For many applications, these two functions are simply too slow; but in this instance they are adequate. The numbers on the scoreboard are poked into the correct position on the screen by reading the correct value from GQ\$ and GR\$.

```
10 CLS:PRINTCHR$(23)
20 PRINT@128,"PINBALL BASEBALL
```

BY U.F.RACINE"

```
30 PRINT@768,"COPYRIGHT NOVEMBER, 1979
2520 S.E.ALEXANDER
TOPEKA, KANSAS 66605"
```

```
40 FORX=1TO1000:NEXT
50 CLS:PRINTTAB(20)"PINBALL BASEBALL":P
RINT"THIS IS A SIMULATION OF A PINBAL
L BASEBALL GAME FOR 2 PLAYERS.":PRINT
"THETRS-80 PITCHES FOR BOTH SIDES. IT
WILL THROW THREE":PRINT"DIFFERENT SP
EED PITCHES IN THREE LOCATIONS WHEN T
HE 'T' KEY"
60 PRINT"IS PRESSED. THE PLAYER SWINGS
THE BAT BY PRESSING THE SPACE BAR."
70 PRINT:PRINT:INPUT"PRESS ENTER";XX$
95 REM ENTER PLAYERS' NAMES AND TYPE OF
PITCHES TO BE THROWN
100 CLEAR1000:GOTO150
110 CLS:PRINT@448,"";:INPUT"SHALL I THR
OW A FAST FASTBALL";XX$:IFLEFT$(XX$,1
)="Y"THENPK(P)=4ELSEPK(P)=2
120 INPUT"SHALL I THROW A FAST CHANGE-U
P";XX$:IFLEFT$(XX$,1)="Y"THENQK(P)=4E
LSEQK(P)=3
130 INPUT"HOW ABOUT A FAST SLIDER";XX$:
IFLEFT$(XX$,1)="Y"THENRK(P)=2ELSERK(P
)=1
140 RETURN
150 CLS
160 PRINT@448,"";:INPUT"FIRST PLAYER'S
NAME";FP$(1)
```



```

GL$+"##"+" "+"_###"+" "+G1$:GB$=
CHR$(149)+" "+FP$(2)+" "+"##"+GL$+"
##"+GL$+"##"+GL$+"##"+GL$+"##"+
##"+" "+"_###"+" "+G1$
600 GQ$="155651556915573155771558115585
155891559315597":GR$="156931569715701
157051570915713157171572115725"
610 QU$=STRING$(64,176):QP$=STRING$(64,
131)
995 REM PRINT PLAYING FIELD AFTER EACH
OUT
1000 CLS
1010 PRINT@0,OF$;:PRINT@64,A$;:PRINT@47
9,A1$;:PRINT@649,A2$;:PRINT@694,A2$;:
PRINT@287,A2$;:FORK=4T029:SET(O,K):SE
T(127,K):NEXT:PRINT@926,CHR$(191);:Y=
44:FORK=58T02STEP-4:Y=Y-1:SET(K,Y):NE
XT:PRINT@704,"OUTS";:PRINT@768,OT;:PR
INT@832,"RUNS";:PRINT@896,R;
1020 Y=44:FORK=69T0125STEP4:Y=Y-1:SET(K
,Y):NEXTK:PRINT@825,"AT BAT";:PRINT@8
89,FP$(AB);
1030 IFFB=1THENPRINT@566,BR$;:ELSEPRINT
@566,BV$;
1040 IFSB=1THENPRINT@159,BR$;:ELSEPRINT
@159,BV$;
1050 IFTB=1THENPRINT@521,BR$;:ELSEPRINT
@521,BV$;
1055 REM LOOK FOR T KEY - IF PRESSED TH
ROW THE PITCH LEFT - CENTER - RIGHT
1060 P$=INKEY$:IFP$="T"THENGOTO1070ELSE
1060
1070 PO=RND(3):Y=22:QW=RND(3)
1080 X=QW+61:J=QW
1090 SET(X,Y):SET(X+1,Y)
1095 REM SWING THE BAT ?
1100 P1$=INKEY$:IFP1$=""THENGOTO1120
1110 IFASC(P1$)=32THENQ=1:GOTO1120:ELSE
1100
1120 IFQ<1THEN1180
1130 IFQ=1PRINT@926,B$;:GOTO1170
1140 IFQ=2THENPRINT@926,B1$;:GOTO1170
1150 IFQ=3THENPRINT@926,B2$;:GOTO1170
1160 IFQ=4THENPRINT@926," ";:GOTO1250

1170 Q=Q+1:IFQ>4THENGOTO1250
1175 REM HAS CONTACT BEEN MADE ?
1180 IFPOINT(X,Y+1)THENGOTO1500
1190 IFY>44THENPRINT@926," ";:GOTO12
50
1200 RESET(X,Y):RESET(X+1,Y)
1210 IFPO=3THENY=Y+PK(AB):GOTO1090
1220 IFPO=2THENY=Y+RK(AB):GOTO1090
1230 IFY<40THENY=Y+RND(QK(AB))-1
1240 Y=Y+1:GOTO1090
1250 RESET(X,Y):RESET(X+1,Y)

1260 Q=0:J=0
1270 PRINT@926,CHR$(191);
1280 PRINT@600,"S T R I K E O U T";
1290 BS=6
1300 ONABGOSUB2350,2420
1310 GOTO2270
1495 REM DISPLAY THE BALL ON THE PLAYIN
G FIELD
1500 ONJGOTO1520,1510,1680
1510 Z=RND(2):ONZGOTO1520,1680
1520 PRINT@926," ";:W=RND(5):W1=RND(4
)
1530 SET(X,Y):SET(X+1,Y)
1540 RESET(X,Y):RESET(X+1,Y)
1550 X=X-W:Y=Y-W1
1560 IFX>3ANDY>3THENGOTO1530
1570 IFX<=3THENGOTO1610
1580 PRINT@926,CHR$(191);
1590 Q=0:J=0
1600 GOTO2000
1610 X=2:W=RND(5):W1=RND(4)
1620 SET(X,Y):SET(X+1,Y)
1630 RESET(X,Y):RESET(X+1,Y)
1640 X=X+W:Y=Y-W1
1650 IFY>3ANDX<125THENGOTO1620
1660 IFY>3THENX=125:GOTO1790
1670 GOTO2000
1680 PRINT@926," ";:RANDOM
1690 W=RND(5):W1=RND(4)
1700 SET(X,Y):SET(X+1,Y)
1710 RESET(X,Y):RESET(X+1,Y)
1720 X=X+W:Y=Y-W1
1730 IFX<126ANDY>3THENGOTO1700
1740 IFX>=126THENGOTO1780
1750 PRINT@926,CHR$(191);
1760 Q=0:J=0
1770 GOTO2000
1780 X=125:W=RND(5):W1=RND(4)
1790 SET(X,Y):SET(X+1,Y)
1800 RESET(X,Y):RESET(X+1,Y)
1810 X=X-W:Y=Y-1
1820 IFY>3ANDX>3THENGOTO1790
1830 IFY>3THENX=2:GOTO1620
1840 GOTO2000
1995 REM WAS IT A HIT ?
2000 IFX<14THENBS=1:PRINT@602,"S I N G
L E";:GOTO2070
2010 IFX>13ANDX<34THENBS=5:PRINT@606,"O
U T";:GOTO2070
2020 IFX>33ANDX<53THENBS=2:PRINT@602,"D
O U B L E";:GOTO2070
2030 IFX>52ANDX<75THENBS=4:PRINT@602,"H
O M E R U N";:GOTO2070
2040 IFX>74ANDX<93THENBS=3:PRINT@602,"T
R I P L E";:GOTO2070
2050 IFX>92ANDX<113THENBS=5:PRINT@606,"
O U T";:GOTO2070

