

# 80~~W~~US.

THE TRS-80 USERS JOURNAL

Vol IV No 6

\$3.00

Nov/Dec 1981

## Micro-computers in the home

*'I refuse to be a computer widow!'*





# Take a look at our EPROM blaster for your Apple<sup>TM</sup> or TRS-80<sup>TM</sup>.



Apparat announces the most versatile EPROM burner available today for your TRS-80 model I and III or Apple computer . . . the Apparat PROM Blasting system (A.P.B.). Most EPROM burners will program only one type of EPROM. The A.P.B. system will program all commonly used 24 pin EPROMs by using special personality modules that adapt the unit to the EPROM. The following EPROMs are programmable: 2704, 2708, 2716, (3-volt) & (5-volt), 2732, 2508, 2516 and 2532.

The versatility and power of the A.P.B. system means you're getting a PROM burning package with extensive capabilities. The price, \$149.00, insures you're getting the most cost-effective PROM burner on the market today.

With a unique combination of personality modules and

sophisticated software, A.P.B. will perform many operations impossible with conventional PROM burners. Here's a brief list of some of A.P.B.'s capabilities:

- Verify ROM is erased
- Read ROM
- Copy ROM
- Copy between different ROM types
- Program ROM
- Partial programming and copies
- Verify programming
- Read or save ROM data on disk or cassette (Apple only)
- Program directly from computer memory
- Examine and/or modify working memory
- Preset working memory

The A.P.B. system is the most flexible PROM burner available. The A.P.B. system package consists of an interface card that plugs directly into an expansion slot\*, a complete set

of personality modules, software on disk and a detailed instruction manual. The software will run under NEWDOS/80, or TRSDOS<sup>TM</sup> for the TRS-80, and APPLE DOS<sup>TM</sup> or APEX for the Apple.

If you're looking for a powerful, versatile and cost efficient EPROM burner, call APPARAT today. Dealer inquiries welcome.

## (303) 741-1778

\*TRS-80 version requires the TRS-80 bus extender (Cat. # 1-025) or a separate user provided power supply and cable. TRS-80, and Apple are trademarks of Tandy Corp. and Apple Computer.



## Apparat, Inc.

4401 So. Tamarac Parkway, Denver, CO 80237 (303) 741-1778

**"ON GOING SUPPORT FOR MICROCOMPUTERS"**





# Your Ticket to Expanded TRS-80 Capability

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

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

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

AND INTRODUCING!

## **NEWDOS/80-C**

The most powerful  
DOS for the TRS-80  
Model I and Model III

★★★ **CORVUS SYSTEMS**

**5 MILLION BYTE  
5¼ inch WINCHESTER  
DISK SYSTEM**

**\$3750**

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

Contact Corvus today for the full story.

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





# Take this hundred ...if you can

This could be yours, but probably never will. This \$100 bill is the reward we offer for the discovery of a legitimate bug in a DOSPLUS DISK Operating System. To qualify you must be:

1. A registered DOSPLUS owner
2. Able to demonstrate and document a real bug, not simply a design shortcoming.

We're convinced that DOSPLUS is the fastest, most powerful, and easiest to operate system on the market. DOSPLUS works! And works right! For the businessman and hobbyists, the speed and simplicity cannot be beat. For the BASIC programmer, NO-ONE can offer you more than we do. And for software authors, compatible kernel systems are available for distribution.

## NO-ONE ELSE can give you!

- The same high level of Model I/Model III diskette and program compatibility.
- True, complete BASIC program chaining with files open and variables saved.

We have it all. Features galore AND error-free operation. If we're wrong, and you can prove it, we've got a brand new \$100 bill for you.

***We're not conceited, we're convinced!***  
***Order yours today, and soon you will be too!!***



**MICRO SYSTEMS  
SOFTWARE**

5846 Funston Street, Hollywood, Florida 33023  
Phone: (305) 983-3390

# DOSPLUS



**CALL TOLL FREE FOR FAST SERVICE (800) 824-7888,  
OPERATOR 193 FOR VISA/MASTERCHARGE/C.O.D. ORDERS**  
California dial (800) 852-7777, Operator 193, Alaska and Hawaii dial  
(800) 824-7919, Operator 193  
**TOLL FREE LINES WILL ACCEPT ORDERS ONLY!**  
For Applications and Technical information call (305) 983-3390 or  
drop us a card.

Dealers inquiries invited



# MIKEEANGELO<sup>®</sup>\*1

## BRINGS

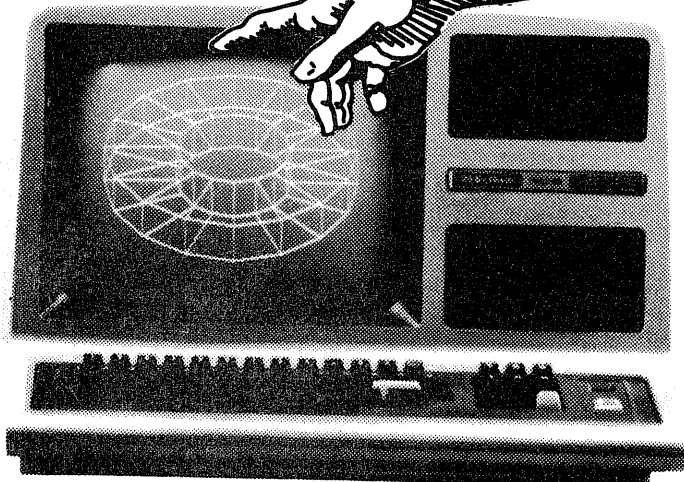
Graphic

## LIFE

TO

## TRS-80<sup>®</sup>\*2

Model I and Model III  
Must have Level II  
Basic or Model  
III basic.



### FEATURES YOU'VE NEVER SEEN BEFORE.

- Hardware total screen inverse video
- Two modes of density:  
384 x 192 or 192 x 192 for Model I  
512 x 192 or 256 x 192 for Model III
- Every dot can be set, reset or tested.
- 12288 bytes Video Memory
- Select normal, high or very high resolution with or without inverse video via output port.
- Disable Mikeeangelo's memory via output port.

\*1 MIKEEANGELO is a trademark for Mikee Electronics Corp.

\*2 TRS-80 is a trademark for the Tandy Corp.

\*3 Opening your TRS-80 will void the limited warranty.

\*4 90 day warranty, full refund or replacement.

### WE'RE GOING TO CHANGE THE WAY YOU SEE THINGS!

Designing a computer that people could use in business and leisure, without spending alot of money was once a problem. Thanks to the TRS-80\* there are now over 200,000 Microcomputers in homes and business today.

Unfortunately in keeping the price of the TRS-80 down, the Random Access Memory was kept down to only 17K. Yes. 17K. (16K User Memory and 1K Video Memory. 128 x 48 or 6,144 Independently controlled dots.) BUT WE'VE CHANGED ALL THAT.

### NOW HIGH RESOLUTION GRAPHICS ARE HERE!

MIKEEANGELO is 16 times better with the Model III and 12 times better for the Model I.

That's 512 x 192 or 98,304 dots for Model III, and 384 x 192 or 73,728 dots for Model I.

MIKEEANGELO connects to your TRS-80 easily.\*3 You can do it yourself with our instruction book in minutes and a handy tool kit is available, if you need one for \$15. Please specify Model I or III TRS-80.

Order today complete with power supply, case, software and excellent manual for \$340. Check or Money Order please. \*4

Or write for free booklet and more information.

## MIKEEANGELO<sup>®</sup>

MIKEE ELECTRONICS CORPORATION

P.O. Box 3813

Bellevue, Washington 98009

(206) 451-0574

Circle 4

Sorry no C.O.D. Stock to 60 days for delivery.  
Washington residents must add \$18.36 sales tax.



Fourteen years ago I swore never again to go near a computer. The vow was firm and resolute. I had just failed a college class for the first time. It was a sadistic introduction to computers through the MAP language.

The course was freshman level, and I was a junior year math major. I should have noticed something was amiss when the instructor and half the class walked in with funny green and white paper. As the professor started into error generation in division algorithms, the glaze began to cover my eyes. It took almost a decade for it to lift. In that time, there was very little help in overcoming frustrations and anger.

In that first class, we had to insert large mechanical monsters into the keypunch so that we could type out our programs and have them coded and verified. The room was full of equipment, reams of paper and cards, and huddling students. I wanted to ask which part of the board I inserted at the top, but had the distinct impression that such mundane questions were not allowed within the hallowed halls. After twelve weeks, I took a final exam and on the way out I checked the room number. I was sure that an error had been made.

We were using IBM manuals as a text; a dubious way to begin. Either text writers assume you know how to program (in which case I wonder why they bothered to write the book), or at the very least, that you are totally enthralled and will devote days to deciphering every nuance. The situation is improving, but today's novice has many of the same impressions.

I have seen much of the same attitude pervading the microcomputer industry today. I am sure that those same huddling students are now selling at the local Nibble Store. Six years ago, I noticed a computer shop and for the first time ever, I saw a complete computer system! Imagine having taken three programming classes and never seen a disk? Batch processing did wonders to preserve the mystery.

I walked in and saw a video display of all zeros and ones. Boolean algebra and switching circuits were not new, to me so perhaps this was the place for me to catch on. The devices were all uncovered, wires going in, out, above and under everything. The

imposing menagerie of electronics filled me with awe.

I turned to the front desk and heard for the first time the language of the 80's. The two men at the front were having a conversation full of bytes, pulsing rates, megahertz and ROMs. The students were still huddling, and I still didn't know how to turn it on. I asked my question, absorbed with a smile the knowing smirk of one of the men, and was pointed to the switch. The salesman went back to his conversation. I was left with a lit video. After about 10 minutes, another customer took pity and showed me that the CPU has its own switch. As I left, the man at the desk asked if I had any questions. If he only knew how many there were!

The attitude in many shops is incredible. I have entered stores and noticed a person thoroughly involved with some major programming effort. Only later did I learn that he was there to help me and that the program was Star Trek 4.5.67.333.

As the competition in the microcomputer market grows, I hope that sales quality improves with it. You can still enter a shop, wander around, and never be helped or asked a single question.

The microcomputer has amazing potential, but computer fear is a real emotion, and ignorance abounds. Here are just a few horror stories to illustrate this point:

I was called by a small electrical parts company to see what was wrong with their payroll program. The office manager had just purchased a 48K two-disk Model I computer system from Radio Shack, along with a number of software packages. This company had a policy of granting vacation time on a per-hour basis for the hourly employees. This resulted in them being taxed for hours that they did not work. To overcome the problem, the bookkeeper would run the payroll package, then confirm the work by hand. The net result was 8 hours to do what used to be a 5 hour job. The same shop also wanted to set up a general ledger. Step one of the package asks you if it is accrual or cash accounting, and how many ledger items are to be used. The

## 80 U.S. JOURNAL

### Publisher & Editor-in-Chief

I. Mike Schmidt

### Sales & Promotion

Margaret G Farrell

### Editor

Thomas N Huber

### Associate Editors

Terry R Dettmann

Jim Klaproth

Cameron C. Brown

### Contributing Editors

Spencer Hall

William Schroeder

Robert C Bahn

Bob Liddil

Jim Perry

James Williams

### Art/Layout/Design

Fred Johnsen

Mike Schmidt

Eva Jones

### Comptroller

Maggie Murray

### Circulation

Robert P. Perez

Kristi Schmidt

### Reviewers

Patrick Perez

Woody W. Harper II

### DISTRIBUTORS

Hofacker Verlag

Tegernseer Strasse 18  
D-8150 Holzkirchen/Obb  
West Germany

Graymar Data Services  
#4-258 East 1st Avenue  
Vancouver, BC V5T 1A6  
Canada

The Software House  
146 Oxford Street  
London, W1, England

MKSS  
40-A High Street  
Stony Stratford  
Milton Keynes  
England

Cisa Microcomputing  
159 Kent Street  
Sydney, N.S.W., 2000  
Australia

Micro Processor Services  
940-A Colombo Street  
Christchurch, 1  
New Zealand

Fugen Electronics Co., Ltd.  
Chino Building 3F  
3-34-24, Nakano  
Nakano-ku, Tokyo 164  
Japan

Format-Admin, Analise, E Prog  
AV NS Copacabana 1417  
Lojas 303 E 304  
Copacabana Rio de Janeiro  
Brazil CEP 22.070

See EDITORIAL, page 4



© 1981 80-Northwest Publishing Inc. All rights reserved. Reproduction for other than personal, non-commercial purposes, or further distribution in any other form, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. While every precaution has been taken in the preparation of this publication, the publisher assumes no responsibility for errors or omissions. Neither is any liability assumed for damages resulting from the use of any information contained herein. Please address all correspondence to: 80-U.S. Journal, 3838 South Warner Street, Tacoma, Washington 98409

Telephone  
(206) 475-2219

**Advertisers:** The Journal will accept limited relevant commercial advertising which pertains to, or is for use on the Tandy Corporation microcomputers. Write for a current rate schedule.

**Authors:** We constantly seek material from contributors. Send your material (double spaced, upper/lower case please) and allow approximately 4 weeks for review. Programs must be supplied in machine readable format on diskette or tape. Text files may be on diskette. Media will be returned if return postage is provided. Cartoons and photographs are welcome. Generous compensation will be made for non-trivial works which are accepted for publication. The Journal pays on acceptance rather than on publication.

## The Cover

Our cover for this issue shows the computer in use in the home. The model is Cindy Harrison; the photographer was Frederick A. Johnsen. Just in case you can't see it clearly, the recipe on the Color computer is for Orange Tea Cake.

**SUBSCRIPTION PRICE** in the United States is \$16 for one year, \$31 for two 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 bimonthly in January, March, May, July, September and November by 80-Northwest Publishing Inc., 3838 South Warner Street, Tacoma, WA 98409

PRINTED IN THE UNITED STATES OF AMERICA

**POSTMASTER:** Please send change of address form 3579 to 80-U.S. Journal, 3838 South Warner St., Tacoma, WA 98409

Second Class Postage paid at Tacoma, WA and at additional entry point.

# 80-U.S.

## THE TRS-80 USERS JOURNAL

\*TRS-80 is a trademark of the Tandy Corporation

Volume IV Number 6

November/December 1981

## Features

Supermarket Comparison Shopper - Joe W Rocke .....	46
BASIC & Machine Language - Jim Klaproth .....	142
Basically BASIC - T R Dettmann .....	139
Crossword - Stanley Silverman .....	56
Design Weaving Projects - R Ziegler & W Buckingham .....	34
Don't get Strung Out - Dan Rollins .....	72
ENHBAS Evaluation - Lawrence Charters .....	82
Files & Foibles - T R Dettmann .....	64
Forth - T R Dettmann .....	68
I refuse to be a Computer Widow! - Denise Berg .....	24
Let your computer read the time - Joseph St Lucas .....	132
Lower Case ROM patch - William R Bell .....	92
Mikee Electronics Hi Res Graphics Board - Staff .....	106
Modifying NEWDOS 2.1 - Steven Wexler .....	118
Pocket Biorhythms - Robert D Miller .....	114
Snapp Enhancements for Model II - Marvin Mallon .....	88
Supergraph 1.0 - Davut Z Korkut .....	90
Tandy Topics - Ed Juge .....	30
The Computerized Home - Staff .....	20

## Reviews

50 BASIC Exercises - reviewed by W W Harper .....	136
ABS Doubler - Staff review .....	109
Color computer game reviews - Staff .....	112
Full screen Text Editor - reviewed by J Klaproth .....	135
Introduction to TRS-80 BASIC - review by W W Harper ...	110
Pathways through the ROM - review by T R Dettmann .....	128
Showdown - game review by Owen Linzmayer .....	129
Super Nova - game review by W W Harper .....	130
Programming in Style - review by W W Harper .....	130

## Departments

Advertiser Index .....	160
Annual 80-U.S. Index .....	156
Back Issue Availability .....	160
Captain 80 - Bob Liddil .....	108
Editorial - Cameron Brown .....	2
Interview (Larry Studdard) - Pete Carr .....	16
Items at Random .....	10
Letters to the Editor .....	6
New Products .....	14
Notes .....	157
System/Command - James F Williams .....	96
Unclassified Advertisements .....	159



## THE FLOPPY DOCTOR — MODEL I/III

By Dave Stambaugh

Now available for both the Model I and Model III TRS-80 computers!

The most comprehensive disk diagnostic program ever for the MODEL I TRS-80\* is now available in an enhanced version for the Model III! Both versions feature:

- Exhaustive read/write testing of your disk system in single or double density, including check for compatibility between drives
- Tests 35, 40, 77, or 80 track mini floppy drives
- Checks write protect, track zero, and index pulse sensors in each drive
- Checks the accuracy of drive motor speed
- Model III version tests all interrupts and wait state generation, and can test double-sided drives as a single volume; excellent for checking out both Radio Shack and 'brand x' controller boards and drives

If you are really serious about computing let THE FLOPPY DOCTOR certify your system's reliability on a regular basis! Also includes memory diagnostic and detailed instruction manual.

PRICE: MODEL I VERS 3.1 — \$24.95

MODEL III VERS 1.0 — \$29.95

Fine print: Specify Model I or Model III. Add \$2.00 P/H on all orders, CA add 6% sales tax, VISA/MC orders OK, include card #, signature, phone number. Drive 0 must be 35, 40, or 80 tracks. Double density on Model I requires Percom or LNW double density adapter, but program runs single density with or without adapter. Not for Lobo interface. Model I Vers 2 owners may upgrade to Vers 3 for \$14.95 + original diskette in good condition. Sorry — no price break for upgrades from Model I to Model III. Most orders shipped within 48 hours.

\*TM Tandy Corporation

**The Micro Clinic**  
**17375 Brookhurst, Suite 114**  
**Fountain Valley, CA 92708**  
**714-962-0621**

Circle 5

## EDITORIAL from page 2

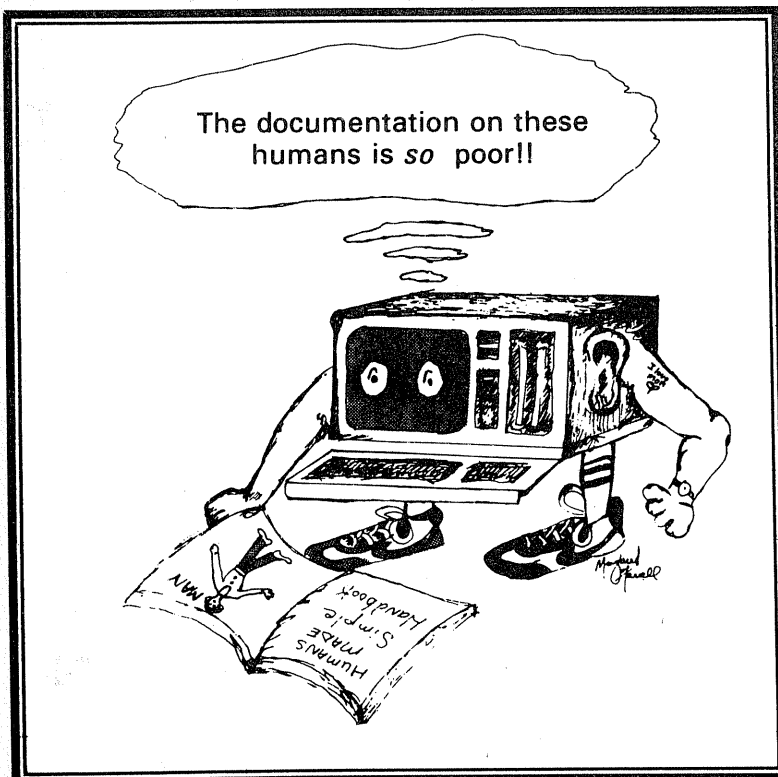
office staff was not sure of the answer to either question and after some discussion it was clear that it would be necessary to purchase a third disk drive to handle their needs. Their frustration at this point was easy to understand. A computer "expert" had sold them the system and it was not the simple turn-key package they had envisioned.

The mistakes can be quite costly. A while back, a businessman had purchased a TRS-80 Model II and contracted with a programmer for the development of a complete payroll, accounts receivable, accounts payable and general ledger package. The programmer took the machine and spent a year writing the programs. When everything was finished, it was returned to the businessman. Upon power up, there was a slight problem. The businessman called the programmer and was told to go ahead and re-format the operating diskette. After having successfully erased the programs, they still didn't work. So, he asked that the backup copies be sent over. You guessed it, there were no backups!

Problems are not restricted to users. A friend of mine has developed a very specialized inventory control program for a local company. Weeks of discussion preceeded any program writing so that all data needs were clearly outlined. The package was written, debugged and delivered three months later. After a few months use, the company began to request changes and alterations. He is still involved with the program after two years and a major re-write.

To those of you who are just entering the computer market, be careful and go slow. Read as much as you can about hardware and software support. The lessons can be quite expensive.

**Cameron Brown**





# WHY

# IS THE ALPHA JOYSTICK SUCH A SUCCESS ?

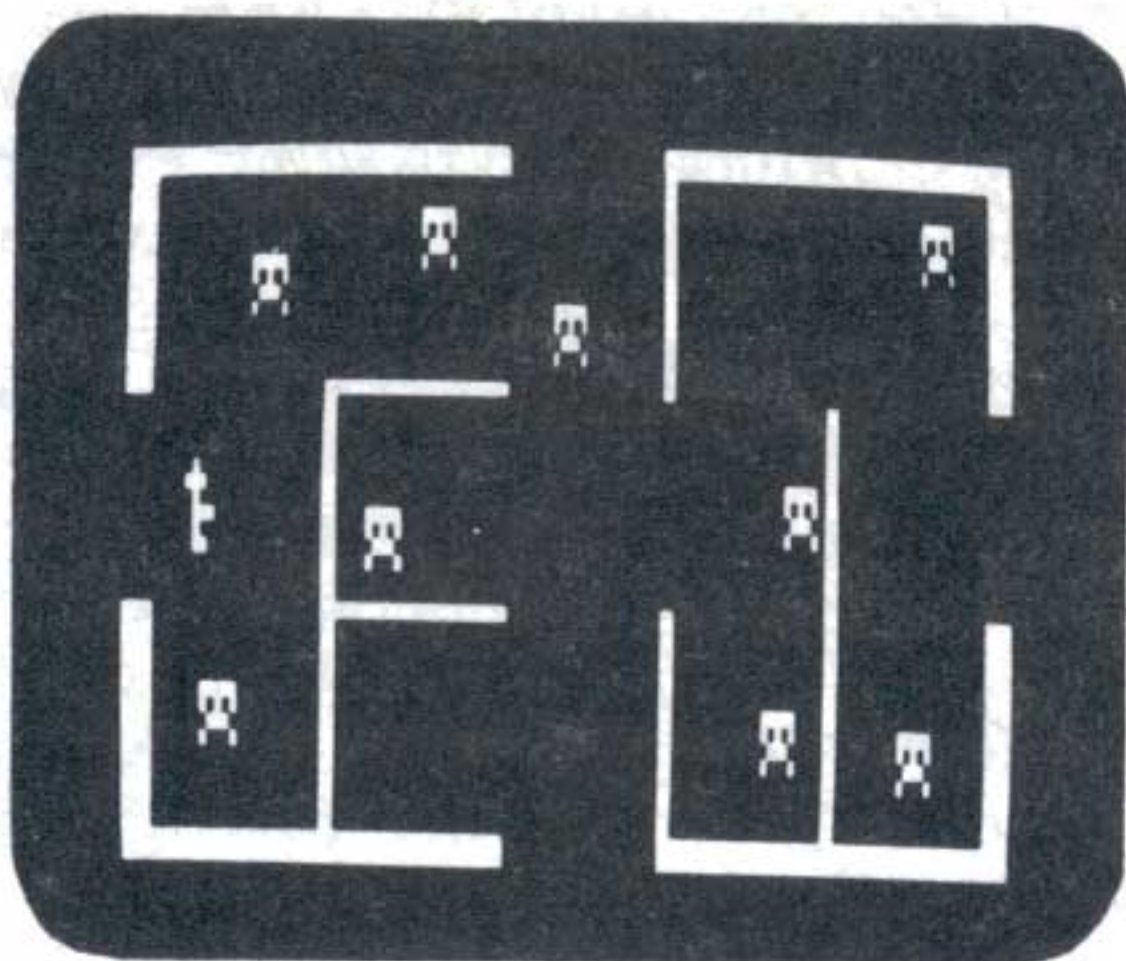
Because of games like these.



## TALKING ROBOT ATTACK

### ALL GAMES:

16K Level 2, Mod 1 + Mod 3 Cassette: \$15.95  
32k Level 2, Mod 1 + Mod 3 Diskette: \$19.95  
10% discount for 2 games, 15% for 3 or more  
Games may be played with or without joystick.



Actual unretouched photos

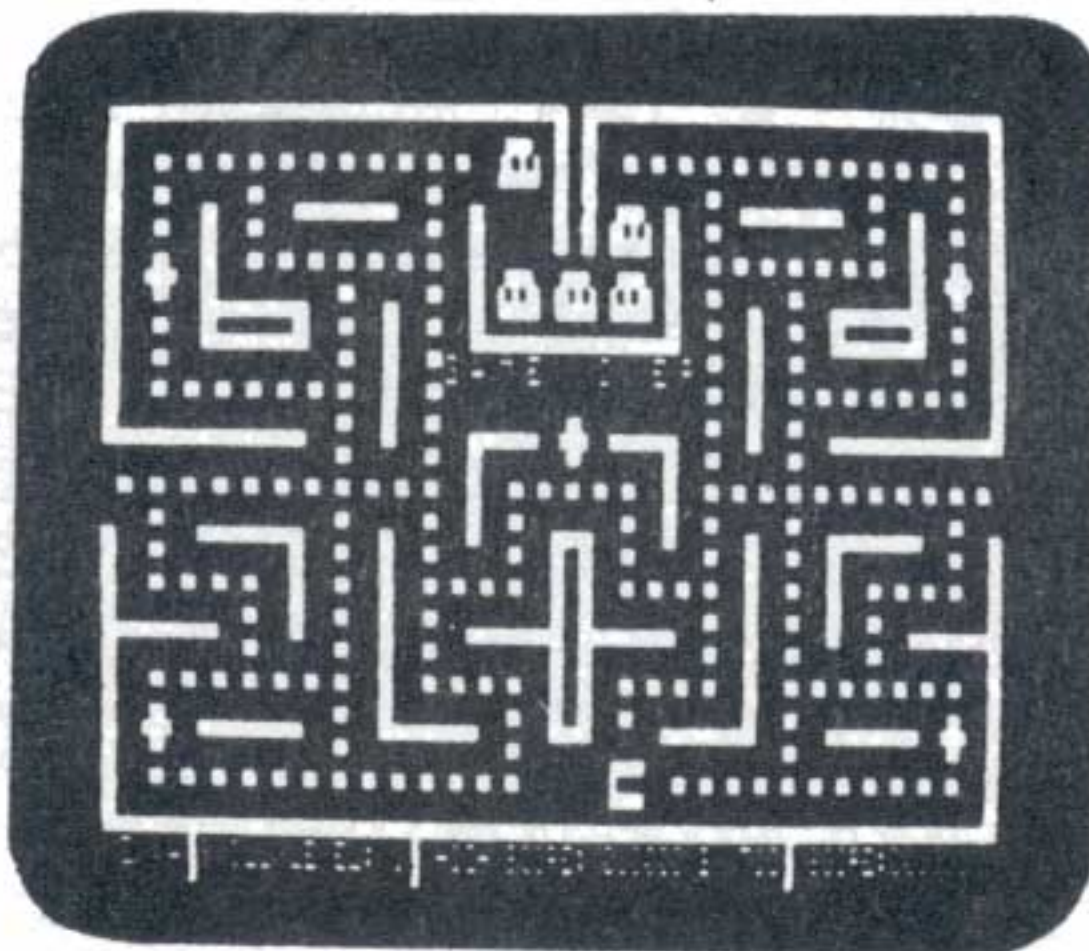
## TALKING ROBOT ATTACK

**INCREDIBLE!** This amazing game actually **TALKS** without a speech synthesizer, through the cassette AUX plug.

You are armed with just a hand held laser. In a remote section of the space station you encounter armed robots, some march towards you, some wait around corners. Watch out, the walls are electrified. Zap as many robots as you dare before escaping into a new section where more robots await you. The struggle continues. With Joystick action and **VOICE OUTPUT**, this game will amaze you.



## SCARFMAN



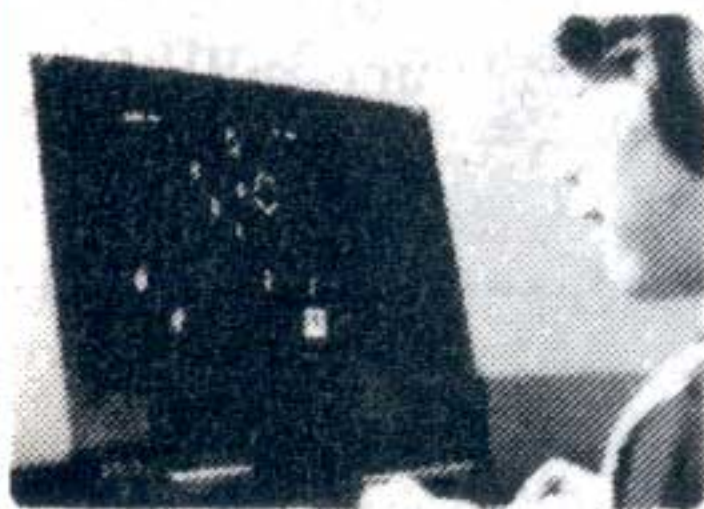
## SCARFMAN



**THE LATEST ARCADE CRAZE** now runs on your TRS-80.

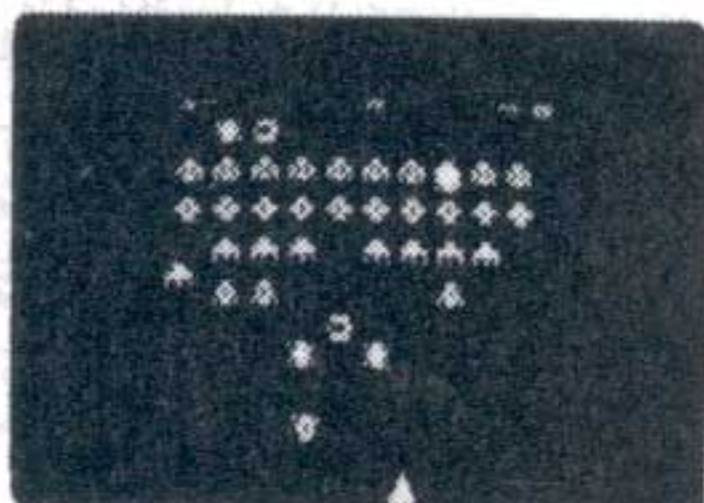
It's eat or be eaten. You control Scarfman around the maze, gobbing up everything in your path. You attempt to eat it all before the monsters devour you. Difficulty increases as game progresses. Excellent high speed machine language action game. From The Cornsoft Group. With sound.

**CAUTION:** Played with the Alpha Joystick, Scarfman may become addictive.



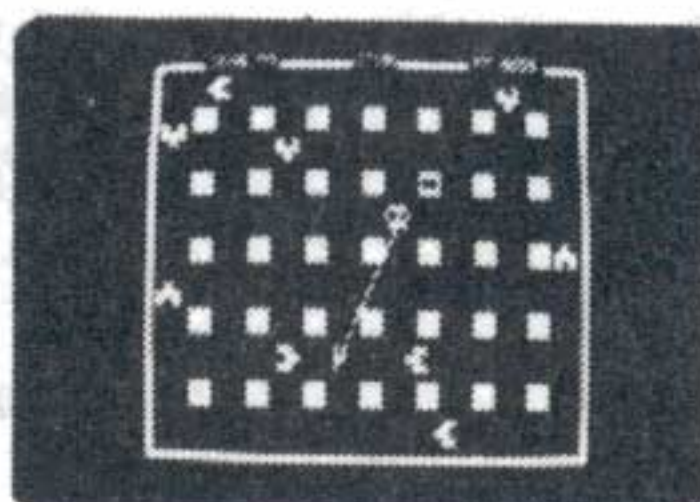
### SUPER NOVA®

Asteroids float ominously around the screen. You must destroy the asteroids before they destroy you! (Big asteroids break into little ones.) Your ship will respond to thrust, rotate, hyperspace and fire. Watch out for that saucer with the laser! As reviewed in May 1981 Byte Magazine.



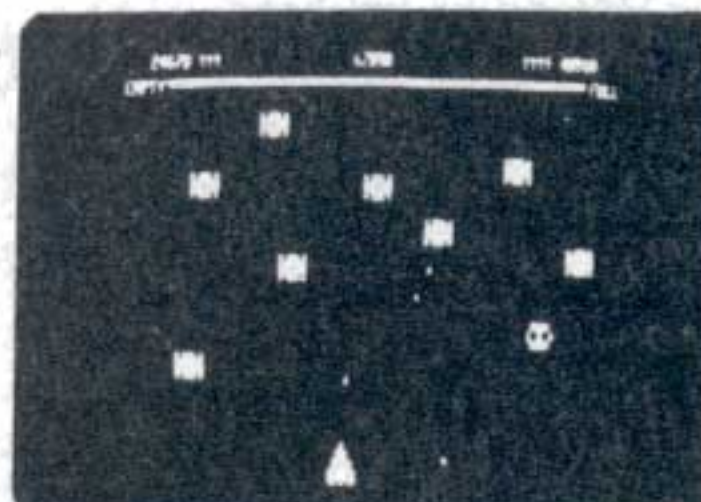
### GALAXY INVASION®

The sound of the klaxon is calling you! Invaders have been spotted warping toward Earth. You shift right and left as you fire your lasers. A few break formation and fly straight at you! You place your finger on the fire button knowing that this shot must connect! With sound effects!



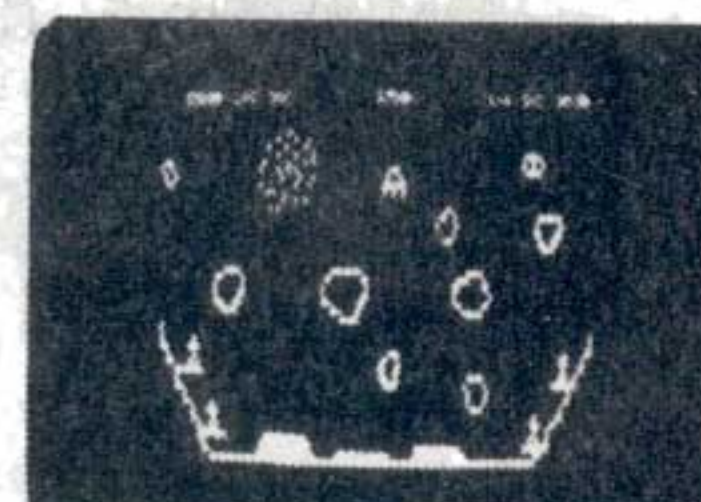
### ATTACK FORCE®

As your ship appears on the bottom of the maze, eight alien ships appear on the top, all traveling directly at you! You move toward them and fire missiles. But the more aliens you destroy, the faster the remaining ones become. If you get too good you must endure the "Flag-ship".... With sound effects!



### COSMIC FIGHTER®

Your ship comes out of hyperspace under a convoy of aliens. You destroy every one. But another set appears. These seem more intelligent. You eliminate them, too. Your fuel supply is diminishing. You must destroy two more sets before you can dock. The space station is now on your scanner... With sound!



### METEOR MISSION II®

As you look down on your view, astronauts cry out for rescue. You must maneuver through the asteroids & meteors. (Can you get back to the space station?) Fire lasers to destroy the asteroids, but watch out, there could be an alien FLAGSHIP lurking. Includes sound effects!

## THE ALPHA JOYSTICK: REAL ARCADE ACTION

- ❑ Features the famous ATARI JOYSTICK
- ❑ Works with any Level II or disk system Model I
- ❑ Plugs directly into KB or E/I (next to printer port)
- ❑ Compatible with any other TRS-80 accessories
- ❑ Saves your keyboard
- ❑ Fun to experiment in BASIC. Simply use A=INP(0) to read the joystick
- ❑ Fully assembled, ready to plug in and use.

Price includes Atari Joystick + Alpha Interface + instructions + demo program. The Alpha Joystick is backed by an unconditional money back guarantee. If you are not delighted with it, return it within 14 days for a prompt and courteous refund.

ONLY  
\$39.95



Circle 6

**Toll Free  
Order Line  
(800)  
221-0916**

ADD \$1.50 PER ORDER FOR SHIPPING AND HANDLING  
ALL ORDERS SHIPPED FIRST CLASS MAIL  
WE ACCEPT VISA, MASTER CHARGE, CHECKS, M.O.  
COD: ADD \$2.00 EXTRA  
QUANTITY DISCOUNTS AVAILABLE  
N.Y. RESIDENTS ADD SALES TAX.



# ALPHA Products

85-71C 79th Street, Woodhaven, N.Y. 11421 (212) 296-5916



# Letters

Spencer Hall is correct, a volume meter is essential for the operation of a TRS-80 cassette based computer system. An even better volume monitor was presented on page 18 of the Mar/Apr 79 issue of 80-U.S. by Ray Thompson. Although this monitor is slightly more costly it clamps the tape over-shoot better and allows loading of tapes with reverse polarity. I constructed one of these 2 years ago and included a switch to allow manual control of the recorder without plugging and unplugging plugs. I have had no problems loading any programs with this system unless magnetic coating on the tape itself was faulty. All tapes load if the meter output stays between 10 and 15 microamps.

Robert A Hood  
Bremerton, WA

*(The Mar/Apr 79 issue is no longer available as a back issue. Mr Hall's article on Tape Without Tears will have a sequel in an upcoming issue. Watch for it. Ed)*

In your Jul/Aug 81 issue, I saw a letter from John T Phillipp on page 4. In this letter he asked for a patch on Scripsit in order to utilize the control key of the Electric Pencil Lowercase modification.

When this patch (given here in NEWDOS80 format) is applied the control key will operate in the same way as the @ key. The CAPS LOCK will not be available via the control key.

SCRIPSIT/CMD,15,7C

Change

57 3A 01 38 E6

to

57 C3 F3 78 E6

SCRIPSIT/CMD,39,87

Change

47 16 4C 49 4E 45 20 50

52 49 4E 54 45 52 20 4E

4F 54 20 52 45 01 02 00

79 41 44

to

47 06 4C 50 20 4F 46 46

3A 80 38 E6 10 C2 42 61

3A 01 38 C3 40 01 02 00

79 61 44

The text "LINE PRINTER NOT READY" now reads "LP OFF".

Ruud Th, van der Ham  
Rijswijk, ZH, Holland

In response to Tom Grumbling's letter in the Jul/Aug 81 issue, where he asked for a set of POKEs to speed up the Color computer, I have this piece of information to offer: POKE 65495,0 will double the speed of the processor and POKE 65494,126 will return it to normal. This will only work on Color computers that have double speed processors (some do not). If you try this on a Color computer whose processor can't handle it, the computer will either "freeze up" or display garbage on the screen.

According to our local computer center, operating the Color computer at double speed for more than an hour or two could overheat the processor. I use the double speed only when I need "bursts" of speed, to avoid CPU meltdown.

You must be at normal speed to CSAVE, CLOAD, PRINT#-1, INPUT#-1, or any other tape operation or your tapes will be unreadable. Double speed does not affect Extended BASIC TIMER function, but it does make SOUND and PLAY an octave higher. Also, I suspect (but cannot confirm) that double speed could affect communications through the RS-232 port.

Tom A Tuling  
Spokane, WA

I have a Stringy Floppy that stopped working. I phoned Exatron's repair department and a man named Mel told me to send in my unit with a note to him. I've had the unit for a while but I don't keep many records so I didn't know if it was under warranty. In my note, I told Mel to fix it and bill me. The enclosed packing slip shows how fast it was fixed, and they said it was under warranty so I wasn't charged (not even return postage - First Class mail).

A company that's this prompt, fair and so thoroughly customer oriented should be openly complimented. I really like the Stringy Floppy. Now I can say that the company is also top grade.

Since your magazine is publishing Exatron's Newsletter, I am pleased to become a subscriber.

Richard Nitzberg  
Oakland, CA

*(This is only one of several letters received lately about Exatron. Mr Nitzberg experienced a five day turnaround at the repair center. Ed)*

Being a new owner of a TRS-80 Color computer, I bought and read with interest your Jul/Aug 81 issue. I typed in and ran the Sundance program by Mr Waples and enjoy it immensely.

There is, however, one item that could be changed. The first time the program is run after being loaded from cassette, the sun is being drawn on a red background with horizontal stripes. After the initial run, the problem disappears. The problem is caused by the order of commands in line 220. Upon initialization, the Color computer defaults to PMODE 2,1. Line 220 reads: PCLS3:PMODE3,1:  
SCREEN1,0:COLOR2,3

As you can see, the PCLS is executed first, however it clears only page 1 of PMODE 2. Upon entering PMODE 3, the computer remains in that mode for subsequent runs. The PCLS then clears the pages for PMODE 3.

By reversing the order of PMODE3,1 and PCLS, the proper pages are cleared initially. Use PCLS before the SCREEN command, as the screen command will display the page, and if it is not cleared first, the previously written data will be visible until execution of PCLS.

Thank you for an excellent magazine, and I will be looking for more articles on the Color computer.

John Steiner  
Riverside, ND

Yes!!

I want to order the \* Captain 80 \* BASIC Adventure Book and mystery decoder ring. (You do include a mystery decoder ring, don't you?) Thanks,

Don Loveday  
(Sorry Don, no boxtop - no ring. Ed)

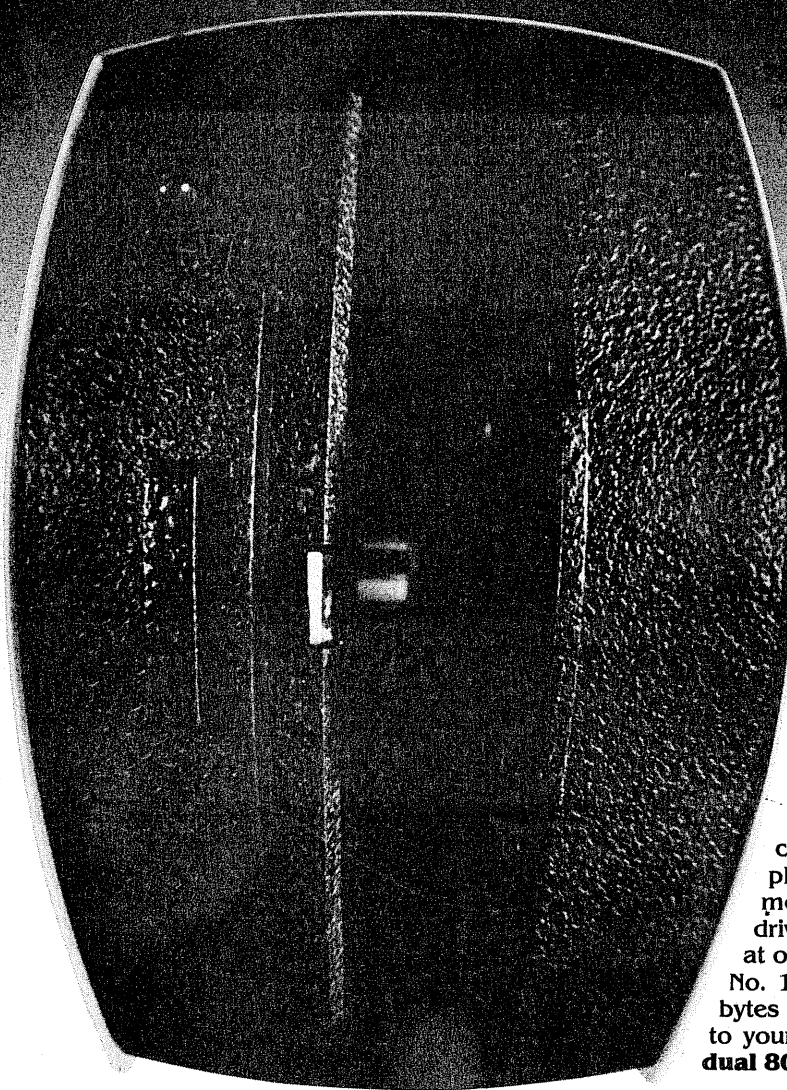
I was quite intrigued with...(Phil Pilgrim's article)... in the most recent 80-U.S. on controlling the Sears Vertical Mill. Some years ago I went through Kerney-Trecker's engineering program (Milwaukee Milling Machine).

The idea of controlling a mill or other machine tool with a relatively inexpensive computer would seem to warrant "filling a magazine" with details. If you ever decide to do so, please reserve me a copy.

Lowell Simons  
Littleton, CO



# APPARAT OFFERS More bytes per buck!

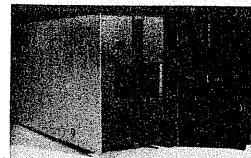


Now, a single 80 track floppy drive is giving you up to 1,424 bytes of storage in a single volume. Newdos/80 version 2.0 expands the capability of double density drives, so you'll have greater applications for your TRS-80® model I and III.

Drives plug directly into an expansion interface (requires installation of a double density controller) or the model III disk bus with our single volume cable so you can now have over 2 megabytes of storage on-line with standard mini-floppy diskettes. Each drive has up to 573 free grants, for a total of 1,719, on a maximum of three 80 track drives, which can be added to a TRS-80 model I. Model III's can have up to 4 dual 80's on-line (almost 3 megabytes).

These drives can "read" standard 35 or 40 track diskettes using Newdos/80 version 2.0 which will allow skipping every other track.

Drives come complete with case, power supply and documentation. The drives are priced at only \$515 (Cat.



No. 1-705, specify I or III). Now, at 1424 bytes per buck, it just might be the answer to your storage problems. **Special - Two dual 80 track drives only \$999.**

 **Apparat, Inc.**

4401 So. Tamarac Parkway, Denver, CO 80237 (303) 741-1778



**"ON GOING SUPPORT FOR MICROCOMPUTERS"**



Continued from page 6

I recently ordered a product featured in your want ad section. I ordered the RS-232 brace for \$4.95. I really wasn't expecting much and if it didn't work I figured it would be no great loss. I received the product at my office along with my check which I forgot to sign. This was a change as most mail order vendors wait for your check to clear the bank. Anyway, I was at my office and was thinking that I really got a bad deal as all I got was two little bitty pieces of plastic and four screws. Well, after getting home and installing the pieces and seeing what they did I was really impressed. This is a real case of American ingenuity.

I would recommend this as the ultimate fix for those who are having trouble with a loose RS-232 (in the Model I expansion interface-Ed)... I don't know why Radio Shack doesn't offer this fix.

...I enjoy your magazine very much. I have been a subscriber for a year or so and tell everyone who buys or who has a computer that they can't live without it.

Dale C Bennett  
Atlanta, GA

I consider your magazine the best of the lot. *Alternate Source* runs a close second, but they are moving so heavily toward disk that a lot of their material is no longer relevant.

Don't forget us Level II users. I have 48K and a Stringy Floppy and have no need for disk in the foreseeable future. The Exatron unit does everything that I need, including word processing.

So keep up the good work, especially a balanced presentation which includes enough Level II material.

Paul F Secord  
Houston, TX

The "Keyword" program (Sep/Oct 81 issue) is cute, but I think it needs an extra flag variable to work as it's supposed to. In tape version, if you type in

ONE; (Enter)  
TWO. (Enter)  
ONE? (Enter)

the program won't be able to find the

ONE. The trouble is in lines 170-180. The string "ONE" is found, but it's not printed until the program finds a period. The line containing the period doesn't contain "ONE" so nothing is printed.

The fix I made is:

In line 150 insert F1=0: at the beginning. Change line 160 to read: 160 GOSUB 480: IF A THEN F1=1

In Line 180 change A=0 to F1=0

In line 210 add: F1=0 at the end.

Incidentally, I translated the Pascal version of "Life" in the same issue into Forth for my homemade Forth compiler. 30 generations of the test pattern took 3 minutes 29 seconds. I also translated the BASIC version so my homemade BASIC compiler would compile it. The test pattern took 55 seconds for 30 generations.

Bill Mason  
Hornitos, CA

Radio Shack will provide at no cost #700-2220 (A document covering access of VisiCalc data files from BASIC). This was mentioned in the April 1981 "Microcomputer News".

E H McGowan  
Houston, TX

First let me thank you for backing me up in response to Brian Wood's letter on Versafire (Jul/Aug 81 80-U.S.). However, I must confess after going over my article (Jan/Feb 81 issue) with a "fine tooth comb", I found what I think are these elusive typos.

I will take the blame for not spotting these in the copy as it appeared in the magazine. I had read the article so many times during creation that when it came out in print I didn't bother to read it again (I darn near had it memorized).

It seems that the typesetter (machine or operator?) didn't like the "number sign", the miniature tic-tac-toe board, and inserted a space instead.

So there are three places that need a touch up. On page 43 in the second column about half way down is line 330. This line should read:

330 IF A\$=" #" GOTO 700

To spell it out: quote mark, space, number sign, quote mark.

Number two: Page 44 second column, the second to last line is 325.

It should read:

325 IF A\$=" #" GOTO 8000

In other words: quote, space, multiplication sign (star), number sign, quote.

Lastly the very first sentence on page 45 reads "Now whenever "\*" is entered..." It should say "\*" , i.e., star, number sign.

I forgot the importance of proofreading one's own work in final print. I can assure you and your readers this won't happen again and any significant typos will be brought to immediate attention.

As far as problems with 8070 I can only guess that Brian's data lines are improperly set up.

Thank you for the space and to try and clear these typos up.

Mike Zielinski  
Rohnert Park, CA

(Don't take all the blame Mike, we share a part of it too. Ed)

I have been reading 80-U.S. Journal almost from the beginning, and have watched it grow from its humble garage shop beginnings into the beautiful publication it is today.

Like many others, I have complained about the bi-monthly publishing rate, but I've decided that I can't assimilate the information you publish any faster than that. I find myself constantly going back to read and re-read articles, and each time I learn a little more.

I have learned more about the workings of my computer from these pages than from any other single source, and I find something I can use immediately, others I find a use for later.

Now for the complaint. It may seem minor, but it has finally prompted me to write. When I want to key in a program, I make a photocopy so I can put it on my copy holder. This is a tremendous aid, and I recommend it to everyone. When you print on various colored pages though, as you did in the Sep/Oct 81 issue, it copies badly, and is difficult to read.

As I said, this may seem minor point to many, but not to my aching eyes. Please, print program listings on plain background.

Don Loveday  
Littleton, CO





# You've Got TOTAL ACCESS<sup>®</sup>

(specializing in TRS80<sup>™</sup>)

**TO YOUR COMPUTER HARDWARE & SOFTWARE  
NEEDS. CALL ROSE TODAY!**

## I've Got

### ★ Disk Drives

TA400 (40-T).....	\$289
TA 800 (80-T).....	\$419
TA400 Floppy.....	\$319
TA800 Floppy.....	\$439
All with silver case and power supply	

### ★ CABLES

2-Drive.....	\$23.95
4-Drive.....	\$33.95
Extender Cable.....	\$14.95

### ★ BARE DRIVES

TA400B.....	\$259
TA800B.....	\$389
TA400B Floppy.....	\$289
TA800B Floppy.....	\$409

### ★ MODEL III DRIVE KIT

Includes DD disk controller, two-drive power supply, mounting towers, all connectors, cables & hardware and instructions. Do it yourself & save..... \$395

### ★ OPERATING SYSTEMS

TRSDOS 2.3 Disk & Manual ...	\$17.95
LDOS.....	\$129.95
NEWDOS/80.....	\$129.95
DOSPLUS 3.3, 3.3D.....	\$89.95

### ★ IRON

Disk Drive Power Supply, Single.....	\$37
Disk Drive Case (silver) and Base.....	\$19
Memorex Diskettes (bx of 10).....	\$25

90 day warranty on drives. Add \$5.00 freight per drive in Cont. US. UPS COD charge \$1.40. There is also a 15 day FREE TRIAL on TA drives. If not completely satisfied I'll refund your money (less shipping). I'll take exception to improper use or mishandling.

### ★ USERS GROUPS

When your club makes a group buy, be sure to call me for a price.  
Rose

## TRS80<sup>™</sup> \* COMPUTERS

### ★ COMPUTERS

26-1061 Mod III, LI, 4K.....	\$595
26-1062 Mod III, LII, 16K.....	\$850
26-1063 Mod III, 32K/2 Disk/RS232.....	\$2150
26-4002 Mod II, 64K.....	\$3300
26-3001 Color Computer, 4K.....	\$330
26-3002 Color Computer, 16K.....	\$510
26-3501 Pocket Computer.....	\$212

### ★ DISK EXPANSION, MOD II

26-4160 One Disk.....	\$977
26-4162 Three Disk.....	\$1998
LOBO drive units also available.	

### ★ PERIPHERALS

26-1140 ØK Exp. Interface.....	\$255
26-1141 16K Exp. Interface.....	\$305
26-1142 32K Exp. Interface.....	\$355
26-1172 D.C. Modem II.....	\$135
26-1206 CTR-80 Recorder.....	\$51
26-3503 P.C. Interface.....	\$42

### ★ PRINTERS

26-1165 Line Printer V.....	\$1581
26-1166 Line Printer VI.....	\$986
26-1158 Daisy Wheel II.....	\$1694*

\* LIMITED AVAILABILITY

The complete line of Radio Shack products is available through TA with standard RS limited warranty. Call me for price and delivery. Just 'cause you don't see it, don't mean we ain't got it.  
ROSE

### ★ SOFTWARE

We have Adventure, Big 5, Med Systems, SBSC, Snapp, Radio Shack and much more. Call or write. Do it!

## ROSE'S SPECIAL OF THE MONTH

### ★ PRINTERS ★

EPSON MX70... \$369.00

EPSON MX80... \$475.00

STARWRITER 45cps

DAISYWHEEL.. \$1795.00

Parallel Cable for TRS80 for any of the above..... \$29.95

**You can't live  
without a bunch  
of these!**

## Rose's T-SHIRTS

With any order of \$1,000.00 or more, I'll send you one of my **"MINI-FLOPPY" T-Shirts!**

## REAL TIME CLOCK CALENDER

**T-Timer<sup>®</sup> .... \$89.95**

Clock continues to run no matter what mode you are in or when system is down with battery back-up\*. Not affected by disk I/O. Plugs into screen printer port-has extender.

Sec, min, hr; day of week;  
Date, mo, yr.  
Mod. I only.

## ORDER NOW! TOLL FREE 800-527-3582

Write or call Rose TOLL FREE at 1-800-527-3582 (Texas residents call 214-234-1770). Please use the toll free lines for orders and literature requests only. Technical help or service use the Texas line. You can pay by VISA or MASTERCARD, you can send check or money order (allow a couple of weeks for personal checks to clear) or order COD (we ship COD's cash, certified check or money order only). Rose will take American money in just about any form. Add freight (UPS where possible) on all orders under \$1000. If you buy \$1000 or more Rose eats the freight! Texas residents cough up 5% sales tax. Allow 2-4 weeks for delivery. Order today - I need the money!

## TOTAL ACCESS<sup>®</sup>

P.O. BOX 3002  
RICHARDSON, TX 75080

**214-234-1770**

\* TRS80 & Radio Shack are trademarks of Tandy Corp.  
© Copyright 1981 TOTAL ACCESS



Items at random

# 80-U.S. goes monthly!



The big news around here is that we are going to be a monthly publication starting in January 1982 (the very next issue!). Yes, I have fought it for a long time, it just wasn't the right time, but now it is and we are geared up to do it.

There may be a small decrease in the number of pages, it all depends on our advertisers. It still has to be run like any other business, and the picture looks good - finally. There will be few changes otherwise. The subscription price will remain the same for the U.S. and possessions. Canada and Mexico will increase to \$25.00 per year, foreign surface will remain at \$30.00 per year but foreign airmail will have to go up to \$72.00 per year. Sounds terrible doesn't it?

You may note that we have a whole new bunch of foreign distributors listed on page 2, and we strongly suggest that foreign subscribers look into getting their copies through them. It may be faster and cheaper in the long run.

The way things work out, you can now buy a subscription to 80-U.S., and save \$20. over the newsstand price. With that you can buy a subscription to another computer mag and still have a buck or so left over for a Big Mac at McDonald's. How about that?

This page, Items at Random, is always written after the rest of the issue is done and eagerly being blue lined by proofreaders. It just occurred to me that @NEWS and R C Bahn's columns haven't arrived yet. So they are not in this issue, but now they are both a whole issue ahead of the game. It must have been some kind of vacation these guys took! Wherever it was, I want to go there next year...

Mr. Ed Juge is now writing a regular column for us. I had asked him to do that about a year ago, but

he had other commitments then. We welcome him now, and hope you will enjoy reading about the happenings in Fort Worth.

Neither Ed nor I liked the name "Tandy Topics". He said we should find a better name, but we couldn't. The only thing we could come up with was "Here come the Juge", which we considered was too trite. Margaret, our advertising director, suggested "Fort (what it's) Worth". For what it is worth, can you think of a better name?

## Regular subscriptions to remain at present price.

There have been some people changes too. In case you hadn't noticed, Larry Panattoni has ceased to be a contributor. His regular job at Ma Bell has become more demanding and he has asked to be let off for awhile. Phil Pilgrim has gone whole-hog into the fishing lure business (using his TRS-80 to run the milling machine, see the last issue), and says he will contribute again when the boom is over. We thank both Larry and Phil for their valuable input, and hope to see more from them when they have the occasion to write.

Old timers leave and new faces take their place. James Williams continues System/Command with this issue. His first installment is rather lengthy, but should excite those who dabble in machine language. Jim Klapproth and Cameron Brown both become Associate Editors. Their efforts in the past have proven to be valuable and we look for more from both of them. In the office, we welcome Eva Jones, who recently joined the staff as typesetter and layout/design person. To all of the above, we hope your stay with us will be long and rewarding.

## Corrections

Now we get to that portion of the page which I call the "red face department": corrections. Here they are.

In the Sep/Oct 81 issue, we said that Radio Shack's Tiny Pascal would run on the Model III. It doesn't. The package is scheduled for conversion to the Model III, but there is no release date at this time.

We couldn't read the title on page 56 of the Sep/Oct 81 issue either. It was our first real bout with color, and thought it was a blue page, not a yellow one. Blue would have worked, darn it...

See letters in this issue for a solution to the bug found in Keyword (Sep/Oct 81 issue). Bill Mason tells about it.

We were also corrected on an item about the Color computer. Extended Color BASIC does recognize the INSTR function and LINEINPUT statement. Thanks to Lonnie Falk, publisher of *The Rainbow*, a publication for the Color computer.

The program in last issue's Files & Foibles was written on and for the Model II. The variable name CMD\$ should be shortened to CM\$ if you attempt this program on a Model I or III. Also, the last letter in line 676 should be T, not P.

## Other stuff

It's about that time of the year again when that creep gets on the television and says: "The flu season has been reported in your area". Keep this in mind: The guy is a paid actor, it was probably June or July in New York when the commercial was made, and *you don't have to believe him!* Yes, I hear you say that you don't. But if you aren't listening and *thinking* about it, he might just get into your subconscious. Don't let him! If you want the flu, get it for your own good reason, not because some jerk told you to. OK?

Hang in there, and tell them all you saw it in 80-U.S. **Mike**



# DON'T SAY WE DIDN'T WARN YOU!



## ASYLUM!

ASYLUM is now in stock and ready for immediate shipment. This is it! The ultimate adventure.

ASYLUM is the most sophisticated, sinister, challenging 3-D graphics adventure ever written! You are placed in an asylum for DEATHMAZE survivors. Your only goal: ESCAPE!

### 3-D PERSPECTIVE GRAPHICS!

ASYLUM has over 1200 locations! Hallways recede into the screen, *as though you are actually there!* Doors open and close! Beds, desks, and even guards and other inmates are drawn on the screen! And graphics are generated instantaneously! Simply press an arrow key to move or turn, and you are moved. Absolutely *no* waiting!

### ADVANCED LANGUAGE INTERPRETER!

English language commands may be issued at any time from a vocabulary of almost 300 words. Commands may include complete statements. "GET EVERYTHING ON THE DESK EXCEPT THE MATCHES" is perfectly legal!

**Med Systems Software**  
P.O. Box 2674-T Chapel Hill, NC 27514  
(919) 933-1990



## CHALLENGING, CHILLING!

To whet your imagination: the Hall of Doors, Nicholson the axe murderer, a revolving door, the time machine, the guru of nails, the old roadster in the drag strip, the ancient catapult room, plus dozens of other problems and a reasonable amount of built-in, subtle hints.

### ATARI 400 COMPUTER TO BE AWARDED TO ESCAPEE!

Will anyone escape? Who knows? Intelligence, cunning and patience will be necessary. Send us your correct solution postmarked no later than November 15th. On November 30th we will draw from the entrants for an ATARI 400 16K color computer!

NO HINTS WILL BE GIVEN  
OVER THE PHONE!

ASYLUM 16K cassette	\$19.95
ASYLUM 32K disk	\$24.95

TRS-80 LEVEL II,  
MODEL I AND MODEL III ONLY. Circle 8

ASYLUM MAY ALSO BE PURCHASED  
FROM THE PROGRAM STORE,  
HW ELECTRONICS (HOBBY WORLD),  
AND DEALERS WORLDWIDE.



# STOP

## BEING OVERCHARGED!

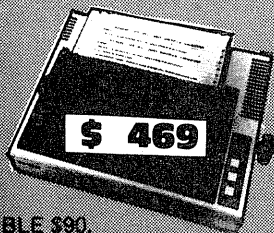
### DON'T

Pay Credit Card Surcharges  
Pay a U.P.S. C.O.D. "Fee"  
Even Pay for the Call!

### DO CALL OMEGA TOLL FREE!

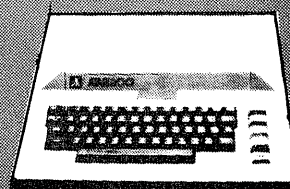
**Special  
of the Month!**

**EPSON  
MX-80**



INTERFACES:  
IEEE \$55, TRS-80 \$35,  
APPLE INTERFACE & CABLE \$90,  
RS-232 \$70

**ATARI 800 16K  
\$ 769**



**WEST COAST  
1-800-235-3581**

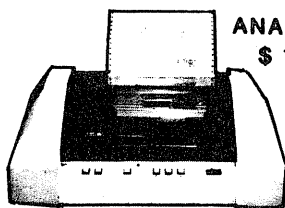
**EAST COAST  
1-800-556-7586**

CALL OMEGA AND FIND OUT WHY WE ARE AMERICA'S FASTEST  
GROWING COMPUTER SALES COMPANY!

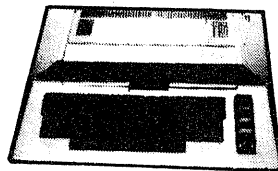
# ΩMEGA SALES COMPANY



# WEST COAST / EAST COAST

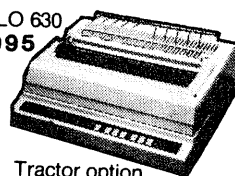


ANADEx  
\$ 1249

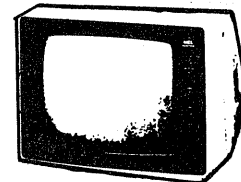


ATARI 800 32K \$ 749

DIABLO 630  
\$ 1995



Tractor option  
\$ 245



NEC 12" MONITOR  
\$ 229

**NEC  
INTERTEC  
OKIDATA  
APPLE  
TELEVIDEO  
COMMODORE  
RADIO SHACK  
AMDEK  
QUME  
ATARI**

INTERTEC SUPERBRAIN 64K RAM	\$2799
QD SUPERBRAIN	\$2999
NEC 5510 SPINWRITER (7710)	\$2345
NEC 5520 SPINWRITER (7720)	\$2695
NEC 5530 SPINWRITER (7730)	\$2345
NEC 12" MONITOR	\$ 229
OKIDATA MICROLINE-80	\$ 399
OKIDATA MICROLINE-82	\$ 529
OKIDATA MICROLINE-83	\$ 769
DIABLO 630	\$1995
APPLE II PLUS 48K	\$1139
APPLE DISK w/3.3 DOS Controller	\$ 525
APPLE DISK w/o Controller	\$ 449
HAZELTINE 1420	\$ 799
NORTHSTAR HORIZON II 32K QD	\$2925
ANADEx DP-9500/9501	\$1249
TELEVIDEO 912C	\$ 669
TELEVIDEO 920C	\$ 729
TELEVIDEO 950	\$ 929
CBM 8032 COMPUTER	\$1149
CBM 8050 DISK DRIVE	\$1349
CBM 4032 COMPUTER	\$1029
CBM 4040 DISK DRIVE	\$1029
CBM 4022	\$ 649
CBM VIC-20	\$ 269
RADIO SHACK II 64K	\$3650
RADIO SHACK III 16K	\$ 929
LEEDEX/AMDEK 100	\$ 139
LEEDEX/AMDEK 100G	\$ 169
LEEDEX/AMDEK COLOR-1 13" Color Monitor	\$ 329
MICROTEK 16K RAMBOARD for Atari	\$ 79
MICROTEK 32K	\$ 149
QUME SPRINT 9/45 (Full Panel)	\$2295
ATARI 400 16K	\$ 349
ATARI 825 PRINTER	\$ 650
ATARI 850 INTERFACE	\$ 139
ATARI 810 DISK DRIVE	\$ 449
ATARI 800	\$ 749

PRICES ARE SUBJECT TO CHANGE WITHOUT NOTICE

Call for price list of ATARI software

We carry the complete line of Personal Software

**We Accept C.O.D.'s • Stock Shipments Same Day or Next  
No Surcharge for Credit Cards • All Equipment Factory Fresh with MFT Warranty**

**WEST COAST  
1-800-235-3581**

OMEGA SALES CO.  
3533 Old Conejo Rd. #102  
Newbury Park, CA 91320  
1-805-499-3678  
CA. TOLL FREE 1-800-322-1873



**EAST COAST  
1-800-556-7586**

OMEGA SALES CO.  
12 Meeting St.  
Cumberland, RI 02864  
1-401-722-1027

**OMEGA SALES COMPANY**

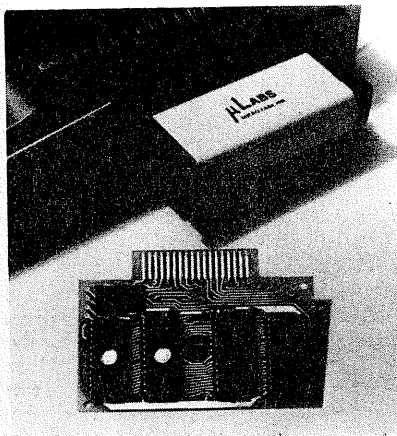
Circle 9



# New products

## Add memory to Color computer

Micro-Labs, Inc., 902 Pinecrest, Richardson, TX 75080 has announced the CMEMORY plug-in cartridge for the Color computer. This unit gives the user 8K of continuous memory which can be divided into any combination of 2K blocks of RAM and/or 2716 EPROM memory. The CMEMORY occupies the unused address space normally reserved for plug-in game cartridges. The CMEMORY cartridge without memory sells for \$24.95. Although you can use your own memory, 2K RAM chips are available for \$19.95 each and 2K 2716 EPROMs for \$14.



Circle 150

## Free catalog

ARCsoft Publishers, PO Box 132, Woodsboro, MD 21798 (301) 845-8856 has announced a new 16-page free catalog of 10 new books for the TRS-80 Color and Pocket computers. The books include dozens of tips, tricks, secrets and shortcuts for programming newcomers as well as hundreds of fresh programs.

Circle 151

## Color Text Editor & EDTASM

Cer-Comp, 5566 Ricochet Ave., Las Vegas, NV 89110 (702) 452-0632 has announced two new products for the Color computer. The first is a Text Editor program, selling for \$19.95 on tape, which besides normal text editing can be used for writing and editing BASIC programs. About 12K of user memory is available in a 16K system.

The other new product, also written in machine language, is CO-RES9, a co-resident Editor/Assembler. The Editor portion is similar to the Text Editor except it does not support BASIC-format tapes. The assembler outputs object code in CLOADM format or directly to memory for execution. Priced at \$39.95 on tape, it is also available with the Text Editor at \$49.95 for both products.

Circle 152

## New game from Acorn

Acorn Software Products, Inc., 634 N Carolina Ave., SE, Washington, DC 20003 (203) 544-4259 has announced "Tenpins", a machine language bowling game for one to four players. It features realistic action and sounds and has both beginner and advanced levels. Available for Models I and III on cassette for \$14.95 and diskette for the Model I (Model III diskette available soon) for \$20.95.

Circle 153

## FREEDOM 3

Field Engineering Consultants, Ltd., PO Box 2368, Woburn, MA 01888 (617) 944-5329, has announced the FREEDOM 3, a modification which adds CP/M capability to the Model III TRS-80. The FREEDOM 3 is available in three versions from \$199 to \$490 and includes T80S, an operating system for CP/M.

Circle 154

## Color computer products

The Micro Works, PO Box 1110, Del Mar, CA 92014, (714) 942-2400 has announced three new products for the Color computer.

SDS80C is a complete 6809 editor, assembler and monitor package in one color pack program. Price is \$89.95.

80C Disassembler is a cassette for a 16K Color computer system. It enables generation of your own source listing of the ROM and documentation includes useful entry points, a complete memory map, I/O details and more. Price is \$49.95.

CBUG Monitor includes such features as examine or change memory, save memory to tape, download/upload data or programs to a host system, move the video display page, send or receive through the RS-232 port, use the color computer as an intelligent peripheral, and more. Priced at \$29.95 for tape or \$39.95 on EPROM which can be plugged into the extended BASIC ROM socket or a modified ROMPACK.

Circle 155

## Software Arts Tech Notes

Software Arts, Inc., the creators of VisiCalc, have announced SATN (Software Arts Technical Notes), a publication offering on-going support to VisiCalc. Contact Software Arts, Inc., SATN Subscriptions, PO Box 815, Quincy, MA 02169 (800-257-7850 Operator 737 or 800-322-8650 in New Jersey). Price is \$30 for six issues.

Circle 156

## SHUFFLEBOARD III

Parasitic Engineering, Inc., 1101 Ninth Ave., Oakland, CA 94606 (415) 839-2636, has announced SHUFFLEBOARD III, a 64K CP/M 2.2 system for the TRS-80 Model III. It plugs into two sockets inside the computer with no traces to cut, no soldering and no permanent changes to the Model III. It is priced at \$495 and includes CP/M 2.2 and manuals, installation instructions and a six month warranty.

Circle 157

## Z80 CPU Micro Chart

Micro Logic Corp., Dept EU, PO Box 174, Hackensack, NJ 07602 (201) 342-6518, has announced release of a Z80 CPU Micro Chart, a durable credit card plastic 8 1/2 x 11 inch chart. Tables on the chart include the instruction set, disassembly tables, ASCII, Hex to decimal, compare vs. jump, effect on flags, interrupt structure and more. Price is \$5.95 each plus \$1 p/h.

Circle 158

## CLOAD Color Magazine

CLOAD magazine, a tape-based monthly production for the Model I and III, has announced CHROMASSETTE, a similar production for the Color computer. Priced at \$25. for six months or \$45 for 12 months from Chromasette Magazine, PO Box 1087, Santa Barbara, CA 94102, (805) 963-1066.

Circle 159

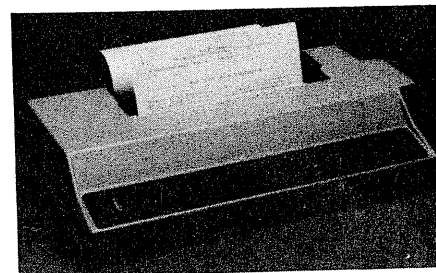
## Model III Mail list program

Micro-Architect Inc., 96 Dothan St., Arlington, MA 02174 (617) 643-4713, has announced MAIL-M3, a mailing list system for the Model III. Capacity is about 500 records per diskette.

Circle 160

## Low cost impact printer

DIP Inc., 745 Atlantic Ave., Boston, MA 02111 (617) 482-4214 has announced the model DIP-81A, a low cost impact printer priced at \$499. It features 7 x 7 or expanded 14 x 7 upper/lower case matrix printing at 100 cps bi-directional, a "finger-clean" ribbon cartridge and single-sheet, roll, or fan-fold capability.



Circle 161



### **Voyage of the Valkyrie**

Advanced Operating Systems, 450 St John Road, Michigan City, IN 46360 (219)879-4693 has announced Leo Christopherson's "Voyage of the Valkyrie". This interactive adventure game involves an exploration of the Island of Fugloy's mountainous terrain with a goal of seeking the proper mountain passes to reach the castles. The castles are protected by birdlike creatures which fly across view screens with the intent of destroying you with laser rays. Available on diskette for \$39.95 or cassette for \$34.95 for Models I or III. Advanced Operating Systems is the micro-computer software division of Howard W Sams & Co., Inc.

Circle 162

### **New general business software**

Cybernetics, Inc., 8041 Newman Ave., Suite 208, Huntington Beach, CA 92647 (714) 848-1922, has announced a major set of general business applications software written in RM/COBOL (Ryan-McFarland) and available on CP/M for the Model II. For general information use the reader service number, but for detailed product descriptions call or write.

Circle 163

### **New Krell Software**

Krell Software Corp., 21 Millbrook Drive, Stony Brook, NY 11790 (516) 751-5139, has announced four new releases. They are Competency Examination Preparation Series, College Board 81/82 Preparation Series, Isaac Newton: An Introduction to Scientific Logic and Odyssey in Time: A Complex Adventure in History.

Circle 164

### **Bookkeeper II**

Data Train, Inc., 840 NW 6th St., Suite 3, Grants Pass, OR 97526 (503) 476-1467 has announced Bookkeeper II for CP/M, an integrated accounting system written in Microsoft BASIC. The modules include General Ledger, A/R, A/P, Fixed Asset and Payroll and may be purchased at \$600 per module or as a complete package at \$1500.

Circle 165

### **Exatron CCI/CCDOS**

Exatron Corp., 181 Commercial Street, Sunnyvale, CA 94086 is now shipping the Exatron CCI/CCDOS, an interface with 16K additional memory (for a total of 32K) and disk operating system for the Color computer. The complete system includes everything but the disk drive and the cable. The Exatron CCI is packaged in an attractive case with a short cable which plugs into the ROM cartridge slot of the Color computer. It requires 16K Extended Color BASIC to be fully operational. If the Color computer contains an additional 16K of memory, the extra RAM will be ignored. Standard 35 or 40 track Radio Shack type 5 1/4 inch disk drives and cables are used with the Exatron CCI. It is priced at \$347 plus \$5.50 s/h.

Circle 166

### **Prosoft's RPM**

Prosoft, Box 839, North Hollywood, CA (213) 764-3131 has announced RPM, a program to measure rotational speed and variation of disk drives on the Model I and III. The documentation includes an explanation of how to adjust the speeds of the most popular mini-floppy disk drives. RPM is on diskette at \$24.95.

Circle 167

### **Radio Shack Compiler BASIC**

Radio Shack has announced Compiler BASIC for the TRS-80 Models I and III. The RSBASIC (26-2204) development system includes full documentation and software to prepare, edit, compile and execute RSBASIC programs. It requires 48K and two disks and is priced at \$149. RSBASIC is similar to the Model II version and is not compatible with the Interpreter BASIC. It is file compatible with the new RSCOBOL for the Model I and III and includes sequential, random and single-key ISAM file accessing capabilities. Available through normal Radio Shack outlets.

Circle 168

### **Joystick interface**

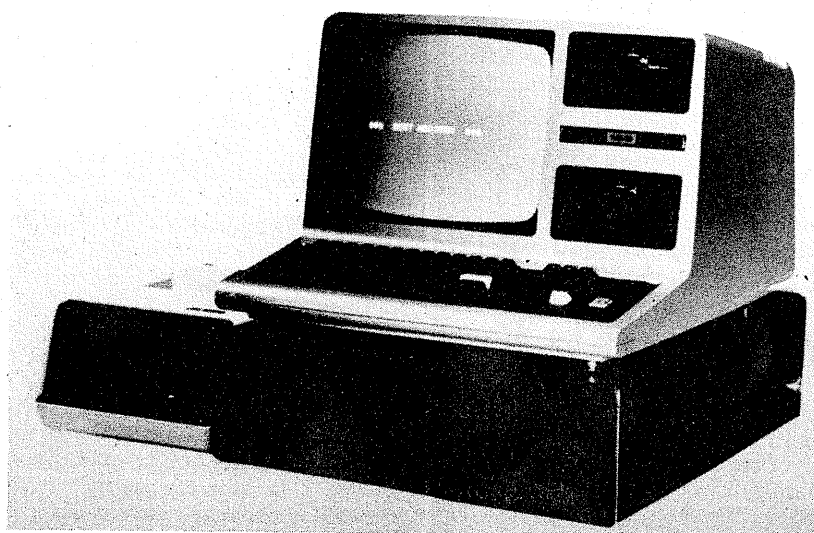
Mega Systems Inc., 262 Park Lane, King of Prussia, PA 19406 has announced Joy-6, a complete joystick interface for the Model I or III, featuring potentiometer type joysticks with pushbuttons, sound effects capability, and simple control software. It can also be used as a general purpose 6-channel analog to digital converter with temperature sensors or other transducers, and can drive an external relay for control applications. The price is \$124.95 assembled and tested, or \$99.95 for the complete kit.

Circle 169

### **Model III/Cash Register**

Integrated Cash Register, Southern Region, 2301 Park Ave., Suite 203, PO Box 1446, Orange Park, FL 32073 (904) 269-1918, and FutureSoft, have announced the CR-180, a Cash Register/POS (Point of Sale) Expansion System for the Model III. The system includes an Electronic Cash Drawer and Receipt Printer which plug directly into the TRS-80 Model III. (The software will support Radio Shack and other printers). Audio has been added for keystroke confirmation. The CR-180 Software provides the operator with continuous instructions at the point of sale and allows management to rapidly change promotional messages printed on the customer receipts. The CR-180 stores transactions for up to 100 employees (clerks), saves 8 methods of payment and provides inventory control and complete reporting. The reports include daily sales and cash by employee and transaction type, inventory usage, and gross profit computation. Price and shelf labels are also printed. Software for the Cash Register Expansion system was developed by FutureSoft and is available in foreign language versions. Prices range from \$900 to \$1900.

Circle 170





# Pete Carr interviews Micro Systems Software for 80-U.S.

## Interview

Micro Systems Software is a fairly new software house in Hollywood, Florida, with a nucleus of three people. Larry Studdard is the president and business manager. Steve is 21 years old and the actual author of DOSPLUS. Mark is 20 years old and does programming as well as a variety of other tasks. We talked about DOSPLUS for the Model I and III, which is what their business is built on. While there, I also had the opportunity to see what they are working on now.

**Pete** - How and why did the three of you get together and form Micro Systems?

**Larry** - I bought a TRS-80 and became addicted to it. I have a successful aluminum business; but my love of computers grew to the point of wanting to do business with computers and software. My next step was to find people who were interested in working with me. The local Radio Shack people kept telling me "you've got to meet Steve". Steve was getting into being a building architect before I met him.

**Steve** - I had started some time before I met Larry. My interest in computers started just as I was getting out of school. I was doing research on the computer and making trips to the local college where they have a big library. After going through many books I got as much information as I could gather and started writing programs in machine language.

**Larry** - Needless to say my main function was to be business manager and the financier of the project.

**Pete** - Was your first plan to write an operating system?

**Larry** - No, it didn't start that way. The first thing we did was to write a business software package to support my aluminum company.

About a week after Steve and I got together we met Mark, who helped us put the business package together. In order for us to write the business system Steve had to make patches to the operating system so it would do what we wanted.

**Steve** - From there I decided to completely rewrite a DOS which was the first version of DOSPLUS. That first version was never released.

**Pete** - Since DOSPLUS came from your experience of what you needed in a business system, what was the criteria you followed in its development?

**Mark** - What we think is important is keeping it easy to use with operator convenience, so that non-programmers along with programmers can use the system. We wanted a DOS that had all that without sacrificing power, flexibility and speed. If a system is not dependable, destroys your files, you don't have anything either. So dependability is a must.

**Steve** - Speed is very important too. We keep DOSPLUS operating fast, even if it means leaving out a command here and there. But I think it is possible to have a system that is packed with features and still keep its speed if it is designed right.

**Larry** - Speed gives the micro the ability to compete with the mini. If we don't keep the DOS fast then the mini will continue to be more popular in the business market. The business market is what we are after.

**Steve** - Everything is thoroughly tested. We don't let it out of here until we are sure it is ready. Our other main consideration is compatibility. This is not a big problem with our DOS, but like all other operating systems, there are certain machine language programs that need to be modified to

run correctly. BASIC programs are not a problem. We want programs written under other systems to work with ours.

**Pete** - Micro Systems Software was the first company specializing in operating systems to offer a double density DOS that didn't have to be patched for double density. Yours was also the first to read single or double density diskettes. How did you get into double density?

**Larry** - Steve and I went to a show in Washington, D. C. and saw the Doubler. We had already heard a rumor about the double density Model III. We wanted to get a jump on everyone for the Model III system. Not so much for the Doubler because we didn't know if it would fly or not. But Steve wrote our Model I double density DOSPLUS. When the Model III was finally released we were ready because we understood double density.

**Pete** - Given that the Model III is designed quite differently from the Model I, and since you had to dig into it for DOSPLUS, could you tell us what you found out about the Model III?

**Steve** - We think the Model III is a very nice computer but that anyone who writes disk I/O for it will find that it is not really quite as fast as it should be. Even the Model I has this problem, but being memory-mapped makes it a little different. I did find a way to do it, but you just don't have much leeway on these machines when you get into double density. It's very critical. That is really the only problem we had. The ROM is almost identical to the Model I ROM except for the added code. We were able to make Model III DOSPLUS very compatible with the programs out there. You can run many programs, such as Microsoft's Model I BASIC Compiler just by changing the high memory location



# IS YOUR PRINTER SMARTER THAN YOUR WORD PROCESSOR? THEN MOVE UP TO PROSOFT'S NewScript:



- \* Easy-to-use Full Screen Editing
  - \* Headings, Page Numbering, Centering
  - \* Global Search and Change
  - \* Table of Contents, Indexing
  - \* All 12 MX-80 fonts + underlining
  - \* Italics on GRAFTRAX MX-80
  - \* Supports Diablo, Microline, Anadex
  - \* Typehead—never loses keystrokes
  - \* Form Letters, Big Documents
  - \* Double Width, Underlining
  - \* Sub-scripts, Super-scripts†
  - \* Proportional font right-margin justification on 737, 739, L.P. IV, and now R/S Daisywheel II
  - \* 160 pages of excellent documentation includes "EZEDIT", "EZSCRIPT", self-study tutorial, and hundreds of examples
  - \* runs under TRSDOS, NEWDOS, NEWDOS/80, LDOS, DOSPLUS
  - \* Requires 48K TRS-80 with one disk drive. Specify Model I or Model III
- †Some features work only if your printer has the mechanical capability.

**NewScript**  
**Mailing Labels Option**  
**Special: New Script + Labels**

**\$ 99.95**  
**\$ 29.95**  
**\$115.00**

**CALL TOLL-FREE FOR ORDERS ONLY:**  
(800) 824-7888, Operator 422  
CALIF: (800) 852-7777, Oper. 422  
ALASKA/HAWAII: (800) 824-7919

## RPM

RPM measures the rotational speed and variation of your disk drives, and reveals a common cause of unexplained errors. Simple one-key operation, runs under any DOS, interchangeable between Models I and III. Shows current and average speeds, plus fluctuation history. Recovers from severe errors. Documentation explains how to adjust drives. Use RPM monthly for best results.

32-48K Model I or III disk:

**\$24.95**

## FASTER

Monitors your BASIC programs while they run, then displays a simple change (usually one line) that can reduce run-times by as much as 50%. No hardware changes, and handles programs that cannot be compiled! Complex programs benefit the most. See review in Personal Computing, May, 1981.

16-48K Model I or III, tape and disk:

**\$29.95**

Order from your Software dealer, or from:

# PROSOFT

**Box 839**  
**North Hollywood, CA 91603**  
**(213) 764-3131**

## QUICK COMPRESS

Small (276 bytes), fast (processes 800 lines in under 3 seconds) utility removes blanks and remarks from your BASIC programs. Produces smaller, faster programs, and doesn't alter the original logic.

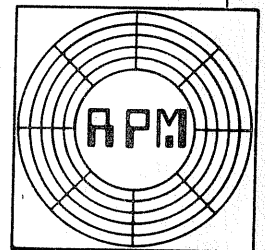
16-48K Model I or III, tape and disk:

**\$19.95**

**SPECIAL FASTER + QUICK Compress: \$39.95**

**ORDERING INFORMATION:** We accept checks, Mastercard, Visa, Money Orders, C.O.D. (under \$50.00, add \$2.00), and even cash. Please, no Purchase Orders. California residents add 6% sales tax. 15% outside North America.

Circle 10





## Interview

to be compatible with DOSPLUS. We found that 90% of the time this high memory change is all that is needed if a machine language program doesn't work properly. You can also exchange disks between the Model I and III with our DOS.

**Mark** - We really like the Model III much more than the Model I. It is a much more reliable machine. The Model III with DOSPLUS can sit up there and run those 80 track drives all day long without error. Steve developed our Model III I/O package on a napkin in Taco Viva. That's true! And he developed our original double density Model I I/O package in Pizza Hut on a napkin.

**Steve** - A lot of work is done like that. I'll be somewhere off in never-never land and get the ideas. These things bother me and I like to work them out.

**Pete** - User support after the sale is very important to the customer. What is your policy on this, such as updates and the like?

**Mark** - If there is a bug found by a registered owner of DOSPLUS, and by a bug I mean if we say that if you type this command it will do this, and it doesn't, that's a bug. If someone comes up with an actual flaw in the system such as it eats your files, the first thing we do is give the user a hundred dollar reward. Second, the DOS gets fixed immediately and everyone gets a letter informing them of the bug. After reading the letter you can send in your diskette and get a new one free. There is no charge for this. Some people are offended by the reward and our claims of a bug-free system, but that's OK. We want to build confidence in our product and we do stand behind our claims. We were tired of bugs, and that is one of the reasons for DOSPLUS.

**Steve** - We like to stay away from the zapping and patching technique. Things like that can get very confusing. Nine times out of ten, the system will need to be reassembled to really get it right. I do see the need for a utility like this on occasion. In our next version we will probably have some sort of patch utility similar to TRSDOS so the user can fix programs that don't run correctly with DOSPLUS. There are only a few that will need this; but we do intend to support some easy way of doing it when it's needed. We don't really intend it to be used for patching the system itself.

**Mark** - Also I would like to point out

that if a user has a program that he cannot get to run under DOSPLUS and he can't get help from the people he purchased it from, and we aren't able to help over the telephone, he can send that program to use and we will fix it to work if at all possible. We are not going to steal the program, we understand copyright law, we'll just try to help the user get it to work in his system. Also, that patch will then be made available to other users.

**Pete** - What about providing information such as addresses and calls for your users?

**Larry** - Yes, we will give any address or call that a user needs to help him program with DOSPLUS. We will not attempt to explain what the differences are between DOSPLUS and some other system, but if you need DOSPLUS information of this sort, we do make it available.

**Steve** - There have been a few problems because we don't have a technical manual, but all the addresses that are important to using DOSPLUS will be in our expanded manual with DOSPLUS 3.4. We do listen to suggestions of our users. The new manual should be useful in many ways. It will be hardcover, full of examples, so the user can take advantage of DOSPLUS to the fullest. And when I say examples, I mean the type that you will find useful in real use, not just to watch the command work for its own sake. It will be full of programming techniques and hints that will be of real help to the users in programming with DOSPLUS. There will be a small charge for updates to 3.4 and the new manual, but we won't be making any money on these updates, just enough to cover the cost of doing it.

**Mark** - We believe that if you have already bought our product that we shouldn't try to make money on you twice, but we can't afford to lose money either. You will need to have the new manual with 3.4 because we have greatly expanded the system with a lot of changes and enhancements. The degree of flexibility that will be allowed with 3.4 will be tremendous. Users have requested more flexibility such as routing to disk files, linking devices and the like, but, we have decided to take it even further. You will be able to call a friend on the telephone and if you both have modems, send him a program straight to a file on his disk, printer, etc. And you won't

have to go out and buy a separate terminal program to do it. We have received a lot of good reaction to our BASIC, such as our Search and Replace feature, but even they will be expanded in this next version. Build and Do are much more flexible also.

**Pete** - Will you be supporting other hardware, such as hard disk or even the new computers from Japan?

**Steve** - We do plan to get into hard drives, eight-inch operation, etc. We are not going to stop here. If at all possible, and we think there is anything in it, we will put systems on these new upcoming machines. Also, if the hardware allows it and if possible I will also make them diskette compatible.

**Larry** - I've called Osborne. I've called PMC. I think Osborne is committed to CP/M, so I don't think we will be getting into that. I have not heard back from them, but we are interested in doing as much as we can with as many machines as we can. One of our sayings around here is that we would like to be the CP/M of the next generation and with micros being the next generation we think we have a good shot at it.

**Pete** - Do you think micros are really good enough to take the place of the minis?

**Larry** - Easily. Micros are where it's at as far as small business goes. Once you put the hard drives and the networking devices that are coming out, along with sophisticated software, you'll be able to have terminals all over the place.

**Mark** - There are hard drives coming out for the Model III very soon and there will be DOSPLUS available for these hard drives. The transfer rate for hard drives is so high that you can fill 48K in the machine in roughly a second or two, allowing for overhead. That means that you can very quickly change every byte of RAM in your computer if you have a hard drive. I'm not talking a long time into the future. I'm talking about the end of 1981.

**Steve** - I would like to say that we are not claiming to be the only experts. There are other people and we realize this. We are just trying to solve all these problems that people have had so long with operating systems and build confidence in our product. We are having a lot of fun doing it and as long as we continue to enjoy it, we will keep working.



# INCREDIBLE

**IMAGINE** a computer printer/electronic typewriter with a 100 character daisy wheel, controlled by 6 microprocessors (including 2 Z-80's) with an all-electronic keyboard...all in one machine!

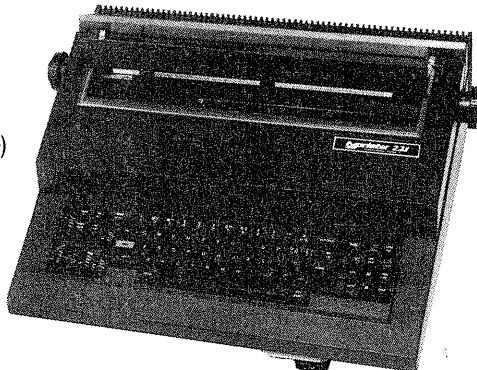
**THAT'S INCREDIBLE!**  
**THAT'S THE TYPRINTER 221!**

## **AUTOMATICALLY, IT WILL:**

- Center copy.
- Line up decimal points.
- Print vertical lines (to separate columns).
- Layout columns.
- Center titles (over a column).
- Print flush right.
- Return carriage (at end of line).
- Paper feed to pre-set starting point.
- 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.
- Store in non-volatile resident memory:
  - Often used line formats (margins & tab stops).
  - Often used phrases (up to 835 characters) in 10 "bins".
  - Up to 10 complete forms (tax, medical, insurance, etc.).
  - 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.
- Do 1/2 line spacing for footnotes and scientific notation.
- Accepts carbon film or reusable nylon ribbons.

## **IT HAS:**

- A lighted key to inform you that it's set to temporary margin.
- A factory installed noise reduction shield.
- A 16K buffer/automatic spooler\*.
- A lighted key to indicate upper case only.
- A Centronics standard parallel interface and can be ordered with:

RS-232 Serial interface\* or  
IEEE (PET) interface\*.

A print speed of 20 cps and (because of logic seeking circuitry) a through-put of approx. 32 cps.

A built-in anti-glare shield.

## **IT EVEN HAS:**

- Carbon film ribbons in various colors.
- 20 character plasma readout that informs you as to:
  - Number of characters to end of line.
  - Number of lines left to end of page.
  - The existence of an error condition.
  - The contents of a memory "bin".
  - Number of characters left in buffer.
- An automatic "feature in use" indicator (centering, storage, etc.)
- With scrolling, both FORWARD and BACKWARDS.

## **INCREDIBLE?**

### **THE 221 OFFERS EVEN MORE!**

- It's totally compatible with all computers and software.
- It will print in English, French, Spanish, Italian and German. It will automatically switch between English and foreign keyboards\*. (Under computer control).
- Scientific, mathematic, financial and legal daisy wheels available\*.
- Tractor feed available\*.
- Can be used as a stand-alone terminal\*.
- Can be used to access both TWX and TELEX networks\*.

**TRY WHAT YOU'VE BEEN MISSING.**  
**TRY THE INCREDIBLE MACHINE.**  
**TRY THE TYPRINTER 221.**

Suggested price \$2850.00

Dealer inquiries invited.  
(Call for store nearest you).

Service available through the world-wide facilities of the Olivetti Corporation.

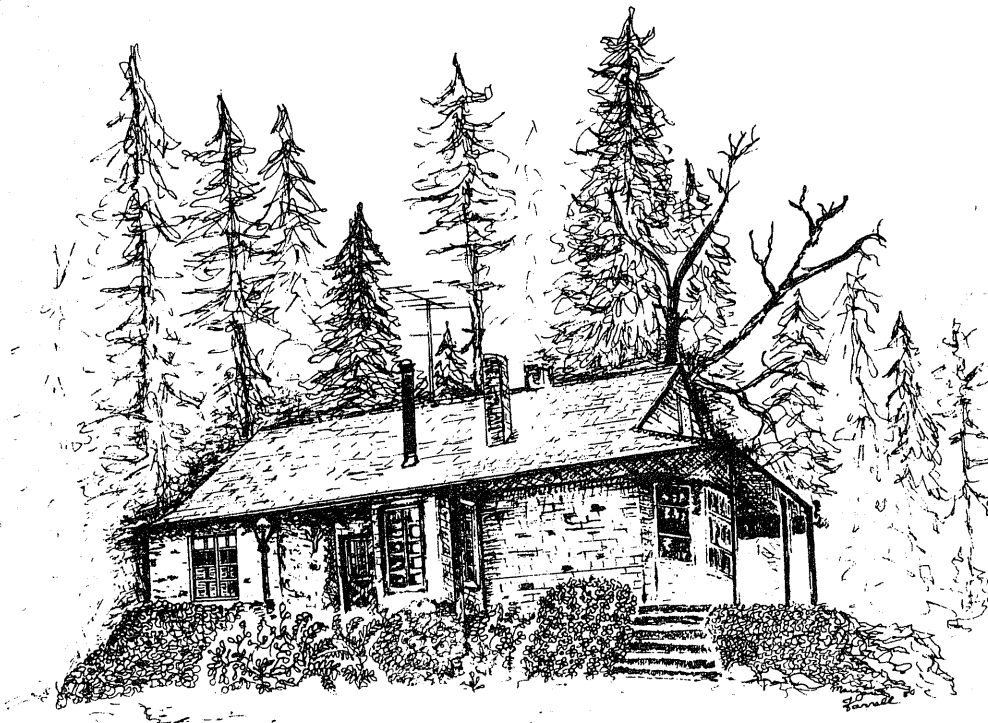
**HOWARD INDUSTRIES**

2051 E. CERRITOS AVE., 8-C  
ANAHEIM, CA 92806  
714/778-3443



# The computerized home

80-U.S. Staff



Back in 1979 Mr. Walt Bolden of Federal Way, Washington, decided to build himself a computerized home.

It may sound easy, but where do you start? Today's architects and builders know little or nothing about designing and equipping a home controlled by a computer. It is commonplace these days to find all the building materials needed in new home construction. Electrical wiring, plumbing and even the intercom can be ordered as stock items. But how about wiring a new home for computer control?

Walt had to play it by ear, and put the whole project together almost by himself. Some of the things he wanted were automatic wake up alarm with a human-sounding voice, lights that came on and turned off again as he walked through a room, and a water overflow alarm system. He also wanted full security against unauthorized entry

and an automatic water sprinkling system.

Walt also wanted to install the very latest in solar heating, and this too, was to be computer controlled.