```

```

2060 IFX>112THENBS=1:PRINT@602,"S I N G
      L E";:GOTO2070
2070 PRINT@926,CHR$(191);:Q=0:J=0
2080 ONABGOSUB2350,2420
2090 FORK=1TO150:NEXT:PRINT@600,"
      ";
2095 REM BASE RUNNERS AND RBI'S
2100 ONBSGOTO2110,2150,2190,2230,2270
2110 IFTB=1THENR=R+1:TB=0
2120 IFSB=1THENTB=1:SB=0
2130 IFFB=1THENSB=1
2140 FB=1:GOTO2310
2150 IFTB=1THENR=R+1:TB=0
2160 IFSB=1THENR=R+1
2170 IFFB=1THENTB=1:FB=0
2180 SB=1:GOTO2310
2190 IFTB=1THENR=R+1
2200 IFSB=1THENR=R+1:SB=0
2210 IFFB=1THENR=R+1:FB=0
2220 TB=1:GOTO2310
2230 R=R+1:IFTB=1THENR=R+1:TB=0
2240 IFSB=1THENR=R+1:SB=0
2250 IFFB=1THENR=R+1:FB=0
2260 GOTO2310
2270 OT=OT+1
2280 FORK=1TO90:NEXT:PRINT@600,"
      ";
2290 BS=0:Q=0:J=0
2300 IFOT<3THENGOTO1010ELSEGOTO2320
2310 BS=0:Q=0:J=0:GOTO1010
2315 REM KEEP TRACK OF THE INNING AND R
      UNS SCORED
2320 NI=NI+.5
2330 IFAB=1THENTA(NI+1)=R:TP(1)=TP(1)+R
      :R=0:GOTO2500
2340 IFAB=2THENTB(NI)=R:TP(2)=TP(2)+R:R
      =0:GOTO2500
2345 REM THIS IS THE OFFICIAL SCORER -
      RECORDS STRIKE OUTS,          SIN
      GLES, DOUBLES, TRIPLES, HOME RUNS AND
      AT BATS
2350 W8=W8+1
2360 IFBS=1THENW0=W0+1:GOTO2410
2370 IFBS=2THENW2=W2+1:GOTO2410
2380 IFBS=3THENW3=W3+1:GOTO2410
2390 IFBS=4THENW4=W4+1:GOTO2410
2400 IFBS=6THENW5=W5+1
2410 RETURN
2420 UV=UV+1
2430 IFBS=1THENU1=U1+1:GOTO2480
2440 IFBS=2THENU2=U2+1:GOTO2480
2450 IFBS=3THENU3=U3+1:GOTO2480
2460 IFBS=4THENU4=U4+1:GOTO2480
2470 IFBS=6THENU5=U5+1
2480 RETURN
2495 REM PRINT THE SCORE BOARD AFTER EA
      CH HALF INNING

```

```

2500 CLS:PRINT@3,G6$:PRINT@67,S$:PRINT@
      131,G7$:PRINT@195,S1$:PRINT@259,G7$:P
      RINT@323,S2$:PRINT@387,G8$
2510 FORK=1TOINT(NI+.5)
2520 SQ=INT(TA(K)/10):SS=TA(K)-(SQ*10):
      SR=K*5-4:CR=VAL(MID$(GQ$,SR,5)):IFSQ>
      0THENGOTO2530ELSEGOTO2540
2530 POKECR,SQ+48:POKECR+1,SS+48:GOTO25
      50
2540 POKECR,SS+48
2550 NEXTK
2560 SQ=INT(TP(1)/10):SS=TP(1)-(SQ*10):
      IFSQ>0THENGOTO2570ELSEGOTO2580
2570 POKE15602,SQ+48:POKE15603,SS+48:GO
      T02590
2580 POKE15603,SS+48
2590 IFNI=.5THENGOTO2680
2600 FORK=1TONI
2610 SQ=INT(TB(K)/10):SS=TB(K)-(SQ*10):
      SR=K*5-4:CR=VAL(MID$(GR$,SR,5)):IFSQ>
      0THENGOTO2620ELSEGOTO2630
2620 POKECR,SQ+48:POKECR+1,SS+48:GOTO26
      40