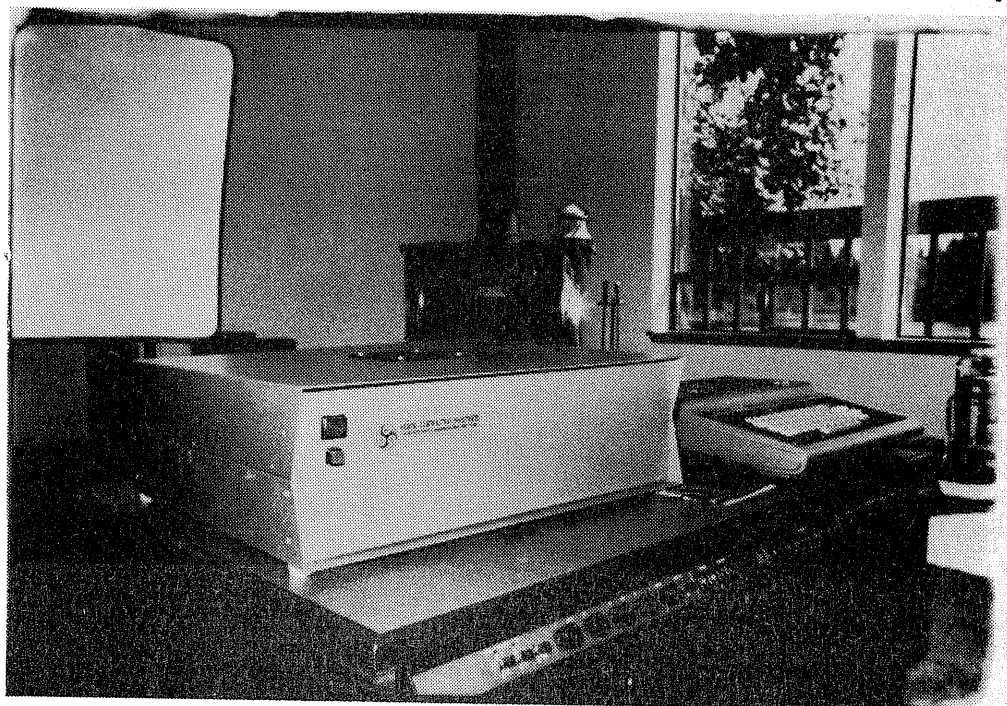
His original system, based around a Model I TRS-80 microcomputer, didn't get too far. After some preliminary work with hand-wired interface boards, it was given up. The Tandy Corporation decision to discontinue this computer model also played a part in the abandonment of the Model I.

About the time the Model I was being announced as discontinued, the Color computer and several new remote control devices were announced by Tandy.

The Color computer, based upon the 6809 central processing unit from Motorola, was originally designed as a control processor. This made it ideally suitable for the purpose Walt had in mind, and was chosen to do the job.

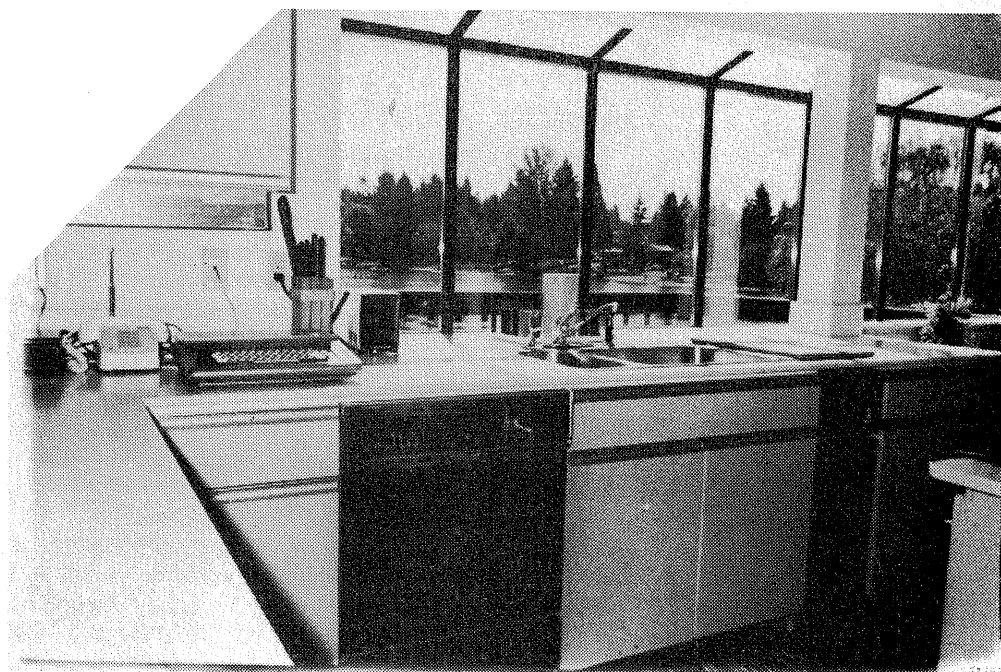


The control console, with the controller, and color computer. Note the large projection screen at the upper left of the photo.



Structural designer John Parrott of Poulsbo, Washington, designed Bolden's house to work with solar heating and energy efficiency. *Photos above and below were taken at the home of Mr. Walt Bolden.*

The kitchen view, showing the color computer as a remote unit.





### Computerized homes: A fad?

Is the computerized home just a passing fad - something for the very rich - the perfect gift for people who already have everything?

At first sight, it seems to be just another "electric banana", but we must keep in mind that the automobile, airplane and electricity were once considered frivolous fads too.

In fact, electricity is now so ingrained in our society that even the computerized home would be impossible without it. Lately it appears that we are even becoming overdependent upon it.

The heating costs mentioned in the accompanying article would seem to indicate the direction we must go to efficiently utilize our dwindling resources. Solar energy has just begun to make inroads to more efficient heating and cooling, and the need for accurate control of such devices is apparent.

It could very well be that in a very few years computer control will be a fact of life. Like the automobile, it may change status from being a gadget to an absolute necessity. The computer, as compared to the automobile though, has several side-benefits. Aside from home control, primarily in climate control, there are entertainment, education and security.

In the same way that electricity opened many new and better ways of living, so might the computer. It is limited only by the ingenuity of man. When new and better ways to use it are needed, they will be implemented.

Eds.

As the construction of the house went on, Walt had various specialists assist him in getting the system integrated into the plans of the builders. Before the dry walls went up, the space between studs looked like the house was going to have a very sophisticated stereo-sound system. Wires went everywhere. Sensing devices were scattered throughout the inside and outside of the house.

A controller had to be designed to interface the computer and the various sensing devices. When finished, it included a number of elements including a power supply with backup, and a multiplexing analog to digital converter for the sensors. It also required a digital to analog controller which was radio-frequency based and compatible with the Radio Shack modules (sensors). When it was finally done, it contained a clock/calendar and a voice synthesizer too. The entire programming for this unit was burned into a read only memory (ROM). The ROM was considered necessary for reliability.

The finished installation includes all the remote input units, sensors, and one large central control station. The central control is built around the 32K Color computer. The regular keyboard has been replaced with a larger detached one. A regular video can be used, but Walt has a large, seven-foot projection screen (see accompanying photo). Central control also has a cassette, MODEM, and floppy disks.

Central control is used for master input to the controller. In its spare time, it can also be used for home management, inventory, mailing lists and word processing. It also operates with VideoTex for entertainment and education.

The software used in this system is a combination of commercially available software with custom modifications, and a strictly "do it yourself" effort.

Options in the system provide for replacement of the Color computer with a Model II with printer and a hard disk. This will permit complete home office environment as well as home control.

Walt's home has attracted some rather widespread interest. There have been inquiries from dozens of individuals, and from several contractors. It began to look like the "Home of the Future" may be here now. One contractor is investigating the installation of computer control in a three-hundred unit complex.

Last year, some of those people who worked with Walt in various capacities decided to form a company that could provide the needs of future construction with computer control. The firm is based in Seattle, Washington, and is called "Home Computer Systems, Incorporated". The company will install program and maintain computerized homes. There are four individuals involved in the corporation: Glen Sayes is in charge of marketing, Terry Dettmann does the system's programming,



and they also use the services of an expert in 6809 technology and another who has a background in construction and business management.

Prior to forming the actual corporation, a complete search in 6 national data banks was performed. As far as can be determined, this group represents the first in the country who do computer subcontracting.

### But what does it do?

Walt's monthly heating and cooling costs are computed to be about sixteen dollars per month. He uses a combination of electrical, solar and wood heat.

Solar heat is complex, because there are many valves to control water flow. The computer regulates the circulation of water from reserve tanks and collectors on the roof. When necessary, it will display a message saying that a fire in the wood-burning stove is necessary. When all else fails to hold the temperature to predetermined levels, the electric heat backup is brought into play.

Another function of the computer is home security. The first level is that of exterior intrusion, the break-in through a window or door. Other levels of protection include motion and infrared or proximity detection.

Walt's system also checks for water over-flow. Placed in the kitchen, bathroom or utility room, these floor based sensors can detect the presence of water and shut off the supply.

By using combinations of various sensing devices, it is possible to enter the home late at night and have the system light a path for you from the front door to the bedroom.

Humidity and moisture sensors in the lawn will detect water content in the soil or air and control the garden sprinkling system.

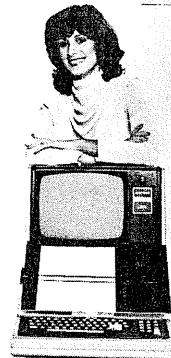
In the morning, the stereo switches on and a custom selected voice from the synthesizer comes on and says, "Wake up, it's time to wake up". The remote input unit next to the bed lights up and displays the time and temperature. A wake up menu is displayed which gives the options for a 5 minute snooze, a 10 minute snooze, music up or off, and coffee on. If the 5 minute snooze is selected, the stereo shuts off, the coffee maker in the kitchen comes on and in 5 minutes, the wake up cycle is repeated.

There is hardly a house built today that does not have electrical wiring installed. Although wiring in a home was at one time quite out of the ordinary, it is today considered commonplace and standard. Perhaps computers in the home will be too. ■

*Home Computer Systems, Incorporated, can be contacted at 911 N. E. 148th, Seattle, Washington, 98155 (206) 771-1422*

# TRS 80 OWNER: What are you doing without a **P-KAY** KEYBOARD COMPANION?

TRS-80 Model II, with  
20" Keyboard  
Companion

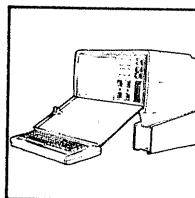


TRS-80 Model I, with  
16" Keyboard Companion

Use one of these new computer copy stands and you'll realize the efficiency and operator comfort a P-KAY stand provides. Keeps the work directly in front of the operator (not to the neck-craining left or right!). Models to fit virtually all computer terminals with detachable keyboards including micros, minis, main/frame terminals, dedicated word processors, the APPLE . . . AND INCLUDING THE TRS 80 **MODELS SHOWN ABOVE.**

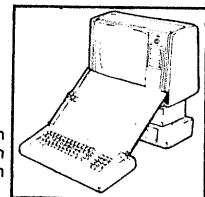
The P-KAY installs in minutes without tools. The all steel pedestal or "riser" provides sturdy lift. The guideline is non-magnetic: place floppy diskettes or mag tapes on it without worry of erasure or damage.

FSI is a major distributor for P-KAY Products, with stock on hand. Contact our Reseda office for details.



TRS-80 Model II,  
version for Terminals  
w/slanted screens

TRS-80 Model I with  
P-KAY Components in  
position



Circle 12

See FSI in Booth 305,  
**MINI-MICRO COMPUTER CONF./EXPO November 2, 3, 4**  
Anaheim Convention Center

**FSI**

6901 Canby Avenue, Reseda, CA 91335  
Los Angeles Phone (213) 705-4202

2680 Bayshore Frontage Road, Suite 1030  
Mountain View, CA 94043 (415) 962-9275

LARGEST MASTER DISTRIBUTOR FOR VERBATIM REMOVABLE MAGNETIC STORAGE MEDIA



### Practical applications for the homemaker...

# I refuse to be a computer widow!

For Models I, II and III

"Don't cry," my husband soothed. "It's going to be all right. You'll love it - I know you will!"

My husband had just informed me that we were going to purchase a microcomputer - a nice little TRS-80 Model I. The shock of that announcement shook me to the core as visions of myself becoming a computer widow flooded my mind. There I was - raising our two little daughters single-handedly. I could just picture them at first asking, "where's Daddy?" and later, "who's that man that sits behind that

funny TV thingie all the time?" I wondered if I'd remember what his face looked like. And then I imagined the bills. Oh, the *bills*! That's when I really began to cry.

"But honey," he continued, "think of the practical applications!"

"Practical applications? Like what?" I sobbed.

"Well like, uh...uh...it could help you memorize your grocery list, and uh...give you the total square inches of any sized pizza, or uh...calculate the average weight of all the elephants at the zoo."

Denise Berg,  
Kirkland,  
Washington

"Really?" I began to perk up. "What else?"

"The games! Oh, I know you'll love the games!"

I noticed a dreamy, far-away look in his eyes and decided that my tears were of no avail. And maybe - just maybe - there would be some practical applications for a homemaker.

My husband tried to soften the blow whenever he could. The day he ordered the computer, he brought me a long-stemmed green carnation. And when he brought the marvelous machine home, unpacked it, and powered it up, the first thing he programmed was:

```
10 PRINT "I LOVE YOU,  
DENISE"
```

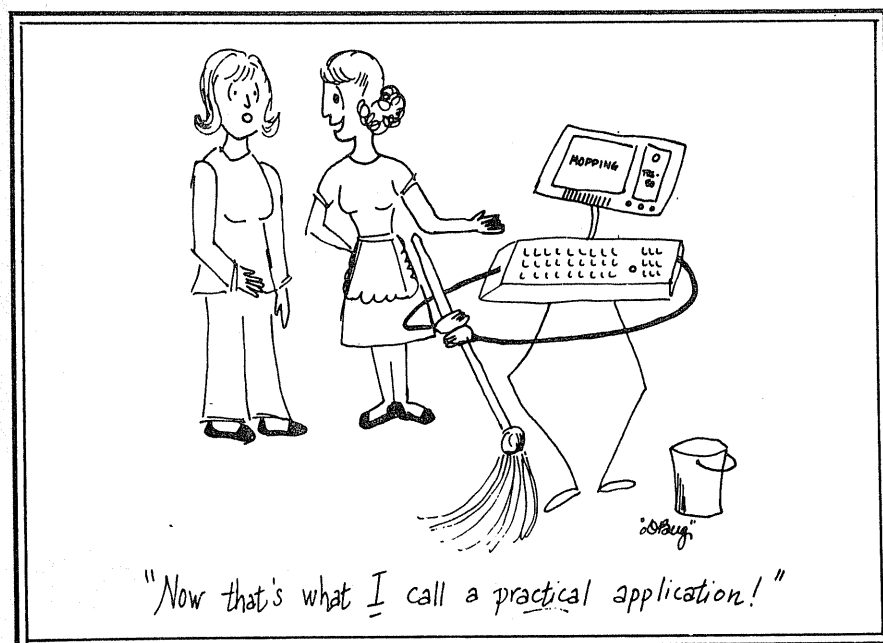
```
20 GOTO 10
```

"Hey honey", he called. "Look at this."

My heart skipped a beat as I watched the video fill with sweet nothings in an infinite loop. My heart was won.

From then on I became more and more addicted. When my husband decided to purchase disk drives, I didn't cry a bit. In fact, I scoured the magazines to find the best buy. By the time he wanted to get a printer, I was scouring them again to find a printer with the features I wanted.

A couple of years passed, and in





the meantime I had learned how to shoot down pirate ships, become a millionaire in the China sea trade, steal treasures from sleeping dragons, and win a gold medal in the Olympic Decathlon. (I wanted to know all about *Interlude*, but was afraid to ask.) All this was great fun, but where were the practical applications my husband had promised?

I decided that I needed to discover them for myself. But doing things by trial and error frustrated me, and 80-U.S. didn't have anything for housewives. So I took a beginning programming class at a local community college. Finally things began to fall into place for me. Words that I had read in game programs, magazines, and programs my husband had written, began to have meaning. A whole new realm opened up to me, and I felt like I could conquer the world (or at least my house).

My first project was a children's chore chart lister (program included with this article). This program is fun for the computer orphans as well as their mothers. They love to type in their names, and watch their charts emerge from the printer. The charts also motivate the children to do their chores. Then when children do more homework, their mothers have more time to play with the computer.

Since writing letters is a task I dislike, I now write one letter, then simply change the name each time I print it out. That's great fun - especially when writing to congressmen.

I have no need to memorize grocery lists, but I do like to memorize scripture, so I wrote a program to help me. Later I plan to adapt it to help my children with their homework.

The possibilities are endless, and I have plans for several projects. Like a recipe file that prints a grocery list based on my menu. And a grocery list maker that prints items in the order I come to them in the store. Or a program that answers the question: "How soon till Christmas?" in a meaningful way to preschoolers.

I have plans for a program that does my nagging for me. Just imagine my husband sitting down to the computer and reading: "Have you noticed how long the grass has grown? Don't you think you should cut it?"

And how about a finance program that not only records the check register and balances the checkbook, but also tells me (in a gentle way) that I have exceeded the budget. (I would probably have a not-so-gentle message for my husband when he exceeded his software allowance, however.)

Perhaps I could team-up with my husband to write an adventure game with some romance. Or a soap-opera spoof, "Guiding Byte".

I hope to take more classes. There is so much that can be done - and so much to learn!

The first time I ran the chore chart program for my youngest daughter, she seemed quite disappointed. "You mean I have to do all those jobs?" she wailed. "I thought you could push a button and make the computer do the work."

"It doesn't do the chores yet," I admitted, "but never fear, sweetheart, Mommy's working on it!"

### Program notes

This program requires a printer. It was written for a TRS-80 line printer IV with 132 columns. You may need to modify certain lines to run it on your printer.

The chores listed can be changed to fit your family. Just be sure that the chores in the video section correspond with the ones in the hardcopy section.

A chore list could be used for adults as well as children. Just substitute appropriate tasks.

Program numbers are multiples of 10, so AUTO may be used when typing the program. Remark statements that do not need to be typed in are on odd-ending lines. ■

### Program listing

```

10 REM * * * * *
20 REM *   CHILDREN'S CHORE CHART   *
30 REM *       BY DENISE BERG       *
40 REM * * * * *
50 CLEAR1000:CLS
60 PRINT"CHILDREN'S CHORE CHART"
70 PRINT
80 PRINT
85 REM * * * YOU MAY NEED TO MODIFY THE
  NEXT FEW LINES TO FIT YOUR PRINTER *
  * *
90 PRINT"WHAT TYPE OF PRINT DO YOU WANT
  ?"
100 INPUT"1=STANDARD  2=PROPORTIONAL
  3=CONDENSED";X
110 IF X=1 THEN LPRINTCHR$(27);CHR$(19)
120 IF X=2 THEN LPRINTCHR$(27);CHR$(17)

```

```

130 IF X=3 THEN LPRINTCHR$(27);CHR$(20)
140 PRINT
150 INPUT"WHAT IS YOUR NAME";N$
160 INPUT"DO YOU WANT (1) A DAY'S LIST
  (2) A WEEK'S LIST";L
170 IF L=2 THEN INPUT"WHAT WEEK SHOULD TH
  ESE CHORES BE DONE";W$:PRINTN$"'S CHO
  RE CHART FOR ";W$
175 REM * * * YOU MAY NEED TO MODIFY TH
  E NEXT THREE LINES TO FIT YOUR PRINTE
  R * * *
180 IF L=2 AND X<3 THEN LPRINTCHR$(27);C
  HR$(14);TAB(10)N$"'S CHORE CHART"
190 IF L=2 AND X<3 THEN LPRINTCHR$(27);C
  HR$(14);TAB(5)"FOR THE WEEK OF ";W$
200 IF L=2 AND X=3 THEN LPRINTCHR$(27);C
  HR$(14);TAB(5)N$"'S CHORE CHART FOR TH
  E WEEK OF ";W$

```



```

210 IFL=2THEN GOTO260
220 INPUT"WHAT DAY DO THESE CHORES NEED
    TO BE DONE";D$
230 CLS
240 PRINTN$"S CHORE LIST FOR ";D$
250 LPRINTCHR$(27);CHR$(14);TAB(5)N$"S
    CHORE LIST FOR ";D$
260 LPRINTCHR$(138)
265 REM * * * YOU MAY NEED TO MODIFY TH
    E NEXT TWO LINES TO FIT YOUR PRINTER
    * * *
270 IFL=2ANDX>1THENLPRINTTAB(60)"MON
    TUE           WED           THURS
    FRI           SAT"
280 IF L=2 AND X=1THENLPRINTTAB(25)"MON
    TUE           WED           THURS           FRI
    SAT"
290 LPRINTCHR$(138)
295 REM * * * THE NEXT FEW LINES SHOW T
    HE COMPLETE LIST ON THE VIDEO * * *
300 PRINT"COMPLETE CHORE LIST"
310 PRINT
320 PRINT"111. DAILY CHORES:","222. W
    EEKLY CHORES:"
330 PRINT
340 PRINT"1. FEED CAT","7. WASH DISHES"
    ,"13. EMPTY WASTEBASKETS"
350 PRINT"2. MAKE BED","8. SET TABLE","
    14. PUT AWAY LAUNDRY"
360 PRINT"3. BEDROOM","9. CLEAR TABLE",
    "15. PRACTICE PIANO"
370 PRINT"4. FAMILY ROOM","10. READ ALO
    UD","16. WEED GARDEN"
380 PRINT"5. LIVING ROOM","11. VACUUM",
    "17. CHANGE SHEETS"
390 PRINT"6. BATHROOM","12. DUST","18.
    (WRITE YOUR OWN)"
400 PRINT
410 PRINT"333. DISPLAY LIST AGAIN"
420 PRINT
430 INPUT"WHICH ONE OF THESE CHORES NEE
    D TO BE DONE (SELECT ONE NUMBER. IF
    NONE, ENTER '0')";C
435 REM * * * THE NEXT FEW LINES MAKE A
    HARDCOPY OF THE CHART OR LIST * * *
440 IF C=111THEN LPRINTTAB(10)"MY DAILY
    CHORES ARE:"GOTO610
450 IF C=222THEN LPRINTTAB(10)"MY WEEKL
    Y CHORES ARE:"GOTO610
460 IF C=333THEN GOTO300
470 IF C=18THENINPUTX$:LPRINTTAB(15)X$:
    GOTO580
480 IFC=0THEN640
490 FOR I=1 TO C
500 READ C$
510 NEXT I
520 IF X=1THENLPRINTTAB(5);C$
530 IFX>1THENLPRINTTAB(15);C$
540 RESTORE
550 DATA FEED THE CAT, MAKE MY BED, TI
    DY MY BEDROOM, TIDY THE FAMILY ROOM,
    TIDY THE LIVING ROOM, TIDY THE BATHRO
    OM
560 DATA WASH THE DISHES,SET THE TABLE,
    CLEAR THE TABLE,READ ALOUD TO MOM OR
    DAD,VACUUM THE CARPET,DUST THE FURNIT
    URE
570 DATA EMPTY THE WASTEBASKETS,PUT AWA
    Y MY LAUNDRY,PRACTICE THE PIANO,WEED
    THE GARDEN,CHANGE THE SHEETS ON MY BE
    D
575 REM * * * YOU MAY NEED TO MODIFY TH
    E NEXT THREE LINES TO FIT YOUR PRINTE
    R * * *
580 IF L=2 AND X=3THEN LPRINTSTRING$(13
    2,"-")
590 IF L=2 AND X=2THEN LPRINTSTRING$(99
    ,"-")
600 IF L=2 AND X=1THEN LPRINTSTRING$(80
    ,"-")
610 INPUT"WHAT ELSE";C
620 LPRINTCHR$(138)
630 GOTO440
635 REM * * * NOW FOR THE POSITIVE REIN
    FORCEMENT! * * *
640 PRINT"WHAT FUN THING WOULD YOU LIKE
    TO DO"
650 INPUT"AFTER YOUR CHORES ARE DONE";X
    $
660 PRINT"AFTER MY WORK IS DONE, I GET
    TO ";X$;"!"
670 LPRINTTAB(10)"AFTER MY WORK IS DONE
    , I GET TO ";X$;"!"
680 LPRINTCHR$(138)
690 LPRINTTAB(10)"I'M GOING TO DO MY CH
    ORES CHEERFULLY!"
700 FOR I=1TO5
710 LPRINTCHR$(138)
720 NEXT I
730 LPRINTSTRING$(80,"-")
740 INPUT"DO YOU WISH TO PRINT ANOTHER
    LIST (Y OR N)";B$
750 IF B$="Y"THEN10
760 CLS
770 PRINT"BYE FOR NOW!"
780 PRINT"REMEMBER TO DO YOUR CHORES CH
    EERFULLY!"
9999 END

```



Spelling Errors? Does your TRS-80\* wordprocessor need help?

# PROOF READER<sup>T.M.</sup>

**CAN SPELL rendezvous AND mnemonic AND OVER 38,000 OTHER WORDS**

Now let TRS-80 and Proofreader by Aspen Software Company check your Scripsit\*, Electric Pencil, or other documents for spelling and typographical errors. It has all the features needed to meet your proofreading requirements.

- Checks every single word of even your biggest document in under 5 minutes.
- The 38,000 word dictionary is one of the largest available.
- Dictionary can be easily extended to add more words such as technical terms or names.
- All unknown words are listed on the screen and can be saved on a file for printing.
- Works with almost any TRS-80 wordprocessor including Scripsit and Electric Pencil.
- Comes with complete and easy to understand User's Manual.

• Proof-Edit<sup>T.M.</sup>, optional interactive corrections feature for Model I/III

# GRAMMATIK<sup>T.M.</sup>

**BEYOND SPELLING CHECKING**

A spelling checker may not be enough! This paragraph contains a number of common errors (indicated by underlining) that will be discovered by Grammatik that would seldom ever be caught by a spelling checker. FOr example, Grammatik checks for improper word usage as identified by a number of writing style manuals (such as "seldom ever"). Grammatik will check for the presence of certain words such as jargon or sexist terms. it also checks for consistant punctuation, cap-

italizAtion, balanced quotation marks and parentheses, and and repeated words. In addition, it will produce a list of all unique words found in your document with the number of times each was used. Grammatik comes with a dictionary of commonly misused phrases and a dictionary of sexist terms. It also includes a complete set of utilities to build, sort, and merge phrase and jargon dictionaries of your own. Works with Scripsit, Electric Pencil, and other standard TRSDOS text files.

	Proofreader	Proof-Edit	Grammatik
MODEL I Requires 32K RAM, 1 disk drive, TRSDOS or NEWDOS..	\$54.00	\$30.00	\$49.00
MODEL II Requires 64K RAM, 1 disk drive, TRSDOS 2.0 (can check 1.2 files using XFERSYS).....	\$109.00	N/A	\$99.00
MODEL III Requires 32K RAM, 1 disk drive, TRSDOS.....	\$64.00	\$30.00	\$59.00
Manual only, specify model (refundable) .....	\$3.00	\$5.00	\$5.00

Aspen Software programs are professional quality software tools developed for the TRS-80 by a Ph.D. in Computer Science. Other tools include:

— **SOFT-SCREEN<sup>T.M.</sup>**, a powerful, state of the art full screen text editor. Over a year in development, Soft-Screen is compatible with all TRS-80 programming languages, including BASIC, FORTRAN, MACRO, Ratfor, and COBOL. Easy to use, comes with tutorial and full documentation.

— **RATFOR**, a structured language preprocessor for Fortran developed at Bell Labs. Aspen Software Ratfor provides a number of extensions, including

"case" and "string". Includes complete manual with all the information needed to learn and write Ratfor programs. Requires FORTRAN.

— **PP-RATFOR**, a pretty printer for use with Aspen Software Ratfor. Automatically formats and indents Ratfor source programs.

	Ratfor	PP-Ratfor	Both	Soft-Screen
MODEL I	\$49.00	\$30.00	\$74.00	\$69.00
MODEL II	\$99.00	\$49.00	\$139.00	\$99.00
MODEL III	\$59.00	\$34.00	\$84.00	\$75.00
Manual only(refundable)			\$12.00	\$15.00

MODEL I, III require 48K, 2 drives, TRSDOS  
MODEL II requires 64K, 1 drive, TRSDOS 2.0

Please call or write for details about our wordprocessor.

## ASPEN SOFTWARE COMPANY<sup>T.M.</sup>

Orders sent postpaid by first class mail.  
Terms: Cash, check, money order, VISA, or Master Card. NM residents add 4% tax.  
When ordering, specify model, memory size, number of drives, and operating system.



Formerly  
SOFT-TOOLS

Dealer inquiries invited

**ASPEN SOFTWARE**  
P. O. Box 339  
Dept. E  
Tijeras, NM 87059  
(505) 281-1634

\* Trademark of Tandy Corporation Proofreader, Grammatik, and Soft-Screen are trademarks of Aspen Software.



# THE PROGRAM STORE



## Crush, Crumble and Chomp!

From Epyx

It's a monster movie, and you are the monster! This 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. It's a struggle of might and strategy all the way.

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

## Empire of the Over-Mind

By N.M.A. from Avalon Hill

A fantasy adventure where you are summoned by good King Alcazar to defeat the tyrannical Over-Mind and reclaim the kingdoms of the red and blue planets.

Throughout your journey, you are guided by the epic "Rhyme of Over-Mind," with its characterizations and clues. The Over-Mind is part machine, part evil force -- a most devastating opponent, indeed. Good luck!

Tape for 40K Atari,  
48K Apple & TRS-80...\$30.00



By John Allen from Acorn

More features, thrills, and sound than even John Allen's famous PINBALL. Once you load ASTROBALL into your TRS-80, the arrow keys become flipper buttons, the screen becomes the play board, and you become the "Pinball Wizard!"

A flying saucer, spaceships, meteors, and black holes add to the fun as your ball realistically zings around the board. ASTROBALL will have all your family and friends lining up for the pinball action and challenge. Five skill levels.

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



TRS-80  
Unless  
Otherwise  
Noted



## GAUNTLET OF DEATH

From Programmer's Guild

You can almost hear the "C-L-A-N-K!" of the doors shutting behind you as you enter the gauntlet. Before you stretch graphically depicted corridors, leading to the rescue of Chief Broton's daughter and safe exit -- or to a hideous death.

Spiders, poisoned darts, and other surprises haunt the halls, along with magic potions and useful treasures. Skill and strategy will help, but luck and determination are needed to successfully run the gauntlet!

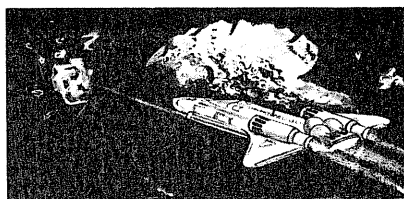
16K tape...\$19.95

## MIND THRUST

By Sackson & Wazaney from Hayden

Match wits with the computer in this deceptively simple game. Your object is to complete an unbroken chain across a 6 X 8 gameboard grid. On each turn you may either place a new "link" on your chain or remove one from the computer's chain. Sound easy? Just wait until you try it!

16K tape...\$16.95



## SPACE ROCKS

By Steven Kearns from Acorn

Gigantic antimatter rocks appear on the Tactical Display Screen of your spacecraft. You blast away with lasers and they just explode into smaller chunks for you to destroy. To add to your woes, time bombs appear periodically. If their timers reach zero -- BOOM! And if that's not enough, the aliens will be glad to send out some spaceships loaded with antimatter torpedoes. Fire thrusters to move, shoot laser cannon, jump to hyperspace -- anything to avoid the onslaught. One or two players can compete, with five levels of difficulty.

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

## ROBOT ATTACK

By Hogue & Konyu from Big Five

One of the top names in TRS-80 arcade games adds a new dimension: voice sound effects! You have to be quick to keep your head on straight in this "search and destroy" arcade game. The innovations built into ROBOT ATTACK take your TRS-80 near the limits of its capabilities. You MUST see and hear it!

16K tape...\$15.95 32K disk...\$19.95

## MANAGEMENT DECISIONS

By Robert Montgomery from Hayden

An incredibly detailed and complex simulation of business management. You are given the reins of a large business, controlling every aspect of its operation for 20 quarters (five years) or until you resign.

Many reports, charts, and graphs are available to keep you abreast of happenings both internal and external to your company. Sales, advertising, production, competition, and economic conditions all interrelate as you try to earn profits for yourself -- and your stockholders. This program is so informative that we think it should grant you credits in Business Administration!

16K tape, Model I or III...\$49.95  
32K disk, Model I only...\$54.95

## Honestly...

### BASIC COMPILERS

BASIC compilers may interest you because compiled programs may run many times faster than regular BASIC.

The ideal compiler would take any BASIC program and compile it directly to machine language. The difficulty lies in the "trick" features written into many programs, like string packing, sound effects, etc. Other problems include non-standard structures like breaking out of a FOR...NEXT loop or a subroutine. All compilers may require modifications to your BASIC program. We have found ACCEL 2 to require the least. BASIC PROGRAMMING ASSISTANT (model I, \$14.95) is useful in finding FOR...NEXT loops and modifying programs; PACKER (\$29.95) in some cases will make a program compilable.

	Allen Gelder's ACCEL 2	Simultek's ZBASIC	Microsoft's BASCOM
Minimum Hardware	16K RAM Tape or disk	16K RAM Tape or disk	32K RAM Disk only
Model III compatible	YES	NO	NO
Optimal memory utilization	YES	NO	NO
All BASIC instructions	YES	NO	YES
All variable types & floating point	YES	NO	YES
Support I/O for tape	YES	NO	NO
Unrestricted commercial use	YES	YES	NO

ZBASIC requires too many modifications to your BASIC program in almost every case. Microsoft's BASCOM is the easiest compiler to use. If you have disk drives. However, it is more expensive, doesn't support string packing, and requires more memory. We recommend ACCEL 2 because it will work with models I or III, requires a minimum amount of memory, and will work with most BASIC programs.

ZBASIC from Simultek: Tape version.....\$79.95  
ZBASIC from Simultek: Disk version.....\$89.95  
BASCOM from Microsoft: Disk only.....\$149.95  
ACCEL 2 from Allen Gelder: Tape & disk...\$88.95  
(To save ACCEL-compiled programs to tape you also need TSABE, \$9.95)

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



TO ORDER CALL TOLL FREE 800 424-2738

For information  
Call (202) 363-9797

**THE PROGRAM STORE**  
4200 Wisconsin Avenue NW, Dept. KR12 Box 9609  
Washington, D.C. 20016

MAIL ORDERS: Send check or M.O. for total purchase price, plus \$1.00 postage & handling. D.C. residents, add 6% tax. Charge card customers: include all embossed information on card.



Get the most from your micro with software and accessories from one of the world's largest selections.

The Program Store

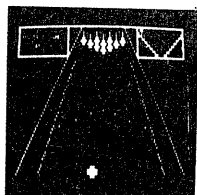
CALL TOLL FREE  
800 424-2738



## MISSILE ATTACK

By Philip Oliver from Adventure Int.  
You must use your twin silos of ABMs to fend off barrage after barrage of enemy missiles that rain down toward your cities. As your skill increases so does the difficulty and speed of this machine language arcade game. Watch the skies and may your aim be true! MISSILE ATTACK has sound and fast-moving graphics galore.

16K tape...\$14.95 32K disk...\$20.95

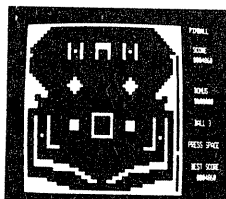


## TENPINS

By John Allen from Acorn  
TENPINS brings you all the thrills of championship bowling. Up to four players participate, and the program automatically senses the skill of each. Beginners can simply position the ball and "roll" it while more skilled players can vary the force, roll a curve, and cause it to spin as it heads for the pins. All this -- plus 3-D graphics and sound effects -- adds up to a realistic and thoroughly challenging bowling game.

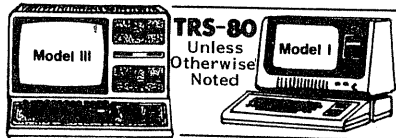
16K protected tape...\$14.95  
32K protected disk...\$20.95

## PINBALL



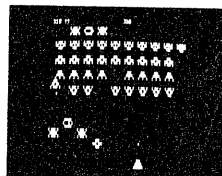
By John Allen from Acorn  
Get your flipper fingers ready for action in this real-time, machine language game. Lots of sound and flashing graphics make this fast action game so much like the real thing that you'll have to remind yourself not to shake your TRS-80. Choose from five playing speeds to match your skill. Can you beat your friends' scores? Will you avoid the infamous "Bermuda Square?" Get PINBALL today and find out.

16K protected tape...\$14.95  
32K protected disk...\$20.95



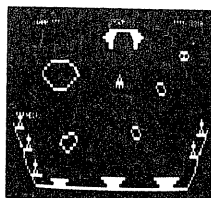
TRS-80  
Unless  
Otherwise  
Noted

## GALAXY INVASION



By Hogue & Konyu from Big-Five  
"The rage of the arcades" is now available for TRS-80! Exciting sound effects add to the action as the invaders swoop down to destroy your base. Even while you have your hands full battling the aliens, you have to watch out for the Flagship! Super graphics, super action, super fun!

16K tape...\$15.95 32K disk...\$19.95



## METEOR MISSION 2

By Hogue & Konyu from Big Five  
Six astronauts are stranded on a desolate planet. You must undock from your command module and maneuver your rescue shuttle through the asteroid field to save them. You can only save one at a time, and each landing burns away parts of your landing sites. Order this real-time action game now or live with the astronauts' pitiful screams forever.

16K tape...\$15.95 32K disk...\$19.95



From Med Systems  
A nightmare of an adventure in graphically depicted three dimensions. Corridors stretch toward infinity right on your TRS-80 screen as you search this maze for treasures. If you get the feeling you're not alone, it's because you're not! You use the arrow keys, plus two-word commands to move, manipulate objects and avoid the many pitfalls (pun intended) that await you in Labyrinth.

16K Tape (May be transferred to 32K disk)  
\$14.95

THE PROGRAM STORE  
Franchises Available

Prices Subject to Change



By W. Godwin & D. Knowlton from Acorn  
Not for everyone. One reviewer said "...don't bother with Everest Explorer." Another commented, "It holds your attention for quite a while and I have yet to get bored with it."

Most people here love it. This is a game of logistics in which you try to lead a team up Mount Everest. If your skill, the weather, and luck are right, you'll make it. But remember, you also have to get back down safely.

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

## PACKER

From Cottage Software  
Packer's five commands allow tremendous control over the readability and efficiency of your BASIC programs. Specify "PACK" and the program will compress text into multiple statement lines. This really speeds up storage, load, and execution time. It can reduce the memory requirement by as much as 33% while saving disk or tape space, too.

Also included are four handy utilities: "MOVE" lets you relocate program lines, "RENUMB" allows program renumbering, "SHORT" deletes unnecessary words and REMarks, and "UNPACK" separates multi-statement lines to ease editing.

16K, 32K & 48K tape...\$29.95



## ATERM 1.4

By Tom Stibolt from Acorn  
Allows your modem-equipped TRS-80 I/III to be used as a full duplex, ASCII terminal. Fully compatible with both the Radio Shack RS-232-C board and the Lynx Modem. Supports lowercase (if installed) and parallel lineprinters.

With ATERM 1.4, you have access to the entire 128 ASCII codes as well as several local control sequences. And as a true duplex system, you can type at the same time material is being received. Order ATERM and start communicating with the world.

16K tape (disk compatible)...\$19.95

Circle 14

THE PROGRAM STORE • Dept KR12 Box 9609 • 4200 Wisconsin Ave. NW • Washington, D.C. 20016

Item	Price	Postage \$1.00	name
		Total	addr
		<input type="checkbox"/> CHECK <input type="checkbox"/> VISA	city
		<input type="checkbox"/> MASTERCARD MC Bank #	state zip
		Card #	Exp



# Tandy topics

**Ed Juge, Director Computer Merchandising, Tandy Corp.**

**1500 One Tandy Center, Fort Worth, Texas 76102**

This column is the first of what I hope will be a continuing monthly dialog in *80-U.S. Journal* designed to improve communications between Tandy Center and you, our TRS-80 owners. I'm excited about writing it, (but it's your column too) since I'll try to answer some questions, and keep you posted on Tandy headquarters' thoughts, actions and new happenings. I'll try to make it as timely as copy deadlines allow. Mike approached me a year ago, but I was committed to writing in another publication, and my other duties simply don't permit two such efforts. I have called an end to the other commitment, and I'm very happy to be working with *80-U.S.* The atmosphere is refreshingly positive and constructive... great for helping you get the most out of your computer, and for helping us understand your needs and desires.

## **We'd like your input, too.**

The staff responsible for new TRS-80 products and support activities appreciate your suggestions and your compliments. Sure we like to see our products reviewed favorably, but we also appreciate objective criticism. Feedback from users (that's you) is our best tool for continued improvement.

When you ask us for a product, or a product change, please bear one thing in mind... our size! For all the great sales bucks it puts into our annual report, it also imposes some not-so-great limitations. It says, for example, that our products must appeal to a very large market, no matter how exciting or revolutionary they may be. It says, too, that with an installed base of machines in the six-figure numbers, we can't make product changes at the drop of a hat that could affect those folks. And those "I'll bet you could do it for only \$5.00 per unit" changes have to

make sense for the majority of our buyers... we can't ask everybody to pay for a change which will benefit a few.

And as we've said all along, we can't furnish "custom" software or hardware engineering, nor can we furnish a "fix" to a problem until we are *really* sure the problem is well understood, and the fix won't upset any other applecarts (no trademark violation intended).

## **Non-Radio Shack products.**

Specialized products and custom software is the special province of the hundreds of software and add-on hardware providers who support the TRS-80 from outside Radio Shack. Many of them are great, with dynamite products. There are a few "ripoff artists", but that is true in any field. We are often asked why we don't support the good outside vendors by recommending or selling their products. Did you know that sixty percent of our products do come from outside vendors? Our name is on them to let you know that they have met our rigorous standards, and we stand behind them. To recommend the others (and some are really great), would be to obligate ourselves to guarantee and support products we simply don't have the facilities to check out. We will not accept for repair, for example, a Model III with someone else's disk drive installed in it, so how could we possibly recommend the other vendor. We appreciate our "cottage industry" friends. They have helped make the TRS-80 a real success. Today, there is no small computer in the world as well supported with hardware and software. I hope we've been able to reciprocate a bit, since the TRS-80 has made many of their businesses possible... and profitable.

**We can't always promise answers you will like...**

**We're always open to suggestions**

on new or improved products or services, so if you have any, pass them on to me, and I will see that they are delivered to the proper person. We are responsible for keeping a lot of people happy, and the majority (tempered with practicality) must rule. You'll probably get some answers you won't like, but we will tell it like it is. Also please realize that you may not get an instant action since our staff is limited. We may look from the outside like a bunch of slow-movin' Texans... inside, I guarantee, we're pedalin' as fast as we can!

Well, enough of that "get acquainted" stuff. For this issue, I thought I'd tell you a little about the operation that builds our Number One system, the TRS-80 Model II.

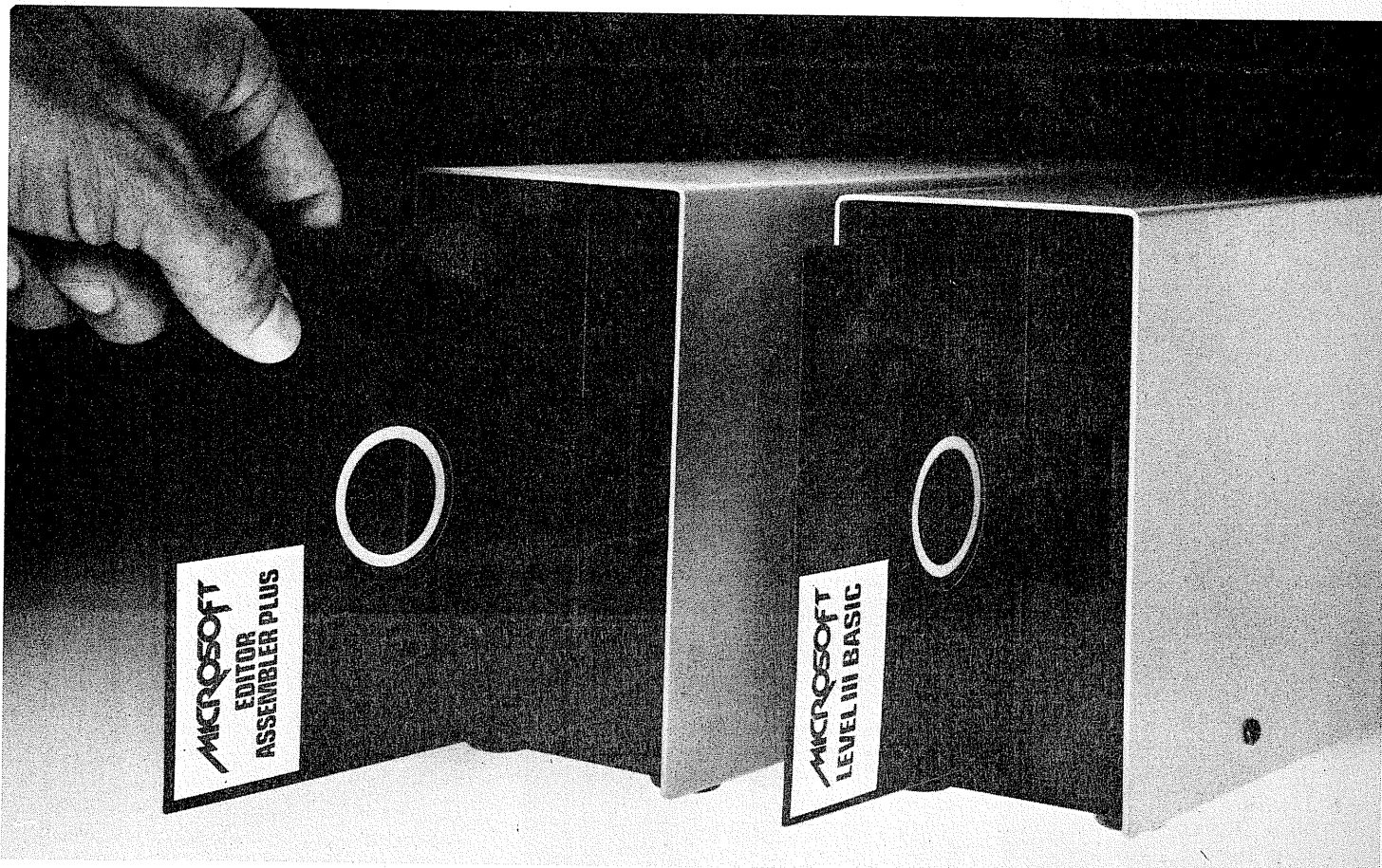
## **A look into our Model II plant.**

The Model II is built right here in Fort Worth. The boards are stuffed and thoroughly tested by our Tandy Instruments facility. They're sent from there to the main Model II plant, Tandy Business Products.

"Business Products" occupies about 114,000 square feet of space, and currently employs roughly 350 people. Since I haven't had a chance to get out there lately, I took a tour last week in preparation for this story. Trying to look at it from your perspective, I was struck by one immediate and interesting fact... the large "manufacturing area" where the production lines are, appeared to have about 60% of its total space devoted to testing. Upon receipt, major assemblies receive a 100% inspection and test. They are then sent down the production lines for assembly. At the end of the line, off rolls a Model II assembled in its bottom cabinet half.

As a long-time ham radio operator, I referred to the next station on the line as the "smoke test" area. The Production Manager





## More powerful programming tools for the TRS-80™. Now on disk.

**Better results.** Microsoft's Level III BASIC and Editor/Assembler-Plus are programming tools that help you write complex programs in less time, with less effort and utilizing less memory. Better programs. No matter what your programming skill. And for the first time these tools are available on disk.

**Editor/Assembler-Plus.** A powerful editing, assembly and debugging tool with many sophisticated features that make writing TRS-80 assembly language programs easier, faster and more efficient.

- Full disk capabilities.
- Assembly directly into memory. No need to save object code then reload for execution.
- Macro capability that allows you to define macros for commonly used sequences of instructions.
- Conditional assembly that allows you to generate more than one version of a program.
- Eight breakpoints at a time for program debugging.
- The INCLUDE statement that allows you to call additional disk files for assembly.
- Other features include extensive operators, automatic origin, symbol table printout, quash command, hex, decimal and octal constants, single step-through instructions in memory, five type-out modes, four type-in radices, plus extensive edit commands.

**A more powerful BASIC.** With Level III BASIC, you get power to perform tasks in BASIC that used to require assembly language. Plus, new ease-of-use features for your TRS-80.

- Advanced graphics. Develop charts, graphs, even animation in Level III BASIC. Draw a line, an outline box or

a solid box by specifying just two points. Then save and recall it with BASIC commands.

- MENU. One command that allows you to construct an entire menu.
- CHAIN and COMMON commands allow you to call another program and pass variables to it.
- Powerful editing commands such as COPY/TRANSFER, FIND and CHANGE.
- DUMP command that makes debugging easier.
- Time-limit response. New INPUT # LEN and LINE INPUT # LEN commands allow you to set a time limit on response.
- RS-232 output from BASIC. With a single command.
- More. Level III gives you automatic line numbering, 26 user-definable single stroke instructions, and more.

**Disk or cassette.** Disk versions of Level III and Editor/Assembler-Plus are brand new. Cassette versions are also available with many of the same capabilities.

**Talk to your Microsoft™ dealer.** Ask for a demonstration of two of the most powerful tools you can get for your TRS-80: Level III BASIC and Editor/Assembler-Plus. On disk or cassette. From Microsoft.

TRS-80 is a trademark of Radio Shack, a division of Tandy Corporation.  
Microsoft is a trademark of Microsoft, Inc.  
Microsoft Consumer Products is a division of Microsoft, Inc.

# MICROSOFT

CONSUMER PRODUCTS

400 108th Ave. N.E., Bellevue, WA 98004. (206) 454-1315

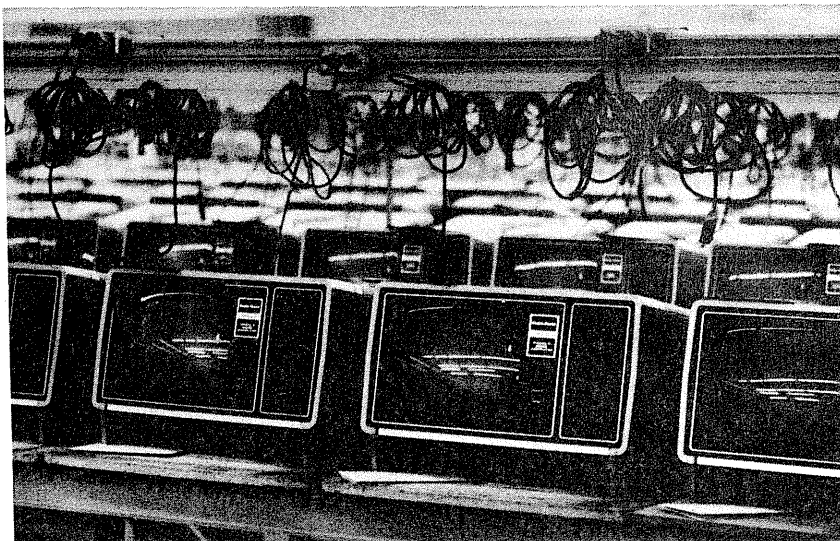




**Lisa Lindquist on  
the Model II  
assembly line  
bolts it all  
together.**



**First power-up test  
being performed  
here by Anita  
Rebman.**



**Model II computers  
patiently sitting  
through their final  
24-hour burn in.**

**Photos courtesy the Tandy Corp.**



(and our tour guide) assures me that my definition very rarely fits! Once in a great while, a renegade capacitor or power supply... oh, well! As an old electronics "homebrewer", I still admit to being just a little awed at seeing a complex product like a computer plugged in for the very first time - come up working 100%!

### Testing and more testing.

The first test lasts only a few minutes, but from there every Model II, still only partially dressed, goes into a "hotbox" for 24-hour burn-in at between 110 and 115 degrees. Most of the "infant mortality" of component parts is caught during this period. Following burn-in, the computer, still hot, is run through a very thorough test of all functions... virtually everything it knows how to do.

Next comes alignment of the video circuit, and final tightening of all the mechanical elements to specified torques. The top section of the case is assembled, and the finished product is passed into the Quality Control testing area.

Again, every computer undergoes a 15 minute functional test, followed by another 24 hour automatic test... this time in full dress, as you will receive it. But, that's not all, our Quality Assurance department sample-tests functionality, and does a 100% visual inspection for cosmetic defects.

Of course all Model II's go from Business Products to our Tandy Electronics Warehouse, which is our only exclusively-computer warehouse. And, as you may have guessed, they get a 100% incoming quality assurance inspection at the warehouse.

### We're working to make it better.

Sounds like we're covering about all the bases, doesn't it? Well, we're covering even more than you might think. Of course you would expect us to be watching all the time for problem areas which might crop up in reports from our service center folks. But we're also working all the time to see how we can improve testing, packing, shipping and more. The Business Products folks are very serious about their "Zero Defects" program. Just recently, for example, they began sample testing of about 40 units (new ones come and go daily), for increased testing time of 96 hours. Objective... to see if an increase in current burn-in time would catch any significant

increase in infant mortality. All the results aren't in yet, but if more burn-in time will help get you a better, more reliable product, we'll do it!

Quite recently, there were another 97 Model II's that spent about eighteen hours riding the worst roads our quality assurance group could find, in the back of a Tandy Transportation truck, at about 100 degrees. They had been tested prior to the trip, and were checked again at the end to see how they would hold up under the worst possible shipping conditions we could conjure up. The resulting data will help us determine whether we need changes in construction, mechanical design, or packing.

Do we still have equipment getting to the field which will fail? Sure we do, but a lot less than we had six months ago, and more than we'll have a few months from now. If you add up the number of hours of testing in our recently extended burn-in, and the number of failures, we experienced approximately one failure per two-thousand operating hours! That's one failure in just about one year of 40-hour weeks... not a bad infant mortality rate. We're highly encouraged, but not satisfied.

Well, I hope you're not asking "So what..." Well, I hope it will make you feel like giving your Model II a little extra pat on the head next time you walk by, knowing that your money was well spent. And I thought you would like to have a little insight into what goes on down here in Texas.

### New 1982 Computer Catalog.

On the off chance you might not have seen it yet, our 1982 Computer Catalog is available. It's a big 48 pages this time. Some of the rumor mongers with their "inside information sources" will note, please, that there is no Model IV or V which I believe I started hearing were imminent just about a year ago this month. What it does contain is a lot of exciting new items, including the long-rumored Hard Disk system and short-rumored color computer disk system (which lets you own the lowest-cost color computer disk system available). There is one unfortunate error in pricing in the Color Computer section... the 32K Color Computer price is \$699.00, not \$749.00 as listed.

There is a super new program-mable originate/answer, auto-dial,

autoanswer direct connect modem which is scheduled for availability this month, priced at only \$249.00. We have a new graphics / DP / WP-capable printer with dot-addressable graphics, and a high-density proportionally spaced character set. It takes 9½ inch pinned, roll or single sheet paper, and contains both parallel and serial interfaces... at only \$799. Of course for less demanding users, our other dot-addressable graphics printer, the Line Printer VII is still one of the lowest-cost impact printers you can buy. By the way... very important fact about the VII is that it uses standard 9½ inch wide fanfold paper you can buy anywhere. There is a "lookalike" printer on the market which uses a very unusual 9-inch fanfold, available only from Japan as far as we can determine.

We have a really exciting 6-pen intelligent plotter in the new catalog, for 6-color graphics on 8½ x 11 inch paper or acetate foils for overhead projectors.

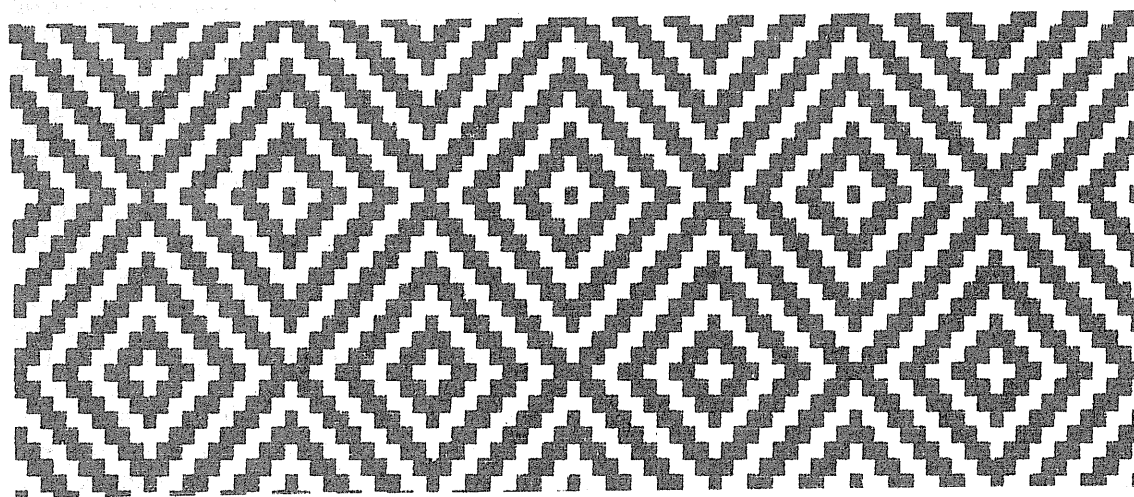
For our Daisy Wheel II owners, there is a really great acoustic cover, which renders the printer as close to silent as you will ever get. It's really effective. For Daisy Wheel II owners, there is also a new automatic sheet feeder, which will feed stacks of letterhead through your printer for unattended continuous printing. Of course, it is quickly and easily removable for other modes of printing.

There is lots of new software, including about 23 color computer packages... a really impressive array that's growing monthly. We have software now for Model II to allow it to transfer files between TRSDOS and IBM 3741 single-density disks, and Bisync communications packages for 3270 and 3780 formats. Correct me if I'm wrong, but I think Model II may be the only 8-bit microcomputer currently capable of bisynchronous communications - but then, if you already have a copy of this new catalog, this won't interest you, and if you don't, I'll let you find out for yourself. Drop by your nearest Radio Shack outlet and ask for your free copy of Catalog RSC-6.

There are a lot of very exciting goings on I wish I could tell you about, but it's not quite time yet. So stay tuned from month to month, and we'll have some fun, while trying to help you get the most out of your TRS-80 investment through more and better communications. ■



### For Model I with disk and line printer V or VI



TOTAL ENDS	=	88
HARNESS 1	=	20
HARNESS 2	=	24
HARNESS 3	=	24
HARNESS 4	=	20

**The program produces this chart and the treadle tie-up shown on the opposite page.**

4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1

	4	4		4	4	4
3	3	3	3	3	3	3
2	2	2	2	2	2	2
1	1	1	1	1	1	1



## Treadle Tie-up

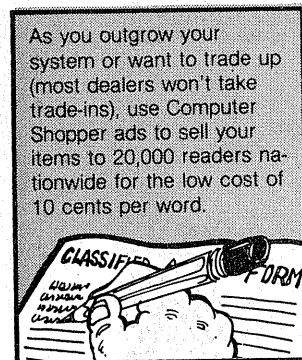
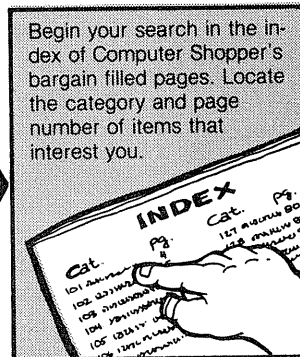
	0	0			0
0				0	0
	0		0	0	
0		0	0		

					1
				1	
			1		
		1			
					1
				1	
			1		
		1			
					1
				1	
			1		
		1			
					1
			1		
					1
		1			
					1
			1		
					1
		1			
					1
			1		
					1
		1			
					1
			1		
					1
		1			
					1
			1		
					1
		1			
					1
			1		
					1
		1			
					1
			1		
					1
		1			
					1
			1		
					1
		1			
					1
			1		
					1
		1			
					1
			1		
					1
		1			
					1
			1		
					1
		1			
					1
			1		
					1
		1			
					1
			1		
					1
		1			
					1
			1		
					1
		1			
					1
			1		
					1
		1			
					1
			1		
					1
		1			
					1
			1		
					1
		1			
					1
			1		
					1
		1			
					1
			1		
					1
		1			
					1
			1		
					1
		1			
					1
			1		
					1
		1			
					1
			1		
					1
		1			
					1
			1		
					1
		1			
					1
			1		
					1
		1			
					1
			1		
					1
		1			
					1
			1		
					1
		1			
					1
			1		
					1
		1			
					1
			1		
					1
		1			
					1
			1		
					1
		1			
					1
			1		
					1
		1			
					1
			1		
					1
		1			
					1
			1		
					1
		1			
					1
			1		
					1
		1			
					1
			1		
					1
		1			
					1
			1		
					1
		1			
					1
			1		
					1
		1			
					1
			1		
					1
		1			
					1
			1		
					1
		1			
					1
			1		
					1
		1			
					1
			1		
					1
		1			
					1
			1		
					1
		1			
					1
			1		
					1
		1			
					1
			1		
					1
		1			
					1
			1		
					1
		1			
					1
			1		
					1
		1			
					1
			1		
					1
		1			
					1
			1		
					1
		1			
					1
			1		
					1
		1			
					1
			1		
					1
		1			
					1
			1		
					1
		1			
					1
			1		
					1
		1			
					1
			1		
					1
		1			
					1
			1		
					1
		1			
					1
			1		
					1
		1			
					1
			1		
					1
		1			
					1
			1		
					1
		1			
					1
			1		
					1
		1			
					1
			1		
					1
		1			
					1
			1		
					1
		1			
					1
			1		
					1
		1			
					1
			1		
					1
		1			
					1
			1		
					1
		1			
					1
			1		
					1
		1			
					1
			1		
					1
		1			
					1
			1		
					1
		1			
					1
			1		
					1
		1			
					1
			1		
					1
		1			
					1
			1		
					1
		1			
					1
			1		
					1
		1			
					1
			1		
					1
		1			
					1
			1		
					1
		1			
					1
			1		
					1
		1			
					1
			1		
					1
		1			
					1
			1		
					1
		1			
					1
			1		
					1
		1			
					1
			1		
					1
		1			
					1
			1		
					1
		1			
					1
			1		
					1
		1			
					1
			1		
					1
		1			
					1
			1		
					1
		1			
					1
			1		
					1
		1			
					1
			1		
					1
		1			
					1
			1		
					1
		1			
					1
			1		
					1
		1			
					1
			1		
					1
		1			
					1
			1		
					1
		1			
					1
			1		
					1
		1			
					1
			1		
					1
		1			
					1
			1		
					1
		1			
					1
			1		
					1
		1			
					1
			1		
					1
		1			
					1
			1		
					1
		1			
					1
			1		
					1
		1			
					1
			1		
					1
		1			
					1
			1		



# How to Buy or Sell Computer Equipment and Software

## and come out a winner



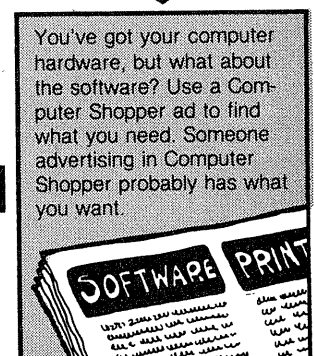
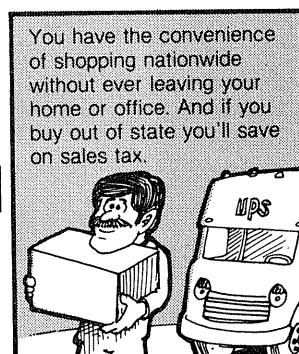
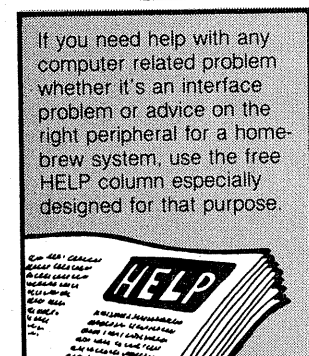
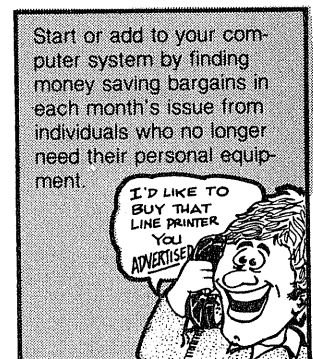
Congratulations, you're a winner whether you buy, sell or trade in the computer marketplace by subscribing and using Computer Shopper's action yellow pages. And for your first bargain, take advantage of a **FREE** issue of Computer Shopper as a "Special Get Acquainted Offer."

Act today and receive your first issue free in addition to the \$10, one year/12 issue regular subscription. Of course, if you are not 100% satisfied, you may cancel and still keep the free issue just for trying Computer Shopper.

**BONUS:** New subscribers are entitled to a complimentary classified ad. Use it for pre-owned equipment or software or as a want-to-buy ad. Just print or type your ad on a plain piece of paper and send it along with your subscription. Your phone will probably start ringing before you receive your first issue.

For MasterCard and VISA Subscriptions only,  
CALL TOLL FREE 1-800-327-9920

In order to keep ad rates this low, we are not staffed to take ads by telephone.



**COMPUTER SHOPPER**  
P.O. Box F36 • Titusville, FL 32780  
Telephone 305-269-3211



# ANNOUNCING A REVOLUTION IN THE COST OF PROFESSIONAL SOFTWARE



VISACCOUNT is a fully integrated business and accounting system designed for use in small businesses. VisAccount is extremely comprehensive and professional, yet it is very easy to use. The system is controlled from a series of interconnected menus permitting user-friendly operation. Everything you need to set-up and operate the system is provided with the VisAccount package.

ALL SYSTEMS is able to provide you VisAccount at this incredible low price because it runs on so many different machines. Through volume sales we are able to substantially reduce our prices.

**OUR GUARANTEE** — Buy both our software and that of our competitors (who will no doubt charge several times our price because they need to recapture their development cost). Compare the two systems and we know you'll return theirs (make sure they'll let you return their software). If you decide not to keep our system, then return it within 45 days for a full refund. Once you've used our system we're confident you'll be delighted.

†Microcomputers for Business, Applications, 1979.

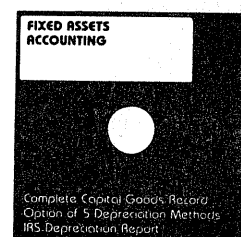
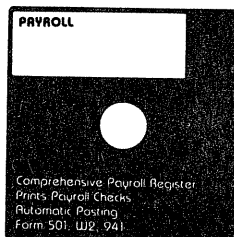
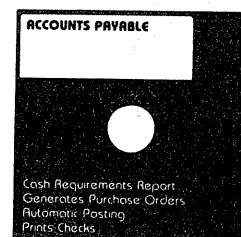
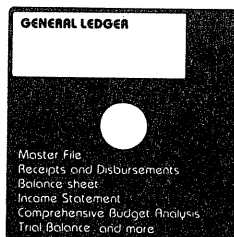
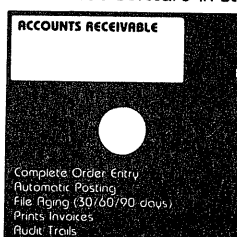
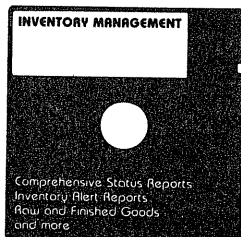
## VISACCOUNT™

### What You Receive

- Nine 5¼" double density disks (or six 8" single density disks)
- Easy-to-use operator's manual (over 200 pages)
- Self-study guide on bookkeeping and accounting (over 180 pages)
- Cassette based instruction program on set-up and operation

Available for Apple\*, TRS-80 I, II & III, Osborne, Heath/Zenith, North Star, Vector, and most other CP/M computers.

\*The Apple version requires the Microsoft Z80 softcard. CSCA has CBASIC2, CP/M and Microsoft Z80 softcard in stock.



Send \$159 for the VISACCOUNT system

**FREE: MAILING LIST PROGRAM**  
Requirements: 48K CBASIC 2  
2 DISK DRIVES CP/M



**ALL SYSTEMS** a division of Computer Services Corporation of America  
332 East 30th Street New York, New York 10016  
Order Toll Free 1-800-221-2486  
For New York and Technical Number 1-212-685-0090

### ALSO

WORD STAR	\$290
SUPERCALC	\$249
DATA BASE SYSTEM	\$190
CP/M for TRS80 MODEL II	\$99
TERMINAL PROGRAM for MODEL II CP/M	\$39

Name \_\_\_\_\_

Address \_\_\_\_\_

City/State/Zip \_\_\_\_\_

☐ Master Charge ☐ Visa ☐ American Express

No. \_\_\_\_\_ Expires \_\_\_\_\_

Your System \_\_\_\_\_

Disk Size ☐ 5¼" ☐ 8"



**Full circle: Loom to computer to loom.**

It is interesting to note that the loom was probably one of the first machines to be programmed. Early sketches by Leonardo da Vinci give evidence that men were constantly working on the problem. Some of his drawings show attempts to carry the shuttle through the shed by mechanical arms working from either side of the loom.

Around 1800, Joseph Marie Jacquard invented a machine for manufacturing fishnets. This secured for him a post at the Conservatory of Arts and Crafts in Paris. He later caused a sensation at the Paris Industrial Exhibition by demonstrating an improved drawloom, and later (in 1805) he introduced the invention which ties his name to the loom - the Jacquard loom.

Using the technology from his fishnet machine, he invented a loom which could be programmed with a perforated card (punch card). By adding several Jacquard attachments to one loom, intricate patterns could be produced. There is even evidence that fine pictures were woven with this method.

In the 1890 census, Herman Hollerith, an employee of the Census Bureau, used the punched card again. This time it was used to help tabulate the 1890 census. The job would have taken till the next census in 1900 had it not been for his invention. The 1890 census count was 63 million, and took about a month to tabulate. His first punch cards had round holes, but he later changed them to oblong so that more could occupy the same space on the card.

Hollerith called his machine the Electric Accounting Machine (EAM) and in 1896 he started a company called the Tabulating Machine Company. Sometime later he merged this company with another which made time clocks, and it was called the Computer-Tabulating-Recording Company. In 1924 this company became International Business Machines (IBM).

You cannot say "punched card" without thinking "IBM card". It has invaded our entire society; even government checks are thinly disguised punched cards. The idea of the punched card has a simple elegance, it has been around so long simply because it works.

We have now come full circle. The card, in many ways, begat the computer. Now the computer (see accompanying article) is being used to define the card. A classic case of pulling oneself up by the bootstraps!

or more of the harnesses can be raised simultaneously by pressing on the treadle. This raises some of the warp strings, creating a shed, or a space, for the horizontal weft thread to pass through and interweave with the warp, thus creating the fabric. You are first given the option of selecting the standard six-treadle tie-up. The numbers of the harnesses will appear on the video with a six-treadle framework. If you have something else in mind, enter the numbers of the harnesses (1 to 4) to be tied to treadle one. Press (ENTER) to advance to treadle two, etc. Press the backspace to go back to an earlier treadle. To change a harness that is already entered, press the number again and it will be erased. Pressing (ENTER) at treadle six will return you to the main menu.

The third step is sequencing the treading (Option 3.). The design is created by the order in which the treadles are pressed, which in turn control which harnesses are raised, which in turn control which individual warp strings are raised. Just press the number of the treadle. Both the treadle number (1 to 6) and the total number of treadlings entered will be displayed. The treading can be (R)epeated automatically from the beginning or from a pre-(S)et point. Pressing (E) gives the option to review and/or edit the treadle sequence entered thus far. In the review and edit section, pressing (ENTER) will advance the video page of treadlings, and return to the input section when finished. Pressing (E) will result in prompts for the treading number and value to edit.

Each of these steps can be printed on the printer. This program assumes a Radio Shack Line Printer VI, and makes heavy use of the printer's graphics capabilities. For a printer without graphics, the output can be simplified by eliminating the bar graphics, and a non-graphics character can be used to generate the fabric design.

The harness threading (Option 4. Print the Harness Threading) will ask for a number of warp ends per unit. This simply prints a line through the chart after so many warps to make it easier to read. If a name for the pattern has been entered (Option 8.), this will be printed, along with the total number of warp strings and the number of warps going through each separate harness, including un-harnessed warps, if any. Then the threading is charted out, much as in any weaving book. As many complete units of the charting as will fit in 80 columns will be printed across the page. If the charting is too long to fit in 80 columns, the remainder will be continued on succeeding lines.

The treadle tie-up (Option 5.) is printed according to standard weaving format, a line of graphics blocks is printed at the end for emphasis, and the treading sequence (Option 6.) follows underneath. If, for example, treadle six were



pressed three times, then treadle five were pressed twice, a three would be printed in row one, column six, and a two would be printed in row two, column five.

Finally, you might want to print the pattern itself (Option 7.). This section initializes by asking for paper size, character size, and black or white warp. The option to select the color of warp allows the weaver to reverse the design and see the underside of the design. This accommodates for differences between counter-balance and jack looms. The program examines which warp strings will be raised or lowered as each treadle is pressed to pass the weft through the shed. Either a graphics block or a blank will be printed accordingly, showing the design in much the same way as in many weaving book examples. If the number of warp strings exceeds the number of printer columns available based on the paper size and character size, the full design will be printed to the maximum number of columns. A few blank lines will be printed, and the rest of the design will be continued.

The program saves hours of pencil and paper drafting time. We get type-set style documentation instead of pages of hand-drawn figures on graph paper. We can also experiment with different threadings, tie-ups, and treadlings to see what the resulting pattern will be.

This program is written for a four-harness loom. Changing the program for a larger loom will mean reformatting the video output, redimensioning the H(500) and TR(6,4) arrays, and basically adding more of the same to the printer routines. The H(500) and PA(500) arrays allow for 500 warp strings and 500 treadlings, respectively.

**A note to weavers:** As in any design drawdown, an alternating tabby weave to provide strength should not be entered when printing out the fabric design.

### Program peculiarities

If the repeat function is (S)et in the harness threading section and the user erases the warp string (i.e., the asterisk), a fatal error will occur if the (R)epet is called without first re-(S)etting.

When identifying the treadling number and entering a new value in the review and edit section of the treadling sequence, the numbers entered from the keyboard are entered into strings via INKEY\$, but will not appear on the video until you press (ENTER).

Returning to the treadling sequence section from the main menu after treadling data has been entered will erase anything already entered. Information is not erased by returning from the main menu in any other section.

The printer routine for the treadling sequence cannot handle more than nine treadles repeated in succession. More will mess up the spacing for the chart grid. ■

```

10 CLEAR 5000 : DEFINT A - Z : DIM H(500), TR(6, 4), PA(500)
20 LPRINT CHR$(27); CHR$(15) : LPRINT C
  HR$(27); CHR$(28) : CLS : COUNT = 1 :
  TR = 1 : P$ = "" : BL$ = CHR$(170) :
  BR$ = CHR$(149) : TF = 0 : RF = 0 :
  FOR X = 1 TO 6 : FOR Y = 1 TO 4 : TR(
    X, Y) = 0 : NEXT Y, X : GOTO 470
30 ' HARNESS THREADING SEQUENCE
40 PRINT "<S> = SET, <R> = REPEAT, <V
  > = REVERSE, <ENTER> = EXIT"; : DIS
  = 131 : AT = 128 : HS = 1 : CH = 191
  : HF = 0 : SF = 0 : GOSUB 510 : IF CO
    UNT = 1 THEN 70
50 FOR X = 1 TO COUNT - 1 : I = H(X) :
  IF I = 5 THEN CH = 32
60 GOSUB 580 : NEXT
70 I$ = INKEY$ : IF I$ = "" THEN 70 EL
  E IF I$ = "V" THEN 150 ELSE IF I$ = "
  S" THEN 120 ELSE IF I$ = "R" THEN 130
  ELSE IF I$ = CHR$(8) THEN 530 ELSE I
  F I$ = CHR$(13) THEN 470 ELSE IF (I$
  < "0") OR (I$ > "4") THEN 70
80 IF HF = 1 THEN HF = 0 : HS = COUNT
90 I = VAL(I$) : IF I = 0 THEN I = 5 :
  CH = 32
100 H(COUNT) = I : COUNT = COUNT + 1 :
  IF SF = 1 THEN SF = 0 : CH = 42
110 GOSUB 580 : GOTO 70
120 HS = COUNT : HF = 0 : SF = 1 : GOTO
  70
130 HR = COUNT - 1 : FOR X = HS TO HR :
  H(COUNT + X - HS) = H(X) : I = H(X)
  : IF I = 5 THEN CH = 32
140 GOSUB 580 : NEXT : COUNT = COUNT +
  HR - HS + 1 : HS = HR + 1 : HF = 1 :
  GOTO 70
150 HS = 1 : HR = COUNT - 2 : FOR X = C
  OUNT TO HR + HR + 1 : H(X) = H(HR - (X
  - COUNT)) : I = H(X) : IF I = 5 THEN
  CH = 32
160 GOSUB 580 : NEXT : COUNT = COUNT +
  HR : HR = COUNT - 1 : GOTO 70
170 ' TREADLE TIE-UP SEQUENCE
180 PRINT "<ENTER> = ADVANCE TREADLE &
  EXIT, <; CHR$(93); > = DECREMENT T
  READLE" : GOSUB 440 : TD = 453 : X =
  1 : IF TF = 0 THEN 210
190 FOR Y = 1 TO 6 : FOR Z = 1 TO 4 : I
  F TR(Y, Z) = 1 THEN U2 = TD + (4 - Z)
  * 64 : PRINT@ U2 - 1, Z;
200 NEXT Z : TD = TD + 2 : NEXT Y : TD
  = 453 : IF TF = 1 THEN 230
210 PRINT@ 128, "STANDARD TREADLE TIE-U
  P (Y/N)"; : INPUT I$ : PRINT@ 128, CH
  R$(30); : IF I$ = "N" THEN 230

```



```

220 TR(1, 1) = 1 : TR(1, 3) = 1 : TR(2,
    2) = 1 : TR(2, 4) = 1 : TR(3, 1) = 1
    : TR(3, 4) = 1 : TR(4, 1) = 1 : TR(4
    , 2) = 1 : TR(5, 2) = 1 : TR(5, 3) =
    1 : TR(6, 3) = 1 : TR(6, 4) = 1 : TF
    = 1 : X = 6 : GOTO 190
230 PRINT@ 128, "TREADLE #";
240 PRINT@ 136, X;
250 I$ = INKEY$ : IF I$ = "" THEN 250 E
    LSE IF I$ = CHR$(8) THEN 290 ELSE IF
    I$ = CHR$(13) THEN 280 ELSE IF I$ < "
    1" OR I$ > "4" THEN 250
260 I = VAL(I$) : IF TR(X, I) = 0 THEN
    TR(X, I) = 1 ELSE TR(X, I) = 0 : I$ =
    " "
270 U2 = TD + (4 - I) * 64 : PRINT@ U2,
    I$; : GOTO 250
280 X = X + 1 : TD = TD + 2 : IF X > 6
    THEN TF = 1 : GOTO 470 : ELSE 240
290 X = X - 1 : TD = TD - 2 : IF X < 1
    THEN X = 1 : TD = 453
300 GOTO 240
310 ' TREADLING PATTERN
320 PRINT "PRESS <E> TO REVIEW AND/OR E
    DIT TREADLING" : PRINT "PRESS <ENTER>
    TO EXIT TO MENU." : PRINT : PRINT "P
    RESS <S> TO MARK BEGINNING OF NEW REP
    EAT PATTERN."
330 PRINT "PRESS <R> TO REPEAT THE PATT
    ERN FROM THE BEGINNING, FROM" : PRINT
    TAB(10)"THE LAST 'REPEAT', OR FROM T
    HE LAST 'SET'," : PRINT TAB(10)"WHICH
    EVER IS MOST RECENT." : RETURN
340 TR = 1 : ZR = 1 : GOSUB 320
350 PRINT@ 640, "INPUT #" : PRINT "TREA
    DLE #"
360 I$ = INKEY$ : IF I$ = "" THEN 360 E
    LSE IF I$ = "E" THEN 390 ELSE IF I$ =
    CHR$(13) THEN 410 ELSE IF I$ = "S" T
    HEN 420 ELSE IF I$ = "R" THEN 400 EL
    SE IF (I$ < "1" OR I$ > "6") THEN 360

370 IF RF = 1 THEN RF = 0 : ZR = TR
380 I = VAL(I$) : PA(TR) = I : PRINT@ 6
    49, TR; : PRINT@ 713, I; : TR = TR +
    1 : GOTO 360
390 T2 = TR - 1 : PRINT : PRINT : INPUT
    "DO YOU WANT TO REVIEW OR EDIT THE T
    READLING (Y/N)"; I$ : PRINT@ 768, CHR
    $(30) : IF LEFT$(I$, 1) = "Y" THEN 11
    40 ELSE 360
400 T2 = TR - 1 : FOR X = ZR TO T2 : PA
    (TR + X - ZR) = PA(X) : NEXT : TR = T
    R + T2 - ZR + 1 : ZR = T2 + 1 : RF =
    1 : PRINT@ 649, TR - 1; : GOTO 360

410 T2 = TR - 1 : RF = 0 : GOTO 470
420 ZR = TR : RF = 0 : GOTO 360
430 ' DISPLAY BORDER FOR VIDEO TREADLE
    TIE-UP SEQUENCE
440 PRINT@ 325, "1 2 3 4 5 6" : PRINT@
    386, STRING$(15, 140) : PRINT "4" : P
    RINT "3" : PRINT "2" : PRINT "1"
450 FOR Y = 20 TO 33 : SET(4, Y) : SET(
    6, Y) : NEXT : RETURN
460 ' MENU
470 CLS : PRINT " 1. THREAD THE HARNESS
    ES." : PRINT " 2. TIE UP THE TREADLES
    ." : PRINT " 3. SEQUENCE THE TREADLIN
    G." : PRINT : PRINT " 4. PRINT THE HA
    RNESS THREADING."
480 PRINT " 5. PRINT THE TIE-UP." : PRI
    NT " 6. PRINT THE TREADLING SEQUENCE.
    " : PRINT " 7. PRINT THE PATTERN." :
    PRINT : PRINT " 8. ENTER PATTERN TITL
    E" : PRINT : PRINT " 9. CLEAR MEMORY
    & START OVER." : PRINT "10. END."
490 PRINT : LINEINPUT "...:"; I$ : CLS
    : ON VAL(I$) GOTO 40, 180, 340, 630,
    950, 1060, 1260, 1390, 20, 1370 : GOT
    O 490
500 ' DISPLAY BORDER FOR VIDEO HARNESS
    THREADING SEQUENCE
510 PRINT@ AT, "4"; BL$; TAB(61)BR$; "4
    " : PRINT "3"; BL$; TAB(61)BR$; "3" :
    PRINT "2"; BL$; TAB(61)BR$; "2" : PR
    INT "1"; BL$; TAB(61)BR$; "1"; : RETU
    RN
520 ' ERASE HARNESS THREADING INPUT
530 COUNT = COUNT - 1 : IF COUNT = 0 TH
    EN COUNT = 1 ELSE H(COUNT) = 0
540 IF DIS = 451 OR DIS = 771 THEN PRIN
    T@ DIS - 4, CHR$(31); : DIS = DIS - 2
    64 : AT = AT - 320
550 DIS = DIS - 1 : IF DIS < 131 THEN D
    IS = 131
560 D2 = 0 : FOR X = 1 TO 4 : PRINT@ DI
    S + D2, " "; : D2 = D2 + 64 : NEXT :
    GOTO 70
570 ' DISPLAY HARNESS THREADING INPUT O
    N VIDEO
580 D2 = DIS + (4 - I) * 64 : PRINT@ D2,
    CHR$(CH); : DIS = DIS + 1 : CH = 191

590 IF DIS = 187 OR DIS = 507 OR DIS =
    827 THEN DIS = DIS + 264 : AT = AT +
    320 : IF AT > 768 THEN 600 ELSE GOSUB
    510 : GOTO 610 : ELSE 610
600 LINEINPUT I$ : AT = 128 : DIS = 131
    : PRINT@ 64, CHR$(31); : GOSUB 510
610 RETURN

```



```

620 ' SHOW HARNESS THREADING SEQUENCE 0
    N PRINTER
630 IF CO = 1 THEN 470 ELSE START = 1 :
    INPUT "ENTER NUMBER OF ENDS PER UNIT
    "; INCH : MAX = INT(79/(IN + 1)) : LP
    RINT CHR$(27); "6" : LPRINT CHR$(138)
    : HO = 0 : H1 = 0 : H2 = 0 : H3 = 0
    : H4 = 0
640 FOR X = START TO COUNT - 1 : IF H(X)
    ) = 0 THEN HO = HO + 1 ELSE IF H(X) =
    1 THEN H1 = H1 + 1 ELSE IF H(X) = 2
    THEN H2 = H2 + 1 ELSE IF H(X) = 3 THE
    N H3 = H3 + 1 ELSE IF H(X) = 4 THEN H
    4 = H4 + 1
650 NEXT
660 IF P$ <> "" THEN LPRINT TAB((79 - L
    EN(P$))/2)P$ : LPRINT CHR$(138)
670 LPRINT "HARNESS THREADING SEQUENCE
    AT"INCH"ENDS PER UNIT:" : LPRINT "TOT
    AL ENDS = " : LPRINT USING "###"; CO
    - 1 : LPRINT "HARNESS 1 = " : LPRI
    NT USING "###"; H1 : LPRINT "HARNESS
    2 = " : LPRINT USING "###"; H2
680 LPRINT "HARNESS 3 = " : LPRINT US
    ING "###"; H3 : LPRINT "HARNESS 4 =
    " : LPRINT USING "###"; H4 : IF HO >
    0 LPRINT "FREE ENDS = " : LPRINT U
    SING "###"; HO
690 LPRINT CHR$(27); CHR$(28) : LPRINT
    CHR$(138)
700 LPRINT CHR$(240); : MC = 0 : FOR X
    = START TO COUNT - 1 : LPRINT CHR$(24
    1); : IF X <> COUNT - 1 AND (INT(X/IN
    ) = X/IN) THEN MC = MC + 1 : IF MC <
    MAX THEN LPRINT CHR$(243); ELSE SX =
    X + 1 : SC = CO : CO = X + 1 : X = SC
    + 1
710 NEXT : IF X >= COUNT - 1 THEN LPRIN
    T CHR$(242)
720 LPRINT CHR$(245); : FOR X = START T
    O COUNT - 1 : IF H(X) = 4 THEN LPRINT
    "4"; ELSE IF H(X) = 5 THEN LPRINT "
    0"; ELSE LPRINT CHR$(32);
730 IF X <> COUNT - 1 AND INT(X/IN) = X
    /IN LPRINT CHR$(245);
740 NEXT
750 LPRINT CHR$(245) : LPRINT CHR$(244)
    ; : FOR X = START TO COUNT - 1 : LPRI
    NT CHR$(241); : IF X <> COUNT - 1 AN
    D INT(X/IN) = X/IN LPRINT CHR$(250);
760 NEXT : LPRINT CHR$(249)
770 LPRINT CHR$(245); : FOR X = START T
    O COUNT - 1 : IF H(X) = 3 THEN LPRINT

```

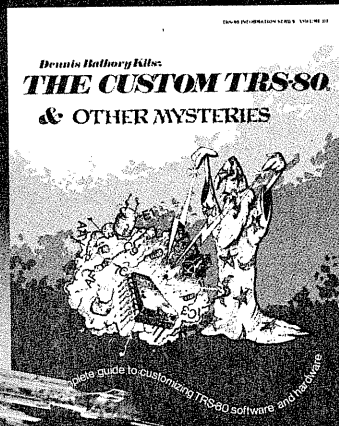
```

    "3"; ELSE IF H(X) = 5 THEN LPRINT "0
    "; ELSE LPRINT CHR$(32);
780 IF X <> COUNT - 1 AND INT(X/IN) = X
    /IN LPRINT CHR$(245);
790 NEXT
800 LPRINT CHR$(245) : LPRINT CHR$(244)
    ; : FOR X = START TO COUNT - 1 : LPRI
    NT CHR$(241); : IF X <> CO - 1 AND IN
    T(X/IN) = X/IN LPRINT CHR$(250);
810 NEXT : LPRINT CHR$(249)
820 LPRINT CHR$(245); : FOR X = START T
    O COUNT - 1 : IF H(X) = 2 THEN LPRINT
    "2"; ELSE IF H(X) = 5 THEN LPRINT "0
    "; ELSE LPRINT CHR$(32);
830 IF X <> COUNT - 1 AND INT(X/IN) = X
    /IN LPRINT CHR$(245);
840 NEXT
850 LPRINT CHR$(245) : LPRINT CHR$(244)
    ; : FOR X = START TO COUNT - 1 : LPRI
    NT CHR$(241); : IF X <> COUNT - 1 AND
    INT(X/IN) = X/IN LPRINT CHR$(250);
860 NEXT : LPRINT CHR$(249)
870 LPRINT CHR$(245); : FOR X = START T
    O COUNT - 1 : IF H(X) = 1 THEN LPRINT
    "1"; ELSE IF H(X) = 5 THEN LPRINT "0
    "; ELSE LPRINT CHR$(32);
880 IF X <> COUNT - 1 AND INT(X/IN) = X
    /IN LPRINT CHR$(245);
890 NEXT : LPRINT CHR$(245)
900 LPRINT CHR$(246); : FOR X = START T
    O COUNT - 1 : LPRINT CHR$(241);
910 IF X <> COUNT - 1 AND INT(X/IN) = X
    /IN LPRINT CHR$(248);
920 NEXT : LPRINT CHR$(247) : IF MC >=
    MAX THEN START = SX : COUNT = SC : LP
    RINT CHR$(138) : GOTO 700
930 GOTO 470
940 ' SHOW TREADLE TIE-UP ON PRINTER
950 IF TF = 0 THEN 470 ELSE LPRINT CHR$(
    27); "8"; : LPRINT STRING$(2, 138) :
    LPRINT "TREADLE TIE-UP:" : LPRINT CH
    R$(138) : LPRINT CHR$(27); CHR$(28)
960 LPRINT CHR$(240); : FOR X = 1 TO 5
    : LPRINT CHR$(241); CHR$(243); : NEXT
    : LPRINT CHR$(241); CHR$(242)
970 FOR X = 4 TO 2 STEP - 1 : LPRINT CH
    R$(245); : FOR Y = 1 TO 6 : IF TR(Y,
    X) = 1 THEN LPRINT "0"; ELSE LPRINT
    " ";
980 LPRINT CHR$(245); : NEXT Y : LPRINT
    " " : LPRINT CHR$(244); : FOR Y = 1
    TO 5
990 LPRINT CHR$(241); CHR$(250); : NEXT
    Y : LPRINT CHR$(241); CHR$(249) : NE
    XT X

```



# EXCUSES, EXCUSES...



IJG would like to apologize to all readers, and dealers, who ordered *The Custom TRS-80* and have been wondering where it is.

Magazine advertisements have to be prepared 2 to 3 months before they actually appear in print. Originally the book was scheduled for printing in early May, just as the first advertisements were to appear, but the Editor must have been in a time-warp when he made the original production estimates!

He completely under-estimated the time needed to prepare and process the dozens of photographs, circuit diagrams, printed circuit layouts, assembly language programs and reams of information that Dennis Kitz had provided.

The book has now been scheduled for printing in early November, and should be available before the end of the month. It will be worth the wait, it's one heck of a book!

Credit card orders are not being processed until the book is back from the printers. If you prepaid by check, and would prefer not to wait, then you can obtain a full refund prior to shipment - or use your credit towards other IJG products.

Sorry about this, thank you for waiting,

*Jim Perry*

Jim ('What year is it?') Perry, Editor



1260 West Foothill Blvd.,  
Upland, California 91786  
(714) 946-5805

TRS-80 is a trademark of Tandy  
Circle 35

## Computer applications

```

1000 LPRINT CHR$(245); : FOR X = 1 TO 6
      : IF TR(X, 1) = 1 THEN LPRINT "0"; E
      LSE LPRINT " ";
1010 LPRINT CHR$(245); : NEXT : LPRINT
      " " : LPRINT CHR$(246); : FOR X = 1 T
      O 5 : LPRINT CHR$(241); CHR$(248); :
      NEXT
1020 LPRINT CHR$(241); CHR$(247)
1030 LPRINT CHR$(234); : FOR X = 1 TO 1
      1 : LPRINT CHR$(239); : NEXT : LPRINT
      CHR$(233)
1040 GOTO 470
1050 ' SHOW TREADLING SEQUENCE ON PRINT
      ER
1060 IF TR = 1 THEN 470 ELSE LPRINT CHR
      $(240); : TC = 1 : Y = 1 : FOR X = 1
      TO 5 : LPRINT CHR$(241); CHR$(243); :
      NEXT : LPRINT CHR$(241); CHR$(242)
1070 LPRINT CHR$(245); : FOR X = 1 TO 6
      : IF PA(Y) <> X THEN LPRINT CHR$(32)
      ; : GOTO 1100

1080 IF PA(Y + 1) = X THEN TC = TC + 1
      : Y = Y + 1 : IF Y <= T2 THEN 1080
1090 LPRINT USING "#"; TC; : TC = 1
1100 LPRINT CHR$(245); : NEXT X : LPRIN
      T CHR$(32) : LPRINT CHR$(244);
1110 FOR X = 1 TO 5 : LPRINT CHR$(241);
      CHR$(250); : NEXT X : LPRINT CHR$(24
      1); CHR$(249)
1120 Y = Y + 1 : IF Y <= T2 THEN 1070 E
      LSE 470
1130 ' REVIEW AND EDIT THE TREADLING SE
      QUENCE
1140 CLS : PRINT "NUMBER 1 2 3 4 5 6"
      ; TAB(50)"<E> = EDIT" : PRINT TAB(8)
      STRING$(13, 140) : PRINT : X = 1
1150 PRINT TAB(2)X; TAB(PA(X) * 2 + 6)P
      A(X) : IF X >= T2 THEN PRINT TAB(30)"
      *** END ***"; : GOTO 1170
1160 IF INT(X/11) = X/11 THEN 1170 ELSE
      X = X + 1 : GOTO 1150
1170 I$ = INKEY$ : IF I$ = "" THEN 1170
      ELSE IF I$ = "E" THEN 1200
1180 IF X >= T2 THEN CLS : GOSUB 320 :
      GOTO 350
1190 PRINT@ 192, CHR$(31); : PRINT@ 192
      , "" ; : X = X + 1 : GOTO 1150
1200 PRINT@ 222, "<ENTER> THE NUMBER TO
      EDIT"; : DE$ = "" : GOSUB 1240 : I =
      VAL(DE$) : PRINT@ 249, I;
1210 PRINT@ 350, "ENTER NEW VALUE"; : D
      E$ = "" : GOSUB 1240 : Z = VAL(DE$) :
      PRINT@ 366, Z; : PRINT@ 478, "MORE T
      READLES TO EDIT (Y/N)?" ; : PA(I) = Z
  
```





48K — w/disk

# CRYSTALWARE

THE FINEST IN  
FANTASY GAME SOFTWARE

APPLE



48 — w/disk

48K — w/disk

"Having previewed over fifty of your competitors' games, I can assure you that your use of scrolling far exceeds anything I've seen for the Atari and, of course, for the Apple. I'm very impressed by the dedication and quality that your company exhibits by virtue of this demo." **David Sosna** — Associate Producer, Universal Pictures

Crystal has done its best to become the Porsche of the computer game industry. New scrolling techniques, video disk games, a real-life fantasyland — our mad programmers toil onward with little food or sleep to produce some incredible firsts in the microcomputer world. If you are an unappreciated genius and want to join our staff to help create the world of tomorrow today, give me a call. Our magazine *Crystal Vision* will within the next month have a circulation of 80,000 and we look forward very soon to producing our first full length motion picture. I'd like to thank my friends at Votrax and Axlon for giving us the tools (128K RAM for Atari and a vocal text synthesizer) to truly produce some programming miracles.

## ★ ★ ★ NEW RELEASES ★ ★ ★

**THE CRYPT** — One evening you awake at sunset to find yourself in what appears to be an endless cemetery. Although defenseless, you must somehow find your way out or perish from the hideous assaults of flesh-eating zombies, rats, vampires, werewolves, and other repulsive monstrosities. To escape you may have to descend into the catacombs beneath the cemetery. This game is a little different from the others of our series because we use a lot of static graphics to set the mood. It is similar in some respects (without any copying intended) to those of our friends at On-Line who produce excellent static graphic adventures. You must use all your common sense and a great deal of courage to escape from this perilous adventure alive. We have made it so nearly impossible that the first player to do it successfully will receive a \$200.00 prize. **\$49.95 2 disks**

**QUEST FOR POWER** by Mark Benioff — An extraordinary game with the adventure and magic of Arthurian legend. Join Galahad as he leaves Camelot in search of the Scroll of Truth. Explore the treacherous depths of the Caves of Somerset, visit the medieval city of Essex. Along the way you will meet powerful wizards and great prophets. The villages of Sunderland and Leeds dot your path. Somewhere in an evil castle called Skenfirth, lurks the devil himself, while the Evil Giant Gogmogo, hungry for human prey, roams the forests. In Fantasyland tradition we include 64 full screens of hires scrolling and some sensational graphic and animation sequences. Well worth the **\$39.95 1 disk**; enjoyable to all ages.

## ★ ★ ★ GALATIC EXPEDITION ★ ★ ★

The year is 3021, almost 100 years since the expedition to the Sands of Mars has returned. The Starship Herman now rests quietly in the Zikon Museum in New Brisbane. It's nearly 80 years since World War III, the Ames Research Center celebrates its 150th anniversary, and you stand at the unveiling of a truly technological wonder — the first ion-propelled vessel, saucer-shaped Lady Joanne, its viewport of pure diamond, its hull of synthetic emeralds. The Martian glyphs of the Meshim and those of Lemuria have now been deciphered and it appears that a much greater mystery is about to unravel. 7 planes and 7 doors — 7 guardians and 7 candles. 7 strange new worlds await the ultimate adventurer to unlock a timeless secret. The starship may seem strange and unfamiliar to our veteran adventurers, faced with its marvelous new technology; this craft must be flown by constant monitoring of ion stabilizers. During your galactic expedition you are surrounded by the flickering heavens, beset by meteor showers and time-warps. Each unique world holds one of the 7 keys to unlock the Great Mystery. The games all run off the Main Module which also is a game unto itself.

**From Earth to Moon** — On the Moon's dark side lie entrances to caverns extending to the moon's hollow core which contains a timeless secret. Here live a race of burrowing creatures, who have built vast earthen cities with storehouses full of precious stones. Gravity is extremely critical and you must use all your skills to manually land your craft. This first Master Disk contains the dos needed to run additional scenarios. Its price is **\$39.95** and includes 64 screens of Hires graphics.

**Mists of Venus** — On Venus' ever hot surface are endless jungles and swamps. The air is unbreathable and spacesuits and oxygen must be carried. This world is especially treacherous with all sorts of loathsome creatures and hardly any place dry enough to land your ship. Beneath the green seas our adventurer may find the second key to solving the Mystery. **\$29.95** (must have Master Disk to run)

**Planet Herman** — It is hard to tell where Herman's atmosphere ends and the surface begins. Much of this adventure will have the feeling of a starship submarine. Navigating around Herman is very dangerous but with a computer on board Lady Joanne it may be just possible. This scenario costs **\$29.95** and needs the Master to run.

**The Asteroid Belt** — Every play something oids. A combination of the best machine language sub-routines of our new Crystaloids with a fast moving adventure game. Penal colonies, lurking pirates, and some unusual forms of scavenger life exist here. It's difficult to travel in the Asteroid Belt without getting blown up. Perhaps you should find some expert help by rescuing a pilot, who is also a sentenced thief or murderer, from one of the penal colonies. There are places for trading and you may wish to indulge yourself with a visit to the sensual Pleasure Planet. **\$29.95** (needs Master Disk)

**Uranus - World of Ice** — A freezing place with nights of — 200° F. Bring along Thermasuits, as well as some Laars with which to battle the Grungik, a 12 foot tall relative of Big Foot, fond of human flesh. Uranus also has a secret inner labyrinth with tropical flora and fauna. However, the King of the Ice Planet, Norion may have his own idea about your trespassing. Without proper clothing, weapons and supplies, your stay here may be very exciting and very short. **\$29.95** (needs Master Disk to run)

**Jupiter - World of Dwarfs** — How would it feel to weigh 300 or so lbs.? A trip to Jupiter should fill you in fast. There is a particularly interesting red spot on Jupiter and a curious set of moons. Picking up some antigravs will help. Landing should really tax your energies. In the Jupiterian atmosphere, you fall fast! Be prepared to use 10 times the normal amount of fuel. Better find the 6th key quickly before your fuel and food are exhausted. **\$29.95** (needs Master Disk)

**The Crystal Planet** — You will have to embark on this final portion of your expedition ignorant of what you may encounter here on this mysterious planet, excepting that the 7th world holds the ultimate key to winning the contest. **\$29.95** (needs Master Disk)

**The Contest** — To the Winner with the highest score, who solves the mystery by November of 1982 will go \$5000.00 in cash. Good Luck!

★ ★ ★ ★ ★

**GLAMIS CASTLE** — According to ancient legend and records this castle is one of the most haunted sites in Great Britain. One Lady Glamis, known to be in league with the devil, liked to send out a destructive demon to harass the townspeople. She finally was burnt at the stake on Castle Hill, cursing as she died all future generations of the Lyon family. Her demon still seems to haunt that spot, murdering the curious who stray up to Castle Hill after dark. The curse stipulated that each succeeding generation would have at least one child, often female, who would be a vampire. When an heir comes of age, there is a secret ceremony in which the heir, his father, and the steward take crowbars and chip away plaster concealing a hidden chamber, known only to them, that Earl Patie used when he gambled with the devil. Another tradition says that a creature, half-man, half-beast stalks the passages in the walls of Glamis to insure the fulfilling of the curse. The mystery, of course, is to determine the location of this secret chamber. Our game, occupying 2 disks, will have as exact a replica of the castle as possible. It's definitely one of a kind! And we will be offering a \$500 prize to the first person daring enough to solve the centuries-old mystery of Glamis Castle. **\$49.95 2 disks.**

Crystal has many other fine fantasy and space games. For a copy of *CRYSTAL VISION* which includes a complete catalog please send \$3.00 to the address below.

**Our order lines are open 24 hrs. a day 7 days a week.**

**(408) 778-2966**

**CRYSTAL COMPUTER 17120 Monterey Rd., Morgan Hill, CA 95037**





# TRS-80

# sensational software

creative  
computing  
software



## Trucker and Streets of the City

### Streets of the City

This simulation is modeled on Grand Rapids, Michigan, a metropolitan area with a population of 550,000. The budgeting, cost and work standard bases are derived from actual experiences of the city over the past five years. The objective of the simulation is to complete a ten-year plan of street and transit improvements while retaining the support of a majority of the City Commission.

During your tenure, you must construct streets and Interstate highways, repair existing streets, and improve traffic safety. For the Transit Authority you have to upgrade and replace a delapidated bus fleet, increase ridership, reduce maintenance downtime and improve on-schedule performance.

Other factors to be considered are operating tax levies, construction bonding and labor negotiations. The simulation provides a substantial challenge and it is both educational and entertaining.

CS-3207 TRS-80 Cassette (32K) \$24.95  
CS-3703 TRS-80 Disk (32K)

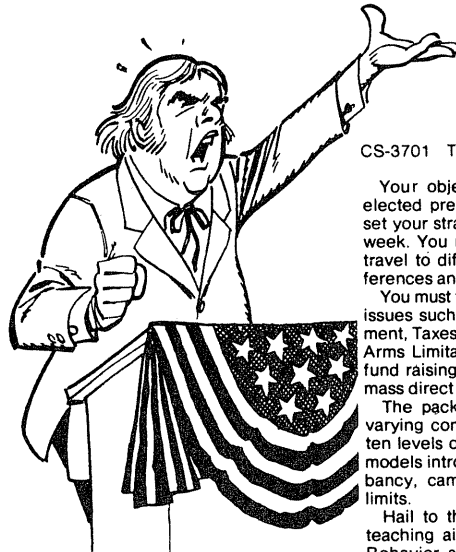
### Trucker

This program simulates coast-to-coast trips by an independent trucker hauling various cargos. The user may haul oranges, freight or U.S. mail. All have different risks and rewards. Maximum profit comes from prudent risk-taking.

If all goes well, you can obey the speed limits, stop for eight hours of sleep each night and still meet the schedule. Bad weather, road construction or flat tires may put you behind schedule. You may try to increase your profit by skimping on sleep, driving fast or carrying an over-weight load.

Other factors are choice of routes, truck payments, fuel, food, tolls and fines. The simulation is engrossing and informative.

## Hail to the Chief



by  
Phillip W. Brashear  
and  
Richard G. Vance

CS-3701 TRS-80 Disk, 48K \$24.95

Your object in this simulation is to be elected president. In your campaign you set your strategy and carry it out week by week. You may run TV or magazine ads, travel to different states, hold news conferences and participate in a debate.

You must take a position on ten campaign issues such as Energy Policy, Unemployment, Taxes, Mid-East Policy and Strategic Arms Limitations. You must manage your fund raising efforts to business, labor and mass direct mail solicitations.

The package includes four models of varying complexity; each can be used at ten levels of difficulty. The more complex models introduce the influences of incumbency, campaign finance and spending limits.

Hail to the Chief has been used as a teaching aid in Political Science, Voting Behavior and Computer Science at the University level since 1976. It is a well proven package which includes a comprehensive manual.

## 3 Adventures

•Disk CS-3516 \$39.95  
Requires 32K



**Adventureland** (by Scott Adams) You'll encounter wild animals, dwarfs and many other puzzles and perils as you wander through an enchanted world, trying to rescue the 13 lost treasures. Can you rescue the Blue Ox from the quicksand? Or find your way out of the maze of pits? Happy Adventuring!

**Pirate Adventure** (by Scott Adams)— Yo Ho Ho and a bottle of rum. You'll meet up with the pirate and his daffy bird along with many strange sights as you attempt to go from your London flat to Treasure Island. Can you recover Long John Silver's lost treasures? Happy sailing matey!

**Mission Impossible Adventure** (by Scott Adams)— Good Morning. Your mission is to... and so it starts. Will you be able to complete your mission in time? Or is the world's first automated nuclear reactor doomed? This one's well named: it's hard, there is no magic but plenty of suspense.

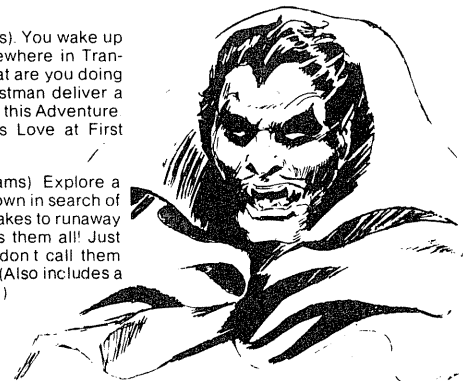
Good Luck

## Voodoo Castle The Count and Ghost Town

**Voodoo Castle** (by Scott Adams) Count Cristo has had a fiendish curse put on him by his enemies. There he lies, you are his only hope... will you be able to rescue him—or is he forever doomed? Beware the Voodoo man!

**The Count** (by Scott Adams). You wake up in a large brass bed somewhere in Transylvania. Who are you, what are you doing here, and why did the postman deliver a bottle of blood? You'll love this Adventure. In fact, you might say it's Love at First Byte.

**Ghost Town** (by Scott Adams). Explore a deserted western mining town in search of 13 treasures. From rattlesnakes to runaway horses, this Adventure has them all! Just remember, pardner, they don't call them Ghost Towns for nothin'! (Also includes a new bonus scoring system.)



Disk CS-3517 \$39.95  
Requires 32K

### Original Adventure

Disk CS-3518 (48K) \$19.95

This is the original adventure game complete with a colossal cave populated with nasty little dwarves, a giant clam, trolls and much, much more. Includes the SAM76 language in which the game runs.

### Adventures on Cassette

Five adventures are available separately on cassette. Each requires 16K and costs \$14.95.

CS-3007 Adventureland  
CS-3008 Pirate Adventure  
CS-3009 Mission Impossible  
CS-3010 Voodoo Castle  
CS-3011 The Count

### Order Today

To order any of these software packages send payment plus \$2.00 postage and handling per order to Creative Computing, Morris Plains, NJ 07950. Visa, MasterCard and American Express orders may be called in toll-free.

Order today at no risk. If you are not completely satisfied, your money will be promptly and courteously refunded.

Creative Computing Software  
Morris Plains, NJ 07950  
Toll-free 800-631-8112  
In NJ 201-540-0445

creative computing software



```

1220 I$ = INKEY$ : IF I$ = "" THEN 1220
      ELSE IF I$ <> "Y" THEN 1190
1230 FOR Y = 0 TO 4 STEP 2 : PRINT@ 222
      +(Y * 64), CHR$(30); : NEXT : GOTO 1
      200
1240 I$ = INKEY$ : IF I$ = "" THEN 1240
      ELSE IF I$ = CHR$(13) THEN RETURN EL
      SE IF I$ < "0" OR I$ > "9" THEN 1240
      ELSE DE$ = DE$ + I$ : GOTO 1240
1250 ' SHOW THE FABRIC DESIGN ON THE PR
      INTER
1260 IF CO = 1 OR TF = 0 OR TR = 1 THEN
      470 ELSE LPRINT STRING$(2, 138)
1270 OK = 1 : T2 = TR - 1 : Z1 = 1 : SC
      = CO : DE$ = "" : PRINT COUNT - 1; "
      WARP STRINGS" : PRINT : PRINT "COLUMN
      S ON LARGE PAPER = 132 STANDARD OR 13
      2 COMPRESSED" : PRINT "COLUMNS ON SMA
      LL PAPER = 80 STANDARD OR 120 COMPRE
      SSED"
1280 PRINT : INPUT "LARGE OR SMALL PAPE
      R (L/S)"; I$ : PRINT : IF I$ = "L" TH
      EN P = 1 ELSE IF I$ = "S" THEN P = 0
      ELSE 1280
1290 INPUT "BLACK OR WHITE WARP (B/W)";
      I$ : PRINT : IF I$ = "B" THEN C1 = 2
      39 : C2 = 224 : ELSE IF I$ = "W" THEN
      C1 = 224 : C2 = 239 : ELSE 1290
1300 INPUT "STANDARD OR COMPRESSED PRIN
      TING (S/C)"; I$ : IF I$ = "S" THEN LP
      RINT CHR$(27); CHR$(15) ELSE IF I$ =
      "C" THEN LPRINT CHR$(27); CHR$(14) EL
      SE 1300
1310 CL = 132 : IF P = 0 THEN IF I$ = "
      S" THEN CL = 80 ELSE CL = 120
1320 IF COUNT - Z1 > CL THEN OK = 0 : Z
      = COUNT : COUNT = CL + Z1
1330 FOR X = 1 TO T2 : FOR Y = Z1 TO CO
      UNT - 1
1340 IF (TR(PA(X), 1) AND H(Y) = 1) OR
      (TR(PA(X), 2) AND H(Y) = 2) OR (TR(PA
      (X), 3) AND H(Y) = 3) OR (TR(PA(X), 4
      ) AND H(Y) = 4) THEN DE$ = DE$ + CHR$
      (C1) ELSE DE$ = DE$ + CHR$(C2)
1350 NEXT Y : LPRINT DE$ : DE$ = "" : N
      EXT X : LPRINT STRING$(2, 138) : IF O
      K = 1 THEN CO = SC : LPRINT CHR$(27);
      CHR$(15) : LPRINT STRING$(2, 138) :
      GOTO 470
1360 Z1 = COUNT : COUNT = Z : OK = 1 :
      GOTO 1320
1370 LPRINT CHR$(27); "6" : END
1380 ' INPUT PATTERN TITLE
1390 PRINT "ENTER THE PATTERN TITLE" :
      PRINT : P$ = "" : LINEINPUT "...:"; P
      $ : GOTO 470

```

# ON SALE NOW! MAKE BASIC PERFORM LIKE A CHAMPION



BASIC is not nearly as slow as most programmers think.

*BASIC Faster and Better* shows you how to supercharge your BASIC with 300 pages of fast, functions and subroutines.

You won't find any trivial poorly designed 'check-book balancing' programs in this book - it's packed with *useful* programs.

Tutorial for the beginner, instructive for the advanced, and invaluable for the professional, this book doesn't just talk... it shows how! All routines are also available on disk, so that you can save hours of keyboarding and debugging.

The #1 disk *BFBDEM* contains all the demonstration programs, and #2 *BFBLIB* has all the library functions.

*BASIC Faster & Better* is \$29.95, and the two program disks are \$19.95 each.

Get the book and/or disks from your local IJG dealer and B. Dalton bookstores.



1260 W. Foothill Blvd.  
Upland, California 91786

(714) 946-5805



Joe W Rocke, Ridgecrest, California

*For Models I & III, 4K and up*

# A TRS-80 Super-market comparison shopper program

The two programs presented here are directed toward taking the confusion out of supermarket shopping. Supermarkets are constantly bombarding the public with TV and newspaper advertisements claiming "our prices are lower!" Some are offering to refund the difference between the price of a bag of groceries purchased at store X and the same items purchased at their store. However, I doubt they seldom have to pay off on this; after all, who wants to buy two bags of groceries? The thrifty shopper should be able to compare prices before laying cash on the line for purchased items.

Does shopping for advertised specials pay? Most supermarkets include shopper's specials in their major ads each week. The thrifty shopper is tempted to shop several stores, buying only the advertised bargains. Is doing so a true or false economy? The average shopper has no means of evaluating this shopping approach. The expenses associated with shopping tend to cloud the issue of how and where to shop for maximum economy. For example, the expense of owning and operating the family car used for shopping has a direct bearing on shopping cost. The distances involved in shopping a local market versus a more distant market offering reduced prices does affect shopping costs. The addition of non-household items such as toys, motor oil, etc., tend to hide the true cost of the weekly groceries.

The home computer is ideally suited to providing the information needed for one to become a "smart" shopper. It can provide a guide to which store provides the lowest overall shopping list total, and which store provides the greatest overall shopping economy. Application of the computer to a chore such as this is limited only by the scope of the shopping program.

The two programs presented here permit the shopper to comparison shop their favorite markets via newspaper ads. While this is not an

ultimate test of shopping economy, the results provide a measure of the store's claims for economical shopping.

Newspaper advertisements provide the item and price information for comparison shopping entries. The important factor in comparing prices is to compare prices of like items. For example, an apple-to-oranges comparison is no measure of a store's fruit prices. Likewise, items must be compared on the same unit price basis, e.g., price per pound, per box, etc. Most stores use similar pricing units in their advertisements, but one must be aware of possible differences. For instance, a 12 ounce jar of jam at \$1.09 may be a better buy than an 8 ounce jar at 98 cents, but comparing prices on a per jar basis would be false economy. However, the computer can easily make price comparisons of this type on a price per ounce basis.

Both programs include the cost of using the family car for shopping. This cost is calculated on a per mile basis for round trip distance from home to store. The cost per mile factor used in the programs is based on an average cost figure used by rental car companies. This figure includes insurance, maintenance and related operating costs.

The "computer shopper" will find that the addition of driving cost makes a surprising difference in shopping totals. Shopping the big discount stores may not reduce the household budget as much as one thinks. The results displayed by either of these programs may surprise you.

### **The Speedy Shopper (Program 1)**

The Speedy Shopper program is just that, a means of quickly comparing costs on the basis of a basic shopping list. The program has provision for comparing the prices of three markets. Results of the data entries are presented as a single video display.



Program input requires the user to enter an item name for each of ten shopping categories. During initial program development this requirement seemed an unnecessary step. However, during trial use of the embryo program it became evident that a pencil/paper list was needed to assure comparison of like items. Using the meat category item as an example, comparing the price of a roast to that of a steak would be a false comparison. Thus, an item name must be entered for each shopping category.

The "PRICE?" prompt appears after entry of the item name. The user responds by entering the advertised price for the named item. The computer responds by displaying the next shopping category. This pattern is continued until inputs have been provided for all ten shopping categories. A typical input display is shown in Figure 1.

Single line input entries are achieved by use of the PRINT@ statement in conjunction with the INPUT statement. The PRINT@ is used for both item name and price inputs. This permits input of entries for all ten shopping categories without scrolling the display. As shown in Figure 1, all data for one market fits within the 16 line display parameters.

The PRINT@ input loop routine is presented in Listing 1. The first PRINT@ location is established by assigning an initial print location to variable G (line 120). Within the loop, G is incremented by 23 spaces to provide the print location for the price entry. Incrementing G by 41 spaces (line 180) establishes the prompt location for the initial entry on the next line. All inputs are stored in subscripted variables for future recall.

TYPE/ENTER ITEM NAME AFTER CATEGORY IS LISTED.

1 . MEAT ITEM	ITEM NAME ? STEAK	PRICE ? 1.98
2 . POULTRY ITEM	ITEM NAME ? CHICKEN	PRICE ? .79
3 . DAIRY ITEM	ITEM NAME ? CHEESE	PRICE ? 2.59
4 . FRESH VEGETABLE	ITEM NAME ? CELERY	PRICE ? .59
5 . FRESH FRUIT	ITEM NAME ? APPLES	PRICE ? .49
6 . CANNED ITEM	ITEM NAME ? TOMATOES	PRICE ? .88
7 . BAKERY ITEM	ITEM NAME ? BREAD	PRICE ? 1.09
8 . STAPLE ITEM	ITEM NAME ? SUGAR	PRICE ? .49
9 . BATH/KITCHEN	ITEM NAME ? L. SOAP	PRICE ? 1.79
10 . MISCELLANEOUS	ITEM NAME ? WINE	PRICE ? 3.19

Figure 1

Price inputs for store B are handled in much the same manner as for store A. The exception is that item names entered during the store A input cycle are displayed in place of shopping categories (see Figure 2). Display of the item name prompts the user to enter the price for a like item. The need to rely on human memory or a penciled list for item names is eliminated.

TYPE/ENTER ALL-WAYS PRICES FOR SAME ITEMS.

1 . STEAK	PRICE ? 2.09
2 . CHICKEN	PRICE ? .69
3 . CHEESE	PRICE ? 2.79
4 . CELERY	PRICE ? .69
5 . APPLES	PRICE ? .33
6 . TOMATOES	PRICE ? .89
7 . BREAD	PRICE ? .99
8 . SUGAR	PRICE ? .55
9 . L. SOAP	PRICE ? 1.99
10 . WINE	PRICE ? 2.89

Figure 2

The comparison shopper has the option of entering price information for a third store by means of the "TYPE 1 TO ADD A 3RD STORE LISTING ELSE 0 ?" prompt. In response to the prompt, the conditional branch statement of program line 300 either allows program flow to continue to the third input loop or jumps it to the summary display of line 380.

The third store entry loop is virtually a duplicate of that for the second store entries, with the exception of the screen display. In this case, the prices for stores A and B are displayed for reference. This allows the totals to be displayed immediately after the last price entry is made. The resulting display is shown in Figure 3.

TYPE/ENTER T-MART PRICES FOR SAME ITEMS.

ITEM	SAVEWAY	ALL-WAYS	T-MART
1 . STEAK	1.98	2.09	? 2.19
2 . CHICKEN	.79	.69	? .75
3 . CHEESE	2.59	2.79	? 2.49
4 . CELERY	.59	.69	? .49
5 . APPLES	.49	.33	? .39
6 . TOMATOES	.88	.89	? .79
7 . BREAD	1.09	.99	? .89
8 . SUGAR	.49	.55	? .51
9 . L. SOAP	1.79	1.99	? 1.79
10 . WINE	3.19	2.89	? 2.99

Figure 3

Continuation of the program results in the display of Figure 4. Driving costs have been added at this point. The shopping list totals now represent a more accurate comparison of shopping costs for each store.

As the name implies, this program provides a quick means of comparing the prices of three stores with a minimum of user entries. While the results may not be statistically conclusive, they are a fair representation of the respective store's pricing structure.

This is a "speedy shopper" program, right? They why not enter prices of all stores at the same time? That question can best be answered by a question; have you tried juggling three sheets of newsprint at one time while making keyboard entries? If not, you will find trying to do so very inconvenient! Hence the reason for structuring this program in three input loops.



## Feature program

ITEM	SAVEWAY	ALL-WAYS	T-MART
MEAT ITEM	1.98	2.09	2.19
POUTRY ITEM	0.79	0.69	0.75
DAIRY ITEM	2.59	2.79	2.49
FRESH VEGETABLE	0.59	0.69	0.49
FRESH FRUIT	0.49	0.33	0.39
CANNED ITEM	0.88	0.89	0.79
BAKERY ITEM	1.09	0.99	0.89
STAPLE ITEM	0.49	0.55	0.51
BATH/KITCHEN	1.79	1.99	1.79
MISCELLANEOUS	3.19	2.89	2.99
SUBTOTALS	13.88	13.9	13.28
> SHOPPING SUMMARY <			
MARKET	SAVEWAY	ALL-WAYS	T-MART
SUBTOTAL	13.99	13.90	13.28
CAR COST	0.90	1.20	1.80
TOTALS	14.89	15.10	15.08

Figure 4

### The Shopping List (Program 2)

The Shopping List program permits entry of a more extensive shopping list. The object of this program is to provide a more thorough price comparison. The program is structured to use the weekly shopping list as a basis for entering item/price information.

The program also includes provision for comparing prices on a common unit basis when necessary. This is achieved by adding an asterisk (\*) at the end of any item name entry priced on a quantity basis. For example, how does a 14 ounce bottle of catsup at 89 cents compare to a 44 ounce bottle at \$1.35? The asterisk appended to a "CATSUP\*" item entry causes the computer to branch to a unit price routine for computation of the price on a per ounce basis. This entry procedure is illustrated in Figure 5 a,b, which also includes the initial program instructions.

The initial input loop calls for the user to enter item names followed by the advertised price. No attempt has been made to format the entries with a PRINT@ input. The program could be edited to include this feature by using an input loop similar to that presented in Listing 1.

All input loops are virtually identical except for the use of different variables. Variables A, B and C have been used for each of the respective loops as a convenience in store identification during program development. The repetitive routines such as mileage computation and total accumulation could have been set up as subroutines. However, the repetitive approach was used for simplicity in programming.

The program provides the option of excluding third store entries. Excluding third store entries created a problem in making final price comparisons via logical operators. This problem is circumvented by initializing third store totals at "99" if no third store entries are made. Thus the "\$99.00" totals shown in the summarizing display

of Figure 6 are fictitious totals. Otherwise, three valid totals will be displayed if entries have been made for three stores. Use of these totals permits computer identification of the store providing the lowest shopping list total, and the store providing the best shopping economy.

The program concludes with the computer displaying "THE DECISION IS UP TO YOU!". Whether or not the computer shopper alters shopping habits as a result of the program is a matter of shopping preference. However, it is interesting to find how much the total price varies from one store to another, and how driving cost can affect shopping cost. Given these facts, it is probable that we would all change our shopping habits if our cars were coin operated. Until such time, the shopping choice is up to you! ■

```

> PERSONAL SHOPPING LIST <

TYPE/ENTER YOUR SHOPPING LIST PER TRS-80 INSTRUCTIONS

INCLUDE DECIMAL FOR PRICES LESS THAN $1.00, AS '.59'.

ENTER '*' AFTER ITEM FOR UNIT PRICED ITEM.

TRS-80 WILL PLAY BACK THE SHOPPING LIST SO YOU MAY ENTER
THE PRICES FOR A 2ND OR 3RD STORE.

LIST TOTALS FOR EACH STORE WILL BE DISPLAYED UPON COMPLETION
OF ALL ENTRIES.

```

Figure 5a

```

TYPE/ENTER LIST ITEM ', ' AND SAVEWAY ADVERTISED PRICE
(TYPE 'END , 0' TO END ENTRIES):

```

```

1 . ? RND STEAK, 1.89
2 . ? BACON, 1.19
3 . ? FRANKS, 1.79
4 . ? EGGS, .89
5 . ? POTATOES-LB, .29
6 . ? CARROTS, .35
7 . ? CELERY, .59
8 . ? CATSUP*, .89
    . . . UNIT PRICE COMPUTATION . . .
ENTER PRICING UNIT NUMBER FOR CATSUP*? 24
UNIT PRICE FOR CATSUP* IS .0370833
9 . ? COFFEE-LB, 2.89
10 . ? FLOUR-5 LB*, .89

```

Figure 5b

LIST ITEMS	SAVEWAY	T-MART	NO ENTRY
1 . RND STEAK	\$ 1.89	\$ 2.19	\$ 0.00
2 . BACON	\$ 1.19	\$ 1.39	\$ 0.00
3 . FRANKS	\$ 1.79	\$ 1.49	\$ 0.00
4 . EGGS	\$ 0.89	\$ 0.99	\$ 0.00
5 . POTATOES-LB	\$ 0.29	\$ 0.25	\$ 0.00
6 . CARROTS	\$ 0.35	\$ 0.33	\$ 0.00
7 . CELERY	\$ 0.59	\$ 0.49	\$ 0.00
8 . CATSUP*	\$ 0.04	\$ 0.03	\$ 0.00
9 . COFFEE-LB	\$ 2.89	\$ 2.39	\$ 0.00
10 . FLOUR-5 LB*	\$ 0.18	\$ 0.16	\$ 0.00
11 . FISH STIX	\$ 1.49	\$ 1.59	\$ 0.00
12 . BREAD	\$ 1.09	\$ 0.89	\$ 0.00

PRESS =SPACEBAR= TO CONTINUE

LIST ITEMS	SAVEWAY	T-MART	NO ENTRY
TOTALS	\$ 12.68	\$ 12.19	\$ 99.00

Figure 6a



PRESS =SPACEBAR= TO CONTINUE

PRICE COMPARISON SUMMARY . . .			
STORE	LIST TOTAL	CAR COST	TOTAL COST
SAVEWAY	\$ 12.68	\$ 0.90	\$ 13.58
T-MART	\$ 12.19	\$ 1.80	\$ 13.99
NO ENTRY	\$ 99.00	\$ 0.00	\$ 99.00

----> T-MART OFFERS LOWEST OVERALL PRICE TOTAL.

SAVEWAY PROVIDES THE BEST SHOPPING ECONOMY.

THE SHOPPING CHOICE IS UP TO YOU!

**Figure 6b**

### Program 1 (The Speedy Shopper)

```

1  > COMPARISON SHOPPING <
2  BY
3  JOE W. ROCKE
4  224 W BENSON
5  RIDGECREST, CA 93555
6
7  ---- SPEEDY SHOPPER 10/80 ----
8
10 CLEAR 100 : S$ = "####.##"
20 CLS : PRINT CHR$(23)
30 PRINT @ 322, "-- COMPARISON SHOPPING
   --"
40 PRINT @ 448, "BASIC 10 ITEM SHOPPING
   LIST"
50 FOR T = 1 TO 2500 : NEXT
60 TA = 0 : TB = 0 : TC = 0 : RESTORE :
   CLS
70 PRINT @ 320, "TYPE 1 FOR BASIC INSTR
   UCTIONS, ELSE 0"; : INPUT Z
80 IF Z = 1 GOSUB 620 ELSE 90
90 PRINT @ 320, CHR$(31) : GOSUB 600
100 A$ = Y$ : MA = D * .3 * 2
110 CLS : PRINT "TYPE/ENTER ITEM NAME A
   FTER CATEGORY IS LISTED."
120 PRINT : G = 151
130 FOR N = 1 TO 10 : READ I$(N)
140 PRINT N". "I$(N); : PRINT @ G, "IT
   EM NAME "; : INPUT N$(N)
150 N$(N)=FOOD ITEM NAME
160 G = G + 23 : PRINT @ G, "PRICE "; :
   INPUT A(N)
170 TA = TA + A(N)
180 G = G + 41 : NEXT
190 GOSUB 580 : CLS : PRINT "PREPARE TO
   ENTER PRICES FOR 2ND STORE"
200 GOSUB 600 : B$ = Y$ : MB = D * .3 *
   2
210 CLS : PRINT "TYPE/ENTER "; B$; " PR
   ICES FOR SAME ITEMS."
220 PRINT : G = 151
230 FOR N = 1 TO 10 : PRINT N ". " N$(
   N);

```

```

240 PRINT @ G, "PRICE "; : INPUT B(N) :
   G = G + 64
250 TB = TB + B(N)
260 NEXT
270 GOSUB 580 : CLS
280 PRINT @ 320, "TYPE 1 TO ADD A 3RD S
   TORE LISTING ELSE 0 ";
290 INPUT Z
300 IF Z = 0 C$ = "" : IF Z = 1 THEN 31
   0 ELSE 380
310 PRINT @ 320, CHR$(30) : GOSUB 600
320 C$ = Y$ : MC = D * .3 * 2 : G = 174

330 CLS : PRINT "TYPE/ENTER "; C$; " PR
   ICES FOR SAME ITEMS."
340 PRINT TAB(5) "ITEM", A$, B$, C$
350 FOR N = 1 TO 10 : PRINT N ". "N$(N
   ), A(N), B(N)
360 PRINT@ G,; : INPUT C(N) : TC = TC +
   C(N)
370 G = G + 64 : NEXT : GOSUB 580
380 CLS : PRINT@ 0, "ITEM", A$, B$, C$
   : PRINT
390 FOR N = 1 TO 10 : PRINT I$(N),
400 PRINT TAB(16) USING S$; A(N); : PRI
   NT TAB(32) USING S$; B(N); : PRINT TA
   B(48) USING S$; C(N)
410 NEXT
420 PRINT : PRINT "SUBTOTALS", TA, TB,
   TC : GOSUB 580
430 CLS : PRINT TAB(22)"> SHOPPING SUMM
   ARY <" : PRINT

```

MICRO-DESIGN PRESENTS  
THE MDX-4  
**PHONE MODEM**  
P.C. BOARD & USER MANUAL

**\$39.95**

- \* 300 BAUD
- \* DIRECT CONNECT
- \* ANSWER AND ORIGINATE MODES
- \* SOLDER-MASKED & SILK-SCREENED
- \* ON BOARD POWER SUPPLY

MDX-4 PC BOARD & USERS MANUAL ... 39.95  
USERS MANUAL ..... 8.95

(Texas Residents Add 5% Tax)  
(Add \$3.00 Shipping for Board)

CALL OR WRITE:

**MD**

MICRO DESIGN  
P.O. BOX 748  
MANCHACA, TX 78652  
(512) 282-0225



DEALER INQUIRIES INVITED



Circle 113



```

440 PRINT "MARKET", A$, B$, C$ : PRINT

450 PRINT "SUBTOTAL", : PRINT USING S$;
    TA,
460 PRINT TAB(32) USING S$; TB; : PRINT
    TAB(48) USING S$; TC
470 PRINT "CAR COST", : PRINT TAB(16) U
    SING S$; MA;
480 PRINT TAB(32) USING S$; MB; : PRINT
    TAB(48) USING S$; MC
490 PRINT " ", "-----", "-----",
    "-----"

500 E = MA + TA : F = MB + TB : G = MC
    + TC
510 PRINT "TOTALS", : PRINT TAB(16) USI
    NG S$; E;
520 PRINT TAB(32) USING S$; F; : PRINT
    TAB(48) USING S$; G
530 PRINT@ 970, "TYPE/ENTER 1 TO REPEAT
    PROGRAM, ELSE 0 "; : INPUT X
540 IF X = 1 GOTO 10 ELSE 550
550 CLS : PRINT CHR$(23) : PRINT@ 320,
    "THANK YOU. GLAD TO BE OF SERVICE" :
    PRINT@ 896, "END" : GOTO 570
560 DATA MEAT ITEM, POULTRY ITEM, DAIRY
    ITEM, FRESH VEGETABLE, FRESH FRUIT, C
    ANNED ITEM, BAKERY ITEM, STAPLE ITEM,
    BATH/KITCHEN, MISCELLANEOUS
570 END
580 PRINT@ 978, "PRESS =SPACEBAR= TO CO
    NTINUE";
590 Z$ = INKEY$ : IF Z$ <> CHR$(32) THE
    N 590 ELSE RETURN
600 PRINT@ 320, "TYPE/ENTER NAME OF MAR
    KET TO BE SHOPPED "; : INPUT Y$
610 PRINT@ 448, "TYPE/ENTER MILES DRIVI
    NG DISTANCE TO "; Y$; : INPUT D : RET
    URN
620 CLS : PRINT TAB(14)"> SUPERMARKET C
    OMPARISON SHOPPING <" : PRINT
630 PRINT "TRS-80 WILL LIST 10 FOOD CAT
    EGORIES.

TYPE IN AN ITEM NAME AFTER '?' PROMPT."

640 PRINT : PRINT "TYPE/ENTER ITEM PRIC
    E AFTER 'PRICE ?' PROMPT." : PRINT
650 PRINT "INCLUDE DECIMAL FOR PRICES L
    ESS THEN $1.00" : PRINT
660 PRINT "TRS-80 WILL KEEP TRACK OF TH
    E PRICES FOR EACH STORE AND
    DISPLAY A SHOPPING LIST TOTAL FOR EACH.
    " : PRINT
670 PRINT "THE FINAL CHOICE IS UP TO YO
    U !" : GOSUB 580 : CLS : RETURN

```

## Program 2 (The Shopping List)

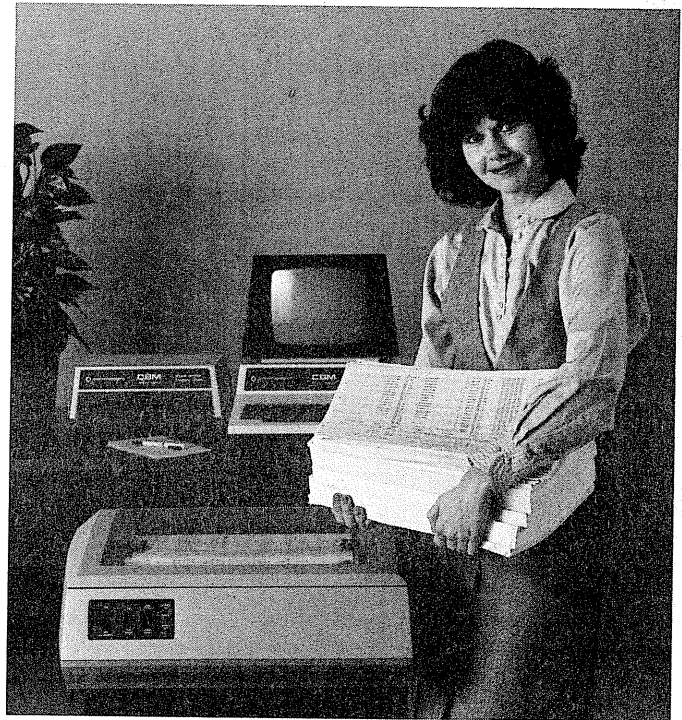
```

1 ' > COMPARISON SHOPPING <
2 ' BY
3 ' JOE W. ROCKE
4 ' 224 W BENSON
5 ' RIDGECREST, CA 93555
6 ' 11/1/80
7 ' ----> PERSONALIZED SHOPPING LIST <--
8 '
10 CLEAR 1000 : DIM I$(35), A(50), B(50
    ), C(50), X(59) : S$ = "$###.##"
20 CLS : PRINT TAB(20)"> PERSONAL SHOPP
    ING LIST <"
30 PRINT STRING$(64, 45)
40 MA = 0 : MB = 0 : MC = 0 : TA = 0 :
    TB = 0 : TC = 0 : L = 1
50 PRINT "TYPE/ENTER YOUR SHOPPING LIST
    PER TRS-80 INSTRUCTIONS"
60 PRINT : PRINT "INCLUDE DECIMAL FOR P
    RICES LESS THAN $1.00, AS '.59'."
70 PRINT : PRINT "ENTER '*' AFTER ITEM
    FOR UNIT PRICED ITEM."
80 PRINT : PRINT "TRS-80 WILL PLAY BACK
    THE SHOPPING LIST SO YOU MAY ENTER
    THE PRICES FOR A 2ND OR 3RD STORE." : P
    RINT
90 PRINT "LIST TOTALS FOR EACH STORE WI
    LL BE DISPLAYED UPON COMPLETION
    OF ALL ENTIRES."
100 GOSUB 690 : CLS
110 PRINT "PREPARE TO ENTER PRICES FOR
    1ST STORE:"
120 GOSUB 710 : A$ = Y$
130 MA = D * .6
140 CLS : PRINT "TYPE/ENTER LIST ITEM '
    ,' AND 'A$ ' ADVERTISED PRICE
    (TYPE 'END , 0' TO END ENTRIES):" : PRI
    NT
150 N = 1
160 PRINT N". "; : INPUT I$(N), A(N)
170 IF I$(N) = "END" THEN 220 ELSE 180
180 X(N) = A(N) : GOSUB 820 : A(N) = X(
    N)
190 TA = TA + A(N)
200 N = N + 1
210 L = L + 1 : GOTO 160
220 DA = TA + MA
230 GOSUB 690 : CLS
240 CLS : PRINT "PREPARE TO ENTER PRICE
    S FOR 2ND STORE:"
250 GOSUB 710
260 B$ = Y$ : MB = D * .6

```



# LETTER-PERFECT PRINTER DOUBLES AS DATA CRUNCHER.



**Print two ways...correspondence quality and high speed data processing.**

The new T-1805 dual purpose serial printer uses a unique 40 x 18 matrix dot pattern for high quality correspondence printing; or, flip a switch, it uses a 7 x 9 matrix for high speed data processing printing. In the high speed mode, it generates reports at time-saving throughput rates reaching 200 lines per minute. In the reduced speed correspondence mode, its pivoting print head lays down overlapping dots to create a letter-perfect character that looks like it came from an office typewriter.

The T-1805 is the latest evolution in the popular and proven T-1000 series of serial printers. As such, the

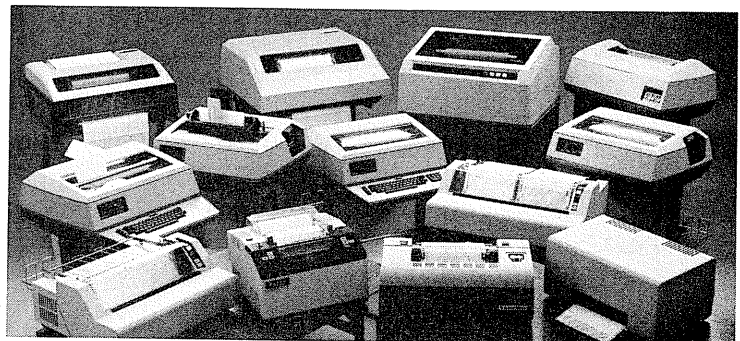
T-1805 offers the same quality construction, high reliability, ease of operation and operator conveniences. Plus, for the benefit of the office crew, the T-1805 is exceptionally quiet. Its 53 dbA noise level ranks it as the quietest impact printer on the market.

There's much more to tell, so visit or call your Mannesmann Tally sales outlet today.

Mannesmann Tally, 8301 South 180th Street, Kent, WA 98031. Phone (206) 251-5524.

*Printers for the long run.*

**MANNESMANN  
TALLY**





```

270 CLS : PRINT "TYPE/ENTER ADVERTISED
    PRICE FOR "; B$; " : " : PRINT
280 FOR N = 1 TO L - 1
290 PRINT N". "I$(N); : INPUT B(N)
300 X(N) = B(N) : GOSUB 820 : B(N) = X(
    N) :
310 TB = TB + B(N) : NEXT
320 DB = TB + MB
330 GOSUB 690 : CLS
340 PRINT@ 320, "TYPE 1 TO ENTER PRICES
    FOR A 3RD STORE, ELSE 0 ";
350 INPUT Z
360 IF A = 1 THEN 380 ELSE 370
370 C$ = "NO ENTRY" : TC = 99 : DC = 99
    : GOTO 450
380 CLS : PRINT "PREPARE TO ENTER PRICE
    S FOR 3RD STORE:"
390 GOSUB 710 : C$ = Y$
400 MC = D * .6
410 CLS : PRINT "TYPE/ENTER ADVERTISED
    PRICE FOR "; C$; " : " : PRINT
420 FOR N = 1 TO L - 1 : PRINT N". "I$(
    N); : INPUT C(N)
430 TC = TC + C(N) : NEXT
440 DC = TC + MC
450 CLS : PRINT@ 320, "TYPE 1 TO REVIEW
    ITEMIZED LIST,
    ELSE 0 FOR STORE TOTALS "; : INPUT
    Z
460 IF Z = 1 THEN 470 ELSE 550
470 GOSUB 740 : C = 1
480 FOR N = 1 TO L - 1 : PRINT N". "I$(
    N);
490 PRINT TAB(30) USING S$; A(N); : PRI
    NT TAB(42) USING S$; B(N); : PRINT TA
    B(55) USING S$; C(N)
500 IF C = 12 GOTO 510 ELSE 520
510 GOSUB 690 : GOSUB 740 : C = 0 : GOT
    O 520
520 C = C + 1 : NEXT
530 PRINT : PRINT "TOTALS"; : PRINT TAB
    (30) USING S$; TA; : PRINT TAB(42) US
    ING S$; TB; : PRINT TAB(55) USING S$;
    TC
540 GOSUB 690 : CLS
550 CLS : PRINT TAB(10)". . . PRICE COM
    PARISON SUMMARY . . ."
560 PRINT "STORE", "LIST TOTAL", "CAR C
    OST", "TOTAL COST" : PRINT
570 PRINT A$; : PRINT TAB(16) USING S$;
    TA; : PRINT TAB(32) USING S$; MA; :
    PRINT TAB(48) USING S$; DA
580 PRINT B$; : PRINT TAB(16) USING S$;
    TB; : PRINT TAB(32) USING S$; MB; :
    PRINT TAB(48) USING S$; DB
590 PRINT C$; : PRINT TAB(16) USING S$;
    TC; : PRINT TAB(32) USING S$; MC; :
    PRINT TAB(48) USING S$; DC
600 GOSUB 750
610 PRINT : PRINT "----> "; X$; " OFFERS
    LOWEST OVERALL PRICE TOTAL."
620 PRINT : PRINT " "; Y$; " PROVID
    ES THE BEST SHOPPING ECONOMY."
630 PRINT : PRINT "THE SHOPPING CHOICE
    IS UP TO YOU!"
640 GOSUB 690
650 CLS : PRINT "TO REVIEW THE LIST, TY
    PE 1 OTHERWISE 0"; : INPUT Z
660 IF Z = 1 GOTO 470 ELSE 670
670 CLS : PRINT CHR$(23) : PRINT@ 128,
    "THE DECISION IS UP TO YOU"
680 END
690 PRINT@ 978, "PRESS =SPACEBAR= TO CO
    NTINUE";
700 Z$ = INKEY$ : IF Z$ <> CHR$(32) THE
    N 700 ELSE RETURN
710 PRINT@ 320, "TYPE/ENTER NAME OF MAR
    KET TO BE SHOPPED ";
720 INPUT Y$
730 PRINT@ 448, "TYPE/ENTER MILES DRIVI
    NG DISTANCE TO "; Y$; : INPUT D : RET
    URN
740 CLS : PRINT "LIST ITEMS"; TAB(30)A$
    ; TAB(42)B$ TAB(55)C$ : RETURN
750 IF TA < TB AND TA < TC THEN XA = TA
    : X$ = A$
760 IF TB < TA AND TB < TC : XA = TB :
    X$ = B$
770 IF TC < TB AND TC < TA THEN XA = TC
    : X$ = C$
780 IF DA < DB AND DA < DC THEN YA = DA
    : Y$ = A$
790 IF DB < DA AND DB < DC THEN YB = DB
    : Y$ = B$
800 IF DC < DA AND DC < DB THEN YC = DC
    : Y$ = C$
810 RETURN
820 U = LEN(I$(N))
830 X$ = RIGHT$(I$(N), (U -(U - 1)))
840 IF X$ = "*" GOTO 850 ELSE RETURN
850 PRINT TAB(15)". . . UNIT PRICE COMP
    UTATION . . ."
860 PRINT "ENTER PRICING UNIT NUMBER FO
    R "; I$(N);
870 INPUT PU
880 X(N) = X(N)/PU
890 PRINT "UNIT PRICE FOR "; I$(N); " I
    S "; X(N)
900 RETURN

```



# DISK III

## 100% Compatible

### Model III Disks

**Complete Business System includes:**  
**48K TRS-80™ Model III, Disk III™ 2 Drive System, TRSDOS and Manual.**



DISK III single drive assembly includes: one 40 track 5 1/4" double density drive, power supply, controller, mounting hardware, and applicable cables.

# \$1882

**DISK III Single drive assy' \$599.00**  
**DISK III Two drive assy 864.00**  
**DISK III Assy w/out drives 435.00**  
**TRSDOS™ & Manual 21.90**  
**External drives (3 & 4) 299.00**

### IMMEDIATE DELIVERY - COMPARE AND SAVE

#### WINCHESTER HARD DISK MODEL III

Integral Winchester Business system includes:  
 48K Model III, LDOS  
 Disk III™, 6.3 MEG  
 HARD DISK SYSTEM.

# \$4995

# \$2895

**6.3 MEGABYTE WINCHESTER HARD DISK SUBSYSTEM**  
 With chassis, PS, LDOS™.  
 9.5 MEG \$3395.00

#### MOD III Options:

9.5 MEG HD (internal)	add \$500.00
80 tk 1 side floppy	add \$120.00
80 tk 2 side floppy	add \$240.00

#### Winchester Subsystem Options:

2 x 6.3 Meg drives	4495.00
2 x 9.5 Meg drives	5495.00

#### Peripherals

Epson MX-80	500.00
Epson MX-80 FT	615.00
Epson MX-100	800.00
Centronics 739	700.00
Starwriter 25 (P)	1395.00
RS-232	95.00
Lexicon modem	105.00

#### MODEL I/III

**EXTERNAL DRIVE \$275**  
**W/ PS & ENC**  
 Fully Compatible  
 120 day warranty  
 Easy installation  
 80 tk or 2 sided \$419.00  
 80 tk & 2 sided 549.00

#### OTHER PRODUCTS

SUPERBRAIN 64K	2990.00
PARALLEL PORT — SUPERBRAIN	99.95
DISK & MYSTERIES	22.50
BASIC & MYSTERIES	29.95
NEC Ribbons (min. 6)	5.95
Epson Ribbons	12.50

#### NEW—

LDOS Operating System	149.00
-----------------------	--------

#### COMING SOON!!

Internal MODEM for MOD III

IF YOU DON'T SEE IT ADVERTISED CALL US AND ASK FOR IT.  
 PUBLISHED PRICES REFLECT CASH DISCOUNT.  
 ALL PRICES ARE SUBJECT TO CHANGE WITHOUT NOTICE.  
 TRS-80 and TRSDOS are trademarks of Tandy Corp.  
 DISK III is a trademark of VR Data Corp. Dealership available.

## Phone toll free 800-345-8102

• in PA 215-461-5300 Cable address "VRDATA" • TELEX

# VR Data

VR Data Corporation  
 777 Henderson Boulevard • Folcroft, PA 19032





# The Newest NEWDOS/80 Version 2.0 For Model I And Model III

THE HOTTEST DISK OPERATING SYSTEM FOR THE TRS-80® COMPUTER IS NOW READY FOR THE MODEL III AND VERSION 2.0 IS READY FOR THE MODEL I. MANY ENHANCEMENTS AND ADDED FEATURES SUCH AS NEW COMMANDS MAKE YOUR COMPUTER MORE POWERFUL!

**\$149.00**

- **DOUBLE DENSITY ON MODEL I**

Use of the LNWD DOUBLER or the PERCOM DOUBLER to expand storage 80% under NEWDOS/80 Version 2.0, mixing single and double density specifications without any patches.

- **SINGLE DENSITY ON MODEL III**

Will allow the MODEL III to read disks from MODEL I and to write disks the MODEL I can read, making it easy to move programs between the two machines.

- **EXPANDED DIRECTORIES**

Directories can be expanded three times the normal number of available entries, even on DOS disks. This is extremely useful when using double density.

- **DYNAMICALLY MERGE IN BASIC**

To allow sections of BASIC programs to be deleted and replaced with lines from a disk file during program execution. Also allows merging of non-ASC II format files.

- **SELECTIVE VARIABLE CLEARING**

Allows the programmer to keep some variables and release the space used by the rest; also, specific variables may be erased releasing the space they use.

(CALL OR WRITE FOR MORE INFORMATION ON OUR COMPLETE LINE OF PRODUCTS AND HARDWARE REPAIR SERVICES FOR YOUR TRS-80® COMPUTER)



4401 South Tamarac Parkway  
Denver, Colorado 80237

(303) 741-1778

"On-going Support for Microcomputers"

TRS-80® is a registered trademark of Tandy Corporation

- **PAGE SCROLLING IN BASIC**

Scrolling has been modified to allow the user to display programs page by page, in addition to the regular line scrolling.

- **REPEAT FUNCTIONS**

Keys in MODEL I repeat when held down. Entering "R" as a DOS command causes the previous DOS command to be repeated.

- **ROUTING FOR DEVICE HANDLING**

To send input and output from one device (display, printer, keyboard, etc.) to others or to a routine in main memory.

- **DISASSEMBLER OUTPUT TO DISK**

The Disassembler will now write a source code file to disk, which the editor assembler can read and edit.

- **CHAINING ENHANCEMENTS**

Features to allow chain files to be written from SCRIPSIT; also, chaining may be switched on and off without changing chain file positioning, and may be executed via CMD "xxx" and DOS-CALL.

- **SUPERZAP**

has the ability to scan diskettes or disk files to find the occurrences of specific values. Also will generate disk file passwords and hashcode.

- **FAST SORT ROUTINE**

basic function CMD "O" provides direct or indirect in-memory sort of multiple arrays.

- **MERGING OF NON-ASCII BASIC PROGRAMS**

- **BASIC SINGLE STEPPING**

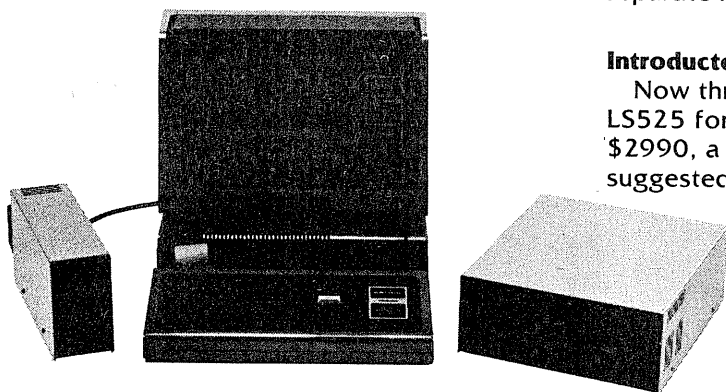




# THE NEW LAREDO LS525. WHEN YOU'RE READY TO GET DOWN TO BUSINESS.

**Laredo Systems, Inc.** introduces the LS525 five megabyte rigid disk memory system for TRS80 Models I and III. Laredo's LS525 rounds up a Seagate ST506 Drive, LDOS Operating System by Logical Systems, and Laredo's own LSI

- On-board data separator, micro-code diagnostics and write-precompensation.
- Increased disk media reliability and data integrity with automatic defect block allocation and extended ID fields.
- Versatile CPU compatibility provided by separate host adaptor.



500 Series Controller into a single-board controller that emulates the famed IBM 3370 disk system, complete with:

- Improved read/write/seek access time through full block buffering and variably tuned interleave.

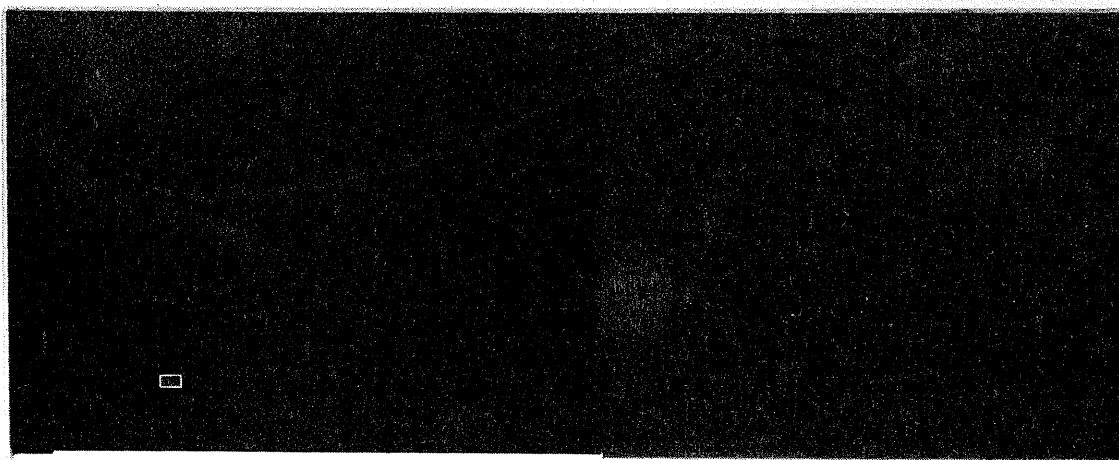
## **Introductory Offer To TRS80 Users.**

Now through October 1, 1981 buy the LS525 for the OEM/dealer price of \$2990, a savings of \$760 off the usual suggested retail price of \$3750.

LDOS Operating System with manual and diskette available for \$149.

For more information about the LS525 Memory System and the LSI 500 Series Controller, contact:

**Laredo Systems, Inc.**  
**669 Giraudo Drive, San Jose, CA 95111**  
**(408) 629-2283**



**laredo systems inc.**

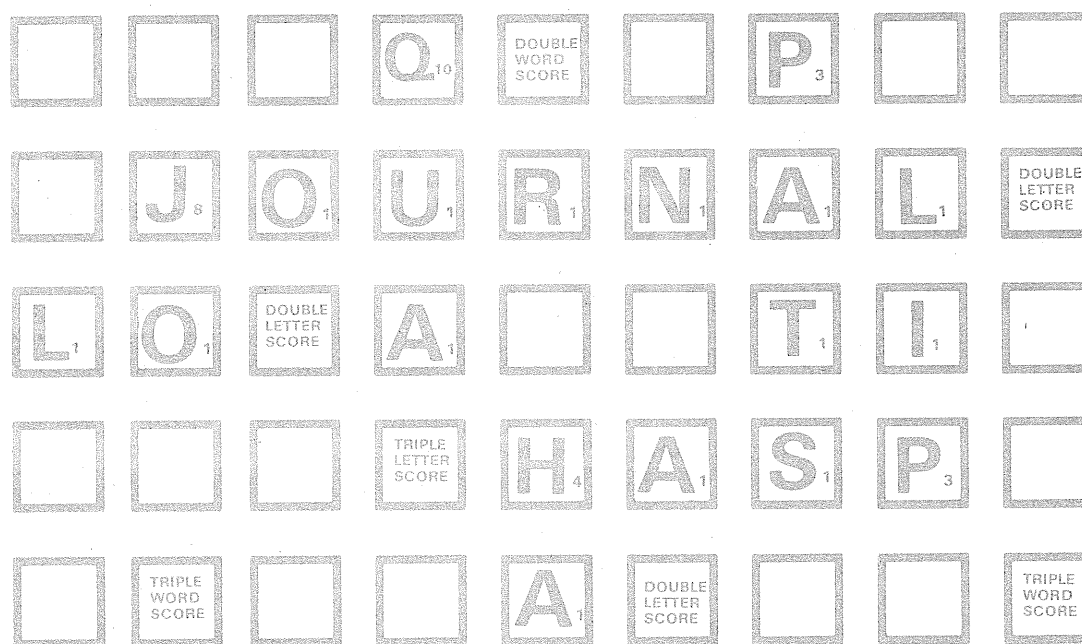


## A scrabble-like game for the TRS-80

# Crossword

Stanley Silverman, Huntington Beach, California

For Models I & III tape or disk



Crossword may be played by 1, 2, 3 or 4 players. (The one-player game, although not competitive, is valuable for practice.) In the two to four-player games, the players compete for highest score by using skill in the positioning of letters to take advantage of the score value of the letters as well as premium-valued board positions.

### To begin

By mutual consent, the players assign themselves a player number. Since the first player to play could have an advantage, the program will determine, by random selection, which player is first.

Load the program. Then type RUN and press the ENTER key. Answer the question "DO YOU WANT RULES?" with yes or no, depending on whether or not you need a refresher course on the

game rules. (The rules within the program are more brief than those described here, but contain essentially the same information.)

Answer the question "HOW MANY PLAYERS (1 - 4)" with the appropriate number and press ENTER.

After a brief pause for set-up, the board will be drawn on the screen. The board consists of 255 playable squares arranged in 15 rows of 15 squares. Some squares have premium values as shown by the following:

1. Squares marked D\*L double the score of a letter placed on them.
2. Squares marked T\*L triple the score of a letter placed on them.
3. Squares marked D\*W double the score of the entire word when one of its letters is placed on them.



4. Squares marked T\*W triple the score of the entire word when one of its letters is placed on them.

5. The center square is marked \*\*\*. It scores as a D\*W square.

The players' scores are displayed along the left edge of the screen. Initially, 100 letters are stored in the letter pool. The letter rack is shown at the bottom of the screen just below the last row of the board. Players are dealt seven letters at the beginning of each turn. They are displayed along with their score values. Examples: B(3) E(1) W(4).

There are also two "blank" letters in the letter pool which, when displayed on the letter rack, look like this: -(0). These blanks may be used as any letter desired, but once chosen to substitute for a particular letter they may not be changed during the game. Their score value is zero.

### The play

The first player combines two or more of his letters to form a word and places them on the board to read either across or down with one letter on the center (\*\*\*) square. This is done by typing the desired letter and pressing ENTER. To select a blank type the "." character. If the letter is available on the rack it will be marked with an arrow. Example: ➤B(3).

Using the arrow keys, move the blinking cursor to the square to which you wish the letter moved. Press ENTER. If that square is available, the chosen letter will appear on that square.

Continue moving letters until the word is complete. If, by accident, you move one or more of your letters to a wrong square, you may retract the letters from the board by typing the word "OOPS" and pressing ENTER. This will not affect your score or cause you to lose your turn. It simply begins your turn anew.

When satisfied that your word is correctly spelled and properly placed on the board, type the word "SCORE" and press ENTER. Your move will now be scored and any unused letters will be returned to the pool. The next player will now be dealt a new ration of letters.

The next player now has a choice: he may begin to move his letters or he may challenge the previous player's word. He would challenge the prior player based on suspected misspelling or improper placement on the board. If, after appropriate discussion, dictionary consultation, etc., the previous player's word is found to be unacceptable, the challenging player now types the word "CHALLENGE" (if all nine letters are typed, it will not be necessary to press ENTER). This will cause the prior player's letters to be removed from the board and placed back into the pool. That player's score total will also be decreased by the amount of the prior word score.

Once a player has moved his first letter to the board, the CHALLENGE command will become inoperative, so keep your eyes open!

Each player, in turn, adds one or more letters to those already played to form new words. All letters in a turn must be placed either in one row across the board or down the board. If they touch letters in other rows, they must form complete words with those letters.

Play continues until all letters have been used or until all players agree that further play is impossible. The player with the highest score wins. If asterisks (\*\*\*) begin to appear on the letter rack, the letter pool is empty.

There are two other commands available which may be helpful. Typing CLEAR then pressing ENTER will permit easier viewing of the played letters: premium legends are abbreviated to a single asterisk.

Typing RESTORE and pressing ENTER will return the screen to its original format.

### Scoring

The player's score is increased by the sum of the score values of each letter in each new word formed or each word modified in the player's turn. To this, the premium values which result from placing letters on premium value squares is added.

Premiums for D\*L and T\*L squares are calculated before calculating the premiums for D\*W and T\*W squares. If a word covers two D\*W or T\*W squares, the score will be doubled and then re-doubled or tripled and then re-tripled as appropriate.

Premiums apply only in the turn in which they are first played.

If more than one word is formed in a turn, each word is scored. The common letter is counted (with premium, if any) for each word.

A bonus of 50 points is added if all seven letters are played in a single turn.

### Miscellaneous

Program code is included for WEB Associates "TBEEP". The TBEEP will "beep" when an input error is made. This software causes no ill effect to those TRS-80 machines without TBEEP

```
10 'CROSSWORD VERS. 2.0: S. SILVERMAN H
    UNTINGTON BEACH, CA 92647
20 CLS: CLEAR 4650: RANDOM: DEF STRB, M, O, T: D
    EFINTA, C, I-L, P, S, U, Z: DIM B(225), BC(13)
    , H(6), HC(6), HM(6), HN(6), HS(6), L(13), O
    (13), S(225), SC(4), SS(6), T(99), U(13), V
    (6), VC(6), VM(6), VN(6), VS(6): PRINT CHR$
    (23) TAB(11) "CROSSWORD
```



(C) 1979 AND 1981, S. SILVERMAN

```

"
30 CU=113:INPUT"DO YOU WANT RULES";0:IF
  LEFT$(0,1)="Y"THEN1020ELSEIFLEFT$(0,1)
  )<>"N"THEN30
40 CLS:PRINTCHR$(23):INPUT"HOW MANY PLA
  YERS (1 TO 4)";P:PRINT:IFP<10RP>4THE
  N40
50 IFP>1PRINT"THE COMPUTER WILL DECIDE
  WHICH
  PLAYER IS FIRST.
  "
60 PRINTTAB(6)"(SETTING-UP BOARD)":P1=R
  ND(P):FORI=2TO224:B(I)=" . ":S(I)=1:N
  EXT:B1="T*W":B2="D*L":B3="D*W":B4="T*
  L":B(113)="***":B(1)=B1:B(8)=B1:B(15)
  =B1:B(106)=B1:B(120)=B1:B(211)=B1:B(2
  18)=B1:B(225)=B1
70 B(4)=B2:B(12)=B2:B(37)=B2:B(39)=B2:B
  (46)=B2:B(53)=B2:B(60)=B2:B(93)=B2:B(
  97)=B2:B(99)=B2:B(103)=B2:B(109)=B2:B
  (117)=B2:B(123)=B2:B(127)=B2:B(129)=B
  2:B(133)=B2:B(166)=B2:B(173)=B2:B(180
  )=B2:B(187)=B2:B(189)=B2:B(214)=B2:B(
  222)=B2
80 B(17)=B3:B(29)=B3:B(33)=B3:B(43)=B3:
  B(49)=B3:B(57)=B3:B(65)=B3:B(71)=B3:B
  (155)=B3:B(161)=B3:B(169)=B3:B(177)=B
  3:B(183)=B3:B(193)=B3:B(197)=B3:B(209
  )=B3
90 B(21)=B4:B(25)=B4:B(77)=B4:B(81)=B4:
  B(85)=B4:B(89)=B4:B(137)=B4:B(141)=B4:
  B(145)=B4:B(149)=B4:B(201)=B4:B(205)
  =B4:S(1)=6:S(8)=6:S(15)=6:S(106)=6:S(
  120)=6:S(211)=6:S(218)=6:S(225)=6
100 S(4)=2:S(12)=2:S(37)=2:S(39)=2:S(46
  )=2:S(53)=2:S(60)=2:S(93)=2:S(97)=2:S
  (99)=2:S(103)=2:S(109)=2:S(117)=2:S(1
  23)=2:S(127)=2:S(129)=2:S(133)=2:S(16
  6)=2:S(173)=2:S(180)=2:S(187)=2:S(189
  )=2:S(214)=2:S(222)=2
110 S(17)=5:S(29)=5:S(33)=5:S(43)=5:S(4
  9)=5:S(57)=5:S(65)=5:S(71)=5:S(113)=5
  :S(155)=5:S(161)=5:S(169)=5:S(177)=5:
  S(183)=5:S(193)=5:S(197)=5:S(209)=5:S
  (21)=3:S(25)=3:S(77)=3:S(81)=3:S(85)=
  3:S(89)=3:S(137)=3:S(141)=3:S(145)=3:
  S(149)=3
120 S(201)=3:S(205)=3:FORI=0TO99:READT(
  I):NEXT:CLS:PRINT"PLR
  #1":IFP=1THEN130ELSEPRINT@256,"PLR
  #2":IFP=2THEN130ELSEPRINT@512,"PLR
  #3":IFP=3THEN130ELSEPRINT@768,"PLR
  #4"

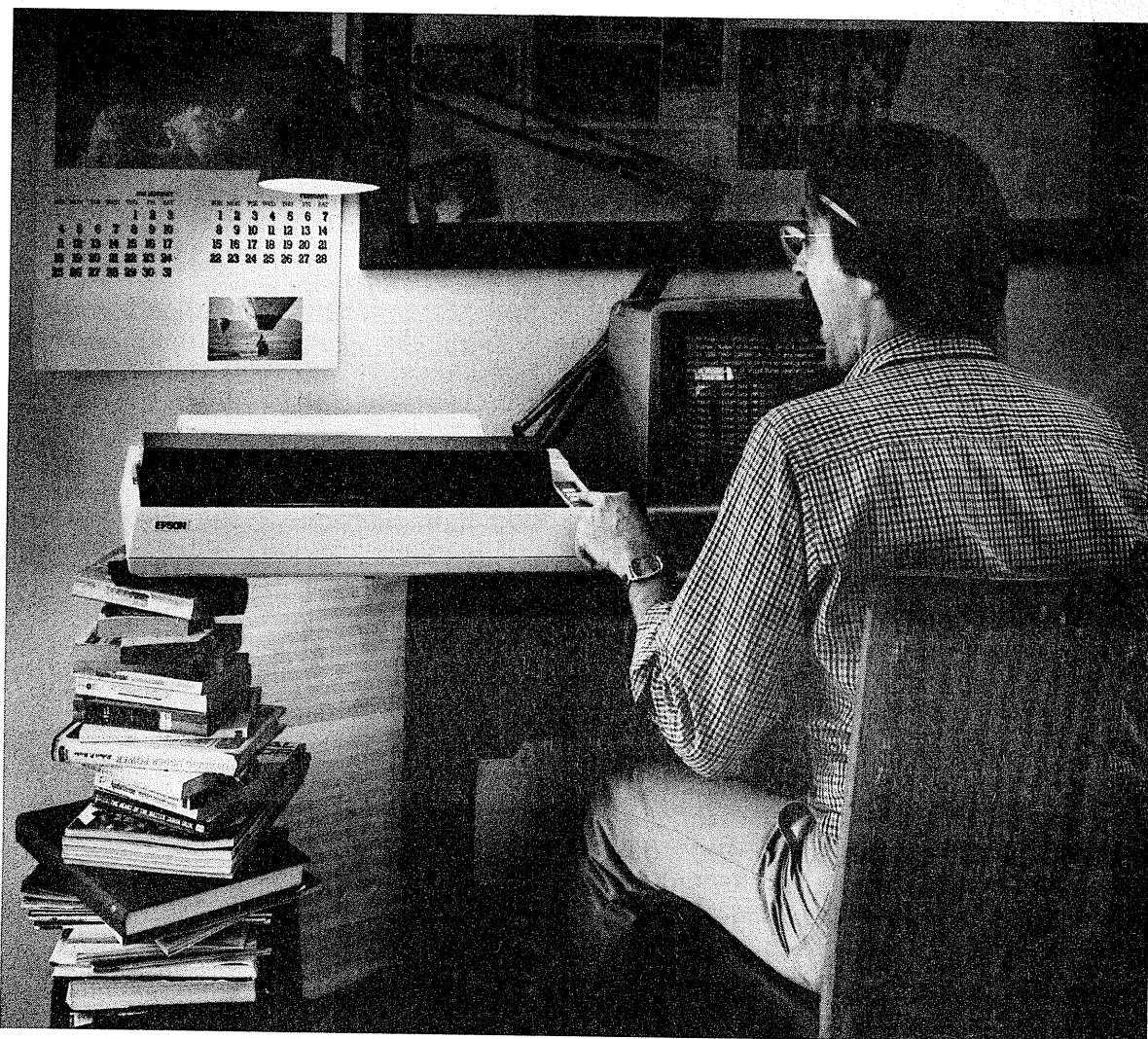
```

```

130 GOSUB140:GOTO180
140 I=0:K=1:PRINTCHR$(15);
150 FORJ=KTOK+14:I=I+1:IFS(I)>9THEN160E
  LSEPRINT@J*4-1,CHR$(170);B(I);
160 NEXT:IFI=225THEN170ELSEK=K+16:GOTO1
  50
170 FORI=16259TO16315STEP4:POKEI,138:NE
  XT:RETURN
180 PRINT@981,"(SELECTING LETTERS)";:GO
  SUB910:IFJ=100THEN600
190 IFP1=PTHEP1=1ELSEP1=P1+1
200 FORI=0TO6
210 Z=RN(100):IFT(Z-1)="*"THEN210
220 O(I)=T(Z-1):L(I)=Z:T(Z-1)="*":GOSUB
  910:IFJ>99THEN610
230 NEXT
240 PRINT@960,CHR$(30);:FORI=0TO6:IF0(I
  )="*"THEN620ELSEPRINT@981+I*6,RIGHT$(
  O(I),1);VAL(O(I));CHR$(24);") ";:PRIN
  T@982+I*6,"(";
250 NEXT
260 PRINT@960,P1;:PRINT@960,"#";:PRINT@
  962,"S MOVE ";CHR$(14);
270 FORI=1TO9
280 M=INKEY$:IFM=""THEN280ELSEIFASC(M)=
  10THEN280ELSEIFASC(M)=13THEN630ELSEIF
  ASC(M)=8THEN670ELSEPRINT@969+I,M;:M(I
  )=M:NEXT
290 GOTO630
300 C=0:K=1+4*CU+INT((CU-1)/15)*4
310 PRINT@K,CHR$(15);CHR$(143);:J=PEEK(
  14400):FORZ=0TO19:NEXT:PRINT@K,MID$(B
  (CU),2,1);:IFJ=1THEN320ELSEIFJ=8THEN9
  80ELSEIFJ=16THEN990ELSEIFJ=32THEN960E
  LSEIFJ=64THEN970ELSE310
320 IFS(CU)>9THEN830ELSESS(I)=S(CU):S(C
  U)=S(CU)+10:B=" "+MID$(O(I),LEN(O(I))
  -1,1)+":PRINT@K-1,CHR$(15);B;:BC(I)
  =B(CU):B(CU)=B:U(I)=CU:M=INKEY$:GOTO6
  60
330 FORI=0TO6:HS(I)=0:HN(I)=0:HC(I)=0:H
  M(I)=1:H(I)=0:VS(I)=0:VN(I)=0:VC(I)=0
  :VM(I)=1:V(I)=0:NEXT:IFA=7THENS=50ELS
  ES=0
340 FORI=0TO6:IFRIGHT$(O(I+7),1)<>"*"OR
  LEN(O(I+7))=1THEN470
350 H=INT((U(I+7)-1)/15)*15+1:FORK=0TO6
  :IFH(K)=HTHEN400
360 NEXT:H(I)=H:FORJ=HTOH+14:IFS(J)<9TH
  EN500
370 IFS(J)<99THEN530
380 HC(I)=HC(I)+1:HS(I)=HS(I)+S(J)-100
390 NEXT:GOTO510
400 V=U(I+7)

```





# The MX-100. Not just better. Bigger. Epson.

Our MX-80 was a pretty tough act to follow. I mean, how do you top the best-selling printer in the world?

Frankly, it wasn't easy. But the results of all our sleepless nights will knock your socks off.

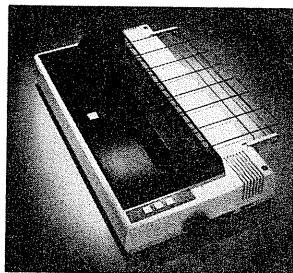
The MX-100 is a printer that must be seen to be believed. For starters, we built in unmatched correspondence quality printing, and an ultra-high resolution bit image graphics capability. Then we added the ability to print up to 233 columns of information on 15" wide paper to give you the most incredible spread sheets you're ever likely to see. Finally, we topped it all off with *both* a satin-smooth friction feed platen *and* fully adjustable, removable tractors. And the list of standard features goes on and on and on.

Needless to say, the specs on this machine — and especially at under \$1000 — are practically unbelievable. But there's something about the MX-100 that goes far

beyond just the specs; something about the way it all comes together, the attention to detail, the fit, the feel. Mere words fail us. But when you see an MX-100, you'll know what we mean.

All in all, the MX-100 is the most remarkable printer we've ever built. Which creates rather a large problem for those of us at Epson.

How are we going to top this?



*Your next printer.*

**EPSON**  
EPSON AMERICA, INC.

3415 Kashiwa Street • Torrance, California 90505 • (213) 539-9140  
See the whole incredible Epson MX Series of printers at your Authorized Epson Dealer.



```

410 V=V-15:IFV>0THEN410ELSEV=V+15
420 FORK=0TO6:IFV(K)=VTHEN470
430 NEXT:V(I)=V:FORJ=VTOV+210STEP15:IFS
(J)<9THEN550
440 IFS(J)<99THEN580
450 VC(I)=VC(I)+1:VS(I)=VS(I)+S(J)-100
460 NEXT:GOTO560
470 NEXTI:FORI=7TO13:IFRIGHT$(O(I),1)="
*"THENS(U(I))=100+VAL(O(I))
480 NEXT:FORI=0TO6:S=S+HS(I)+VS(I):NEXT
:SC(P1)=SC(P1)+S:PRINT@127+(P1-1)*256
,STR$(SC(P1));:RETURN
490 PRINT@971," ("';:FORJ=91TO94:PRINTCH
R$(J);:NEXT:PRINT")";:RETURN
500 IFHN(I)=0THENHC(I)=0:HS(I)=0:GOTO39
0
510 IFHC(I)>1THENHS(I)=HS(I)*HM(I)ELSEH
S(I)=0
520 GOTO400
530 HN(I)=HN(I)+1:HC(I)=HC(I)+1:GOSUB93
0:IFS(J)<14THENHS(I)=HS(I)+VAL(O(Q))*
(S(J)-10)ELSEHS(I)=HS(I)+VAL(O(Q)):HM
(I)=HM(I)*(S(J)-13)
540 GOTO390
550 IFVN(I)=0THENVC(I)=0:VS(I)=0:GOTO46
0
560 IFVC(I)>1THENVS(I)=VS(I)*VM(I)ELSEV
S(I)=0
570 GOTO470
580 VN(I)=VN(I)+1:VC(I)=VC(I)+1:GOSUB93
0:IFS(J)<14THENVS(I)=VS(I)+VAL(O(Q))*
(S(J)-10)ELSEVS(I)=VS(I)+VAL(O(Q)):VM
(I)=VM(I)*(S(J)-13)
590 GOTO460
600 PRINT@960,:INPUT"OUT OF LETTERS.
GAME IS OVER. PLAY AGAIN (YES/
NO)";T:IFLEFT$(T,1)="Y"THENRUNELSEIFL
EFT$(T,1)<>"N"THEN600ELSEEND
610 IFI=6THEN240ELSEFORJ=I+1TO6:O(J)="*
":NEXT:GOTO240
620 PRINT@981+I*6," *** ";:GOTO250
630 IFI<2THEN650ELSEIFI=2THEN680
640 M=M(1)+M(2)+M(3):IFM="00P"THEN710EL
SEIFM="CHA"THEN750ELSEIFM="SC0"THEN79
0ELSEIFM="RES"THEN900ELSEIFM="CLE"THE
N860
650 PRINT@971,CHR$(15);" WHAT ??";:GOSU
B950
660 PRINT@970,CHR$(202);:GOTO260
670 IFI<2THEN270ELSEI=I-1:PRINTCHR$(8);
:GOTO280
680 FORI=0TO6:IFM(1)=RIGHT$(O(I),1)THEN
700ELSENEXT
690 GOTO650
700 PRINT@980+I*6,CHR$(15);CHR$(94);:GO
SUB490:O(I)=O(I)+"*":GOTO300

```

```

710 PRINTCHR$(15);:FORI=0TO6:IFRIGHT$(O
(I),1)="*"THEN730
720 NEXT:GOTO660
730 IFLEFT$(O(I),1)="*"THEN720ELSEPRINT
@980+I*6," ";:GOSUB740:S(U(I))=SS(I):
U(I)=0:GOTO720
740 O(I)=LEFT$(O(I),LEN(O(I))-1):B(U(I)
)=BC(I):PRINT@INT((U(I)-1)/15)*4+*
U(I),BC(I);:RETURN
750 IFCTHEN760ELSEPRINT@970,CHR$(15);"N
OT NOW!!";:GOSUB950:GOTO660
760 C=0:PRINTCHR$(15);:FORI=7TO13:IFRIG
HT$(O(I),1)="*"THEN780
770 NEXT:SC(P0)=SC(P0)-S:PRINT@129+(P0-
1)*256," ";:PRINT@127+(P0-1)*256,STR
$(SC(P0));:GOTO660
780 GOSUB740:T(L(I)-1)=O(I):S(U(I))=SS(
I-7):GOTO770
790 PRINT@980,CHR$(15);CHR$(30);TAB(28)
"(SCORING)";:P0=P1:A=7:C=1:FORI=0TO6:
O(I+7)=O(I):U(I+7)=U(I):L(I+7)=L(I):B
C(I+7)=BC(I):NEXT
800 FORI=0TO6:IFRIGHT$(O(I),1)="*"THEN8
40
810 A=A-1:T(L(I)-1)=O(I)
820 NEXT:GOSUB330:PRINT@960,CHR$(30);:G
OTO180
830 PRINT@972,CHR$(15);" HUH??";:GOSUB9
50:PRINT@972,CHR$(198);:GOSUB490:GOTO
300
840 IFLEN(O(I))=1THENA=0
850 GOTO820
860 I=0:K=1:PRINTCHR$(15);
870 FORJ=KTOK+14:I=I+1:IFS(I)>9THEN890
880 IFMID$(B(I),2,1)="*"THENPRINT@J*4,"
* ";
890 NEXT:IFI=225THEN660ELSEK=K+16:GOTO8
70
900 GOSUB140:GOTO660
910 J=0:FORK=0TO99:IFT(K)="*"THENJ=J+1
920 NEXT:RETURN
930 FORQ=0TO6:IFU(Q)=JTHENRETURN
940 NEXT
950 OUT255,1:FORZ=1TO700:NEXT:OUT255,0:
RETURN
960 IFCU=INT((CU-1)/15)*15+1THEN310ELSE
CU=CU-1:GOTO300
970 IFCU/15=INT(CU/15)THEN310ELSECU=CU+
1:GOTO300
980 IFCU<16THEN310ELSECU=CU-15:GOTO300
990 IFCU>210THEN310ELSECU=CU+15:GOTO300

1000 DATA0-,0-,1A,1A,1A,1A,1A,1A,1A,1A,
1A,3B,3B,3C,3C,2D,2D,2D,2D,1A,1E,1E,1
E,1E,1E,1E,1E,1E,1E,1E,4F,4F,2G,2G
,2G,4H,4H,1I,1I,1I,1I,1I,1I,1I,1I,1I,
8J,5K,1L,1L,1L,1L,3M,3M

```

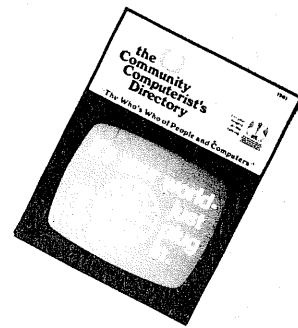
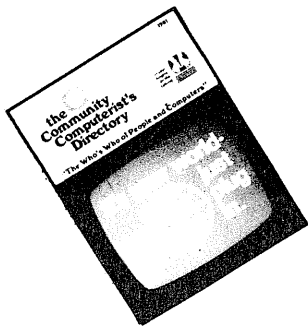


# EXTRAORDINARY INTRODUCTORY OFFER

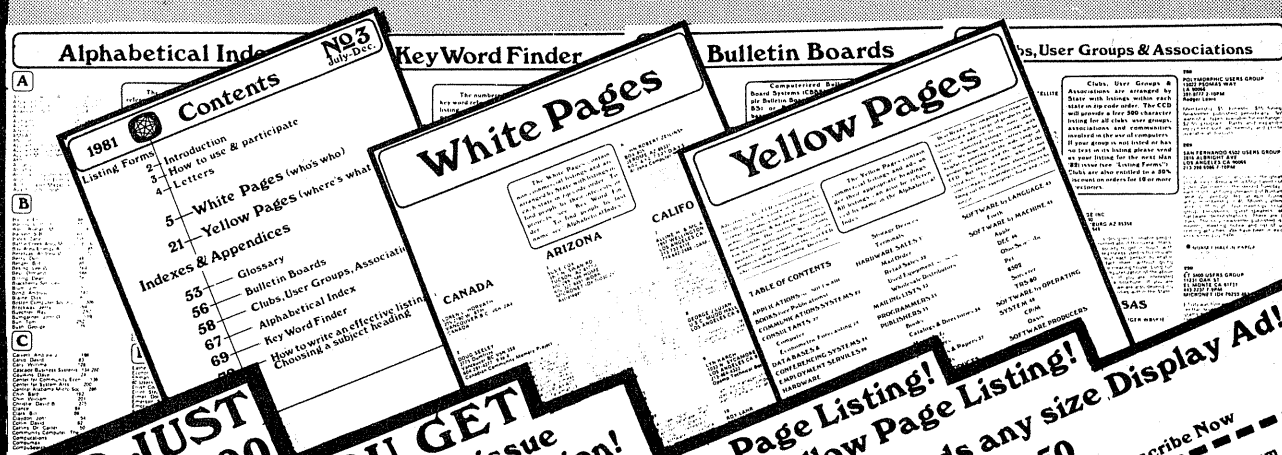
FOR NEW SUBSCRIBERS

**\$10<sup>00</sup>**

**NEVER  
BOUGHT SO MUCH!!**



**This is not another computer magazine**



**FOR JUST \$10<sup>00</sup> YOU GET**

1) a Free copy of current issue  
2) a One Year Subscription!  
3) a Free 25 word White Page Listing!  
4) \$5.00 Credit on a Yellow Page Listing!  
5) \$10.00 Credit towards any size Display Ad!

**Total Value = \$28.50**

Save \$18.50 and Join the Information Revolution. Subscribe Now

Send me ☐ Display ad rates ☐ store order form

ENCLOSED \$

**the Computerist's Directory**  
PO BOX 405  
FORESTVILLE, CA 95436  
(707) 887-1857

☐ VISA  
☐ MASTER CHARGE  
☐ AMERICAN EXP  
ACCOUNT NO.

NAME ADDRESS

SIGNATURE

CITY

STATE ZIP

**What is the Computerist's Directory?**  
It is a national "paper data base" in phone book format dedicated to all computer users including professionals, business people, hobbyists and prospective buyers. It is published twice annually in January and July with quarterly update dates planned for April '82.



(Editor's note: The data in line 1010 is not the number 10, but the number "1" and the letter "O".)

```
1010 DATA 1N,1N,1N,1N,1N,1N,10,10,10,10,
10,10,10,10,3P,3P,10Q,1R,1R,1R,1R,1R,
1R,1S,1S,1S,1S,1T,1T,1T,1T,1T,1U,1
U,1U,1U,4V,4V,4W,4W,8X,4Y,4Y,10Z
1020 CLS:PRINT"SEVERAL SQUARES HAVE PRE
MIUM VALUES:
```

```
D*L = LETTER SCORE IS DOUBLED
T*L = LETTER SCORE IS TRIPLED
D*W = WORD SCORE IS DOUBLED
T*W = WORD SCORE IS TRIPLED
*** = THE CENTER SQUARE. SCORES AS A
D*W SQUARE.
```

```
1030 PRINT"THE LETTER RACK IS SHOWN AT
THE BOTTOM OF THE SCREEN. THE"
1040 PRINT"LETTERS ARE SHOWN ALONG WITH
THEIR SCORE VALUES. EXAMPLE: B(3)."
;:PRINT"THERE ARE ALSO 2 BLANKS IN TH
E POOL WHICH LOOK LIKE: -(O).
BLANKS MAY BE USED AS ANY LETTER DESIRE
D, BUT MAY NOT BE"
1050 PRINT"CHANGED DURING THE GAME. TH
EIR SCORE VALUE IS ZERO.":GOSUB1200:P
RINT"...THE PLAY:
THE FIRST PLAYER COMBINES TWO OR MORE O
F HIS LETTERS TO FORM A
WORD AND PLACES THEM ON THE BOARD TO RE
AD EITHER ACROSS OR "
1060 PRINT"DOWN WITH ONE LETTER ON THE
CENTER SQUARE. THIS IS DONE BY:
1. TYPE THE DESIRED LETTER AND PRESS =
ENTER=. IF THE LETTER
IS AVAILABLE IT WILL BE MARKED.
EXAMPLE: ";CHR$(94);"B(3)."
1070 PRINT"2. USING THE ARROW KEYS, PO
SITION THE CURSOR TO THE SQUARE YOU
WISH THE LETTER MOVED. PRESS =ENTE
R=. IF THE SQUARE IS AVAILABL
E, THE LETTER WILL APPEAR ON THAT SQU
ARE."
```

```
1080 PRINT"3. CONTINUE MOVING LETTERS
UNTIL YOUR WORD IS COMPLETE.":PRINT"4
. IF YOU MOVE A LETTER TO A WRONG SQ
UARE, YOU MAY RETRACT YOUR LETTERS
BY TYPING THE WORD ";CHR$(34);"OOPS"
;CHR$(34);"."
1090 PRINT"5. WHEN SATISFIED THAT YOUR
WORD IS PROPERLY PLACED, TYPE THE
WORD ";CHR$(34);"SCORE";CHR$(34);".
YOUR MOVE WILL BE SCORED AND THE NEX
T PLAYER'S LETTERS WILL BE SELECTE
D.":GOSUB1200
1100 PRINT"...CONTINUE THE PLAY:
```

```
6. EACH PLAYER IN TURN ADDS LETTERS TO
THOSE ALREADY PLAYED
TO FORM NEW WORDS. ALL LETTERS IN
A TURN MUST BE PLACED"
1110 PRINT" IN A ROW ACROSS OR DOWN
THE BOARD. IF THEY TOUCH LETTERS
IN OTHER ROWS THEY MUST FORM COMPLE
TE WORDS WITH THOSE
LETTERS."
1120 PRINT"7. A WORD MAY BE CHALLENGED
BEFORE THE NEXT PLAYER MOVES HIS
FIRST LETTER. IF THE WORD CHALLENG
ED IS FOUND UNACCEPTABLE,;
1130 PRINT" TYPE THE WORD "CHR$(34);
"CHALLENGE";CHR$(34);" AS THE FIRST M
OVE. THIS WILL
CAUSE THE PREVIOUS PLAYER'S LETTERS
TO BE REMOVED FROM THE
BOARD AND PLACED BACK INTO THE POOL
. THE PREVIOUS PLAY-"
1140 PRINT" ER'S SCORE WILL ALSO BE
ADJUSTED.":GOSUB1200:PRINT"8. PLAY C
ONTINUES UNTIL ALL LETTERS HAVE BEEN
USED OR UNTIL ALL PLAYERS AGREE TH
AT FURTHER PLAY IS IMPOSSIBLE. THE P
LAYER"
1150 PRINT" WITH THE HIGHEST SCORE W
INS. WHEN ASTERISKS (***) BEGIN
TO APPEAR ON THE LETTER RACK, THE L
ETTER POOL IS EMPTY.
"
1160 PRINT"...THERE ARE TWO OTHER COMMA
NDS WHICH MAY BE USEFUL:
TYPING ";CHR$(34);"CLEAR";CHR$(34);" WI
LL PERMIT EASIER VIEWING OF PLAYED LE
TTERS."
1170 PRINT"(PREMIUM SQUARE LEGENDS ARE
REPLACED WITH ASTERISKS.)
TYPING ";CHR$(34);"RESTORE";CHR$(34);"
WILL RETURN THE SCREEN TO ITS ORIGINA
L FORMAT.
```

```
...SCORES ARE CALCULATED AS FOLLOWS:"
1180 PRINT"FOR EACH TURN, THE PLAYER'S
SCORE IS INCREASED BY THE SUM OF
THE SCORE VALUES OF EVERY LETTER IN EAC
H NEW WORD FORMED OR
EACH WORD MODIFIED IN THE PLAY PLUS THE
PREMIUM VALUES WHICH"
1190 PRINT"RESULT FROM PLACING LETTERS
ON PREMIUM VALUE SQUARES.":GOSUB1200:
GOTO40
1200 PRINT@979,"(PRESS ANY KEY TO CONTI
NUE)";
1210 0=INKEY$:IF0=""THEN1210ELSECLS:RET
URN
```



# Color computer owners, 32K PLUS DISKS\*

## \$298.<sup>00</sup>

Yes, that's right - for as little as \$298.00 you can add 32K of dynamic RAM, and a disk interface, to your TRS-80 Color Computer! If you just want the extra memory it's only \$199.00, and you can add the disk interface later for \$99.00.

Just plug the *Color Computer Interface (CCI)*, from Exatron, into your expansion socket and "Hey Presto!" - an extra 32K of memory. No modifications are needed to your computer, so you don't void your Radio Shack warranty, and Exatron give both a 30 day money-back guarantee and full 1 year repair warranty on their interface.

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.

So what about the *CCI Disk Card*? Well as we said it's only an extra \$99.00, but you'll probably want Exatron's *CCDOS* which is only \$29.95 - unless you want to write your own operating system. The *CCI Disk*

*Card* uses normal TRS-80 Model I type disk drives, and *CCDOS* will even load Model I TRSDOS disks into your color computer - so you can adapt existing TRS-80 BASIC programs.

As a further plus, with the optional *ROM Backup* adaptor, you can dump game cartridges to cassette or disk. Once the ROM cartridge is on cassette, or disk, you can reload, examine and modify the software. The *ROM Backup* adaptor is only \$19.95.

For more information, or to place an order, phone Exatron on their Hot Line 800-538 8559 (inside California 408-737 7111), or clip the coupon.



*excellence in electronics*

# exatron

### DEALER ENQUIRIES INVITED

Exatron,  
181 Commercial Street,  
Sunnyvale, CA 94086



- ☐ Please send a 32K Color Computer Interface for \$199.00
- ☐ Please send a CCI Disk Card for \$99.00
- ☐ Please include CCDOS and manual for \$29.95
- ☐ Also include a ROM Backup adaptor for \$19.95

Please add \$5.00 for shipping to all orders, and 6 percent sales tax in California.

Name .....

Address .....

City .....

State ..... Zip .....

Charge my:

☐ MasterCard Interbank Code .....

☐ Visa Expiration Date .....

Card .....

☐ Check enclosed for .....

☐ Ship COD (\$2.00 extra)

Signature .....



# Putting the Allocation Table on Disk

# Files & Foibles

for Models I, II, III, & Color with disk

**Terry Dettmann**

In the last issue, we introduced you to the concept of indexing a random access file. This was illustrated by using the TODO program, which unfortunately had one major failing. The file index isn't on diskette with the rest of the file all of the time. Therefore, anything which changes the index (additions, deletions, etc.) will be lost if someone accidentally knocks you off line through power failure, computer reset or unintentional reboot.

Instead of having two files, one for the allocation file and index and another for data, we will put all the information into one file. To do this we will create several different FIELD structures for the same file.

To create an allocation table for the file, set aside one or more sectors for this information. One sector, which is 256 bytes long, will allow us 128 integers, which occupy two bytes each. With bit manipulation, we could fit in 2048 yes/no (1 or 0) responses into a 256-byte sector. We won't worry about getting down to this level at this time, but what about the byte level?

The TRSDOS manual informs us that the smallest sized number which can be used by the system is the integer. An integer occupies two bytes of diskette space.

If you think for a moment, you will realize that an alphanumeric character occupies one byte of space. Not only that, but it is stored in the computer as a number! The range of that number is 0 to 255 and most of the lower half (0 to 127) has been identified as the ASCII code.

When a data file is fielded, the computer is instructed which fields to use as numbers and which to use as letters. The computer must be further instructed to treat the numbers as letters by using the conversion functions MKI\$, MKS\$ and MKD\$, and to reverse the process, CVI, CVS and CVD.

Two other conversion functions have been around since Level II: CHR\$ and ASC. These are one-byte conversions of alpha to numeric and visa-versa. The important thing to remember is

the limitation of the numeric range when using this technique. As mentioned above, the range of a single byte representing a letter is 0 to 255, which are the limits imposed on us here.

Now, let's open a random access file and work with it. First type in:

```
200 OPEN "R",1,"RANDOM/DAT"
```

We will limit ourselves to a 255 byte record length because of an inherent limitation of strings to this size. Now field the allocation table:

```
210 FOR I=1TO255:FIELD 1,(I-1) AS DMY$, 1  
      AS AT$(I): NEXT I
```

Also field for the actual data file:

```
220 FIELD 1, 255 AS DA$
```

Even though two field statements have been used, neither has precedence over the other. Fielding is simply the assignment of certain variables to "buffer" space in memory. There is nothing to prevent the assignment of more than one variable to the same area of memory as we have done here. In the area of file manipulation, it makes this disk BASIC the most powerful and flexible of its kind.