```

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Game \_\_\_\_\_

```

2630 POKECR,SS+48
2640 NEXTK
2650 SQ=INT(TP(2)/10):SS=TP(2)-(SQ*10):
    IFSQ>0THENGOTO2660ELSEGOTO2670
2660 POKE15730,SQ+48:POKE15731,SS+48:GO
    T02680
2670 POKE15731,SS+48
2675 REM PRINT BATTING AVERAGE OF PLAYE
    RS
2680 AV=(W0+W2+W3+W4)/W8
2690 PRINT@515,STRING$(50,176)
2700 PRINT@579,CHR$(149);:PRINT@590,"AB
    SO 1B 2B 3B HR AVE "
    ;CHR$(170)
2710 PRINT@643,"";
2720 PRINTUSINGG$;W8,W5,W0,W2,W3,W4,AV

2730 IFNI=.5THENGOTO2770
2740 PRINT@707,"";
2750 PRINTUSINGGB$;UV,U5,U1,U2,U3,U4,(U
    1+U2+U3+U4)/UV
2760 GOTO2790
2770 PRINT@707,STRING$(50,131)
2780 GOTO3000
2790 PRINT@771,STRING$(50,131)
2995 REM HAS ANYONE WON THE GAME OR DO
    WE NEED EXTRA INNINGS
3000 IFNI=8.5ANDTP(2)>TP(1)THENPRINTFP$
    (2);" WINS THAT GAME":CE=1:GOTO3130
3010 IFNI=9ANDTP(2)>TP(1)THENPRINTFP$(2
    );" WINS THAT GAME":CE=1:GOTO3130
3020 IFNI=9ANDTP(1)>TP(2)THENPRINTFP$(1
    );" WINS THAT GAME":CE=1:GOTO3130
3030 IFNI=9ANDTP(1)=TP(2)THENPRINT" THE
    GAME IS TIED ---EXTRA INNINGS":CE=2:
    GOTO3060
3040 IFCE=3THENGOTO3070
3050 GOTO3100
3060 IFCE=2THENS$=G2$+" "+G1$+"10
    "+G1$+"11 "+G1$+"12 "+G1$+"13 "+G1$+
    "14 "+G1$+"15 "+G1$+"16 "+G1$+"17 "+G
    1$+"18 "+G1$+" TOTAL "+G2$:NI=0:CE=3:
    GOTO3100
3070 IFNI-INT(NI)=0THENGOTO3080ELSEGOTO
    3100
3080 IFTP(1)>TP(2)THENPRINTFP$(1);" WIN
    S IN EXTRA INNINGS":GOTO3130
3090 IFTP(2)>TP(1)THENPRINTFP$(2);" WIN
    S IN EXTRA INNINGS":GOTO3130
3100 INPUT"PRESS ENTER TO CONTINUE";XX$
    :CLS
3110 IFAB=1THENAB=2:FB=0:SB=0:TB=0:R=0:
    OT=0:Q=0:GOTO1010
3120 AB=1:FB=0:SB=0:TB=0:OT=0:Q=0:R=0:G
    OT01010
3130 INPUT"ANOTHER GAME";XX$:IFLEFT$(XX
    $,1)="Y"THENRUN100ELSESTOP ■
    
```

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# @News

## Stringy Floppy owner's news

Jim Perry

Being an alien like Mork (I'm legal, I wonder if he is?), I have to register with the government every January. When you buy an Exatron Stringy Floppy you are automatically registered as an owner, but if you move or purchased a Stringy used, then Exatron doesn't know where you are! If you have moved in the last year or didn't buy your Stringy from Exatron, why not drop Exatron a postcard and get registered.

Exatron doesn't intend to send you any junk mail (not everyone enjoys it like me), but they want to be able to send all owners useful information and news about the growing Stringy revolution.

### Model III Stringy

At long last there is an ESF for the TRS-80 Model III! The Model I storage format is used so that existing Model I wafers can be used. The single-drive starter kit is \$349.00 with a twin-drive starter kit at \$449.00.

You just connect the unit to the Model III and type in SYSTEM followed by /ESF. The ESF operating system is loaded into the computer via the cassette port with a special "boot" wafer. It only takes about 10 seconds. More details next month, or if you can't wait, call Exatron on their hot line (800-538-8559).

### String Packer Fly

It seems that one of those pesky Medflies found its way into the String Packer program on @LOAD 1. Everything works fine until you use the PACK function. To fix it, do the following:

1. @LOAD1.
2. In the command mode, enter the following new line: 111 IF A\$=CHR\$(13) THEN GOXUB 5000
3. Type in EDIT 110 <Enter>.
4. Type 218
5. Press the SPACE bar.
6. Press the letter "H".
7. <Enter>.

This gets rid of the end of line 110 where the bug lives and the program should now work correctly.

After you have deloused the program, @SAVE it onto a new wafer. Don't @SAVE it back onto the @LOAD wafer as it is now slightly longer and could overwrite the beginning of file two.

In the future we will increase the Malathion dosage given to all new @LOADs!

### Composite Programs

The following letter was sent in by Dan Shelby of Omaha, Nebraska:

"I use the following technique with my ESF and call it the "Composite Program" technique. It involves merging together several programs into one large program which can then be saved as a single file. In this way, several programs can be loaded in virtually the same period of time and wafer capacity is increased (no interprogram gaps).