The allocation table is now assigned to some record in the file. For convenience and ease of programming, assign it to the first record.

Next, place a 1 in the first position to indicate the allocation of the table and fill the rest with zeros to indicate empty, or unused, file space. Do this as a subroutine:

```
400 REM INITIALIZE ALLOCATION TABLE  
410 LSET AT$(1)=CHR$(1)  
420 FOR I = 2 TO 255  
430 LSET AT$(I)=CHR$(0)  
440 NEXT I  
450 PUT 1,1  
460 RETURN
```

Next, several subroutines need to be assigned various tasks. To check our allocation table, use this routine:



# FREE SHIPPING

(ONLY IN CONTINENTAL U.S.)

## MODEL III DISK KITS

TWO 40/track drive kit and hardware. Comes complete with all the necessary hardware and 2 drives of your choice, (MPI or TANDON 40 track). NO SOLDERING OR TRACE CUTTING REQUIRED! COMPLETE EASY TO FOLLOW INSTRUCTIONS INCLUDED ..... **\$75.95**



TWO 80/track drive kit and hardware. Same as above ..... **1,095.00**

ONE 40/track drive kit with all hardware and your choice of MPI or TANDON 40/track drive. (INSTRUCTIONS INCLUDED) ..... **599.99**

ONE 80/track drive kit with all hardware and one MPI 80/track drive. No soldering! (INSTRUCTIONS INCLUDED) ..... **699.99**

TRS-80 MODEL III, 48K, 2 40 Track TANDON or MPI drives ..... **2,095.99**  
TRS-80 MODEL III, 48K, 2 80 Track MPI drives ..... **2,325.99**

1 YEAR WARRANTY

## 16 K MEMORY 19.95

MODEL I, III APPLE AND EXIDY. Instructions included.  
(MOD 1 Keyboard requires jumpers. \$2.00 extra)

ARCHBOLD SPEED-UP MODIFICATION FOR MOD I  
TRS-80. RUN UP TO 300% FASTER CPU SPEED! SPEED UP  
SLOW PROGRAMS WITHOUT SOFTWARE! ..... **45.00**

## MONITORS

Black and White Monitors 12" (TECO) ..... **129.95**  
Green Phosphor Monitors 12" (TECO) ..... **159.95**  
AMDEK Black and White 12" Monitor ..... **159.95**  
AMDEK Green Phosphor 12" Monitor 100G ..... **189.95**

## MODEL I DISK DRIVES

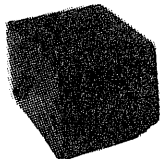
These drives come complete with power supply and chassis.  
90 day warranty on disk drives. ALL DRIVES COMPLETELY  
TESTED PRIOR TO SHIPPING! 40 track drives are fully  
compatible with TRSDOS, NEWDOS-80, LDOS etc.

Fully compatible with the PERCOM DOUBLER and Double  
density! 80 track drives require MAKE-80 program to run  
regular software. (SPECIAL! GET A FREE 2 DRIVE CABLE  
WHEN BUYING 2 or more DRIVES!)

40 TRACK MPI or TANDON DRIVES ..... **319.95**  
80 TRACK MPI ..... **439.95**  
DOUBLE SIDED 80 TRACK MPI ..... **579.95**  
2 DRIVE CABLES ..... **25.95**  
4 DRIVE CABLES ..... **35.95**  
SPECIAL DOUBLE SIDED CABLES ..... (CALL \$)  
MAKE-80 CONVERT 40 TRACK TO 80 TRACK.  
(SPECIFY MOD I, III) ..... **29.95**

## DISKETTES

SPECIAL: Brown Bag Diskettes (Verbatim) Bag of 20 ..... **49.95**  
SPECIAL: Brown Bag Diskettes 100 Quantity ..... **214.00**  
VERBATIM DATALIFE DISKETTES Box of 10 ..... **32.50**  
VERBATIM DATALIFE DISKETTES 100 Quantity ..... **275.00**



## SPECIAL DISK HOLDER

Holds 50 Diskettes  
Reg. Price \$35.95  
SPECIAL

**\$21.95**

PERCOM DOUBLER II (Includes DBLDOS) Doubles storage  
on Model I disk drives. Installs in Exp. Int. in minutes! Will not  
effect normal operation! ..... **169.95**

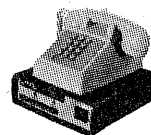
NEWDOS-80 (New Version 2) ..... **139.95**  
LDOS ..... **139.95**  
DOSPLUS 3.3 ..... **89.95**

(Specify Mod I or III)

## LYNX TELEPHONE MODEM

AUTO/DIAL AUTO/ANSWER.

COMPLETE WITH SOFTWARE AND  
HARDWARE FOR MODELS I AND III



The RS-232 is not needed! Completely  
assembled. LYNX MODEMS are compatible with  
ST-80 III also ..... **299.95**  
ST-80 III: Smart terminal program. Allows saving data to disk  
or sending data from disk and more! Mod I or III ... **149.95**

## PRINTERS

**SPECIAL: FREE CABLES AND FREE SHIPPING  
WITH ALL PRINTERS!**

CABLES FOR MODEL I EXPANSION INTERFACE, MOD III,  
or PMC-80 EXP 100 or PIF-40 only.)  
PLEASE SPECIFY WHICH COMPUTER!

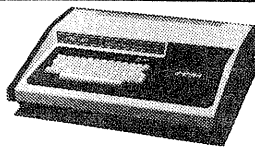
## HIGH QUALITY DOT MATRIX

EPSON MX-80 (Tractor feed only) ..... **539.95**  
EPSON MX-80 FT (Tractor and Friction feed) ..... **639.95**  
EPSON MX-70 (Tractor feed only) ..... **419.95**  
EPSON MX-100 (Tractor and Friction feed 14.5 wide) ..... **895.95**  
EPSON MX-80 Hi-Res Graphics Option ..... **89.95**  
Add-On Friction Feed Adaptor for MX-80 or MX-70 ..... **59.95**  
OKIDATA MICROLINE 80 (Friction and Pin feed) ... **414.95**  
OKIDATA MICROLINE 82 (Friction and Pin feed) .. **597.95**  
OKIDATA MICROLINE 83 ..... **897.95**  
(Friction, Pin and Tractor feed 14.5")  
OKIDATA MICROLINE 82A. 120 cps ..... **625.00**  
(9x9 matrix w/descenders)  
OKIDATA MICROLINE 83A. 120 cps ..... **925.00**  
(9x9 matrix w/descenders)  
TRACTOR FEED ADAPTOR for 80 and 82 ..... **75.00**

## LETTER QUALITY PRINTERS

The C-itoh Daisy wheel printer is one of the finest Letter  
Quality printers we've seen. WHY PAY MORE FOR LESS???  
Exchange Daisy wheels to get the kind of printing fonts you  
need. 12-10 pitch. Excellent with Scriptit or Electric pencil.  
Let's face it, sometimes dot matrix doesn't hack it! (You can  
use standard Diablo Carbon ribbons with the C-itoh to get  
crisp "COPY READY" printouts!)

C-ITOH DAISY WHEEL 25 CPS ..... **1,795.25**  
C-ITOH DAISY WHEEL 45 CPS ..... **1,995.25**  
C-ITOH TRACTOR FEED ..... **219.95**



## PMC-80 COMPUTER

**16K LEVEL II** Fully compatible with  
all TRS-80 Mod I Software **595.95**

## PMC-81 COMPUTER 16K LEVEL II

with upper/lower case. Upper/lower case  
driver in ROM. Auto key repeat. Numeric keypad.

4 programmable keys. Built in speaker. 100% Mod I software compatible **679.99**  
**EXPANDER 100** PMC's expansion interface 32K, disk controller, printer interface.  
(Expands PMC-80/81 to 48K) ..... **499.99**  
**RF-MODULATOR** for PMC or TRS-80 to TV Hook-up. Completely assembled and  
tested. (Plugs in Video port) UHF CH.33 ..... **39.95**

TRS-80 Disk and Other Mysteries Book, 132 pp ..... **22.50**  
Microsoft Basic Decoded and Other Mysteries, 312 pp ..... **29.95**  
Custom TRS-80 and Other Mysteries, 300 pp ..... **29.95**

**CALL TOLL FREE: 800-528-1149**

NO SURCHARGE FOR VISA, MASTER CARD OR AMERICAN EXPRESS!!!  
(10% DEPOSIT REQUIRED ON C.O.D.'S OVER \$200.00) Send Certified Check,  
Money Order or Check.

## SIMUTEK COMPUTER PRODUCTS INC.

4877 E. SPEEDWAY  
TUCSON, AZ 85712  
(602) 323-9391

CALL FOR  
FREE 100+ PAGE  
CATALOG!!!

TRS-80 IS A TM OF TANDY CORP. PMC-80 IS TM OF PERSONAL MICROCOMPUTERS.  
PRICES AND SPECIFICATIONS ARE SUBJECT TO CHANGE WITHOUT NOTICE.



```

500 REM CHECK ALLOCATION TABLE
501 REM IF EF=0 THEN THAT TABLE
502 REM LOCATION IS EMPTY. IF EF=1
503 REM THEN IT IS FULL. LC IS THE
504 REM LOCATION WE WANT TO CHECK.
505 REM FIRST GET THE TABLE FROM
506 REM RECORD ONE.
510 GET 1,1
520 EF=ASC(AT$(LC))
530 RETURN

```

To find the first available free space in the table, get the table into memory and search the array:

```

600 REM GET FREE SPACE
601 REM LC WILL BE THE FREE LOCATION.
602 REM IF LC=0 THEN THERE IS NO FREE
603 REM SPACE.
610 GET 1,1
620 FOR I=2 TO 255
630 IF ASC(AT$(I))=0 THEN LC=I : RETURN
640 NEXT I
650 LC=0
660 RETURN

```

To allocate space in the file, find the free space from subroutine 600 and then call the space allocation routine:

```

700 REM ALLOCATE SPACE.
701 REM LC IS THE RECORD TO ALLOCATE.
710 GET 1,1
720 LSET AT$(LC)=CHR$(1)
730 PUT 1,1
740 RETURN

```

To deallocate the space (free it up when we delete a record), use the following routine:

```

800 REM DEALLOCATE SPACE
801 REM LC IS THE RECORD TO DEALLOCATE
810 GET 1,1
820 LSET AT$(LC)=CHR$(0)
830 PUT 1,1
840 RETURN

```

It is important to keep track of what you are working with when there are two different things in the same fielded file. Lines 710 and 810 insure that we are working with the allocation table before we do anything. The system tracks which record is in the buffer and will not re-access the disk if we already have the record we want.

You may have noticed that subroutines 700 and 800 are, for all intents and purposes, identical. We can eliminate one of the subroutines by passing

the number which indicates allocation (1) or deallocation (0) to a single subroutine.

We can expand beyond the 255 number limit by assigning more than one record (sector) to the allocation table. By looking at the records one at a time and rewriting our routines to handle multiples of 255 we can do this.

## Where is the index?

Now that the allocation table is on diskette we won't lose more than the very last transaction. What about the index? Here things get slightly complex.

For a sorted index, we have to perform a sort. An on-diskette sort is much slower than in memory. A fairly obvious way to speed this up is to read the index into memory, sort it, and write it back out to disk for use. This way, if a failure occurs during the sort, nothing has been lost because the original is still on diskette and we can resort it if necessary. However, there are still better ways to accomplish the same thing.

In the next session, we will look at ways to use that index without having to sort it. In the process, we will improve the access time to a file.

The technique is called *Hash Coding*, which is a way to turn our key into a number which becomes the location of the data in the file. With a properly designed system, a record may be accessed almost as quickly as if the key was the address of the record itself!

## A word of caution--

Dr George Haller, of Naples, Florida, pointed out that in the Mar/Apr 81 issue, we did something which can cause problems if not treated properly. We fielded a variable like this:

```
8 AS CS$
```

He correctly pointed out that if we leave out the spaces, we get:

```
8ASCS$
```

which the interpreter sees as:

```
8 ASC S$
```

ASC is a BASIC function which, on execution, will create a syntax error. Using any variable which starts with the letter C in a field statement may create this type of error. Unless you are aware of this problem, the cause is very difficult to detect as it looks OK, especially if you have other variables fielded that same way - without spaces.

By either *never* using a variable which begins with C or *always* spacing between the AS and the variable, this problem can be avoided.

## Postscript

I would like to thank everyone who has written to comment on this series of articles. Your comments, suggestions, and opinions have been most helpful in determining the future of the series. *T R Dettmann* ■



# Not all Spelling Checkers are the same.

# MICROPROOF<sup>T.M.</sup> stands out!

**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 MICROPROOF proofreads your document, displaying misspellings and typos on the screen. Then correcting MICROPROOF 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 MICROPROOF's 50,000 word vocabulary. Finally, MICROPROOF corrects your document. All in less than a minute.

## SELECT APPROPRIATE RESPONSE:

CORRECT MISPELLED WORD:	ENTER CORRECT WORD
LEAVE WORD "AS IS":	HIT <ENTER> KEY
DISPLAY WORD IN CONTEXT:	?
ADD WORD TO DICTIONARY:	+
EXIT:	!

WORD: (Your error)  
RESPONSE:

*Correcting MICROPROOF Screen Display*

**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. MICROPROOF's speed is outstanding. It can proof-read a several page letter in 20 seconds.

**LOW PRICES:** Standard MICROPROOF is available for either \$89.50 (TRS-80® Models I or III) or \$149.50 (CP/M®, TRS-80® Model II and all others). The optional correction feature can be added at any time for an additional \$60.00. Optional patches to integrate MICROPROOF into your word processing software can also be added at any time for an additional \$35.00. (Integration patch not needed for Wordstar®.)

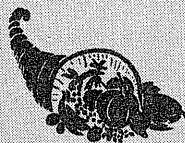
**MICROPROOF'S FULL 50,000 WORD VOCABULARY** saves you time and allows you greater confidence in the lists of potential errors that MICROPROOF identifies. The mini-dictionary programs, with their 10,000 and 20,000 word vocabularies, have many correctly spelled words omitted from their vocabularies. Consequentially, they identify as potential "errors" many words that are actually spelled correctly; five to ten times as many such words as does MICROPROOF. So, when you use MICROPROOF 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 MICROPROOF's vocabulary assures you confidence in the error lists that MICROPROOF generates.

There are other proofreading programs available to choose from. Since MICROPROOF became available in December of 1980, a number of companies have announced programs with small dictionaries. It took us almost two years to develop MICROPROOF. During that time we were able to compress our full 50,000 word dictionary into a manageable size (fits on one single density 5¼ inch disk). And we were able to design a proofing program which operates remarkably fast. The chart below illustrates the comparative advantages of MICROPROOF.

## ADVANTAGES OF MICROPROOF

	MICROPROOF DICTIONARY SOFTWARE	OTHERS (Mini- Dictionaries)
DICTIONARY SIZE	50,000 Words	20,000 Words
DISK SPACE REQUIRED FOR DICTIONARY	70,000 BYTES (fits easily on one 5¼" disk)	170,000 BYTES
DICTIONARY ENLARGEMENT	VIRTUALLY UNLIMITED	EXTREMELY LIMITED
SPEED—400 Words	20 Seconds	1 to 5 Minutes
SPEED—3,000 Words	1 Minute	2 to 10 Minutes
CORRECTION FEATURE	Optional	Not Available

See your local microcomputer dealer or write to:



## CORNUCOPIA SOFTWARE

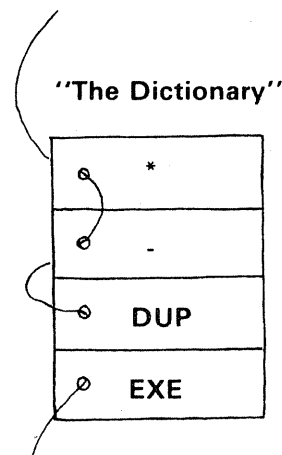
Post Office Box 5028, Walnut Creek, California 94596 • (415) 893-0633



## A look at another language

# Forth

*Terry R Dettmann*



Forth commands are "threaded" together with one pointing to the next.

Forth emerged from a need of the developer, Charles H. Moore, to have a program language which allowed use of programming time more effectively. Years ago, as he was busy programming control systems for radio telescopes, he became keenly aware of the need of a high level language with assembler power and speed to work in a small computer.

In his research, he came upon a way to fit this in a small package - 8K of RAM for compiler, interpreter, assembler, disk operating system and development tools. The result was Forth.

The astronomy community extensively uses Forth to run sophisticated telescopes, multi-user computer systems, peripherals and printers. Much of the documentation on Forth has come from them.

As the power of Forth became apparent, its popularity grew and Moore decided that it was worth pushing. He formed his own company, Forth Incorporated, which produces and markets this system to a wide variety of users. Since Forth, Inc., deals with large users, their packages are not found in general hobbyist or small business systems.

An early group of supporters of this language felt it should become more generally available. They formed the Forth Interest Group in the San Francisco Bay area and produced their own Forth system called "FIG Forth". This was put into public domain and is available at nominal cost to anyone who wishes to use it as they see fit. A number of companies offer fully implemented systems to run on a number of computers.

In 1978, Miller Microcomputer Services, 61 Lake Shore Road, Natick, MA 01760 (617) 653-6136,

released a TRS-80 Model I Forth. This work was based on that done by Tom Dowling and was not in any way associated with either FIG Forth or Forth, Inc. This first attempt to provide Forth's power to the TRS-80 user did a tremendous job which far exceeded the quality and reliability of most of the other software on the market at the time. In the opinion of many, it is one of the best all-around efforts at Forth available for the small computer.

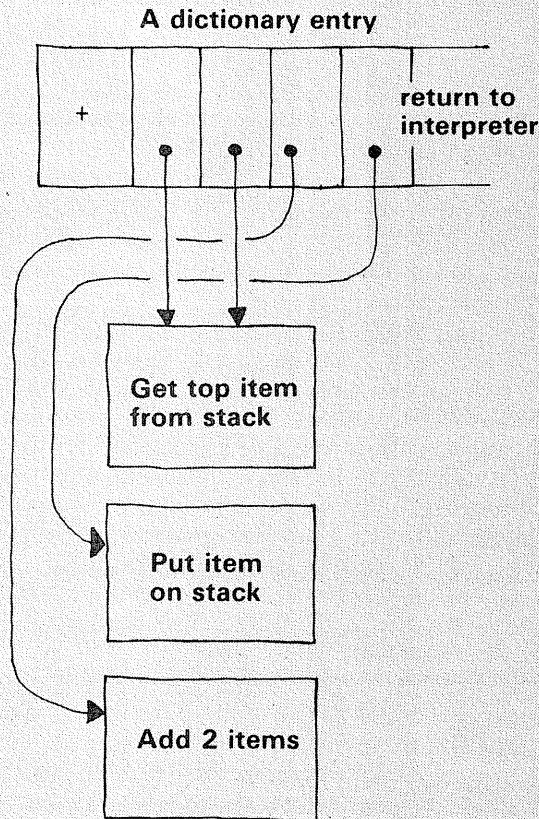
### The Forth language

Forth is a Threaded Interpretive Language. The system works by having a dictionary of allowed "words" or "procedures". Each word, starting from the last defined, is connected to the next. To find a word, the system "threads" its way from word to word until the one wanted is found. The system then actually executes that word. While this may not sound too efficient, the way a word is executed makes up for lost time.

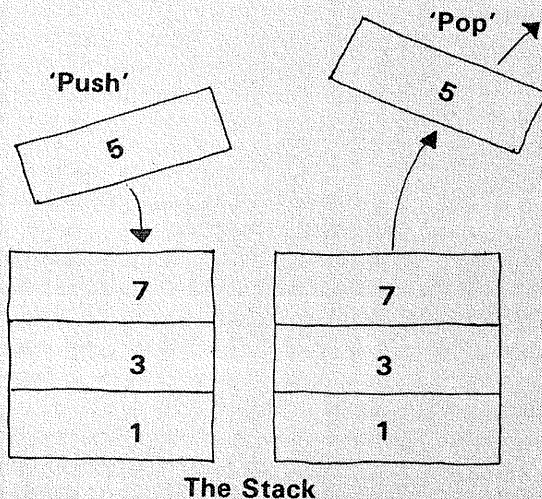
As in all dictionaries, there are definitions and Forth's dictionary is no different. In the definition section, the computer is informed what to do in one of two ways: The first form, referred to as the Forth Form, consists of memory addresses where the routine can be found which will actually accomplish the desired task. The second form is to have the actual machine language routine exist in the dictionary.



Let's show how this is done. First, we previously defined *shutter* as "open the shutter of a camera for a preset time", *exposure* as "measure the light and set the exposure" and *focus* as "focus the camera to the right setting". We have simplified the definitions here for clarity. We can now define



This is an example of the "+" command in the dictionary. The memory locations following the "+" identifier point contain the memory addresses which point to various machine language routines.



The stack of three numbers illustrated here is having a "5" added to it. The "5" becomes the new top of the stack and is available as the first item off of it.

a new word, *picture*, in terms of old ones to actually take a picture. We do it like this:

```
: PICTURE (defines new word)
  FOCUS (focus camera)
  EXPOSURE (measure and set exposure)
  SHUTTER (take the picture)
;
```

The colon symbol tells the Forth System to compile a new word into the dictionary. The first word separated by spaces from the colon is the name of the new word. Then follow the words which define how the new word's task is to be accomplished. In our example, a picture is taken by focusing the camera, measuring and setting the exposure and opening the shutter to take the picture. The semi-colon symbol informs the compiler that the definition is complete.

The compiler places the word and the addresses of the routines into the dictionary. Because only addresses are left, execution is very quick.

Miller Microcomputer Services' Forth (MMSFORTH) has a very impressive demonstration of Forth's power and speed. Random characters are placed on the screen and then sorted into order. The 1023 items sort fast and are fascinating to watch. Their own assembler Quick Sort does it the fastest - just a matter of seconds.

The real potential of Forth is in handling numbers. It is also the bottleneck for most potential Forth programmers.

Forth uses RPN (Reverse Polish Notation) to accomplish all functions. If you haven't heard of RPN, it's time to. Hewlett-Packard has used it for years in their very powerful and highly respected scientific calculators. While the concepts of RPN can be difficult to grasp, they also can be learned thoroughly in a matter of hours.

RPN is used by high level language compilers to analyze mathematical statements. Calculations take place by logical, predetermined rules.

In Forth, when a number is entered in the computer it is placed on the stack. The term stack is very appropriate, since the last thing put on the stack is the first thing wanted off of it.

When an operator, like addition (+) occurs, two things are taken off the stack and replaced with the sum. Since the numbers have to be on the stack *before* the operator, it is placed or entered, last. To add 2 and 3 we would write:

2 3 +

and to multiply 5 times 17, we would write:

5 17 \*

If we wanted to add 2 and 3, and multiply it by the sum of 5 and 17, we would write algebraic notation (as in BASIC):

(2+3)\*(5+17)

and in RPN it would be:

2 3 + 5 17 + \*



1. Put 2 on the stack.
2. Put 3 on the stack.
3. Take 3 and 2 off the stack, replace them with the sum, 5.
4. Put 5 on the stack.
5. Put 17 on the stack.
6. Take 17 and 5 off the stack, replace them with the sum, 22.
7. Take 22 and 5 off the stack, replace it with the product, 110.

If people would take the time to understand the principles behind RPN, they wouldn't be quite so quick to drop Forth as a viable language.

Unfortunately, Forth's popularity also suffered from some of the things which make it so powerful. Under some cases, reading someone's Forth program is equivalent or worse than the ancient Chinese water torture. Forth programmers are getting better as they feel the need for good comments. But even the best Forth code can be puzzling when it's good. One could almost say that Forth code is the opposite of COBOL code.

Also, there aren't many Forth application programs available to the general public. Miller Microcomputer Services will write software for you, but you are dealing with custom work which is expensive.

Manuals have been a continuing problem. Most Forth manuals suffer from the author's inability to explain the concepts of Forth in enough detail. Fortunately, there have been several books introduced lately on Forth which help.

Forth's real power lies in its ability to streamline programming. A job which might take a week can many times be done in a day with Forth.

It is a fast language, topped only by assembly language, and then by only a small margin. Forth is rapidly being adapted for process control work and some of the popular arcade game manufacturers have shifted to it for game development. The University of Washington Applied Physics Lab is doing high speed data acquisition in Forth. These and other users are discovering that the power and speed of Forth is essential to delivering their packages quickly and at low cost.

### Two available Forth systems for TRS-80

There are many good Forth systems available, especially under the CP/M operating system on the Model II. FIG Forth is an especially good one. Of the two reviewed here, one is for CP/M on the Model II and the other for Model I & III.

Stackworth's Forth, called SL5, is from SuperSoft Associates, PO Box 1628, Champaign, IL 61820 (217) 359-2112, and sells for \$200 plus \$2 shipping and handling.

SL5 is a CP/M based system which uses standard input and output routines to maintain

maximum compatibility with other CP/M software. This is SL5's big advantage compared to other versions of Forth in that it does not create its own operating system. If you are familiar with CP/M you won't have to learn new file handling techniques to effectively use this package.

As with all versions of Forth, you build the language up to your needs. It grows or contracts as your needs change. All of the source code is provided so you can regenerate the system in any customized fashion you may want.

SL5 is easy to work with and everything tried worked well, including a dumb terminal program and several utilities. Though several pages of the manual were inserted backwards, it was still easy to read and understand.

Although the Model I and III can't run standard CP/M without hardware modification, they do have one of the best Forth packages available. MMSFORTH, from Miller Microcomputer Services has their version 2.0 for \$89.95 for tape users and \$129.95 for disk (both plus \$2 shipping and handling). This version is compatible with the latest standard for Forth language systems: Forth 79. The earlier version has been around since 1978, and we have consistently had fewer disk problems working with MMSFORTH than under all other operating systems.

MMSFORTH comes normally with source code in Forth for most of the system. Only the deepest parts of the system are held back as proprietary information. Dick and Jill Miller also provide a newsletter for registered owners at \$10 per year. Also available is additional Forth software such as the very flexible *Datahandler* data base manager, a Z80 assembler, a floating point package, games and a smart terminal package.

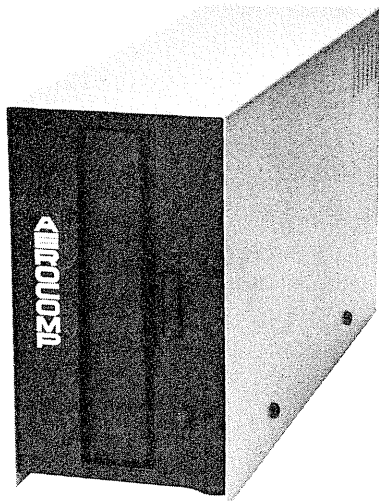
Normal features include an auto directory; software disk protection; full screen editor; graphics, string and full math functions; backup and format utilities; sorting demonstrations; a checkbook record keeping program; Conway's game of Life, and a one page letter writing program. There is also a customizing program to adapt Forth to your system. ■

### Other sources

*Mountain View Press, PO Box 4656, Mountain View, CA 94040 (415) 961-4103, advertises as the Forth Source. They specialize in Forth and offer good books on Forth, FIG Forth listings for a wide variety of microprocessors, and Forth Operating Systems.*

*The Forth Interest Group (FIG) PO Box 1105, San Carlos, CA 94070 (415) 962-8653, publishes an excellent newsletter called Forth Dimensions. It is available with membership in FIG for \$15 per year. FIG also makes available a free programmer's reference card. ■*





**TRS 80\***

# DISK DRIVES

## 40 & 80 TRACK

as low as **\$299.95**

### NEW LOW PRICES

Thanks to you our sales volume has allowed us to cut costs and we're passing the savings along. We offer the best disk drive value in the market place. Reliability, features and cost tough to beat. We deliver...and we stand behind our products. AEROCOMP is the only manufacturer to offer FREE TRIAL! Buy Aerocomp drives today. You deserve the best.

### BEST FEATURES

- ★ Fast 5 ms. track-track access time.
- ★ Operates single or double density.
- ★ "FLIPPY" feature for lower media cost (40-1 & 80-1).
- ★ Head load solenoid.
- ★ Disk ejector.
- ★ Easy entry door.
- ★ **NEW** EXTERNAL DRIVE CABLE CONNECTION. (no longer need to remove the cover to hook up cable)

## MODEL III INTERNAL DRIVE KIT

Includes the following:

(1) Disk Controller Board, Double Density, (2) Dual Power Supply (handles two drives), (3) Drive Mounting Brackets & Shield, (4) all necessary hardware, cables and connectors and (5) installation instructions.

May be used with AROCOMP bare drives. DOSPLUS operating system available \$89.95.

**SPECIAL PRICE**

**\$399.95**

Add \$3.00 for shipping & handling

### ORDER TODAY!

- ★ 40-Track Drive. . . . . \$299.95
- ★ 80-Track Drive. . . . . \$429.95
- ★ 40-Track "FLIPPY" Drive. . . . \$329.95
- ★ 80-Track "FLIPPY" Drive. . . . \$449.95
- ★ 40-Track Dual-Head Drive. . . \$449.95
- ★ 80-Track Dual-Head Drive. . . \$579.95

All above drives are complete with silver enclosure, power supply and external drive cable connection. 115 VAC 50/60 Hz 230 VAC 50/60 Hz available on special order.

- ★ 40-Track Bare Drive. . . . . \$269.95
- ★ 80-Track Bare Drive. . . . . \$399.95
- ★ 40-Track "FLIPPY" Bare Drive \$299.95
- ★ 80-Track "FLIPPY" Bare Drive \$419.95

### ★ SPECIAL PACKAGES★

STARTER A. . . . . \$339.95  
40-Track Drive, 2-drive cable, TRSDOS 2.3 Disk & Manual, Freight & Ins.

STARTER B. . . . . \$369.95  
40-Track "FLIPPY" Drive, cable, TRSDOS 2.3 Disk & Manual, Freight & Ins.

COMBO C. . . . . \$465.00  
40-Track "FLIPPY" Drive, 2-drive cable, NEWDOS/80 or LDOS, Freight & Ins.

COMBO D. . . . . \$585.00  
80-Track "FLIPPY" Drive, 2-drive cable, NEWDOS/80 or LDOS, Freight & Ins.

COMBO E. . . . . \$709.00  
Two 40-Track "FLIPPY" Drives, 4-Drive cable, TRSDOS 2.3 Disk & Manual, Freight & Ins.

COMBO F. . . . . \$999.00  
Two 80-Track "FLIPPY" Drives, 4-drive cable, NEWDOS/80 or LDOS, Freight & Ins.

COMBO G. . . . . \$909.00  
Two 40-Track Dual-Head Drives, cable, TRSDOS 2.3 Disk & Manual, Freight & Ins.

COMBO H. . . . . \$1299.00  
Two 80-Track Dual-Head Drives, cable, NEWDOS/80 or LDOS, Freight & INS. DOSPLUS available with any special package.

Add \$5.00 per drive for shipping & handling (Cont. US).

### FREE TRIAL OFFER

Order your AEROCOMP Disk Drive and use it with your system for up to 14 days. If you are not satisfied for ANY REASON (except misuse or improper handling), return it, packed in the original shipping container, for a full refund. (Special packages will be perforated) We have complete confidence in our products and we know you will be satisfied! **ORDER TODAY!!**

\* TRS80 is TRADEMARK of TANDY CORP

### WARRANTY

We offer you a 120 day unconditional warranty on parts and labor against any defect in materials and workmanship. In the event service, for any reason, becomes necessary, our service department is fast, friendly and cooperative.

### 100% TESTED

AEROCOMP Disk Drives are completely assembled at the factory and ready to plug in when you receive them. Each drive is 100% bench tested prior to shipment. We even enclose a copy of the test checklist, signed by the test technician, with every drive. AEROCOMP MEANS RELIABILITY!!

### ORDER NOW!!

To order by mail, specify Model Number(S) of Drive, cable, etc. (above), enclose check, money order, VISA or MASTERCARD card number and expiration date, or request C.O.D. shipment. Texas residents add 5% sales tax. Add \$5.00 per drive for shipping & handling (Cont. US). Please allow 2 weeks for personal checks to clear our bank. No personal checks will be accepted on C.O.D. shipments-cash, money orders or certified checks only. You will receive a card showing the exact C.O.D. amount before your shipment arrives. Be sure to include your name and shipping address. You will be notified of the scheduled shipping date. Your bank credit card will NOT be charged until the day we ship!!

### WRITE AEROCOMP TODAY FOR MORE VALUES III

**CALL TOLL FREE FOR FAST SERVICE  
(800) 824-7888, OPERATOR 24**

**FOR VISA /MASTERCARD /C.O.D. ORDERS**

California dial (800) 852-7777, Operator 24. Alaska and Hawaii dial (800) 824-7919, Operator 24.

**TOLL FREE LINES WILL ACCEPT ORDERS ONLY!**

For Applications and Technical information, call (214) 337-4346 or drop us a card.

Dealers inquiries invited

**AEROCOMP**  
Redbird Airport, Bldg. 8  
P.O. Box 24829  
Dallas, TX 75224

AEROCOMP/23



# Don't get strung out!

## Stalking the garbage man...

Dan Rollins, Azusa, CA

For Models I and III

This article, though prepared for the Model I & III owner, contains much useful information for the Model II and Color computer owner and programmer. The programs included here are designed specifically for the Model I & III and will not run on the Model II or Color computer. However, the sorting technique and the information on the garbage man is still valid.

TRS-80 BASIC string handling is a real pleasure. There is such a comprehensive selection of commands that just about any conceivable manipulation can be performed. This article, however, concerns itself with the one major complaint often heard about TRS-80 strings, the garbage collection routine.

If you've tuned your transistor radio to KTRS during a long string sort you will have noticed an occasional interruption of the normal buzzing. This is BASIC cleaning up the string space which you set aside with the CLEAR command. Any string which has been redefined leaves behind its old value. This old string is of no use to you or BASIC. It just sits there taking up space until the celebrated garbage man comes along.

When this occurs, the machine checks through its list of string variable pointers and overwrites any of the junk with valid strings. All of these are moved to the top of the string space and the VARPTR for each is adjusted to reflect the

changes. This frees the lower areas for new definitions. The process can be very lengthy, especially when a lot of memory was cleared and much of it contains junk strings.

Listing 1, included here, is a demonstration of exactly what happens when the garbage man pays a visit. The program changes three string-related pointers. These usually point to high memory, just below the value of MEMORY SIZE. After lines 90-110 they point to the screen and any new string definitions are stored right there in plain sight. The next lines simply fill the string space with two different types of strings - a string array A\$(0) through A\$(75) and DUMMY\$ which is redefined at each pass of the loop. When the string space has been filled, you will see (and hear if your radio is turned on) as the array strings are packed to the bottom of the screen.

Note that the cleanup is invoked more and more often as the string space (in this case the screen) begins to fill with the array strings. This is one reason a string sort can seem to take forever.

One way to speed up your sort routine is to clear as much space as possible. Another method (seen more often lately) is to exchange the values of the VARPTRs of the strings. Briefly, all sorts will come down to a point when two variables need to be exchanged. The most often seen method is:  
TEMP\$=A\$:A\$(X)=A\$(X+1):A\$(X+1)=TEMP\$  
The VARPTR method goes:



```
V1=VARPTR(A$(X)):V2=VARPTR(A$(X+1))
:T=PEEK(V1):T1=PEEK(V1+1):
T2=PEEK(V1+2):POKE V1,PEEK(V2):
POKEV1+1,PEEK(V2+1):
POKEV1+2,PEEK(V2+2):
POKEV2,T:POKEV2+1,T1:POKEV2+2,T2
```

Though there is obviously more processing using the second method, the garbage man is avoided and a lot of time can be saved in long sorts. The reason that the first method is slower is that TEMP\$ is constantly being redefined (like DUMMY\$ in the listing). All that unused memory has to be swept up.

Another method which I've never seen in print I'll dub the "MID\$=" method. This gimmick requires that you use disk BASIC and that all the strings be the same length. It is demonstrated in Listing 2. The main point is that redefining a string with MID\$(string1,1)=string2 *creates no new strings*. The area already set apart for its storage is filled with the new value. As long as the strings are the same length, they may be swapped with total abandon and the garbage man never comes.

Forgive my use of the slowest sort known - the bubble sort. It happens to be the quickest to type in and does a good job of proving a point. For a visual demonstration, plug the lines of Listing 2 into Listing 1. The entire sort is performed before your eyes. If you are unfamiliar with what goes on during a sort, here is a chance to see it in action. Watch A\$(0), "AAAA", as it "bubbles" its way to the top of the screen. You might also try replacing line 175 with the TEMP\$ and VARPTR swapping methods above. Time the results for a benchmark comparison.

During a run of Listing 1, try hitting BREAK and experimenting a little from DIRECT mode. A few ideas:

- 1) Type F=FRE(A\$).
- 2) Observe what happens with some of the string commands, i.e., LEFT\$, RIGHT\$, STR\$, etc.
- 3) Concatenate: A\$="1"+"2"+"3"+"4" etc.
- 4) Position the cursor over one of the SAVE A\$(n) areas, then type some stars or other recognizable character, then type PRINT A\$(n).

Be sure to GOTO 200 after any BREAK. Otherwise, the program will crash upon the next RUN or after an EDIT. Apparently the BASIC stack is oriented on the position of the string pointers. Lines 200-220 put everything back in place. A few more notes on these pointers. You can save some garbage collection time by changing 16544,5 to a lower value. This is the address of the end of string space. Let's say you have just read in a bunch of data from tape or disk. This is your base data and will not need to be changed. PEEK the VARPTR of the last item to find the values to

POKE to this pointer. Now the garbage man will ignore the addresses above this point, but you will still retain all the information.

Another idea is to "PRINT to memory" subroutine. Build A\$ and send it, along with an address, to a subroutine which pokes the next available byte pointer (16598,9) to the address + LEN(A\$). The start of string space pointer must be poked to a value somewhat less. Now the command: A\$=A\$ will place the string at the desired address. Be sure to restore the pointers afterwards.

Here is something which might forward bias the LED above your head: As you know, some strings are stored in program memory. Let's say you have a program line

```
10 A$="***":B$=STRING$(3,191)
```

If you poke the start of string space pointer (16561,2) with a value *less than* program memory (zero is OK) then the command

```
MID$(A$,1)=B$
```

will replace the "\*\*\*" with 'USINGUSINGUSING' and A\$ has been changed right in the program line! In case you are wondering, the USINGs are just BASIC's way of representing a fully lit graphics byte in a program listing.

This also shows an alternative to poking a machine language USR routine. Just prepare a program line with a dummy string, concatenate the machine codes into a string, POKE 16562 with zero, and use the "MID\$=" command to slip the code into place. Be sure to restore the value that was in 16562!

Strings can be lots of fun, if you don't get caught in the cat's cradle! ■

0 ' This program demonstrates the  
TRS-80 string-handling "Garbage  
Collection" routine.

```
10 CLS
20 DIM A$(75)
30 F$ = "...FORGET ME..."
40 ' SAVE THE STRING SPACE POINTERS
50 S = 16561 : S1 = PEEK(S) : S2 = PEEK
   (S + 1)
60 E = 16544 : E1 = PEEK(E) : E2 = PEEK
   (E + 1)
70 N = 16598 : N1 = PEEK(N) : N2 = PEEK
   (N + 1)
80 ' CHANGE THEM SO THEY POINT TO
   VIDEO MEMORY
90 POKE E, 0 : POKE E + 1, 60 '
   End of string space pointer
```



Do you know what a  
**Stringy Floppy**  
*is and what it can do for your TRS-80?*  
 Here is an

## Opportunity

to find out for FREE! - and you also get an added BONUS! Simply call this TOLL FREE number and ask for the name of your nearest Exatron Program Chairman:

**1-800-538-8559**

(in California 408-737-7111)

Then take this ad, or a copy of it, to the Chairman, who will show you all about the Stringy Floppy with *NO Obligation* on your part.

The Chairman will then submit your name and you will receive a full year (that's 12 issues) subscription to *80-U.S. Journal (the TRS-80 User Journal)*. (If you already subscribe, you will receive a free one-year extension.)

Stringy Floppy is a trademark of the Exatron Corp.  
 TRS-80 is a trademark of the Tandy Corp.

**NO STRINGS  
 ATTACHED!  
 CALL TODAY!!**

.....  
 I own a (computer type) \_\_\_\_\_

Name \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_

State \_\_\_\_\_

Zip \_\_\_\_\_

Chairman \_\_\_\_\_

☐ New subscription or ☐ Extend subscription

.....

## Programming technique

```
100 POKE N, 255 : POKE N + 1, 63 '
    Next available byte pointer
110 POKE S, 255 : POKE S + 1, 63 '
    Start of string space pointer
120 '
130 FOR X = 0 TO 75
140 N$ = RIGHT$(STR$(X), 2)
150 A$(X) = "-SAVE A$(X) + N$ + "-" '
    Define a string to keep and...
160 DUMMY$ = F$ '
    ... one to discard
170 FOR DELAY = 1 TO 100 : NEXT
180 NEXT : DUMMY$ = " ** FINISHED " + "
    ** "
190 ' NOW RESTORE THE POINTERS TO
    AVOID A WIPE-OUT
200 POKE S, S1 : POKE S + 1, S2
210 POKE E, E1 : POKE E + 1, D2
220 POKE N, N1 : POKE N + 1, N2
300 GOTO 300 '
    Break point
```

### Program listing 1

(Be sure to GOTO 200 and press (BREAK) if the program is interrupted.)

```
130 TEMP$ = STRING$(8, " ") : B$ = "...
    ...." + "TEMP$ STORAGE -->"
135 A$(0) = "AAAA <" + CHR$(93)
140 FOR X = 1 TO 35
145 A$(X) = "" : FOR Y = 1 TO 5 : A$(X)
    = A$(X) + CHR$(RND(26) + 64)
150 NEXT : A$(X) = A$(X) + "... : NEXT

155 PRINT FRE(A$) : A$ = STRING$(233, "
    ") : A$ = A$ '
    Erase the junk
160 ' FOLLOWING LINES PERFORM THE SORT
165 C = 0
170 FOR X = 34 TO 0 STEP - 1 : IF A$(X)
    => A$(X + 1) THEN 185
175 MID$(TEMP$, 1) = A$(X) : MID$(A$(X)
    , 1) = A$(X + 1) : MID$(A$(X + 1), 1)
    = TEMP$
180 C = 1 : FOR DELAY = 1 TO 50 : NEXT
    '
    Slow it down
185 NEXT : IF C = 1 THEN 165
190 MID$(A$, 15) = " ** SORT FINISHED **
    " '
    "
```

### Program listing 2

(Plug these lines into listing 1 for a visual demonstration of the "MID\$" bubble sort.) (Requires disk BASIC.)

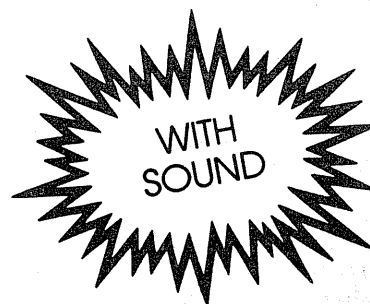
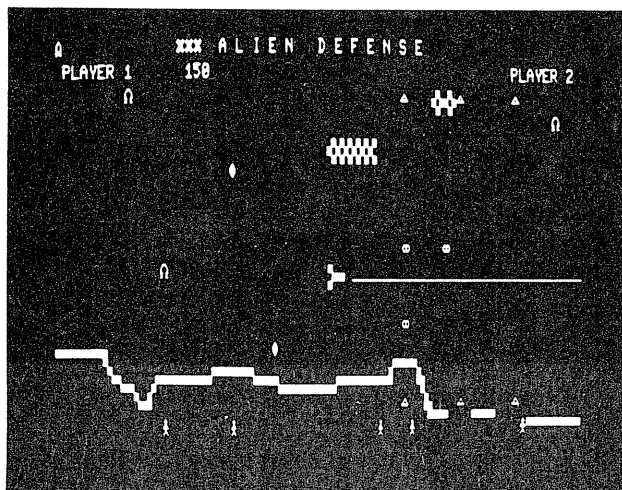


# Christmas Shopping List

## ALIEN DEFENSE

Copyright ©1981 Soft Sector Marketing, Inc.

Written by Larry Ashmun



Mod III Only

- 1 or 2 Players -

**It's An Experience!**

Super Fast Action!

Cassette ..... \$19.95

Disk ..... \$24.95

Only Disk version saves high scores.

The first machine language arcade game written to use  
all those NEW SPECIAL FEATURES of your MOD III!

**Do you reap only mysteries from  
your TRS-80 ROMs?  
Your book has arrived!**

### MODIII ROM COMMENTED

Copyright ©1981 Soft Sector Marketing, Inc.

Not just a rehash of old information, but detailed  
comments on the ROMs in the latest machine  
from Tandy.

### SUPER VADERS

With Sound

for Mod I & Mod III

Copyright ©1981 Soft Sector Marketing, Inc.

The third in the evolution of the  
most popular  
space invaders games.

Now for

**1 or 2 Players**

10 levels of play

Cassette (goes to disk) ..... \$19.95

Disk (Mod III only) ..... \$24.95

**Ask for upgrade information for  
TRS-Super Invaders or Invaders Plus.**



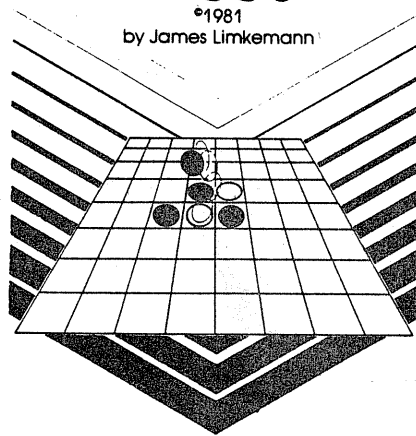
**Only \$22.50**

+ \$2.50 Shipping & Handling

## Flippy

©1981

by James Linkemann



**A Machine Language,  
Othello Game.**

MOD I & MOD III

- 1 or 2 Players-

Cassette ..... \$14.95

Complete with  
Good Game Instructions.

Outside Michigan  
Order Line Only  
**800-521-6504**

**SSM** **SOFT SECTOR MARKETING,**  
**INCORPORATED**  
6250 Middlebelt  
Garden City, Michigan 48135

Questions &  
Michigan Orders.  
**313-425-4020**



# For Your Color Computer

## MASTER CONTROL

Copyright ©1981 Soft Sector Marketing, Inc. - Written by A. Swartz



Requires 16-32K

1. 50 preprogrammed command keys. Standard and Extended command.
2. Direct control of motor, trace, and audio from keyboard.
3. Automatic line numbering.
4. Programmable Custom Key.
5. Direct Run Button.
6. Keyboard overlay for easy program use.
7. Easy entry of entire commands into computer.

Load Master Control into your machine then either type in a BASIC program or load one in from tape to edit. Cuts programming time by 50% or more ..... **\$24.95**

## Coming for Christmas! COLOR BONANZA

50 Programs for the Color Computer.  
Less than \$1.00 a program!

Some 4K, some 16K, some extended BASIC, some for non-extended.

Games - Personal Programs - Utility Programs

### CONFLICT

A strategy game  
involving land conquest.

- 2 Players -

Cassette ..... **\$14.95**

MOD I & MOD III, Color.  
Please state machine when  
ordering. Requires 16K.

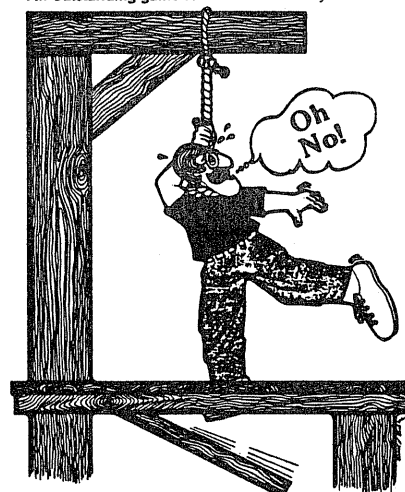
List ..... **\$49.95**

Expected shipping date  
December 1 or before

Any prepaid orders received  
before that date will pay only  
**\$39.95**

### Animated Hangman

He winks... he blinks... he almost lives!  
An outstanding game for the whole family!



Non Extended BASIC  
Requires 16K  
**\$12.95**



C.O.D. - certified check, M.O. or cash only. Most orders shipped next day. All orders must have shipping included. Please add 2% or \$2.50, whichever is higher for shipping. Michigan residents, please add 4% tax. Add extra \$1.50 for C.O.D. Personal checks take 3 weeks to clear. All hardware must be prepaid. No hardware shipped collect. Out of the country orders add \$10.00 extra shipping.

\*TRS-80 is a product of Radio Shack, division of the Tandy Corporation.





# Utilities

## NEW SUPER UTILITY PLUS

### SUPER UTILITY PLUS

Copyright ©1981 Breeze Computing, Inc. SUPER UTILITY PLUS was written by Kim Watt and is the most powerful program of its kind on the market at this time. This program is a machine language, stand alone program that has its own I/O routines, does not use any ROM or DOS calls, and works on SINGLE or DOUBLE DENSITY systems. Super Utility Plus performs such a wide range of varied tasks, that it may truly be called "The King of Utilities". It is not required that the disk be in any drive after initialization of the program and user may custom configure the program to suit his individual system requirements.

**ZAP** does everything your present "zapping" utility does plus many additional enhancements. It will operate on SINGLE or DOUBLE DENSITY systems and will work with most major operating systems that are presently on the market. The screen printout on Zap displays one sector at a time in HEX and ASCII (as other "zapping" utilities), but also tells you the true and relative track and whether the disk in IBM format or not. Zap also has a search routine that will locate the highest or lowest configured track on the disk and others that will search the disk for byte list, ASCII string, word list, or even encrypted code. Zap also allows you to display disk sectors, compare disk sectors, copy sector data, zero disk sectors, copy disk sectors, reverse sector data, sector searches, read ID address marks, or alter data address marks.

**PURGE** has a full screen editing kill control that allows you to kill files by positioning cursor and pressing one key. Also, Purge has several sub-utilities that allow you to zero out unused directory entries or zero out unused disk granules. In addition, user may kill files by naming the common category of the files, and may compute existing passwords, change the disk name, date, passwords, auto command, or even file parameters (name, passwords, protection levels). Lastly, Purge contains a complete disk directory that indicates all active and non-active files on the disk.

**FORMAT** is a utility that allows the user to format a disk with: standard format, format without erasing existing data, special format (custom format your disk most any way you want it), build a format track and optionally write it back to any track on your disk, and even contains a software bulk erase utility. The total formatting capabilities of this program are just about UNLIMITED and you may even reformat over a disk or add tracks to an existing disk without destroying existing disk data.

**DISK COPY** will copy most any standard disk, with or without formatting. The Special Disk Copy enables the user to make a backup of most TRS-80® readable disks that are presently on the market, regardless of any efforts that have been made to protect them from being "backed up". (NOTE: This program WILL NOT copy itself). This program's only intended use is for you to make backups of your legally purchased programs. Please DO NOT use this utility to make "bootleg copies" for others as authors of quality programs deserve their royalties.

**TAPE COPY** enables the user to perform a wide variety of actions that include the ability to read, write, or verify tapes and even includes a Bit by Bit copying routine that will back up most ANY TRS-80® readable tape regardless of protection attempts made by authors. This utility also is for your own use only.

**DISK REPAIR** allows you to automatically repair the HIT and GAT sectors, and will automatically repair a Boot. This utility also does a complete Directory Check and will advise you of errors that exist. In addition, this utility allows the user to recover killed files (if the file was killed by this utility or by NEWDOS), read protect or un-read protect the directory, move it to a different location on the disk, or clear unused entries. Lastly, this utility advises you of all inactive files that are on the disk.

**MEMORY** supplies the ability to display, move, test, compare, zero, exchange, input or output a byte to any port, exchange, jump to, reverse, fill, string search, or even load/write and entire track or sectors to/from memory.

**FILE** contains the abilities to display file sectors, compare files, copy files, disk directory, free space, file locations, drive status, create files, and clear files from disk. These utilities give you a wide range of powerful complete reorganization of your entire disk with all the files re-written in their most contiguous order.

**CONFIGURE SYSTEM** gives you the ability to custom configure Super Utility Plus to your system. You may select single or double density, in any combination, 5" drives, select your operating system boot of your choice, upper or lower case, high speed clock, single or double headed drives, or even configure your printer.

Now for Mod I or III ..... **\$74.95**  
Please state when ordering

Sold on protected media

## BOSS III

©1981 Soft Sector Marketing, Inc.

for Mod III

This Machine Language utility is designed to aid you in creating and debugging programs written in BASIC. The utility allows you to trace the program flow, to single step the BASIC program, to observe the conditions of variables during program execution, and to push your basic program on the stack during program development. The utility is known to operate with Mod III, TRS-DOS or Mod III Rom BASIC.

Cassette (goes to disk) ..... **\$18.95**

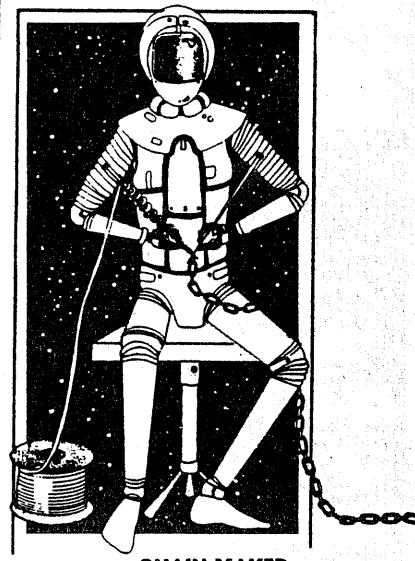
- Now Lower Price -

Also **Boss 2.1 version 2.2** ©1980 V.B. Hester for

Mod I Cassette (goes to disk) ..... **\$18.95**

Original concept by V.B. Hester.

The  
BASIC  
OPERATED  
SINGLE  
STEPPER



### CHAIN MAKER

©1981 Steve Skindell. This program makes writing chain files on NEWDOS-80 a breeze. This is not only a program that creates chain files but it also is an editor of the file. A file can be removed from the disk and edited and saved back to the disk quick and easy. An outstanding program and a must for every NEWDOS-80 owner. Comes with complete, easy to read manual. Purchaser must own NEWDOS-80 ..... **\$14.95**

## TAPE COPY 2

©1981 Soft Sector Marketing, Inc.

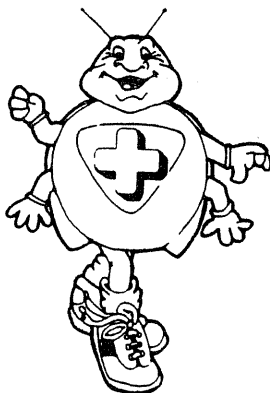
This program will load most any TRS-80 500 Baud system tape (standard Mod I speed) and load it into memory and save it at either 500 or 1500 Baud on the Mod III. NO KNOWLEDGE OF MACHINE LANGUAGE NEEDED. Now it gives you a way to back up a machine language program that loads at the lower speed and makes cassette loading into your new Mod III a much faster, more reliable process. Works with Mod I® & Mod III.

Only ..... **\$14.95**

\*Mod I loads and saves at 500 Baud only.

## BUG +

©1981 by James Limkemann



A Self-relocating Machine Language Monitor  
for MOD I & MOD III

### BUG+

©1981 by J. Limkemann. Bug+ is a powerful machine language monitor. The one point most improved over other monitors, is the tape write. Bug+ has the ability to write a "clean" tape (at 500 baud), this tape will read into the TRS-80 under the system command, without the problems previously associated with the volume setting. Regardless what version basic you have or whether or not you have a Radio Shack cassette fix, this monitor will improve the reliability of your cassette by 100%. There is also a verify command that works the same as a "CLOAD?", except when an error is found; the memory address and what is found on the tape is displayed.

Finally a break point that works! When a break point is reached, there is a blinking asterisk in the bottom right hand corner, you are able to see what is on the screen before the monitor takes control. Press the enter key the screen clears and the monitor comes to life. When you continue from a break point, the monitor will restore the screen first then load the CPU registers and return to your program. You do not lose your program or display, and it does work!

Bug+ also has all the commands of T-Bug, they just work better. Bug+ loads into low memory, then relocates itself.

Mod III has all the commands of the Mod I version plus it gives you the ability of reading or writing 1500 baud or 500 baud tapes. You can read at one rate and write at another. MOD I or III, 4K, both on same tape.

Cassette ..... **\$14.95**

Outside Michigan  
Order Line Only  
**800-521-6504**

**SSM** SOFT SECTOR MARKETING,  
INCORPORATED  
6250 Middlebelt  
Garden City, Michigan 48135

Questions &  
Michigan Orders.  
**313-425-4020**



# The Serious Side of Computing . . . Business Programs

## THE COMPLEAT IDIOT'S BOOKKEEPER (TCIB)

### Product Overview

#### GENERAL DESCRIPTION

##### BACKGROUND

TCIB was written by Larry Raper. Larry is a Chartered Life Underwriter and Licensed Life Insurance Counselor. He has consistently ranked among the top Sales Managers nationally in his company for the past several years. He also writes software for insurance and financial planning applications. TCIB came about as a result of a humiliating visit Larry made to his accountant - carrying a briefcase full of unorganized checks, receipts and other financial information. As a result of that visit, he decided there had to be a better way. TCIB is the result of that experience.

It is intended that this set of programs should be easily usable by any person who has to keep his/her own financial records. The next section will provide an overview of the specific capabilities of this package.

##### PRODUCT CAPABILITIES

###### What will TCIB do?

**Data Gathering** - TCIB provides a simple method of entering your financial information into a disk file. A format screen is presented which will prompt you for entry of the required data from your records. The following fields are provided:

FIELD NAME	NUMBER OF CHARACTERS
Identifier	8
Date	4
Payor/Payee	18
Description	18
Category/Account	5
Income or Expense	1
Deductible or Non-deductible	1
Amount	9

A 'screen-oriented editor' allows you to see the whole record as you are entering it. You are free to move about in the record and change any data you wish. Once you are satisfied with the results, pressing the <ENTER> key causes the program to (1) review the data you entered for possible errors - and (2) assuming no errors, write the record to the disk file.

Since most people are not able or willing to post every financial transaction immediately as it occurs, provision has been made for the fact that 'catching up' will almost always result in duplicate entries. (e.g. you may enter the same check twice, or enter a check and receipt covering the same transaction). A 'PURGE' program guides the computer to search your file or files for possible duplicate entries and, if found, present them to you for disposition.

**Data Manipulation** - In addition to the 'PURGE' capability just described (technically a data manipulation feature), TCIB also features other important data manipulation abilities:

**'EDIT'** - allows you to retrieve, edit or delete any record in any TCIB file. You can retrieve a record by its record number. You can search any field of all or part of a file for any record containing your search target as all or part of the target field. You can also do a multiple file, single or multiple field search of from 1 to 20 separate files in a single search after building the appropriate index. Any time a search results in retrieving a record, the record will be displayed and you will have the choice of carrying out any desired editing functions. When you are finished with the record currently being displayed, you will have the choice of continuing with the search, returning to normal edit functions, editing another file or returning to the main menu.

**'INDEX'** - This program allows the user to build a single index to the contents of from 1 to 20 selected files. The index can span one or more fields in a single record. This information is sorted and stored on the disk. The REPORT GENERATOR and EDIT programs use the index to control their access to the chosen files.

The index is limited to a maximum of 10 character from each of 1000 records. If more than 10 characters per record are used in building the index, the number of records to which it can point will be reduced proportionately. Since the programs are referred to in unprotected source code, you are free to 'play with' the string space and index arrays if your DOS leaves you more headroom.

**'REFILE'** - The purpose of this utility program is to allow you to build a new file by copying any records in an old file which satisfy your search requirements to the new file. You can also copy selected records from one file to another in the same way. This search can be done with a MATCH or NON-MATCH test. For example, when you instruct the EDIT program to DELETE a record, it replaces the contents of the identifier field with "DELETED". You can then use the REFILE utility to copy all records which DO NOT have DELETED as their identifier to a new file.

**'SEPARATE'** - This program reads a specified data file and checks each date. Each month's transactions are copied into a separate file. If there are no transactions for a given month, no file is created. The files created are named JAN/DAT, FEB/DAT, etc. This utility can be run several times during an accounting period. If a required monthly data file already exists, the new data will be added to it. Otherwise it will be created and the new data entered into it. REPORT GENERATOR - This program represents the final step in transforming unorganized financial data into useful financial reports.

After you have INSERTED your financial data, EDITed it to your satisfaction, PURGED, REFILED, and SEPARATED as you want, you are now ready to INDEX it and REPORT. The report generator program first reads the index you have built, and based on that presents you with a finished product. Each major category (the first item of your index) will be presented on a separate page. Income entries will be shown as a simple, formatted numeric value. Expense entries will be shown in parentheses. Each page will contain a running sub-total of the current major category (Income items will be added, expense items will be subtracted). The sub-total will also be presented in the above format. Finally, a summary page will be printed, itemizing each major category covered in the report (such as IRS form 1040 Line #1) along with that category's sub-total. Finally an overall total of all entries covered by the index will be presented to finish your report.

**MAKE-VC** - An additional utility program is available at extra cost to allow the transfer of files from TCIB to VISICALC. This makes use of VISICALC's 'DIF' format and is very useful for performing special computations with data gathered by TCIB. Incidentally, if you wish, TCIB files can also be created by VISICALC if you conform to the requirements specified in the 'MAKE-VC' program.

**Product Limitations** - Before we create the impression that this program is the 'end all and be all' let us hasten to talk about its requirements and limitations. This list of limitations is probably not all-inclusive. Doubtless, someone will find some way in which to push the program past its limits that we never thought of - however, this is a good start. PLEASE READ THIS SECTION CAREFULLY TO AVOID DISAPPOINTMENT!

1) With the exception of the screen input routine and the sort routine, the programs are written entirely in BASIC. The programs are furnished to you in UNPROTECTED source code. While this gives you the opportunity to study program and/or modify it to your special needs (AT YOUR OWN RISK, OF COURSE), interpreted BASIC just isn't as fast as machine language.

2) This program does a LOT of string manipulation. As a result, at times the computer will occasionally have to stop and 'collect its wits' (i.e. do "garbage collection" on its string space).

The answer to this peculiarity is 'DON'T PANIC' - we have never seen a "garbage collection" shutdown more than a few moments. Just watch for the cursor. If it is flashing, all is well and you can proceed with data entry. If it is not flashing, relax a moment and proceed when it resumes flashing. You can type as fast as you want in data input. We have yet to see anyone able to type faster than the program can accept the data.

3) There are only two restrictions on the amount of data you can handle with TCIB.

**Disk Storage** - all data being used by the programs MUST be on disk(s) mounted on drive(s) currently in use. Swapping of data disks during program operation is NOT supported. You can, however, use as many drives as your hardware and operating system will support. You should be able to use any type of disk your hardware and operating system will support. (We have not tested the program with anything besides 5 1/4" drives, but if problems arise, let us know and we will do our best to help you overcome them.)

**Computer Memory** - TCIB requires 48K of RAM (and uses every bit of it, I might add). The INDEXER program leaves 15000 bytes free in which to build an index. Therefore, this is your main program limitation. The index itself uses 5 bytes per record for its own overhead. An index built on the category field (5 bytes) plus the date field (4 bytes) would use 14 bytes per record (5+4+5). A full 1000 records can be handled with a single index built on these fields. On the other hand, an index built on category (5 bytes) + date (4 bytes) + description (18 bytes) would use 32 bytes per record (5+4+18+5) and could only handle about 460 records. The 'bottom line' is - don't put more information in your index than you REALLY need if you want to maximize the number of records you can handle. Also - keep an eye on available disk space when you are building an index. Be sure there is enough room or you'll wind up doing it over. If the program encounters a 'disk full' error while writing the index, it will close the index file, kill it and tell you to provide enough disk storage before trying again.

Mod I or III, 48K, 1 drive ..... **\$49.95**

##### CRITPATH\*

\*1980 PM Programming

###### CRITPATH\* will help

- Determine the earliest possible completion date for your project.
- Identify the critical activities in your project; the jobs that will delay completion of the entire project if they are not completed on time.
- Provide you with the scheduled start and finish date for all project activities so you can plan your labor and material needs to support the project completion date.
- Develop the information needed to permit you to shift resources and funds to critical activities from those

activities identified by the program as being capable of delay without delaying the completion of the project.

###### CRITPATH\* provides you with

- Both screen and printer outputs of your schedule in work days, tabulating the earliest start/finish and latest start/finish day as well as the total float for each project activity.
- The length of the critical path in work days.
- A listing of all activities that are on the critical path; jobs that cannot be delayed without delaying the entire project.
- A printer output of the actual calendar dates for the earliest start/finish and latest start/finish along with both free and total float for each activity.
- Your choice of printing out data sorted consecutively

##### MAKE VC

\*1981 S.F.I. Changes IDIOT files to VISI CALC interchange format or take VC files and makes it into IDIOT readable file. Now Only ..... **\$24.95**  
Make VC requires Compleat Idiots Bookkeeper

Specially designed for builders, by a builder. Also works well with many other businesses.

MOD I ..... **\$600.00**  
MOD III ..... **\$750.00**  
Manual ..... **\$50.00**  
Overview ..... **Free**

Requires 48K, 2 disk drives and 132 column printer.



C.O.D. - certified check, M.O. or cash only. Most orders shipped next day. All orders must have shipping included. Please add 2% or \$2.50, whichever is higher for shipping. Michigan residents, please add 4% tax. Add extra \$1.50 for C.O.D. Personal checks take 3 weeks to clear. All hardware must be prepaid. No hardware shipped collect. Out of the country orders add \$10.00 extra shipping.

\*TRS-80 is a product of Radio Shack, division of the Tandy Corporation.

VISA

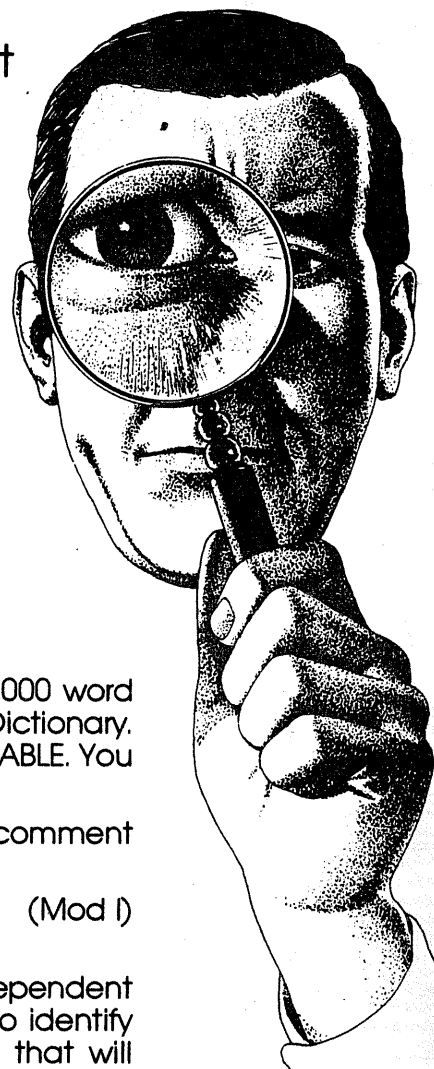


Now you can proofread and correct  
ten pages of text in less  
than one minute, with

# MICROPROOF\*

dictionary software

- **EASY TO USE:** Prepare your text on Mod I or Mod III microcomputer, using any of a number of popular word processing programs. When you are finished, enter the appropriate command, and MICROPROOF proofreads your document, displaying misspellings and typos on the screen. Then MICROPROOF displays each error separately, requesting you to enter the correct spelling for each. Finally, MICROPROOF corrects your document. All in less than a minute.
- **COMPREHENSIVE:** MICROPROOF comes with a 50,000 word vocabulary. That's equivalent to a Webster's Pocket Dictionary. And MICROPROOF's dictionary is INFINITELY EXPANDABLE. You can add your own technical words and jargon.
- **RECOGNIZES** prefixes, suffixes, hyphenation and comment lines.
- **REQUIRES:** ONLY 32K of memory and one single (Mod I) or double density 5¼ inch (Mod III).
- **AFFORDABLE:** Available in three forms: fully independent program to identify errors, independent program to identify and correct errors, or with a conversion program that will permit MICROPROOF to operate from within your own word processing software.



## PRICES

TRS-80® Model I or III version ... Was \$125.00 Special **\$89.50**  
 Correcting Feature ..... Add \$60.00  
 Word Processing Conversion  
     **Lazy Writer®**, Scripsit or Electric Pencil ..... Add \$35.00  
 Separate User's Manual ..... \$5.00  
 Please state machine type and program when ordering.

**Let MICROPROOF Find Your Errors  
Before Someone Else Does!**

\*MICRO PROOF is a product of Cornocopia Software

**OPEN**  
TUE.-SAT.  
11 A.M.-6 P.M.

**SSM** **SOFT SECTOR MARKETING,**  
**INCORPORATED**

6250 Middlebelt • Garden City, Michigan 48135

Order Line Only **800-521-6504** Mich. Orders & Questions **(313) 425-4020**



C.O.D. - certified check, M.O. or cash only. Most orders shipped next day. All orders must have shipping included. Please add 2% or \$2.50, whichever is higher for shipping. Michigan residents, please add 4% tax. Add extra \$1.50 for C.O.D. Personal checks take 3 weeks to clear. All hardware must be prepaid. No hardware shipped collect. Out of the country orders add \$10.00 extra shipping.  
 \*TRS-80 is a product of Radio Shack, division of the Tandy Corporation

**VISA**

**OPEN**  
TUE.-SAT.  
11 A.M.-6 P.M.



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

# Lazy Writer®

©1980  
by  
David  
Welsh

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

MOD I - \$125  
MOD III - \$175

\*Requires 2 drives for  
conversion only.

\*Lazy Writer is the product of ABC Sales

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

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

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

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

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

**\$125.00**

**SSM** SOFT SECTOR MARKETING,  
INCORPORATED

VISA®

Phone Orders  
**800-521-6504**



Questions & Michigan Orders  
**(313) 425-4020**

## NEW FEATURES in Lazy Writer

### "The People Request, and David Welsh Delivers"

**The system permits embedding ASCII commands** into the text of the program. NOW you can do SUPERScript and SUBScript (if your printer can handle it). Underlining and boldface, printing of a single word in a paragraph, is now possible, at no extra cost.

**A key that remembers the cursor position.**

**User definable special character.** For use with printers that have printable characters that the TRS-80 keyboard does not normally support.

**Margin control from within text.** This means that you can change the margins of your printed text without stopping the printer routine and changing it.

**Page offset with odd/even headers & footers.** This means that you can print one page offset to the left of center and the next page offset to the right. This is very nice when you are writing a book.

**Printing chaining feature.** This permits having more than one file on disk and create one printed letter, contract, or book without having to reset the printer commands.

**Mandatory space command.** This is necessary when you are writing letters or papers that have certain words that are not to be broken-up. eg.: John P. Andhouser. This name can be made to be unbreakable to justify routines in the program.

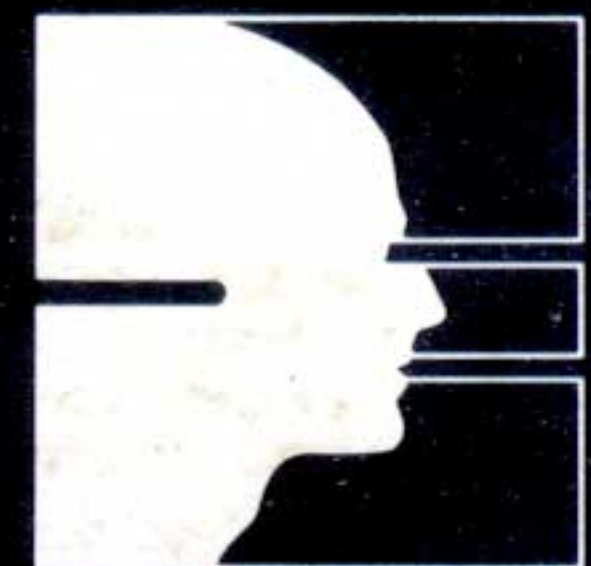
**Disk catalog.** Now you can load your disk directory into memory and create a file of this information.

**Reverse indents** or known as Hanging Indents.



# JUST LAUNCHED! VOYAGE OF THE VALKYRIE

BY LEO CHRISTOPHERSON



**ADVANCED  
OPERATING  
SYSTEMS**

450 St. John Road  
Michigan City,  
Indiana 46360

The ancient Norse lords bravely sailed their ships across new waters in search of adventure. No obstacle was too great to overcome nor any force powerful enough to prevent their mighty advance. ■ Now you're in command. You are the pilot of the attack ship Valkyrie. Your mission: to wrestle the island Fugloy from the grasp of an army of laser-wielding war birds and secure the golden treasures hidden within the walls of the island castles. Success of the mission depends solely upon you. The castle Drage appears on the horizon when suddenly the air is alive with the flutter of giant wings. Your prize is in sight . . . do you dare accept the challenge and go on? ■ You can put yourself at the controls of the Valkyrie thanks to the genius of Leo Christopherson and the versatility of the \*TRS-80 microcomputer. As absolutely flickerless birds sail smoothly across the screen, strains of Wagner's "Ride of the Valkyries" are heard. The game offers 10 levels of difficulty which provide a challenge for players of all ages and skills. The game also provides one of the finest examples of computer cartoon-graphics presently available. Accept the challenge of the Voyage of the Valkyrie . . . available now at leading software retailers.

\*Trademark of Tandy Corp.

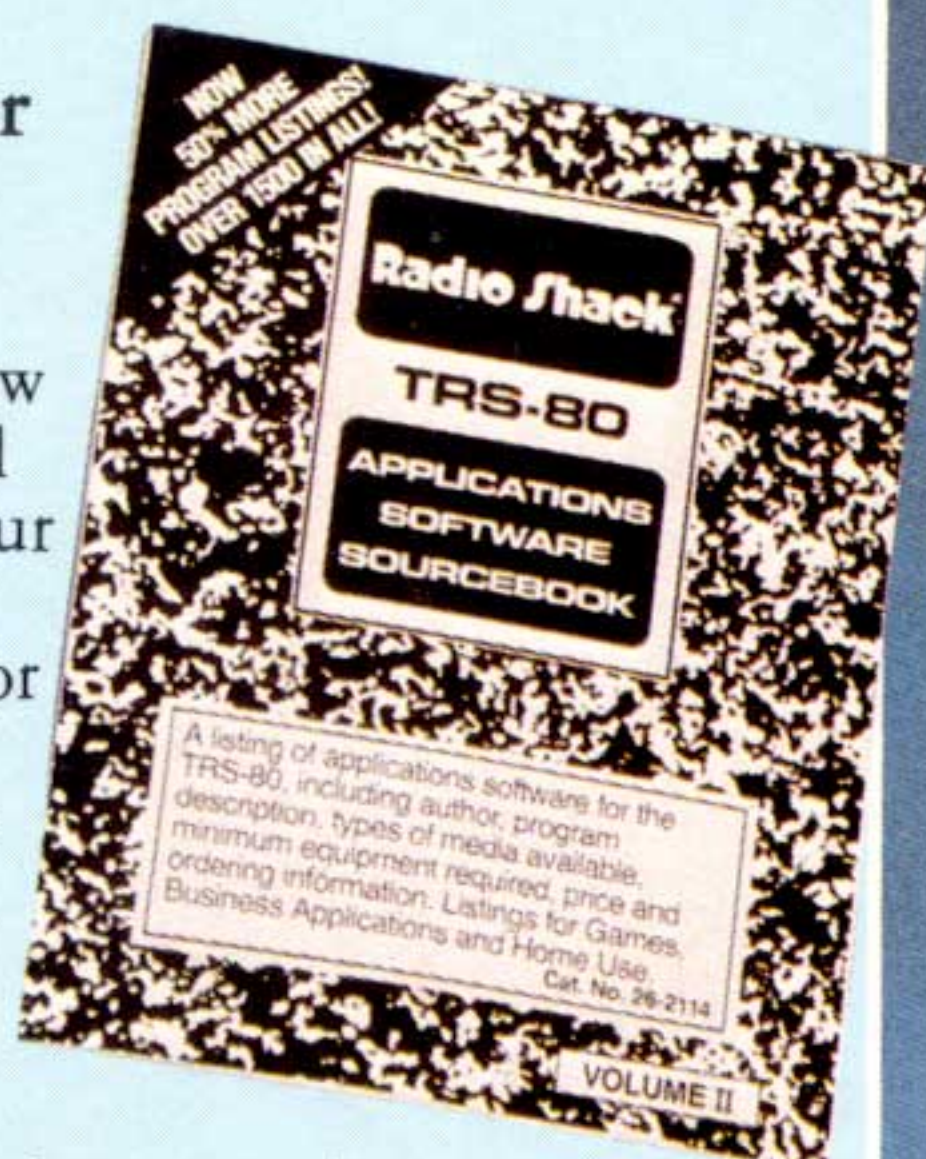


# RADIO SHACK'S TRS-80®-WORLD'S BEST

TRS-80 owners Have a Wider Choice of Software,  
Than Those Provided for Any Other Small Computer

**You'll Find More Software  
for the TRS-80  
Than for Any Other  
Microcomputer**

We at Radio Shack know we can't possibly fill all your software needs. Our \$2.95 Applications Sourcebook is a must for TRS-80 owners. It lists over 2300 programs for our TRS-80s that are available from outside vendors. Includes programs available for business, education, home and other applications. It's a veritable goldmine of software!



**Get Down to Business  
With Our Many  
Ready-to-Run Programs**

Radio Shack currently offers over 160 time and work-saving program packages designed for our TRS-80 computers. That's many times the selection offered by our nearest competitor! More software means you can use a TRS-80 for more varied tasks than any other small business computer.



**Choose From Our Exclusive Family**



**Daisy Wheel II  
Word Processing Printer**

Ideal for use with SCRIPSIT™ word processing! Provides electric typewriter-quality printing at 43 characters per second. That's over 500 wpm! Features interchangeable 124-character wheel and carbon multi-strike ribbon. \$1960<sup>00</sup>

**You'll Find the  
Printer for A**

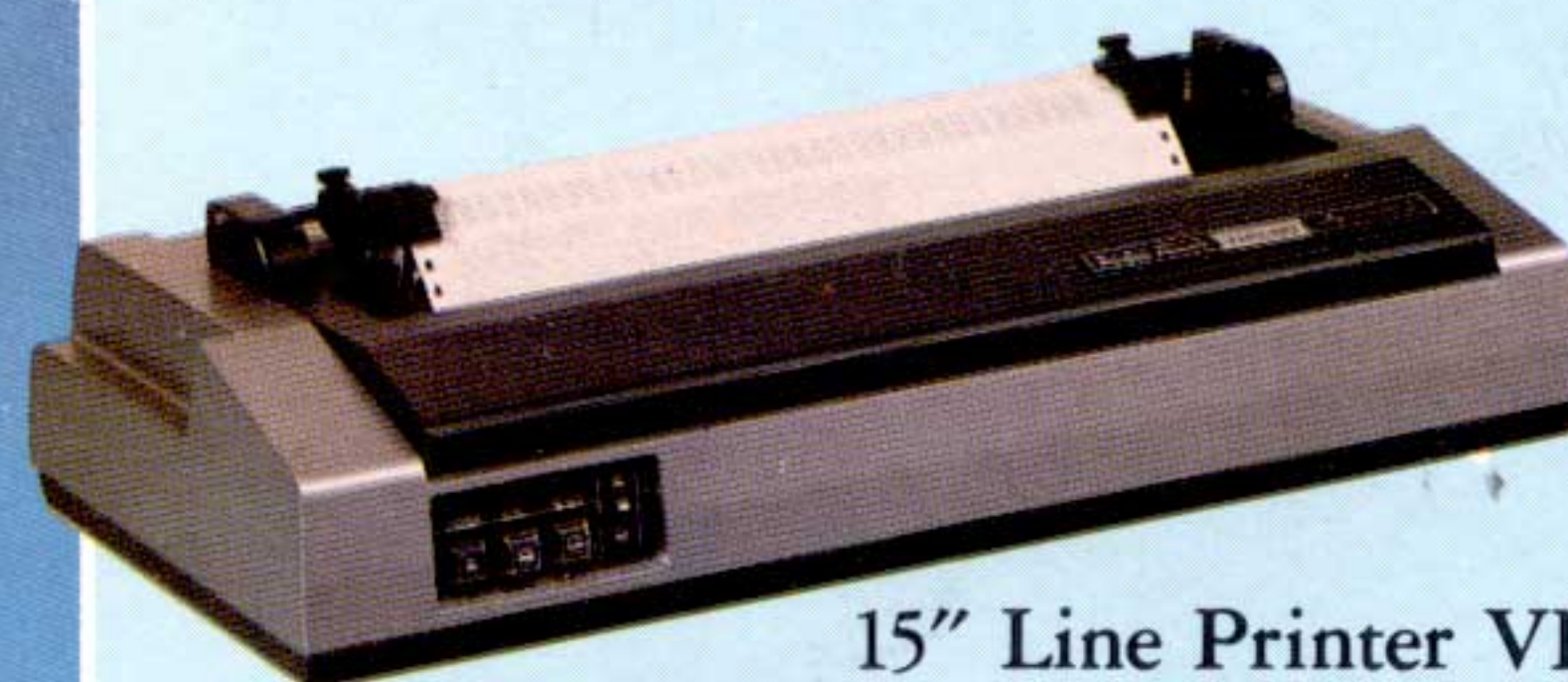
(cables sold separately)

Select a dot-matrix or high-speed or our Daisy Wheel for "letter-quality" characters. Each one is U.L. listed.



**Affordable Line Printer  
Ideal for the Color**

Quality impact printing. Prints 80 or 40 upper and lower case characters on an 8" line. Lets you print high-density graphic information on 9½" fanfold paper. Includes parallel and serial interfaces. \$399<sup>00</sup>



**15" Line Printer VI**

Bidirectional 7-wire head prints upper and lower case, graphic characters and symbols. Prints a full 132 columns at 33 lpm. Removable, adjustable tractor. Uses fanfold or single-sheet paper. \$1160<sup>00</sup>

**RIBBONS AND SUPPLIES  
TRS-80 PRINTERS ARE  
AT YOUR NEARBY RADIO SHACK**



**Model II  
Desktop  
Business  
Computer**

**From  
\$3899<sup>00</sup>  
64K**

Compact, powerful, 4 MHz, Z80 that's perfect for high-volume business applications. 64K RAM, built-in half-meg disk, 80x24 screen, two RS-232 and one parallel I/O port. U.L. listed.

**Low-Cost  
Model III  
For Home  
Or Office**

**From  
\$699<sup>00</sup>  
4K Level I  
BASIC**

Great for beginners—yet it's expandable to a 48K 4-Disk (2 internal) Business System with RS-232. Monitor and parallel printer port are standard. U.L. listed.



**TRS-80  
Color**

Very powerful, yet easy to use, everyone! Uses Color BASIC, easy to learn. Color BASIC is very simple to program. Multiple modes to 32K, 4 Disks included. U.L. listed.

**From  
\$399<sup>00</sup>  
4K Color  
BASIC.**



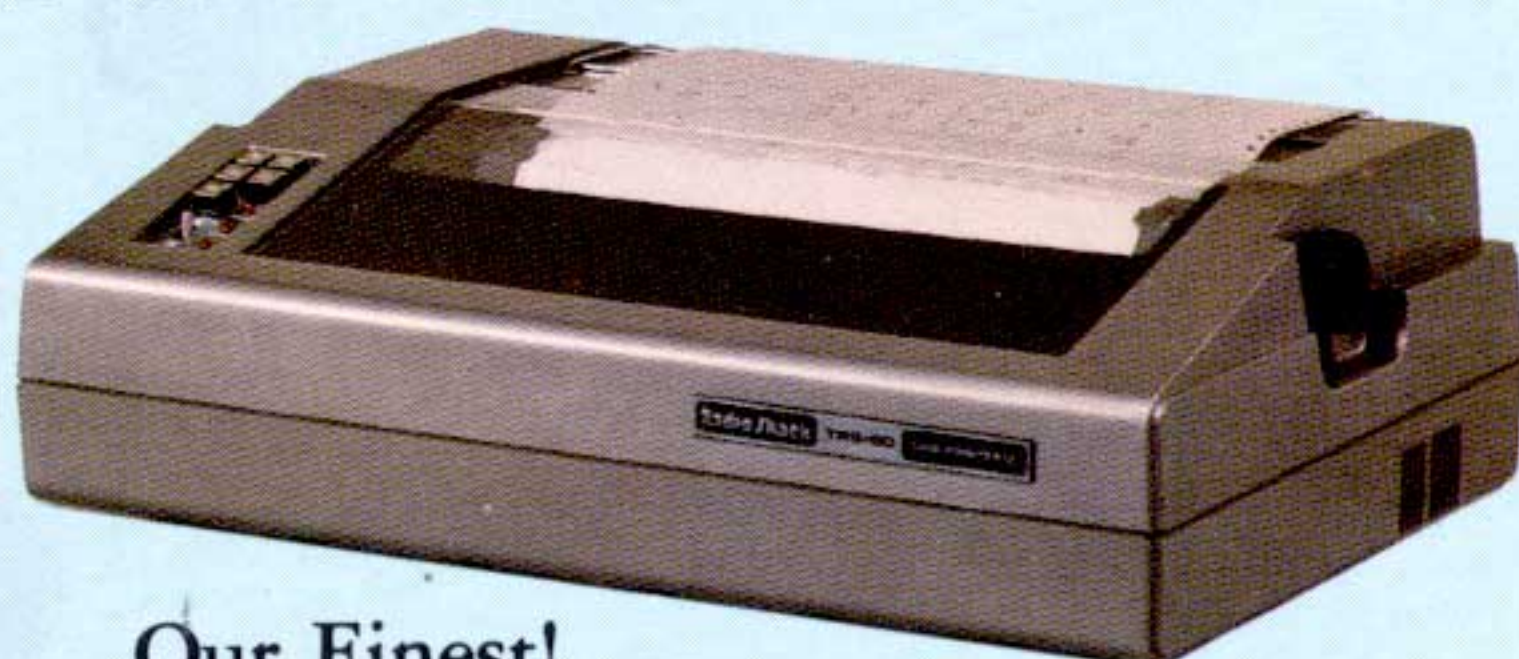
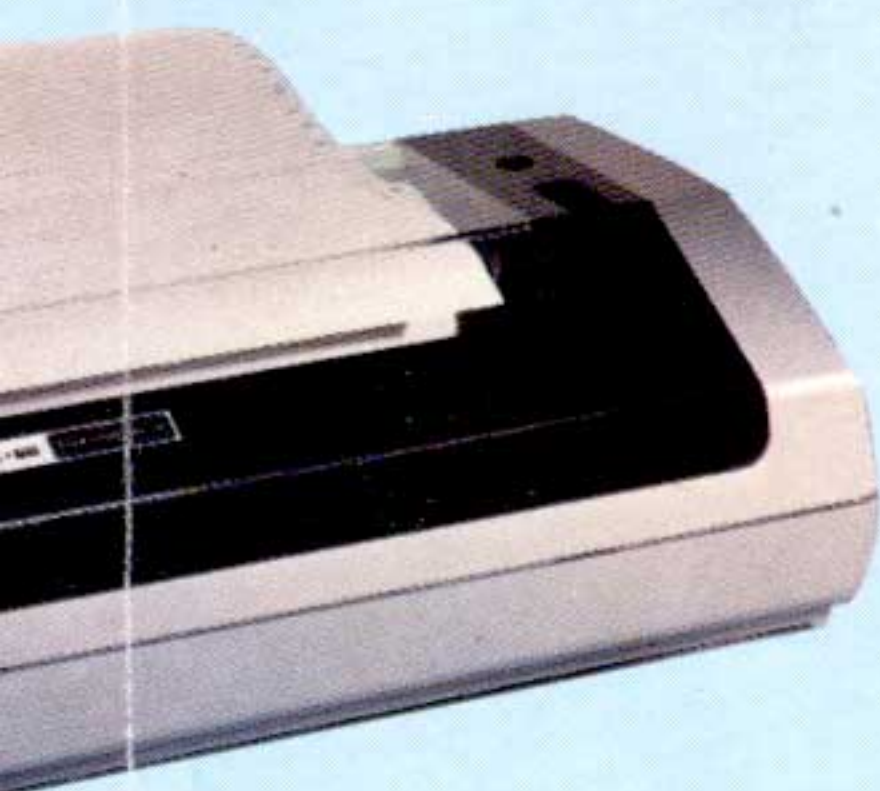
# BEST-SUPPORTED MICROCOMPUTER!

Software, Peripherals, Accessories, Literature and Services  
 Computer. You Should Settle for Nothing Less!

## The Family of TRS-80 Line Printers

Find the Right  
 for Any Job  
 (sold separately)

Matrix model for  
 our Daisy Wheel II  
 "quality" characters.  
 U.L. listed, of course!



### Our Finest! The All-Business Line Printer V

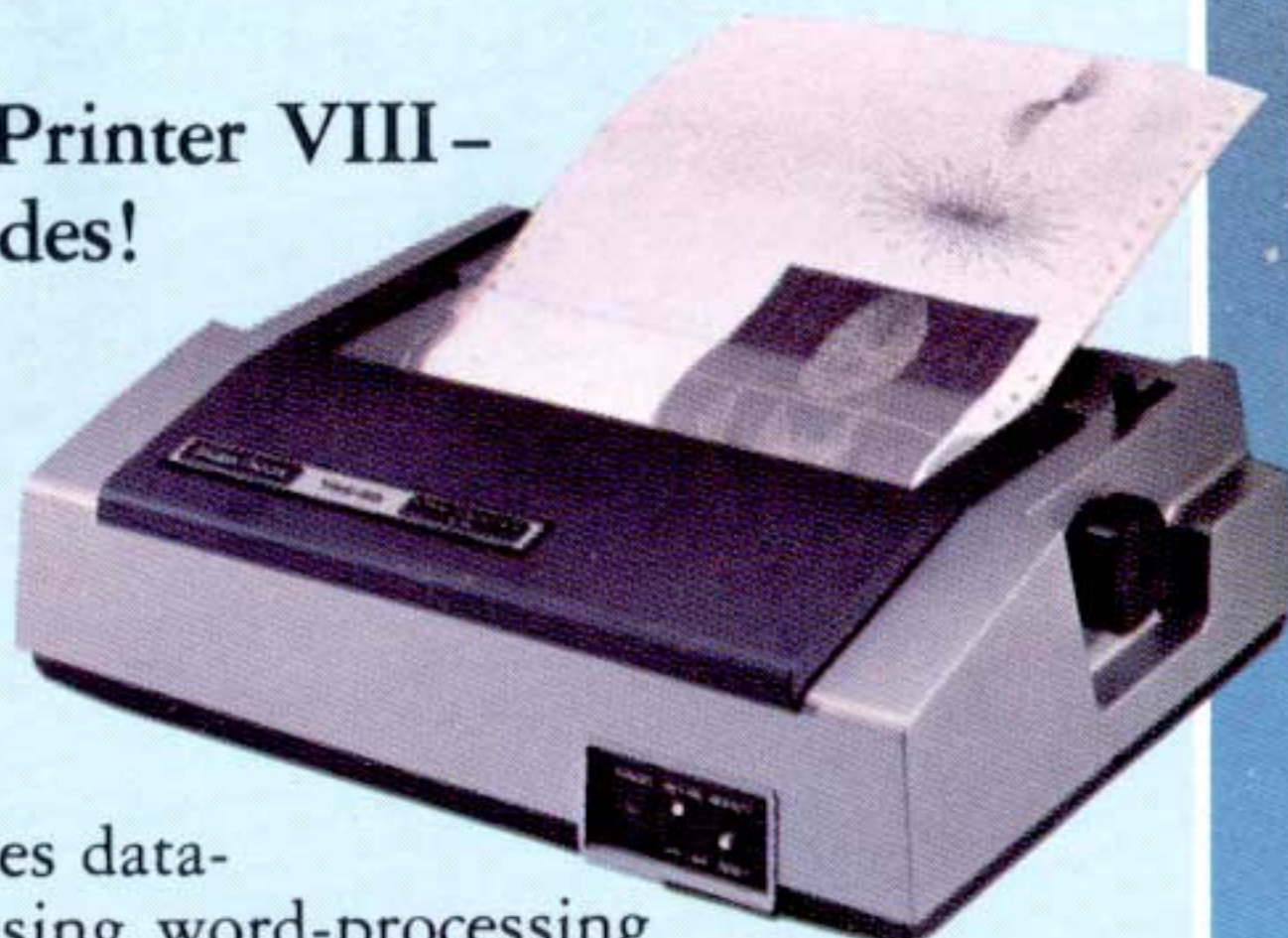
Here's a top-quality, compact impact printer designed to handle heavy business use. Prints 132 columns at 10 cpi. "Logic-seeking" bidirectional 9-wire head for fast throughput. Prints 4 character sizes with descenders, bold and underline at 60 lpm. Adjustable tractor mechanism uses fanfold paper up to 15" wide. \$1860<sup>00</sup>

### Line Printer VII Color Computer

Printing at low cost!  
 upper and lower case  
 in 8" line at 30 cps. Also  
 high-density dot-address-  
 information. Uses standard  
 paper. Includes parallel  
 faces. \$399<sup>00</sup>

ALL SUPPLIES FOR ALL  
 MODELS ARE AVAILABLE  
 AT ANY RADIO SHACK

### Line Printer VIII— 3 Modes!



New

Features data-processing, word-processing with near letter-quality characters, and bit image modes for dot addressable graphics. Prints 23 80-column lines per minute. 9½" pin or friction feed. \$799<sup>00</sup>

### Low-Cost, Direct-Connect Modem I For Computer Communications

Here's a real price breakthrough in direct-connect telephone modems! It's Bell 103 compatible, with Originate and Answer modes, and contains a DB-25 connector, plus a 4-pin DIN for connection to our Color Computer. Features full-duplex, 0-300 baud operation for TRS-80 Model II, Color Computer, plus Model I and III systems with an RS-232 Serial Communications Interface, or half-duplex through cassette port of 16K Level II TRS-80 Model I (software required). FCC approved. AC power module. (Not for multi-line use.) \$149<sup>00</sup>



### TRS-80 Owner-Support Services

**TOLL-FREE HOTLINE!** Our Computer Service Department is just a phone call away.  
**TRS-80 NEWSLETTER!** Monthly publication with news, tips, useful programs and ideas.  
**SERVICE!** Over 160 repair centers, plus "In-Shop" and "On-Site" service agreements.  
**TRAINING!** Computer Center classes for anyone—beginners to advanced programmers.  
**LEASING!** Available for Model II or any system valued over \$1500 (excluding software).

### TRS-80 Color Computer—Vivid Color Graphics—Plus Sound!

A powerful, very affordable—6809-based computer for one! Uses optional plug-in Program Paks or cassette reader. Color BASIC is simple to learn. Extended BASIC makes graphics simple to program in multiple modes. Expandable to 64K, 4 Disks. RS-232. U.L. listed.



TV sold  
 separately

### Sale! Save \$60 on the TRS-80 Pocket Computer

Programs in BASIC! Features 15 built-in functions, 10-digit accuracy, 1424 bytes of non-volatile RAM, 24-character LCD and 300-hour batteries. Add our Printer/Cassette Interface (149.95) for even more power! Reg. \$229.95 \$169<sup>95</sup>



**Radio Shack**  
 The biggest name in little computers™  
 A DIVISION OF TANDY CORPORATION  
 Retail prices may vary at individual stores and dealers



**A beautiful match, the Smartmodem and the TRS-80.** Your TRS-80 can talk with other computers, over the telephone lines. And with no acoustic losses or distortions. Access time-sharing systems and information utilities such as the Source,\* CompuServe† and MicroNet.

**Direct hook-up with no interference noises.** The Smartmodem hooks to the telephone line just like a modular telephone, simply insert in a wall jack.

**"Love at first sight"** — your TRS-80 and the Smartmodem!

**Brawny — because it does so many things.** Auto-dial and auto-answer features built in. With the Smartmodem, your TRS-80 can automatically dial the telephone, answer the telephone, receive and transmit, and hang up the telephone. Completely unattended.

**Pulse dialing or Touch-Tone.** \*\* The Smartmodem can be connected to any telephone system in the U.S. because it allows pulse-dialing, Touch-Tone dialing or a combination of the two. FCC approved.

**Program controllable in any language** using ASCII character strings. This is a unique

# Hayes Stack™

## Microcomputer Component Systems

feature of the Hayes Smartmodem.

**Brainy — because it does them all so simply.** Seven LED indicators on the front panel give you visual signals of the status of the Smartmodem:

MR — Modem Ready, SD — Send Data, CD — Carrier Detected, etc.

**The audio monitor feature** lets you "listen in" on the call being dialed and the connection made. You are immediately alerted to busy signals, wrong numbers, etc.

**Over 30 different commands** can be entered directly from your TRS-80 keyboard, including the unique "Set" commands which allow you to select and change various optional parameters such as dialing speed, escape code character, length of

time for a dial tone, and number of rings to answer. There are 17 "Set" commands. *The Smartmodem is completely compatible with the Bell-103 type modems*, the type of modem most time-sharing systems have. Operation can be in full or half-duplex, with a transmission speed of 0-300 baud.

**The Smartmodem is ready to "get-together" with your TRS-80.** TRS-80 Model II and TRS-80 Color Computers have RS-232 serial ports and can immediately interface with the Smartmodem. Expansions that permit use of the Smartmodem with TRS-80 Model I and Model III are available through your TRS-80 dealer.

**Match your TRS-80 with a Hayes Smartmodem for a sophisticated, high performed data communication system.** Available at computer stores nationwide (except TRS-80 dealers) — call or write for the location nearest you. And don't settle for anything less than Hayes.

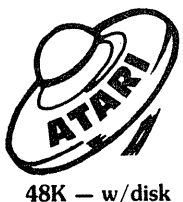
**Hayes Microcomputer Products, Inc.**  
5835 Peachtree Corners East,  
Norcross, Georgia 30092 (404) 449-8791



Your TRS-80® computer  
and the Hayes Stack™ Smartmodem.  
Beauty, Brains, and Brawn!

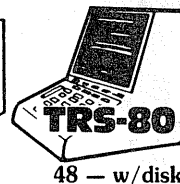






# CRYSTALWARE

THE FINEST IN  
FANTASY GAME SOFTWARE



At Crystal we are doing our best to provide the finest state-of-the-art graphic adventure software in the world. Our list of credits include the first indoor-outdoor graphic adventure, the first multi-disk graphic adventure, and now for the Atari, the first graphic adventure in the world which includes screen scrolling and animation. The era of the text adventure and games which are simple combinations of static graphics and text is rapidly drawing to a close. We attempt to utilize the full potential of your computer. True, many of our games use up to 48K and we only deal in disk products, but there are a lot of users out there who have worked hard to upgrade their systems to the max and we think they deserve games that will give their computer system a run for its money.

## ★★★ ADVENTURE GAMES ★★★

**1-THE HOUSE OF USHER-** Haunted house type adventure game with scrolling in the Atari version. Wander the creepy hallways of the three story castle based on Edgar Allen Poe's short story of the same name. Written in graphics, of course, with animation and sound. We have introduced a new mystery for another \$100 prize. \$29.95/1 disk

**2-FANTASYLAND 2041 A.D.-** The largest disk based adventure game in the world (that we know of). Enter the Hall of Heroes and prepare yourself for the greatest fantasy-role-playing game you will see for years to come. To win you must survive Congoland, Arabia, King Arthur, Captain Nemo, Olympus (a sea voyage), and Dante's Inferno (Hell itself). In both the Atari and Apple versions it takes up more than 400,000 bytes of memory and uses more than 400 hires screens. The winner of the contest described in the manual with this game will receive \$1000.00 and a bronze trophy. We have pushed the award date forward to February 1982 to allow more people to participate in the contest. \$59.95/6 disks

**3-GLAMIS CASTLE-** Yes, Pat and I are on our way to Britain to stay in the dreaded Glamis Castle. If we survive our real life adventure, we'll be measuring it and will be able to provide you with a 3-D game based on this ancient haunted site where King Duncan met his end at the hands of Macbeth. Our good friend, Mark Benioff, after much research, said there's a mystery room that has never been found in this castle and a half beast, half-man creature that guards a treasure therein. Our stay will be covered by the British media and we hope to share our experience with you through the writing of this game. \$49.95/2 disks

**4-BENEATH THE PYRAMIDS-** You are an archaeologist in 1932 and must find your way through the perilous chambers beneath the pyramids to discover a golden statue of the cat goddess Bast. This game is in hires graphics, includes sound, your little man actually moves through the corridors which you can see on the screen. The monsters are animated and very aggressive. There is a new \$100 prize for the first to solve the mystery; which is a toughie! \$29.95/1 disk

## ★★★ SPACE GAMES ★★★

**5-GALACTIC QUEST-** An excellent combination of Star Trek and Space Trader. Battle the animated Vegan fighters as you warp from galaxy to galaxy. At the same time, you may land on and trade with hundreds of planets. Super hires graphics and lots of sound. This has been one of our most popular games. \$29.95/1 disk

**6-SANDS OF MARS-** Take an exciting voyage to the planet Mars via the Starship Herman. This game compared to the rest, is second only to Fantasyland 2041 A.D. It includes scrolling on the Atari and hundreds of full screen graphics. You can move your little man through the terrain of Mars; if, of course, you survive the exciting journey to Mars, which occupies the whole first disk. There is a new mystery and another \$100 prize just waiting for some clever adventurer out there. Good luck! \$39.95/2 disks

## ★★★ WAR GAMES ★★★

**7-WORLD WAR III-** You Atari gamers will have to see this in the Atari version to believe it! If your tired of war games which take 15 minutes a move and have a manual the size of a telephone book; but still want a complex, real-time action war game-this is it! It is designed for two arm-chair generals which may maneuver up to 128 separate type of units at a time. The game displays a map of Iran & Iraq in the first scenario and later on you will find yourself moving nuclear submarines and battleships through two world wars. This is not a boring copy of a board based game but an original war game which takes a lot of skill and may take weeks to play. \$29.95/1 disk

**8-WATERLOO II-** If you had been Napoleon would you have done a few things differently? Well as you approach this final battle you are equipped with the same forces, face the same opposition, and survey the same terrain which he did. We have done a great deal of research to make this historically accurate as well as extremely complex. Even the angle of sight, fatigue of the individual soldier, and his psychological profile are included in the calculations. Oh by the way, your opposition is no slouch. You may find it more difficult to change the course of history than you think! \$49.95/2 disks

## ★★★ ARCADIA ★★★

**9-LASAR WARS-** Hires-3d space war simulation. Protect the earth from alien invaders. \$29.95

**10-LITTLE CRYSTAL-** The first of our line of education software, which will be completed by December. It includes a very fine version of Hangman, Mr. Music; which transforms the computer into a piano, Gunk-a hilarious shoot-em up game, and Storytime- an anthology of bedtime stories featuring Herman, the cat, Oscar, the Hamster, and of course, Little Crystal. \$39.95

**11-IMPERIAL WALKER-** A fine game pack written by our Atari programmer, Michael (graphics) Potter. Includes the Walker animation which is superb, Gunfight, and Lasar Nim, a game of 'how many robots'. \$29.95

**12-ADVENTURE PACK-** (#1-4) \$112

**14-THE WARRIOR-** (#7-8) \$64

**13-SPACEOUT-** (#5-6) \$58

**15-ARCADE-** (#9-11) \$60



Crystal has many other fine fantasy and space games. For a copy of CRYSTAL VISION which includes a complete catalog please send \$3.00 to the address below.

Our order lines are open 24 hrs. a day 7 days a week.

(408) 778-2966

CRYSTAL COMPUTER

17120 Monterey Rd., Morgan Hill, CA 95037



# Enhanced BASIC for Models I & III

# ENHBAS

*Lawrence I Charters, Bremerton, Washington*

A review of the Cornsoft Group's ENHBAS, in which the reviewer also includes three short programs written using this BASIC enhancement.

Most reviews are just that, but this one departs slightly and gives not only a review of ENHBAS, from the Cornsoft Group, but three sample programs written in ENHBAS as well. If you already have this remarkable package, key in the programs and enjoy them. If you don't have ENHBAS, read on and find out more about it.

ENHBAS is an extension of TRS-80 BASIC, and is worth every penny of its modest cost. Once loaded, you have the ability to use all normal TRS-80 commands, plus such new and powerful additions as WHILE/WEND structured loops, and elegant little flourishes such as the built-in PI constant. Lovers of the exotic will relish commands such as EXEC, which allows you to execute, as if it were a program line, any string expression.

Unlike most BASIC extensions and utilities, ENHBAS is available for Model I and Model III, cassette and disk systems. (An expanded version is available for the Model II). As long as you have at least 16K of RAM and Level II BASIC, there is a version of ENHBAS you can use, and it will allow

you to run virtually any ENHBAS program. When this reviewer sent off a check for ENHBAS, it arrived promptly, packed in a sturdy box and padded by sections of the "Indianapolis Star" - a much better paper than the local paper. (I might even subscribe...)

To give you some idea of what you can do with ENHBAS (pronounced "EN - BASE"), note Spectacular Short Program 1 (Listing 1). Written as a single line, it requires next to no memory; the ENHBAS "SIZE" command reports it to be just 160 bytes long. Yet this tiny program prints, in regular, orderly columns, the full binary and hexadecimal equivalents of all decimal numbers between 1 and 500. If this doesn't impress you, it also prints a caption across the top of the video, labels the columns, draws a bar to separate the labels from the columns, and scroll-protects the top three lines of the video. The binary, decimal and hexadecimal numbers neatly scroll up the screen and disappear under the bar, giving a very professional appearance. Finally, as a parting gesture, the program disables the scroll protection. All of this using just three ENHBAS features: SCROLL, BIN\$ and HEX\$.



```

10  SCROLL=SET:A$=STRING$(32,42):B$="
    Binary          Dec  Hex":PRI
    NTTAB(14)"BINARY / DECIMAL / HEX
    CONVERSIONS":PRINTB$"      "B$:PRIN
    TA$A$:SCROLL=3:FORI=1TO500:PRINTB
    IN$(I);"  "I;"  "HEX$(I),:NEXT:SC
    ROLL=RESET

```

### Listing 1

In answer to "what else can it do?" note Spectacular Short Program 2 (listing 2). Again the program is one line long, requiring a mere 181 bytes. This program (1) sets up a string array of 448 one-byte strings (448 fit nicely on the screen); (2) assigns a random character to every element of the array; (3) prints the array (so you can see that it is truly random); (4) waits patiently for you to press a key; (5) sorts the array in ascending order; and (6) prints out the sorted array. In spite of the complexity of the task, the sort is blindingly fast - it takes just six seconds to sort all 448 elements. A program designed to do the same thing, written in standard TRS-80 BASIC, would be much longer, and could very well take *hours* to finish sorting. Note too, such details as the WINKEY\$ command. Even the most dedicated Microsoft purist will admit that:

```

10 Z$=WINKEY$:PRINT"YOU TOUCHED
ME!"

```

is much easier to write and understand than

```

10 Z$=INKEY$
20 IF Z$=""GOTO 10
30 PRINT"YOU TOUCHED ME!"

```

Both of these program segments perform identically. Which would you use?

### Listing 2

```

10  CLS: CLEAR500: SCLEAR: DIMA$(447): PR
    INT"*** INITIALIZING STRING ARRAY
    ***": FORI=0TO447: A$(I)=CHR$(RND(
    95)+32): PRINTA$(I) " ";: NEXT: PRINT
    "PUSH ANY KEY TO START";: Z$=WINKE
    Y$: CLS: PRINT"START": KEYA$: SORT: PR
    INT"DONE": FORI=0TO447: PRINTA$(I) "
    ";: NEXT

```

You may have noticed that both listing 1 and 2 are very neatly formatted. ENHBAS does this automatically. Listings on both the video and the printer reserve the first six columns for line

numbers, resulting in uniform columns of numbers and very readable program lines. ENHBAS also allows you to set the maximum printing width of your printer. For example, if you have an 80 column printer and want your program listing to look identical to what appears on your 64 column screen, simply type "CLM=64" and your printer will think it has only 64 columns. If this isn't enough, ENHBAS automatically sets the maximum page length of your printer at sixty lines, with a three line margin at the top and bottom. Never again will you have to worry about LLISTing your program on the page perforations! If you don't want a sixty line page, you may change the default by setting PAGE to some other value. Finally, if you don't have a printer (or your printer is turned off) the computer will not hang up if asked to LPRINT or LLIST. Instead, after a few seconds, the message "PRINTER NOT READY" will appear and you can continue on.

Other ENHBAS features include: automatic lower case; a user defined cursor; the ability to "RENEW" programs; one-letter edit commands (D, E, I, L, P, R and F replace DELETE, EDIT, AUTO, LIST, LIST-, RUN, and a new command, FIND); short-entry commands - <control> <SHIFT>S, for example, prints "STRING\$("; and the ability to print, directly from the keyboard, all the arrow keys, plus the brackets, Yen and Pound signs, and other special characters available with a lower case modification. With a speaker/amplifier connected, ENHBAS provides an audible key "click"; a two-note error tone; and a one-note <BREAK> tone. Simply writing PRINT CHR\$(7) or pushing <control> G will activate the "bell" signal, an eight-note rendition of Westminster Chimes.

If you haven't purchased a disk yet, cassette versions of ENHBAS include the Disk BASIC feature MID\$, INSTR, LINEINPUT, and octal and hexadecimal constants. Machine language programmers will appreciate the ENHBAS commands WPEEK, WPOKE, and CALL. The first two commands are sixteen bit versions of PEEK and POKE - no more messing around trying to figure out the backward Z-80 instructions and addresses. CALL is similar to USR, except that addresses of machine language routines do not need to be predefined, and arguments may be passed both ways.

In fact, ENHBAS has something for everyone. Several extensions of BASIC are available, such as Microsoft's Level III, Apparat's Bionic Basic, and Modular Software's NewBasic. None offer the power and flexibility of ENHBAS, and ENHBAS is the only such extension with versions for cassette and diskette, Model I and III. ENHBAS also comes with extremely well written documentation, the only problem area being a somewhat fuzzy explanation of the PLAY (play



music) command. You won't have to flip through cryptic explanations, poorly printed on off-sized, off-color paper - ENHBAS documentation is written in English, and enclosed in an 8½ by 11 inch ring binder. The documentation even includes both a table of contents and an index. Remarkable.

For this review, a disk version of ENHBAS was tested on a 48K Model I using TRSDOS, NEWDOS+, and NEWDOS80. The original version tested, ENHBAS 1.7, worked quite well, with just one trivial bug noted (one command lacked a feature the documentation said it should have). Another minor problem was the use of the down-arrow as a control key for shorthand entry of BASIC keywords - irritating when using the NEWDOS or NEWDOS80 single-line listing functions.

ENHBAS 2.2, the latest version received, added several new features, and fixed the bug noted earlier. The short entry procedure has been changed, allowing all the arrow keys to be used. This latest version also "tokenizes" ENHBAS, resulting in faster operation than 1.7. Probably the most useful feature, though, is the new ZSTEP option. When ZSTEP is set to 1, the programmer can single-step through the program. A pause occurs after each statement is executed, and execution continues only after a key, any key, is pressed. Coupling TRON with ZSTEP makes debugging ridiculously easy.

Some users might find certain aspects of ENHBAS annoying. ENHBAS loads at the top of memory, occupying around 5K that it guards most jealously. Machine language programmers who like to use this area for various routines may find some conflicts, but the WPEEK, WPOKE and CALL command should permit easy adjustments. ENHBAS is also a bit slow. The program "FOR I=0 TO 10000:NEXT" will take 24 seconds to execute under regular disk BASIC, but 29 seconds under ENHBAS 2.2. This, too, is a minor difficulty, since sorts and graphics are the most time-sensitive BASIC operations, and ENHBAS offers routines which *drastically* speed up both types of programs.

The only "defect" noted in ENHBAS 2.2 was the lack of a shorthand entry command for the zero key (it should yield "INSTR", but doesn't). Programs written under older versions of ENHBAS will also require some fairly simple editing, since the "tokenizing" of reserved words in version 2.0 and later releases will create conflicts resulting in syntax errors. If you have an older version of ENHBAS and wish to receive the latest version, the Cornsoft Group will update your disk for around \$3.00 (send them the disk). For the very reasonable price of \$15.00, they will update your disk and send you the second edition of the manual. The Cornsoft Group appears firmly

committed to product support and improvement.

The final sample program (Listing 3) illustrates several ENHBAS features. Borrowing a "turtle graphics" concept, an integer array is used to hold the graphic image of "A Famous Android".

Using the DRAW command, an outline of the android (defined in the array L) is rapidly drawn, rotated at 45 degree intervals, moved all around the screen, inverted from black to white and white to black (using the INVERT command), and expanded and contracted. Two boxes are drawn (with the PLOT command), forming an identification card for the android, and finally the entire display is scrolled off the left edge of the screen (using the LEFT command). While all of this is going on, music vaguely resembling part of Beethoven's Ninth Symphony is played (the command PLAY uses the string S\$ for this purpose), together with some other incidental music.

Then, using the RDGOTO and JNAME features, the contents of the array defining the android's outline are replaced with another set of values defining a solid representation of the famous android. In other words, two separate and independent sets of data occupy the same array (L) at different, program-specified times. More androids are drawn, moved and rotated, and more music is played.

Eventually the process is repeated. Note too, that the RDGOTO and JNAME features allow the string S\$ to contain, at various times, three different music selections. These features make for a very fast, compact (2963 bytes), and versatile program.

If you do any programming at all, you owe it to yourself to try ENHBAS. The Cornsoft Group also offers an integer BASIC compiler at an attractive price, and is working on a floating point compiler. "Missile Attack", one of Adventure International's latest hits, is another Cornsoft product. Any way you look at it, ENHBAS is a bargain.

#### Listing 3

```

10  CLS: CLEAR 700: DEFINITI=L: DIM L(54): P
    OKE16427,1: POKE16409,1
20  PRINT@340,"L APWRROEGNRCAEM MCIHN
    AGR TBEYR S"
30  PRINT@960,CHR$(23): FOR I=0 TO 9: LEFT
    : FOR J=0 TO 300: NEXT J,I
40  RDGTO"MUSIC": S$="": GOSUB 280: RDGTO
    "ANDY1": FOR I=0 TO 54: READ L(I): NEXT
50  IY=12: FOR IX=124 TO 68 STEP 14: FOR I=1
    TO 8: POKE16426,I: CLS: GOSUB 270: NEXT
    : IY=IY+4: NEXT
60  PRINT@26,"THE ADVENTURE OF";: PRIN
    T@90,"SECRET 'BOT .037";: GOSUB 300

```



```

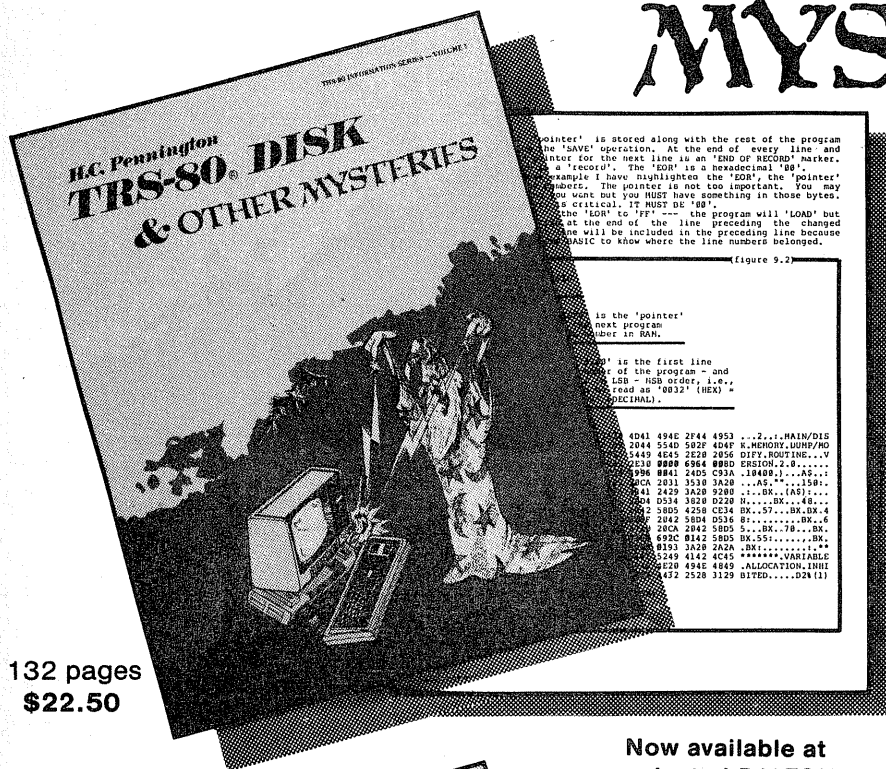
70  IX=68:IY=28:FORI=2T011:POKE16427,
    I:GOSUB270:CLS:NEXT
80  CLS:FORI=11T01STEP-1:POKE16427,I:
    GOSUB270:NEXT
90  RDGT0"MUSIC2":S$="":GOSUB280:FORI
    =0T011:INVERT:NEXT:GOSUB300
100 CLS:IY=28:FORIX=68T020STEP-4:GOSU
    B270:IY=IY-1:NEXT
110 CLS:IX=20:IY=16:GOSUB270:PL0TSB,3
    ,2T034,34:PL0TSB,0,0T0127,47
120 PRINT@88,"SECRETARIAT FOR BUREAU C
    RACY";:PRINT@157,"SECURITY DIVISI
    ON";:PRINT@215,"ANDROID DEPARTMEN
    T, SEC. .037";:PRINT@274,STRING$(
    44,42);
130 PRINT@338,"NAME: Android Nim
    AGE: Two Years";:PRINT@402,"RANK
    : Special Agent STATUS: Active
    ";:PRINT@466,"WEAPON: Mk 46 Laser
    Blaster, Type III,";:PRINT@538,"
    or Light Saber, 4 Megawatt";
140 PRINT@594,"CLEARANCE: Utmost Top
    Secret, RS-232C";:PRINT@658,"MISS
    ION: Seek out and destroy checksu
    m";:PRINT@731,"errors, bad loads,
    and null sorts.";
150 PRINT@770,"DESCRIPTION-- Wt.: 700
    kg. Ht.: 200 cm. Eyes: Two.";:
    PRINT@834,"Hair: None. Agent Nim
    is fluent in BASIC, Assembler,";
    :PRINT@898,"binary, octal, decima
    l, and hexadecimal. No oiling re
    quired.";
160 FORI=0T05:GOSUB300:NEXT
170 RDGT0"ANDY2":FORI=0T054:READL(I):
    NEXT
180 FORI=0T063:LEFT:NEXT:POKE16426,4:
    IY=5:FOR IX=15T0127STEP16:GOSUB27
    0:NEXT
190 POKE16426,0:IY=42:FORIX=113T00STE
    P-16:GOSUB270:NEXT:RDGT0"MUSIC3":
    S$="":GOSUB280
200 IX=114:IY=12:FORI=0T010:IX=IX-9:I
    Y=IY+2:CLS:GOSUB270:NEXT
210 FORI=5T08:POKE16426,I:CLS:GOSUB27
    0:NEXT
220 FORI=0T05:IY=IY-2:CLS:GOSUB270:NE
    XT
230 FORI=0T05:IX=IX+14:GOSUB270:NEXT:
    INVERT:FORI=0T03:GOSUB300:NEXT:FO
    RJ=0T063:LEFT:NEXT
240 CLS:IX=60:IY=12:GOSUB270:POKE1642
    6,2:IX=80:IY=16:GOSUB270
250 IX=74:IY=33:POKE16426,4:GOSUB270:
    IX=54:IY=29:POKE16426,6:GOSUB270
260 PRINTCHR$(7);:RDGT0"MUSIC":S$="":
    GOSUB280:G0T040
270 DRAWSET@IX,IYUSINGL:RETURN
280 FORI=0T0120:READJ,K:IFJ=0RETURN
290 K2=INT(K/256):K3=K-256*K2:S$=S$+C
    HR$(J)+CHR$(K3)+CHR$(K2):NEXT:RET
    URN
300 PLAYS$:RETURN
310 JNAME"ANDY1"
320 DATA 1307,513,1027,257,519,513,51
    9,513,519,1025,263,1029,1287,1025
    ,263,1029,519,517,519,517,519,261
    ,1027,773,1031,517,519
330 DATA 517,519,261,515,517,515,517,
    1027,1285,1031,261,1283,2049,2307
    ,2053,1283,257,1031,3329,771,2053
    ,771,257,519,2049,1031,513,0
340 JNAME"ANDY2"
350 DATA 257,258,517,1045,259,529,513
    ,273,513,273,257,258,261,277,261,
    789,261,533,261,259,2817,529,259
360 DATA 517,277,1541,259,1025,273,51
    3,259,261,277,1285,259,1281,273,7
    69,276,3077,259,1553,257,273,513
370 DATA 275,261,277,1285,533,261,275
    ,529,257,0
380 JNAME"MUSIC"
390 DATA 111,200,111,200,105,210,94,2
    40,94,240,105,210,111,200,125,190
    ,140,160,140,160,125,190,111,200,
    111,300,125,90,125,260
400 DATA 111,200,111,200,105,210,94,2
    40,94,240,105,210,111,200,125,190
    ,140,160,140,160,125,190,111,200,
    125,300,140,70,140,220
410 DATA 125,190,125,190,111,200,140,
    160,125,190,111,80,105,120,111,18
    0,140,200,125,190,111,80,105,120,
    111,180,125,190,140,160,125,190,1
    88,200
420 DATA 111,200,111,200,105,210,94,2
    40,94,240,105,210,111,200,125,190
    ,140,160,140,160,125,190,111,200,
    125,300,140,70,140,400,0,0
430 JNAME"MUSIC2"
440 DATA 168,100,168,100,149,120,168,
    100,140,140,149,120,125,160,140,1
    40,0,0
450 JNAME"MUSIC3"
460 DATA 188,180,188,180,168,190,168,
    190,158,200,158,200,168,190,168,1
    90,0,0

```



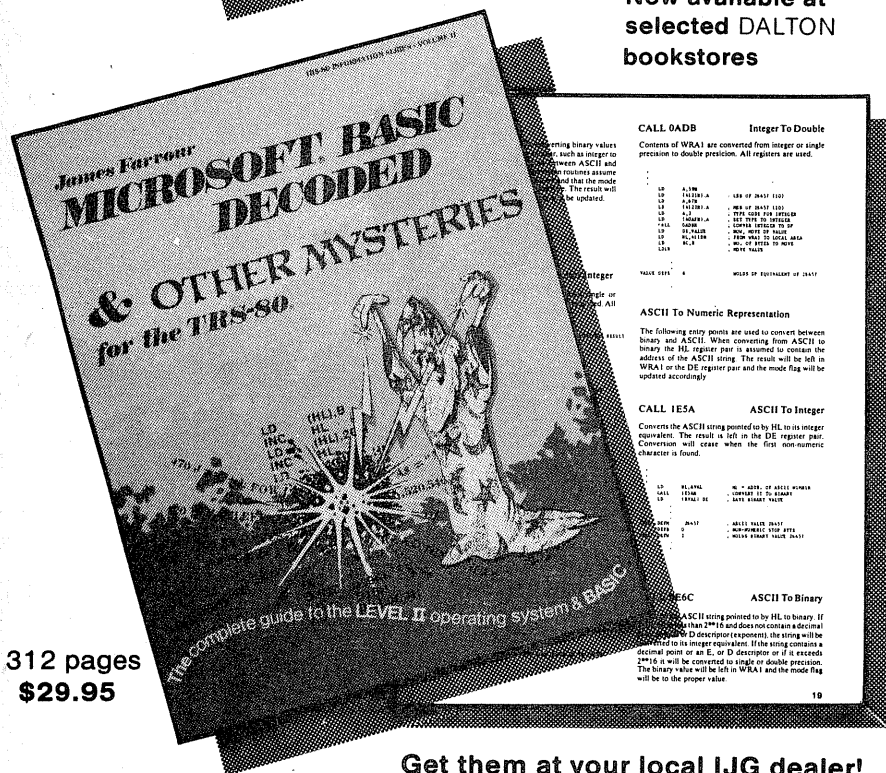
'.. this is not only a worthwhile book but a great book. My advice is to get it and USE it!' - William Barden Jr.

# OTHER MYSTERIES



132 pages  
\$22.50

Now available at  
selected DALTON  
bookstores



312 pages  
\$29.95

Get them at your local IJG dealer!

'It has twelve thousand one-liners in it, and every one is great!' - Dennis Kitsz.

Phone orders (714) 946-5805

TRS-80 is a trademark of Tandy, Microsoft is trademark of Microsoft.

TRS-80 Disk and Other Mysteries is the definitive fixit book for disk users. Written by Harvard Pennington it has more than 130 pages of easy to read, entertaining and immensely useful information - find out how to recover disk files, the layout of information on the disk, memory maps, problem-solutions . . . the list goes on!

Many readers have saved days of work by recovering files that had been unreadable. Now in its fourth updated printing, TRS-80 Disk and Other Mysteries has been getting rave reviews in several magazines. Yours for only \$22.50 (plus \$3.00 shipping, CA residents please add \$1.35 sales tax).

Microsoft BASIC Decoded and Other Mysteries is the complete guide to your Level II ROMs. With over seven thousand lines of comments and 6 additional chapters packed with information, this is easily the biggest, and best, book about the Level II ROMs available.

Exploit the full power of Microsoft BASIC, with the aid of more than 300 pages of tested examples, understandable explanations and detailed comments. Now available in a revised second printing, only \$29.95 (plus \$3.00 shipping, CA residents add \$1.80 sales tax).

**IJG Computer Services,**  
1260 West Foothill Blvd.,  
Upland, CA 91786

Please send me the following  
*Other Mysteries:*

- ☐ TRS-80 Disk for \$22.50
- ☐ Microsoft BASIC Decoded for \$29.95
- ☐ The Custom TRS-80 for \$29.95
- ☐ BASIC Faster and Better for \$29.95
- ☐ The BFBLIB Disk for \$19.95
- ☐ The BFBDEM Disk for \$19.95

Please add \$3.00 per book, or disk, for shipping.

Overseas airmail \$8.00 per book.  
California residents add 6% sales tax.

Name .....

Address .....

City .....

State ..... Zip .....

Charge my:

☐ MasterCard Interbank Code .....

☐ Visa Expiration Date .....

Card No. ....

☐ Check enclosed for .....

☐ Ship COD (\$3.00 extra)

Signature .....



# **TOP QUALITY BUSINESS PROGRAMS from MICROGRAM**

## **MEDICAL OFFICE MANAGEMENT**

- Accounts Receivable/Payable/Billing Statements
- Preparation of Insurance Information using AMA Code Work Descriptions
- Expense Summaries/Profit and Loss Statement
- Day Sheets and much more

## **DENTAL OFFICE MANAGEMENT**

- Accounts Receivable/Payable/Billing Statements
- Preparation of Insurance Information using ADA Code Work Descriptions
- Expense Summaries/Profit and Loss Statement
- Day Sheets and much more

## **LAW FIRM MANAGEMENT**

- Accounts Receivable/Payable/Billing Statements
- Narrative Billing Statements
- Revenue/Workload by Attorney
- Expense Summaries/Profit and Loss Statements

## **PROPERTY MANAGEMENT**

- Listings of Property Owners, Tenants, Rental Rates
- Billing Statements, Delinquent Payment Notices
- Prepare Client Trust Account Reports
- Prepares complete Expense Summary for Tax purposes

**M I C R O G R A M**

P.O. Box 310  
Gig Harbor, WA 98335  
(206) 858-6304

West 1022 9th Avenue  
Spokane, WA 99204  
(509) 455-9791

Circle 36

**TOLL FREE 1-800-547-5995 Ext 112**



# Snapp enhancements for Model II

*Marvin Mallon, Canoga Park, California*

As a professional TRS-80 programmer I am always on the alert for any software tools that will increase my work efficiency. So it was that I quickly embraced Apparat's NEWDOS for the Model II. As those of you who are also using this remarkable DOS know, it is a significant improvement.

It was with considerable dejection, therefore, that I discovered that the Model II TRSDOS (version 1.2) was not what I had grown accustomed to. Even TRSDOS 2.0, while introducing some nice features, still fell short of what I thought a useful DOS should be.

The natural assumption was that Apparat would soon provide a NEWDOS for the Model II, but for reasons not known to me, they have yet to announce an interest in pursuing that. So it was with great delight (and some trepidation) that I read the advertisement from Snapp, Incorporated (a name unfamiliar to me) proclaiming the availability of six enhancement modules for Model II TRSDOS. It sounded great, but none of my colleagues had heard of this Cincinnati software firm, much less used their utilities.

Out of desperation I abandoned my cardinal rule about buying software sight-unseen and sent off for a set of all six. I am pleased to report that I have since received ten times their cost in value.

Their eight-inch diskette contains three files: XBPATCH, XBCOPY and DOSFIX. XBPATCH modifies Radio Shack's (Microsoft) BASIC so that it will intercept your keystrokes and jump to Snapp's enhancements. XBCOPY is the actual set of patches that provide the improvements which I will elaborate on in a moment. DOSFIX has nothing to do with either of the other two and is included as a free inducement. It is quite valuable in itself, and is discussed first.

DOSFIX is a set of 13 patches which provide fixes or cosmetic improvement to TRSDOS 2.0. If you are still using 1.2 you will have to obtain version 2.0 for \$24.95 from Radio Shack, or Snapp will provide their disk for the "standard" 1.2 DOS which comes with the Model II. This makes little sense because 2.0 is a marked improvement over 1.2.

DOSFIX 1 is a patch which inhibits FORMAT from trying to format a marginal track ten times.

Snapp's argument is that FORMAT is the time to discover (and discard) diskettes whose surface quality is dubious.

DOSFIX 2 allows the password (KTA2) to get you into the operating systems. It seems someone inadvertently "shut the door" somewhere in the DOS and this patch unlocks it.

The third fix is a set of patches "from Ft. Worth and offered without comment", by Snapp. The fourth patch is an adjustment which permits TRSDOS to be overlayed. It is required for some of Snapp's other software but mandatory for the XBASIC package.

The fifth fix is an esoteric fix to the DUMP command and will be most useful to machine language programmers. I'm not one, but used it anyway thinking that, like chicken soup for a cold, it couldn't hurt. The sixth fix is like number five and works with DEBUG.

Number seven interested me. If you choose to use it (all of these fixes are optional) then the BREAK key is permanently disabled and moved to the control (CTL) 6 combination. I agonized over implementing this but decided to do so on behalf of my clients. The software I create (or modify) is often run by inexperienced office help and it seems



logical to protect them against problems caused by an inadvertent program interruption.

The eighth fix is a controversial modification which I also hesitated to employ. It seems TRSDOS 2.0 had added a verify detect feature which checks the disks each time an input or output is performed to prevent destruction of the directory if a diskette has been swapped and a SYSTEM "I" has not been issued. It's a great idea but costs so much in access time that 2.0 runs detectably slower than 1.2. Snapp's fix gets you back to the faster, though riskier, mode. Just be sure to initialize when appropriate and you will be OK. I generally take care of this from within a program and thus am not concerned with the problem.

DOSFIX 9 is one I experimented with and chose to ignore. This patch reaches into the DOS and changes the drive's stepping rate from 20 to 12 milliseconds. While it works fine and offers some improvement in program speed, the patch makes my drives sound like a broken pin-ball machine. Rather than answer my clients' questions about the disturbing (but harmless) noise, I left it out.

The tenth patch is a delight. It eliminates the Tandy logo display which comes on with boot-up. I don't think my clients miss it and it leaves the door open to displaying my personal insignia if I ever get around to translating the one I did for the Model I.

DOSFIX 11 and 12 are mutually exclusive. Eleven eliminates the TIME question at boot-up and number twelve rids the DOS of both DATE and TIME questions. I opted for eleven, as I need the date stored away for many programs.

The highly touted 80-key type-ahead which was added to TRSDOS 2.0 doesn't function properly in BASIC. At the cost of the loss of the HOLD key function, it does after installation of fix number thirteen. Since type-ahead can appreciably speed up data entry, I chose to plug it in.

#### Enhancing BASIC

Six new functions are added to BASIC after performing the XBPATCH and XBCOPY routines from Snapp's instructions. The manual is handy, well-written and 21 pages long.

XBASIC is nothing more than one stroke general keyboard functions. "K" supplants KILL and "M" does nicely for MERGE along with a handful of others. Nice, but not valuable. The single stroke "N" for NEW concerns me with its potentially disastrous results. An un-NEW ("U") command, however, restores the unintentionally lost program.

The truly useful portion of this module is the ability to use the cursor control keys (arrows) to list a program line-by-line. This was a feature of NEWDOS (Model I) which I welcomed warmly for my Model II.

XREF is the most useful tool which a BASIC programmer could desire. In essence, you can get a partial or complete dump to the screen or printer of all variables and line number references in a program. This serves as an indispensable map which tells, for example, that the variable X is referred to in lines 1500, 1650 and 2000. Program debugging is made enormously easier with such a guide at hand. When modifying someone else's code, it becomes even more valuable.

XFIND goes beyond Apparat's XREF and dumps out all keyword and string references. One can see, for example, all the program lines which contain an LPRINT statement. This is also true for any other BASIC statement, function, command or operator. Imbedded literals ("Press ENTER when ready") are alphabetically listed with their accompanying line references. Fantastic!

XDUMP rounds out your program dissection by listing all named variables and their value at the time the program was halted. Even an old familiar program will surprise you when you pull an XDUMP and see the current status of the variables. A real eye-opener and invaluable in the debugging process.

XRENUM may mean more to you than to me. I learned long ago *not* to renumber a program under development unless absolutely necessary. I lose all continuity from one version to the next. Nonetheless, this utility, on a limited basis, can be useful. I recently transplanted a lengthy

subroutine but had to renumber it prior to merging it with the new program to prevent conflict of line numbers. On other occasions XRENUM was invoked (with one of its options) to scan a program, not to change it, and report on undefined line numbers and similar errors. It works beautifully in this mode and can spare you a lot of grief in a bad encounter.

XCOMPRESS has to be seen to be believed. The one stroke command "H" puts your program through a press which squeezes out 25% (or more) of the code. If you give it unlimited control, it throws out all remarks, irrelevant blanks, extraneous keywords and makes multiple statements wherever it can. To top it off, it rennumbers your program on a one by one basis to cast out a few extra digits. You may opt to inhibit one or more of these removals and settle for a partial but more intelligible reduction in program content. This enhancement, while not recommended for use during program development, really pays off in space and performance when implemented.

An interesting by-product of installing XBASIC is worth mentioning here. Snapp utilizes the 26th sector on the diskette in hiding away its code. Consequently, each new backup copy must have the XBCOPY routine run onto it before it will perform. This is not a significant problem and, once done, it sticks even after that disk is used for subsequent backups. Only a fresh FORMAT will wipe out the enhancement code.

#### In Summary

Snapp's Extended BASIC is intended principally for the serious programmer. My operating procedure is to use this excellent package on all development tasks but to turn over a "non-Snapped" version to the customer. The end-user in a business environment will benefit from the efficiencies which the utilities gave to the programmer, but won't see (or completely appreciate) the hidden powers. The professional programmer, however, needs this software no less than a plumber or carpenter needs the best available tool. To paraphrase Mr Malden, "Don't leave your keyboard without it!" ■



## A mathematical function grapher

# Supergraph 1.0

For Model I & III disk or tape

Did you ever want to know what this expression looks like?

$$\int_0^x (\sin(X) + \cos(X^2)) dx$$

How about  $d/dx(\cos(X)/X^x)$ ? One way to find out is to solve them analytically and use the analytical expression in a regular graphing program. That's fine if an analytical expression can be found. An easier approach is to use *Supergraph*.

*Supergraph* is actually a mathematical/engineering tool that requires approximately 13K of memory. It is three graphing programs in one. It can:

- Graph a function
- Graph a derivative of a function
- Graph the integral of a function
- Analyze slopes, definite integrals and roots

Some special features include:

- Automatic ranging of the y-axis
- Complete control of end points
- 6 cursors, 2 on X, 2 on Y and 2 blinking
- Fool proof data entry
- Error trapping
- Capability of merging a function saved on disk
- Optional cross-hatch reference points

You can use *Supergraph* to:

- Teach students calculus
- Solve minima and maxima problems
- Solve probability and statistical problems
- Graph difficult derivatives and integrals
- Solve engineering distribution type problems

### Submodes - Running *Supergraph*

*Supergraph* contains three function modes: the

**Davut Z Korkut, Kenner, Louisiana**

function proper mode (function itself), the derivative mode, and the integral mode. The function mode can be changed during program execution. Under each function mode there are two sub-modes: the graph (G) and the examine (X) sub-mode.

When you load *Supergraph* and type RUN, you will see:

```
ENTER FUNCTION AS SUBROUTINE 5000.  
THE ENTRY VALUE SHOULD BE STORED IN  
VARIABLE X, AND THE RETURNED VALUE  
IN VARIABLE F.  
ENTER 'GOTO 20' WHEN FINISHED.  
CURRENT FUNCTION (ERROR =0, LINE 0):  
5000 F=.398942*EXP(-.5*X*X)  
10000 RETURN  
READY  
>—
```

At this time you can enter the function beginning with line 5000 and ending with RETURN in line 10000. Be sure the function subroutine begins with line 5000 and does not exceed line 10000! Notice that the default equation is the normal distribution function and the current function is automatically listed.

The function subroutine can have discontinuities or can be approximated. If it has discontinuities, be careful when the derivative is plotted, as the slope at a discontinuity may be grossly inaccurate. If the function is approximated, be sure to include a calculation of F for all values of X.

See **SUPERGRAPH**, page 145



# Now for the TRS-80™ Models I & III

# LDOS

## VERSION 5.1 THE TRS-80™ OPERATING SYSTEM MODEL I AND III

- \* **DOUBLE** Sided & **DOUBLE** Density support.
- \* **AUTOMATIC** Density recognition.
- \* 35, 40, 77, 80 and any other track counts are supported.
- \* All available drive stepping rates are supported.
- \* Hard Drive support, can be **HANDLED AS A SINGLE DRIVE**.
- \* Hard drive partitioning, one drive can act as up to six.
- \* Intermix 5", 8" and Hard drives, up to a total of 8 drives.
- \* Compatible with the Model I Radio Shack Expansion Interface.
- \* Upward compatible with **TRSDOS** (2.3 & 1.3 as documented).
- \* Fully supports Microsoft language products for **TRS-80**.
- \* Complete media compatibility Model I to Model III and back.
- \* Full support for **LOBO's LX-80** interface.
- \* Full support for **AEROCOMP'S** double density controller(DDC).
- \* Full support for **PERCOM's DOUBLER II**.
- \* Complete documentation (well over 250 pages)
- \* Complete technical information.
- \* A **TOLL-FREE** 800 number for customer service.
- \* An **LDOS** users bulletin board on MicroNET.
- \* A Quarterly **LDOS** users magazine (The **LDOS QUARTERLY**).
- \* A liberal update policy.
- \* An enhanced **BASIC (LBASIC)** including:
  - > Upward compatible with Microsoft Basic.
  - > High speed **LOAD** and **SAVE**.
  - > Run multiple programs with common variables.
  - > **BLOCKED** (variable length) files are supported.
  - > **DOS** commands may be executed from **LBASIC**.
  - > Built in string array. **SORT**.
  - > Single stepper for debugging.
  - > Several new statements and file modes.

- \* A compiled **JOB CONTROL LANGUAGE (JCL)**.
- \* **CONVERT** utility to move files from Model III **TRSDOS**.
- \* An Extended Debugging and Monitor program (with disk access).
- \* **CMDFILE** for movement of disk and/or tape system (/CMD) files.
- \* Device independent operation.
- \* Full **LINKing**, **ROUTEing** and **SETting** are supported.
- \* **MiniDOS** feature for constant access to certain **DOS** commands.
- \* **RS-232 DRIVER** for serial support.
- \* Sophisticated communications software included.
- \* Wildcard characters and partial Filespecs are supported.
- \* **DATED FILES**, show when a file was last written to.
- \* Backup: Mirror, by Class, if Modified, by Date, by Extension, etc.
- \* Selectable **PURGE** for fast disk "cleanup" of unwanted files.
- \* Print formatter, for control of printer output.
- \* Built in printer **SPOOLER**, to both disk and ram.
- \* Joblog to record all system operations with time stamps.
- \* **UPPER** and **lower** case support, throughout the system.
- \* Blinking cursor with selectable cursor character.
- \* 128 character **TYPE AHEAD** buffering for keyboard input.
- \* Assign strings to individual keys with Key Stroke Multiply (**KSM**).
- \* **SUPER FAST** operation with the **SYSRES** feature.
- \* Extensive user control and system feedback.
- \* Advanced **PATCH** utility for easy maintenance.
- \* Complete transportability of software among all **Z-80 LDOS** systems through the use of the **LDOS** high ram supervisory call system.
- \* Dealers to serve users Nationwide and in the Common Market.
- \* The only **DOS** with a limited **ONE YEAR WARRANTY!**
- \* Enjoy a professional operating system on **YOUR TRS-80!**

\* Specific hardware is required to use these features.

The Ultimate In  
Operating Systems  
For Model I & III

Only \$**169<sup>00</sup>**  
Version 5.1

- \* Model I LDOS provided on 35 track single density media.
- \* Model III LDOS provided on 40 track double density media.
- \* LDOS can be provided on special media configurations at an additional charge.
- \* Prices & Specifications are subject to change without notice.

For Further Information Contact The Distributor Or Dealer Nearest You:

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

(Central)  
**GALACTIC SOFTWARE LTD.**  
11520 N. Port Washington Rd.  
Mequon, WI 53092  
(414) 241-8030

(East)  
**MISOSYS**  
5904 Edgehill Dr.  
Alexandria, VA 22303  
(703) 960-2998

(The Common Market)  
**MOLIMERX LTD.**  
1 Buckhurst Rd., Bexhill  
Sussex, England  
(0424)-220391

DEALER INQUIRIES WELCOME. LDOS is a product of LSI. TRS-80 & Radio Shack are trademarks.

**LOGICAL  
SYSTEMS  
INC.**  
  
Mequon, WI 53092  
(414) 241-3066



## Lower case ROM patch

**Lower case on power-up with no software driver...**

William R Bell, El Granada, California

For Model I Level II

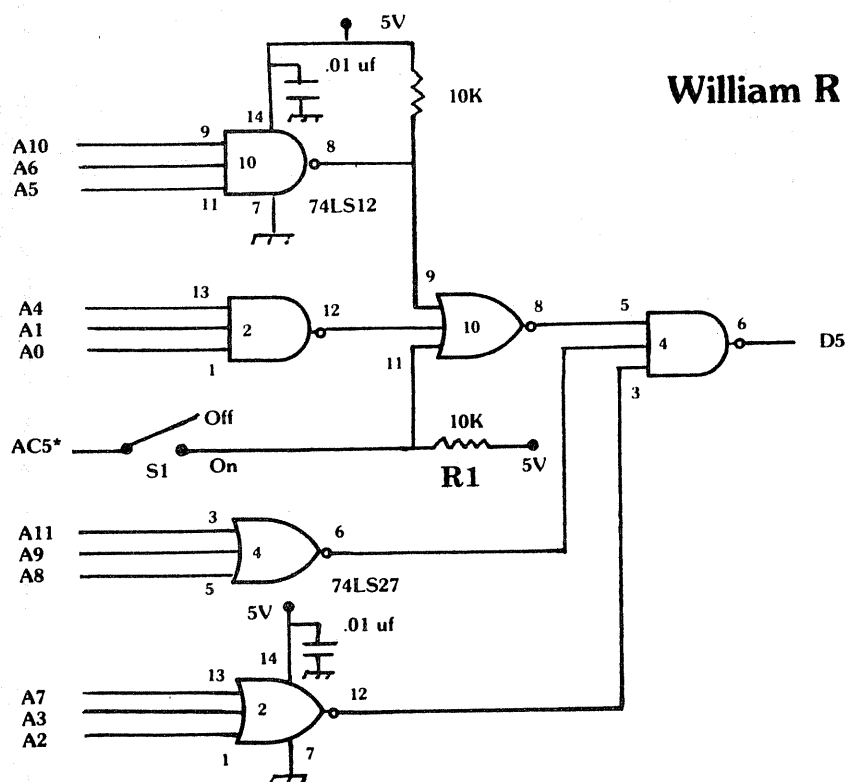


Figure 1

This modification adds two integrated circuits to the TRS-80 Model I Level II to give lower case on power up without needing to load a software driver. It works in conjunction with the Radio Shack or Electric Pencil type lower case modifications.

0473	3808	JR C,\$+0AH	;if not letter jump
0475	D640	SUB 40H	;convert to ASCII 0-31
0477	FE20	CP 20H	;test for UC or LC
0479	3802	JR C,\$+04H	;if upper case jump
047B	D620	SUB 20H	;change LC to ASCII 0-31
047D	CD4105	CALL 0541H	;continue on

Program listing 1



The TRS-80 has lower case in everything but video. The video driver routine in ROM converts upper and lower case letters to control codes. The video controller hardware converts the control codes to upper case letters. The Radio Shack and Electric Pencil modifications take care of the video controller. However, a RAM resident video driver routine must be loaded to replace the routine in ROM. This modification patches the ROM so the software driver is not needed.

The patch converts the JR C instruction to JR. This causes the jump to always execute and bypass the code that converts letters to control codes. The code is shown in Listing 1. Memory location 0473 hex is changed from 38 hex, JR C, to 18 hex, JR, by changing bit 5 from a 1 to a 0. This is done by decoding that memory location and pulling data line D5 low. Figure 1 shows the circuit for the patch. S1 and R1 are optional. They allow the patch to be switched out. The output must connect to D5 at the ROM pin 15, not the data bus. This is so D5 is pulled low at the input of the data line tri-state buffer. The 74LS12 is an open collector device. This is necessary whenever more than one device drives the same line.

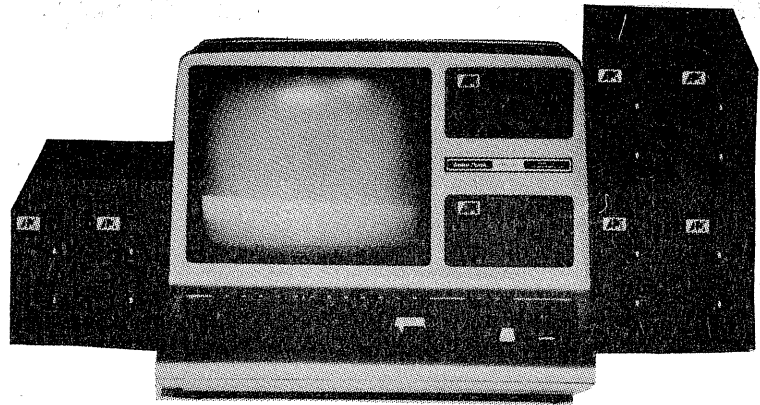
The patch can get all but one of its signals from the empty ROM socket. The ACS\*, ROM A chip select, is available at pin 1 of the 74LS42 on the Level II board. I built my patch into a small module that plugs into the empty socket with a wire to the ROM board for ACS\*. It can also be built on a small board and connected to the socket with a DIP cable like the one the Level II board has. If you have the two-ROM Level II, you don't have an empty socket, so you will have to hard wire the modification. ■



P.O. Box 915  
105 W. Plant Street  
Winter Garden, FL 32787  
305-877-2830

AUTHORIZED SOUTH-EASTERN REGION SERVICE  
CENTER FOR A.M. ELECTRONICS

\* 48 K 2-Disk Mod. III \$1895.



#### A.M. ELECTRONICS

\*\* Model III 1st 40 TK Drive Kit AM-I \$445.00

#### 5 1/4" BARE DRIVES

40 TK Teac	\$240.00	80 TK Teac	\$325.00
40 TK MPI 51	\$250.00	80 TK MPI 91	\$345.00

#### 5 1/4" COMPLETE DRIVES

Add \$45.00 to Bare Drive price.

#### PRINTERS

Epson MX-70	MX-80	MX-80 Ft	MX-100
-------------	-------	----------	--------

Call for price list

#### VIDEO SCREEN

\$9.95 specify model

#### 5 1/4" FLOPPY DRIVE REPAIR

Pertec • MPI • Tandon • Radio Shack

Single Side \$35 plus parts  
Add \$3.00 postage & handling  
Warranty: 30 days on parts  
Usually 24 Hour Turn-Around

**OPEN 3-9 pm (EST) MON—FRI**  
**Technician available after 5 PM.**

\* Uses ASG memory, disk drives and AM Electronics components.

\*\* All retrofit packages include circuitry, power supplies, mounting brackets, cables and everything required to turn your Model III into a reliable, disk-based system. 100% compatible with Radio Shack hardware.

**Call us with an order. We have a connection - 80**  
**(BBS) on line for your use**

Prices subject to change without notice.

Circle 38



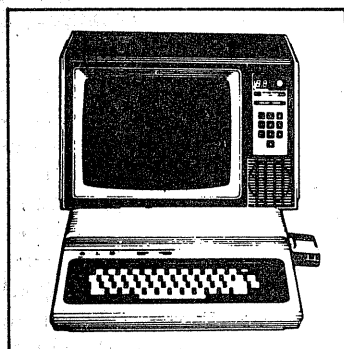
INTRODUCING:

# SPECTRONICS, INC.

(A Wholly Owned Subsidiary of Level IV Products)

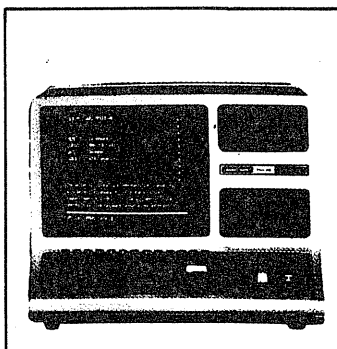
- OFFERING -

## The Full TRS-80\* Line at Discount Prices, and Extended Warranty Coverage



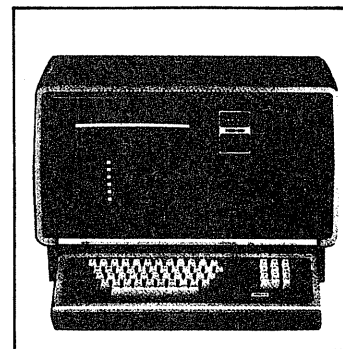
### COLOR COMPUTER

16K (R)	\$440
16K (E)	\$359
16K w/ext basic (R)	\$529
16K w/ext basic (E)	\$479



### MOD III COMPUTER

16K (R)	\$859
48K 2-40 drives (R)	\$2010
48K 2-40 drives (E)	\$1859
48K 2-80 drives (E)	\$2119
RS232 interface add	\$89



### MOD II COMPUTER

32K (R)	\$2950
64K (R)	\$3375
Expansion Dr#1 (R)	\$999
Expansion Dr#1-2-3 (E)	\$695

**NOTE:** THE MOD III CAN BE ASSEMBLED WITH UP TO 4 MEG UNFORMATTED FLOPPY DISK STORAGE CAPACITY (4-80 TRK DOUBLE SIDED DRIVES) - CALL FOR A QUOTE ON THE SYSTEM TAILORED TO YOUR EXACT NEEDS.

### PRINTERS

Line Printer IV (R)	\$849
Line Printer VI (R)	\$986
Daisy Wheel II (R)	\$1679
C. ITOH Starwriters	Call
Centronics All	Call
Epson All	Call
Anadex All	Call

### DRIVES

	COMPLETE	RAW
40 TRK MPI (E)	\$309	\$245
80 TRK MPI (E)	\$429	\$360
40/40 TRK MPI (E)	\$445	\$375
80/80 TRK MPI (E)	\$579	\$515

### PERIPHERALS

E.I. OK (R)	\$249
E.I. 16K (R)	\$359
E.I. 32K (R)	\$469
E.I. 16K (E)	\$305
E.I. 32K (E)	\$362
16K RAM (200MS)	\$ 39

DEALER'S INQUIRIES INVITED, CALL FOR OUR WHOLESALE DEPARTMENT (313) 525-6201

### WARRANTY POLICY

Items including non-Radio Shack components (E) are covered by an extended six-month parts/labor warranty in our tech service center.

Items constructed from Radio Shack approved components (R) are covered by a 90-day parts/labor warranty at any Radio Shack store, plus an additional 90 days in our tech service center.

### TERMS OF SALE

2% Discount allowed on cash pre-paid orders. Personal checks require two weeks for bank clearance.

Visa, Master Charge and C.O.D. orders accepted. Add \$1.50 for C.O.D.'s.

Shipping/handling/insurance add 1.5% or \$2.50 minimum.

Prompt shipments from stock.

### SPECTRONICS, INC.

32461 SCHOOLCRAFT ROAD  
LIVONIA, MICHIGAN 48150

MICHIGAN - (313) 525-6200  
TOLL FREE - 800-521-3305

\*TRADEMARK OF TANDY CORP.





---

# MAZE of DARKNESS

---

The test awaited. It hovered in the Initiate's thoughts, a shroud of impending death. It threatened with each heartbeat which brought him closer to the confrontation. It coiled in the gloom like an asp, unseen but anticipated. Yet amid the doubt and fear that dogged his tracks, he felt calm. For he was here by choice, not by the spearpoint proddings and laughing tortures that had laid waste to so many of those he called comrade.

The Tyrant had been on the Graylock throne too long. With his rise to power came an end to the peaceful co-existence between Human and Graylock. Though no war existed between the races, the Humans were raided in their encampments in the foothills and the women hauled off to the Trade City for enslavement. No human, Freeman or otherwise was safe from the whims of the Phooba.

So rose the Guild. An Assassin's trade was honorable in this time for he rid the free people of their overlords, one at a time, with such skill and stealth that they

were rumored to be ghosts. Silent, invisible and deadly, the guildsman struck such terror into the hearts of the Graylock gentry that their castles were rebuilt into fortresses of deadly traps, with only the innermost chambers being safe.

The lessons of survival floated inside the Initiate's head. The tools of his trade were his wits and his reflexes and his courage. Clad only in light leather armor and weaponless, he would face the test. To graduate, his training would mean induction into the Assassin's Guild and the chance to strike his blow for freedom. To fail would mean death, his body cremated, his ashes scattered for none would know his fate save his masters.

He paused before the door. A Guildsman's robes awaited. He took the first step into the maze. The deathtraps poised before him as unfeeling as the Graylocks, his enemies. The heavy iron door clanked behind him, echoing into the inky darkness. He had never felt more alive.

Let the test begin...

## NEW from the PROGRAMMER'S GUILD The GAUNTLET SERIES

Adventure at its keenest, a graphics trip into the deathtrap world of Assassins and Barbarians. So simple to play (just move through the mazes). Yet impossible to survive, (the traps are invisible). Charles Forsythe, whose Dragonquest has been extremely popular, has formulated this exciting new genre of fantasy simulation to satisfy the most discriminating computer gamer.

Gauntlet of Death  
Model I and III tape \$19.95

Maze of Darkness  
Model I and III tape \$19.95

Both simulations  
\$35.00 tape or disk

Circle 40

---

**The Programmer's Guild**  
**PO Box 66**  
**Peterborough, NH 03458**  
**or Phone (603) 924-6065**

---



# Machine language application

---

*Combine any number of areas of memory  
into one machine language tape...*

James F Williams, Rocky Mount, North Carolina

## System/Command

James Williams of Byte Miser Software has joined our staff as the editor for this column. Besides running his own software house, he has been an Assistant Professor of Music at North Carolina Wesleyan College in Rocky Mount since 1975. He is currently teaching a BASIC course at Wilson Technical Institute. In addition, he is president of the Research Triangle TRS-80 User Group in Raleigh, North Carolina, and has developed a series of Ear Training programs for the Model I which he uses in his music theory classes at Wesleyan. James makes his debut with a real whopper - we welcome him and hope you enjoy his work.

After seventeen great installments, Phil Pilgrim has decided to move on to smaller but better things. Actually, he has gone fulltime into the fishing lure business (his last column was sort of a tip-off). He promises to contribute from time to time though, and we all wish him the best in his new endeavor. *Ed.*

### For Models I & III

SYSTPE is a machine language program that will allow you to copy any number of different areas of memory and combine them into one SYSTEM tape. It also has the built-in option of having your programs start execution immediately after loading, without having to initialize with /ENTER.

#### Applications

This program has a wide variety of uses. Perhaps some of my personal applications will give you ideas of how you can make use of it.

You can modify machine language programs in memory, then make a tape version of your modification. I offer a version of SYSTPE with my program ASPTCH, a program that extends the functions of Radio Shack's editor/assembler 1.2. ASPTCH overlays many sections of EDTASM, and SYSTPE allows one to combine their copy of EDTASM with my ASPTCH modifications into one SYSTEM tape that takes about the same time to load as the editor/assembler itself. Because this combined tape is made on one's own cassette player, it is usually far easier to load than the

commercial editor/assembler tape.

You can put several machine language programs in memory, and use SYSTPE to combine them into one tape for a single load. I used this technique to combine a spooler, printer driver, EDTASM and ASPTCH.

If you can figure out how to break into some of the programs with special loaders, you can create regular SYSTEM format tapes for easy loading and backup.

You can copy the screen produced by a BASIC program, combine it with a machine language program, and load the screen directly from tape. This is the technique I used in my Organ program. I wrote the BASIC program that produced the two manual organ keyboard on the screen, then used the USR function to jump to SYSTPE and copy the screen and machine section onto one tape. I had to use the USR function, because typing SYSTEM (ENTER)/SYSTPE(re-entry address)(ENTER) would have messed up the display on the screen. I also made use of the immediate execute option, because manual



initialization (typing /ENTER after loading) would also have messed up the display.

### User instructions

To use SYSTPE you must know the beginning, end and entry address (in decimal or hex) of the areas you wish to copy. Armed with that information you are ready to decide where to ORG SYSTPE. If memory is tight, you need to have only the last section (XII-XX) plus the address buffer (4 bytes for each ORG) in memory at the same time your other programs are in memory. You may initialize SYSTPE (I-XI) even before you load the programs you wish copied.

To make use of the automatic execute option, simply include as one of your ORG's, 41E2H-41E4H. SYSTPE automatically loads these locations with JP (entry point). However, be warned. Using this option will cause a jump to your entry point every time you try to use the SYSTEM command. If you plan to be able to return to BASIC from your program, the problem can be fixed from BASIC by typing POKE 16866,201. A better solution would be to have your machine language program fix it as part of its initialization (LD A, 201 / LD (41E2H),A).

### Example

Suppose the first machine language program you wish to copy resides at 4F00H-5000H and the second program at 7000H-7D50H. The entry point is 4F00H. The second ORG conflicts with the beginning of SYSTPE, so load and execute the

initialization of SYSTPE before loading the two programs.

1. Load SYSTPE.
2. Initialize with /ENTER.
3. Answer "Number of different ORGS?" with 2 and ENTER.
4. Answer "Start address?" with 4F00H and ENTER.
5. Answer "End address?" with 5000H and ENTER.
6. Answer "Start address?" with 7000H and ENTER.
7. Answer "End address?" with 7D50H and ENTER.
8. Answer "Entry address?" with 4F00H and ENTER.
9. Load program 1 and do not initialize.
10. Load program 2 and do not initialize.
11. Ready the tape player for recording.
12. Answer SYSTEM prompt with /(SYSTPE re-entry address).
13. Repeat steps 11 and 12 for more copies.

### Special notes

SYSTPE uses the screen as an input buffer, so users with the lower case modification will have to have a driver in memory for SYSTPE to work properly.

Model III users may wish to add the following line to the source code so that they may select the output baud rate:

```
01985 CALL 3042H
```

```

00100 ;SYSTPE BY JAMES F. WILLIAMS
00110 ;BYTE MISER SOFTWARE
00120 ;720 WEST HAVEN BOULEVARD
00130 ;ROCKY MOUNT, NC 27801
7D00 00140 ORG 7D00H ;ORG ANYWHERE SO THAT
00150 ; RENTRY TO THE END WILL
00160 ; NOT CONFLICT WITH
00170 ; AREA(S) TO BE COPIED.
00180 ; ALSO REMEMBER TO LEAVE
00190 ; ROOM AT THE END OF THE
00200 ; PROGRAM FOR ADDRESSES
00210 ; (4 BYTES FOR EVERY
00220 ; SEPARATE ORG).
00230 ;*****
00240 ; I. FILE NAME INPUT
00250 ;*****
7D00 21747D 00260 ENTRY LD HL,FNAME ;PRINT FILE NAME PROMPT
7D03 CDA728 00270 CALL 28A7H
7D06 2A2040 00280 LD HL,(4020H) ;CURSOR POSITION TO HL
7D09 CD4900 00290 STRINP CALL 49H ;LOOP 'TIL KEY PRESSED
7D0C FE0D 00300 CP 0DH ;CARRIAGE RETURN ?
7D0E 2805 00310 JR Z,NAMESV ;YES, SAVE NAME IN BUFFER
7D10 CD3300 00320 CALL 33H ;NO, PRINT CHARACTER
7D13 18F4 00330 JR STRINP ;LOOP BACK FOR MORE

```



```

7D15 110A7F 00340 NAMESV LD DE,STRDAT ;NAME STORAGE AREA IN DE
7D18 010600 00350 LD BC,6 ;SAVE 6 CHARACTERS
7D1B EDB0 00360 LDIR ;MOVE FROM SCREEN TO BUF
00370 ;*****
00380 ; II. NUMBER OF ORGS INPUT
00390 ;*****
7D1D 21807D 00400 LD HL,NUMBER ;PRINT # OF ORGS PROMPT
7D20 CDA728 00410 CALL 28A7H
7D23 CDF17D 00420 CALL INPUT ;INPUT HEX OR DEC VALUE
7D26 45 00430 LD B,L ;# OF ORGS TO B
7D27 7D 00440 LD A,L ;# OF ORGS TO A
7D28 329B7E 00450 LD (NUMDAT+1),A ;SAVE # OF ORGS
7D2B DD21107F 00460 LD IX,ADDAT ;ADDRESS STORAGE AREA
00470 ;*****
00480 ; III. START-END ADDRESS INPUT LOOP
00490 ;*****
7D2F C5 00500 INPADS PUSH BC ;SAVE # OF ORGS (IN B)
7D30 219C7D 00510 LD HL,STRAD ;PRINT START ADRS PROMPT
7D33 CDA728 00520 CALL 28A7H
7D36 CDF17D 00530 CALL INPUT ;INPUT HEX OR DEC
7D39 DD7500 00540 LD (IX+0),L ;SAVE LOW ORDER
7D3C DD23 00550 INC IX ;BUMP POINTER
7D3E DD7400 00560 LD (IX+0),H ;SAVE HIGH ORDER
7D41 DD23 00570 INC IX ;BUMP POINTER
7D43 21AC7D 00580 LD HL,ENDAD ;PRINT END ADRS PROPMT
7D46 CDA728 00590 CALL 28A7H
7D49 CDF17D 00600 CALL INPUT ;INPUT HEX OR DEC
7D4C DD7500 00610 LD (IX+0),L ;SAVE LOW ORDER BYTE
7D4F DD23 00620 INC IX ;BUMP POINTER
7D51 DD7400 00630 LD (IX+0),H ;SAVE HIGH ORDER BYTE
7D54 DD23 00640 INC IX ;BUMP POINTER
7D56 C1 00650 POP BC ;RESTORE # OF ORGS COUNT
7D57 10D6 00660 DJNZ INPADS ;LOOP UNTIL ALL ORGS IN
00670 ;*****
00680 ; IV. ENTRY ADDRESS INPUT
00690 ;*****
7D59 21BA7D 00700 LD HL,ENTRAD ;PRINT ENRTY ADRS PROMPT
7D5C CDA728 00710 CALL 28A7H
7D5F CDF17D 00720 CALL INPUT ;INPUT HEX OR DEC
7D62 22E37E 00730 LD (ENTDAT+1),HL ;SAVE ENTRY ADDRESS
00740 ;*****
00750 ; V. DISPLAY RE-ENTRY ADDRESS
00760 ;*****
7D65 21CA7D 00770 LD HL,SYSPMT ;PRINT RECORD PROMPT
7D68 CDA728 00780 CALL 28A7H
7D6B 21777E 00790 LD HL,REENTRY ;RE-ENTRY ADDRESS TO HL
7D6E CD487E 00800 CALL DECOUT ;DISPLAY DECIMAL NUMBER
7D71 C3B202 00810 JP 2B2H ;TO BASIC SYSTEM PROMPT
00820 ;*****
00830 ; VI. PROMPTS
00840 ;*****
7D74 46 00850 FNAME DEFM 'FILE NAME ?'
7D7F 00 00860 DEFB 0
7D80 0D 00870 NUMBER DEFB 13

```



```

7D81 4E      00880      DEFM      'NUMBER OF DIFFERENT ORGS ?'
7D9B 00      00890      DEFB      0
7D9C 53      00900      STRTAD    DEFM      'START ADDRESS ?'
7DAB 00      00910      DEFB      0
7DAC 45      00920      ENDAD     DEFM      'END ADDRESS ?'
7DB9 00      00930      DEFB      0
7DBA 45      00940      ENTRAD    DEFM      'ENTRY ADDRESS ?'
7DC9 00      00950      DEFB      0
7DCA 54      00960      SYSPMT    DEFM      'TO RECORD, ANSWER SYSTEM PROMPT WITH /'
7DFO 00      00970      DEFB      0
00980 ;*****
00990 ;      VII.      HEX-DEC INPUT
01000 ;*****
7DF1 3E5E    01010      INPUT     LD      A,94      ;ASCII FOR RIGHT ARROW
7DF3 CD3300  01020      CALL     33H      ;DISPLAY IT
7DF6 3E1E    01030      LD      A,30      ;CLEAR TO END OF LINE
7DF8 CD3300  01040      CALL     33H
7DFB 2A2040  01050      LD      HL,(4020H) ;CURSOR LOCATION TO HL
7DFE CD4900  01060      SCAN     CALL     49H ;LOOP 'TIL KEY PRESSED
7E01 FE0D    01070      CP      0DH      ;CARRIAGE RETURN?
7E03 2805    01080      JR      Z,EVAL    ;YES, SEE IF HEX OR DEC
7E05 CD3300  01090      CALL     33H      ;NO, PRINT CHARACTER
7E08 18F4    01100      JR      SCAN      ;GET ANOTHER CHARACTER
7E0A ED5B2040 01110      EVAL     LD      DE,(4020H) ;CURSOR POSITION TO DE
7E0E 1B      01120      DEC     DE        ;BACK UP ONE
7E0F 1A      01130      LD      A,(DE)    ;CHARACTER TO A
7E10 FE48    01140      CP      'H'       ;IS IT H?
7E12 2810    01150      JR      Z,HEX     ;YES, EVALUATE AS HEX
01160 ;*****
01170 ;      VIII.     DECIMAL INPUT
01180 ;*****
7E14 13      01190      INC     DE        ;PLACE 0 BYTE AT END
7E15 AF      01200      XOR     A
7E16 12      01210      LD      (DE),A
7E17 CD4F1E  01220      CALL     1E4FH    ;EVALUATE AS DECIMAL
7E1A EB      01230      EX      DE,HL     ;VALUE TO HL
7E1B CD537E  01240      CALL     HEXOUT    ;DISPLAY HEX EQUIVALENT
7E1E 3E0D    01250      CR      LD      A,0DH ;PRINT CARRIAGE RETURN
7E20 CD3300  01260      CALL     33H
7E23 C9      01270      RET
01280 ;*****
01290 ;      IX.      HEX INPUT
01300 ;*****
7E24 110000  01310      HEX     LD      DE,0
7E27 EB      01320      EX      DE,HL     ;HL=0:DE=FIRST CHARACTER
7E28 1B      01330      DEC     DE        ;PREPARE FOR LOOP
7E29 13      01340      NEXT    INC     DE ;BUMP SCREEN POINTER
7E2A 1A      01350      LD      A,(DE)    ;CHARACTER TO A
7E2B FE48    01360      CP      'H'       ;IS IT H?
7E2D 2814    01370      JR      Z,DECDPY   ;YES, SHOW DEC EQUIVALENT
7E2F FE30    01380      CP      '0'       ;LESS THAN ASCII "0"?
7E31 38F6    01390      JR      C,NEXT     ;YES, IGNORE IT
7E33 29      01400      ADD     HL,HL      ;SHIFT HL LEFT 4 TIMES
7E34 29      01410      ADD     HL,HL
7E35 29      01420      ADD     HL,HL

```



```

7E36 29      01430      ADD      HL,HL
7E37 FE3A    01440      CP        'A'      ;> OR = ASCII "A"?
7E39 3002    01450      JR        NC,LTR    ;YES, A-F
7E3B C607    01460      ADD      A,7        ;NO, 0-9
7E3D D637    01470 LTR      SUB      55      ;ADJUST TO VALUE
7E3F B5      01480      OR        L        ;MERGE A AND L INTO A
7E40 6F      01490      LD        L,A      ;BACK TO L
7E41 18E6    01500      JR        NEXT     ;LOOP FOR NEXT DIGIT
01510 ;*****
01520 ;      X.      DISPLAY DECIMAL NUMBER
01530 ;*****
7E43 CD487E  01540 DECDPY  CALL     DECOUT    ;VALUE TO DECIMAL STRING
7E46 18D6    01550      JR        CR      ;PRINT CARRIAGE RETURN
7E48 E5      01560 DECDPY  PUSH     HL      ;SAVE VALUE
7E49 3E20    01570      LD        A,20H    ;ASCII FOR SPACE IN A
7E4B CD3300  01580      CALL     33H      ;PRINT IT
7E4E CDAF0F  01590      CALL     OFAFH    ;DISPLAY DEC STRING
7E51 E1      01600      POP      HL      ;RESTORE VALUE
7E52 C9      01610      RET
01620 ;*****
01630 ;      XI.     DISPLAY HEX NUMBER
01640 ;*****
7E53 0E04    01650 HEXOUT  LD        C,4      ;SET FOR 4 DIGITS
7E55 E5      01660      PUSH     HL      ;SAVE HL
7E56 3E20    01670      LD        A,20H    ;ASCII FOR SPACE TO A
7E58 CD3300  01680      CALL     33H      ;PRINT IT
7E5B 0604    01690 DIGIT   LD        B,4      ;SET FOR 4 BITS
7E5D AF      01700      XOR        A      ;CLEAR A
7E5E 29      01710 SHFT    ADD      HL,HL    ;SHIFT HL 4 BITS
7E5F 17      01720      RLA      ;INTO A
7E60 10FC    01730      DJNZ     SHFT    ;LOOP 4 TIMES
7E62 C630    01740      ADD      A,48    ;ADJUST TO 0-9
7E64 FE3A    01750      CP        58      ;LETTER?
7E66 3802    01760      JR        C,PRINT  ;NO, 0-9: PRINT IT
7E68 C607    01770      ADD      A,7      ;ADJUST TO A-F
7E6A CD3300  01780 PRINT   CALL     33H      ;PRINT CHARACTER
7E6D 0D      01790      DEC        C      ;DIGIT COUNT
7E6E 20EB    01800      JR        NZ,DIGIT  ;MORE
7E70 3E48    01810      LD        A,'H'    ;ASCII H TO A
7E72 CD3300  01820      CALL     33H      ;PRINT IT
7E75 E1      01830      POP      HL      ;RESTORE VALUE
7E76 C9      01840      RET
01850 ;%%%%%%%%%%%%
01860 ;ALL PREVIOUS CODE MAY BE OVER-WRITTEN AFTER EXECUTION.
01870 ;%%%%%%%%%%%%
01880 ;*****
01890 ;      XII.    IMMEDIATE EXECUTE OPTION
01900 ;*****
7E77 AF      01910 RENTRY  XOR        A      ;CLEAR A
7E78 21E241  01920      LD        HL,41E2H    ;SYSTEM PATCH TO HL
7E7B 36C3    01930      LD        (HL),0C3H    ;PUT JP INSTRUCTION THERE
7E7D 2AE37E  01940      LD        HL,(ENTDAT+1) ;ENTRY ADDRESS TO HL
7E80 22E341  01950      LD        (41E3H),HL    ;AUTO JP TO ENTRY
01960 ;*****
01970 ;      XIII.   -WRITE HEADER BLOCK
01980 ;*****

```



```

7E83 CD1202 01990      CALL    212H      ;DEFINE DRIVE
7E86 CD8702 02000      CALL    287H      ;WRITE LEADER
7E89 3E55    02010      LD      A,'U'    ;HEADER CHARACTER TO A
7E8B CD6402 02020      CALL    264H      ;WRITE IT TO TAPE
7E8E 110A7F 02030      LD      DE,STRDAT ;FILE NAME STORAGE AREA
7E91 0606    02040      LD      B,6      ;6 CHARACTERS
7E93 CD007F 02050      CALL    WRTLP     ;WRITE TO TAPE
7E96 DD21107F 02060    LD      IX,ADDAT   ;ADDRESS STORAGE TO IX
7E9A 0601    02070 NUMDAT LD      B,1     ;MODIFIED TO # OF ORGS
7E9C C5      02080 NXTBLK PUSH    BC      ;SAVE # OF ORGS (IN B)
7E9D DD5E00 02090      LD      E,(IX+0)   ;LOW ORDER START ADDRESS
7EA0 DD5601 02100      LD      D,(IX+1)   ;HIGH ORDER START ADDRESS
02110 ;*****
02120 ;      XIV.   WRITE BLOCK OF DATA TO TAPE
02130 ;*****
7EA3 3E3C    02140 TBLOCK LD      A,'<'   ;TEXT BLOCK CHAR TO A
7EA5 CD6402 02150      CALL    264H      ;WRITE IT TO TAPE
7EA8 DD6E02 02160      LD      L,(IX+2)   ;LOW ORDER END ADDRESS
7EAB DD6603 02170      LD      H,(IX+3)   ;HIGH ORDER END ADDRESS
7EAE AF      02180      XOR      A        ;CLEAR CARRY
7EAF ED52    02190      SBC      HL,DE    ;# OF BYTES-1 IN HL
7EB1 B4      02200      OR       H        ;HIGH ORDER BYTE 0?
7EB2 2844    02210      JR       Z,LSTTME ;YES, WITHIN 256 BYTES
02220 ;      OF END OF THIS MEM AREA
7EB4 AF      02230      XOR      A        ;NO, SET TO 256
7EB5 47      02240      LD      B,A      ;256 COUNT IN B
7EB6 CD6402 02250 CONT2 CALL    264H      ;WRITE COUNT TO TAPE
7EB9 7B      02260      LD      A,E      ;LOW ORDER START ADDRESS
7EBA CD6402 02270      CALL    264H      ;WRITE TO TAPE
7EBD 7A      02280      LD      A,D      ;HIGH ORDER START ADDRESS
7EBE CD6402 02290      CALL    264H      ;WRITE TO TAPE
7EC1 4B      02300      LD      C,E      ;LOW ORDER BYTE TO C
7EC2 81      02310      ADD      A,C      ;ADD TO HIGH ORDER BYTE
7EC3 4F      02320      LD      C,A      ;TOTAL TO C (CHECKSUM)
7EC4 CD007F 02330      CALL    WRTLP     ;WRITE DATA TO TAPE
7EC7 79      02340      LD      A,C      ;CHECKSUM TOTAL TO A
7EC8 CD6402 02350      CALL    264H      ;WRITE IT TO TAPE
7ECB 18D6    02360 LSTFLG JR      TBLOCK  ;MODIFIED BY LSTTME TO
02370 ;      JR TO NEXT INSTR (O)
02380 ;*****
02390 ;      XV.   PREPARE TO WRITE NEXT MEMORY AREA
02400 ;*****
7ECD C1      02410      POP      BC      ;RESTORE # OF ORGS COUNT
FIELD OVERFLOW
7ECE 3ED6    02420      LD      A,TBLOCK-LSTFLG-2 ;ASSEMBLY TIME
02430 ;      CALCULATION OF LAST
02440 ;      BYTE OF JR INSTRUCTION
7ED0 32CC7E 02450      LD      (LSTFLG+1),A ;RESTORE INSTR TO ORGINAL
7ED3 DD23    02460      INC      IX      ;POINT IX TO NEXT SET OF
02470 ;      ADDRESSES
7ED5 DD23    02480      INC      IX
7ED7 DD23    02490      INC      IX
7ED9 DD23    02500      INC      IX
7EDB 10BF    02510      DJNZ     NXTBLK ;LOOP FOR NUMBER OF ORGS

```



```

02520 ;*****
02530 ;      XVI.   WRITE TRAILER BLOCK
02540 ;*****
7EDD 3E78 02550      LD      A,78H      ;TRAILER BLOCK CHAR TO A
7EDF CD6402 02560      CALL    264H      ;WRITE IT TO TAPE
7EE2 210000 02570 ENTDAT LD      HL,0      ;MODIFIED TO CONTAIN
02580      ; ENTRY ADDRESS
7EE5 7D 02590      LD      A,L      ;LOW ORDER ENTRY TO A
7EE6 CD6402 02600      CALL    264H      ;WRITE IT TO TAPE
7EE9 7C 02610      LD      A,H      ;HIGH ORDER ENTRY TO A
7EEA CD6402 02620      CALL    264H      ;WRITE TO TAPE
02630 ;*****
02640 ;      XVII.  FINAL ODDS AND ENDS
02650 ;*****
7EED CDF801 02660      CALL    1F8H      ;TURN OFF MOTOR
7EF0 21E241 02670      LD      HL,41E2H    ;SYSTEM PATCH ADDR TO HL
7EF3 36C9 02680      LD      (HL),0C9H    ;RESTORE WITH RET
7EF5 C3B202 02690      JP      2B2H      ;TO BASIC SYSTEM PROMPT
02700 ;*****
02710 ;      XVIII. ROUTINE TO HANDLE LAST BLOCK
02720 ;*****
7EF8 32CC7E 02730 LSTTME LD      (LSTFLG+1),A ;A SET TO 0. MODIFIES
02740      ; "JR TBLOCK" TO "JR 0"
02750      ; (NEXT INSTRUCTION)
7EFB 23 02760      INC      HL      ;SET HL TO # OF BYTES
7EFC 45 02770      LD      B,L      ;BYTES IN BLOCK TO B
7EFD 7D 02780      LD      A,L      ;BYTES IN BLOCK TO A
7EFE 18B6 02790      JR      CONT2    ;WRITE LAST BLOCK IN THIS
02800      ; AREA
02810 ;*****
02820 ;      XIX.   WRITE DATA TO TAPE AND DEVELOP CHECKSUM
02830 ;*****
7F00 1A 02840 WRTLP  LD      A,(DE)      ;LOAD A WITH DATA
7F01 CD6402 02850      CALL    264H      ;WRITE IT TO TAPE
7F04 13 02860      INC      DE      ;BUMP POINTER
7F05 81 02870      ADD      A,C      ;DEVELOP CHECKSUM
7F06 4F 02880      LD      C,A
7F07 10F7 02890      DJNZ    WRTLP      ;LOOP FOR NUMBER OF BYTES
7F09 C9 02900      RET
02910 ;*****
02920 ;      XX.    DATA STORAGE AREA
02930 ;*****
0006 02940 STRDAT DEFS    6      ;FILE NAME STORAGE
7F10 00 02950 ADDAT  DEFB    0      ;BEGIN ADRS STORAGE AREA
7D00 02960      END      ENTRY
00001 TOTAL ERRORS

ADDAT 7F10 02950 00460 02060
CONT2 7EB6 02250 02790
CR 7E1E 01250 01550
DECDPY 7E43 01540 01370
DECOUT 7E48 01560 00800 01540
DIGIT 7E5B 01690 01800
ENDAD 7DAC 00920 00580

```

The listing accompanying this article has one field overflow error. This error is introduced by the Apparat editor/assembler being used to produce the listing. The calculation of the byte D6 is correct. ASPTCH does not produce this error.

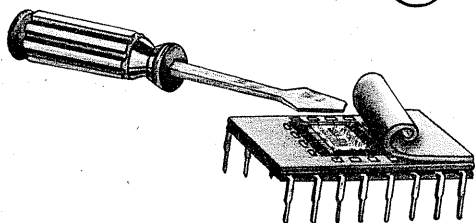


ENTDAT	7EE2	02570	00730	01940
ENTRAD	7DBA	00940	00700	
ENTRY	7D00	00260	02960	
EVAL	7E0A	01110	01080	
FNAME	7D74	00850	00260	
HEX	7E24	01310	01150	
HEXOUT	7E53	01650	01240	
INPADS	7D2F	00500	00660	
INPUT	7DF1	01010	00420	00530 00600 00720
LSTFLG	7ECB	02360	02420	02450 02730
LSTTME	7EF8	02730	02210	
LTR	7E3D	01470	01450	
NAMESV	7D15	00340	00310	
NEXT	7E29	01340	01390	01500
NUMBER	7D80	00870	00400	
NUMDAT	7E9A	02070	00450	
NXTBLK	7E9C	02080	02510	
PRINT	7E6A	01780	01760	
RENTY	7E77	01910	00790	
SCAN	7DFE	01060	01100	
SHFT	7E5E	01710	01730	
STRDAT	7FOA	02940	00340	02030
STRINP	7D09	00290	00330	
STRTAD	7D9C	00900	00510	
SYSPMT	7DCA	00960	00770	
TBLOCK	7EA3	02140	02360	02420
WRTLPL	7F00	02840	02050	02330 02890

Should'a never  
taught her how  
to program...

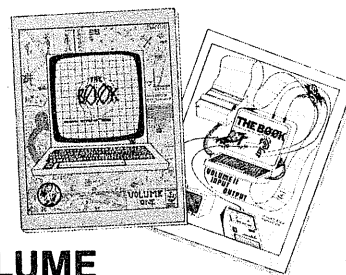


## Accessing the TRS-80\* ROM...



←or→

It's your choice:  
do it the hard way, or  
get the information you need from



## THE BOOK VOLUME I & II

Comprehensive Guide to TRS-80\* Assembly Language Routines

Each Volume Priced At \$14.95 Plus \$1.50 Shipping/Handling

VA residents add 4% tax • Foreign: send U.S. funds, add \$4 ea. for overseas delivery

\*Trademark of Tandy Corp.

### VOLUME I

The most complete book yet on the math routines of the BASIC ROM, Models I & III. Contains a wealth of detail about integer, single and double precision formats, advanced math, data manipulation, and assembly language interfacing, with examples. Includes commented listing (0708H-1607H), plus a highly detailed map of the ROM and reserved RAM.

### INSIDERS SOFTWARE CONSULTANTS, INC.

P.O. Box 7086, Dept. U 3 • Alexandria, VA 22307

Please send THE BOOK: ☐ Volume I ☐ Volume II

Name \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_

Enclosed is ☐ check ☐ M.O. for \$ \_\_\_\_\_

Charge to my ☐ VISA ☐ MasterCard Bank Code \_\_\_\_\_

Exp. date: \_\_\_\_\_ Card No. \_\_\_\_\_

Signature \_\_\_\_\_

### VOLUME II

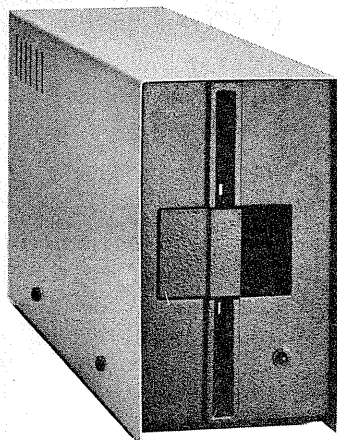
Packed full of useful information on the model I input/output routines, with detailed listings to illustrate the commented source code. Learn to control and manipulate the keyboard, video, printer port, and cassette port. Essential for assembly language programmers, you can write your own routines or use the many programming examples included.



# Mini-Disk Storage Systems for TRS-80\* Computers

## Access... Offers More. Charges less.

from  
**\$275**



**Check this line-by-line comparison of Access 5-inch mini-disk systems for Model I and Model III computers. Nobody offers more benefits, better service or lower prices.**

**TOLL-FREE ORDER NO.**  
**1-800-527-3475†**  
(orders and literature only)

### Free trial offer

Use your brand new AFD drive system for up to 15 days. If you're not *completely* satisfied, pack it in the original shipping container and send it back to Access. We'll refund the price of the system (less shipping charges), no questions asked. (No refund for misuse or improper handling.)

### Operating burn-in test — too

Every drive that leaves Access is not only 100% electrically tested and double-checked for mechanical alignment, but it is also given a full 48-hour operating burn-in test. You'll find a test list — checked and signed by

one of our competent technicians — in the drive carton. If a drive has latent defects, the burn-in life test will weed them out. The drives we ship just keep on running. And running. And running.

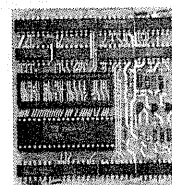
### About our warranty

Venus de Milo has about the right number of fingers to count our warranty returns. Nevertheless, your new drive system is covered by our comprehensive 90-day limited warranty. The details are spelled out in the illustrated users manual included with each AFD drive system.

### Software galore!

Games. Business programs. System software. We sell many of the best TRS-80\* Model I and Model III programs, and at competitive prices. Make Access Unlimited your one-stop shopping center for all of your TRS-80\* software, hardware and accessories. Save big! Call our toll-free order number, 1-800-527-3475† for free descriptive literature.

**USE YOUR CREDIT CARD AND SAVE! VISA AND MASTER CARD CHARGES ARE NOT DEPOSITED UNTIL THE DAY YOUR ORDER IS SHIPPED. CALL NOW TOLL-FREE, 1-800-527-3475†.**



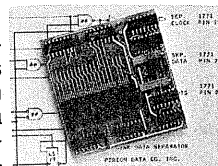
### the DOUBLER-II™

Percom's new plug-in adapter for your Expansion Interface stores almost twice the data on a diskette track as a single-density system. You can store up to four times more data — depending on the type of drive — on one side of a diskette than you can store using a standard Model I mini-disk drive. Other features: Reads, writes and formats *either* single or double density minidiskettes. • Runs TRSDOS\*, NEWDOS+† Percom OS-80™ or other single-density software *without* changing either software or hardware. Switch to double-density when convenient. • Includes DBLDOS™, a TRSDOS\* compatible double-density operating system. • Includes on card, high-performance data separator circuit. • Installs *without* rewiring or trace cutting. • Introductory price, including DBLDOS and format conversion utility, only \$159.95.

▶ Permits Model III software to be read on Model I computers. ◀

### DATA SEPARATOR™

This PC board plug-in adapter for the TRS-80\* virtually eliminates data read errors (CRC error — Track locked out!) which occur on high-density inner disk tracks, a problem that has plagued TRS-80\* systems. The Percom Data Separator™ is installed in the Expansion Interface without modifying the host system. Caution: Opening the TRS-80\* Expansion Interface may void the limited 90-day warranty: \$23.95



### Printer Bargain: Microline-80 \$399.95 (reg. \$446.00)

**Features:** • Prints 96 ASCII characters, 64 graphic characters • Throughput is 80 cps • Use roll paper, fan-fold, individual sheets • Printhead is rated at 200 million characters • Lightweight, compact, dependable.

Cable (parallel port): \$24.95

### Percom System Desks

**Features:** Modular design permits arrangement suited to each user's needs • Styling and construction are elegant furniture quality — colors are Tandy-compatible pumice and black • Units knock down for UPI shipping, easy "carry-out" handling • Prices start at only \$115 for desk, \$144 for printer stand. Optional under-desk bay, equipment drawer and desk-top riser available.

## ACCESS UNLIMITED

401 N. Central Expressway #600  
Richardson, Texas 75080

**How to Order** Order by calling Access Unlimited toll-free on 1-800-527-3475†. Mail orders also accepted. Orders may be charged to a VISA or MasterCard account or paid by a cashier's check, certified check or money order. We accept COD orders with 25% deposit. Sorry, we cannot accept personal checks. We pay shipping and insurance charges on orders over \$1,000.00. Add approximate insurance and shipping charges for under \$1,000.00. If in doubt about these charges, ask when you call in your order. Texas residents include 5% sales tax. Minimum order \$20.00. Allow 2 to 4 weeks for delivery. †Texas residents call (214) 690-0206

T trademark of Access Unlimited Company. \*RADIO SHACK and TRS-80 are trademarks of Tandy Corporation. ™trademark of Percom Data Company, Inc. ‡trademark of Apparat Corporation. ALL PRICES AND SPECIFICATIONS SUBJECT TO CHANGE AND ALL OFFERS SUBJECT TO WITHDRAWAL WITHOUT NOTICE.





By John Allen

**NEW!**

We took the uncanny realism and the excitement of John Allen's famous PINBALL; added more features, more thrills, and more sound to come up with new ASTROBALL. Once you load ASTROBALL into your TRS-80\* model I or III, the arrow keys become flipper buttons, the screen becomes the play board, and you become the "Pinball Wizard!"

A flying saucer bumper hovers at the top, lights flashing, while spaceship bumpers fly across the board beneath it. Your ball bounces off the moving spaceships in a most unpredictable fashion, so you must stay alert to keep it in play.

As your ball zings around the board scoring on the bumpers, knock out five of the meteor rollovers and you'll get an extra ball. There are double and triple bonus targets to increase your score, too, but be careful—below each is a black hole, waiting to swallow your ball!

ASTROBALL will have all your family and friends lining up for the action and challenge. Five selectable playing speeds make it suitable for all skill levels. Available on your choice of 16K tape or 32K disk for \$19.95. Order its companion, PINBALL, for \$14.95 on 16K tape, \$20.95 on 32K disk.

**ACORN PROGRAMS ARE AVAILABLE AT FINE COMPUTER STORES EVERYWHERE**



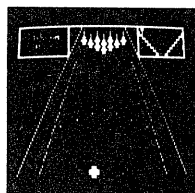
**SPACE ROCKS**

By Steven Kearns

Huge antimatter rocks appear on the Tactical Display Screen of your spacecraft. You blast away but they just explode into smaller chunks for you to destroy.

To add to your woes, alien ships and time bombs appear periodically. If the ships hit you or the timers reach zero—BOOM! Maneuver, fire lasers, jump to hyperspace—anything to avoid the onslaught. For one or two players, with five skill levels.

For TRS-80\* model I or III. Versions for 16K tape or 32K disk are \$19.95 each.



**TENPINS**

By John Allen

A realtime action game with 3-D graphics and sound, TENPINS brings the thrill of championship bowling to your TRS-80\*

From one to four players participate, and the program senses the skill of each player. Beginners can simply "roll" the ball while more skilled players can vary the ball's force, direction, and spin.

TENPINS even has factors to simulate imperfections in the lanes, adding even more realism. Available for only \$14.95 for 16K tape version, \$20.95 for 32K disk.

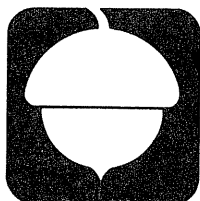
**SUPERSCRIPT**

By Richard Wilkes

Using your SUPERSCRIPT modified SCRIPSIT Word Processor and a compatible printer, you can now underline, bold-face, insert text during printout, slash zeros, set type pitch, subscript and, of course, superscript! You can even read your directory and kill files without ever leaving SCRIPSIT.

Includes drivers for popular printers and easy instructions. Just \$50.00 for TRS-80\* model I (requires 32K, 1 drive, SCRIPSIT/LC) or model III (requires 32K, 2-drives, SCRIPSIT/LC model I version).

\*Trademark of Tandy Corp.



(202) 544-4259

**Acorn**

Software Products, Inc.

634 North Carolina Avenue, S.E., Washington, D.C. 20003

**ALL ACORN ENTERTAINMENT  
SOFTWARE SUPPLIED FOR  
TRS-80\* MODELS I & III**

MAIL ORDERS: Include \$2.00 shipping & handling (D.C. residents add 6% sales tax).

CHARGE CARD CUSTOMERS: Call (202) 544-4259 for fastest service.



### *Hi-res for your Model I or III...*

# Mikee Electronics high resolution graphics board

80-U.S. Staff

Video resolution is one of the problems with the Models I and III. Now, a new company from Bellevue, Washington, called Mikee Electronics Corporation, has introduced a product to fill the need.

We were introduced to the board, called the Mikeeangelo (pronounced MIK-E-ANGELO), recently and were very impressed. The resolution of the Model III version is fine enough to produce grey-scale pictures or fine-line charts for business. The resolution is 512 horizontal by 192 vertical on the Model III and 384 by 192 for the Model I.

The driver program used for point to point lines and individual graphic point setting, resetting and testing, is supplied as a machine language program of a little less than 500 bytes. Parameters, which are poked into RAM for use by the driver

routine, can be passed in about 10 lines of BASIC code.