The only limitation, besides fitting into memory (remember to allow for the largest CLEAR statement), is that only one of the programs may include any data statements.

1. Renumber all the programs so that each has a unique number range.
2. The lowest-numbered program should begin with line 100.
3. @LOAD the lowest numbered program and insert the following lines:

Figure 1

```
1 IF PEEK (16633) > 1 GOTO 5
2 POKE 16548, PEEK (16633) + 254
3 POKE 16549, PEEK (16634) - 1
4 END
5 POKE 16548, PEEK (16633) - 2
6 POKE 16549, PEEK (16634)
7 END
```

4. RUN the program.
5. @LOAD the next-numbered program.
6. POKE 16548, 233 : POKE 16549, 66.
7. Repeat steps 4, 5 and 6 for each program until all are merged.
8. Delete lines 1 to 7.
9. Insert code similar to the following:

**Figure 2**

```

1 CLS:PRINT"PROGRAM MENU FOLLOWS":PRINT
2 PRINT "<< 1 >> PROGRAM #1 NAME "
3 PRINT "<< 2 >> PROGRAM #2 NAME "
4 PRINT "<< 3 >> PROGRAM #3 NAME "
5 PRINT "<< 4 >> PROGRAM #4 NAME "
6 PRINT@960,"PRESS 1-4 FOR PROGRAM";
7 C$=INKEY$: IFC$<"1" OR C$>"4" GOTO7
8 ON VAL(C$) GOTO 100, 200, 300, 400

```

This example assumed that you had loaded four programs, numbered from 100, 200, 300 and 400 respectively. Also note that the highest line number for each program must be lower than the next program.

10. @SAVE the "Composite Program" onto a new wafer.

With this technique I have saved more than 10 programs onto a wafer that previously was full with only eight programs. The Radio Shack's I.Q. series of programs were apparently broken into 4K sections to fit on the smallest TRS-80 and are ideal candidates for this technique.

If more than nine programs are to be merged, it is best to have eight programs per menu with selection nine displaying a second menu.

#### Cassette-to-wafer

The following cassette-to-wafer information was sent in by Harry Maurer from Succasunna, NJ.

	Start	Length	Auto-start
SCRIPSIT (Radio Shack) . . . .	17152	11217	21490
PACKER (Cottage Software)	60787	4548	60767
Disassembler 1.2 (Misosys) ..	40000	5188	40000
STEP-80 (Mumford Microsys.)	28416	4353	28416
BOSS 2.1 (Soft Sector Market.)	24576	2875	24688

All the start locations are for his 48K system, but programs like PACKER can be loaded into low memory with the ESF Monitor.

Harry admitted to having a couple of disk drives as well as his ESF, just like me. The only problem using both disks and Stringys is remembering to issue a CMD"T" before using the ESF. This command disables the interputs in disk BASIC which clobber the ESF data when reading or writing. Some disk-based software also seems to need a system /12346 for the ESF initialization, bypassing the ESF keyboard debounce routine.

Another east coast owner, Donald Eilenstine from Seneca Fall, NY, pointed out that the procedure for getting the Scott Adams Adventures onto wafer, outlined in the September/October @News, is much easier for owners with more than 16K of memory. In this case, the ESF monitor will handle the transfer to wafer in the normal way.

Donald also described a technique for transferring the 48K Avalon Hill Adventures to wafer. Save the program and data file on a 50-foot wafer as files one and two respectively (the addresses are given in the Avalon Hill documentation). To load the adventure, type in SYSTEM /12341 and when the data file prompt appears ("??") responds with /12342. The data file will load and the program will autostart.

#### MX-80 Histograms

The following patches to Electric Spreadsheet (48K version) allow you to produce the histogram plot on an MX-80 printer. Change lines 186 and 187 to the following:

**Figure 3**

```

186 PRINT@960,"ENTER LINE NO. + <E> TO
    GRAPH; 'P' FOR PRINTER; '/' FOR ME
    NU";
187 D$=INKEY$: IFD$="" THEN 187 ELSE IF
    ASC(D$)=13 THEN 188 ELSE IF ASC(D$)
    =47 THEN CLS: GOTO159 ELSE IF ASC(D
    $)=80 THEN 204 ELSE N$=N$+D$: PRINT
    @1021,N$: GOTO187

```

Also add the following seven lines:

**Figure 4**

```

201 FOR LQ=15360 TO 16256 STEP 64: FOR
    PQ=0 TO 63:AQ=PEEK(LQ+PQ):IF AQ<32
    AQ=AQ+64
202 IF AQ>127 AND AQ<192 AQ=AQ+32
203 LPRINTCHR$(AQ);: NEXT: LPRINT: NEXT
    :N$="": GOTO186
204 PRINT@960,CHR$(31);: PRINT@960,"ENT
    ER PRINTER TITLE: ";: N$=""
205 D$=INKEY$:IF D$="" THEN 205 ELSE IF
    ASC(D$)=13 THEN 207 ELSE IF ASC(D$)
    =8 THEN N$=LEFT$(N$,LEN(N$)-1) ELSE
    N$=N$+D$
206 PRINT@983,N$;" ";: GOTO205
207 LPRINT: LPRINTN$: LPRINT: GOTO201

```

The spaces in each line are optional. They were put in here for clarity. ■



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keyboard driver characteristics. They are: debounce delay, initial delay for repeat and delay between repeats. If the default parameters are suitable, the user presses ENTER and >READY appears. If another setting is desired, such as a longer debounce delay, the user may reset it before initialization.

The features include debounce, auto repeat on all keys and lowercase driver with shift lock. A single key stroke sends the contents of the screen to the printer with an option to convert graphic characters to the nearest ASCII equivalent. This is effective for simple displays such as bar graphs and function plots. There is a print switch feature that sends the printer output to the screen if the printer is not ready. The line printer driver has some interesting features, such as a page counter that may be accessed in a program; blank line insertion between pages; and right and left

margin settings. The final features are a keyboard lock where the user can lock out the keyboard and then unlock it by typing in a password, and a utility to send all screen input to the printer.