Like the normal video, the screen is memory mapped and parallels part of the last 16K addressable by the TRS-80. The memory is static RAM and can be software switched in or out for those who wish to utilize all 48K of normal RAM. This is somewhat the way in which the Model II uses its video memory. Also, like the normal video of the I and III, alphanumeric characters are produced by the regular character generator and intermixed with graphics in the same manner as an unmodified TRS-80.

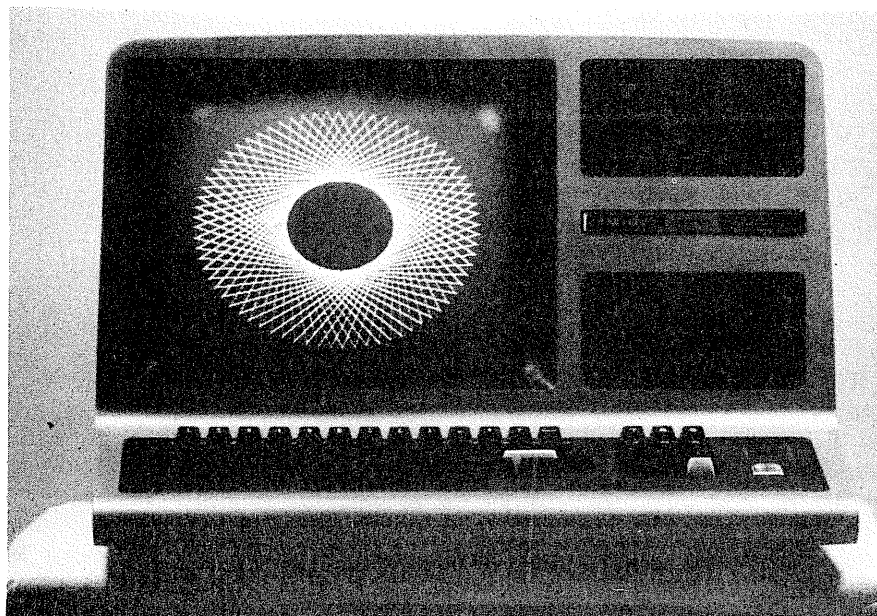
Total inverse video can be optionally selected. However, you cannot select partial inverse video at this time.

The entire assembly comes as two separate units connected via

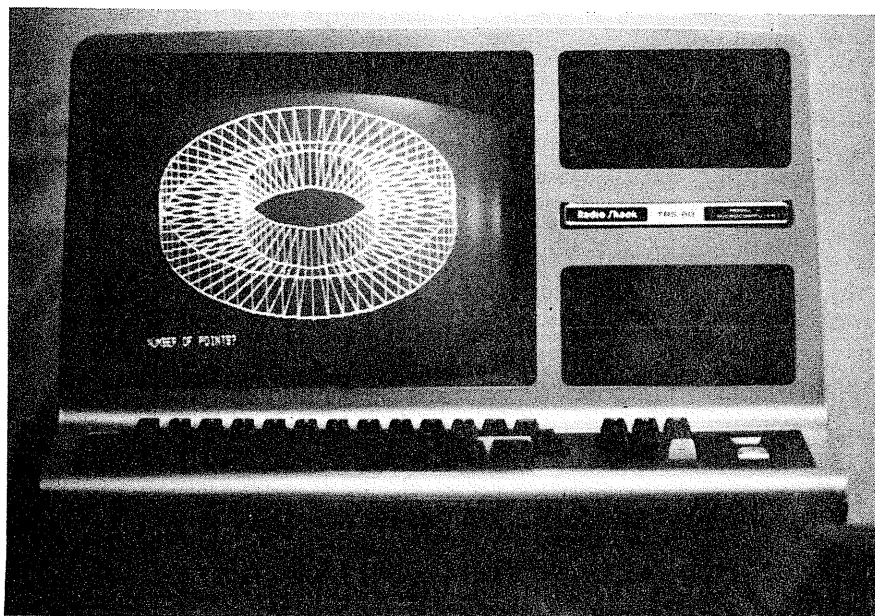
a flat ribbon cable. The interface board which requires ten solder point connections to the computer and one trace line (or integrated circuit pin) cut is located inside the computer case. The outlying module contains the other large circuit board (for the 12,288 bytes of video memory) and the power supply. For Model I owners, it does not require the expansion interface and can be used in a system with as little as 16K of RAM.

The real benefit comes from finally having super graphics for these computers. We looked at and played with the Model III version and were very impressed. The photos included here are representative of the quality available on the Model III. The Model I, by its inherently lower resolution monitor, still gives a remarkably good performance. ■





Actual screen photos above and below, showing the Mikee Electronics board in action. Note on the bottom photo that the characters are still normal size, but the graphics resolution is increased.



## Send for our FREE Catalog

ADDRESS LABELS  
FROM AVERY  
ONLY

# \$15.00

Shipping is even included,  
but you must mention Ad #8  
when you order

This special price is just to  
introduce you to our catalog  
of computer accessories and  
word processing supplies.  
We offer you 25-50% off on  
products like 3M-Scotch\*  
brand diskettes, computer  
paper, ribbons, printwheels,  
binders, and alot more.

**THESE ARE THE BEST  
ADDRESS LABELS  
YOU CAN BUY**

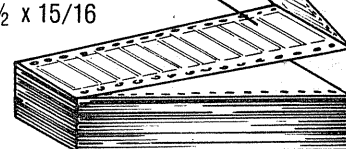
•TRACTOR FEED

•EXTRA HEAVY  
BACKING PREVENTS  
SKEWING DURING  
PRINTING

•ACCURATELY  
REFOLDS AFTER  
PRINTING

•SPECIAL  
NON-SMEAR  
LABEL PAPER

•STANDARD  
LABEL SIZE  
3½ x 15/16



**BOX OF  
5000 LABELS**



## TRICOR▲ Circle 44

3601 S. 9th St.  
Kalamazoo, MI 49009  
TOLL FREE: (800) 253-4358  
In Michigan: (616) 375-7519

- ☐ Please send me \_\_\_\_\_ box(es)  
of address labels at \$15.00 per box.  
(Ad # 8)
- ☐ I don't need the labels, but please  
put me on your catalog mailing list.

Name \_\_\_\_\_

Company \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_

State/Zip \_\_\_\_\_

\*3M Co.



# Captain 80

## The adventures of a software secret agent...

# Captain 80

© 1981 Bob Liddil

Here's the Software Secret Agent reporting back to headquarters after a grueling four day mission into the heartland of the American countryside. The purpose was to visit Advanced Operating Systems in Michigan City, Indiana. You might remember these guys as the publishers of Leo Christopherson's new *Voyage of the Valkyrie*. I've visited many publishers in the last couple of years and have seen some unusual locations. Instant Software, for example, occupies a converted motel, thirty some odd rooms crammed full of computers, clerks and reviewers. Acorn Software, by contrast, is situated in the basement of a Washington, D C townhouse. The Programmer's Guild is laid out in the rear third of a small town Radio Shack dealer store, and Advanced Operating Systems takes up the whole top floor of a high rise bank building, overlooking a really good sized shopping center.

The way they are laid out is inspiring. There are several specialists, experts in individual areas of software evaluation, and each has a broad market knowledge to cover the gray areas. Additionally, top marketing people and expert media people round out this staff which I found to be the most enthusiastic of any commercial software marketing team I have ever visited.

Software Procurement Manager, Palmer Wolf, summed up his company's goals simply and in the straightforward manner for which he is known.

"We want to market the very best software obtainable anywhere," he told me.

While there, I saw a top quality PAC-MAN program rejected due to its publisher's unwillingness to relinquish full control. Advanced Operating Systems will not co-publish, at least not as of this writing. So before submitting there make sure you are willing to give them complete authority to market your program. If accepted, the reward should exceed your ability to produce income with it yourself under other circumstances.

While in Michigan City, the Secret Agent Mobile, recently returned to my possession by a repentant phone company, was broken into and robbed. This incident, a rude re-introduction to the world of thieves and burglars, points up the need to think about insurance. Check it out. Do you carry your computer over to a friend's house once in a while? Or maybe go to a computer show or flea market where a disk drive or CPU or other goodies would spend time in your car? Chances are, your auto insurance does not cover anything in the car that is not attached to it. This means that anything stolen is gone and you are out the bucks. It only has to happen once.

If you check with your insurance agent, you will find that it is very inexpensive to cover all your valuable equipment against break-in in the home or car. No, I haven't gone into the insurance business. It's just that when I got home, I had a check waiting for me to cover the loss of equipment which was ripped off while in Indiana. The check would have been larger, had I scheduled the equipment by the piece. Talk to your agent, you can't lose.

This column completes more than a year of bimonthly tomfoolery and sometimes semi-seriousness, since Mike invited me to join his crew. During that time, I've completed a book and become self sufficient as a writer/reviewer. The success I've enjoyed over the last year has been largely due to you, the readers, and I am grateful.

As *80-U.S. Journal* enters a new era, namely that of monthly publication, I am called upon to produce this column twice as often as before - which leads me to the following question. What would you like to see reviewed? What topics would you like discussed? This column is as much yours as mine, because it is the readers who ultimately decide the fate of a writer.

Drop a letter to me, just a few lines and help me lay out this column for the future. I'll ask Mike to print the best ones, and maybe we can get a two-way dialog going. Thanks for a great year and we are all looking forward to the next.

Here's the Software Secret Agent checking out headquarters for new stuff to review. Wait a minute, there's a thirty ton tractor trailer outside, backing into the driveway, dropping new software packages on the lawn! Oh, wow, there must be three thousand new game packs, in every color of the rainbow, an ocean of tape, plastic wrap and styrofoam. And no two of them alike, Hmmm, they're all from the same company. Where's my Electric Pencil?

Dear Scott,

Did you have to send them all in the same shipment.....? ■



# Product review

ABS Doubler  
ABS Suppliers  
PO Box 8297  
Ann Arbor, MI 48107

5 $\frac{1}{4}$  inch diskette aid  
\$3.50 postpaid

The floppy diskette is a thin pancake of plastic which is coated on both sides with a magnetic material similar to that used in cassette tapes. It has the ability to accept and store magnetic impulses which are interpreted as data by the computer.

The standard mini-floppy diskette used by the TRS-80 Models I, III and Color computer is designed for recording on one side. This leaves the reverse side unused. While some manufacturers of hardware have introduced double-sided disk drives, the majority of drive owners possess single-sided designs.

The desire of many disk owners is to get more information on a diskette. The Percom and LNW companies both produce double density controllers which are not inexpensive and still leave the reverse half of the diskette unused. The answer for most is to make a floppy into a floppy-floppy, and ABS has come up with a simple solution.

The ABS-Doubler is a heavy duty plastic template to be used in the conversion process. It measures 5 $\frac{1}{4}$  by 3 $\frac{1}{4}$  inches and contains a notch on one side and a hole in the center. The notch and hole correspond to the write-enable slot and timing hole, respectively, of a 5 $\frac{1}{4}$  floppy diskette. The instructions are clear with good illustrations. The unit itself is durable and should last for years.

By using a pencil, one can trace the positions of the hole on the floppy, and with a quarter inch punch remove those corresponding portions of the floppy sleeve and liner. This makes the use of the reverse side of the diskette possible.

The only reservations we have about using a device of this nature is with the diskette itself. The standard floppy is certified for use on one side only. While the reverse

side does contain the same material, it sometimes is not as finely polished and may cause head wear problems.

It is the reverse side of the diskette which comes into contact with the head load pad. The pad is a small circular felt pad which, when it gets dirty, can and will put microscopic scratches on the diskette surface. This normally presents no problem as that side of the diskette is not used. But with the floppy diskette, those scratches increase disk abrasion and one could lose valuable information. Normal maintenance and periodic replacement of the head-load pad can solve this problem and extend the life of your equipment.

While the floppy diskette is turning, the liner inside serves a double purpose. It cleans the diskette surface and protects the diskette from the outer plastic sleeve. When the diskette is flipped, the direction of travel of the diskette is reversed. It is possible to end up with a piece of dirt previously captured by the liner coming loose and damaging the diskette or drive head. Again, the solution is relatively simple. Keep your diskettes in their protective envelopes and away from dust, dirt and smoke.

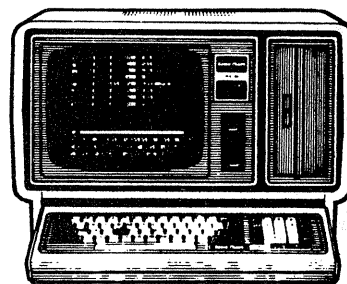
The diskette motion will cause the nap of the liner to lie with the direction of the motion. If the diskette is heavily used, this becomes very pronounced. Such a diskette should not be made into a floppy, because when reversed, it will be turning against the nap which will increase the possibility of scratches from particles lodged in the nap itself.

Most disk owners will never experience any problems, and so for them these objections will not be valid. The idea of inexpensively doubling the capacity of your diskette library has merit and should be seriously considered as an alternative to more expensive solutions.

Staff



## BIGGEST Discounts Ever On TRS-80<sup>TM</sup>



### Computers, Accessories & The Following NEW Items

Hewlett-Packard®  
HP-85 Personal Computer

Atari® CX-2600  
Video Computer System

Magnavox®  
Odyssey²  
Home Video System

Magnavox®  
Magnavision®  
Videodisc Player

- FREE SHIPPING in 48 continental contiguous States.
- NO SALES TAX collected on out-of-state orders.
- FREE Discount Price List available.

TOLL FREE ORDER NUMBER  
800/531-7466

Texas & Principal Number  
512/581-2766

Telex Number 767339

### Pan American Electronics

Sales and Main Office  
Department 31  
1117 Conway Avenue  
Mission, Texas 78572

TRS-80 is a Trademark of Tandy Corp.



## THE LEAST EXPENSIVE PROGRAMS YOU CAN BUY.

Up to 77 high-quality programs  
for TRS-80, only \$10.95

**NewBasic—expands disk basic**  
Now configure your Basic to do any or  
all of the following:

- Convert decimal to hex, and vice versa, provide character representation for each, or the hex-dec number of any character • Blinking cursor
- Repeat key • Audible key entry (each key makes a sound) • directory command from Basic • Disk load and disk run command file • Graphic functions, including drawing blocks, lines, filling-in blocks • Lowercase driver • RS232 driver (LPRINT-LLIST) • Call function, hex-order number will execute subroutine • Spooler and despooler • Print toggle, LPRINTS your video display • Find (locate a Basic command or string) • Modular Software Assoc; tape \$19.95, disk \$29.95

### Level II Tapes

'Tiny' Pascal runs on any 16K Level II system, includes the programming structuring capabilities of full Pascal, but not data structuring.

Able to compile Z-80 machine code, programs run about 5X faster than Level II Basic—graphics run eight times faster! Requires use of T-Bug (or Tape 7) and ETASM.

Tape 3, People's Pascal	\$19.95
Tape 1, 34 buis., edu., game progs.	\$10.95
Tape 2, 77 programs from Osborne book: Some Common Basic Programs	\$10.95
Tape 5, 24 buis., edu., game progs.	\$10.95
Tape 7, 31 buis., edu., game progs.	\$10.95
Tape 8, 40, inc. 4X tape speedup	\$10.95
Tape 9, 25 buis., edu., game progs.	\$10.95
Tape 10, income tax, check act	\$10.95
People's Taxman, fills-out all forms	\$39.95

### PASPATCH

**PasPatch, Tape 6P, makes Tandy tiny Pascal a powerful disk system!**

Modular Software Assoc. \$19.95

### SuperPIMS—People's Database

PIMS has been greatly speeded up and simplified, with machine-language sorts, key debounce, optional automatic lowercase (no keying, no hardware mod) on labels or reports. Up to 20 fields, limited by 240-character maximum per record. Easy to revise, add records, split or merge files, sum or average any fields. Customized for tape, tape & disk, Zoom, TC8 Poor Man's Floppy, B17, Stringy Floppy—all on one tape! As mailing labels program, easily manages 20,000 list. CIE does! Advanced labels module to come, \$24.95, making system most powerful mailer available! \$25.90 on disk program (CIE) \$19.95 (\$21.15 CA) book, details uses (CIE) \$11.95 (\$12.67 CA)

**NEW:** Send for free monthly catalog

**10% DISCOUNT**

when ordering 3 items

**totaling \$50 or more**

Add \$1 shipping per order

**Games for color TRS-80**

Modular Software Assoc. tape contains:

- PONG-80 • ENTRAP • DEMOLISH (like Breakout) • TRAFFIC (Grand Prix auto race)
- BETA TREK space game • SHUTTLE (rocket ship game).

\$19.95 (\$20.55 CA)

### Word Processing Newsletter

Want to really USE your computer? Then word processing is for you. Let your computer show you how much easier writing can be.

Learn about the new 510 cps 'non-daisy' that at 10X daisy speed gives correspondence quality, at less than twice the cost. Too slow? The really fast guys are coming. How about 30 11x14 typeset-quality documents per minute? Maybe you could use the same 'printer' as a copier.

How about an inexpensive (\$169) magnetic card reader-writer that would let you input mail addresses, letter paragraphs, even small programs?

Read about all this and more in Low Cost Word Processing, the only newsletter about word processing using your personal computer. Just \$15 for 12 issues.

All orders charge card, check or m.o.  
Calif. residents add 6 pct tax. Dealer inv. included  
Oversens, add \$1.50 per tape postage

**COMPUTER INFORMATION EXCHANGE**  
Box 159  
San Luis Rey CA 92068

## Book review

### Introduction to TRS-80 Level II BASIC and Computer programming \$10.95

186 pages, illustrated

Introduction to TRS-80 Level II BASIC and Computer Programming is a very well written book designed to teach Level II BASIC. It uses solid examples to emphasize the text, and each example is accompanied by several lines of comment, which aid the beginner in following the author's train of thought. The book is divided into ten chapters and three appendices.

Chapter one is entitled "Your TRS-80 Computer", and describes the cassette based Level II system. It explains the keyboard layout, and highlights some of the non-typewriter keys and their functions. This chapter introduces the idea of communicating with the computer with a generous dose of examples and exercises.

Chapter two introduces the print command, and gives examples of its various forms and uses. This chapter also defines variables and their assorted functions. It also presents the arithmetic functions available on the TRS-80, and covers single and double precision.

While chapter two deals with BASIC statements or expressions, chapter three defines a program, and clarifies the difference between typing in statements in command mode and typing in program lines in the programming mode. It explains the significance of line numbers and gives many examples of short programs to get the user familiar with the idea of programming. Remark statements are explained as are

the INPUT, CLS, STOP, CSAVE, CLOAD, CLOAD?, DEFINT, DEFDBL and DEFSTR, commands. Program line editing on the TRS-80 is explored, and the reader is presented with many exercises designed to sharpen line editing skills.

Chapter four introduces the relational and logical operations. AND, OR, NOT are discussed and the truth tables for these operations are presented. The next idea dealt with in this chapter is flowcharting. All of the flowcharting symbols and conventions are presented and given exercises and examples which should be completed before moving on to the next section. After flowcharting, transfer statements are discussed. The various types of transfer statements (conditional, unconditional, on X GOTO) are explained, and the ON ERROR statement is defined. At this point, some fairly complex programs can be developed by the user and the exercises at the end of this section integrate all of the commands covered up to this point.

Chapter five concerns itself primarily with the processes of looping. IF THEN and FOR NEXT loops are discussed, and many examples of their use are given. The principles of nested loops are also studied. Subscripted variables are covered in this chapter, and their uses are explored. The chapter ends with a lesson on debugging loops for greater speed and readability.

Chapter six is entitled "Input/Output", and covers several of the ways in which data may be stored and retrieved

Circle 46



by the TRS-80. The ways presented include READ DATA statements and cassette input/output. The commands given under cassette I/O are CSAVE, CLOAD, CLOAD?, PRINT#-1 and INPUT#-1. Also presented in this chapter are ways to present on-screen data as neatly and effectively as possible. The commands explained under this section are TAB, POS and PRINTUSING.

Chapter seven is concerned entirely with the "library" functions of the TRS-80. Among others they include RND, COS, SIN, TAN, LOG, ABS. One of the program examples is a short routine to graph some of the math functions.

Chapter eight deals with the subject of subroutines, and outlines some of their major functions. Unconditional and conditional transfer statements for subroutines are explained, and several exercises at the end of the chapter help accent the ideas presented.

Chapter nine covers the principles behind primary TRS-80 graphics. The commands introduced are SET, RESET and POINT. These three commands are effectively integrated in an example program which simulates the random path of a rodent trying to escape from within the confines of a given space on the video screen. In this simulation, the subject is not allowed to retrace steps at any time, thereby creating the possibility of "painting oneself into a corner."

The tenth chapter deals with string manipulation. All of the ASCII codes are presented and explained, and several character manipulation functions are presented. These functions are

LEN, LEFT\$, RIGHT\$ and MID\$. Other string function commands deal with CHR\$, ASC, STRING\$, CLEAR, FRE, STR\$, VAL and INKEY\$.

At the end of the book are three appendices and the solutions to the even numbered exercises. Appendix one contains all of the Level II error messages. Appendix two is a list of all of the words reserved in Level II BASIC. Appendix three is a very extensive glossary covering all of the Level II commands, and any given words that might be associated with programming and computers.

Throughout the book there are small grey boxes which contain thoughts or messages which the author thought needed extra clarification or emphasis. These boxes are quite convenient and aid in learning. The author, Michael Zabinski, is a professor at Fairfield University in Connecticut. Dr Zabinski is a consultant to public schools on computer usage in classroom situations. He is also the author of several programming books as well as educational materials for Radio Shack. His strong background clearly shines through in this book.

As the title clearly states, this book is an introduction to programming and is not designed to be an advanced technical course in the nuances of advanced programming techniques offered by Level II BASIC. I have come to the conclusion that after studying this book and implementing the examples and exercises that the reader will end up with a very solid working knowledge of programming in general, and programming the TRS-80 Level II specifically.

W W Harper II

## MMSFORTH VERSION 2.0: MORE FOR YOUR RADIO SHACK TRS-80 MODEL I OR MODEL III !

- ★ **MORE SPEED**  
10-20 times faster than Level II BASIC.
- ★ **MORE ROOM**  
Very compact compiled code plus VIRTUAL MEMORY makes your RAM act larger. Variable number of block buffers. 31-char. unique word-names use only 4 bytes in header!
- ★ **MORE INSTRUCTIONS**  
Add YOUR commands to its 79-STANDARD-plus instruction set!  
Far more complete than most Forths: single & double precision, arrays, string-handling, clock, more.
- ★ **MORE EASE**  
Excellent full-screen Editor, structured & modular programming  
Word search utility  
THE NOTEPAD letter writer  
Optimized for your TRS-80 with keyboard repeats, upper/lower case display driver, full ASCII, single- & double-width graphics, etc.
- ★ **MORE POWER**  
Forth operating system  
Interpreter AND compiler  
8080 Assembler  
(280 Assembler also available)  
Intermix 35- to 80-track disk drives  
Model III System can read, write & run Model I diskettes!  
VIRTUAL I/O for video and printer, disk and tape (10-Megabyte hard disk available)

# mmsFORTH

## THE PROFESSIONAL FORTH FOR TRS-80

(Over 1,500 systems in use)

MMSFORTH Disk System V2.0 (requires 1 disk drive & 16K RAM, 32K for Model III) ..... \$129.95\*

### AND MMS GIVES IT PROFESSIONAL SUPPORT

Source code provided  
MMSFORTH Newsletter  
Many demo programs aboard  
MMSFORTH User Groups  
Inexpensive upgrades to latest version  
Programming staff can provide advice, modifications and custom programs, to fit YOUR needs.

MMSFORTH UTILITIES DISKETTE: Includes FLOATING POINT MATH (L2 BASIC ROM routines plus Complex numbers, Rectangular-Polar coordinate conversions, Degrees mode, more), plus a full Forth-style Z80 ASSEMBLER; plus a powerful CROSS-REFERENCER to list Forth words by block and line. All on one diskette (requires MMSFORTH V2.0, 1 drive & 32K RAM) ..... \$39.95\*

FORTHCOM: communications package provides RS-232 driver, dumb terminal mode, transfer of FORTH blocks, and host mode to operate a remote TRS-80 (requires MMSFORTH V2.0, 1 drive & 32K RAM) ..... \$39.95\*

THE DATAHANDLER V1.2: a very sophisticated database management system operable by non-programmers (requires MMSFORTH V2.0, 1 drive & 32K RAM) ..... \$59.95\*

MMSFORTH GAMES DISKETTE: real-time graphics & board games w/source code. Includes BREAKFORTH, CRASHFORTH, CRYPTOQUOTE, FREEWAY, OTHELLO & TICTACFORTH (requires MMSFORTH V2.0, 1 drive & 32K RAM) ..... \$39.95\*

Other MMSFORTH products under development

### FORTH BOOKS AVAILABLE

MMSFORTH USERS MANUAL - without Appendices, for non-owners ..... \$17.50\*

STARTING FORTH - best companion to our manual ..... \$15.95\*

INVITATION TO FORTH - detailed beginner book on figFORTH ..... \$17.50\*

THREADED INTERPRETIVE LANGUAGES - advanced, excellent analysis of MMSFORTH-like language, ..... \$18.95\*

PROGRAM DESIGN & CONSTRUCTION - Intro. to structured programming, good for Forth ..... \$13.95\*

FORTH - 79 STANDARD MANUAL - official reference to 79-STANDARD word set, etc ..... \$12.95\*

CALTECH FORTH MANUAL - good on Forth internal structure, etc ..... \$10.00\*

FORTH SPECIAL ISSUE, BYTE Magazine (Aug. 1980) - we stock this collector's item for Forth users and beginners ..... \$4.50\*

\* - ORDERING INFORMATION: Software prices include manuals and require signing of a single system, single-user license. SPECIFY for Model I or Model III! Add \$2.00 S/H plus \$3.00 per MMSFORTH and \$1.00 per additional book; Mass. orders add 5% tax. Foreign orders add 20%. UPS COD, VISA & M/C accepted; no unpaid purchase orders, please.

Send SASE for free MMSFORTH information.  
Good dealers sought.

Get MMSFORTH products from your  
computer dealer or

**MILLER MICROCOMPUTER  
SERVICES (U11)**

61 Lake Shore Road, Natick, MA 01760  
(617) 653-6136

Circle 47



# Color computer game reviews

To celebrate the Color computer's first anniversary, 80-U.S. evaluated five of the color computer cartridge games. Overall, they represented some real fun, though some held our attention better than others.

### **Dino Wars** 26-3057 \$39.95

Dino Wars is a fairly entertaining two-player game. Adults and teens soon tired of this one, but it kept the younger generation going for hours.

Each player controls movement and attack of his own Tyrannosaurus Rex with the joystick control. The big dino can move towards the players or away, and left or right in any combination of directions. Attack is accomplished by pressing the controller button and is accompanied by a growl and a bite by the attacking monster. If effective, the opponent obediently falls on its back and twenty points are removed from its score. The object is to reduce your opponent's score to zero, effectively "killing" him.

The graphics and sound effects are excellent. The dinosaurs are shown in perspective with walking sounds accompanying their ponderous steps. The scenario contains mountains in the distance and a number of cactus patches. The dinos and cactus patches don't mix and each time a dino collides with a cactus, he falls down and loses 5 points. Should one or both dinos wander off-screen, the "camera" slowly pans toward the closer of the two. The effective field of battle is 360 degrees.

When one or the other of the dinos loses all his points, he retreats into the mountains in the distance, yelping all the way.

### **Pinball** 26-3052 \$29.95

Pinball is an arcade favorite. The

older age groups enjoyed this one while the younger set's attention span was too short to hold them very long.

Pinball accepts up to four players. Flippers are controlled by joystick buttons. A joystick acts as the plunger and also to control the shaking of the "machine".

While the game comes with an excellent field, the configuration may be modified or a new one built from scratch. The results can be saved on tape for later retrieval.

It is possible to design fields where the game gets stuck and runs up impossible scores. Really challenging playing surfaces are difficult to design but will certainly challenge the creativeness of the most avid pinball fan.

One note is worth mentioning here. The game is noisy and realistic. The volume control on the TV set can be turned down to keep the sound at a minimum. The "machine" can be "tilted", just as in the real thing, by too liberal a use of the joystick.

### **Quasar Commander** 26-3051 \$39.95

This must be Radio Shack's obligatory space game. It is a typical shoot'em up, one-player arcade game of a style popularized by the Odyssey series of several years ago.

The joystick controls of this game are very realistic with enough delay to simulate flying a real space fighter. The enemy fighters look somewhat like the Star Wars' Tie Fighters although there are enough differences to prevent trademark problems. Both controls are used to the utmost with one controlling speed and the other direction. The scenario is deep space with dozens

of enemy fighters, a couple of battlecruisers and lots of space mines.

The objective is to destroy as many of the enemy targets as possible. Several options are possible including time, number of enemy targets and enemy movement.

Quasar Commander was very challenging, much too difficult for smaller children. Adults tired of it quickly, while it received a mixed reaction from teens.

### **Skiing** 26-3058 \$39.95

Skiing the slalom run against the clock is fun and exciting. There is much to be said for this new addition to the Radio Shack repertoire. It has two modes, one which requires only simple joystick movement, the other requiring pushing (via a controller button) with ski poles to achieve speed.

The objective is to ski the slalom through a course of flags, just like the real thing. The perspective is from the skier's eyes and the sound effects emulate skiing and striking the flag and course markers. The run is as quick (or slow) as your capabilities allow. The graphics and sounds are excellent; much improved over earlier cartridges.

The Color computer, even with extended BASIC, has capabilities far beyond those described in the manuals. I strongly suspect that this machine will beat out the best of the competition, given time and the ingenuity of programmers. The sound from Skiing is a good example. A very realistic applause greets you at the end of the run. The slapping sound of the markers and flags as you strike them is realistic. The fine line high-speed graphics on the white snowy background is



impressive, but not as great as we should see in the future. The video chip is capable of 64 shades of color and very fine resolution. It is directly accessible from machine language with the introduction of the 32K version with floppy disk. There is a whole world of excitement and fun opening up for this machine.

**Chess**  
**26-3050**  
**\$39.95**

Computer Chess graduated from a dream to reality with the advent of the micro-computer. When Star Trek portrayed computer chess (albeit, three dimensional) the notion was that the *moves* had to be programmed for a particular board combination rather than utilize the deductive logic inherent in the computer. This type of thinking slowed the development of computer chess as most machines did not have a large core memory.

Radio Shack's only other

computer chess program (Microchess 1.5) was one of the first to effectively *play* a real game of deductive logic, though heavily weighted toward attack. The most amazing factor was that this program ran in only 4K of memory on the Level I, Model I. It was quickly outclassed by two versions from Dan and Kathie Spraken under the Hayden label: Sargon and Sargon II.

The color version of this ever-popular board game is much improved over Microchess 1.5, and is somewhere between the two versions of Sargon in its power and capability. There are several levels of difficulty, the board is presented in a very pleasing display, and the logic is very good.

For color computer owners, there should be no reason to go out and spend two or more times the price of this cartridge for one of the more recent chess games.

In general

As with most Radio Shack software products, the documenta-

tion on the cartridges is excellent. Several of the earlier releases, in being rushed into production, had mistakes in the manuals, which have been corrected with errata sheets. The four by four inch size is not convenient; we would rather have seen an 8 x 11 inch folder format, or something to be punched for a three-ring binder.

The cartridges themselves are as wide and thick as an 8-track cartridge but only half the length. They are well constructed and should last many years.

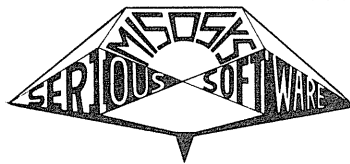
The (relatively) high cost of the individual cartridges is offset somewhat by the lower initial cost of the machine in which they run. Whether they are worth the price will depend upon your preferences. In comparison to other software now available for this machine, Radio Shack has an obvious advantage. These games are well thought out, and represent excellent software for the color computer.

Pat Perez  
Clay Caldwell

## EDAS 3.5

EDAS is a sophisticated Editor and Assembler for TRS-80 I & III

- All text may be input in upper or lower case.
- Assemble directly from one or more disk files via \*GET.
- Assemble to disk or memory
- Binary, octal, decimal, hex, and string constants; Multiple constants may be input on a single line.
- CMDFILE utility included.
- Conditional assembly support.
- Cross-Reference utility.
- DOS functions DIR, FREE, KILL, and LIST are supported.
- 14-character labels including special chars. "@", "\$", " ", "?", " ", " ", " ", " ", " ", " ", " ", " ", " ", " ", " ".
- Editor includes block move, global change, rename, find.
- EDTASM & M-80 source files can be read or written.
- Expression evaluator supports +, -, \*, /, MOD plus logical AND, OR, and XOR.
- Paged & titled listings with page numbers and date/time.
- PAGE, TITLE, SUBTTL, SPACE, & COM pseudo-ops supported.
- Set memory size, page prompt, JCL execution, Abort option.
- EDAS is supported with TRSPO compatible DOSs (LDOS, VTOS).
- Price is \$79.00 + \$4.00. S&H.



**MISOSYS MISOSYS MISOSYS MISOSYS MISOSYS**

LDOS, Version 5.1 is the Ultimate in Operating Systems for the TRS-80 Models I and III. MISOSYS is your East Coast Headquarters for LDOS, the documented system! Version 5.1 is priced at \$169.00 + \$5.00 S&H per system. Deduct \$50 if ordering both.

**LOGS 5.1**

## DSMBLA

Complement your assembly language tools with this Z-80 disassembler which produces screen, printer, cassette, or disk file output. A two pass process provides SYMBOLS for 16-bit address and 8-bit relative references. EQUates & ORG are generated. Read SYSTEM programs & display load address range. \$20 (DSMBLR I for non-disk use is \$15).

**EDAS, CMDFILE, DSMBLR Specify Mod I or III. Add \$1 S&H+\$ .50 per program. VA residents add 4%.**



**MISOSYS - Dept. UP3**  
**5904 Edgehill Drive,**  
**Alexandria, Virginia 22303**  
**960-2998 MicroNET 70140,310**  
**Dealers Inquiry Invited**



# DISKMOD

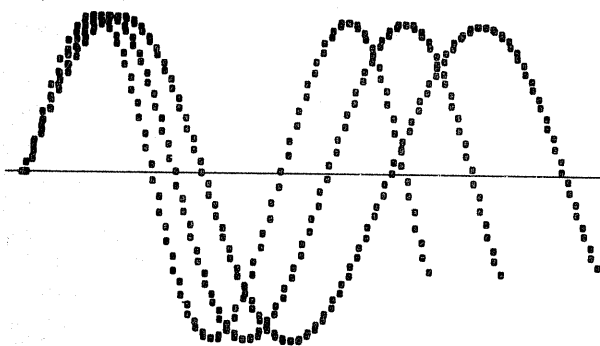
Turn your Editor Assembler into a disk package. This 32K patch modifies EDTASM for DOS operation. Features? Add full disk I/O, block move, global change, printer pagination, sorted symbol table, print memory utilization, enhance DEFM expansion, protect memory, and recover after BOOT. From within the EDTASM you will have DIR, KILL, & FREE. Upgrade your EDTASM! \$20.

## THE BOOKS

THE BOOKS must be a part of your tools. Volume I gives you access to all math operations in your Level II ROM. A symbol table of the entire machine noting over 500 addresses is included. Volume II tells you everything you wanted to know about the level II I/O—printer, keyboard, video, and cassette routines are fully explained. Each volume has a fully commented listing of all the routines discussed. THE BOOKS will save you hours of assembler programming. Each volume is priced at \$14.95 or buy both for \$24.95. Add \$1.50 S&H per book.



# Pocket biorhythms



*Robert D Miller, Hopewell, Virginia*

When I bought my TRS-80 pocket computer, I was immediately impressed with the power, flexibility and capability of such a small device. The developers of this miniature computer have my deepest respect. Because of its small size, it is extremely portable, so naturally I wanted to show off my new purchase to my friends. Those of my friends who are familiar with computers and computer languages were duly held in awe of the pocket computer and its capabilities, but those friends who know little of computing somehow couldn't get too excited about 1.9K of RAM and programming in BASIC; they just wanted to know, "but what does it do?"

I set out to develop a program which would allow the computer to demonstrate itself in such a manner that even the non-computer types would gain an appreciation for its capabilities. I wanted to make the program self-instructive and conversational. Plus, I wanted to deal with a subject that would be familiar and interesting to a wide cross-section of people. What I came up with is a program entitled "Pocket Biorhythm Demonstration". It satisfies the self-instructional and conversational requirements, and it has proven to be of much interest to those to whom I've shown it. In fact, it has even proven to be an effective "ice-breaker" in getting to know people better! And for the computer types, it

demonstrates a few programming techniques that may be of interest.

Now I don't claim to be an expert on the subject of biorhythms; I just know enough to make me mildly dangerous! The idea behind biorhythms revolves around the theory that on the day a person is born, three cyclical "clocks" start ticking in their body. One such clock is referred to as the physical cycle, upon which your physical state of being is supposedly based. The cycle is like a sine wave which completes one oscillation every twenty-three days. For half of these twenty-three days, your physical state is on the "plus" side of an imaginary axis; the rest of the time is spent on the "minus" side. Biorhythm theorists claim that an individual will experience a "critical" day when their physical cycle crosses from the plus to the minus (or the minus to the plus), an event which happens every eleven and one-half days. The body, at that point, is supposedly in a state of change. The theory goes on to say that one should be aware of such critical days and be duly cautious of any activities that would require physical stress.

A second clock is the twenty-eight day emotional cycle. It is similar to the physical cycle except for the length. Again, one experiences critical days when crossing from plus to minus and minus to plus; in this case, every fourteen



days. On such days, one should avoid emotionally trying situations if possible.

The final clock is the intellectual cycle, the length of which is thirty-three days. In this case, one should avoid intellectually stressful situations when a critical day is encountered every sixteen and one-half days.

All three cycles start the day you are born and continue, independent of one another, until you die. Occasionally, two cycles will cross the axis on the same day, thus bringing about a "double critical" day, one on which due caution should be taken. And every once in a great while a "triple critical" day will occur when all three cycles cross the axis on the same day.

I am not claiming any validity to the biorhythm theory. If the subject interests you, then I suggest you read some of the many articles and books written on the subject. My purpose in choosing biorhythms as the subject of my demonstration program is twofold. First, it is entirely mathematical and thus, lends itself readily to computer programming. Second, it is a subject with which most people have at least some familiarity, thus making the program of more interest.

If you want to figure out your biorhythm manually, you first have to compute how many days old you are on the date for which you wish to examine. Dividing this number by twenty-three and taking just the remainder will let you know how many days you are into your current physical cycle. If the remainder is zero or eleven (actually eleven and one-half), the date is to be considered physically critical. Dividing your age in days by twenty-eight and thirty-three respectively and taking the remainders will show you the current positions of your emotional and intellectual cycles. Zero and fourteen are critical points for the emotional cycle, and zero and sixteen (and one-half) days are intellectually critical days.

This program will take care of all the mathematics for you. First type in the program *exactly* as listed. Note that line 75 cannot be completely entered as written in one step unless you are using the word PAUSE with a reservable key. Simply enter as much of the line as you can, press ENTER, and then space out to the end of the line and finish entering the information. The word PAUSE when entered letter-by-letter takes up five bytes of memory. When the ENTER key is pressed, this is reduced to only one byte, thus allowing the additional space to complete the line.

When you have finished typing in the program, type MEM and press ENTER. If the display says "1STEPS 0MEMORIES", then chances are you have entered the program correctly. Notice that this program occupies all but one byte of program

memory, so it serves as an excellent example of how much can fit in such a small device.

Now that you have done the hard part, type RUN, press ENTER and enjoy the fruits of your labor. From time to time during the program, execution will stop to allow you to read the display; simply press ENTER to continue. The first thing you will be asked to do is input your name. (If your name is longer than seven letters, only the first seven will be retained.) Next, you will be asked to enter your birthdate. Do so using numbers (not letters) representing the month, day and year of birth. Also be sure to enter the *full year*, not just the last two digits. The computer will then tell you on what day of the week you were born! Then you will be asked to put in the computation date. Do so, again being sure to enter four digits for the year. You will then be told the day of the week of the computation date. Press ENTER and the computer will reveal your age in days (ouch!). Following this you will be told on what points each of your three biorhythm cycles are for that date. If any cycle is critical, you will be so informed with appropriate "warning" beeps. Finally, a summary statement is made, letting you know whether the day is a single, double or triple critical day, or more than likely, not a critical day at all. To compute the biorhythm for another date, simply press ENTER and the program will loop to the point requesting the computation date.

Now let's look at the program and see how it works. Lines 55-190 represent the mainstream of the program. Lines 55-110 are primarily the opening verbiage of the program. Your name is stored in the variable J\$ and is used several times in the program.

Line 110 jumps to the subroutine starting at line 300, which performs most of the calculations of the program. For continuity's sake, I'll describe this subroutine now. Lines 300-320 accept month, day and year as numerical input. Checks are made on month and day to insure that the values are within acceptable ranges.

Line 330 computes the number of days that have transpired between the year zero and the year prior to the one you just entered. This calculation takes our current calendar system and projects it backwards as if it has always existed in its current form. This, of course, is not actually true, but for the purposes of the program the calculation works fine. All leap year conditions are taken into account during this calculation.

Lines 340-450 calculate the number of days that have transpired during the year you entered, up through the month prior to the one that you input. Note that line 340 (also lines 180 and 480) utilizes a very powerful feature of the pocket computer, which is the ability to GOTO a line number based on an arithmetic calculation. This can be used in a



similar manner as the "ON N GOTO line number" statement found in Microsoft BASIC. Lines 442-446 check to see if the year entered is a leap year and if it is, adds an extra day for February.

Line 460 adds the days that have transpired in previous years to the days that have transpired in the year you entered. Using this number, you can tell on what day of the week the date you entered falls. Divide the number by seven and take the remainder (line 470). If the remainder is zero, the date falls on a Sunday; a remainder of one indicates a Monday, etc. Lines 480-550 take care of this determination.

A technique I used in lines 480-550 allows you to construct string values that are longer than seven letters (the maximum allowed by the pocket computer for one variable). Every day of the week has the word "day" as the last three letters in its name. Thus, by setting G\$ equal to "DAY", and F\$ to the appropriate value, one can construct a compound value that not only contains more than seven letters, but also saves on memory space. When the day of the week is printed in lines 120 and 145, the values of F\$ and G\$ are printed back to back, forming the complete spelling of the appropriate day of the week. (A similar technique is employed in lines 165-175 with respect to the printing of a variable longer than seven letters in line 700).

The subroutine consisting of lines 300-550 returns to the main program with the number of days since the year zero in variable C and the day of the week in variables F\$ and G\$. Line 120 displays the day of the week and copies the day count to variable Z. Lines 130-140 send you back through the same subroutine with the computation date. The day of the week returned is printed by line 145. Then the new day count just returned from the subroutine is subtracted from the previous one (stored in Z) to obtain the net difference in days between the two dates (stored in X). This is displayed as your age in days in lines 150 and 155.

Line 160 computes the current position on each of the three biorhythm cycles (P, E, I). Lines 165-175 each set variables to the length (L\$), name (N\$ and O\$) and midpoint (Q) of the respective cycles. The variable R is set to the value of the current position of the cycle, and a transfer is made to the subroutine starting at line 700. Let's look at this now.

Lines 700 and 710 tell you the appropriate cycle name and your current position in that cycle. Lines 720-740 and 900 tell you whether the day is critical or not. If your current position (R) is equal to zero or the midpoint (Q) (line 730), the day is critical and a transfer is made to line 900, which beeps a warning and informs you of the situation. A counter (U) is also incremented to keep track of

how many of the three cycles are critical. If the day is not critical, line 740 prints "NORMAL DAY!" prior to returning to the main program.

After each of the three cycles are analyzed (lines 165-175), a final summary for the day is made in lines 180-185. Depending on the value of the critical day counter (U), the variable V\$ is set to the applicable value, and line 185 prints out the final assessment along with a number of beeps equal to the value of U. Line 190 then loops back into the program to provide you the opportunity to calculate biorhythms for other days.

In addition to providing biorhythm analysis, this program can be used to tell you the day of the week for any given date. In addition, you can use it to find the number of days between two dates. Just enter the earlier date as the birthdate and the latter as the computation date. The number of days between the two dates will be displayed as your "age" in days (line 155).

This program has proven to be very successful as a demonstration vehicle for the TRS-80 pocket computer. Hopefully, it will provide the same degree of success for you. Watch out for those critical days!

```

55:PAUSE "BIORHYTHM DEMONSTRATION":PAU
SE "HI THERE!":INPUT "WHAT IS YOUR NA
ME? ";J$
65:PAUSE "OKAY, ";J$:PAUSE "LETS COMPU
TE YOUR":PAUSE "BIORHYTHM!"
75:PAUSE "FIRST, I NEED TO KNOW":PAUSE
"YOUR BIRTH DATE.":PAUSE "SO, ENTER
YOUR BIRTHDAY"
90:PAUSE "USING NUMBERS FOR YOUR":PAUS
E "MONTH, DAY AND YEAR":PAUSE "OF BIR
TH."
110:PAUSE "OKAY, ";J$:PAUSE "HERE WE G
O!":GOSUB 300
120:PAUSE "WOW, YOU WERE BORN ON":PRIN
T "A ";F$;G$;"", ";J$;"!":Z=C
130:U=0:PAUSE "NOW, I NEED THE":PAUSE
"COMPUTATION DATE IN"
140:PAUSE "THE SAME FORMAT.":GOSUB 300

145:PRINT "THAT DAY IS A ";F$;G$;"!":X
=C-Z
150:PAUSE "ON THAT DATE YOU ARE"
155:PRINT USING "#####";"EXACTLY";X;"
DAYS OLD!"
160:P=X-INT (X/23)*23:E=X-INT (X/28)*2
8:I=X-INT (X/33)*33
165:L$="23":N$="PHYSICA":O$="L":Q=11:R
=P:GOSUB 700
170:L$="28":N$="EMOTION":O$="AL":Q=14:
R=E:GOSUB 700

```



```

175:L$="33":N$="INTELLE":O$="CTUAL":Q=
16:R=I:GOSUB 700
180:GOSUB 181+U:GOTO 185
181:V$="NOT A":RETURN
182:V$="SINGLE":RETURN
183:V$="DOUBLE":RETURN
184:V$="TRIPLE":RETURN
185:BEEP U:PRINT V$;" CRITICAL DAY!"
190:GOTO 130
300:B=0:INPUT "MONTH? ";M:IF (M<1)+(M>
12)THEN 300
310:INPUT "DAY? ";D:IF (D<1)+(D>31)THE
N 310
320:INPUT "FULL YEAR? ";Y
330:A=INT ((365.25)*(Y-1))-INT (Y/100)
+INT (Y/400)
340:GOTO (13-M)*10+340
350:B=B+30
360:B=B+31
370:B=B+30
380:B=B+31
390:B=B+31
400:B=B+30
410:B=B+31
420:B=B+30

```

```

430:B=B+31
440:B=B+28
442:IF INT (Y/4)<>(Y/4)THEN 450
444:IF (INT (Y/100)=(Y/100))*(INT(Y/40
0)<>(Y/400))THEN 450
446:B=B+1
450:B=B+31
460:C=A+B+D
470:W=C-INT (C/7)*7
480:G$="DAY":GOTO W*10+490
490:F$="SUN":RETURN
500:F$="MON":RETURN
510:F$="TUES":RETURN
520:F$="WEDNES":RETURN
530:F$="THURS":RETURN
540:F$="FRI":RETURN
550:F$="SATUR":RETURN
700:PAUSE "YOUR ";L$;"-DAY ";N$;O$
710:PRINT USING ";CYCLE IS ON DAY ";R
720:PAUSE "THAT DAY IS A"
730:IF (R=0)+(R=Q)GOSUB 900:RETURN
740:PRINT "NORMAL DAY!":RETURN
900:BEEP 3:PRINT"CRITICAL DAY!!!":U=U+
1:RETURN

```

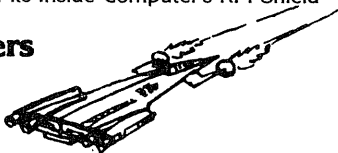


TRS-80

## COLOR COMPUTER

- SUPERCHARGER RAMCHARGER**  
**64K UPGRADE 32K UPGRADE**
- EXTEND MEMORY FROM 4/16K TO 64K
  - \$299.95
  - 100% Compatible w/Ext. or DOS BASIC
  - No Soldering or Modification Required
  - Fits Inside Computer's RFI Shield

### Space Invaders Meteoroids Space War



- The Best Games Available
- High Resolution Graphics
- Fast, Machine Language
- Compatible w/ Ext. Basic
- \$21.95 each, \$59.95 for all three

#### EXTENDED BASIC GAMES

- **LOTHAR'S LABYRINTH**  
Word Search Puzzle
- **BATTLEFLEET**  
Battleship Search Game (one or two players)
- **SPACE TRADERS**  
Galactic trading game

\$14.95/ea.



### THE FACTS

At last, a complete description of the "guts" of the Color Computer. Specs on all the ICs, complete schematics, theory of operation and programming examples.

\$14.95

### UTILITIES

- **EDITOR/ASSEMBLER** ..... \$34.95
- **SUPER MONITOR** ..... 19.95

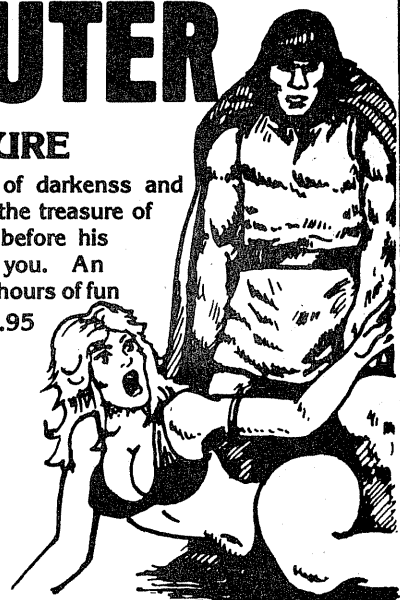
Full feature machine language monitor. Completely position independent code - lets you load it anywhere in the computer's memory.

- **EPROM PROGRAMMER** ..... 89.95  
(Program your own ROMs for the ROM-PAC port)
- **MAGIC BOX** ..... 24.95  
Load MOD I/III Tapes into the color computer

Circle 49

### ADVENTURE

Combat the powers of darkness and evil! Can you recover the treasure of the Golden Sorcerer before his minions overcome you. An adventure for endless hours of fun and excitement. \$19.95



## SPECTRAL ASSOCIATES

145 HARVARD AVE.  
Tacoma, Washington 98466

(206) 565-8483

WRITE FOR COMPLETE  
CATALOG

ADD 3% FOR SHIPPING

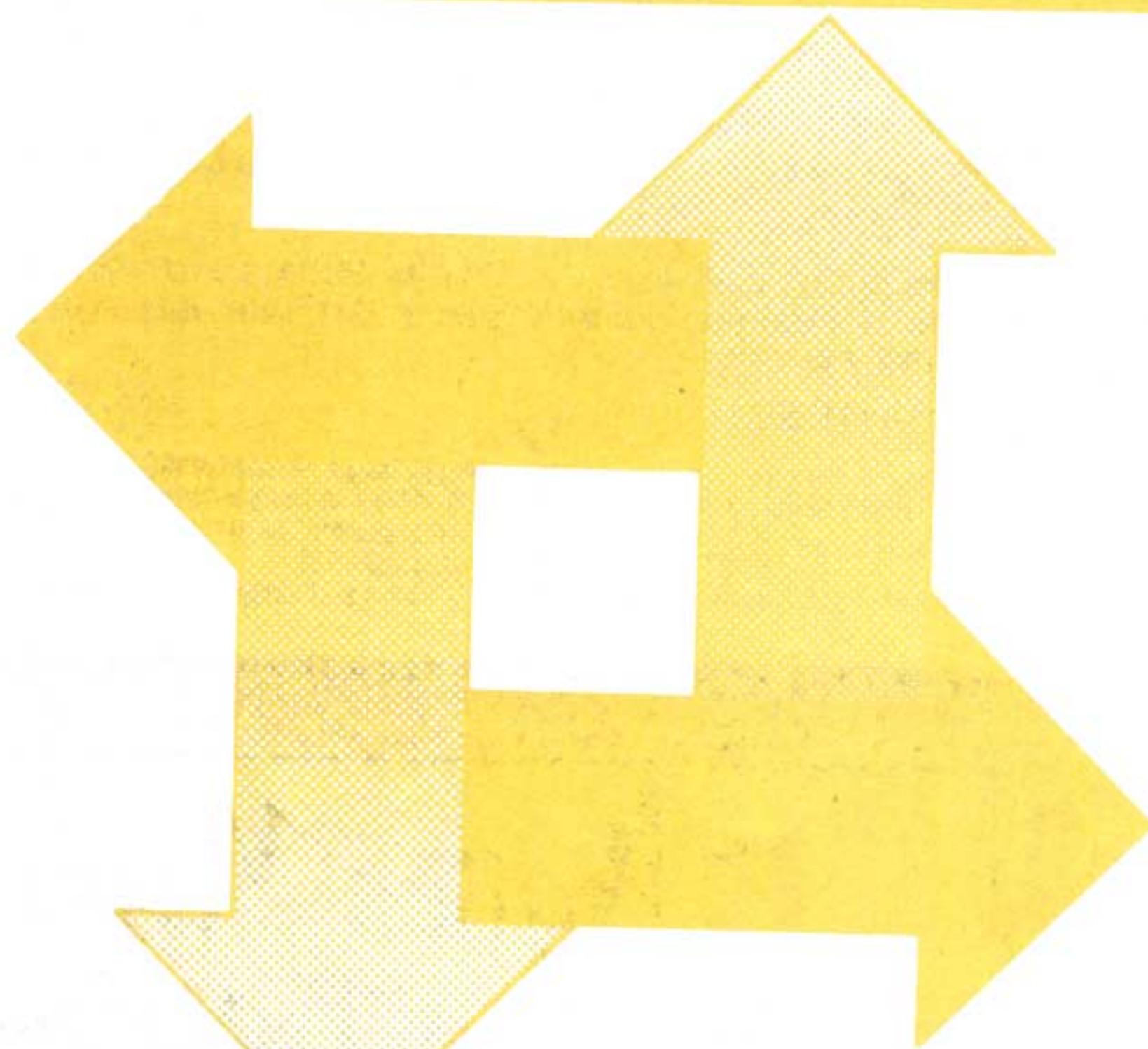
VISA OR MASTERCARD ACCEPTED



# System modification

For Model I Disk with NEWDOS version 2.1

## Modifying NEWDOS 2.1



Steven Wexler

Huntingdon Valley, Pennsylvania

The following article deals with Apparat's NEWDOS and NEWDOS+ version 2.1. These should not be confused with NEWDOS80 versions 1 and 2.

Fast typists: How often have you lost characters on your TRS-80 because of the erratic NEWDOS debounce routine? For those of you with Radio Shack's lower case modification, would you like the JKL command to work without requiring the lower case driver to be loaded? If you can answer yes to either of these questions, read on.

A word of caution: Before attempting to modify your diskette, make a backup copy.

The first modification replaces the NEWDOS debounce routine with a more sophisticated routine. The original routine traps duplicate key strokes and rejects the second if it was typed too quickly. Although this method is effective for debounce purposes, the occasional loss of a legitimate keystroke is too much. The new code avoids this problem while retaining the integrity of the JKL command.

To implement this new routine load NEWDOS's SUPERZAP utility, enter the DD mode and read track 0, sector 6. Type MOD29 and key in the following code:

```
21 36 40 01 01 38 16 00 0A 5F AE 73 A3 20 09 14
2C CB 01 F2 85 43 18 10 5F C5 01 DF 04 CD 60 00
C1 0A A3 28 03 CD FB 03 CD B5 43 F5 AF 32 B4 43
F1 C9 00 00
```

Confirm that the next byte reads 3A, double check that the new code was entered correctly, and finally press the ENTER key. The display, (before and after) is shown in Figure 1, page 125. Please note that this figure also shows the results of the next modification as well.

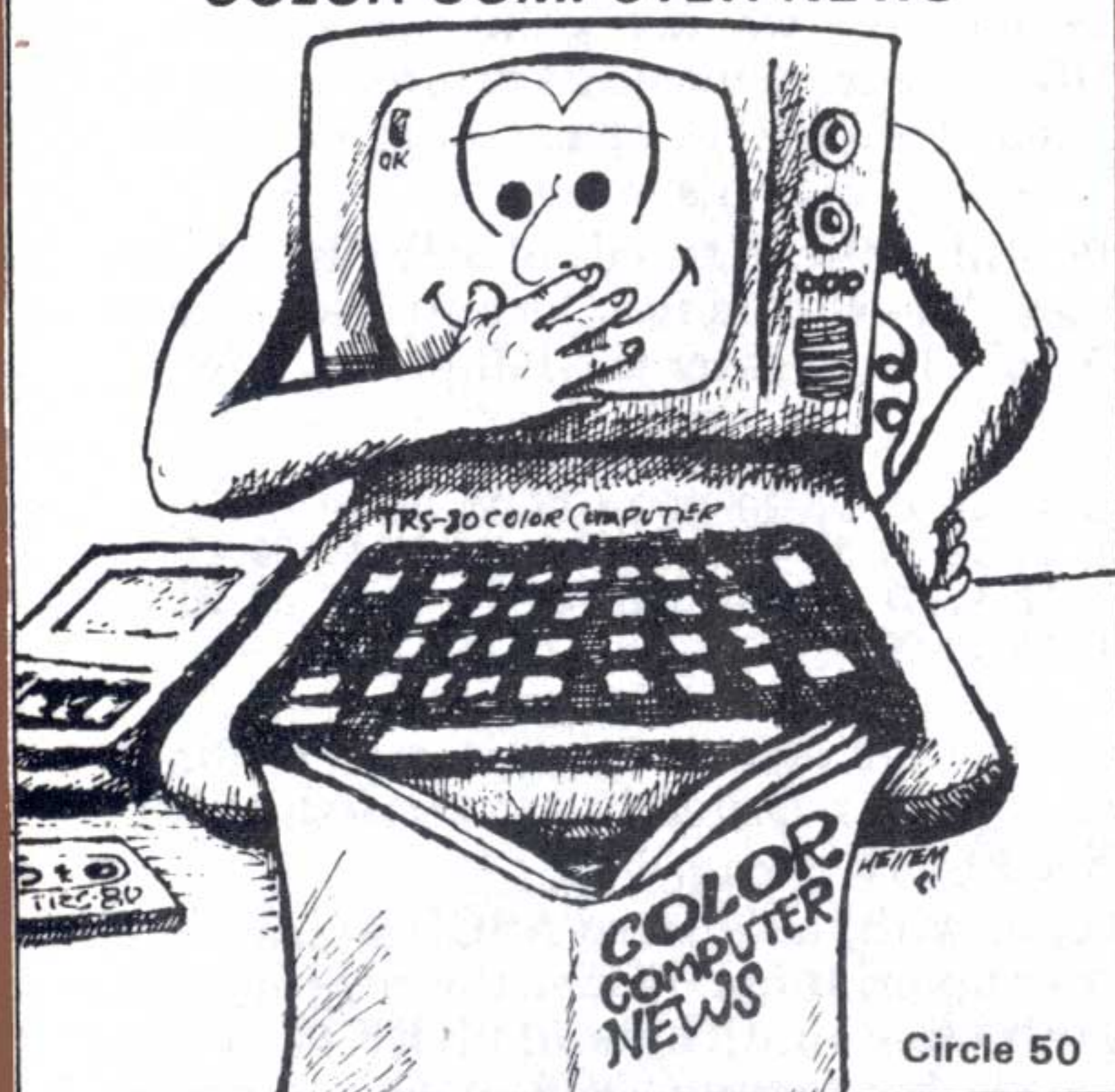
We have just inserted the TRSDOS 2.3 debounce routine, modified to work with the NEWDOS JKL command. This routine will load from address 437DH to 43B0H.

The second modification alters the JKL

**Please turn to page 120**



I didn't know that!!  
And you won't either  
unless you subscribe to  
**COLOR COMPUTER NEWS**



Circle 50

\$9.00 for a 6 issue subscription

Send to:  
**REMarkable Software**  
P O Box 1192  
Muskegon, MI 49443

## HOW ACCEL2 WORKS

TRS-80 Model I/III BASIC Compiler

ACCEL2 uses a novel translation technique that keeps code growth down and insures highest compatibility with BASIC source programs while giving huge speedups. Only a carefully chosen subset of BASIC instructions is translated. The non-compileable statements are left in the compiled program in their original source form and at run-time are actually given to the BASIC interpreter to execute. Program flow may flip into direct execution of the compiled machine instructions and then flop back to interpretation many times during execution.

Why Compilation improves performance.

\*Name Resolution. Term given to the process of identifying the value of a variable given its name. As a program runs, the interpreter builds a dictionary consisting of a chain of items, each containing a variable name, data type and current value. Every time a variable is to be resolved the interpreter must sequentially search this dictionary. By contrast, ACCEL2 builds the variable dictionary once at compile time and thereafter can refer to the variable names by direct address, with no run-time search.

\*Line Resolution. The interpreter has to take the line-number following a GOTO or GOSUB, convert it to binary, and then search the program sequentially to find the target line. At compile-time ACCEL2 generates single machine-instructions for GOTO or GOSUB using the actual address of the target line. For the interpreter, both name resolution and line resolution get slower as the program gets more complex, whereas for compiled code these two operations are independent of program size or number of variables.

\*Computational Operations. The interpreter must parse each statement every time, find the one-byte codes that correspond to the operations, look ahead to the next operator to establish the precedence rules and check for data-type mismatch and conversion. Constants must be converted from character strings to internal binary. But under ACCEL2 constants are converted and embedded right in the Z80 instruction stream, and operations are translated once and for all at compile-time into sequences of calls to ROM or the run-time component. INTEGER operations are actually turned into directly executing straight-line Z80 code!

The result is a mixture of BASIC statements and machine language instructions, usually not more than 1½-2½ times the size of the original but running much faster (can be 50-100 times as fast with some programs).

**ACCEL2:** 32K TRS-80 Model I/III. Compiles selected subset in all variable types, local and global compilation options, output save to ES/F wafer, disk under TRSDOS, NEWDOS, NEWDOS/80.

Circle 51

\$88.95 + \$2.00 shipping

Developed in Britain  
by Southern Software



ALLEN GELDER SOFTWARE  
Box 11721 Main Post Office  
San Francisco, CA 94101  
(415) 387-3131

Mastercharge/Visa  
CA add 6%

TRS-80, TRSDOS tm Radio Shack

Stringy/Floppy tm exatron inc. NEWDOS tm Apparat, Inc

## Word Processing? You need a SPELLING CHECKER

This is an example of a text being checked by HEXSPELL. The text scrolls up the screen as it is checked. When an error is detected, you have three choices.

1) REPLACE the incorrect word. The replacement word is INSTANTLY RE-CHECKED for correctness, then inserted in the text.

2) The word is correct, leave it as it is.

3) Leave the word as it is, AND tell HEXSPELL to LEARN this word for future reference, with just one keystroke.

Your document is ready to print as soon as HEXSPELL is finished. The word in error e.g. \*

WORD IN ERROR: mistake

CONTINUATION: is shown in context, including continuation

PRESS: R) REPLACE WORD S) LEAVE AS IS L) LEARN WORD

# HEXSPELL

sneaky  
zaps those sneaky typos

HEXSPELL shows you the errors right where it finds them, then instantly checks your corrections to make sure they ARE correct! When HEXSPELL is finished the corrected document is ready for printing. HEXSPELL comes with a 20,000 word list, with room for 8000 more! Just one keystroke teaches HEXSPELL a new word. You can even clear the memory and teach HEXSPELL a complete new language.

Programs, wordlist & manual \$69us. Manual only \$12.

Requires 48K TRS-80 Mod I with 2 Drive & TRSDOS. Tested against Scripsit & Electric Pencil, should work with most word processors.

TRS-80, Scripsit are trademarks of Tandy Corp. Electric Pencil is a trademark of Michael Shrayder Software.

Circle 52

**HEXAGON  
SYSTEMS**

P.O. Box 397, Station A  
Vancouver, B.C. Canada V6C 2N2  
Telephone (604) 682-7646

At last!  
**MOD III**  
Tape Assembler

# Byte Miser Software

Circle 53

ALL PROGRAMS FOR **MODEL I** and **MODEL III** TRS-80's  
ALL PROGRAMS BY JAMES F. WILLIAMS

**ASPTCH 3.2-->** Loads behind Radio Shack's EDITOR/ASSEMBLER 1.2 and adds many features while taking only a few hundred bytes from the original text buffer. Reserve memory, dump object code directly to memory and execute, return to BASIC with EDTASM/ASPTCH and source code protected in high memory, verify source dumps, combine EDTASM/ASPTCH for single load, and much more. Selectable baud rate for Model III and complete compatibility with Model I files. For Model I or Model III (please specify) 16K and up. Only \$17.

**DATORG-->** Unique file keeping system designed especially for Model I and Model III tape users (Model I Stringy Floppy and Disk versions also available). Use for Indexing (magazines, records, coins, etc.), budget-checkbook, mailing list, and almost anything else you can think of. Extremely memory efficient with variable length fields and user definable delimiters (including space compression codes and special tab characters for left justified fields). Control program is in BASIC for easy user modification, and machine language module for high speed sort (48K in less than 1 minute), search (with "wild card" characters), write, read, verify, and merge. Selectable baud rate for Model III and complete compatibility with Model I files. Model I and Model III (please specify) 16K and up and Stringy Floppy ->\$25. Model I Disk version on tape (32K and 48K)->\$25.

**ORGAN-->** Play your TRS 80 keyboard in real time as if it were a 2 manual, 3 1/3 octave, fully chromatic, electronic organ. Play single note melodies or chords. Listen in real time by connecting aux cable to amp. One version for Model I or Model III 4K and up tape-> \$12, or 32K Model I or Model III Disk version on tape->\$15.

**CPYALL-->** Make back-up copies of almost any L2 format tape (BASIC, SYSTEM, EDTASM source, data, and many programs with special loaders). Specify Model I or Model III (with selectable baud rate), 4K and up. A mere \$7.

Send check or money order to Byte Miser Software, 728 West Haven Boulevard, Rocky Mount, NC 27801.



command so that it will interpret ASCII control codes as uppercase codes. Graphic codes are printed as a pound sign (#) rather than as a period.

Again, use SUPERZAP DD mode to read track 0, sector 6, type MOD80 and key in:

23 CD EF 44

Verify that the next byte is 18, double check the new code and press the ENTER key.

The first byte (23) is ASCII code for the pound sign (#), it replaces the ASCII code for a period. The next three bytes (CD EF 44) call a subroutine that we will insert at 44EFH. This call replaces one to the printer output routine. We do this because the new routine exits to the printer output routine.

Now use SUPERZAP to read track 1, sector 6, type MODCA and key in:

81

The next byte should contain FE. If it does, press the ENTER key.

We have just altered a DOS loader code

instructing it to load 13 less bytes than normal. We do this because we are going to shorten the NEWDOS power up message printed at the top of the screen. This makes space on the diskette for the JKL modification subroutine.

While still in the DD mode of SUPERZAP, press the + key. You should now be at track 1, sector 7. Type MOD24 and enter the following code:

```
20 43 4F 4F 4B 2C 20 31 39 37 38 2E 20 20 41
4C 54 45 52 41 54 49 4F 4E 53 20 42 59 20 41 50
50 41 52 41 54 2E 0D 03 01 0B EF 44 FE 20 30 02
C6 40 C3 3B 00
```

The next byte should read 02. Confirm that the code was typed in correctly and press the ENTER key. (See Figure 2, page 126)

To begin with, we altered ASCII codes used for the power up print out. Notice the code beginning on the third line, ninth byte (01 0B EF 44). This is a loader code instructing DOS to load the next 9 bytes into memory starting at location 44EFH. The first byte (01) tells the DOS to load the object code to follow. The second byte (0B) tells the DOS the number of bytes to load minus 2 which, in this case, is 9 bytes (0B = 11 minus 2 = 9). The third and fourth bytes (EF 44) represent the memory

### ADVENTURES!!!

For TRS-80 and COLOR-80. These Adventures are written in BASIC, are full featured, fast action, full plotted adventures that take 30-50 hours to play. (Adventures are interactive fantasies. It's like reading a book except that you are the main character as you give the computer commands like "Look in the Coffin" and "Light the torch.")

Adventures require 16K. They sell for \$14.95 each.

**ESCAPE FROM MARS** (by Rodger Olsen)

This ADVENTURE takes place on the RED PLANET. You'll have to explore a Martian city and deal with possibly hostile aliens to survive this one. A good first adventure.

**PYRAMID** (by Rodger Olsen)

This is our most challenging ADVENTURE. It is a treasure hunt in a pyramid full of problems. Exciting and tough!

**TREK ADVENTURE** (by Bob Retelle)

This one takes place aboard a familiar starship. The crew has left for good reasons - but they forgot to take you, and now you are in deep trouble.

**DEATH SHIP** (by Rodger Olsen)

Our first and original ADVENTURE, this one takes place aboard a cruise ship - but it ain't the Love Boat.

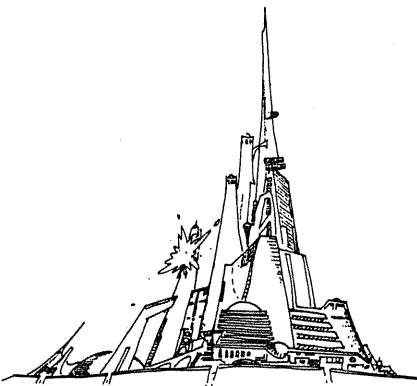
**VAMPIRE CASTLE** (by Mike Bassman)

This is a contest between you and old Drac - and it's getting a little dark outside. \$14.95 each.

### QUEST

**QUEST - A NEW IDEA IN ADVENTURE GAMES!** Different from all the others. Quest is played on a computer generated map of Alesia. Your job is to gather men and supplies by combat, bargaining, exploration of ruins and temples and outright banditry. When your force is strong enough, you attack the Citadel of Moorlock in a life or death battle to the finish. Playable in 2 to 5 hours, this one is different every time.

16K COLOR-80 OR TRS-80 ONLY. \$14.95



### ARCADE AND THINKING GAMES

16K and extended or level II BASIC

**TIME TREK, REAL TIME REAL GRAPHICS TREK.** See the torpedoes fly and Klingons explode. No more scrolling displays, no more turn taking. - This one has real time and real displays. In BASIC - for 16K level II or extended color BASIC. \$14.95.

**STARFIGHTER** - This one man space war game pits you against spacecruisers, battlewagons, and one man fighters. You have the view from your cockpit window, a working instrument panel, and your wits. Another real time goody. \$9.95.

**BATTLEFLEET** - This grown-up version of Battleship is the toughest thinking game available on 80 computers. There is no luck involved as you seek out the 80's hidden fleet. This is a topographical toughie. \$9.95.

**SLASHBALL** - A two player game of strategy and skill, this is like nothing you have ever seen before. This takes fast fingers, quick wits and concentration. Playable from age 6 to 65, it is a good family game. \$9.95.

**MINOS** - 8K - Features amazing 3D graphics. You see a maze from the top, the screen blanks, and when it clears, you are in the maze at ground level finding your way through on foot. Realistic enough to cause claustrophobia. \$12.95. (COLOR-80 ONLY)

Please specify system on all orders

This is only a partial listing of what we have to offer. Send for free catalog to:

**AARDVARK - 80**

**2352 S. Commerce, Walled Lake, MI 48088**

**(313) 669-3110**

**TRS-80**

**COLOR-80**

Circle 54



address (44EFH) used to locate the starting address where the next 9 bytes will be stored.

The 9-byte subroutine will change ASCII control codes to upper case codes. The ROM video driver loads control codes into video memory. An unmodified TRS-80 changes the control codes to

upper case via hardware. This is not the case when a lower case modification is installed. That's why machines with lower case modifications require a new video driver for proper operation. This is also the reason we have added our subroutine to the NEWDOS JKL code. ■

```

00100 ;          *** LISTING 1 ***
00110 ;
00120 ;
00130 ;SUBROUTINE TO DEBOUNCE KEYBOARD
00140 ;WHILE RETAINING THE INTEGRITY
00150 ;OF THE JKL COMMAND
00160 ;
0060 00170 DELAY EQU 0060H ;DELAY LOOP IN 14.66
00180 ;MICROSECOND INCREMENTS
43B4 00190 GATE EQU 43B4H ;IF GATE=C9H AN INTERRUPT
00200 ;CAN'T BE USED TO CALL JKLSCN
00210 ;IF GATE=00H JKLSCN CAN BE
00220 ;ACCESSED VIA INTERRUPT
43B5 00230 JKLSCN EQU 43B5H ;SUBROUTINE THAT PRINTS
00240 ;SCREEN IF JKL IS PRESSED
3801 00250 KEYBRD EQU 3801H ;FIRST ADDRESS OF
00260 ;THE KEYBOARD MATRIX
00270 ;EACH BIT OF MATRIX
00280 ;(3801H, 3802H, 3804H,
00290 ;3808H, 3810H, 3820H,
00300 ;3840H) IS TIED TO A KEY
00310 ;1=DEPRESSED 0=NOT DEPRESSED
03FB 00320 KEYROM EQU 03FBH ;ENTRY POINT FOR RETURN

```

**Upgrade Your TRS-80\***

# 16K RAM

**NEC 4116 - 200 NS**

## 8 for \$17<sup>50</sup>

**Order Toll Free**

**800-538-5000 800-662-6233 (CAL.)**

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



**New Location**

**JDR MICRODEVICES, INC.**

1224 So. Bascom Ave.  
San Jose, CA 95128  
800-538-5000 • 800-662-6233 (Calif.)  
408-247-4852

TERMS For shipping include \$2.00 for UPS Ground, \$3.00 for UPS Blue Label Air. \$10.00 minimum order. Bay Area Residents add 6 1/2% sales tax. California Residents add 6% sales tax. We reserve the right to limit quantities and substitute manufacturer. Prices subject to change without notice. Send SASE for complete list.



```

4036      00330      ;TO THE ROM KEYBOARD ROUTINE
          00340 STATUS EQU 4036H ;FIRST BYTE OF KEYBOARD STATUS
          00350      ;ARRAY - THE ARRAY IS A MEMORY
          00360      ;MAP OF STATUS OF EACH KEY AS
          00370      ;OF THE LAST KEYBOARD SCAN
          00380 ;
          00390 ;NOTE: THE FIRST TWO LINES OF CODE (440, 450) ARE NOT
          00400 ;SUPERZAPPED ONTO THE DISKETTE SINCE THE NEWDOS DEBOUNCE
          00410 ;ROUTINE ALREADY CONTAINS THEM
          00420 ;
          00430      ORG 4378H
          00440      LD HL,GATE ;DISABLE JKLSCN ACCESS
          00450      LD (HL),0C9H ;VIA INTERRUPT
          00460 ;
          00470 ;THE FOLLOWING CODE SCANS THE KEYBOARD, UPDATING THE
          00480 ;KEYBOARD STATUS ARRAY. IF NO NEW KEY DEPRESSION IS
          00490 ;DETECTED, THE JKL KEYS ARE CHECKED, AND THE SUBROUTINE
          00500 ;EXITS WITH REG. A SET TO 0.
          00510 ;
437D 213640 00520      LD HL,STATUS ;KEYBOARD STATUS ARRAY
4380 010138 00530      LD BC,KEYBRD ;FIRST KEYBOARD ADDRESS
4383 1600 00540      LD D,00H ;KEYBOARD ROW COUNTER
4385 0A 00550 SCAN LD A,(BC) ;A=STATUS OF 8 KEYS
4386 5F 00560      LD E,A
4387 AE 00570      XOR (HL)
4388 73 00580      LD (HL),E ;UPDATE STATUS ARRAY
4389 A3 00590      AND E ;A<>0 IF NEW DEPRESSION
438A 2009 00600      JR NZ,DEBNCE ;JUMP IF NEW KEY DETECTED
438C 14 00610      INC D ;UPDATE ROW COUNTER
  
```

## ComputerVille

SHOP BY PHONE  
IMMEDIATE DELIVERY  
Toll Free 800-258-1551  
IN NEW HAMPSHIRE CALL COLLECT 880-1980



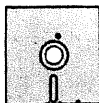
NAME BRANDS  
FEATURING  
**MEMOREX**

### Diskettes

TESTED - CERTIFIED - GUARANTEED

**\$2<sup>29</sup>**  
from each

BOX OF TEN



#### FULLY COMPATIBLE

- APPLE
- TRS80
- PET
- ALL OTHER 5 1/4 AND 8" DRIVES

©1981 Computer Products Unlimited, Inc.

VOLUME DISCOUNTS

NO SALES TAX



VISA

**C.O.D.**  
WE SHIP ANYWHERE

### Ribbons



BRAND NEW  
TOP QUALITY  
FABRIC/MYLAR  
COMPATIBLE WITH HUNDREDS OF PRINTERS.

CALL FOR PRICES

### Paper

ALL SIZES,  
COLORS,  
WEIGHTS  
MULTI-PART  
CARBON OR CARBONLESS

SHIPPED DIRECT FROM OUR  
NATIONWIDE WAREHOUSES

TEST  
OUR  
UNCONDITIONAL  
GUARANTEE

LIMITED TIME OFFER

**1 DISKETTE  
FREE!**

WITH INITIAL 2-BOX MINIMUM ORDER

CALL FOR DETAILS

FREE DISKETTE

IS YOURS  
TO KEEP  
EVEN IF YOU  
RETURN THE  
2 BOXES!



```

438D 2C      00620      INC      L      ;UPDATE STATUS ARRAY PTR
438E CB01    00630      RLC      C      ;UPDATE KEY ADDRESS PTR
4390 F28543  00640      JP       P,SCAN ;IF MORE KEYS THEN LOOP
4393 1810    00650      JR       EXIT
              00660      ;
              00670      ;
              00680      ;THE FOLLOWING CODE CHECKS FOR DEBOUNCE. IF NO BOUNCE
00690      ;IS DETECTED THEN CALL BACK TO ROM IS MADE TO CONVERT
00700      ;INFORMATION IN REG. E (KEY MATRIX COLUMN POINTER)
00710      ;AND REG. D (ROW POINTER) TO ASCII CODE.
              00720      ;
4395 5F      00730  DEBNCE LD      E,A      ;SAVE MATRIX COLUMN PTR
4396 C5      00740      PUSH     BC
4397 01DF04  00750      LD       BC,04DFH ;SET DELAY DURATION
439A CD6000  00760      CALL     DELAY ;WAIT FOR KEY TO SETTLE
439D C1      00770      POP      BC
439E 0A      00780      LD       A,(BC) ;CHECK FOR DEPRESSION
439F A3      00790      AND      E      ;A<>0 IF KEY STILL DOWN
43A0 2803    00800      JR       Z,EXIT ;IF BOUNCE JUMP
43A2 CDFB03  00810      CALL     KEYROM ;SET REG. A TO ASCII CODE
              00820      ;
              00830      ;THE FOLLOWING CODE CHECKS FOR JKL DEPRESSION, ENABLES
00840      ;JKL VIA INTERRUPT, AND EXITS SUBROUTINE.
              00850      ;
43A5 CDB543  00860  EXIT   CALL     JKLSCN ;IF JKL DOWN PRINT SCREEN
43A8 F5      00870      PUSH     AF
43A9 AF      00880      XOR      A      ;REG. A=00H
43AA 32B443  00890      LD       (GATE),A ;ENABLE JKL INTERRUPT
43AD F1      00900      POP      AF
43AE C9      00910      RET
43AF 00      00920      NOP

```

## TWO USER MULTI-TASKING

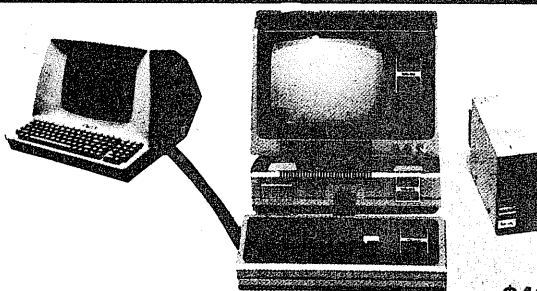
\$89

T SHARE VI.3  
A SPLIT PERSONALITY FOR YOUR  
TRS - 80 MODEL I

- Interrupt driven executive patches to parent operating system NEWDOS 2.1 or TRSDOS 2.3.
- Allows two active users to share a single TRS-80.
- Execute BASIC or MACHINE LANGUAGE (above 7700 Hex).
- Joint access of disk files.
- Second user ties to HOST via modem, terminal, or 2nd TRS-80.
- Options for Expansion Interface, RS-232, TRS232, or HUH interface.
- SIMPLEX MODE for non serial-port users. Requires only a printer to act as second "screen". Jobs share the keyboard under user control.
- CONFIGURE UTILITY partitions memory usage and selects I/O.

TRS-80 tm Radio Shack/Tandy Corp.  
NEWDOS tm Apparat, Inc.  
TRS232 tm Small System Software  
HUH tm California Computer Systems.

TO ORDER



DBM 5

\$49

### MULTI - FEATURE DATA MANAGER

- Up to 20 user defined fields.
- Files extend across multiple diskettes.
- Supports up to four drives.
- Automatic single drive disk mount requests.
- Four data types and computational fields.
- Flexible REPORT GENERATOR.
- Fast assembly language sorts.
- MULTI-FIELD sorts and searches.
- Keyed access on any sorted field.
- Indexed relations between files.

## ComSoft

203 ARDEN STREET  
GLENDALE, CA 91203  
(213) 649-0369

Circle 56



## System modification

```
43B0 00      00930      NOP
0000      00940      END
00000 TOTAL ERRORS
```

```
DEBNCE 4395 00730      00600      JKLSCN 43B5 00230      00860
DELAY  0060 00170      00760      KEYBRD 3801 00250      00530
EXIT   43A5 00860      00650 00800      KEYROM 03FB 00320      00810
GATE   43B4 00190      00440 00890      SCAN   4385 00550      00640
                                           STATUS 4036 00340      00520
```

```
00100 ;      *** LISTING 2 ***
```

```
00110 ;
```

```
00120 ;
```

```
00130 ;SUBROUTINE TO CHANGE ASCII CONTROL
```

```
00140 ;CODES TO ASCII UPPER CASE CODES
```

```
00150 ;
```

```
003B      00160 PTROUT EQU      3BH
```

```
44EF      00170      ORG      44EFH
```

```
44EF FE20 00180 JKLFIX CP      20H
```

```
44F1 3002 00190      JR      NC,LPOUT
```

```
44F3 C640 00200      ADD      A,40H
```

```
44F5 C33B00 00210 LPOUT JP      PTROUT
```

```
00220
```

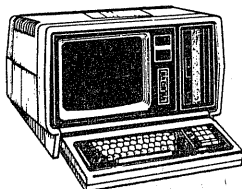
```
0000      00230      END
```

```
00000 TOTAL ERRORS
```

```
;IF NOT ASCII CONTORL
;CODE THEN DO NOT ALTER
;CONVERT TO UPPER CASE
;OUTPUT REG. A TO LINE
;PRINTER
```

```
JKLFIX 44EF 00180
LPOUT  44F5 00210      00190
PTROUT 003B 00160      00210
```

MODEL II



26-4002  
64K 1 Drive  
\$3399.00

We carry the full line of  
TRS-80 Computers. All  
sold at Discount Prices.

**DISCOUNT**  
**TRS-80®** **BUY DIRECT**  
**COMPUTER SPECIALISTS**

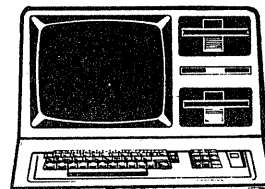
**CALL US...**

WRITE US FOR A  
**FREE CATALOG**

**SAVE MONEY**

**1-800-841-0860** Toll Free Order Entry

MODEL III



26-1061 4K I.....\$609.00  
26-1062 16K III.....849.00  
26-1066 48K III  
W/2 Drives, RS232.....2149.00

**MICRO MANAGEMENT SYSTEMS, INC.**

No Taxes on Out Of  
State Shipments

Immediate Shipment  
From Stock on Most Items

DOWNTOWN PLAZA SHOPPING CENTER

DEPT. # 5

115 C. SECOND AVE. S.W.

CAIRO, GEORGIA 31728

(912) 377-7120 Ga. Phone No. & Export

TRS-80 is a registered trademark of the Tandy Corp.

Circle 57

A copy of the manufacturer's war-  
ranty can be obtained free upon  
specific written request to the  
Electronic's Department of our  
Cairo, Georgia Retail Store.



Figure 1

000600	01A6	5843	B7FA	0000	C300	00DD	CB01	EEC3	..XC.....
000610	2348	CD0E	48C0	DD7E	OADD	350A	B720	03DD	#H..H.....5....
000620	350B	AFC9	21B4	4336	C9E5	2136	4001	0138	5...!.C6...!6a..8
000630	16Q0	0A5F	AE73	A320	0914	2CCB	01F2	8643	.....,....C
000640	180A	C5F5	CDFA	03CD	B543	D1C1	E136	00B7	.....C...6..
000650	C8FE	0032	A643	C05F	OAA2	C87B	C93A	4038	...2.C.....:a8
000660	0067	3A02	38FE	1C7C	C0D5	2100	3C7D	E63F	...:8.....!<..?
000670	3E0D	CC3B	007E	CB74	2320	0BFE	8038	023E	>..;....#.....8.>
000680	2ECD	3B00	18E7	D1AF	C97D	C616	CB66	C078	..;.....
000690	FE06	3E58	C209	4476	F57C	D644	C2F9	487D	..>X..D....D..H.
0006A0	D6A0	20F8	C1F6	1DC9	0105	0044	3E93	EF01	.....D>...
0006B0	0505	443E	B3EF	0105	0944	C3B0	4401	140D	..D>.....D...D...
0006C0	44C3	B444	C396	45C3	9345	C3A5	45C3	8E45	D..D..E..E..E..E
0006D0	3EC3	EF01	0520	443E	A4EF	0105	2444	3E94	>.....D>.....\$D>.
0006E0	EF01	0528	443E	95EF	0105	2C44	3EA5	EF01	... (D>.....,D>...
0006F0	3830	44C3	164C	C306	4CC3	6D47	C38B	47C3	80D..L..L..G..G.

# Auto-dial/Auto-answer FOR \$224.95!

*The Microconnection™ can dial the phone and answer it too, transcribe transmissions decode busses, run printers, receive/send radio transmissions, answer/originate, and direct-connect to the phone system. Lots of terminal and host software for cassette and disk too. That's why it's a modem —and much more.*



Regular MICROCONNECTION™ prices start at \$199.50.



**the microp peripheral corporation**

Circle 58

To order your MICROCONNECTION, or for more information, write or phone: 2643 151st Pl. N.E., Redmond, WA 98052 (206) 881-7544



## System modifications

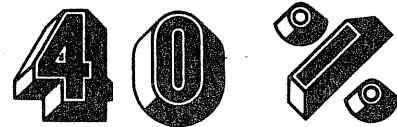
Figure 2

001700	2046	4F52	4D41	5429	204F	5249	4749	4E41	.FORMAT).ORIGINA
001710	4C4C	5920	434F	5059	5249	4748	5445	440D	LLY.COPYRIGHTED.
001720	4259	2052	414E	444F	4C50	4820	482E	2043	BY.RANDOLPH.H..C
001730	4F4F	4B2C	2031	3937	382E	2020	414C	5445	OOK,.1978...ALTE
001740	5241	5449	4F4E	5320	4152	4520	4259	2041	RATIONS.ARE.BY.A
001750	5050	4152	4154	2E0D	0302	0200	4E5B	40CB	PPARAT.....N.a.
001760	FE11	F745	ED53	5940	CBF6	3E01	320F	4311	...E.SY@..>.2.C.
001770	AF45	3E07	CD10	4421	ED4E	7E00	00CD	3300	.E>...D!.N....3.
001780	23FE	0320	F5CD	2B00	FE0D	CA00	440E	0016	#.....+.....D...
001790	111E	0021	0042	CD35	4BC2	0944	3AE0	42FE	...!.B.5K..D:.B.
0017A0	0DCA	0044	21E0	4211	1843	0120	00ED	B021	...D!.B..C.....!
0017B0	1843	CD67	44C3	0544	4E45	5744	4F53	202D	.C..D..DNEWDOS.-
0017C0	2044	4953	4B20	4F50	4501	8EFE	4E52	4154	.DISK.OPE...NRAT
0017D0	494E	4720	5359	5354	454D	202D	2056	4552	ING.SYSTEM.-.VER
0017E0	2032	2E31	0D0D	5448	4953	2044	4F53	2028	.2.1..THIS.DOS.(
0017F0	424F	4F54	2C20	5359	5330	2D53	5953	362C	BOOT,.SYS0-SYS6,

001700	2046	4F52	4D41	5429	204F	5249	4749	4E41	.FORMAT).ORIGINA
001710	4C4C	5920	434F	5059	5249	4748	5445	440D	LLY.COPYRIGHTED.
001720	4259	2052	2E20	434F	4F4B	2C20	3139	3738	BY.R..COOK,.1978
001730	2E20	2041	4C54	4552	4154	494F	4E53	2042	...ALTERATIONS.B
001740	5920	4150	5041	5241	542E	0D03	010B	EF44	Y.APPARAT.....D
001750	FE20	3002	C640	C33B	0002	0200	4E5B	40CB	..0..a.;....N.a.
001760	FE11	F745	ED53	5940	CBF6	3E01	320F	4311	...E.SY@..>.2.C.
001770	AF45	3E07	CD10	4421	ED4E	7E00	00CD	3300	.E>...D!.N....3.
001780	23FE	0320	F5CD	2B00	FE0D	CA00	440E	0016	#.....+.....D...
001790	111E	0021	0042	CD35	4BC2	0944	3AE0	42FE	...!.B.5K..D:.B.
0017A0	0DCA	0044	21E0	4211	1843	0120	00ED	B021	...D!.B..C.....!
0017B0	1843	CD67	44C3	0544	4E45	5744	4F53	202D	.C..D..DNEWDOS.-
0017C0	2044	4953	4B20	4F50	4501	8EFE	4E52	4154	.DISK.OPE...NRAT
0017D0	494E	4720	5359	5354	454D	202D	2056	4552	ING.SYSTEM.-.VER
0017E0	2032	2E31	0D0D	5448	4953	2044	4F53	2028	.2.1..THIS.DOS.(
0017F0	424F	4F54	2C20	5359	5330	2D53	5953	362C	BOOT,.SYS0-SYS6,

# SAVE!



Off cover price of **THE BLUE BOOK**

Wonderful! Sign me up for the special subscription rate marked below. My payment is enclosed.

[Foreign subscribers add 50 cents per issue.]

- ☐ 6 issues for \$8.95  
☐ 12 issues for \$16.95

Name .....  
 Street ..... Zip .....  
 Town ..... State .....

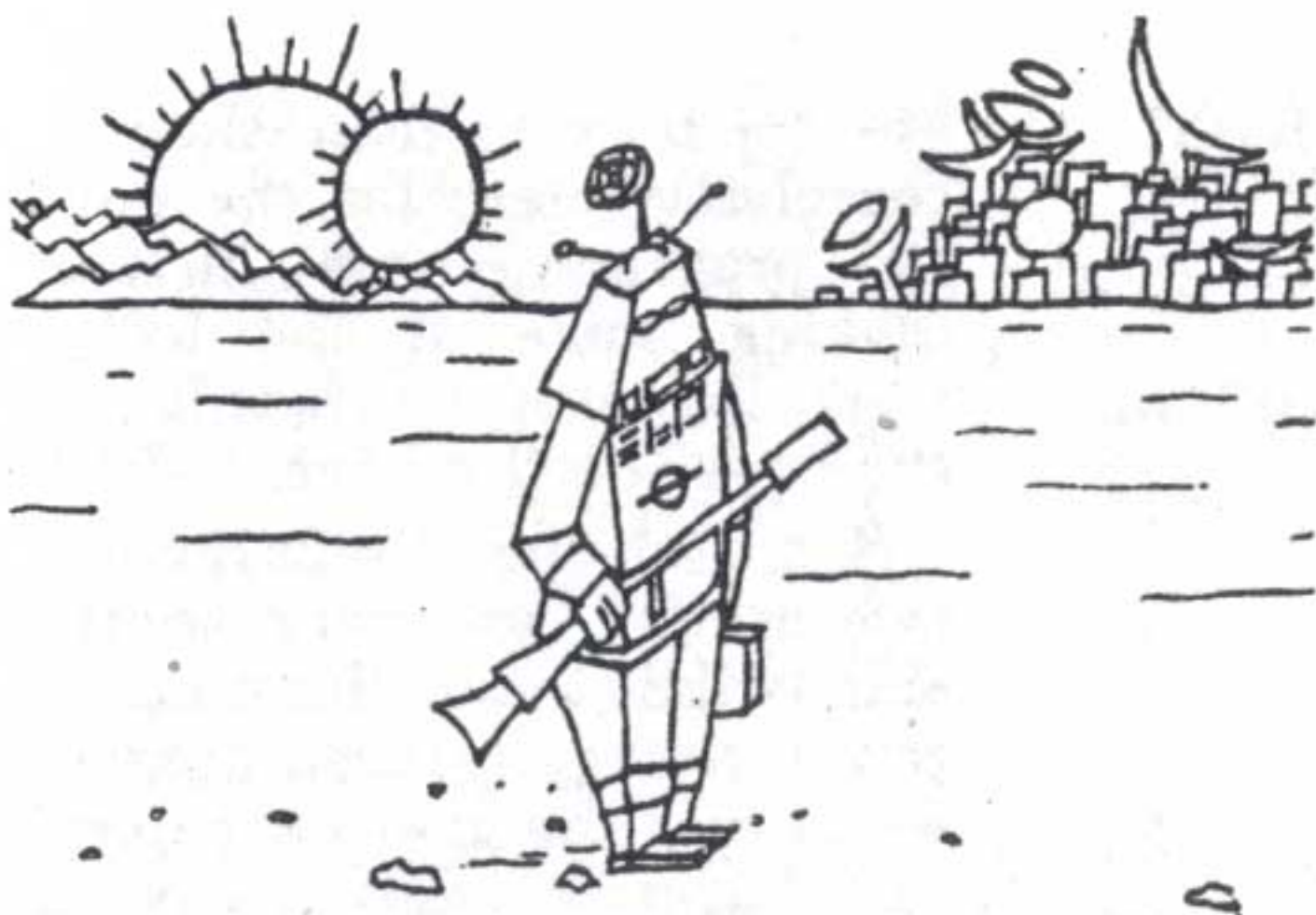
Send to: **THE BLUE BOOK**

**1510 So. 97th Tacoma, Wa. 98444**

Are you tired of trying to read computer magazines full of sophisticated computereze? Are you a beginner in the new field of microcomputers having need of information explained in plain English? If you answered yes to either of these questions then you need **THE BLUE BOOK**. **THE BLUE BOOK** magazine is written by educators specifically for the beginner and is loaded with articles pertaining to the use of the microcomputer in business and education. Each issue includes numerous ready-to-type, do something programs that are as functional as they are educational. You won't want to miss a single issue so take advantage of our special coupon offer **TODAY!** One program alone, is worth the subscription rate



# CYBORG WARS



UP TO 4 PLAYERS COMPETE WITH EACH OTHER AND/OR COMPUTER TO ACHIEVE WORLD PEACE. BALANCE OF POWER FLUCTUATES AS PLAYERS DEVELOP RESOURCES, USE ESPIONAGE, EXPLOIT ALLIES, UTILISE MILITARY POTENTIAL.

TAPE CASSETTE FOR TRS-80 16K LEVEL II MODEL I

\$15

**STRATAGEM CYBERNETICS**  
286 Corbin Pl., B'klyn, N.Y. 11235

## AT LAST!

Mass production prices for high quality software. Buy direct and save 50%. Also available for CPM and HDOS.

### DATA BASE MANAGER

Mod I & III \$69, \$149 (48K). Mod-II \$199  
Maintain a data base and produce reports, all without user programming. Define file parameters and report formats on-line. Key random access, fast multi-key sort, field arithmetics, audit log, label. No time-consuming overlays. 500 happy users in one year. Mod-II and 48K versions have over 50 enhancements, including 40 fields maximum. "IDM-M2 is great!" - 80-US.

### A/R

Mod-I \$69 Mod-II \$149 Mod-III \$69  
Handles invoices, statements, aging, sales analysis, credit checking, forms input, and order entry. Unlike other accounts receivable programs, ours can be used by doctors, store managers, etc.

### WORD PROCESSOR

Centers, justifies, indents, and numbers pages. Mod-I version features upper/lower case without hardware modification! File merge option available.

### MAILING LIST

Mod I & III \$59, \$79 (48K). Mod-II \$99  
The best! Compare and be selective. Includes forms input, 5-digit selection code, zip code extension, sort on any field, and multiple labels. Who else offers a report writer and merges with word processor?

### INVENTORY

Mod I & III \$89, \$109 (48K) Mod-II \$149  
Fast key random access. Reports include order info, performance summary, EOQ and user-specified reports. Many people have converted to our system! "Next to impossible to damage the file."

### GL, A/R, A/P, PAYROLL

Mod-II \$129 each  
Integrated accounting package. 100+ page manual. As opposed to Osborne's slow binary search and 64 column screen, we use fast ISAM and 80 columns. Dual disk and TRSDOS required.

### L216

\$59  
A cassette package of 10 business programs for Level II 16 K systems. Includes word processor and data base manager. Poker game \$19.

Most programs are on-line, interactive, random-access, bug-free, documented, and delivered on disks. Mod-I programs require 32K TRSDOS. We're #1 in business software—don't let our low price fool you! Ask for our free 20-page catalog if you're still not convinced. Compiled versions are available.

Circle 60



**MICRO ARCHITECT, INC.**  
96 Dothan St., Arlington, MA 02174

## ELECTRIC SPREADSHEET™

### NEW - For Personal or Business Use

ELECTRIC SPREADSHEET does everything you can do with a pencil, paper and calculator. Start with a blank screen. Move the fast cursor to desired location. Enter line or column labels or data. Select preprogrammed operators for line, column, or cell calculations. Run. Results appear on the screen, formatted for your printer. Revise. Run again.

PREPROGRAMMED OPERATORS for mathematics, finance, and statistics. Save data on tape or disk. The screen is your window to a larger spreadsheet. Output features scrolling and split-screen. Variable formats for labels and data.

UNLIMITED APPLICATIONS. P/L forecast. Personal budget. Real estate investment. Net worth forecast. Invoice. Cash flow estimate. Sales analysis. Check record. Business forms.

16K version has 50 operators. 32/48K version has 70 operators plus histogram plot, remote storage of data, global revise spreadsheet layout, alpha entries, and more.

16K Model I or III Tape ..... \$34.95  
32/48K Model I or III Tape ..... \$64.95  
48K Model I or III Disk (Specify Model) ..... \$67.95

YOU CAN'T LOSE! Calif. orders add 6½% tax.

Circle 61

**Dan G. Haney & Associates, Inc.**  
P.O. Box 687, San Mateo, CA 94401  
(415) 493-4094

## GOSUB

### GOSUB'S MX80/70 FRICTION FEED KIT ONLY \$49.95 ppd

The Gosub MX80/70 Friction Feed Kit for the Epson MX80 printer will give you complete paper control. You get easy to follow instructions and all parts necessary to give your Epson friction feed capabilities. No drilling and it installs in about 15 minutes. Money back guarantee if not satisfied.

#### PLUS:

- USE SINGLE SHEET PAPER
- USE INEXPENSIVE ROLL PAPER
- USE YOUR OWN LETTER HEAD
- FREE PAPER ROLL RACK INCLUDED WITH KIT
- DOES NOT AFFECT PIN-FEED USE

PRINTERS: EPSON MX80. \$515 ppd MX100..\$850

### STRATEGY SIMULATIONS FOR THE TRS-80

#### MERCENARY FORCE

Command a mercenary army. Decide the number of men, type of weapons, armor, air support, medical aid and transports. Battle the enemy in jungles, underwater, on moons and in space. (1-4 players)

TRS-80 L2 16K.....\$16.95

#### SPACE MERCHANT

Build an Empire in the stars. Choose your cargo, means of shipping, and security. Risk pirates, ion storms, engine failure and other hazards while you try to become a Space Merchant. (1-6 players)

TRS-80 L2/16K.....\$9.95

KANSAS RES. ADD 3% SALES TAX.

(TRS-80 IS A TRADEMARK OF TANDY CORP.)

ALL PRICES SUBJECT TO CHANGE WITHOUT NOTICE.

FREE CATALOG UPON REQUEST.

SEND CHECK OR MONEY ORDER TO:

Circle 62

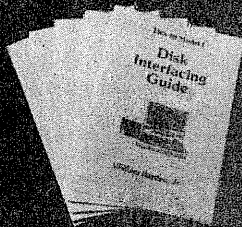


**GOSUB**  
P.O. BOX 275

(316)265-9992  
WICHITA, KS 67201



# MOD I



## TRS-80 MODEL I DISK INTERFACING \$5.95

\$7.95 Foreign Airmail (U.S. Funds)  
Postpaid mailed to you

### FIRST CLASS

United States Only

Send To:  
80-U.S. Journal  
3838 South Warner St.  
Tacoma, Washington 98409  
(206) 475-2219

A DIVISION OF 80-NORTHWEST PUBLISHING  
Dealer Inquiries Invited

Send \_\_\_\_\_ Copies of the Guide  
Check Enclosed \_\_\_\_\_  
Visa or MasterCard  
# \_\_\_\_\_  
Exp. Date \_\_\_\_\_  
Signature \_\_\_\_\_  
Name \_\_\_\_\_  
Address \_\_\_\_\_  
City \_\_\_\_\_ State \_\_\_\_\_  
Zip \_\_\_\_\_

TRS-80 is a registered trademark of TANDY CORP.

# 80-*U.S.*

## Book review

**Pathways through the ROM**  
George Blank, Editor  
Softside Publications  
6 South Street  
Milford, New Hampshire 03055  
1-800-258-1790  
116 pages, \$19.95  
For Model I

There are now a number of books which give you the inside story on the TRS-80 Model I ROM (Read-Only-Memory): how it is built, how to use it, where to find the routines you want.

After looking at several books on the subject, I feel that Pathways Through the ROM is a reasonable choice for the only book on the ROM. Actually, it isn't a singular work, but a compilation of three books plus additional material originally published by Softside.

The book includes the Fuller Supermap; Richardson's TRS-80 Disassembled Handbook; John Phillipp's machine language monitor program - HEX MEM; George Blank's BASIC Z-80 Disassembler; and guides to the Level II BASIC, Model I TRSDOS and NEWDOS source codes by John Hartford.

Like most books on the subject, it includes comments on the ROM routines and a discussion on how to access those you wish to use. You have to use the disassembler to get your own listings, as they are protected by copyright from being published.

I do a lot of machine language programming, and this book sits next to my machine as a constant reference. I have found it gradually becoming my principal resource because so much is contained in this one volume. Most of the other books are not as complete, and it is necessary to go from one to another to find different information.

All the available books agree on how things are done and therefore, I tend to think that only one book is really needed for most people.

With most good things, there are some limits and Pathways has several. First, it is about machine language programs. It does *not* teach you *how* to program, it just tells you where things you may need are in ROM. While the instructions

are not hard to read, they are not completely clear for the novice. A new programmer may have trouble making some of the techniques work. However, this is true of any of the books on the Level II ROM.

Some of the discussions, while informative, are very short. This means that the novice and, in some cases, an experienced programmer won't find the answer to questions. The discussion may not be enough even to use the routine or technique being covered.

A beginner can benefit from the programs and ROM comments. They will help a person learn how things are done. While some comments in the ROM listing are useless (06AFH has the comment "Twiddle thumbs"), they are fun for the experienced programmer. The novice may experience some frustration before he realizes that this is a call to a delay loop routine.

The manual is worth its price, and may be the only one of this type you will need. Don't expect it to make a Bill Gates or Phil Pilgrim out of you. No book can do that - it takes time and hard work - and Pathways through the ROM may make it easier.

T R Dettmann

**Showdown**  
by Russel Starkey  
Adventure International  
PO Box 3235  
Longwood, FL 32750  
\$14.95 Model I tape

There is now a game on the market which fulfills the daydreams of those who would like to have had the chance to do battle with the evils of the Old West, to rid a town of infamous gunfighters, to become a hero. Picture yourself in this situation:

You are looking through the branches of the tree in front of you, searching for a clue as to where your opponent is. Your heart beats rapidly for you know that this is a "kill or be killed" situation. "Where is he?", you mumble to yourself. The agony of waiting is getting to you, so you decide to make



the first move. While checking to see how many bullets are left in your six-shooter, you notice a large covered wagon approaching. Figuring it is now or never, you apply an old but nonetheless effective trick and dash behind the slowly moving wagon. As you jog along-side the wagon it rolls off into the sunset where you cannot follow it. You realize you are now out in the open. Being in such a position can be extremely hazardous to your health, therefore you throw up a blaze of fire as you simultaneously scramble for cover behind the nearest cactus plant. But alas, your opponent spies you! He fires rapidly with accuracy and you go down in a hail of bullets rather than history. Not to worry, this is only a TRS-80 computer game named "Showdown" and you will have plenty of opportunities to gain revenge.

Showdown is the TRS-80 version of the popular arcade game "Boot Hill". Showdown is a fast-paced shoot'em up game with sound effects and was written in machine language by Russel Starkey. The program is sold by Adventure International and will run on either the TRS-80 Model I or the PMC-80.

After you have loaded the program, it allows you to pick a few options. The first option is called "Shooting Type", which chooses your shooting ability. There are three choices; Gunslinger (the

hardest), Old Smokey (moderate) and Greenhorn (for beginners). The type you pick will determine the overall speed of the game.

Once you have chosen the desired shooting type, you get the option of playing the computer or a human opponent. This two-player option greatly enhances the fun of the game.

The motion and movement of the gunfighters may be controlled on the screen. There are 5 angles at which the arm may be held and about 10 different places where the gunfighters can stand. With the correct positioning and gun angle, it is possible to hit your opponent no matter where he is, provided there is no obstacle in the path of the bullet.

There are three different obstacles in all; trees, cacti, and a moving covered wagon. The trees and cacti are randomly placed on the screen before every shootout. The wagon is constantly scrolling from the bottom of the screen to the top. Many a misplaced shot hits that rickety wagon and when it does, the wagon slowly deteriorates as do the other obstacles. Although shooting the obstacles may prove to be entertaining, the real fun begins with the Showdown.

While playing, you must remember to keep looking to see how many bullets you have left in your Smith & Wesson (the computer keeps track of the number and it is displayed continuously). If the

number reaches zero, then you must reload which takes anywhere from 10 to 25 seconds depending on the shooting type you picked earlier. When you have to reload you become easy picking for your enemy. The only thing that will keep you alive is some fancy footwork and quick reflexes. If your opponent runs out of ammo while you are reloading, the screen clears for a moment while both load up and then the shootout continues as before. The showdown is over when someone gets sloppy and ends up with a bullet in the gut.

After a shootout, the screen clears and a chart is displayed. On this chart appears the amount of times each gunfighter has been shot during the series of individual showdowns. There is an antagonizing blinker over the name of the poor soul who has been hit the most. At this point you have the choice of either pressing (R) to restart the series with new options, or pressing (ENTER) to continue the slaughter. There is no time limit nor a restriction as to how many separate showdowns you may play, thus the game is endless.

The game makes good use of all the TRS-80 graphics capabilities and has enjoyable sound effects. It is a quick moving game which will sharpen your reflexes. It is as close to the game "Boot Hill" as possible, and if you enjoy that one, then this one is for you!

Owen Linzmayer

# OMNITERM

## What is OMNITERM?

OMNITERM is a professional communications package for the TRS-80 that allows you to easily communicate and transfer files or programs with almost any other computer. We've never found a computer that OMNITERM can't work with. It's a complete package because it includes not only the terminal program itself, but also conversion utilities, a text editor, special configuration files, serious documentation and serious support.

## Why do I need it?

You need OMNITERM if you need to communicate efficiently with many different computers, or if you want to customize your TRS-80 for use with one particular computer. You need OMNITERM to SOLVE your communications problems once and for all.

## What do I get?

The OMNITERM package includes the OMNITERM terminal program, four conversion utilities, a text editor, and setting files for use with popular computers such as CompuServe, the Source, and Dow Jones — just as samples of what you can

## The ULTIMATE TRS-80 Terminal Package

do for the computer you want to work with. The package includes six programs, seven data files, and real documentation: a 76-page manual that has been called "the best in the industry." And OMNITERM comes with real user support. We can be reached via CompuServe, Source, phone, or mail to promptly answer your questions about using OMNITERM.

## What do I need to use OMNITERM?

A Model I or Model III TRS-80, at least 32K of memory, one disk, and the RS-232 interface. OMNITERM works with all ROMs and DOSes, and will work with your special keyboard drivers.

## What will it do?

OMNITERM allows you to translate any character going to any device: printer, screen, disk, keyboard, or communications line, giving you complete control and allowing you to redefine the character sets of all devices. It will let you transfer data, and run your printer while connected for a record of everything that happens. OMNITERM can reformat your screen so that 80, 32, or 40 column lines are easy to read and look neat on your TRS-80 screen. It even lets you get on remote computers with just one keystroke! The program lets you send special characters, echo characters, count UART errors, configure your UART, send True Breaks and use lower case. It accepts VIDEOTEX codes, giving you full cursor control. It will even let you review text that has scrolled off the screen! Best of all, OMNITERM will save a special file with all your changes so you

can quickly use OMNITERM for any one of many different computers by loading the proper file. It's easy to use since it's menu driven, and gives you a full status display so you can examine and change everything.

"OMNITERM has my vote as the top TRS-80 terminal program available today" Kilobaud Microcomputing, June 1981, pages 16-19.

OMNITERM is \$95 (plus shipping if COD) Call for 24 hour shipment. Manual alone \$15, applied toward complete package. Visa, M/C, and COD accepted. MA residents add 5% tax. Dealer inquiries invited.

Contact Lindbergh Systems for your custom programming needs. We are expert at writing software to work with YOUR hardware, in assembler, high-level language, or Fortran.

**Lindbergh Systems**

41 Fairhill Road, Holden, MA 01520 (617) 852-0233

Source: TCA816 CompuServe: 70310,267 TRS-80 is a trademark of Tandy Corp



If you're looking for  
the best prices  
in the U.S.A. on



## TRS-80 MICROCOMPUTERS

We have consistently offered the TRS-80 line at savings up to 20%. You can save up to \$1500 by buying from Computer Discount of America.

**Model II**  
26-4002 64K, 1 disc \$3385.00

**Model III**  
26-1061 4K, Level I \$ 610.00  
26-1062 16K, Level III \$ 845.00  
26-1066 48K, Level II 2-drive/RS-232 \$2115.00

**Color Computer**  
26-3001 4K \$ 325.00  
26-3002 16K w/Ext. Basic \$ 489.00

**EPSON**  
MX70 Printer \$ 375.00  
MX80 Printer \$ 485.00  
MX80FT Printer \$ 585.00

**ATARI®**  
MICROCOMPUTERS



We have the full line of ATARI personal computers and systems. **Circle 64**

Our savings are as big on expansion interfaces, printers, diskettes, Apple Computers, OKIDATA Microliner, C-ITOH Starwriter, Lexicon Modems — everything for your computer.

We have the largest inventory in the Northeast, and most models are in stock, for immediate delivery. Our full price catalog or a price quote is as near as your phone.

**CALL TOLL FREE:**  
**800-526-5313**

**Computer  
Discount  
of America**

COMPUTER DISCOUNT OF AMERICA, INC.  
15 Marshall Hill Road, West Milford Mall  
West Milford, New Jersey 07480-2198  
In New Jersey Call 201-728-8080

## Software review

**Super Nova**  
by Bill Hogue  
Big Five Software  
PO Box 9078-185  
Van Nuys, CA 91409  
Cassette \$15.95 +\$1.50 p/h  
Model I/III 16K Level II

Spaceships, laser beams, energy torpedoes, alien threats and space intrigue - sound familiar? Well, to anyone who has been around computer or arcade games recently these elements are probably old hat. The growing number of computer-based arcade games makes isolation from them quite difficult. High technology games have been the topic of numerous articles and discussions in diversified publications, and the games themselves are popping up everywhere. Even the local grocery store is taking part in this revolution. It is rather common these days to see some pinball or arcade game in the local supermarket, next to the fireplace logs and dog food. The most popular of these games is from Atari, and is entitled "Asteroids". It was the biggest money maker in 1980, and still retains much of its popularity.

Super Nova, from Big Five, is the TRS-80 answer to Asteroids. Super Nova is played exactly the same with the exception that it does not have sound. Perhaps I should stand corrected, the *major* difference is that whenever you wish to play Super Nova, you need not insert twenty-five cents into the little slot!

The game places your ship in the center of an "endless" asteroid field. This is accomplished by using the natural wraparound feature of the computer. You can maneuver right, left, thrust, fire, or engage a hyperspace jump. If you select the latter, you run the risk of re-entering normal space very close to, if not inside of, an asteroid or an alien vessel. Points are earned by shooting asteroids and by destroying enemy ships bent on your destruction. A large asteroid is worth 20 points, a medium asteroid is worth fifty, and a small asteroid is worth one hundred points. There are five types of alien ships you must disintegrate before they kill you. The "JLK" alien is worth 200 points, the "BH" alien is worth 300 and the odd shaped "Battlestar" is worth 400. The two

most deadly ships are the "Space Rover" and the "Flagship". The Space Rover is worth 1000 points and the ever-so-dangerous Flagship earns the pilot with a good aim 2000 points.

For those of you who have seen the Atari arcade version of Asteroids, you know the graphics are excellent. The process is called "Vector-Scan", and allows very high resolution to aid in game clarity and enjoyment. Super Nova's graphics, while not high resolution, do not detract from the enjoyment of the game.

At the start of the game each player is presented with three ships. A ship is eliminated when it is destroyed by either contact with an asteroid, contact with an enemy ship (which eliminates the tactic of ramming an alien ship), or contact with an enemy torpedo. The player is awarded an extra ship for each 10,000 points. Once those first 10,000 points have been accumulated, the program begins to send alien flagships to destroy you. The ships move very fast and are quite accurate with their laser cannons. If you are lucky enough to shoot one of these chaps you are awarded 2000 points. At the end of the game, if you have scored relatively high, you are asked to input up to four initials for placement next to your score on the program display menu. This allows easy reference to past scores, and your progress may be charted by comparing past and present scores.

Super Nova is a very good game and provides many hours of entertainment.

W W Harper II

**TRS-80 Programming in Style**  
Thomas Dwyer  
and  
Margot Critchfield  
Radio Shack  
\$10.95 illustrated

This large book (8 x 11 inches) introduces itself as "An inventive, idea-oriented approach to creative programming for those who have mastered the fundamentals of Level II BASIC...Chock full of programming ideas!"

After reading this I expected a



great book to follow. I was deceived.

In describing this book, it really must be broken into two sections. Section one, which covers the first two chapters, is designed for someone with no prior computer experience and covers BASIC syntax rules and gives several program assignments and examples. One rather confusing observation about this first section is that the authors repeatedly refer to several program examples as being "silly", yet they insist those programs are necessary. The demo programs in this section are not very interesting and fail to be useful in later programming efforts. Ditto for the exercises in this section. They are not interesting to do and the final result is quite bland.

The second section of the book improves considerably in that a number of useful programs and routines are presented. Some of these are a loan/interest program, a savings account program and a check book balance/file keeper.

Chapter three, which begins the second half of the book, is entitled "Getting Serious", which is what should have been done on page 1 instead of page 145.

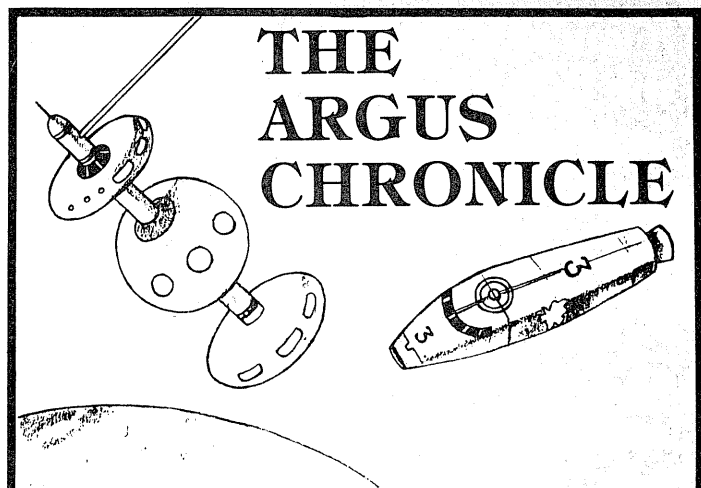
Chapter four is about "Taking the plunge", and is involved in upgrading to a more powerful computer system. It explains why certain peripherals are advised as the programmer advances and how to effectively use them. Several programs are offered to show the usefulness of such devices as printers and disk drives. The disk routines include a "Filebox" program to keep track of any important data, and the explanations of how to use disk-based files are quite good. A simple word processor/text editor is developed at the end of chapter four. This chapter also touches upon the attributes of machine language programming.

Chapter five is the last chapter, and gives solutions to the problems presented in the earlier part of the book.

The appendices at the end of the book cover a summary of Level II BASIC and the ASCII codes.

The book is well written and one can learn BASIC programming from it. I would suggest though, that you give it a good hard look before spending \$10.95 on it.

W W Harper II



STARDATE 12756.3 . . . . . An explosion has destroyed the main engines aboard the deep space explorer, the ARGUS. The ship is drifting with only maneuvering power. The life support systems are failing and the main radios are dead. Ahead lies Spacestation ALPHA. A frantic call for help on the emergency transmitter brings only silence. Your only chance for survival is to reach the safety of Spacestation ALPHA.

## SPACE STATION ALPHA DEAD AHEAD. THE DOCKING LAMP IS LIT . . . . .

For an out of this world mystery, order this classic machine language adventure.

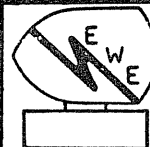
\$19.95/cassette \$24.95/disc (L2-16K/cass 32K/disc) MOD1.3



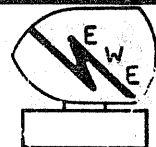
**EDU-WARE EAST**  
P.O. Box 336  
Maynard, Mass.  
01754  
617-568-8641

Visa, Mastercard and phone orders accepted. Mass. residents add 5% tax. Overseas orders add \$2 for air shipment. Ask about our cassette duplicating service.

Circle 65



**EDU-WARE EAST**  
P.O. Box 336  
Maynard, MA 01754  
617-568-8641  
MODELS I & III



### MATH-PAK-1: MATH-PAK-2: MATH-PAK-3

Interactive math drill programs that let the user enter the answer digit by digit, just like paper and pencil. With user selected difficulty levels, carryovers, simplification, reducing, scoring, pointing off, games, and more. The MATH-PAK'S are used throughout the U.S. and Canada and are recommended by the 80US Journal, S-80 Bulletin, and the Computing Teacher. Order MATH-PAK-1 for integers, MATH-PAK-2 for fractions, and MATH-PAK-3 for decimals. (L2-16K) \$14.95 ea.

### H-O-R-K-S

Low cost, single entry accounting system for the home or office. With 66 user assigned account codes, auto audit trail, search with totals, 32 or 48K, 1 to 4 drives, credit and debit reports with 3 options, and up to 9200 entries.

\$24.95/cassette \$29.95/disc

### INVENTORY +

Why settle for just an inventory listing? get aging reports with 2 options, reorder reports, total listings with purchase dates, amounts, and vendors, total costs, items sold, profit/loss, and more. Use as a stand alone system with daily updates, delete, change, and file packing routines. (32K - 1 disc minimum).

\$24.95/cassette \$29.95 disc

### CASH REGISTER 80

Use your TRS-80 as a point of sale terminal with automatic inventory lookup, pricing, updating, discounting, and more. Print sales slips with user adjusted formats, end of day reports with all cash, charge, and check sales by salesperson. CR80 requires INVENTORY+, 48K, and 1 disc minimum (2 drives recommended).

\$24.95/cassette \$29.95 disc

### PYRAMIND

A challenging game of logic and deductive reasoning. Can you solve the computer generated code? The computer will give you clues on each entry but it will take all your skill to break the code. With 3 difficulty levels, sound, high speed graphics, and save a game on disc or cassette. (L2-16K) \$11.95 cassette

Mass. residents add 5% tax. VISA, M.C. and phone orders accepted. Overseas orders add \$2.00 for air shipment. Dealer inquiries invited. TRS-80 is a registered trademark of the Tandy Corp.

Circle 66



## Let your computer read the time

For Model I, Level II

Joseph St. Lucas, San Diego, California

Have you ever wanted a real, real-time clock? One which wouldn't lose track of time whenever you loaded a tape or did a disk backup? Afraid to open the case on your computer? Here is an article on just such a clock which is constructed and connected to the external bus on the TRS-80.

I've always longed for a way to tell time with my TRS-80. Not having an expansion interface and the real-time clock, I looked for a better way to read the time for controlling external devices via the BSR remote control system. When I looked, I could find no clock integrated circuits made specifically for microcomputers. The closest available was the National Semiconductor MM5318 (available from JAMECO Electronics, 415-592-8097, for \$10 plus \$1.50 postage and insurance).

This particular device will act as a polled clock. By outputting specific data to the chip, it will return the time according to this table:

Output to port 243      Returned to port 243

0	Ten's of hours
1	Hours
2	Ten's of minutes
6	Minutes
5	Ten's of seconds
4	Seconds

Since we are using an output port, the clock will keep time on its own, requiring no attention or signals from the TRS-80. The MM5318 is a 60 Hz, line-driven clock, and since it does not use a quartz crystal for timing, it is as accurate as your power company's supply grid. No interrupts are provided to the computer, so you are only able to read the

time from a program and act upon that time. This still beats putting timing loops in your program.

To start this project, you will need a four bit input/output port. The port I chose is number 243. Details on port addressing can be found in the TRS-80 Technical Reference Handbook (26-2103). Originally, I built an 8-bit I/O port, waiting for something useful to hang onto it. The clock turned out to use half of this port.

The schematic shows that the clock requires both a plus 5 and plus 12 volt supply. To the MM5318, a logical 1 is plus 12 volts, while a logical 0 is negative 2 to plus 4 volts. To the rest of the TTL (Transistor-Transistor-Logic) devices, however, both logical 1 and logical 0 fall under plus 4 volts, so some voltage matching must be done. The voltage translation from the TTL plus 3.5 to plus 12 volts is handled by a 74LS75 driving a 2N2222 transistor. The reverse comes through a simple Zener 1N5227B or 1N747A diode network. The 60 cycle signal is provided by a small 12 volt transformer and a full-wave bridge rectifier.

To read the clock, use the machine language program included with this article. (Both source code for the editor-assembler and a BASIC loader with equivalent DATA statements are included). It runs in about .005 seconds and is about ten times faster than the equivalent BASIC program. This routine polls the clock and displays the results in the upper right-hand corner of the display as six continuous digits without separators for hours, minutes and seconds. This was done to conserve display space. This same figure is stored in memory locations 32756 to 32761. The last six memory locations, 32762 to 32767, are left blank for storage of another time for comparison, if desired.



Set your memory size to 32701 and load the system program. POKE address 16526 with 198 and 16527 with 127. Then, to read the time, use X=USR(0) in your BASIC program. The clock time is then displayed on the screen.

The first time the clock is powered up, or following any major power interruption, the time must be set. This is done by executing a short BASIC program, such as:

```
1 X=USR(0):GOTO 1
```

and then grounding pin 18 on the clock for fast setting or pin 17 for slow setting. Once this has been done, you could power down the computer and come back any time later, power up, and read the current time. However, with the high cost of electricity, I turn my clock off when not needed. Some unused outputs on the MM5318 could even be used to provide a LED (light emitting diode) display of the time.

This clock provides a low cost means to be able to tell the time to your computer without worrying about interrupts and software for tape users which the expansion interface clock requires.

**Note:** Pin 13, ground for 12 hour time, +12 volts for 24 hour time.

Power			
+12	+5	Gnd	
15	-	1,14	MM5318
-	14	7	74LS02
-	14	7	74LS04
-	5	12	74LS75
-	14	7	74LS30
-	20	10	81LS95

**Parts**

- 3-2N2222 transistors
- 4-1N4001 diodes
- 1-110 volt to 12 volt transformer
- 2-SPST normally open switches
- 4-1N5227 3.6 volt zener diodes
- 7-2K, 1/4 watt resistors
- 3-1.2K 1/4 watt resistors
- 3-1.5K 1/4 watt resistors

Also requires a +5 volt and a +12 volt power supply.

#### Basic loader program

```
10 FOR A= 32701 TO 32767 : READ B : POK
   E A,B : NEXT A
20 DATA 33, 198, 127, 34, 142, 64, 195
   , 204, 6
30 DATA 6, 0, 17, 244, 127, 33, 56, 60
   , 205, 230
40 DATA 127, 4, 184, 202, 217, 127, 19
   5, 206, 127, 6
50 DATA 6, 205, 230, 127, 5, 184, 202,
   243, 127, 195
60 DATA 219, 127, 120, 211, 243, 219,
   243, 18, 246, 48
70 DATA 119, 62, 3, 35, 19, 201, 0, 0,
   0, 0
80 DATA 0, 0, 0, 0, 0, 0, 0, 0
```

## MICRO IMAGES

**SUPER SOFTWARE & HARDWARE BUYS**  
Prices INCLUDE SHIPPING Within Continental USA

### PRINTERS

**EPSON MX 100** ..... \$CALL  
Epson MX-80... 499.00 MX-80 F/T... 649.00 Cable to E/I... 35.00  
Okidata Microline 80... Only 429.00... **New!** Model 82A... \$Call  
**New!** Microline 83A... \$Call... **New!** Model 84... \$Call  
Data South DS180 ..... \$Call

RS232 Not Req. **LYNX** Mod I/III **259.95**  
includes auto dial/answer, cables and terminal software

**DISKETTES** **SYNCOM 5 1/4** BOX S/D 29.00  
HUB REINFORCED of 10 D/D 32.00

*Christmas Shopper Blues? Not sure what he or she needs or  
already has? SOLVE YOUR PROBLEM WITH OUR*

### GIFT CERTIFICATES

AVAILABLE IN AMOUNTS OF \$10.00 & UP. Catalog Inc. with each

**COPYRIGHT KIT** - A must for authors who want to learn how to  
protect their programs. Written by national attorneys **\$11.95**

### GREAT SOFTWARE AT SUPER PRICES

**MAXI MANAGER** Mod I/III by Adventure Inter'l 48K Disk **\$79.95**

**LAZYWRITER** A BEST BUY IN WORD PROCESSORS  
32K Mod I Only **\$118.95** Mod III Only **\$164.95**

**Proofreader** by Soft-tools ..... Mod I - 49.95 Mod III - 59.95  
**Proofedit** ..... Mod I - 28.50 Mod III - 28.50  
**Grammatik** ..... Mod I - 45.95 Mod III - 55.95

**FINANCIAL PARTNER** — by Denver Software- **\$165.00**  
A GREAT PACKAGE FOR SMALL BUSINESS

**SUPER ★ ★ ★ SPECIAL**  
**LDOS ONLY**... **\$144.95**

Mod I or III includes manual & latest updates

**ACORN** — Tape Mod I/III — Disk Mod I **TAPE DISK**  
Pinball/Invaders from Space/Basketball/  
Duelin Droids/Ten Pins ..... 16 K ea... **13.95 18.95**  
Superscript... 32K Disk Requires Scripsit & L/C..... **25.90**  
**BRODERBUND** — Tape Mod I 16K Mod III 32K Disk I only 32K  
Galactic Empire/Trader/Revolt..... ea... **12.95 17.25**  
Galactic Trilogy 32K Disk Only..... **34.55**

### PERSONAL

Arcade Classics... 4K Tape ..... **19.95**  
Zork... 32K Disk... Mod I Only ..... **35.95**  
**ADVENTURE** — Tape Mod I/III — Disk Mod I Only  
Kid Venture #1... Mod I Tape 16K/Mod III Tape  
& Disk 32 K ..... **12.95\*12.95**  
Project Omega - Tape 16 K Disk 32K ..... **12.95 21.55**  
Missile Attack or Showdown... Tape 16K-Disk 32K... **12.95 18.15**  
E-Z Sounds (Add sound to programs) Mod I Only ..... **17.95\*17.95**  
Six Micro Stories... 32K Disk..... **12.95**  
Local Call for Death/Two Heads of the Coin/  
His Majesty's Ship-Impetuous... 32K Disk..... ea... **17.25**

### AVALON HILL — Model I Only

Conflict 25... 16K Tape ..... **14.50**  
Empire of the Overmind... **New!** 48KTape or Disk... **28.95 33.50**  
Major League Baseball... **New!** 16K Tape 32K Disk... **23.95 28.50**  
Tanktics... **New!** 16K Tape 32K Disk ..... **22.95 27.50**

### BIG FIVE — Tape Mod I/III - Disk Mod I only

Galaxy Invasion/Attack Force/Cosmic Fighter/  
Meteor Mission III... All w/sound... 16K each ..... **13.95\*15.95**

\*Tape to Disk Version

We carry many other items at comparable discounts. Call if you don't see what you want.  
SEND FOR YOUR FREE CATALOG.

No credit cards at these low prices. Add \$1.50 on all C.O.D. orders. Certified Ck/MO/COD  
shipped immediately. Please allow 2 weeks for personal checks. For extra fast service  
phone in your COD order. Prices subject to change without notice. New York State  
residents please add appropriate sales tax.

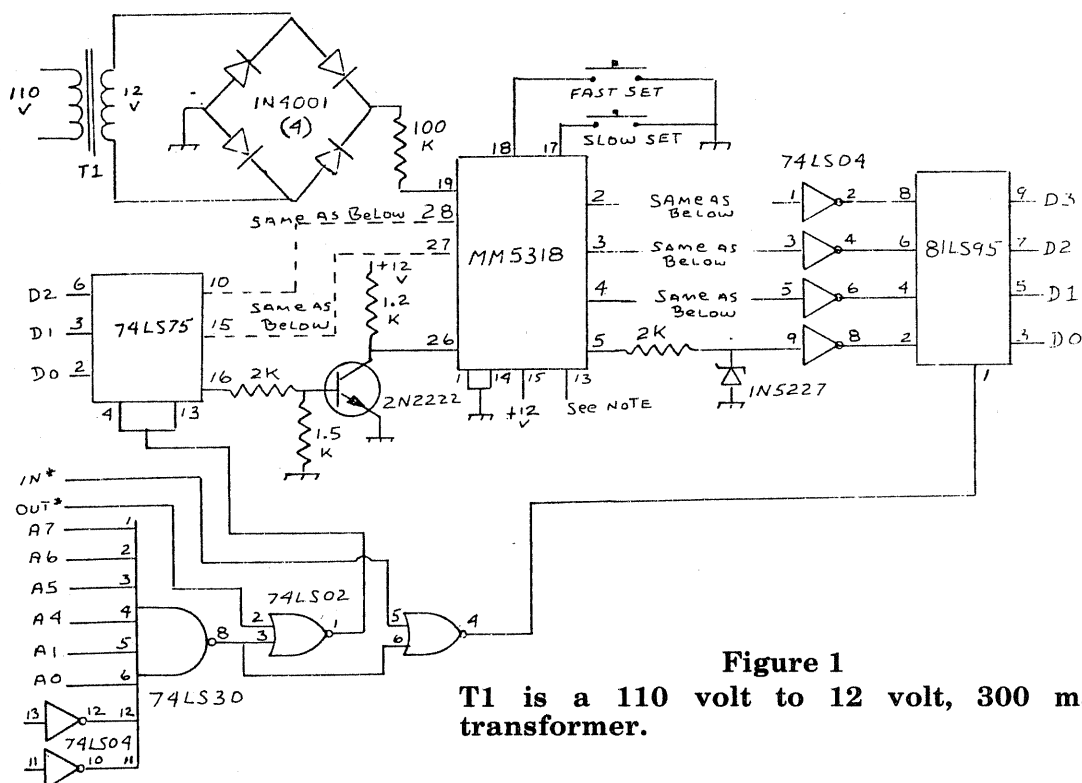
*We Offer Great Values & Prompt Delivery — Why Not Try Us?*

**146-03 25th Road, Flushing, New York 11354**

**Mon-Fri 10 AM - 9 PM (212) 445-7124**

**Sat 10 AM - 5 PM**





7FBD		00100	ORG	7FBDH	
7FBD	21C67F	00110	START	LD	HL, TIME ;SAVE FOR AUTOSTART
7FC0	228E40	00120		LD	(16526), HL
7FC3	C3CC06	00130		JP	6CCH ;FOR NON-DISK USERS
7FC6	0600	00140	TIME	LD	B, 0
7FC8	11F47F	00150		LD	DE, 7FF4H ;UPPER MEM TIME STORAGE
7FCB	21383C	00160		LD	HL, 3C38H ;SCREEN POSITION
7FCE	CDE67F	00170	FIRST	CALL	AGAIN
7FD1	04	00180		INC	B
7FD2	B8	00190		CP	B ;ARE FIRST 3 DIGITS DONE
7FD3	CAD97F	00200		JP	Z, NEXT ;IF SO, DO LAST 3 DIGITS
7FD6	C3CE7F	00210		JP	FIRST ;ELSE DO AGAIN UNTIL DONE
7FD9	0606	00220	NEXT	LD	B, 6
7FDB	CDE67F	00230	SECND	CALL	AGAIN
7FDE	05	00240		DEC	B
7FDF	B8	00250		CP	B ;DONE 3 TIMES?
7FE0	CAF37F	00260		JP	Z, STOP ;ALL DONE, RETURN TO BASIC
7FE3	C3DB7F	00270		JP	SECND ;ELSE DO REMAINDERS
7FE6	78	00280	AGAIN	LD	A, B
7FE7	D3F3	00290		OUT	(OF3H), A ;OUTPUT VALUE TO PORT 243
7FE9	DBF3	00300		IN	A, (OF3H) ;READ CLOCK VALUE RET'D
7FEB	12	00310		LD	(DE), A ;WRITE DIGIT IN MEMORY
7FEC	F630	00320		OR	30H ;CONVERT TO ASCII CODE
7FEE	77	00330		LD	(HL), A ;WRITE DIGIT ON SCREEN
7FEF	3E03	00340		LD	A, 3 ;USED TO COMPARE WITH B
7FF1	23	00350		INC	HL ;INCREMENT THE COUNTERS
7FF2	13	00360		INC	DE
7FF3	C9	00370	STOP	RET	
7FBD		00380		END	START
00000 TOTAL ERRORS					



# Software review

**Full screen program text editor**  
**Computer Applications Unlimited**  
PO Box 214 Rye, NY 10580

**Model I \$24.95**

**Model III \$29.95**

**Tape and Disk BASIC**

**For Model I Level II or disk**

You may think another full screen BASIC program text editor is the last thing we need. There are several excellent ones on the market, and they are powerful tools for the prolific programmer. However, this one is different! In addition to the features of the others it adds some very powerful ones of its own. For instance, it will actually renumber all line numbers which are referenced to or from the line which is currently being edited.

The program is supplied on cassette for a 16K Model I and is compatible with either Level II or Disk BASIC. It can be configured according to the memory size of the machine. The documentation is excellent for a program of this type, with clear examples of each function and a sample program with which to experiment.

As the program loads as a SYSTEM tape, the user must set the memory size to protect the last 5K of memory for the editor. This minor inconvenience is heavily outweighed by the features of this powerful programming tool. After loading, the user types XEDIT and the magic begins.

The resident BASIC program is now displayed with twelve lines and a blinking cursor on the screen at one time. The indestructible cursor can be positioned with 6 different keys. One can delete or insert characters, extend a statement, scroll the display through the text, and type in BASIC keywords using shifted letters. For example, typing shift-D would insert the keyword DATA where the cursor was positioned. The user may change the meaning of each of the twenty-six alphabetic keys at any time.

More magic is accomplished using the CLEAR key. In this mode, one may delete an entire line, insert a line, copy or move a line to any location (moving the line deletes the original line while copying duplicates it), or even copy or move an entire block of lines. It is also in this mode that one may scroll to the top of the program and exit the editor.

The final frontier is the extended command mode. While in this altered state, the user may perform such trivial tasks as defining the line number increment for text insertion or defining what each shifted key is to mean. Some not so trivial features are search for a particular line number, find a character string, and change a

character string. It is very much like the global search and replace features of SCRIPSIT. The final function is a swift renumbering utility.

The most amazing feature of the editor is its ability to selectively renumber any group of statements without destroying the program logic. For example, we may have a subroutine with an embedded subroutine with line numbers of 600 to 660 which we want to move to a new location starting at line 1000. 600 used to read:

```
600 F=0:GOSUB650:GOTO630
```

After the move:

```
1000 F=0:GOSUB1050:GOTO1030
```

and all other lines would be subsequently renumbered correctly.

This is not the easiest editor to use, but it may be the most powerful. The initialization routine could certainly be improved upon and the scrolling commands are a bit unnatural, such as using the ENTER key to move down a line. However, the package is an excellent value and done very well. The author is certainly to be congratulated on a fine product.

**Jim Klaproth**

**TRS-80<sup>TM</sup>**  
**MODEL III  
AND MODEL I  
SOFTWARE PACKAGES.**

**Can 30 user proven high-quality TRS-80 programs cost a mere \$24.95?**

We have a lot to gain by almost losing our shirts. Because we're a young, growing software company. We're BASICS AND BEYOND. And in order to build, we need your business.

**MICROCOSM I.** Thirty programs with everything from our incredible "Atlantis" game that'll challenge your intellect, to "Flowering Houseplants" for valuable reference.

**MICROCOSM II.** Twenty programs that require skill: the desire for intense concentration as in "Decipher." And practical guides like "Stain Removal."

Both packages, for 16K Model I or Model III, on quality tape cassettes, with hardcover storage case and detailed handbook. Just \$24.95 each. Our prices will never be lower. Send today.

**BASICS AND BEYOND, inc.**  
BOX 10 • AMAWALK, N.Y. 10501 (914) 962-2355

No charge for postage or handling. N.Y. residents add 5% sales tax. TRS-80 is a trademark of Radio Shack Division of Tandy Corp.

Circle 68



# DISCOUNT DISKS

\*\*\*\*\*

## VERBATIM

5 1/4" MINI DISKS	33.95
8" DISKS	49.95

ALL VERBATIM PRODUCTS  
AVAILABLE. ASK FOR QUOTES.

ALL ORDERS SHIPPED UPS SAME  
DAY.

TERMS: CASH, CHECK, MONEY  
ORDER, VISA, MASTERCARD OR  
TRANSACTION. WASH. RESIDENTS  
INCLUDE 5.4 SALES TAX.

Circle 69

\*\*\*\*\*

(206) 952-6372

\*\*\*\*\*

S-80 SYSTEMS

P.O. BOX 6244

FEDERAL WAY, WA. 98003

\*\*\*\*\*

### LEARN TRS-80® ASSEMBLY LANGUAGE DISK I/O

Your disk system and you can really step out with  
**REMSOFT's** Educational Module, **REMDISK-1**, a  
"short course" revealing the details of DISK I/O  
PROGRAMMING using assembly language.

Using the same format as our extremely popular  
introduction to assembly language programming,  
this "ASSEMBLY LANGUAGE DISK I/O PROGRAM-  
MING" course includes:

- Two 45-minute lessons on audio cassette.
- A driver program to make your TRS-80® video monitor serve as a blackboard for the instructor.
- A display program for each lesson to provide illustration and reinforcement for what you are hearing.
- A booklet of comprehensive, fully-commented program listings illustrating sequential file I/O, random-access file I/O, and track and sector I/O.
- A diskette with machine-readable source codes for all programs discussed, in both Radio Shack EDTASM and Macro formats.
- Routines to convert from one assembler format to the other.

This course was developed and recorded by  
Joseph E. Willis, for the student with experience  
in assembly language programming; it is an inter-  
mediate-to advanced-level course. Minimum hard-  
ware required is a Model I Level II, 16 K RAM one  
disk drive system.

**REMDISK-1** only \$29.95

Dealer inquiries invited



**REMSOFT, INC.**  
571 E. 185 St.  
Euclid, Ohio 44119  
(216) 531-1338

Circle 70



Includes \$1.50 for shipping and handling.  
Ohio residents add 5 1/2% sales tax.

TRS-80® is a trademark of the Tandy Corp.

## Book review

**Fifty BASIC Exercises**  
**J.P. Lamoitier**  
**Sybex Publishing**  
**253 pages w/illustrations**  
**\$12.95**

Fifty BASIC Exercises is a 253 page, 7 x 9 inch book from Sybex publishing. It is designed to aid in the primary phases of learning BASIC programming. The book also helps to "tune-up" the form and methods used by more advanced programmers. This book makes extensive use of listings, flow charts, and sample runs. These detailed illustrations help to convey and highlight the major points discussed in the text. Fifty BASIC Exercises is very easy reading despite all of the useful information it contains. For someone with a moderate grasp of BASIC, it should take about two evenings to fully digest all of the data. For the more advanced programmer, the first few chapters are not essential, but they at least should be briefly scanned. The reason for this is that some very useful routines are presented in the beginning as well as in the later chapters.

Each exercise in Fifty BASIC Exercises is presented so as to include: 1) a statement of the problem to be solved, 2) an analysis of said problem, 3) the solution with a flow chart and comments, 4) a corresponding program, and 5) a sample run of the program. This systematic approach allows readers to verify their understanding and progress at every step of the learning process. Fifty BASIC Exercises teaches by using solid examples of programming situations and possible problems occurring therein. The author, J. P. Lamoitier, has taught FORTRAN and BASIC for 15 years in industry as well as at several universities, and he feels that this method is one of the best that can be used to teach programming.

As was stated earlier, the book makes extensive use of graphic illustrations. Many of these illustrations are actual program listings. All of the programs are written in Microsoft BASIC, and are verified for direct use on the TRS-80 microcomputer. Each program will execute directly on a TRS-80, and minute syntax changes are all that are necessary to make the examples operate on a PET, Apple, or any other popular computer

equipped with Microsoft BASIC. All of the programs in the book are available from Sybex, on cassette. The cassettes are only in TRS-80 format, and will not function on any other machine.

The chapters in Fifty BASIC Exercises are subdivided into numbered sections (1.3, 2.7, 8.5 etc...) for easy reference. Each chapter covers one particular section of programming and goes into an in-depth study of this section.

Chapter 1, entitled "Your First Program in BASIC", offers a quick look at how a BASIC program is developed using a pertinent example from the income tax form 1040. It teaches the rudimentary code and rules of the BASIC language, and shows several ways to improve upon a program after it has been written.

Chapter 2 teaches flow charting. Many examples are given to aid the beginner in "getting the hang of it". It teaches that a flow chart is a graphic representation of the procedure proposed to solve a problem and therefore a very useful tool indeed. The author even goes as far as to call flow charts, "An Indispensable Tool...". The exercises in chapter 2 include such problems as sorting numbers and working with simple arrays.

Chapter 3 deals with exercises using integers. The applications range from ancient mathematics (Egyptian Fractions) to modern computer science (integer base conversions). Chapter 3 presents exercises demonstrating the use of whole numbers in BASIC. More advanced flow charts are used, but documentation explains each step thoroughly without being redundant. Chapter 3 also deals with using the computer to factor numbers, determine primes, and convert number bases. The exercises are of varying difficulty, and always emphasize the usefulness of section by section flow charting.

Chapter 4 concerns elementary exercises in geometry. It states how BASIC can be used to program some fairly complicated formulas from analytic geometry. It deals with such problems as plotting curves, determination of a circle passing through three given points, perimeters, and areas. Chapter 4 offers many examples of the numerical applications in analytic geometry as opposed to Euclidean



geometry. As always, the exercises are designed for their practical application and simplicity.

Chapter 5 presents some simple exercises in data processing. The exercises are business oriented, dealing with shell sorting, merging files, and report generation. The author uses the shell sort method over the bubble method because shell sorting speeds up execution time by reducing the number of comparisons that need to be made. Two of the programs in this chapter are a telephone directory and a routine to determine the time elapsed between two dates. The exercises on data processing are relatively straightforward because only a limited amount of data is actually processed.

Chapter 6 concerns itself with mathematical computations. It uses common formulas from algebra and calculus to evaluate polynomials and integrals, and to solve equations. It also addresses the validity and range of the numerical results in a microcomputer. Since the BASIC language was developed for the programming of simple mathematical calculations, the flow charts and programs in this section are generally uncomplicated and easy to design and execute. Chapter 6 states what can be done to avoid the possibility of error accumulation due to internal round-off errors. The exercises include synthetic division of polynomial, calculation of a definite integral, calculation of Pi using regular polygons, equation solving by Dichotomy, and numerical evaluation of polynomials. All things considered, the exercises in chapter 6 are actually easier than those in chapter 3.

Chapter 7 is concerned primarily with the financial side of computing in BASIC. It has exercises involving sales and growth forecasting, loan payments, interest computations, and advanced income tax applications. The author treats the subject of business computing in much the same way he handled the scientific and mathematical computations in earlier chapters.

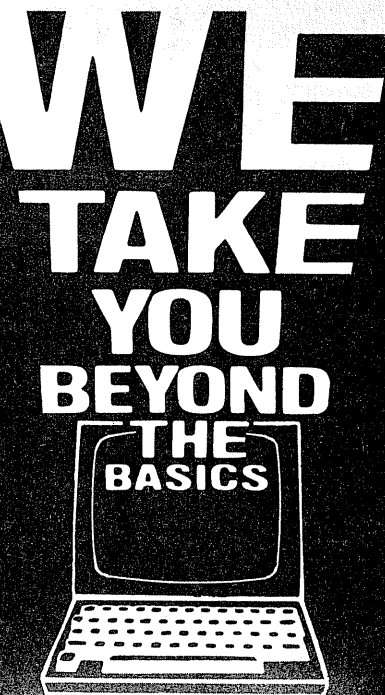
Chapter 8 enters the realm of game programming. It offers a little light programming practice after the rather engrossing sections concerning data processing and financial computing. This chapter teaches the level of computer involvement in any given game.

The emphasis in this chapter is to teach how to increase the amount of computer involvement in some of the simple games that are presented. Some of the exercises are, a "too low/too high" game in which the player must guess a computer generated number, while being given clues as to his position relative to said number. A matchstick game is also included. This is a nim-type game in which the last player to draw a "matchstick" from the pile loses. A simple craps dice game is discussed in this chapter, as are more advanced games such as chess and Othello.

Chapter 9 is entitled "Operations Research" and deals primarily with the use of arrays and subscripts. The exercises include task scheduling, project management (PERT), and optimal course planning. The programs in this chapter are the most complicated and lengthy of any up to this point. The reason for this is that several graphs are needed in each program, and whenever it is necessary to "walk a graph", subtle subscript handling operations are created. Since these operations have a tendency to build up, lengthy programs are the result.

Chapter 10 is based on statistics and the measuring of data. The exercises are in such areas as mean, variance, standard deviation, skewness, and kurtosis. Other exercises concern linear regression and the behavior of the BASIC RND (random number generator) function. The programs mentioned offer few if any major problems and if any happen to occur, the reader should be able to handle them at this point in the book. The problems in this chapter are fairly stimulating and particularly useful.

Chapter 11 is the last and is entitled "Miscellaneous". It consists of exercises that are interesting from an information processing point of view, but do not fit well under any of the previous chapter headings. The exercises in this chapter involve clever programming techniques and/or unique flow chart development. One of the two main problems addressed is to design and execute a program which, when given the month and day of birth, will output the corresponding zodiac sign. The other main problem is to design a



If you're serious about expanding the horizons of your TRS-80\*, then our professional quality software programs are for you:

**M-ZAL™ DISK EDITOR/ASSEMBLER:**  
full screen editing; modular source and object; relocation; link editing; symbol table with XREF; 8 character symbols:  
Mod 1 32k disk #1050-10 \$149.00  
Mod 3 32k disk #1250-10 \$149.00

**T-ZAL: TAPE BASED ASSEMBLER:**  
supports relocatable object; Symbol table with XREF, Relocating Loader:  
Mod 3 #1250-20—\$49.95

**FULL SCREEN PROGRAM TEXT EDITORS:** full cursor and scrolling control; block move/copy/delete; global find and change, 26 macro keys:  
For tape and disk BASIC:  
Mod 1 #1010-20—\$24.95  
Mod 3 #1210-20—\$29.95  
For EDTASM source files:  
Mod 1 #1010-31—\$34.95

**XBUG: Self-Relocating Debug Tool and Monitor:** with multi-speed single step feature, 10 invisible breakpoints:  
Mod 1 #1020-10—\$19.95  
Mod 3 #1220-10—\$19.95

Note: these products are not available for level 1.

When ordering specify Model, RAM size, # of disks.

Send check, money order, or MC/VISA numbers and expiration date to:  
**Computer Applications Unlimited**  
P.O. Box 214, Dept. 600  
Rye, New York 10580



N.Y. State residents add applicable sales tax. Allow 4-6 weeks for delivery.  
Dealer Inquiries Invited.



**COMPUTER APPLICATIONS UNLIMITED™**  
A Div. of CAU, Inc.

**Quality • Reliability • Service**

\*TRS-80 is a TM of Tandy Corp.



**New From  
Verbatim**

DATA LIFE  
MD 525-01

## TRS-80 SPECIAL

### DISKETTES

Made especially for TRS-80 and Commodore PET Computers, with REINFORCED HUB RING. Ends torn center holes and off-center diskette rotation due to wear.

**10 \$31  
FOR**

In stock for instant shipment.



P.O. Box 327  
Center Valley, Pa.  
18034  
(215) 439-1717

WRITE FOR  
FREE CATALOG

Checks, M.O., MC and Visa Accepted.  
No COD's. Circle 72

## COMPILER WORKSTATION TRS-80 Model I and III

*Your BASIC program development  
could go faster...*

**EDIT:** Full-Screen BASIC editor with floating cursor and auto-repeat. More than 30 commands and functions let you variously find, change, insert, delete, replace, replicate, copy, move or position BASIC text at the character, string, line or block level. Developed in Britain by Southern Software. Mod I, III \$40.00 + 1.50 shipping.

**PACKER:** (Cottage Software) Editing tool will unpack, shorten, repack, renumber all or part of your BASIC text. The UNPACK segment is very useful when preparing BASIC source programs for compilation by ACCEL2. Mod I, III \$29.95 + 1.00 shipping.

*Then your BASIC program  
could go faster...*

**ACCEL2:** Compiler for TRS-80 Mod I, Mod III Disk BASIC. New functional improvements in place to give more ease-of-use, quicker compilation of large programs, better chaining of compiled and non-compiled programs. Size read-out helps you monitor code growth during compilation. REM NOARRAY option lets you use variable-bound arrays. Professionals note: Comprehensive instructions show how to organize your compiled programs for resale on tape, ES/F wafer or disk. No royalties! Developed in Britain by Southern Software. Specify Mod I or III. \$88.95 + \$2.00 shipping.

**TSAVE:** Writes compiler output to independent SYSTEM tape. \$9.95 + \$1.00 shipping.

**EXEC:** Command-List Processor for TRS-80 Mod I. Prepare, execute, pass as many as nine parameters to lists of TRSDOS or NEWDOS commands and/or BASIC statements. Simplifies repetitive procedures such as power-up sequences, file set-ups, etc. Compatible with ACCEL2 compiler disk output. Developed in Britain by Southern Software. \$22.00 + \$1.00 shipping.

M/C, VISA  
CA add 6%

Circle 73



Allen Gelder Software  
Box 11721 Main Post Office  
San Francisco, CA 94101  
(415) 387-3131

TRS-80, TRSDOS tm Radio Shack, ES/F tm Exatron

## Book review

program to solve the "Eight queens problem". This is a classic problem for computer science students as well as chess players. The problem entails finding all of the possible ways to arrange eight queens on a chess board so that no two queens are "en prise" (threatening to take one another). One solution is given, and the others must be worked out.

The two appendices at the end of the book deal with A) the characters and symbols that comprise the "BASIC alphabet", and B) the main syntax rules that should be followed in all BASIC programming. Some of the areas covered in appendix B are constants, numerical variables, arithmetic expressions, assignment instructions, program loops, character strings, and input/output methods. Appendix B offers several examples of how each of the above areas can be utilized to their fullest.

To conclude in one sentence, Fifty BASIC exercises is a very complete, well written and informative book that will make a useful addition to anyone's computer information library.

W. W. Harper II

## Microcomputer Power Series John P. Grillo

and

J. D. Robertson

Wm. C. Brown Co. Publishers  
2460 Kerper Blvd.  
Dubuque, Iowa 52001

The authors have developed a four volume paperback series to aid the microcomputer programmer. The series covers the following: 1) Guide to Systems Applications (\$17.95), 2) Techniques of BASIC (\$18.95), 3) Introduction to Graphics (\$15.95) and 4) Data Management Techniques (\$16.95). This reviewer was quite impressed with the quality and depth of the texts.

The Guide to Systems Applications begins with elementary concepts and introductory terminology. After a thorough discussion of microcomputer

systems, computer functions, and BASIC commands, the authors begin to show the reader the possibilities. The chapter on File Manipulation Techniques is exceptional. Sorting via a number of methods is discussed and shown by example. The authors take you through an Exchange, Shell-Metzner 'Quicksort', Key Record, Sort-Merge, BSST or Binary Sequence Search Tree. This material is followed by discussions on designing file structures and complete system programming.

Once you have digested the material, the authors demonstrate the various techniques with some major programs. The programs are all well remarked and completely tested for the TRS-80, some run on a 4K Level II (personal file system), 16K Level II (gradebook record system), 32K Level II with disk & printer (Mailing List System).

The intent is not to give the reader the 'best' program possible as it is to show how programs can be developed to meet your needs.

The Techniques of BASIC volume covers the topics of data analysis, graphing data, text processing, error trapping, sorting and includes over 60 programs.

The volume on Introduction to Graphics is aimed at showing the reader a variety of possibilities for inclusion in their own programs. It is aimed at the beginning programmer. Thirty-eight programs are included.

The fourth volume, Data Management Techniques, is written with the more advanced reader in mind. Memory, tape and disk files are managed in a number of ways. There is list, array, queue, stack and tree processing. ISAM files, linked lists, BSST transaction file merging, and multilist file management are discussed. Listings for 48 programs are given.

Pick the volume that most fits your needs. Not all volumes will appeal to every user of the TRS-80, and each text does include material that is either too elementary or too advanced for the general audience.

Cameron Brown



## The four BASIC statements

# Basically BASIC

T. R. Dettmann

For all TRS-80 models

In programming, we often lose sight of the forest for the trees. We have a tendency to confuse good programming with very specialized techniques. We forget that it is more than an ability to program random files, faster sorts, or tricky input routines. Good programming is the development of simple solutions to a given problem.

In reading magazines, many beginners will try a new technique before they have mastered the simpler basics. Even the seasoned professional will find he can accomplish a lot with the simplest BASIC commands and statements.

The four BASIC statements we will use in this article are: PRINT, INPUT, IF-THEN and GOTO. By learning how to use these statements effectively we can expand our programming skills a great deal. By adding one or two statements at a time, we can come up with some amazing capabilities.

### INPUT

We will use the INPUT statement in its very elementary form. At this point we will not allow it to do anything *but* enter information (data). The form of the statement is:

*INPUT variable-name*

where the variable-name can be either an alphanumeric string or a number. Strings are defined by

using a dollar sign (\$) behind the variable name. Those without the string declarator are numeric variables.

### PRINT

The PRINT statement is used to get information from the computer. It prints data to the video screen. The form we will use is:

*PRINT variable-name list*

where the variable name list can be one or more variable names consisting of numeric or string variables or constants. The only variable name list separator we will use in this article will be the comma.

### IF-THEN

The IF-THEN statement is used to make decisions. The form we will use is:

*IF (condition to be tested is true)  
THEN (do this)*

### GOTO

The GOTO statement is used to jump or branch to a new place in the program. We will use it with the IF-THEN statement in complex situations. Its form is:

*GOTO line number*

where the line number is the number of the program line to be jumped or branched to.

### Program design

The first step in any program is the design stage. Unfortunately, many BASIC programmers just sit down at the keyboard and make up little programs as they desire. For

serious programming, nothing beats prior planning.

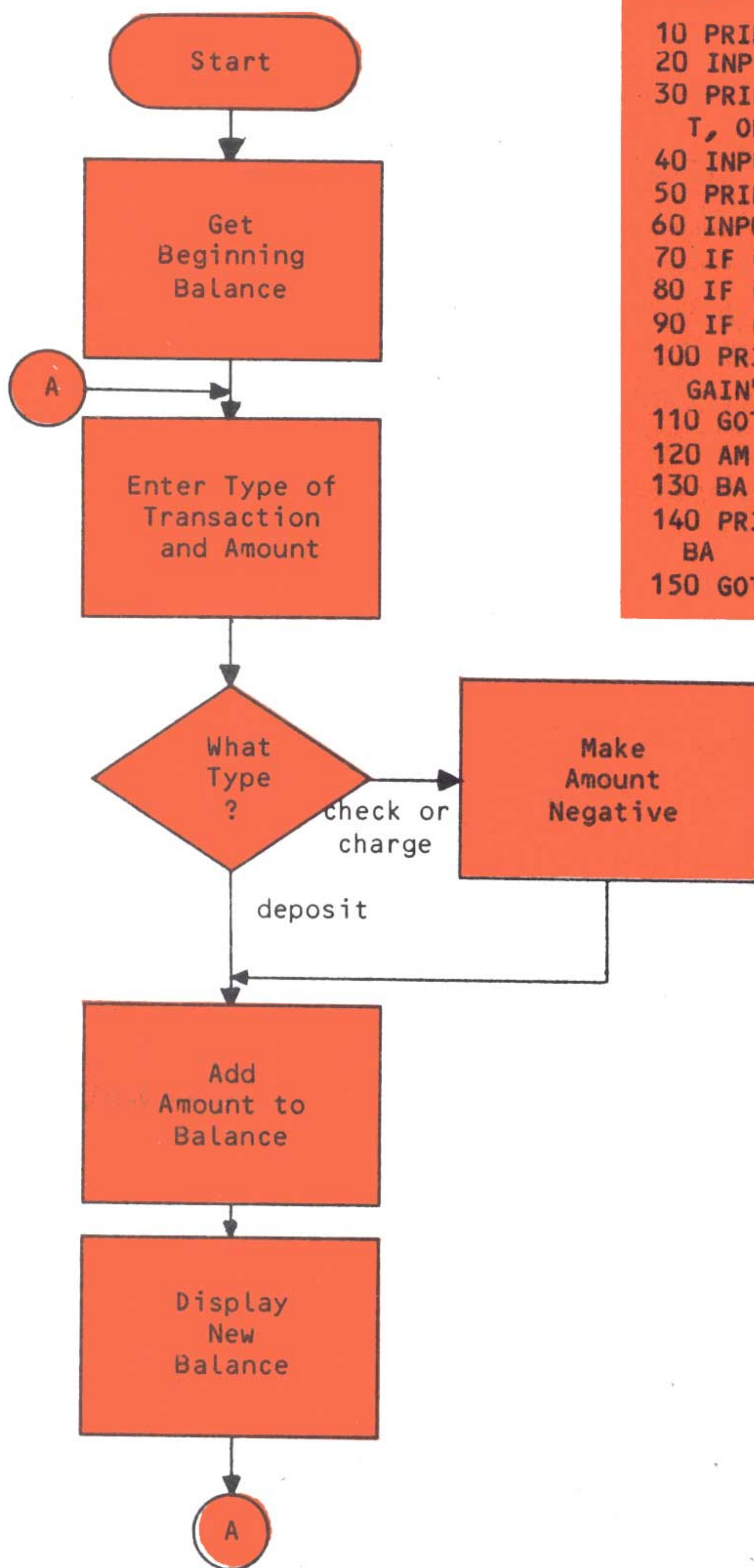
The standard method for design is the flow chart. It is a series of symbols, connected by lines to show the flow of the program. In its greatest detail, every minute step of the program is illustrated. In its simplest form, it isn't much more than a block diagram of the program concepts. There are arguments for both ends of the spectrum of the flow chart. We will show you a variation which is gaining wide-spread acceptance among computer scientists.

This variation uses English intermixed with BASIC statements and commands. As the program is prepared and refined, more and more of the English text is converted into BASIC. For foreign programmers, a foreign language text could just as easily be used, even though the BASIC portion is still in English.

Before we get into our sample program, there is one more thing to understand about BASIC. We talk about statements and commands. These are very much like English sentences. In BASIC, each sentence must be assigned a line number. The computer will numerically follow these line numbers unless instructed to do otherwise by the program itself.

Now let's design our program.





Flowchart for Program in Figure 1

```

10 PRINT "ENTER THE BEGINNING BALANCE"
20 INPUT BA
30 PRINT "ENTER (CK) CHECK, (DP) DEPOSIT, OR (CH) CHARGE"
40 INPUT C$
50 PRINT "ENTER AMOUNT"
60 INPUT AM
70 IF C$ = "CK" THEN 120
80 IF C$ = "DP" THEN 130
90 IF C$ = "CH" THEN 120
100 PRINT "ERROR IN DATA ENTRY -- TRY AGAIN"
110 GOTO 30
120 AM = - AM
130 BA = BA + AM
140 PRINT "AMOUNT", AM, "NEW BALANCE", BA
150 GOTO 30

```

Figure 1

The first step in any program design is to state or define "the problem we wish to solve" which is widely referred to as the program objective. More programs have been lost by ignoring this step. If the problem or objective is inadequately defined, the program will almost always require redesign.

For our problem, we state:

Do standard checkbook math starting with a beginning balance amount and then subtract checks and charges and add deposits. Print the results.

The flow of this program is shown in Figure 1. The initial English version will look like this:

- PRINT prompt for the beginning balance.  
 INPUT the beginning balance.  
 A/ Print prompt for check, deposit or charge.  
 INPUT transaction type.  
 PRINT prompt for amount.  
 INPUT amount.  
 IF check THEN B/  
 IF deposit THEN C/  
 IF charge THEN B/  
 PRINT error message.  
 GOTO A/  
 B/ Make amount negative.  
 C/ balance = balance + amount  
 PRINT amount, new balance  
 GOTO A/

Next we assign variable names which are similar to our English names in the program flow: BA for balance and AM for amount. See how closely our finished program matches the flow. ■



The Captain 80 Book of BASIC

# ADVENTURES

The world's most complete book of **BASIC ADVENTURES**! Eighteen, **YES 18**, of the most popular **ADVENTURES** available today, all in one book, easy to read, listings ready to be keyed in. **ADVENTURES** by Boner, Kepner, Powers, Micklus, Forsythe, Greg Hassett and others.

Including **TEMPLE OF THE SUN, DOG STAR, LOST SHIP, SPIDER MOUNTAIN, LOST DUTCHMAN'S GOLD, THUNDER ROAD, SORCERER'S CASTLE, DEADLY DUNGEON, ATLANTIAN ODYSSEY AND OTHERS.**

This unique book also contains an **ADVENTURE GENERATOR** program, not available anywhere else. **YES**, this program will actually write another **BASIC ADVENTURE** program!

Chapters on what an adventure is, how to play adventures, how to write adventures, how to sell your adventures, ten adventure program ideas, and more!

Although specifically written for the **TRS-80 Model I and III**, these programs are adaptable to other computers using **Microsoft's BASIC**.

Order yours today and order another for a gift, just in time for Christmas giving.



## It's Here!!!

## ONLY \$19.95 \*

## 18 PROGRAMS!!!

Send To: 80-U.S. Journal  
3838 South Warner Street  
Tacoma, Washington 98409  
(206) 475-2219

Please send \_\_\_\_\_ Copy (Copies) of the **ADVENTURE BOOK** for only \$19.95 each plus \*\$2.05 for postage & handling. Please use a separate sheet for Gift orders, we will send an announcement card with all gift orders.

Check M.O. Visa/MC# Enclosed

Name \_\_\_\_\_

Address \_\_\_\_\_

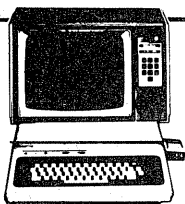
City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_

Visa/MC \_\_\_\_\_

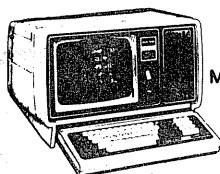
Exp. Date \_\_\_\_\_ Signature \_\_\_\_\_



meet a  
**REAL  
PLUS**



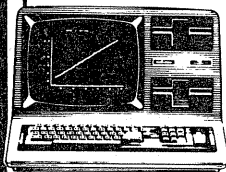
Color Computer 4K \$310  
w/Ext. Basic 16K \$459



Model II 64K  
\$3300



Atari 800 32K \$789



Model III 16K  
\$839  
2 DR + RS232C  
\$2100

These are just a few of our many fine offers — computers, peripherals, modems, printers, disc drives and an unusual selection of package values. Call TOLL FREE today and check us out for price and warranty.

Factory warranties on Apple and Atari equipment. Other equipment carries manufacturer's warranty or Computer Plus 180 day extended warranty. Combined warranties carry Computer Plus 180 day warranty or original manufacturer's warranty.

DEALER INQUIRIES ARE INVITED

Prices subject to change without notice.

TRS-80 is a registered trademark of Tandy Corp.

Call TOLL FREE

**1-800-343-8124**

**computer  
plus**

Write for your  
free catalog ...

Dept. A  
245A Great Road  
Littleton, MA 01460  
(617) 486-3193

Circle 74

## Tutorial

### What's the difference?

# BASIC & machine language

*Jim Klaproth, Associate editor*

### For Models I & III

This article deals with a subject that should be of great interest to a majority of 80-U.S. readers, namely, how does a machine language program differ from a BASIC program? To the great majority of TRS-80 users, assembly language is a mystery, reserved for only the elite who hold a Ph. D. in computer science. It is also a subject that most of us would like to know more about, judging from the tremendous interest generated by Leo Christopherson's magical animation techniques that have been published in past 80-U.S. issues. This article will attempt to explain what machine language is and how it differs from the native language of the TRS-80. It assumes no prior knowledge of the subject and is being written by a virtual novice to assembly language. Hopefully, it will serve as the beginning of a series of tutorials dealing with teaching the neophyte how to take the plunge into programming in assembly language.

### Is machine language the same as assembly language?

Machine language is not the same as assembly language, although the terms are sometimes mistakenly used interchangeably. Machine language consists of the actual binary or hexadecimal numbers that cause the Central Processor Unit (CPU) to carry out a specific function. Assembly language refers to a higher level language that enables the programmer to issue commands that will be translated into machine language by a program known as an "assembler".

### What is binary

"Binary" means "based on 2"; therefore, the binary numbering system contains only 2 elements: the numerals 0 and 1. Any decimal number can be expressed as a binary number, although very large numbers tend to be very clumsy when expressed in binary. Just as in the decimal system, digits are



placed in position by the power of ten they represent, so it is in binary only each digit represents a power of two. For example, the decimal number 1456 is composed of the following:

$$1 \times 10^3 + 4 \times 10^2 + 5 \times 10^1 + 6 \times 10^0 \\ 1000 + 400 + 50 + 6 = 1456$$

The binary number 1010 would be broken down as follows:

$$1 \times 2^3 + 0 \times 2^2 + 1 \times 2^1 + 0 \times 2^0 \\ 8 + 0 + 2 + 0 = 10$$

#### What does binary have to do with the TRS-80?

The TRS-80 utilizes an 8 bit microprocessor (CPU) known as the Z-80. This means that the Z-80 has the capability to input and output 8 binary digits (bits) at a time. 8 bits form what is known as a byte. This is important because it means that the largest binary number that can be represented during any one cycle is the number 11111111, which equals 255 in decimal. If we include the binary 0, that gives us a total of 256 possible byte combinations. What that means is that we can have a total of 256 possible instructions, each represented by a unique byte. For example, the instruction 00001000 tells the Z-80 to exchange the contents of two of its internal registers, while 00110100 tells it to increment by one the contents of another register. Actually, the Z-80 has more than 500 instructions, which is possible by combining two or more bytes into each instruction. Don't let the sheer numbers scare you - the majority of programs utilize only a handful of the basic instructions.

#### What is hexadecimal?

In early days of microcomputing, the programmer would actually program the computer by inputting each byte into memory through the use of switches on a front panel. You may have seen one of these panels on some of the older machines such as the IMSAI. This was a slow and tedious process that was prone to errors. Imagine inputting 4000 instructions, each containing 8 switch settings! A better way had to be developed - and it was. Why not break down the 8 bits into 2 groups of 4 like this: 1000 1101. Now treat each group as a separate number, each containing 4 digits. The highest number that can be represented is now 1111 which equals 15 in decimal. By using the

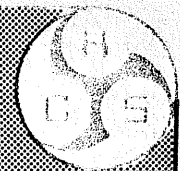
numerals 0-9 and the letters A-F, with A=10 and F=15, we can represent each 4 bit group with only one character. Thus, the binary 10001101 now becomes 8D in our new number system called hexadecimal or, simply, hex. (See page G/1 in your Level II Manual for further enlightenment.) Now the instructions could be entered via the keyboard in hex, with a sideline benefit of a great decrease in error probability. One is less likely to make an error with 2 digit hex numbers than with 8 digit binary numbers. A simple monitor program in the computer converts the hex numbers back into binary numbers for internal use of the processor. The TRS-80 and most all modern computers utilize the hex numbering system, while the octal (base 8) system is still used by some of the older generation machines.

#### What is an assembler?

At this point, the computerist still had a problem - namely, 8D or 4F still a long way from relating to the actual function that was desired. The problem was solved by creating a program called an "assembler". Each instruction was assigned a unique abbreviation or mnemonic that relates to each specific function. The mnemonic LD means to LOAD a register, ADD means to add two registers, and SUB means to subtract, and so on. The assembler allows the programmer to enter mnemonics into a text buffer and then the assembler converts each mnemonic into the corresponding hexadecimal Z-80 code. We call the actual mnemonics the "source" code, and the assembled output the "object" code. The object code is the machine language that the computer can actually run on.

#### BASIC differences

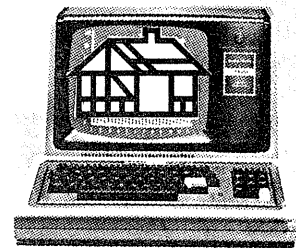
With all of that out of the way, we can now consider how a machine language program differs from a BASIC program. One of the most obvious differences, that should be apparent to even the most novice TRS-80 user, is the manner in which the two types of programs load from tape in Level II. To run a BASIC program, the CLOAD command is issued at the >READY prompt, while a machine language program uses the SYSTEM command. The difference in the two is the way that each loads into memory and the



## INTRODUCING

## COMPUTER SUBCONTRACTING

- Hardware Design
- Software Design & Marketing
- System Design & Installation
- Consulting



## INQUIRIES INVITED

*Live in Tomorrow's  
house today!*

**911 N.E. 148th  
Seattle, Washington  
98155  
(206) 771-1422**

HOME COMPUTER  
SYSTEMS



# MOVING? RENEWING? QUESTION or COMPLAINT?

## THEN USE YOUR LABEL

Please attach  
your  
label here,  
or copy  
your name and  
address as it  
appears on your  
label:

		zip
name	address	city
		state

All our services to subscribers are faster  
when you include your subscription label.

## WRITE IN NEW ADDRESS

Name \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_

# 80-U.S.

A DIVISION OF 80-NORTHWEST PUBLISHING INC.

**MOVING?** Please give us 6  
weeks notice. Attach your label when you  
send us the new address.

**RENEWING?** Check your  
label to be sure it's correct. By the way, your  
label shows the last issue in your current sub-  
scription in the top right corner. (Example  
MAR 81 means March of 1981 is the last issue  
you'll get.) For uninterrupted service include  
your label with your order.

**COMPLAINT?** We can  
give faster results when you include your  
label.

3838 South Warner Street  
Tacoma, Washington 98409

## Tutorial

format of the data on the tape. A machine language program must include the starting and ending memory addresses (where to load the program), and the transfer address (where to begin execution of the program), while the BASIC program simply loads text (similar to source code) into a reserved area of RAM. To begin execution, we enter RUN for BASIC or "/" for machine language. If we simply type "/" the program will automatically jump to the transfer address on the tape. We can also type "/" followed by an address in decimal and the program will jump there instead. This is the equivalent of entering GOTO XXX instead of RUN in Basic.

### What about speed?

Another obvious difference is that machine language programs run much faster than most BASIC programs. The difference in speed is due to the fact that machine language is optimized for the machine and does not require any processing before it is executed. On the other hand, the BASIC that is built into the TRS-80 is an interpreter BASIC. This means that before anything takes place at the machine level, each BASIC statement has to be converted or interpreted into its machine language equivalent, which takes time. What we have done in BASIC is achieved a higher level language with a trade-off of some execution speed. For most applications, this is not a serious deficiency; however, animation and certain repetitive functions, such as sorting, require the higher speed of machine language. Another alternative is a BASIC compiler, which gives us the best of both worlds. A compiler takes the BASIC text and compiles it into a machine readable format, thereby giving an increase of 2-8 times the speed over an interpreter.

### How does the Level II ROM work?

The Level II ROM (Read Only Memory) contains the machine language routines that accomplish this magic for us. The interpreter actually looks at the BASIC text and decides what machine language subroutine or "call" to execute. The BASIC ROM contains many such routines and these can be combined in many ways to accomplish a certain task in BASIC.

For example, when we type the BASIC command "CLS" and the program is run, the interpreter "recognizes" the characters CLS and tells the program to jump to an address in the ROM that contains the machine code to clear the screen. This particular routine is a very short one that causes the program to return to its original location after clearing the screen, much as a RETURN from a GOSUB does. Now, if we were to write a machine language program that simply cleared the screen, we could either write out the actual instructions with the aid of an assembler or a monitor program, such as TBUG, or we could simply call the routine that is contained in the Level II ROM. Therein lies the power of the BASIC ROM for the assembly language programmer.

### Why bother with machine language?

Why do we even need to mess with machine language, if we have a high level language like BASIC, and even a BASIC compiler? There are many answers to that question. First of all, there are times when we have an excellent BASIC program which could be enhanced by adding a machine language subroutine, through the USR function or by use of string or line packing. Examples of this include adding sound to a game, adding a high speed sort to a mailing list, or adding a flashy animated title page to that fancy program we are going to submit. Secondly, most games that utilize high speed graphics require the speed of machine language. Third, some functions, such as matrix operations, are not available to the BASIC programmer and can be performed in machine language. Fourth, programs written for process control tend to be more efficient when written in machine language. For example, it would be an easy task to interrogate a temperature sensor 20 times per second in machine language, but not so in BASIC. Lastly, it gives one an opportunity to learn a new and exciting computer language. Hopefully, we will touch a little on each of these applications in future articles. In the meantime, I hope you have a better understanding of what machine language is and more interest in learning this fascinating and powerful language. ■



# SUPERGRAPH,

from page 90

The function subroutine must assign one value to F for one value of X. Be sure not to use the following variables in the subroutine: MD, X1, X2, Y0, X0, DY, DX, Y1, Y2, M1, M2, I1, I2, XL, XR, FF, FK, FG, FP, F1, CN, CA, CB, CC, CD, CE, DG, ER, IO, IN, MO, MN, XA, XB, XC, YC, FX(I), IX(I), MX(I), FC(I), MC(I), and IC(I) (I=0 to 98)

When you are ready to graph, type "GOTO20" and you will see:

ENTER Y-AXIS LABEL (11 CHARS. MAX)?—

Now enter the axes labels. If no labels are entered, the default labels will be "FUNCTION" for the y-axis and "INDEPENDENT VARIABLE" for the x-axis. Labels exceeding the maximum allowable length will have to be shortened and re-entered.

After the label information has been entered, enter the initial function mode and initial end points.

ENTER Y-AXIS LABEL (11 CHAR MAX)? PROB!DIST  
ENTER X-AXIS LABEL (40 CHAR MAX)? VARIABLE  
INITIAL FUNCTION MODE:

- 1=FUNCTION ITSELF
- 2=DERIVATIVE OF THE FUNCTION
- 3=INTEGRAL OF THE FUNCTION

?1

ENTER LEFT ENDPOINT: -5

Valid modes are 1, 2 and 3. Any other entries will be rejected. When entering end points, note the following:

- 1) Except for E, +, -, ., ,, - and "Shift-", non-numeric data is ignored.
- 2) Values beyond the capability of the machine are rejected (e.g., 1E+45).
- 3) Pressing - clears the last character entered. Pressing the "Shift -" key clears the entire entry.
- 4) Meaningless data will be treated as 0.
- 5) If the initial left end point (lep) equals the initial right end point (rep), both have to be re-entered.
- 6) If the rep is less than the lep, they are automatically switched.

When the initial end points are entered, the program will graph the function, the derivative of the function, or the integral of the function depending on the function mode selected. In the

## MODEL III DISK DRIVES AVAILABLE NOW!!

- Super Disk Controller. Allows you to read any soft sector diskette. **Single or Double Density!**
- Reads 5¼" and 8" Diskettes!
- No additional hardware required to read 8" diskettes.
- Enhanced storage capability of up to 800 kilobytes per drive with purchase of the 80 or 160 track drives.
- Convert existing Model I software to Model III format\*
- Complete package includes Drive, Power Supply, Cables, Controller Board, Brackets and DOS.

**40 Track Drive - \$775.00**

**80 Track Drive - \$895.00**

**160 Track Drive - \$995.00**

\* Some programs may require patching to operate.

Dealer Inquiries Invited

Model III TRS-80 is a product of the Tandy Corp.

**Watch for our 10 megabyte Model III-H Winchester Drive System!**

**Call or write for further information**



**Micro Mainframes**  
**714 Alhambra Blvd.**  
**Sacramento, CA 95814**  
**(916) 447-7048**



Circle 76

## MODELS I & III UPGRADED Check Our Prices!

- TRS-80 Model III Level II 16K **\$925.00**
- 16K Memory upgrade for Mod I, III & Color **\$59.95**
- New Archbold Speed up board **\$44.95**
- 5¼" Verbatim Diskettes (Box of 10) **\$24.95**
- Vista V-50 40 track double sided disk drive **\$395.00**
- Vista V-800 80 track double sided disk drive **\$595.00**
- Vista V-8000 160 track double sided disk drive **\$795.00**

*Drives include case & power supply but no cable.*

- Cable for 2 drives **\$23.95**
- Printer Multiplexer Box, handles up to 4 printers at the same time, user selectable. ★
- Epson MX-80 ★
- Vista V-300 Daisy Wheel Printer ★
- EPROM Programmer ★
- MAXI-ZAP for Model III **\$79.95**  
(Greatly enhanced Super-Zap like Utility for Model III, written in machine code. Reads Model I and Model III Diskettes!)
- Sea Gate Technology 5 Megabyte add on Winchester Drive for Model I only **\$2995.00** complete until June 1, 1981.

**CALL OR WRITE FOR FURTHER INFORMATION**

★ Please call for these prices



Circle 77

**Micro Mainframes**  
**714 Alhambra Blvd.**  
**Sacramento, CA 95814**  
**(916) 447-7048**



case of the default equation, graphing takes approximately 25 seconds for the function itself and 35 seconds for the derivative and integral. A count will be displayed in the lower left hand corner. Calculation can be stopped at any time while this count is displayed. To stop calculation, press "S". Stopping is independent of the function mode.

When the graph is complete, the count will be replaced by a "G" in the lower left hand corner of the screen. The program is now in the G sub-mode.

The function mode which the program is in can be determined at any time by observing the y-axis label. If the graph is a derivative "D\*(assigned label)\*" will be printed as the label. If the function itself is plotted, the assigned label will appear by itself. For example, if the assigned label is "PROB!DIST", the label of the derivative will be "D\*PROB!DIST\*". Under the G sub-mode, the following are available:

T - Display x-axis label in lieu of current end points.

W - Display current end points in lieu of x-axis label.

C - Insert cross-hatch reference points.

L - Move one range left and graph under current function mode.

R - Move one range right and graph under current function mode.

D - Double range and graph under current function mode.

H - Half range and graph under current function mode.

(Note: 1 range is defined as ABS(rep-lep) or 1 x-axis length).

P - Change lep.

Q - Change rep.

(Note: If you use "Q" to enter "5" and then try to use "P" to enter "5", the program will not accept the new data. However, you do not have to re-enter data using the "Q" command (as under initialization). Use the "W" command to view endpoints as they are changed.)

E - Graph under the current function mode using data entered with the "P" and/or "Q" commands.

S - Stop calculation of graph and return to the G sub-mode.

F - Change function mode to function proper (1) and graph using end points as modified by above commands.

M - Change function mode to derivative (2) and graph using end points as modified by above commands.

(Note: Graph calculation begins immediately upon pressing E, F, M or I. If you have made a mistake in choosing the correct function mode, merely press "S" and then the correct

mode).

X - Go to the examine sub-mode (X) under the current function mode.

(Note: If the end points have been altered or graph calculation has been stopped using the "S" command, you cannot enter the X sub-mode until a complete graph is plotted and a "G" has appeared in the lower left hand corner of the screen).

Here is an example of using the G sub-mode. Under initialization you choose the default equation  $F = .398942 \cdot \text{EXP}(-.5 \cdot X \cdot X)$ . The y-axis label and x-axis label will be "PROB!DIST" and "VARIABLE" respectively. The initial function mode will be (1). After entering -5 for the lep and 5 for the rep, the familiar bell curve will be plotted. You now press "M" so that you can see what the derivative looks like.  $d/dx(.398942 \cdot \text{EXP}(-.5 \cdot X \cdot X))$  will be plotted. Now press "I" to graph the normal probability curve

$$\int_{-5}^X (.398942 \cdot \text{EXP}(-.5 \cdot X \cdot X)) dx.$$

Now press "F" to re-graph the function itself.

Further manipulation of the graphing can be achieved by using the "S" command in connection with the "L", "R", "H" or "D" commands. First press "W" to display the current end points. By pressing "R" and then "S" you will have moved the endpoints to 5,10. By pressing "R" and "S" again you will have moved the endpoints to 10,20. When you have obtained the desired end points press "F", "M" or "I". Thus, you can quickly scan a function and/or its derivative and integral. Similarly, you can use the "H" and "D" commands to quickly zero in on or expand the function.

Once the graph is plotted, the X sub-mode can be entered. Pressing "X" will cause the following to happen:

- 1) Blinking cursors will appear on the function. Non-blinking cursors will appear on the x and y axes.
- 2) The x-axis label will be replaced by the x-y coordinates of the blinking cursors.
- 3) The "G" in the lower left hand corner of the screen will be replaced by an "X" signaling that the program is ready to accept X sub-mode commands.

If the program is in any function mode (1), (2) or (3), the following commands are available:

↑ - Move the left cursors 1 division right.

Shift↑ - Move the left cursors continuously right.

↓ - Move the left cursors 1 division left.

Shift↓ - Move the left cursors continuously left.

Note: Left arrow, right arrow, shift-left arrow and shift-right arrow do the same as above,



but manipulate the right cursors.

H - Halts continuous movement of cursors.

E - Exits X sub-mode, and enters G sub-mode. End points remain unaltered and no new graph is plotted.

G - Exits X sub-mode, enters G sub-mode, and graphs the function under the current function mode using the end points as altered by cursor movement.

If the program is in the function proper mode (1), the following additional commands are available to further examine the function. They are ignored under function modes (2) and (3):

M - Allows manipulation of the left cursors while displaying the x-y coordinates and slope at the blinking left cursor. This will allow scanning of the slope of the function. The right cursors are disabled.

A - Calculate slope at left function cursor to  $\pm 1$  in the fifth significant digit ( $\pm 1.5SD$ ).

Note: a) The iteration count replaces "X" in the lower left hand corner of the screen. The current approximation is displayed at the bottom of the screen.

b) If the slope does not seem to converge, or the current approximation is satisfactory, press "S". The last approximation and the final iteration count will be displayed at the bottom of the screen.

I - Calculate integral between current cursor positions to  $\pm 1$  in the sixth significant digit ( $\pm 6SD$ ).

Note: a) The integration count replaces the "X" in the lower left hand corner of the screen. The current approximation is displayed at the bottom of the screen along with the current iteration count.

b) If the integral does not seem to converge, or the current approximation is satisfactory, press "S". The last approximation and the final iteration count will be displayed at the bottom of the screen.

S - Solve for a root which lies between cursors to  $\pm 1$  in the sixth significant digit.

Note: a) The iteration count replaces "X" in the lower left hand corner of the screen.

b) If the root is less than  $1E-07$ , it is assumed to be 0 due to the precision of the machine.

c) Since the bi-section method is used, the function value at each cursor must differ in sign.

R - Re-display x-y coordinates of each cursor at the bottom of the screen after a calculation using the M, A, I or S command.

Note: a) If the left cursor position has been modified by the "M" command, the position will remain the same when "R" is pressed.

See SUPERGRAPH, page 150

## Color Computer News

**Color Computer News** is the first and only magazine devoted to the users of Radio Shack's Color Computer. **Color Computer News** allows CC users to have a source of information about their machine plus forums for the exchange of ideas, discoveries, helps, and complaints. **CCN** is published every other month and contains features like 6809 Assembler programming, Novice Basic, Advanced Basic, Letters and Technical Forums. **CCN** reviews current products for the Color Computer and tells the truth about them, good or bad.

It's not just a beginner's magazine either, it prints what old hacker's need to know too. Things like entry points to the ROM and pointers in the Basic scratchpad.

**Color Computer News** is more than just a magazine, it's also a software exchange service. Color Computer owners can exchange original software by contributing it to the **CCN** library where several of these programs are put on a tape and distributed for a nominal fee. **CCN** is also a nationwide User's Group. **CCN** helps establish local User's Groups with form letters, posters, names and publicity.

If you own a Color Computer you need a subscription to **Color Computer News**. While the other magazines will print some articles about the Color Computer you need a constant source of information to stay abreast of what's happening with the Color Computer.

A charter subscription to **Color Computer News** is just \$9.00 for 6 issues. But you'd better hurry, you don't want to miss a single issue.

Available From:

**REMarkable Software**

P.O. Box 1192

Muskegon, MI 49443

Some back issues available for \$2.50 including postage and handling.

Circle 78

## STOP PLAYING GAMES!

Computer games are fun and recreational, but we believe the computer has great educational potential too. We specialize in the production of quality educational software for school and home use of the TRS-80 computer.

### ELEMENTARY/MIDDLE SCHOOL

Entertaining, challenging package of programs to aid and develop word recognition and spelling skills, for the high ability elementary (to adult) user. **WORD RECOGNITION PACKAGE** TAPE, \$14.95. DISK, \$19.95

### HIGH SCHOOL/COLLEGE PHYSICS

A series of **PHYSICS TUTORIAL STUDY UNITS**, written in easy-to-grasp manner for use both as in-school computer-aided-instruction, and at-home personal physics tutor. Each unit treats a major body of material and contains: subject synopsis, formulae, carefully designed problems, and fully explained solutions. Problems change each time program is run. Some titles available are: **DYNAMICS-NEWTON'S LAWS OF MOTION, MOMENTUM, HEAT AND TEMPERATURE STUDY UNIT (A), HEAT AND TEMPERATURE STUDY UNIT (B)**. Write for other physics titles available.

**SET OF FOUR TITLES** TAPE, \$65.00. Disk, \$75.00  
**INDIVIDUAL TITLES** TAPE, \$17.50. DISK, \$20.00

### GRADES MANAGEMENT

**GRADES MANAGEMENT** program enables teachers using numerical grades to create student/grade files without requiring disk capability. Determine periodic average with both numerical and bar-graph presentations. Computes final grades using your own school formula (please provide), or mine. Disk version has advantage of greater speed and flexibility of disk.

TAPE, \$24.95. DISK, \$29.95

### PROGRAM FOR PILOTS

**NAVIGATION AIDS**. Use to determine straight-line distance, time, fuel, best altitude, and power before flight to save time and money.

TAPE, \$9.95. DISK, \$14.95

**MONTHLY BILLING**. For small groups, partners or clubs sharing expenses of an aircraft. Quickly, accurately determines (and prints) each member's bill.

TAPE, \$14.95 DISK, \$17.50

**CLUB BILLING**. For groups or clubs billing on hourly basis. Handles aircraft rentals (wet/dry), instruction, dues, taxes, etc.

TAPE, \$24.95. DISK, \$29.95

**ORDERING INFORMATION**. Please add \$1.00 for first tape or disk, or \$2.00 to an order of two or more programs, for postage and handling. New York State orders add sales tax. Please indicate TRS-80 model and memory.

### THE TEACHING ASSISTANT

22 SEWARD DRIVE, HUNTINGTON STATION, N.Y. 11746

TRS-80® is a registered trademark of Tandy Corp.

Circle 79



## GRAPHICS EDITOR AND PROGRAMMER

(GEAP) Part text editor, drawing utility, and BASIC program creator best describes GEAP. GEAP's command library allows creation of intricate screen images and formats. When finished, **GEAP will construct a BASIC program that will recreate the image you have drawn.** The program created requires no special operating system. Just type RUN. Program writing options allow ASCII compatible (hand-editable, also required by some compilers), compressed or String format. Using GEAP's commands **requires no knowledge of BASIC programming.** However, GEAP's features make it the professional's choice.

GEAP's facilities include over 40 commands. GEAP will **magnify, rotate, shrink,** or move figures to other locations. You may move all or selected portions of the screen, **create one composite drawing from 2 or more drawings,** reverse graphic pixels, shift between graphics, alphanumerics, create your own graphic characters and much more. Most other Basic program drawings may be edited to GEAP's Basic program format. Future **expansion modules** are planned or you can design your own now. Model I, 16K min, LII, Disk, and stringy are supported. Cassette and 20 page manual - 16.99 / Manual only 2.99 - CA. add 6% - Dealer inquiries invited.  
**J F CONSULTING-74355 BUTTWOOD-  
PALM DESERT, CA 92260**

Circle 80

## \*TRS-80 Level 2 QUALITY SOFTWARE 7 DAY REFUNDS!

FOR CATALOG  
Send 50¢ mail charge

J/C Enterprises  
BOX 441186  
MIAMI, FL. 33144

\*trademark Tandy Corp

Circle 81

## — Professional — Real Estate Software

For APPLE, TRS-80 & PET

### Property Management System (32K, 1 Disk Systems)

#### Features:

- Tenant Information
- Late Rent Reports
- YTD & Monthly Income
- Handles —
  - Partial Payments
  - Returned Checks
  - Advance Payments
  - Prints Receipts
- 5 Digit Expense Accounts
- Building Expense Report
- Vendor Expense Report
- Income Tax Report
- All Reports Can Be Printed
- Complete Documentation
- Easy Data Entry & Edit
- Vacancy Report

Price \$275.00

### Real Estate Analysis Modules: (Cassette or Disk)

- 1) Home Purchase Analysis
- 2) Tax Deferred Exchange
- 3) Construction Cost/Profit
- 4) Income Property Cashflow
- 5) APR Loan Analysis
- 6) Property Sales Analysis
- 7) Loan Amortization

\$35 Per Module

**Real Estate Software**  
**Real Estate Company**

At Computer Stores Everywhere  
Or Order COD Direct  
(Cal Residents Add 6% Sales Tax)  
(213) 372-9419

Circle 82

Dept. U, 1116 'F' 8th St., Manhattan Beach, CA 90266

## Teachers Grade Keeper CC/Mod I/III \$29.95

Tracks attendance, project grades, test grades, prints class roster & grade reports.

### The Enemy Below Color Computer \$29.95

Real time Search & Destroy Subtracting War Game / using realistic sonar simulation.

Write for Monthly Updates on New Products

**HOME COMPUTER  
SYSTEMS**  
911 NE 148th  
Seattle, WA 98155  
(206) 771-1422

Circle 83

## Data Acquisition and Control for the TRS-80\* \$180 ppd.

The STARBUCK-8882 is a complete eight channel data acquisition and control system, plug compatible with the Model I Level II TRS-80. It includes 8 protected analog inputs (0-5 Vdc with  $8 \pm 1$  bit accuracy), 8 protected digital inputs, 8 optoisolated digital outputs, and two joystick ports. Interrupt-driven software package allows **simultaneous** data acquisition and storage while using the TRS-80 for any other purpose!

Application manual covers home security, energy monitoring, weather station use, appliance control, graphics and games. Price includes case, power supply, extra expansion card edge, connector cable, complete software package and detailed applications manual. Manuals only are available for \$4.00 ppd. To order, write:

**STARBUCK DATA CO.**  
P.O. Box 24, Newton, MA 02162

Massachusetts residents add 5% sales tax.

\*TRS-80 is a trademark of Tandy Corp.