This utility package works as advertised and was quite easy and enjoyable to use. It is incompatible with disk, which is unfortunate because some of the features would be highly desirable for the disk owner. The documentation is short and concise; however, it contains a fatal error. The file name is given as "PRP" in the literature and is not written on the cassette label. After several unsuccessful attempts to load it, the name was extracted with a monitor utility and found to be "DDD". Hopefully, this has been corrected on later releases of Dynamic Device Drivers. All in all, a well written and useful utility for the Level II user.

**Jim Klaproth**



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*Reviews*

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Trakcess, written by Roxton Baker, is one of the most powerful utilities to hit the market since Apparat brought out Superzap. It may also become the most controversial piece of software due to the nature of its power. It will virtually allow the user to duplicate any disk on the market, including "protected" disks. It is not the policy of this magazine to encourage piracy of copyrighted software; however, this reviewer happens to believe, as does the author of Trakcess, that "protected" software is not the solution to the problem. By making a piece of software non-copiable, you also run the risk of bombing or wearing out the original, with the resulting headaches of having to replace the media.

Many schemes have been employed, such as using special loaders, locking out attempts to copy disks, or using non-standard disk formatting. In the latter case, it is virtually impossible to copy or even inspect the disk sectors because TRSDOS rigidly formats each sector with a certain pattern of ID bytes. When TRSDOS reads these sectors, it is looking for the same pattern. By changing the pattern of the ID bytes, TRSDOS becomes totally useless for reading the disk sector. A small number of packages now on the market are utilizing non-standard formatting. Trakcess will allow you to backup any diskette including those with non-standard formatting, those with foreign operating systems such as CP/M, or even an Intecolor diskette.

Trakcess is actually a takeoff on Bill Barden's book, "Disk Interfacing Guide for the TRS-80," which is an excellent treatise on the disk system of the TRS-80. Hardware requirements are 48K and two disk drives for full benefits of the utility. It is written in BASIC, with machine language assists, and even includes a copy of the documentation on the diskette itself. It can be listed on the CRT or printed on a line printer with the DOS commands, LIST and PRINT. The documentation is a little skimpy, but the user is assumed to have either a good background in disk operations or else a copy of Barden's book.

Trakcess goes beyond being simply a tool used to make backup copies of expensive programs which need extra care. There are several features built in which make this program fun to use. You can step the read/write head in or out a track at a time or go to a specified track very easily. You can read a specific sector into a specified block of memory, modify the data and write it back to the sector. You can display the data, either as Hex or ASCII, with the added ability to enter ASCII data right from the keyboard, i.e., instead of having to enter 41 for the letter A, you simply type the letter A.

The program is menu-driven for user ease and you can select which

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## Reviews

drive is to be active at any time simply by typing a numeral from zero to three. You can also read an entire track into RAM and then inspect it with the editor or write an entire track back to the diskette when formatting a blank diskette with empty sectors.

With Trakcess, you can scan the current track or locate all useable sectors on the disk. The program will determine all of the sector ID information, including whether or not it is standard IBM format and present it to the screen or printer. You may copy a single track to another diskette in another drive, which is why you need two drives, or copy the entire diskette which takes about 13 minutes. There is a utility that calculates something called CRC bytes for those who are really into repairing damaged disks. There is a memory dump to the printer routine in Hex or ASCII. But the most powerful command is the Build Format Track command.

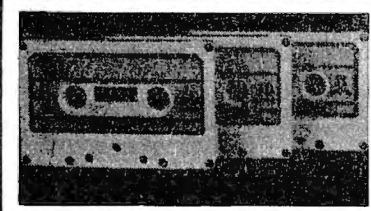
This command allows you to

create any type of track desired. For example, a track containing 80 different sectors could be created, or even a track with only one sector of 3024 bytes. This entire sector could be read into RAM very quickly using the techniques in Barden's book. Another application might be to duplicate a track on a "protected" diskette or even use the same type of "protection" for your own software. You may even mix different types of sectors on the same track for some truly creative programming efforts. The only problem is that once you have created these fancy sectors, you must be able to read and write data into them. This is beyond the limits of the program. Still, it is fun to play with this utility to see what can be done; but, more important, it is a tremendous learning experience.

Trakcess is definitely a must for serious disk owners. All of the features work as advertised, including the backup function. No bugs were detected after several hours of using the program. We did try to read an Apple diskette with no success. This is because Apple uses hard sectoring instead of soft sectoring. We had no problem reading any of the "protected" TRS-80 diskettes in our possession. Now we wonder who will be the first to come up with a new technique to protect software from being copied by Trakcess.

James E. Klaproth

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**"Starting Forth"**

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When I first learned Forth, it seemed to be a very obscure language. Not just obscure really, but downright difficult. The problem was lack of documentation.

Forth has never been a particularly well documented language. Manuals for the language were often confusing and difficult to read. Some were better than others and once I puzzled it out, I found Forth to be a delight. The language doesn't deserve poor manuals.

This is the best book on Forth I have seen, without exception. Brodie explains the concepts of Forth so clearly that even the newest user could become an expert in no time. Brodie's book is so complete that even the Forth expert

is likely to find something he missed.

*Starting Forth* is not a book on how to design a Forth system, nor does it cover fancy things you can do with the language. It explains very clearly how to program in Forth. It makes Forth a tool for using your computer better.

If you're having doubts about understanding Forth programming, this book will eliminate them—not because of the clarity alone, but because Leo Brodie is not a professional programmer! He obtained his education by specializing in writing at UCLA. He is presently a writer for Forth, Inc. Sure, he's interested in computers, but his background should convince anyone that it doesn't require a degree in science or engineering to understand Forth.

The book is loaded with programming examples that help to guide you along your way in learning the language. There are also sample problems at the end of

each chapter with corresponding answers in the back of the book.

The book is based on Forth, Inc.'s Polyforth. This is close enough to available TRS-80 Forth's that you can do the examples with little or no changes. Do be careful.

Terry R. Dettmann

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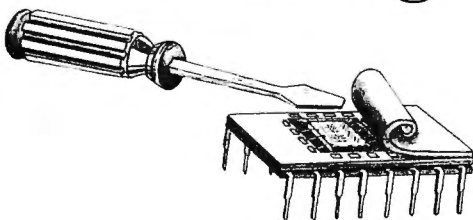
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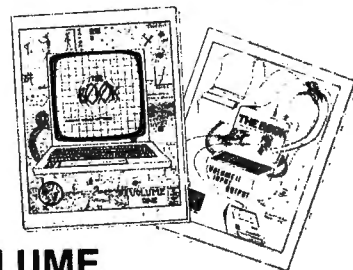
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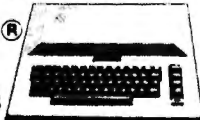
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## Reviews

### Scarfman

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If your friends are still not convinced that the TRS-80 is capable of providing some top notch entertainment in the line of arcade games, or if you'd just like to add another quality program to your software library, then "Scarfman" is definitely for you.

Scarfman is an excellent variation of the arcade game Pacman. It is produced by The Cornsoft Group and designed to run on the TRS-80 Model I/III computers. What gives Scarfman its special appeal? It's fast! This machine language program has rapid graphics, sound, response to commands and makes for some really exciting times. You definitely must have quick reactions for this game.

The game starts slowly so that the beginner may work his way through

the nine different skill levels provided. By the time you reach level nine (if you get there), WOW! You'll have to buy the game to discover what happens.

Scarfman is a chasing game. Small creatures are chasing you around a maze; they will kill you if you come into contact with them! Among the little dots in your path are five bigger ones which, when eaten, cause the creatures to become vulnerable for a short period of time (you may eat them).

You can earn points in three possible ways: 1) Eat a regular dot. 2) Eat a big dot. 3) Eat one or more of the little creatures. If you can avoid the creatures and eat all of the regular and big dots, the screen will flash several times. You will then move up one level of skill and get a new screen full of regular dots, big dots and little creatures.

The sound effects, though somewhat limited, are very clear and well defined. It would be rather nice to have a tune similar to the one played before every Pacman game. Nevertheless, Scarfman does a good job with both sound and graphics. There is even a nifty little title page before each game.

The controls are very basic and are the same as found in almost every other TRS-80 arcade game. The direction of travel is controlled by the arrow keys (up, down, left, right). If you want to end a game before the finish, you may hit the break and clear keys simultaneously to receive the "game over" message—then press ENTER to return to the menu.

If you are skilled enough to beat the built-in high score (about 55,000 points), with the four men provided at the beginning of the game, your name may be entered as high scorer.

I would highly recommend Scarfman to anyone who enjoys arcade games or would like an impressive demonstration game for their friends and family. This game is top notch quality, highly entertaining, extremely impressive and should be in the software library of every self-declared game addict.

**Tim Knight**

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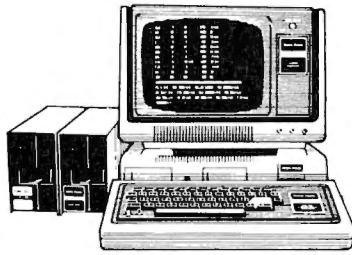
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**Robot Attack**  
**Big Five Software**  
**P.O. Box 9078-185**  
**Van Nuys, CA**  
**(213) 782-6861**  
**Model I/III—\$15.95**

Are you looking for action? Is your Model I or Model III TRS-80 thirsting for some liveliness? Do you want a program to drive you berserk? Then Robot Attack, the latest from Big Five Software, is for you. Robot Attack combines the best of all worlds in this new, exciting arcade game.

Fast, invigorating action, plus excellent sound and graphics are enough to make this one a winner, but the *real* plus is that this program *talks!* That's right! From telling whose turn it is, to calling out the players' names, the computer uses the cassette port for a voice, as well as for some very impressive sound effects.

The game begins with a long "title sequence" (something like the one in the beginning of Star Wars) explaining that the "Jidyans," a group of hostile aliens, have taken over an earth base. They have armed themselves with vicious robots, whose only purpose is to GET YOU!

Following this introduction (which may be skipped in later games by pressing the BREAK key), a series of flashes and sounds produce a giant robot attack on your screen with a voice shouting out the program's name. You may watch as the computer scrolls the high scores up the screen from previous games, or press "1" or "2" to get into a one or two player game. At the beginning of the game there are already three "high scores" built in. One of them is the author's high score, so it's good for the ego if you beat *that* one.

At this point your TRS-80 will form a random maze. This maze is similar to the one you might see in the original Berserk by Stern. A small "man" is positioned on the left side, accompanied by several robots which are spread throughout the

maze. Before you begin, the computer will announce which person is playing (player one or player two) and you're on your way to saving the human race.

Your "man" (yes, these computer games are still pretty sexist!) may be controlled by several different means. The one I use, and the one that is most easily understood, is merely pressing the corresponding arrows to command your man in the proper direction. To fire, press the space bar and the proper arrow key to tell the computer which direction you are firing. It's pretty tricky at first, but after running into a couple of walls and being shot a few times, you'll get the hang of it! Another way is to use the I, J, K and M keys for up, left, right and down. This can be cumbersome since your controls are all so close. With that combination, the F key is used for firing.

The third alternative for movement is to use a joystick if you have one. There are special instructions included with the game reminding you that if you have a joystick other than the one from Big Five, some modification may be necessary, and if it is necessary, how to modify it. Although I personally don't own a joystick, I think it's easier just playing with the arrow keys and space bar than to modify a joystick.

I believe that the new technique of voices in a game and the smooth graphics animation plus great sounds truly make this latest creation from Big Five Software a winner. Of course, some of the sounds are better than others. Creating voice through a cassette port is not the easiest task in the world, though the simulation of a "talking machine" in the game is just fine.

I highly recommend this game, based on its quality, appeal and value. It's a great deal of fun and will prove once and for all (I hope) that the TRS-80 can be used for just about *any* application.

**Tim Knight**

**Internal Memory**  
**Holmes Engineering**  
 6246 West 3705 South  
 Salt Lake City, UT 84120  
 (801) 967-2324  
 Model I

Many TRS-80 owners originally purchased the Tandy machine partly because of the price. More than one Model I was sold because someone took their income tax refund, the contents of their savings account and maybe even a few dollars borrowed from Junior's piggy bank, and used it to buy one of the early TRS-80s. Those same owners couldn't afford the price tag for a complete system with an expansion interface and disk drives, so they turned instead to less costly alternatives. If the cassette recorder wasn't fast enough, there was always the Exatron Stringy Floppy, the TC-8 ("poor man's floppy"), Fastload and other mass storage methods, none of which required an expansion interface.

Unfortunately, something important was lost in the bargain—the ability to expand the amount of memory in the TRS-80 beyond the 16K that can be installed into the keyboard itself. Various products have appeared that attempt to make up for this deficiency, but most of these have other drawbacks (such as bare printed circuit boards that require you to purchase and install the parts required, if you can figure out how to do it from the instructions provided).

Another solution is Internal Memory™. It fits right inside the TRS-80 keyboard unit and requires NO knowledge of electronics to install (you don't even have to know how to use a soldering iron)!

Internal Memory is a product of Holmes Engineering of Salt Lake City, Utah, and they offer two models. Model IM-1 adds 16K of RAM to your existing 16K for a total of 32K. Model IM-2 adds 32K of RAM, giving you a grand total of 48K (the maximum amount of memory normally usable in the TRS-80). 4K memory chips cannot be used with either model, so if you haven't already upgraded to 16K, you'll need an additional set of 16K

memory I.C.s.

Either model can be purchased with RAM already installed or with I.C. sockets installed where the RAM should go so that you can purchase and install your own RAM. At this writing, the IM-1 (32K model) costs \$52.50 (not including the RAM) while the IM-2 (48K model) is \$79.50 (also less the cost of the RAM). Holmes Engineering will install as many sets of 4116-type RAM I.C.s on your Internal Memory as you desire for \$26.00 per set of eight RAM chips. You may want to write directly to Holmes to ascertain these prices, since I.C. prices tend to change often.

I have installed an IM-2 Internal Memory unit in my TRS-80 and it works very well. It sure is nice to have 48K of memory available, especially when using a program such as Microsoft's Editor-Assembler Plus. I had a couple of problems during the installation of the unit—mostly due to my own carelessness.

Included with the unit are 10 pages of instructions which are *very* complete. They tell everything from how to remove and handle I.C.s to how to open up the computer and install the Internal Memory. There

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is even a troubleshooting section in case you have problems after installation. Photographs and pictorials are used where necessary to clarify the instructions. Even someone who has never opened up his TRS-80 before and who knows nothing about electronics should be able to complete the installation with no difficulty by following the instructions. I understand that they have been rewritten to make things even clearer since I received my unit.

Some potential buyers may be concerned about the additional current requirements placed on the TRS-80 power supply. Holmes Engineering has a brochure that addresses this question (and others). Most of the additional current drawn by the Internal Memory is from the +12 volt supply of the TRS-80 which doesn't even come close to being overloaded with the Internal Memory attached. It is the +5 volt and -5 volt supplies that are operating at near capacity in the TRS-80 and the Internal Memory board draws negligible current from those supplies. I have noticed no degradation of performance of the TRS-80 with the IM-2 installed.

Holmes Engineering says that the Internal Memory unit is compatible with all known hardware, such as line printers, the Exatron Stringy Floppy, JPC Products TC-8 and even with other internal modifications such as high-speed or lowercase models. Internal Memory units are completely assembled and require no additional software or hardware to operate. The keyboard expansion connector remains available for use by other devices. I am personally using the TC-8 and a lowercase modification with the Internal Memory unit with no problems.

Considering the very helpful attitude of the folks at Holmes Engineering, I would wholeheartedly recommend the Internal Memory boards to anyone who is looking for an inexpensive way of expanding the memory capacity of the TRS-80 Model I.

**Jack Decker**

**CBUG**

**The Micro Works**  
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Del Mar, CA 92014  
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**For Color Computer**  
Tape \$29.95, ROM \$39.95

CBUG is a small, very powerful monitor that was recently introduced for the TRS-80 color computer. CBUG requires a little less than 2K of memory and is compatible with both 4K BASIC and extended BASIC models. CBUG is available on cassette tape or as a 2K ROM which may be installed on the computer's main memory or in an outboard ROM pack. The documentation includes detailed instructions for installing the ROM on a Tandy "Diagnostic ROM" pack.

CBUG loads from cassette tape and resets BASIC's pointers so that BASIC programs may be loaded to utilize the features of the monitor. CBUG is relocatable and reentrant. However, the monitor is normally loaded beginning at address hex 0600 which is the beginning of graphics display memory. When the monitor is used in conjunction with BASIC graphics display programs, it must be relocated to high memory. If this is not done, the monitor will be "wiped out" by BASIC graphics commands. A very easy method to avoid this problem is to load CBUG in upper memory, execute (EXEC) CBUG, and using the monitor memory change function, change location hex 0019 to 06 to reset BASIC's pointers. This problem does not occur when using the ROM version.

CBUG is an invaluable tool for the programmer that wants to gain greater insight into how the TRS-80 Color Computer works, or just wants an easy way to enter small machine language routines into the computer. A complete list of all commands available in CBUG is contained in Table 1. The memory examine and change function is particularly impressive. When selected, it presents a full screen hex display of memory which may be

scrolled up or down, left or right. CBUG utilizes the capabilities of the RS-232 serial interface provided in the Color Computer to allow the computer to be used as an intelligent terminal to a host computer or to emulate a CRT terminal in half or full duplex mode.

Another function of CBUG allows users to display pages of user (RAM) memory in ASCII. This function, which is useful for observing how BASIC programs are stored in memory, has one minor fault. If memory addresses in read only memory (ROM) above hex 8000 are selected, CBUG will display RAM addresses between hex 0000 and 7FFF. ROM memory may be viewed in ASCII by using the transfer function to move ROM memory to a RAM memory area for display.

All of the functions provided in the monitor with the exception of the communications terminal modes were exercised and performed correctly with the minor exceptions noted above.

The documentation provided was very detailed. All of the command functions were described with examples of their use. The documentation also included entry points to subroutines in the monitor which could be called by the programmer when writing subroutines. The documentation included a well commented source/object listing of the monitor program and has been written for the serious programmer. It assumes a working knowledge of the MC

Table 1

## CBUG Commands

G—	Return to BASIC or call program.
R—	Display register list.
M—	Memory examine and change.
I—	Insert hex to memory.
T—	Transfer block of memory.
J—	Jump to machine language routine.
C—	Change register list.
S—	Save memory to tape.
B—	Set baud rate.
L—	Load hex.
\$—	Convert hex to decimal.
.—	Convert decimal to hex.
P—	Display page of memory in ASCII.
U—	Send data to the communications link.
D—	Receive data from the communications link.
!—	Set software interrupt (breakpoint).
AU—	Auto terminal mode.
X—	Emulate a CRT terminal.
*—	Reset computer and return to BASIC.

6809E instruction set. However, this program and documentation, when used in conjunction with an assembly language instruction manual, should be a real asset to the novice programmer who is attempting to gain a greater understanding of the TRS-80 Color Computer and machine language programming.

Robert P. Bussell

## Announcement

80-U.S. Journal is looking for newsworthy tips and tricks pertaining to the TRS-80 microcomputers, especially the Color Computer. Your newsworthy items may be worth CASH! So if you have discovered a new trick, tip or method of doing something with your computer, send it to us. We'll pay \$5.00 for each item published. Send your submission to: *Editor, 80-U.S. Journal, 3838 South Warner Street, Tacoma, Washington 98409*

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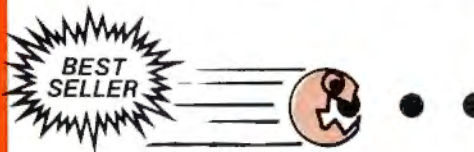
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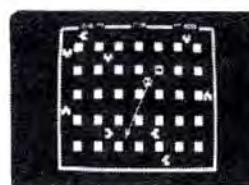
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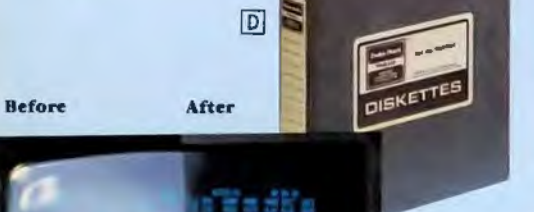
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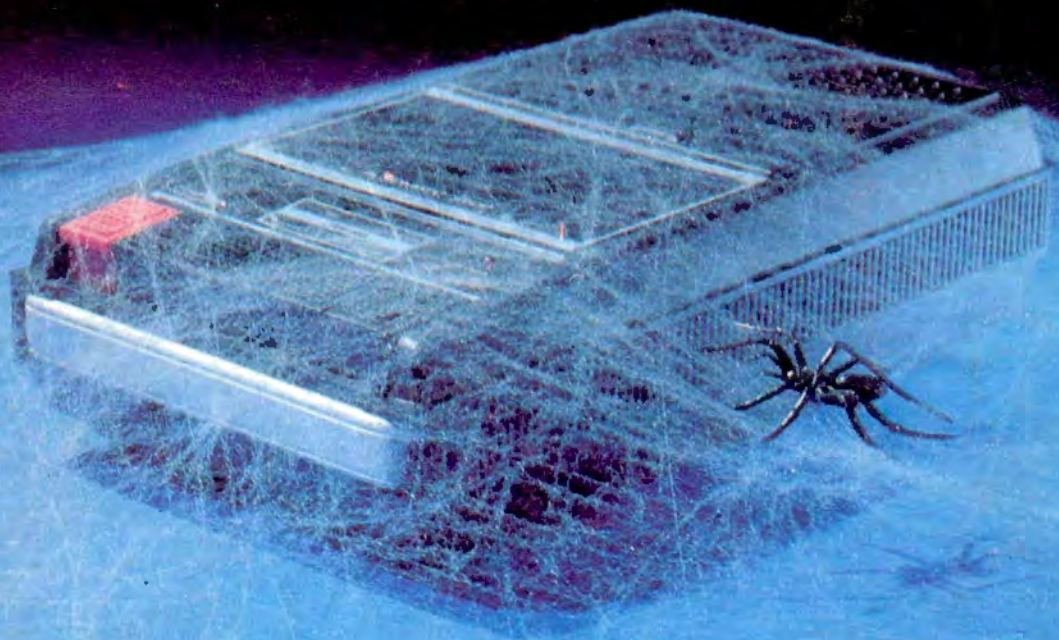
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