Circle 84

## Wall Street Software™

- PORTFOLIO MANAGEMENT SYSTEMS
  - OPTION PRICE ANALYSIS PROGRAMS (volatility, time premium, Black-Scholes)
  - STOCK PRICE TREND ANALYSIS (volume, price, direction, screens)
  - FUNDAMENTAL & TECHNICAL ANALYSIS (P/E, yield, dividend performance, etc.)
  - ON BALANCE VOLUME - Granville
  - COMMODITIES, BONDS, WARRANTS
  - COMPUTER INVESTOR NEWSLETTER AVAILABLE
- Over 100 easy-to-use professional investment analysis programs similar to those used by the large investment houses now made affordable. For Apple, TRS-80, ATARI, PET, CP/M and others.

SEND \$3 TODAY FOR OUR CATALOG

Wall Street Software  
332 E. 30th Street  
New York, NY 10016

Order Toll Free  
1-800-528-6050,  
ext. 1592

Your System ☐ No System

Name

Address

City/State/Zip

© Computer Services Corporation of America

Circle 85

## DENTAL COMPUTER NEWSLETTER

E.J. Neiburger,  
D.D.S., Editor  
1000 North Ave  
Waukegan, IL 60085

The DCN is an international group of dentists, physicians and office management people who have interests in office computers. Though the emphasis is on micro-computers, many members use minis. We cater to all makes and brand names. Annual membership dues \$12.00. Membership runs from January to January. If you join mid-year, we will supply you with the years back issues.

Circle 86

## Teach Yourself by Computer Software™

### Educational Software for TRS-80\*\* and Apple\*

**Individual Study Center** - (7 programs) study any subject for Grade 1 to Adult; over 50 different subjects available. (TRS-80 Lev. 11, 16K and Apple Cassette \$49.95. Apple Disk 48K \$54.95).

**Words For The Wise** - 5 activities plus 1000 words or you can make your own words. (TRS-80 Lev. 11, 16K \$24.95)

**Earth Science Series** - for Jr. and Sr. High School (12 programs - TRS-80 Lev. 11, 16K, \$68.50)

For free information write to:  
**TYC Software™**

40 Stuyvesant Manor Dept. B  
Geneseo, NY 14454 716-243-3005

\*Trademark of Apple Computer Inc.

\*\*Trademark of Tandy Corp.

Circle 87

## IEEE-488 TO TRS-80\* INTERFACE Everything needed to add *powerful* BASIC GPIB-488 controller capability to TRS-80 Model 1 or 3, Level 2 or DOS with a minimum of 16K.

488-80B  
For Model 1  
Operation



488-80C  
For Model 3  
Operation



Model 488-80B or 488-80C Price: \$325.  
+ shipping, insurance & tax

WHEN ORDERING SPECIFY DISK OR TAPE

### SCIENTIFIC ENGINEERING LABORATORIES

11 Neil Drive • Old Bethpage, NY 11804  
Telephone: (516) 694-3205

\*Trademark of Tandy Corp.

There is no affiliation between Scientific Engineering Laboratories and Tandy Corp. or Radio Shack.

Circle 88



**COLOR COMPUTER  
Terminal Package  
\$29.95 Tape**



**Can go to and from BASIC  
while connected to other  
computers.**

**Full access to RS-232  
routines.**

**COLOR COMPUTER  
Smart Term I  
\$39.95 Tape**

**All above plus upload & download.**

*Write for monthly updates on new products*

**HOME COMPUTER  
SYSTEMS**

**911 NE 148th  
Seattle, WA 98155  
(206) 771-1422**

**Circle 89**

**3 NEW PROGRAMS FOR TRS-80  
L II, Mod I, III, 16K**

**STOCK CHART GRAPHER:** Track your own stocks price performance. Shows trading prices, volume, moving advances and price momentum for up to 16 dates, \$24.95.

**STAR SEARCH ASTRONOMY GUIDE:** Obtain an instant map of the skies overhead. Over 400 sky wonders displayed to scale with scientific data, \$19.95.

**THE RECORD KEEPER:** An all purpose filing system for Birthdate, Addresses and more. Holds up to 100 records of 57 characters each for fast tape storage. Includes keyword search update, and edit routine, \$14.95.

**SEND CHECK OR MO TO:**

**Softbyte Computing  
Box 217  
Wallingford, CT 06492**

 **softbyte computing**

**Circle 90**

**PLASTIC TRS-80 INFORMATION SHEET**  
Stop putting all that information about addresses, ROM calls, graphic characters, and scan routines on your wall. Use this bright, durable, easy-to-find yellow plastic sheet. Save time! (8 1/2" X 11" two sided) \$3.50 ea.

**NEW DISK LABELS-Get Organized!!!**  
Utilize your disk directory program; Number your disks and save time! 105 Blue Ink Labels that peel off. \$2.50 per pack.

**BEHAVIOR MODIFICATION MANAGEMENT**  
Written by a Behavioral Psychologist. System consists of 3 interacting programs. Will keep track of 47 different behavior modification programs per disk. Will output to a line-printer progress report. Requires Model I 48K, 2 drives, and GSF by Racet. \$35.00.

Send check or MO to:

**Computer Vision  
P.O. Box 658  
Lapeer, Michigan 48446  
(313) 653-5954**

*Dealer Inquires Welcome*

**Circle 91**

**Micro-Grip™**

FRICITION FEED FOR YOUR EPSON

**MX-70\* or MX-80\***

\*MX-70 and MX-80 are Trade Marks of EPSON, Inc.

- \*\*\*\*\*
- + Converts your printer for friction feed of SINGLE SHEETS or ROLL PAPER.
- + Snap-on Installation (all you need is a screwdriver, no soldering)
- + Tractor feed remains undisturbed.
- + Proven reliability.
- + Available NOW!
- + Only **\$39.95** (add \$1.50 for postage)
- \*\*\*\*\*

SATISFACTION GUARANTEED OR YOUR MONEY BACK



VISA & MasterCard Accepted  
(804) 826-8808

**MICRO-GRIP, Ltd.  
P.O. BOX 873  
LAFB, VA 23665**

**Circle 92**

**Soft-R Software**

**PLAYPEN**

**A new, exciting game for couples.**  
Put new 'Z' in your life! You won't get tired of this one.

**R.S. 2.3 or NEWDOS 80 ..... Tape**  
Tape ..... **\$18.95**  
Disk ..... **\$17.95**

**Model I**

**Paneltech, LTD  
P.O. Box 218070 Dept. C  
Houston, TX 77218-0070**

**Visa/MC Welcome**

**Circle 93**

**Model II SCRIPSIT®  
Q CARD**

**Circle 94**

An alphabetically listed, quick reference guide for the TRS-80® Model II Word Processing program. \$7.50 per card. Send check or Money Order. OH Res. add 4 pct. tax. Available through:

**Gerhart, Prasher &  
Assocs., Inc.**

**5233 Stoneham Road  
N. Canton, OH 44720  
Tel. (216) 494-7699**

®SCRIPSIT and TRS-80 are reg. trademarks of Tandy Corp

**MODEL II USERS**

**TIRED OF WAITING FOR DISK  
FORMATS AND BACKUPS?**

FASTFMT formats and verifies a disk in 43 seconds. TRSDOS™ FORMAT takes 2-1/2 minutes.

FASTBAK formats and verifies a full disk in 55 seconds (2 drives).

TRSDOS BACKUP takes 8 minutes.

Both utilities on an 8" TRSDOS diskette, for systems with 1 or more drives.

**\$49.95 plus \$2.00 shipping**

VISA/MC

TRSDOS is a trademark of the Tandy Corp

**The MicroProgrammers  
5629 University Way NE  
Seattle, WA 98105  
(206) 525-1466**

**Circle 95**

**STRINGY FLOPPY  
GENERAL LEDGER**

**Works like DISK General Ledger  
FEATURES:**

- UP TO 100 ACCOUNTS!!
- UNLIMITED entries per Accounting Period

**PRINTS:**

- Journal & Ledger Updates
- Chart of Accounts
- Trial Balance
- Income Statement
- Balance Sheet

**Requires 16K Level II, Printer, and Stringy Floppy**  
Only \$49.95 from:

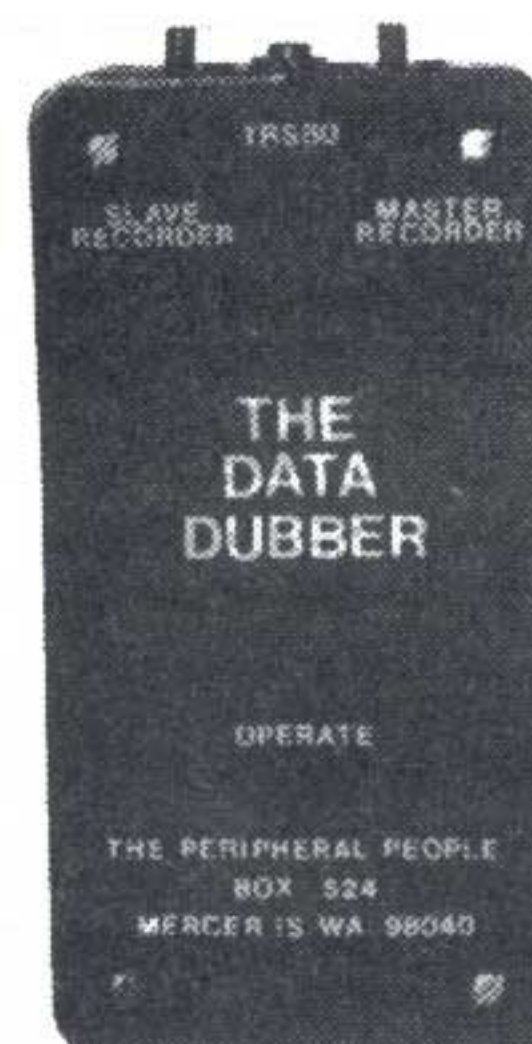
**Maine Data & Financial  
Systems Inc.**

**S.R. 79, Box 103  
Orland, ME 04472**

**Stringy Floppy is a trademark of the Exatron Corporation**

**Circle 96**

**END YOUR TAPE LOADING PROBLEMS  
FOREVER!**



Circle 97

\$49.95

**THE DATA DUBBER**

**THE PERIPHERAL PEOPLE  
P.O. BOX 21123 - SEATTLE, WA 98111  
(206) 632-8649 MC & VISA O.K.**



# SUPERGRAPH,

from page 147

- b) Full cursor control of both end points is returned).

Here is an example of using the X sub-mode. You have just plotted the bell curve in the first example. Now you press "X" to enter the X sub-mode. Now press "I" to find

$$\int_{-5}^{+5} (.398942 * \text{EXP}(-.5 * X * X)) dx.$$

This integral should approach 0.999999 and as you will see, it does. (Check a standard probability table to confirm this and other integrals.) Now press "R" and position the left cursor at L = (0.857143, 0.276295). Observe the left coordinates as you move the cursor. Press "A" to calculate the slope at this point. The answer will be printed at the bottom of the screen.

## Error handling

Make a mistake? Errors are handled as follows:

- 1) If an overflow, division by 0, or illegal function call is encountered within the function subroutine, "ERROR/OVERFLOW at X = "number", TRY NEW ENDPOINTS" will be printed at the bottom of the screen. Control is returned to the G sub-mode and you may enter new end points with the "P" and "Q" commands. Be sure not to include "number" within the new range!
- 2) Syntax errors which occur in the function subroutine will cause "SYNTAX ERROR IN LINE (number) OF FUNCTION" to be printed at the bottom of the screen. In 5 seconds, the program will re-initiate itself printing the current error code and number of the line where the error occurs.
- 3) Other errors are treated like syntax errors above. The program is restarted with the error information printed. However, the error information may or may not concern the function. Consult the User Manual to determine the error.

## Disk operation

Supergraph will run with disk BASIC as well as with Level II BASIC. However, there is one advantage to using disk. Suppose you write the following program which describes a special function:

```
LIST
30 Y$="SOME FUNC":X$="SOME VARIABLE"
5000 IFX<0,F=1/0
5010 IF X>=0 AND X<1, F=X
5020 IFX>=1ANDX<5,F=X*X
5030IFX>=5,F=25
5040 RETURN
```

Now save the program under the file name "SPECFUNC/BAS" but use the A option. Load Supergraph and then merge "SPECFUNC/BAS". When you type RUN and then "GOTO20, you will see:

TITLE: SOME FUNC VS. SOME VARIABLE

INITIAL FUNCTIONS MODE:

1=FUNCTION ITSELF

2=DERIVATIVE OF THE FUNCTION

3=INTEGRAL OF THE FUNCTION

?—

The old function is over-written and the titles are automatically entered! Following the above procedure you can build your own library of special functions to be called when needed. However, observe the following rules:

- 1) Using line 30 only, assign the y-axis label to Y\$ and the x-axis label to X\$. Observe maximum lengths!
- 2) Start the next line with line 5000 and use 10 line increments. Make sure that the last statement is a RETURN statement and does not exceed line 9999. Following these procedures will insure that the old function is erased when the new one is loaded.
- 3) Make sure that a value for F is assigned for all values of X. If F is undefined for a given X, it will force an error as in line 5000 of "SPECFUNC/BAS". The error handling routine will then trap the error and allow a shifting of end points.

## Some other notes

Since differentiation is a subtracting type function, graphing a derivative of a rapidly changing function will give errors. First graph the function itself to insure that it is not changing too rapidly over the given range, then graph the derivative.

When using the "A" command in the "X" sub-mode, a slope may not converge if it is too close to 0. If the program senses this case, it will assume that the slope is 0.

In some graphing programs, a horizontal function will cause an error. For example, the default equation (probability distribution) when graphed from 100 to 200 will yield a horizontal line at F=0. Supergraph will sense this and graph it as such.

```
10 CLS:PRINT"ENTER FUNCTION AS SUBROUTI
NE 5000. THE ENTRY VALUE SHOULD":PRIN
T"BE STORED IN VARIABLE X, AND THE RE
TURNED VALUE IN VARIABLE F.":PRINT"EN
TER 'GOTO20' WHEN FINISHED.":PRINT:PR
INT"CURRENT FUCTION ( ERROR="DU",LINE
"ERL")":PRINT:LIST5000-10000
20 CLS:CLEAR300:S1$=STRING$(63," "):S2$
=STRING$(31," "):DIMFX(99),MX(99),IX(
99),YC(99),MC(99),IC(99):PRINTTAB(25)
"SUPERGRAPH":PRINTTAB(25)"VERSION 1.0
":PRINT:PRINTTAB(22)"BY DAVUT Z. KORK
UT":PRINT:PRINT:X$="":Y$="":ONERRORGO
T011460
```



```

30 REM *** MERGED LABEL INFORMATION GOE
  S IN THIS LINE ***
40 IF LEN(X$)<>0 AND LEN(Y$)<>0,PRINT"TITLE: "Y$ VS. "X$;:GOTO100ELSEPRINT@384,"ENTER Y-AXIS LABEL (11 CHARS. MAX.)";:INPUTY$
50 IF LEN(Y$)>11,PRINT@384,S1$;:Y$="":PRINT@384,"TOO MANY CHARACTERS.":FORI=0 TO1000:NEXT:GOTO40
60 IF Y$="","",Y$="FUNCTION"
70 PRINT@448,"ENTER X-AXIS LABEL (40 CHARS. MAX.)";:INPUTX$
80 IF LEN(X$)>40,PRINT@448,S1$+" ";:PRINT@448,"TOO MANY CHARACTERS.":PRINT@512,S1$;:X$="":PRINT@576,S1$;:FORI=0 TO1000:NEXT:GOTO70
90 IF X$="","",X$="INDEPENDANT VARIABLE"
100 PRINT@512,"INITIAL FUNCTION MODE:
      1 = FUNCTION ITSELF
      2 = DERIVATIVE OF THE FUNCTION
      3 = INTEGRAL OF THE FUNCTION";:INPUTDUS

```

```

110 MD=VAL(DUS):IF MD<1 OR MD>3,PRINT@768,S1$;:PRINT@768,"ILLEGAL MODE, ENTER A GAIN";:PRINT@832,S1$;:PRINT@896,S1$;:FORI=0 TO1000:NEXT:GOTO100
120 PRINT@832,S1$;:PRINT@896,S1$;:PRINT@960,S1$;:PRINT@960,"ENTER LEFT ENDPOINT";:GOSUB11370:X1=DU:PRINT@960,S1$;:PRINT@960,"ENTER RIGHT ENDPOINT";:GOSUB11370:X2=DU:PRINT@960,S1$;
130 IF X1=X2,PRINT@960,S1$;:PRINT@960,"X1=X2 (X1=X1,X2=X2), UNACCEPTABLE";:FORI=0 TO1000:NEXT:GOTO120
140 IF X1>X2,DU=X2:X2=X1:X1=DU
150 FG=0:FP=0:ON MD GOSUB 10010,10150,10320
160 IFFK=1,PRINT@960,S1$;:PRINT@960,"LE P=X1",REP=X2;ELSEPRINT@960,S1$;:PRINT@960+INT(50-LEN(X$))/2+13,X$;
170 PRINT@896,"G ";
180 B$=INKEY$:IF B$=" ",GOTO180
190 IF B$="T",FK=0:GOTO160
200 IF B$="W",FK=1:GOTO160
210 IF B$="L",C=X2:X2=X1:X1=2*X1-C:GOTO150

```

Circle 98

Circle 99

Circle 100

OSI (8K) APPLE TRS-80†



## Computers & Gambling Products Magazine

PRESENTS:

### PROBABILITY HANDICAPPING DEVICE 1 — A BASIC PROGRAM FOR: HORSE RACE HANDICAPPING!

This incredible program was written by a professional software consultant to TRW Space Systems. This is a complex program carefully human factored for easy use. It is a comprehensive horse racing system for spotting overlays in thoroughbred sprint races. Your computer will accurately predict the win probability and odds line for each horse based on your entries from the racing form. The next day overlaid horses can be spotted on the track tote board. The user's manual contains a complete explanation of overlay betting plus much more useful information. The appendix contains a detailed tab run of a 100 consecutive race system workout showing an amazing 50% return (\$1.50 returned for each \$1.00 flat wager.) Includes many features such as error correction, bubble sort, line printer output, automatic keyboard debounce, archiving, etc. The manual may be ordered separately for perusal for \$7.95 and credit.

CHALLENGER 1P, 2P, or 4P 8K VERSIONS Now Available!

Phd-1 User's manual and cassette for:

Apple II (16K), TRS-80 Level II (16K), Challenger (8K) 29.95  
 TRS-80 or APPLE DISK 34.95

**BRAND NEW FROM SDL: WIN AT THE RACES.** This thoroughbred handicapping algorithm is based on a currently popular book on thoroughbred multiple regression techniques. Both sprints and routes. All of the features of PHD-1 plus more. This program incorporates the best data entry technique we've ever seen.

32K TRS-80 or APPLE CASSETTE 34.95  
 32K TRS-80 or APPLE DISK 39.95

## BOOKS:

Winning at the Races 21.95 + .75 P&H  
 Beating the Races with a Computer 14.95 + .75 P&H

Make checks payable to JOE COMPUTER DEPT U  
 22713 Ventura Blvd., Suite F, Woodland Hills, CA 91364

CA-residents add 6% sales tax.

PHONE ORDERS: 213-992-0514

\*SEND \$2.00 TO PLACE YOUR NAME ON OUR MAILING LIST.

†TRS-80 is a registered trademark of Tandy Corporation.

## NEW PROGRAMS for the TRS-80

# INCOPROP

### Income Property Analysis

**INCOPROP:** Based upon standardized methods of property analysis used throughout the real estate industry. Generates a 3 page report containing an annual property operating statement and a comprehensive 10 year cash flow analysis. Contains I.R.S. tax table to project after-tax income stream and investor's I.R.R.

- Handles 5 different methods of tax depreciation
- Handles up to 3 loans & 3 different type loans
- Highly interactive format permits "Sensitivity Analysis"
- Disk files created for permanent storage of data

Minimum system requirements: 32K RAM, 1 drive and printer. Sold with informative 78 page user's manual covering basic aspects of income property investment & 50 data worksheets.

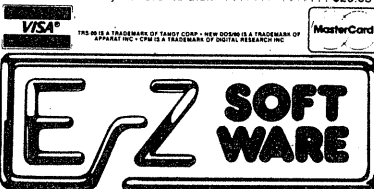
Model I & III: on cassette for easy transfer to disk \$120.00  
 Model II: on 8-inch diskette \$145.00  
 Model II: Version available in MBASIC running under CP/M \$165.00

New!

**MAINDEX:** An easy-to-use program to aid you in the indexing of your files on disk. Can't find that program you wrote last month? Put your computer to work! Find any program or data file in your system in seconds.

- A Main Index of all your other disk's directories.
- Alphabetizes list of files and gives you names, grants used, dates written, tracks and file descriptions.
- Sorts Files by name, disk, and categories.
- File descriptions can be searched for key words.
- Prints disk labels with disk name and file names.
- Uses all the advanced and extremely fast file manipulation capabilities of Apparat, Inc.'s NEWDOS/80.

Requires Level II, 48K, 1 disk drive and NEWDOS/80, on cassette for easy transfer to disk \$20.95



DEPT EU, PO BOX 591, NOVATO, CA 94947

## Let Your TRS-80® Teach You ASSEMBLY LANGUAGE

Tired of buying book after book on assembly language programming and still not knowing your POP from your PUSH?

REMSOFT proudly announces a more efficient way, using your own TRS-80®, to learn the fundamentals of assembly language programming --at YOUR pace and at YOUR convenience.

Our unique package, "INTRODUCTION TO TRS-80® ASSEMBLY PROGRAMMING", will provide you with the following:

- Ten 45-minute lessons on audio cassettes.
- A driver program to make your TRS-80® video monitor serve as a blackboard for the instructor.
- A display program for each lesson to provide illustration and reinforcement for what you are hearing.
- A textbook on TRS-80® Assembly Language Programming.
- Step-by-step dissection of complete and useful routines to test memory and to gain direct control over the keyboard, video monitor, and printer.
- How to access and use powerful routines in your Level II ROM.

This course was developed and recorded by Joseph E. Willis and is based on the successful series of courses he has taught at Meta Technologies Corporation, the Radio Shack Computer Center, and other locations in Northern Ohio. The minimum system required is a Level II, 16K RAM.

**REMASSEM-1 only \$69.95**



REMSOFT, Inc.  
 571 E. 185 st.  
 Euclid, Ohio 44119  
 (216)531-1338



Include \$1.50 for shipping and handling.  
 Ohio residents add 5 1/2% sales tax.

TRS-80® is a trademark of the Tandy Corp.



## Engineering application

```

220 IFB$="R",C=X1:X1=X2:X2=2*X2-C:GOTO1
50
230 IFB$="D",C=.5*(X2-X1):X1=X1-C:X2=X2
+C:GOTO150
240 IFB$="H",C=.25*(X2-X1):X1=X1+C:X2=X
2-C:GOTO150
250 IFB$="F",MD=1:GOTO140
260 IFB$="M",MD=2:GOTO140
270 IFB$="I",MD=3:GOTO140
280 IFB$="X"ANDFF=1ANDFG=1ANDFP=0:GOSUB
10500:GOTO160
290 IFB$="X"ANDFF=1ANDFG=0ANDFP=0:C1=29
:C2=127:GOSUB10500:GOTO160
300 IFB$="C",FORI=0TO40STEP10:SET(60,I)
:SET(94,I):SET(127,I):NEXT
310 IFB$="Q",FP=1:GOSUB11600:GOTO160
320 IFB$="P",FP=1:GOSUB11630:GOTO160
330 IFB$="E"ANDFP=1,GO10140
340 GOTO170
350 CLS:FORI=0TO41:SET(29,I):NEXT:FORI=
28TO127:SET(I,40):NEXT:FORI=0TO30STEP
10:SET(28,I):NEXT:SET(60,41):SET(94,4
1):SET(127,41)
360 IFF1=0,NY$=Y$:GOTO380
370 IFF1=1,NY$="D"+"Y$"+"*""ELSENY$="I"+"
Y$"+"*"
380 FORN=1TOLEN(NY$):PRINT@INT((14-LEN(
NY$))/2+(N-1))*64,MID$(NY$,N,1):NEXT
:PRINT@960+INT(50-LEN(X$))/2+13,X$;
390 DU=Y0+DY*40:GOSUB10460:PRINT@3,,:PR
INTUSINGFM$,DU,:DU=Y0+DY*30:GOSUB1046
0:PRINT@195,,:PRINTUSINGFM$,DU,:DU=Y0
+DY*20:GOSUB10460:PRINT@387,,:PRINTUS
INGFM$,DU,:DU=Y0+10*DY:GOSUB10460:PRI
NT@643,,:PRINTUSINGFM$,DU,:DU=Y0:GOSU
B10460:PRINT@835,,:PRINTUSINGFM$
400 DU=X0:GOSUB10460:PRINT@901+OF,,:PRI
NTUSINGFM$,DU,:DU=X0+DX*31:GOSUB10460
:PRINT@917+OF,,:PRINTUSINGFM$,DU,:DU=
X0+DX*65:GOSUB10460:PRINT@934+OF,,:PR
INTUSINGFM$,DU,:DU=X0+DX*98:GOSUB1046
0:PRINT@949+OF,,:PRINTUSINGFM$,DU;
410 RETURN
5000 F=.398942*EXP(-.5*X*X)
10000 RETURN
10010 FF=0:DX=(X2-X1)/98:X0=X1:X=X1:GOS
UB5000:FX(0)=F:X=X1+DX*98:GOSUB5000:F
X(98)=F:Y1=FX(0):Y2=FX(98):FORI=1TO97
:X=X1+DX*I:GOSUB5000:PRINT@896,I,:FX(
I)=F
10020 D$=INKEY$:IFD$="S",RETURN
10030 IFY1>FX(I),Y1=FX(I)
10040 IFY2<FX(I),Y2=FX(I)
10050 NEXT
10060 IFY1>FX(98),Y1=FX(98)
10070 IFY2<FX(0),Y2=FX(0)
10080 IFABS(Y2)<ABS(Y1):DU=Y1ELSEDU=Y2
10090 IFDU=0,Y1=-1:Y2=1:FORI=0TO98:FX(I
)=0:NEXT:GOTO10120
10100 IFABS((Y2-Y1)/DU)<1E-3,Y2=2*Y2:Y1
=0:DU=(Y2+Y1)/2:FORI=0TO98:FX(I)=DU:N
EXT
10110 IFY2<Y1,DU=Y2:Y2=Y1:Y1=DU
10120 F1=0:Y0=Y1:DY=(Y2-Y1)/40:GOSUB350

10130 FORI=0TO98:YC(I)=40-INT((FX(I)-Y1
)/(Y2-Y1)*40+.5):SET(I+29,YC(I)):NEXT

10140 FF=1:RETURN
10150 FF=0:X3=X1:X4=X2:X0=X3:DX=(X4-X3)
/98
10160 X=X0-DX:GOSUB5000:FA=F:X=X0:GOSUB
5000:FX(0)=F:X=X3+DX:GOSUB5000:FX(1)=
F:X=X3+97*DX:GOSUB5000:FX(97)=F:X=X3+
98*DX:GOSUB5000:FX(98)=F:X=X3+99*DX:G
OSUB5000:FB=F
10170 MX(0)=(FX(1)-FA)/(2*DX):MX(98)=(F
B-FX(97))/(2*DX)
10180 F2=0:M2=MX(0):M1=MX(0):FORI=2TO98
:X=X3+DX*I:GOSUB5000:FX(I)=F:PRINT@89
6,I,:MX(I-1)=(FX(I)-FX(I-2))/(2*DX)
10190 D$=INKEY$:IFD$="S",RETURN
10200 IFM1>MX(I-1),M1=MX(I-1)
10210 IFM2<MX(I-1),M2=MX(I-1)
10220 NEXT
10230 IFM1>MX(98),M1=MX(98)
10240 IFM2<MX(98),M2=MX(98)
10250 IFABS(M2)<ABS(M1),DU=M1ELSEDU=M2
10260 IFDU=0,M1=-1:M2=1:FORI=0TO98:MX(I
)=0:NEXT:GOTO10290
10270 IFABS((M2-M1)/DU)<1E-3,M2=2*M2:M1
=0:DU=(M2+M1)/2:FORI=0TO98:MX(I)=DU:N
EXT
10280 IFM2<M1,DU=M2:M2=M1:M1=DU
10290 F1=1:Y0=M1:DY=(M2-M1)/40:GOSUB350

10300 FORI=0TO98:MC(I)=40-INT((MX(I)-M1
)/(M2-M1)*40+.5):SET(I+29,MC(I)):NEXT

10310 FF=1:RETURN
10320 FF=0:X5=X1:X6=X2:X0=X5:DX=(X6-X5)
/98:X=X5-DX:GOSUB5000:FA=F:X=X5:GOSUB
5000:FX(0)=F:X=X1+DX*98:GOSUB5000:FX(
98)=F
10330 IX(0)=((FA+F(0))/2)*DX
10340 AD=0:I2=IX(0):I1=IX(0):FORI=1TO98
:PRINT@896,I,:X=X5+DX*I:GOSUB5000:FX(
I)=F:AD=AD+((FX(I)+FX(I-1))/2)*DX:IX(
I)=AD
10350 D$=INKEY$:IFD$="S",RETURN
10360 IFI1>IX(I),I1=IX(I)
10370 IFI2<IX(I),I2=IX(I)
10380 NEXT
10390 IFABS(I2)<ABS(I1),DU=I1ELSEDU=I2
10400 IFDU=0,I1=-1:I2=1:FORI=0TO98:IX(I
)=0:NEXT:GOTO10430
10410 IFABS((I2-I1)/DU)<1E-3,I2=2*I2:I1
=0:DU=(I2+I1)/2:FORI=0TO98:IX(I)=DU:N
EXT

```



```

10420 IF I2<I1,DU=M2:I2=I1:I1=DU
10430 F1=2:Y0=I1:DY=(I2-I1)/40:GOSUB350

10440 FOR I=0 TO 98:IC(I)=40-INT((IX(I)-I1)
    )/(I2-I1)*40+.5):SET(I+29,IC(I)):NEXT

10450 FF=1:RETURN
10460 D1=LEN(STR$(FIX(DU))):DU$=STR$(DU
    )
10470 IF LEFT$(RIGHT$(DU$,4),1)="E"ORD1>
    7,FM$="#.####^":OF=0:GOTO10490
10480 IF D1>0 AND D1<=7,FM$="#####.#":OF
    =INT((6-D1)/2)
10490 RETURN
10500 CN=MD
10510 PRINT@896,"X ";FG=1:IFMD=1,SET
    (C1+1,YC(C1-28)):IFC1>29,SET(C1-1,YC(
    C1-30))
10520 IFMD=1SET(C2-1,YC(C2-30)):IFC2<12
    7,SET(C2+1,YC(C2-28))
10530 IFMD=1,XL=X1+DX*(C1-29):YL=FX(C1-
    29):XR=X1+DX*(C2-29):YR=FX(C2-29):PRI
    NT@960,S1$;:PRINT@960,"L = ("XL","YL"
    )";TAB(32)"R = ("XR","YR")";
10540 IFMD=2,SET(C1+1,MC(C1-28)):IFC1>2
    9,SET(C1-1,MC(C1-30))
10550 IFMD=2,SET(C2-1,MC(C2-30)):IFC2<1
    27,SET(C2+1,MC(C2-28))
10560 IFMD=2,XL=X1+DX*(C1-29):YL=MX(C1-
    29):XR=X1+DX*(C2-29):YR=MX(C2-29):PRI
    NT@960,S1$;:PRINT@960,"L = ("XL","YL"
    )";TAB(32)"R = ("XR","YR")";
10570 IFMD=3,SET(C1+1,IC(C1-28)):IFC1>2
    9,SET(C1-1,IC(C1-30))
10580 IFMD=3,SET(C2-1,IC(C2-30)):IFC2<1
    27,SET(C2+1,IC(C2-28))
10590 IFMD=3,XL=X1+DX*(C1-29):YL=IX(C1-
    29):XR=X1+DX*(C2-29):YR=IX(C2-29):PRI
    NT@960,S1$;:PRINT@960,"L = ("XL","YL"
    )";TAB(32)"R = ("XR","YR")";
10600 IFMD=4ANDER=0,PRINT@960,S1$;:PRIN
    T@960,"INTEGRAL FROM "XL" TO "XR" = "
    IN" +/- 1 6SD";ELSEIFMD=4ANDER=1,PRIN
    T@960,S1$;:PRINT@960,"WILL NOT CONVER
    GE IN "N+1"ITERATIONS. LV=("IN")";
10610 IFMD=5,XL=X1+DX*(C1-29):X=XL:GOSU
    B5000:YL=F:X=XL-DX:GOSUB5000:A=F:X=XL
    +DX:GOSUB5000:B=F:M=B/(2*DX)-A/(2*DX)
    :PRINT@960,S1$;:PRINT@960,"SLOPE @ ("
    XL","YL") = "M";
10620 IFMD=6ANDER=0,PRINT@960,S1$;:PRIN
    T@960,"THE ROOT IS: "XC" +/- 1 6SD";
10630 IFMD=7ANDER=0,PRINT@960,S1$;:PRIN
    T@960,"SLOPE @ ("XL","YL")="MN" +/- 1
    5SD";ELSEIFMD=7ANDER=1,PRINT@960,S1$
    ;:PRINT@960,"WILL NOT CONVERGE IN "I+1
    "ITERATIONS. LV=("MN")";
10640 IFFC=1,GOSUB11080:GOTO10660
    
```

microfusion\*



CHROME

- CHROME is the perfect back-up for disk — low cost, very low error rate
- Twice as secure during EMPs, power failures, & other malfunctions
- MICROFUSION\* CHROME runs like a champ on high baud rate formats like JPC
- Needs no special modification on good cassette decks
- CHROME saves lots of money & time  
— saves lots of program & data

C-10s — 10 for only \$12.00!

C-20s — 10 for only \$15.00!

Add \$2 per order for P&H; in CT add 7.5% tax. M.O., check, MasterCard, Visa. If paying by card, give card number, expiration date, sign order. Prompt shipment.

Nine CHROME are in black, 5-screw shells; the 10th CHROME (in white) carries a half dozen of Emory Cook's fast-running business-oriented sub-routines with documentation. They're in R/S Level II Basic, some very sneaky.

True digital transfer plus premium tape makes us the acknowledged prime duplicator of software for T.I., OSI, and all the Tandy, Apple, Pet, Atari, & fast formats. Write for further information, or call 203-853-3641.

\* TM Reg

COOK LABORATORIES, INC.

375 Ely Avenue Norwalk, CT 06854

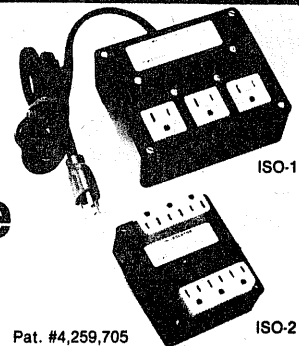
Oldest in DIGDUP, newest in SOAP

(If you don't know what SOAP stands for, place an order!)

Circle 101

DISK DRIVE WOES?  
PRINTER INTERACTION?  
MEMORY LOSS?  
ERRATIC OPERATION?

Don't  
Blame The  
Software!



Power Line Spikes, Surges & Hash could be the culprit!

Pat. #4,259,705

Floppies, printers, memory & processor often interact! Our patented ISOLATORS eliminate equipment interaction AND curb damaging Power Line Spikes, Surges and Hash.

- ISOLATOR (ISO-1) 3 filter isolated 3-prong sockets; integral Surge/Spike Suppression; 1875 W Maximum load, 1 KW load any socket ..... \$62.95
- ISOLATOR (ISO-2) 2 filter isolated 3-prong socket banks; (6 sockets total); integral Spike/Surge Suppression; 1875 W Max load, 1 KW either bank ..... \$62.95
- SUPER ISOLATOR (ISO-3), similar to ISO-1 except double filtering & Suppression ..... \$94.95
- ISOLATOR (ISO-4), similar to ISO-1 except unit has 6 individually filtered sockets ..... \$106.95
- SUPER ISOLATOR (ISO-11) similar to ISO-2 except double filtering & Suppression ..... \$94.95
- CIRCUIT BREAKER, any model (add-CB) ..... Add \$ 8.00
- CKT BRKR/SWITCH/PILOT (-CBS) ..... Add \$16.00

AT YOUR  
DEALERS

Master-Card, Visa, American Express  
Order Toll Free 1-800-225-4876  
(except AK, HI, PR & Canada)

Electronic Specialists, Inc.

171 South Main Street, Natick, Mass. 01760

Technical & Non-800: 1-617-655-1532

Circle 102



```

10650 B$=INKEY$:GOSUB11080:IFB$="",GOTO
10650
10660 C$=INKEY$:IFC$="H",FC=0
10670 IFMD=4ORMD=6ORMD=7,GOTO10770
10680 IFASC(B$)=10,C1=C1-1:IFC1<29,C1=2
9:GOTO10880ELSEGOTO 10880
10690 IFASC(B$)=26,B$=CHR$(10):FC=1
10700 IFASC(B$)=91,C1=C1+1:IFC1=C2,C1=C
1-1:GOTO10930ELSEGOTO10930
10710 IFASC(B$)=27,B$=CHR$(91):FC=1
10720 IFMD=5ORMD=7,GOTO10770
10730 IFASC(B$)=9,C2=C2+1:IFC2>127,C2=1
27:GOTO11030ELSEGOTO11030GOTO11030
10740 IFASC(B$)=25,B$=CHR$(9):FC=1
10750 IFASC(B$)=8,C2=C2-1:IFC2=C1,C2=C2
+1:GOTO10980ELSEGOTO10980
10760 IFASC(B$)=24,B$=CHR$(8):FC=1
10770 IFB$="G",X1=X1+(C1-29)*DX:X2=X2-(
127-C2)*DX:MD=CN:GOTO150
10780 IFB$="I"ANDMD=1:MD=4:GOSUB11120:G
OTO10510
10790 IFB$="R"AND(MD=4ORMD=5ORMD=6ORMD=
7),MD=CN:GOTO10510,MD=CN:GOTO10510
10800 IFB$="E",MD=CN:FORI=0TO41:SET(29,
I):NEXT:FORI=29TO127:SET(I,40):NEXT:R
ETURN
10810 IFB$="M"ANDMD=1,MD=5:GOTO10510
10820 IFB$="S"ANDMD=1,MD=6:GOSUB11230:G
OTO10510
10830 IFB$="A"ANDMD=1,MD=7:GOSUB11500:G
OTO10510
10840 GOTO10640
10850 IFMD=1ORMD=5,SET(C1,YC(C1)):SET(C
2,YC(C2)):RESET(C1,YC(C1)):RESET(C2,Y
C(C2))
10860 IFMD=2,SET(C1,MC(C1)):SET(C2,MC(C
2)):RESET(C2,MC(C2)):RESET(C2,MC(C2))

10870 IFMD=3,SET(C1,IC(C1)):SET(C2,IC(C
2)):RESET(C2,IC(C2)):RESET(C2,IC(C2))

10880 RESET(C1,40):SET(C1+1,40)
10890 IFMD=1ORMD=5,SET(29,YC(C1-28))
10900 IFMD=2,SET(29,MC(C1-28))
10910 IFMD=3,SET(29,IC(C1-28))
10920 GOTO10510
10930 RESET(C1,40):SET(C1-1,40)
10940 IFMD=1ORMD=5,IFC1>30,SET(29,YC(C1
-30))
10950 IFMD=2,IFC1>30,SET(29,MC(C1-30))
10960 IFMD=3,IFC1>30,SET(29,IC(C1-30))
10970 GOTO10510
10980 RESET(C2,40):SET(C2+1,40)
10990 IFMD=1,SET(29,YC(C2-28))
11000 IFMD=2,SET(29,MC(C2-28))
11010 IFMD=3,SET(29,IC(C2-28))

11020 GOTO10510
11030 RESET(C2,40):SET(C2-1,40)
11040 IFMD=1,IFC2>30,SET(29,YC(C2-30))
11050 IFMD=2,IFC2>30,SET(29,MC(C2-30))
11060 IFMD=3,IFC2>30,SET(29,IC(C2-30))
11070 GOTO10510
11080 IFMD=1ORMD=5,RESET(C1,YC(C1-29)):
RESET(C2,YC(C2-29)):SET(C1,YC(C1-29))
:SET(C2,YC(C2-29)):RESET(29,YC(C1-29))
):RESET(29,YC(C2-29))
11090 IFMD=2,SET(C1,MC(C1-29)):SET(C2,M
C(C2-29)):RESET(C1,MC(C1-29)):RESET(C
2,MC(C2-29)):RESET(29,MC(C1-29)):RESE
T(29,MC(C2-29))
11100 IFMD=3,SET(C1,IC(C1-29)):SET(C2,I
C(C2-29)):RESET(C1,IC(C1-29)):RESET(C
2,IC(C2-29)):RESET(29,IC(C1-29)):RESE
T(29,IC(C2-29))
11110 RETURN
11120 N=0:IO=1:HD=2:CA=XL:CB=XR:PRINT@9
60,S1$;:PRINT@960,"CALCULATING . . ."
;
11130 DC=(CB-CA)/HD:CD=0:CE=0
11140 FORI=1TOHD/2:X=CA+(2*I)*DC:GOSUB5
000:CE=CE+2*F:X=CA+(2*I-1)*DC:GOSUB50
00:CD=CD+4*F:PRINT@896,I;
11150 B$=INKEY$:IFB$="S",ER=1:RETURN
11160 NEXT
11170 PRINT@991,S2$;:PRINT@992,IO;"("N+
1")";
11180 X=CA:GOSUB5000:CG=F:X=CB:GOSUB500
0:CH=F:IN=.333333*DC*(CG+CD+CE-CH)
11190 IFIN=0,ER=0:RETURNELSEIF(ABS(IO-I
N)/(ABS(IO)+ABS(IN))<1E-7,ER=0:RETUR
N
11200 HD=HD*2:IO=IN:N=N+1
11210 IFN>=10,ER=1:RETURN
11220 GOTO 11130
11230 A=FX(C1-29):B=FX(C2-29):IFA*B>=0,
PRINT@960,S1$;:PRINT@960,"FUNCTION AT
TWO ENDPOINTS MUST DIFFER IN SIGN, M
OVE ENDPOINTS.";:ER=1:RETURN
11240 XA=X1+(C1-29)*DX:XB=X1+(C2-29)*DX

11250 X=XA:GOSUB5000:YA=F
11260 XC=(XA+XB)/2
11270 PRINT@960,S1$;:PRINT@960,"APPROXI
MATING: ";XC;
11280 X=XC:GOSUB5000:YC=F
11290 IFYC=0,GOTO11360
11300 IFYA*YC<0,GOTO11330
11310 XA=XC:YA=YC
11320 GOTO11340
11330 XB=XC
11340 IFABS(XA-XB)<=1E-6,GOTO11360
11350 GOTO11260

```



```

11360 IFXC<1E-7,XC=0:ER=0:RETURNELSEER=
0:RETURN
11370 DU$="":PRINT@990,S2$;
11380 C$=INKEY$:IFC$="",GOTO11380
11390 IFC$="0"ORC$="+"ORC$="-"ORC$="E"O
RC$="."ORASC(C$)=13ORASC(C$)=8ORASC(C
$)=24,GOTO11410
11400 IFVAL(C$)=0,GOTO11380
11410 IFASC(C$)=13,DU=VAL(DU$):RETURN
11420 IFASC(C$)=24,GOTO11440ELSEDU$=DU$
+C$:PRINT@990,DU$;
11430 IFASC(C$)=8ANDLEN(DU$)>1,DU$=LEFT
$(DU$,LEN(DU$)-2)
11440 IFASC(C$)=24,DU$="":PRINT@990,S2$
;:GOTO11380
11450 GOTO11380
11460 DU=ERR/2+1:IFERL>=5000ANDERL<=100
00AND(DU=50ORDU=60ORDU=11),PRINT@960,S1
$;:PRINT@960,"ERROR/OVERFLOW @ X="X",
TRY NEW ENDPOINTS";:RESUME180
11470 DU=ERR/2+1:IFERL>=5000ANDERL<=100
00ANDDU=2,PRINT@960,S1$;:PRINT@960,"S
YNTAX ERROR IN LINE"ERL"OF FUNCTION";
:FORI=0TO1000:NEXT:RESUME10
11480 IFERL=11410,PRINT@990,S2$;:PRINT@
990,"UNACCEPTABLE ENTRY";:FORI=0TO100
0:NEXT:RESUME11370
11490 DU=ERR/2+1:PRINT@960,S1$;:PRINT@9
60,"ERROR"DU"HAS OCCURED IN LINE"ERL;
:FORI=0TO1000:NEXT:RESUME10
11500 MO=1:HD=1:CA=XL:I=0:PRINT@960,S1$
;:PRINT@960,"CALCULATING ...";
11510 X=XL:GOSUB5000:YL=F
11520 CB=(XR-XL)/98
11530 PRINT@896,I;:PRINT@992,MO;
11540 B$=INKEY$:IFB$="S",ER=1:RETURN
11550 X=CA-CB/HD:GOSUB5000:CC=F:X=CA+CB
/HD:GOSUB5000:CD=F
11560 MN=(CD-CC)/(2*CB/HD)
11570 IFMN=0,ER=0:RETURNELSEIFABS((MN-M
O)/(ABS(MN)+ABS(MO)))<1E-5,ER=0:RETUR
N
11580 MO=MN:I=I+1:HD=HD*1.05:IFI>=500,E
R=1:RETURN
11590 GOTO11530
11600 PRINT@960,S1$;:PRINT@960,"ENTER X
L, LEFT ENDPOINT";:GOSUB11370
11610 IFDU=X2,PRINT@960,S1$;:PRINT@960,
"XL=XR (XR="X2"),NOT ACCEPTABLE";:FOR
I=0TO1000:NEXT:GOTO11600
11620 X1=DU:RETURN
11630 PRINT@960,S1$;:PRINT@960,"ENTER X
R, RIGHT ENDPOINT";:GOSUB11370
11640 IFDU=X1,PRINT@960,S1$;:PRINT@960,
"XR=XL (XL="X1"),NOT ACCEPTABLE";:FOR
I=0TO1000:NEXT:GOTO11630
11650 X2=DU:RETURN

```

## CONVERT YOUR TRS-80 MODEL-I INTO A DEVELOPMENT SYSTEM

Now you can develop Z-80 based, stand-alone devices such as games, robots, instruments and peripheral controllers, by using your TRS-80 as a development system. The DEVELOPMATE plugs into the expansion connector of your TRS-80 and adds **PROM PROGRAMMING** and **IN-CIRCUIT-EMULATION** capabilities to your system (with or without expansion interface).

Complete instructions and sample schematics are included to help you design your own simple stand-alone microcomputer systems. THESE SYSTEMS CAN BE AS SIMPLE AS FOUR ICs: one TTL circuit for clock and reset, a Z-80, an EPROM, and one peripheral interface chip.



When the In-Circuit-Emulation cable is plugged into the Z-80 socket of your stand-alone system, the system becomes a part of your TRS-80. You can use the full power of your editor/assembler's debug and trace programs to check out both the *hardware and the software*. Simple test loops can be used to check out the hardware, then the system program can be run to debug the logic of your stand-alone device.

Since the program is kept in TRS-80 RAM, changes can be made quickly and easily. When your stand-alone device works as desired, you use the Developmate's PROM PROGRAMMER to copy the program into a PROM. With this PROM, and a Z-80 in place of the emulation cable, your stand-alone device will work by itself.

The DEVELOPMATE is extremely compact: Both the PROM programmer and the In-Circuit-Emulator are in one small plastic box only 3.2"x5.4". A line-plug mounted power supply is included. The PROM programmer has a "personality module" which defines the voltages and connections of the PROM so that future devices can be accommodated. However, the system comes with a "universal" personality module which handles 2758,2508(8K), 2716,2516(16K), 2532(32K), as well as the new electrically alterable 2816 and 48016(16K EEPROMs).

The COMPLETE DEVELOPMATE 81, with software, power supply, emulation cable, TRS-80 cable, and universal personality module, is ONLY \$329! The PROM PROGRAMMER is available separately for ONLY \$239.



ORION INSTRUMENTS  
172 Otis Avenue, Dept B, Woodside, CA 94062  
(415) 851-1172  
Master Charge and Visa phone orders accepted.  
California residents please add 6% sales tax.



Circle 103

**ebg**  
& ASSOC

EMMANUEL B. GARCIA, JR.  
& ASSOCIATES  
203 N. WABASH  
CHICAGO, ILLINOIS 60601  
PHONE (312) 782-9750

## NOW IN ITS THIRD YEAR OF SPECIALIZING IN PRODUCTS RELATED TO THE TRS-80\*

- Dealer of quality software and hardware—we sell **only** the best, proven items.
- Sponsor of CHICATRUG—monthly learning sessions for TRS-80 users.
- Publisher of "CHICATRUG News," monthly publication for TRS-80 users.
- ■ Send for sample issue ■ ■
- Sponsor of the FORUM-80 of Chicago, a 24-hour computerized bulletin board.
- Author of "Pensionmaker," the revolutionary defined benefit pension system running on the TRS-80 Model I where other pension actuaries are using mainframes.
- Repair facilities (90-day warranty on new equipment and 30 days on used).

E.B.G. & Associates is NOT affiliated with Tandy Corporation or Radio Shack.

\*TRS-80 is a trademark of Tandy Corporation. Circle 104



## Annual index to Volume

*Alphabetically by title of article.*

50 BASIC Exercises, book review, W W Harper, 136	Nov/Dec 81
@NEWS, 96	Mar/Apr 81
@NEWS, Jim Perry, 76	May/Jun 81
@NEWS, Jim Perry, 44	Jul/Aug 81
@NEWS, Jim Perry, 13	Sep/Oct 81
ABS doubler, review, staff, 109	Nov/Dec 81
Air traffic controller review, D L Pardee, 116	May/Jun 81
Alternative to string packing, Dennis Taylor, 30	May/Jun 81
Anatomy of smart tac toe, R C Bahn, 25	Mar/Apr 81
Anatomy of calendar program, R C Bahn, 18	Jan/Feb 81
Animation & the TRS-80, Gary Sanderson, 66	May/Jun 81
Ball turret gunner review, Pat Perez, 114	May/Jun 81
Base II line printer eval, Tom Little, 72	Sep/Oct 81
BASIC & machine language, Jim Klaproth, 142	Nov/Dec 81
BASIC compiler review, T Krumholz, 124	Jan/Feb 81
BASIC interactions, R C Bahn, 70	Jul/Aug 81
BASIC letter writing program, Charlie Jones, 134	Sep/Oct 81
BASIC self-programmer & interpreter, W Havenhill, 90	May/Jun 81
Basically BASIC, T R Dettmann, 139	Nov/Dec 81
BOSS, review, Pete Carr, 128	Sep/Oct 81
BREAK- with JKL, Al Domuret, 120	Jan/Feb 81
Build your own interface, L Panattoni, 85	Jan/Feb 81
Calendar maker program, TR Dettmann, 16	Jan/Feb 81
Captain 80, Bob Liddil, 30	Jan/Feb 81
Captain 80, Bob Liddil, 38	Mar/Apr 81
Captain 80, Bob Liddil, 44	May/Jun 81
Captain 80, Bob Liddil, 40	Jul/Aug 81
Captain 80, Bob Liddil, 97	Sep/Oct 81
Captain 80, Bob Liddil, 108	Nov/Dec 81
CCA data management system review, Jim Klaproth 41	Sep/Oct 81
Cocobug review, Don Scarberry, 130	Sep/Oct 81
Color computer game reviews, Perez/Caldwell, 112	Nov/Dec 81
Color computer conversions, staff 15	Jul/Aug 81
Compute the retail installment contract, C P Knight, 62	Sep/Oct 81
Computer yahtzee, John A Junod, 86	Mar/Apr 81
Computerese simplified, L Charters, 137	Sep/Oct 81
computerized home, The, staff, 20	Nov/Dec 81
CP/M handbook review, T R Dettmann, 56	May/Jun 81
CP/M, T R Dettmann, 52	May/Jun 81
Crossword, Stanley Silverman, 56	Nov/Dec 81
Custom operating system, D A Busch, 104	May/Jun 81
Cyborg wars, review, P Perez, 116	May/Jun 81
DATORG, review, T R Dettmann, 104	Jan/Feb 81
Day of week, days between dates, Anon, 20	Jan/Feb 81
Descending lower case for Model I, Larry Panattoni, 54	Jul/Aug 81
Design weaving projects with your TRS-80 Ziegler & Buckingham, 34	Nov/Dec 81
Directory hash code generator, Steven Wexler, 78	Sep/Oct 81
Don't get strung out, Dan Rollins, 72	Nov/Dec 81
DOSPLUS 3.3 eval, Pete Carr, 50	Jul/Aug 81
Drawing aid, Mike Tattersall, 112	Jul/Aug 81
Echo your line printer to screen, Bob Foster, 114	Mar/Apr 81
ENHBAS eval, L Charters, 82	Nov/Dec 81
ERRORS, Greg Perry, 42	May/Jun 81
Estimate programming jobs, T R Dettmann, 78	Jan/Feb 81
Everest explorer review, W W Harper II, 131	Sep/Oct 81
Files & foibles, T R Dettmann, 110	Jan/Feb 81
Files & foibles, T R Dettmann, 104	Mar/Apr 81
Files & foibles, T R Dettmann, 60	May/Jun 81
Files & foibles, T R Dettmann, 88	Sep/Oct 81
Files & foibles, T R Dettmann, 64	Nov/Dec 81
FILTRAN, review, T R Dettmann, 53	May/Jun 81
Forth, T R Dettmann, 68	Nov/Dec 81
Full screen text editor review, Jim Klaproth, 135	Nov/Dec 81
Functional subroutine library, David R Pepple, 21	Jan/Feb 81
Gain copy flexibility with NEWDOS80, David Busch, 59	Mar/Apr 81
Gameshow simulation, Robert D Miller, 46	Sep/Oct 81
Graphics editor, William K Mason, 88	Jan/Feb 81
Hi-type G printer driver, Steve Kelley, 106	Jul/Aug 81
How to make Versafire more versatile, Mike Zielinski, 42	Jan/Feb 81
How to read disk directories, Debbi Tesler, 65	Jan/Feb 81
Hybrid programming, R B Nottingham, 34	Sep/Oct 81
I Refuse to be a computer Widow!, Denise Berg, 24	Nov/Dec 81
Infinite BASIC, review, Pete Carr, 129	Sep/Oct 81
Inside VTOS 4.0 and NEWDOS80, Eval, Pete Carr, 38	Jan/Feb 81
Interview-Roger Billings, 8	Jan/Feb 81
Interview-Scott Adams, 8	Mar/Apr 81
Interview-Bill Gates, 8	May/Jun 81
Interview-Bill Schroeder, 8	Jul/Aug 81
Interview-Larry Studdard, 16	Nov/Dec 81
Introduction to TRS-80 BASIC, book review, W W Harper, II, 110	Nov/Dec 81
Keyplus integrated utility review, James Joachim, 120	May/Jun 81
Keyword, Jim Peyton, 26	Sep/Oct 81
Kid ventures review, Sherry M Taylor, 132	Sep/Oct 81
LDOS, your next operating system?, Staff, 34	Jul/Aug 81
Lemonade or champagne? Review, W W Harper, II, 108	Jan/Feb 81
Leo Christopherson in person, Staff, 28	May/Jun 81
Let your computer read the time, Joseph St. Lucas, 132	Nov/Dec 81
Level II BASIC instruction course review, Cameron C Brown, 123	Jul/Aug 81
Line packing, Leo Christopherson, 23	May/Jun 81
LNW Expansion interface review, Yvon Kolya, 72	Jan/Feb 81
LOBO Drives LX80 & drive eval, staff, 30	Jul/Aug 81
Look at XEDIT from MiProg, T R Dettmann, 101	Mar/Apr 81
Lower case ROM patch, W R Bell, 92	Nov/Dec 81
Making of a computer program, M Schmidt, 92	Jan/Feb 81
Making sense and dollar\$ too, G L Haller, 92	May/Jun 81
Management & the pocket computer, J D Farrell, 34	Mar/Apr 81
Membership billing program review, T R Dettmann, 108	Jan/Feb 81
Memory size reset, James F Williams, 110	May/Jun 81
Micro clinic, review, W W Harper, II, 57	Jul/Aug 81
microcomputer in industry, The, staff, 18	Sep/Oct 81
Microsoft BASIC decoded, book review, Norm Jacobson, 141	Sep/Oct 81
Mikee Electronics hi res board eval, Staff, 106	Nov/Dec 81
Missile attack, review, O Linzmayer, 125	Jul/Aug 81
Model I monitor mods, T Krumholz, 102	Sep/Oct 81
Model III makes its debut, staff, 115	Jan/Feb 81
Modifying NEWDOS 2.1, Steven Wexler, 118	Nov/Dec 81
Moire' patterns, Dennis Anderson, 84	Sep/Oct 81
MuMath, review, Cameron C Brown, 62	Mar/Apr 81
MuMath, Another look, T R Dettmann, 64	Mar/Apr 81
New Radio Shack color computer, William Barden, Jr., 80	Mar/Apr 81
Nine Z-subroutines, Spencer Hall, 26	Jan/Feb 81
Notes, 118	Jan/Feb 81
Notes, 102	Mar/Apr 81



## IV - 1981

Notes, 122	May/Jun 81
Notes, 120	Jul/Aug 81
Notes, 142	Sep/Oct 81
Notes, 159	Nov/Dec 81
Okidata is OK, Ira McComic, 60	Jul/Aug 81
Organ, review, Clay Caldwell, 123	Jul/Aug 81
Packer, review, Pete Carr, 128	Sep/Oct 81
Panattoni's Panacea, L Panattoni, 74	Mar/Apr 81
Panattoni's Panacea, L Panattoni, 36	May/Jun 81
Pascal, book review, Steven Sharro, 124	Sep/Oct 81
Pathways through the ROM, book review, T R Dettmann, 128	Nov/Dec 81
Playmate - a computer that talks! Don Scarberry, 100	Jan/Feb 81
Pocket biorhythms, Robert D Miller, 114	Nov/Dec 81
Pocket computer application, Bill Vick, 48	Jan/Feb 81
Profile II for Model II, Bill Schroeder, 96	Jan/Feb 81
Programming for wier flow, J C Dahlke, 91	Mar/Apr 81
Protect your fields, W Stevener, 70	Mar/Apr 81
Rate your printer, staff, 80	Jul/Aug 81
Reader, Charles Quante, 52	Sep/Oct 81
Revised Level II manual, review, E M Roberts, 120	May/Jun 81
Showdown, game review, O Linzmayer, 129	Nov/Dec 81
Six ways to get more of Scripsit, D Busch, 78	Mar/Apr 81
Sketch & pack, P Gerhardt, 46	May/Jun 81
Slalom run! Greg Perry, 74	Jan/Feb 81
Smart tac-toe, Steve Kelley, 22	Mar/Apr 81
Snapp enhancements for Mod II, eval, Marvin Mallon, 88	Nov/Dec 81
Space marauder game, C Quante, 101	May/Jun 81
Stalking the elusive PRINT USING, R C Bahn, 62	May/Jun 81
String pack using your BASIC editor, Woody Pope, 82	Sep/Oct 81
Strings in graphics, R C Bahn, 56	Sep/Oct 81
Student timetable printer, I Sinclair, 100	Jul/Aug 81
Sundance, game, J J Waples, 86	Jul/Aug 81
Super Nova game review, W W Harper II, 130	Nov/Dec 81
Supergraph 1.0, D Z Korkut, 90	Nov/Dec 81
Superscript, review, T R Dettmann, 118	Sep/Oct 81
Survival, Spencer Hall, 40	Mar/Apr 81
Swap, a useful Mod II command, T R Dettmann, 52	Mar/Apr 81
System/Command, Phil Pilgrim, 52	Jan/Feb 81
System/Command, Phil Pilgrim, 50	Mar/Apr 81
System/Command, Phil Pilgrim, 84	May/Jun 81
System/Command, Phil Pilgrim, 66	Jul/Aug 81
System/Command, Phil Pilgrim 120	Sep/Oct 81
System/Command, James Williams, 96	Nov/Dec 81
Tandy topics, Ed Juge, 30	Nov/Dec 81
Tape without tears, Spencer Hall, 76	Jul/Aug 81
Three machine language utilities for BASIC, J McKenney, 34	Jan/Feb 81
Time, staff, 15	Jan/Feb 81
Tiny Pascal compared with BASIC, J Waples/ Norm Jacobson, 102	Sep/Oct 81
Traveling with the pocket computer, G Haller, 86	Sep/Oct 81
TRS-80 programming in style, book review, W W Harper, II, 130	Nov/Dec 81
TRS-80 supermarket comparison shopper program, J W Rocke, 46	Nov/Dec 81
TRSDOS 2.0 for Model II, Bill Schroeder, 48	Mar/Apr 81
Two BASIC compilers, T R Dettmann, 67	Mar/Apr 81
Two computers feed one printer, G Rittenbach, 117	Jan/Feb 81
Upper/lower case for line printer I, Review, Yvon Kolya, 124	Jul/Aug 81
View from the top of the stack, staff, 106	Jan/Feb 81
View from the top of the stack, staff, 30	Mar/Apr 81
VisiCalc, Cameron C Brown, 18	Mar/Apr 81
What to do when SUPERZAP chokes, D North, 21	Jul/Aug 81
X-reference, review, Tom Huber, 108	May/Jun 81

NEWDOS80 users take note! When assigning a string variable in the IMMEDIATE OR COMMAND mode (by direct keyboard entry) and that variable's name begins with an A, D, or E and has a numeric character (0 thru 9) for its second character, you will end up with a "Syntax Error". Also, the variable will not be changed.

NEWDOS80 sees the A, D and E commands as shorthand for AUTO, DELETE and EDIT, respectively. The situation only comes up in the immediate mode and will not happen in a program. Apparat is not sure at this time if a ZAP will be issued to correct version 1.X of NEWDOS80, but version 2.0 should be OK. The explicit BASIC statement LET should never be used in the immediate mode to prevent the above error.

Jerry Latham  
Midwest City, OK

Remember that on Model I and III, when you go into BASIC, you are automatically allotted three buffers for disk files. This is space that you could be using for something else if you are not going to have three files open at the same time. However, on Model II you get no buffers unless you ask for them specifically when going into BASIC.

If you do work with files, remember that you can't use a file buffer number higher than the number of files you specified upon entering BASIC.

Using the LINEINPUT versus INPUT statements: the effect on the variable involved is different. If you press the Enter key without any text using the LINEINPUT statement, the variable will be nulled. If you do this with the INPUT statement, the variable will retain its previous value.

Model I and III Scripsit is a great tool with which to edit BASIC programs. Here is another way it can help:

If you need to break up a multi-statement program Line, this is the easiest way to do it. When your BASIC program has been loaded into Scripsit, hit a carriage return at the point you want the original line to end. Then insert the new line number at the beginning of the (now) new line. You may also insert any new lines using regular Scripsit methods. Don't forget to terminate any new program lines with a carriage return, and don't forget to save the program using the S,A filename combination.



# AMRAD

## Amateur Radio Research and Development Corporation

AMRAD is a worldwide club of radio and computer amateurs. Activities include:

- Monthly AMRAD Newsletter
- Amateur Networking and Protocols
- Computer Bulletin Board System
- Handicapped Education Exchange-HEX
- Deaf Telecommunications Research
- Spread Spectrum Experimentation
- 2-Meter Voice and Data Repeater

1524 Springvale Avenue  
McLean, VA USA 22101

Circle 111

Many have requested that we publish the information on how we transmit Color Computer programs to the Model II for printout. Here are the details.

The Color Computer sends out line listings via the RS-232 port to a serial printer like Radio Shack's Line Printer VII or VIII. This serial signal is a standard RS-232 signal which can be routed to the Model I, II, or III. The wiring is as follows:

Model II	Color Computer
Pin Signal	Pin Signal
2 RS232OUT	2 RS232IN
3 RS232IN	4 RS232OUT
6 DSR	1 Carrier Detect
7 Ground	3 Ground
8 Carrier Detect	1 Carrier Detect
20 DTR	1 Carrier Detect

### Notes:

1 - Pins 6, 8 and 20 are tied together at the Model II end.

2 - All pin references are at the cable and refer to cable connector pinouts, not at the machine. Close examination of the cable plugs will reveal very tiny numbers stamped into the connector body next to the pin.

The Color Computer Transmits at 600 Baud, 1 Start Bit, 7 Data Bits, 2 Stop Bits, and no parity. To receive this signal correctly, set up the Model II A-channel to these parameters and go into the terminal mode. Open and clear the RAM buffer type LIST on the Color Computer keyboard, and the BASIC program will appear on the Model II screen.

If you receive any error message, double check your wiring connections and don't forget the

terminator plug in the B-channel! On occasion, the Model II displays an F in inverse video between normal text. This indicates a parity error was detected and you probably have the wrong parameters set for your A-channel.

If you drop out of terminal mode on the Model II, the Color Computer will continue transmitting the listing until finished as there is no way for it to detect a printer (modem) fault.

After completion of the transmission, take the Model II to the Terminal Menu and save the RAM buffer to disk. Since the Model II Terminal package saves the RAM buffer in ASCII format, BASIC will load it properly unless the program contains lines greater than about 240 characters long. A "Direct Statement in File" error will be generated in these cases. The rest of the program will not be loaded. You will have to go back to the color computer, split the guilty program line and retransmit the whole thing over again.

To Transmit data files, treat them like a sequential file, but send the signal to the printer instead of the tape. Don't forget to open the file in the Color Computer. The resultant disk file (handled the same way as a BASIC program) at the Model II may also be treated as a sequential file.

In the July Notes section, we suggested a number of different routines for double precision handling of certain numbers. If you tried them, you may have found that none worked all the time for the Model II BASIC, especially if you did not want a two decimal place answer. Try the following routine using A# and B# as the two input numbers and C# as their sum. The answer will be in I#:

```

5 CLEAR 1000
100 CLS
110 INPUT "ENTER A#"; A#
120 INPUT "ENTER B#"; B#
130 C# = A# + B#
140 I# = C#
150 I$ = STR$(I#)
160 IF LEN(I$) < 17 THEN 210
170 I2 = INSTR(I$, ".") : IF I2=0 THEN I
  2 = LEN(I$) + 1 : I$ = I$ + ".00"
180 I1$ = LEFT$(I$, LEN(I$) - 2)
190 I3 = LEN(I$) - I2
200 IF ABS(VAL(I$) - VAL(I1$)) > 50 * 1
  0^-I3 THEN I# = I# + (VAL(I$) - VAL(I
  1$) - 5*10^-I3)
210 I$ = LEFT$(STR$(I#), 15)
220 I# = VAL(I$)
230 PRINT A#, B#, C#, I#

```

Wally Turnbull  
West Palm Beach, FL



## Unclassified rates

**\$5.00 per half inch and \$5.00 per each additional half inch per insertion. Ads must be typewritten or printed clearly, and must be accompanied with payment in advance. No telephone orders or "bill me's" will be accepted. Unclassified ads are always set in the type on this page with the first line in bold caps. Use the ads on this page as a guide to figure your size and payment. Commercial store-front ventures please use our display advertising. Send for rates. This space is for "garage operations", individuals and "one of a kind" items. Send your ads to 80-U.S. Journal, 3838 South Warner Street, Tacoma, Washington, 98409**

**COMPUTER ASSISTED HANDICAPPING** aids for your TRS-80 (Model I or Pocket computer versions). Be a winner with WelMur's HARNESS or GREYHOUND software for your handicapping needs. Just \$29.95 (cassette) or \$34.95 (disk) plus \$1 shipping (CA residents add 6% sales tax). Please specify HARNESS or GREYHOUND and cassette or disk. Send check, MO or request for additional information to: WelMur of California, Inc., PO Box M-11B, Fremont, CA 94537 (111)

**DAILY APPOINTMENT CALENDAR IS A** year round computerized diary for home or office. Each daily appointment table allows 20 exact time reminders, also records birthdays and other important events. Calendar display highlights important days, month after month. Includes printout capability for daily appointment table. L2 16K cassette \$19.95; diskette \$29.95. Tape-Tronics, 346 N Western Ave., Los Angeles, CA 90004 (111)

**L.U.S.T. (A QUASI-EROTIC EXPERIENCE!)** From the people who brought you Sin Palace. Send \$3. for program on cassette, catalog and Genuine Casino Souvenir. Paul's Electric Computer, PO Box 42831U, Las Vegas, NV 89104 (111)

**DATA BASE MANAGER - IDM -** "There are many data base managers available these days, some may do the job for you, others may not. This one is doing a very good job for us." - 80-U.S. Jul '80. Now, new documentation and fastest machine sort. Mod II \$199. Mod I 48K \$149. Micro Architect Inc., 96 Dothan St., Arlington, MA 02174 (111)

**ATTENTION LASER EXPERIMENTERS!!** Use your TRS-80 Model I to aid you in the planning design and research of lasers. Over 30 subroutines are at your command (through menu selection) relating to laser fundamentals and design. Powerful table-generation capabilities are built in for professional table outputs to your video screen or your video screen to your printer. Instant screen dump to your printer and variable margin compliment this laser package (RS-232 driver comes as part of the package). System requirements: Tape, Level 2, 16K; Disk, 32K. Your data sheet and order form for "LASER!" will be mailed to you within 24 hours from receipt of your request. Westcomp, PO BOX 494, Temple City, CA 91780 (111)

**NEW QUARTERLY NEWSLETTER FOR** VisiCalc® users. Disks too. \$7.50. Micro-Calc Business Users Group, PO Box 12039, Salem, OR 97309 (012)

**PRINTER INTERFACE—LETS YOU** connect the MX 80 to your CPU without the Exp. Interface. Illinois Custom Computers, 110 1/2 N. Vine, Harrisburg, IL 62946 (618) 252-4050 or send \$85.00 + 3.00 S/H. (012)

**UNIQUE TRS-80 SOFTWARE & BOOKS** Disassembled Handbook for TRS-80 all postpaid. Vol 1 5th printing "save one year's study" \$10. Vol 2 3rd printing "all you wanted to know" \$15. Vol 3 New 1981 "exploring new horizons" \$17. Morse code transmit program: cassette/disk \$15. Richcraft Engineering Ltd. Box 1065, 1 Wahmeda Industrial Park, Chautauqua Lake, NY 14722 Phone (716) 753-2654 for COD orders (111)

**PERSONALIZE YOUR SCRIPSIT™!!** PERSCRIP lets you design your OWN word processor. Your name or message up to 35 chars will be displayed upon initializing your word processor. Defaults (all margins, spacing, video width, etc.) will be yours, not arbitrary to be reset constantly. Change your cursor to any character! Rid yourself of "loud", eye-straining graphics (cursor, bottom demarcation line, etc.). Underline (most printers)!! Finally, the most eye-saving SCRIPSIT™ enhancement ever: our famous non-cursor. Try it, and you will never use a conventional cursor again!! Package includes manual, cassette, complete map of graphics characters. Disk SCRIPSIT™ req. Specify SCRIPSIT/LC or /UC. PERSCRIP will be nationally advertised at \$15.95. Mention 80-U.S., and your cost is \$12.95. Add \$1.00 post/handling. Send to: Dave Rose, Rohan Concepts, PO Box 20873, Atlanta, GA 30320. (111)

**WE'LL INSTALL YOUR SPEEDUP** Small Business Systems Group, Inc is offering to install an 'Archbold' speed-up for your TRS-80. This feature will improve the performance by 100%, automatically returns to normal speed during disk and cassette operation. No software mods are required. All speed ups are installed by trained personnel and are guaranteed for 30 days. This feature is ideal for systems running hard disk, or double density or 8" drives. The cost is \$125 + shipping. All systems will be checked out before any work is done to insure proper operation. Call or write: Small Business Systems Group, 6 Carlisle Road, Westford, MA 01886 (617) 692-3800 (012)

**PERCOM ELECTRIC CRAYON USERS** Are you looking for action, instructive, or game programs to run on your Electric Crayon equipped TRS-80? Write for list of programs and program descriptions. Send SASE to F S Kalinowski, 16 N. Alder Drive, Orlando, FL 32807 (111)

**FOTO FILE ORGANIZES YOUR PHOTOS,** slides or negatives for easy reviewing by title, code, location or category. Uses data files for unlimited capacity - great for assembling slide shows. Anybody who owns a camera (and a computer) should have this program. L2 16K cassette \$19.95; diskette \$29.95. Tape-Tronics, 346 N Western Ave., Los Angeles, CA 90004. Write for free brochure. (111)

**SFINKS MICROCOMPUTER CHESS** program was recently challenged by the best programs available for the TRS-80 in a Canadian Round Robin. The result: Sfinks riddled Mychess, Sargon II, and Gambiet 80 to finish in a tie for 1st place. Sfinks features an audio alert, a problem mode, superb graphics, and nine levels of play. Play chess with the best for less. 32K Model I TRS-80 cassette or disk only \$29.95. William Fink, PO Box 5912, Lighthouse Point, FL 33064 Dealer inquiries welcome. (111)

**EXATRON STRINGY FLOPPY FOR SALE-** \$250 including software. Barely used-still under warranty. T. Tuling, PO Box 386, Spokane, WA 99210 (111)

**LOOKING FOR PRACTICAL SOFTWARE?** Applications for home, office, school and the computer buff. Low cost TRS-80 software with full written documentation. For example our education series programs with unique phonetic recognition of misspelled answers are only \$7.95 each. Send SASE to DEMI-Software, 6 Lee Road, Medfield, MA- 02052 (111)

**THE CHEAP AMPLIFIER FOR YOUR "80".** Use as a radio or amp. Instructions include PMC—80 audio fix. \$2.00 and SASE to Terry Dalton. POB 22, Somerton, AZ 85350 (111)

**NUCLEAR POWER: LVII, MODIII 16K-- You're** the Control Operator of Beach Cities Unit 2. Run equip., learn to handle various casualties, serious mistakes could cost you your license. GRAPHIC actions side view with SOUND. Written by operator. Steven Moore, 113 Loma Lane, San Clemente, CA 92672 (714) 498-4666-\$8.00 (111)

**FOR TRS-80 RS-232 BOARD FIX** intermittent problems due to PC board connector with a connector brace. Easy to install. Only \$4.95. Gunn Industries 704B Franklin Austin TX 78751 (052)

**MAKE MONEY WITH YOUR TRS-80 (48-K)** W/ENHBAS + disk and line-printer required send S.A.S.E. for information-C.A. BUSS. Box 18156, Indianapolis IN. 46218 (111)

**TRS-80 COLOR FILE "HANDLER" FROM** select menu choose to copy data file from cassette, save file to cassette, list data, ADD/CHARGE/DELETE data, create data file, sort in ascending or descending sequence. Always returns to menu. For customization program provides index of subroutine locations. Requires 16K Color computer. Send \$14.95 to Andrew Mucci, 75 Maitland Place, Garfield, NJ 07026 (111)

**TRS-80 COLOR COMPUTER PROGRAMS** and Hardware: Morse code send-receive program and hardware Interface \$50. RTTY send-receive program \$25. FSK, AFSK RTTY Interface unit kit \$45, 32K memory upgrade instructions \$4, 20 line I/O Interface Card for the ROM Pack Slot \$37. Hex Monitor debugger Program \$15 send SASE for more Info. to Frank Lyman III, 12 Reservoir St. Cambridge MA 02138 (111)

**PART-TIME BUSINESS OPPORTUNITY -** Need dealer for my TRS-80 based business. Initial investment \$500 to \$1000. Tremendous potential. Minimum system required Model I 48K 1-disk with Epson MX-80 or equivalent. For details and product sample send date, time and place of birth to Bob's Charts, 405 E. Third St. Suite 206, Long Beach CA 90802. Include detailed description of your system. (012)

**PRNTPLOT PLOTS GRAPHS OF** functions on any type of printer (no special graphics capabilities are required). Make hard copy graphs of user defined functions. Order NOW and get a FREE copy of the subroutine PRSCREEN which copies screen displays to printer paper (PRSCREEN does require printer graphics). PRNTPLOT...\$31.00 Cassettes...Models I/III ADDA-U, 1176 N. East St., Layton, UT 84041 800/766-4857 VISA, MASTER-CARD (111)



# Advertiser index

UNCLASSIFIED ads,  
from previous page.

## TRS-80 COLOR "BRICKAWAY" GAME.

Fast action machine language video game; destroy bricks with bouncing ball. Sold on cassette, joystick required. Runs on any configuration machine. Only \$7.00 post paid. From Britt Monk, CPD PO Box 802, Elyria, OH 44036 (022)

## EXATRON STRINGY FLOPPY OWNERS

ESF-DIR is a machine language sub-system which maintains a Directory of programs on your ESF wafers and adds appropriate commands. Occupies 496 bytes of protected memory. For TRS-80 Level II with ESF Version 4.1. Make your ESF even more like DOS. You must see and use to believe! \$14 ppd. Cubbyhole Software, PO Box 884, Troy MI 48099 (111)

## 2 IN-MEMORY DATA BASE PROGRAMS


In Basic for 16K-Model I & III with tape. Menu driven-Edit-Search-Sort-Total; \$18 SCHLEGEL & Assoc. Rt. 2 Box 211d Lakeville, MN 55044 (111)

## WORD WIZARD AND SENTENCE WIZARD

Two new word games...Mind boggling, new, different, brainbusters, educational. \$9.95 ea. on tape for TRS-80 Level II, Add \$1.50 mailing. (Distributors wanted) Shirley Software, PO Box 417, Old Greenwich, Ct. 06870 (111)

## WORD PROCESSING IN BASIC YOU GET

two programs, one for disk one for level II basic. \$14.95 on cassette. Send SASE for further information. Jerry Lee--6953 Waldo, Detroit, MI 48210 (012)



### TOTAL DISKETTE BACKUP

**DO NOT TAKE UNNECESSARY RISKS  
WITH YOUR SOFTWARE.**

If your diskette software library is not completely backed up, or, if you are wasting diskettes by making backup copies of all your diskettes, your problem is solved! Using DUMPLoad, the total contents of your diskettes can be safely dumped to tape. The hi-speed tape option allows six 35 or 40 track diskettes to fit on one C60 cassette.

- TRS-80 Model 1 16K - 48K
- TRSDOS or NEWDOS80 Compatible
- May be used to back-up TRSDOS, VTOS 4.0, NEWDOS, MICRODOS, or data disks. (Single Density)

— \$16.95 on Cassette — \$19.95 on Diskette  
Plus \$1.00 handling (Indiana Res. add 4% tax)  
TOLL FREE 24 HR. ORDERING SERVICE  
1-800-525-9391 (Ext. 509) (Except Colo.)  
1-800-332-9259 (Ext. 509) (Colo. Residents)  
or Mail Check or Money Order To:  
COMPLETE COMPUTER SERVICES  
8188 HEATHER DRIVE  
NEWBURGH, INDIANA 47630

Circle 112

## Advertiser Index

RSN	Advertiser	Page	RSN	Advertiser	Page
	* 80 U.S. Books	141	11	Howard Industries	19
	* 80 U.S. Books	128	21	IJG	45
54	Aardvark-80	120	35	IJG	42, 86
42	Access Unlimited	104	41	Insiders Software	103
43	Acorn Software	105	81	J/C Enterprises	148
32	Advanced Oper. Sys.	Centerfold 1	55	JDR Microdevices	121
30	Aero Comp	71	80	JF Consulting	148
18	All Systems	37	98	Joe Computer	151
38	All Systems Go	93	25	Laredo Systems	55
51	Allen Gelder Software	119	63	Lindbergh Systems	129
73	Allen Gelder Software	138	37	Logical Systems Software	91
6	Alpha Products Corp	5	96	Maine Data & Financial Sys Inc.	149
111	AMRAD	158	22	Mannesmann Tally	51
24	Apparat	54	8	Med Systems Software	11
7	Apparat	7	60	Micro Architect	127
1	Apparat	Cover 2	5	Micro Clinic	4
13	Aspen Software Co (Soft-Tools)	27	113	Micro-Design	49
68	Basics & Beyond	135	67	Micro Images	133
59	Blue Book, The	126	57	Micro Management Systems	124
53	Byte Miser Software	119	77	Micro Mainframes	145
112	Complete Computer Services	160	76	Micro Mainframes	145
46	Computer Information Exchange	110	3	Micro Systems Software	Cover 4
91	Computer Vision	149	92	Micro-Grip Ltd.	149
*	Computerville	122	106	Micro Computer Technology	Cover 6
71	Computer Applications Unltd.	137	36	Microgram	87
74	Computer Plus	142	58	Microperipheral Corp.	125
17	Computer Shopper	36	95	Microprogrammer's, The	149
64	Computer Discount of America	130	16	Microsoft	31
27	Computerist's Directory	61	4	Mikeeangelo Elect. Corp.	1
56	Comsoft	123	47	Miller Microcomputer Services	111
101	Cook Labs	153	48	Misosys	113
29	Cornucopia Software	67	9	Omega Sales Co.	12, 13
2	Corvus Systems	Cover 3	103	Orion Instruments	155
20	Creative Software	44	45	Pan American Electronics	109
109	Crystal Computer	43	93	Paneltech Ltd	149
110	Crystal Computer	81	97	Peripheral People, The	149
61	Dan Haney & Asso.	127	40	Programmer's Guild, The	95
86	Dental Computer Newsletter	148	14	Program Store, The	28, 29
72	Disks, Etc.	138	10	Prosoft	17
99	E-Z Software	151	107	Radio Shack	Cover 7
104	EBG & Asso.	155	33	Radio Shack	Centerfold 2, 3
66	Edu-Ware East	131	82	Realty Software Co	148
65	Edu-Ware East	131	50	Remarkable Software	119
102	Electronic Specialists	153	78	Remarkable Software	147
26	Epson America	59	100	Remsoft	151
28	Exatron	63	70	Remsoft	136
108	Exatron	Cover 8	69	S-80 Systems	136
*	Exatron	74	88	Scientific Engineering Labs	148
12	FSI	23	28	Simutek	65
105	Galactic Software	Cover 5	31	Soft Sector Marketing	75 thru 80
94	Gerhart, Prasher & Asso.	149	90	SoftByte Computing	149
62	Gosub	127	49	Spectral Associates	117
34	Hayes Microcomputer	Centerfold 4	39	Spectronics (formerly Level IV)	94
52	Hexagon Systems	119	84	Starbuck Data Co	148
83	Home Computer Systems	148	*	Stratagem Cybernetics	127
89	Home Computer Systems	149	79	Teaching Assistant, The	147
75	Home Computer Systems	143	19	Total Access	9
			44	Tricor	107
			87	TYC Software	148
			23	V-R Data	53
			85	Wall Street Software	148

\* Please contact these advertisers directly.

## Back Issue Availability

The following back issues of 80-U.S. Journal are still available: May/Jun 79, Jul/Aug 79, Nov/Dec 79, May/Jun 80, Nov/Dec 80, Jan/Feb 81, May/Jun 81, Jul/Aug 81 and Sep/Oct 81.

The price per each is \$4.00 postpaid in the United States, Canada and Mexico, other foreign buyers please add appropriate additional air or surface postage.



# TRS-80™ PROGRAMS SUPER SOFTWARE AT SUPER PRICES

## THE ULTIMATE DISK-OPERATING SYSTEM

### LDOS™

A completely documented new generation of operating system for the TRS-80. Far superior to any on the market. It is a totally independent device system, capable of device linking, routing, setting, and filtering. LDOS will support 5" and 8" floppies, single/double density, single/double sided, and up to 80 tracks. Full customer service provided with a toll free 800 number. Excellent documentation in a tab indexed manual (over 250 pages). Call or send for more information today.

**Available for Model I or III . . . . . only \$169.00**

LDOS™ is a product of Logical Systems Inc.

### ALSO AVAILABLE

**EDAS 3.5 Model I and III . . . \$79.00**  
**EDAS 5.0 Model II . . . . \$179.00**

**Host Model II was . . . . \$199.00**  
**now . . . . . \$99.00**

## MAILING SYSTEMS

### MAIL/FILE - SERIES II

NEW Series II Mail/File has all of the outstanding features of the original Series I Mail/File, PLUS many additional qualities which again will set standards for this type of system. "Word processor" type input editor, fast sorting, and fabulous editing capabilities are a few of its features. Name and ZIP code are under constant sort. Series II is compatible with Series I data files.

**Model I system will handle up to 600 names.**

**Model III system will handle up to 1200 names.**

**Either system available for only . . . . . \$159.00**

**Also available for the Model II . . . . . \$199.00**

**Handling up to 2500 names per file**

### MASS/MAIL SUBSCRIPTION SYSTEM

### AVAILABLE FOR MODEL II.

### THE ULTIMATE IN MAILING SYSTEMS

*"I think the system will stand the test of time . . . it is probably the most sophisticated system around for the micros today"*  
Mike Schmidt (EDITOR) 80-US Jan/Feb pg. 94

Galactic's Mass/Mail System was designed with the needs of the large mailing list in mind. This system has capabilities of handling up to 10,500 records, with access times of less than 15 seconds and usual access of about one second. All adds, deletes and edits are instant for the operator and

## MAILING SYSTEMS

are then completed later in a "batch mode". The System comes complete with extensive documentation and ongoing support. . . . .

**Contact Galactic Software for detailed specifications for your exact needs. Available only for the TRS-80 Model II.**

## BUSINESS SYSTEMS

### INVENTORY MASTER SYSTEM

A program to fill your needs, handling up to 2700 items. With today's market, keeping on hand only what your demand calls for is reason enough to let your TRS-80 accurately and effectively take care of your inventory. Always know what to stock and when to stock it. Have a multitude of reports at your finger tips. This system has many features which were modeled after a main frame system of large capacity. More information available upon request.

**Model I version just . . . . . \$159.00**

**Model III version just . . . . . \$259.00**

**ALSO AVAILABLE . . .**

**For the MODEL I or III**

### STOCK MARKET MONITOR

**Cassette version . . . . . \$89.00**

**Disk version . . . . . \$99.00**

### ULTRA-TREK GAME

**Can you master this trip through the galaxies? As commander, will you be able to keep the Enterprise and its crew en route and on patrol? Can you destroy the hostile base? Order today.**

**Model I or III version only . . . . . \$19.95**

Send me the following:

- ☐ LDOS Model I . . . . . \$169.00
- ☐ LDOS Model III . . . . . \$169.00
- ☐ EDAS 3.5 Model I . . . . . \$79.00
- ☐ EDAS 3.5 Model III . . . . . \$79.00
- ☐ EDAS 5.0 Model II . . . . . \$179.00
- ☐ HOST Model II . . . . . \$99.00
- ☐ MAIL/FILE II Model I . . . . . \$159.00
- ☐ MAIL/FILE II Model III . . . . . \$159.00
- ☐ MAIL/FILE II Model II . . . . . \$199.00
- ☐ INFO ON MASS/MAIL MODEL II
- ☐ I WOULD LIKE MORE INFORMATION ON THE FOLLOWING:

- ☐ INVENTORY MASTER Model I . . . \$159.00
- ☐ INVENTORY MASTER Model III . . . \$259.00
- ☐ STOCK MARKET MONITOR Model I  
cassette . . . . . \$89.00  
disk . . . . . \$99.00
- ☐ STOCK MARKET MONITOR Model III  
cassette . . . . . \$89.00  
disk . . . . . \$99.00
- ☐ ULTRA TREK Model I . . . . . \$19.95
- ☐ ULTRA TREK Model III . . . . . \$19.95

☐ CHECK ENCLOSED ☐ C.O.D. ☐ VISA CARD NO. ☐ MASTERCARD NO.

NAME \_\_\_\_\_

ADDRESS \_\_\_\_\_

CITY \_\_\_\_\_ STATE \_\_\_\_\_ ZIP \_\_\_\_\_

Mail to: Galactic software Ltd. 11520 N. Port Washington Rd. K81C  
Mequon, WI 53092

**Can't wait? call  
414/241-8030**



TRS-80 A Trademark of Tandy Corp.



# IF YOU CAN RECOGNIZE VALUE, YOU CAN SAVE;

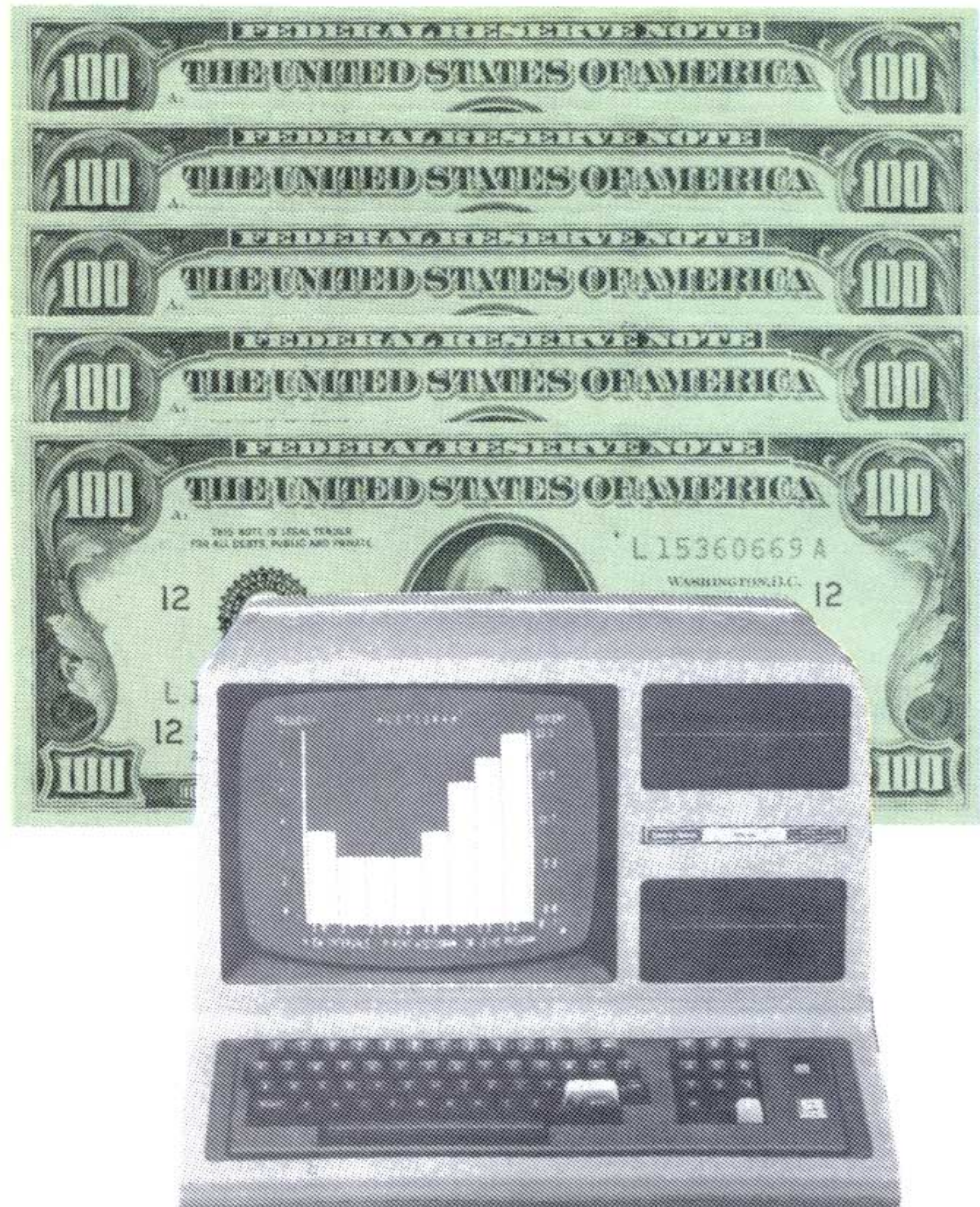
## \$500<sup>00</sup>

### M.T.I. MOD III PLUS

Now You Can Save  
\$500 over comparable model.

## \$1998

We have taken the basic 16K Model III expanded the memory to 48K and added our MTI Double Density, Dual Disk Drive system. System is fully compatible with Radio Shack DOS and peripherals.



### MOD III/EXPANDED

Same as above but has double storage capacity (708 storage). Your choice of 2 dual headed 40 track drives or 2 single headed 80 track disk drives

## \$2499

### MOD III/280

Our largest MOD III, approximately 1.5 mega-bytes of storage, utilizes 2 dual headed 80 track, double density disk drives. Complete with manuals and professional operating system. Microsystems DOS plus 3.3.

## \$2799

### MTI MOD III, SALES, PARTS & SERVICE CENTERS-INDEPENDENT DEALERS

PHOENIX, AZ .....	(602) 244-9739	WALNUT, CA.....	(714) 594-8311	MANHASSET, NY .....	(516) 869-8335
SIERRA VISTA, AZ .....	(602) 458-2479	FORT COLLINS, CO ...	(303) 221-1776	NEW ROCHELLE, NY ..	(914) 235-4444
TEMPE, AZ .....	(602) 839-0546	GROTON, CT .....	(203) 445-5166	TROY, NY .....	(518) 273-8411
TUCSON, AZ .....	(602) 323-9391	HOLLYWOOD, FL ....	(305) 981-1011	N & S DAKOTA .....	(701) 594-5674
ANAHEIM, CA.....	(714) 773-0240	GEORGIA .....	(404) 449-8982	CLEVELAND, OH.....	(216) 779-6040
COVINA, CA.....	(213) 332-4088	KAILUA, HI .....	(808) 261-6596	MAUMEE, OH.....	(419) 893-4288
HOLTVILLE, CA .....	(714) 356-5185	IDAHO .....	(208) 785-1497	DALLAS, TX .....	(214) 247-6679
INGLEWOOD, CA.....	(213) 673-3295	SHREVEPORT, LA ....	(318) 865-7189	CHEYENNE, WY.....	(307) 632-9132
LANCASTER, CA.....	(805) 942-5747	JOPLIN, MO .....	(417) 781-1748	MEXICALI, BC .....	(714) 357-4717
OXNARD, CA .....	(805) 486-5837	MIDWEST .....	(618) 345-5068	OVERSEAS	
SAN DIEGO, CA.....	(714) 275-4243	MISSOULA, MT .....	(406) 549-9715	AUSTRALIA .....	3877-6946
SAN JOSE, CA .....	(408) 946-1265	RALEIGH, N.C. ....	(919) 755-1175	BELGIUM .....	1663-2452
SANTA CRUZ, CA.....	(408) 427-0836	JERICHO, NY .....	(516) 997-8668	REP. OF SOUTH AFRICA ....	2145-1047



**MICROCOMPUTER TECHNOLOGY INC.**

3304 W. MACARTHUR, SANTA ANA, CA 92704

• (714) 979-9923 • TELEX 6780401 TABIRIN •



U.S. PRICES  
F.O.B. SANTA ANA,  
CALIFORNIA



**Radio Shack, The Leader in Small Business Computers  
Also Has Computers for Your Home!**

# **Introducing the Lowest Cost Color Disk System Ever— Radio Shack's TRS-80**

Radio Shack now offers disk drives for our popular TRS-80 Color Computer. Now you can have superb high-resolution color graphics and fast, "on-line" access to large amounts of data.

**Only \$1198.** Our new \$599 disk kit makes our TRS-80 Color Computer with 16,000 characters (16K) of internal memory and Extended Color BASIC language a versatile, low-cost computing system that's ready to attach to any TV (not included).

**Stores 156,000 Characters!** Just plug in the Program Pak™ controller to add disk storage to the Color Computer. The Disk Operating System—an enhanced version of the Color Computer's Extended Color BASIC language—is completely contained in the Program Pak, so you get a full 156K-bytes of on-line storage.

**Easy to Use.** The 16K TRS-80 Color Computer lets you create sophisticated color diagrams, business charts and even simple animation—using just a few simple one-line commands! This gives experienced programmers incredible power, yet makes it easy for beginners, too. We take you from the ground up with over 500 pages of easy-to-read documentation.

**Instant Fun and Games.** And just for fun, you can plug in any of our game cartridges. Battle starships in outer space, conquer dinosaurs from a prehistoric world, or just brush up on your chess.

**Fully expandable.** Your TRS-80 Color Computer Disk System can expand with up to four drives for over 626,000 characters of storage! And the additional drives are only \$399 each. Add up to 16K more memory, a printer and other accessories anytime.

## **Radio Shack's TRS-80—The Best-Supported Microcomputer in the World!**

The TRS-80 line of computers is backed with a wide selection of accessories, software, and service. We can even show you how to get up-to-the-minute news, current stock market reports and even electronic mail using your TRS-80! It's all available today at over 8000 Radio Shack stores and dealers, and at 185 Computer Centers nationwide.

**\$1198**

**16K-1 Disk  
System**  
(TV not included)

Stop by your nearest Radio Shack and see what's really new in personal computers. Or write: Radio Shack, Department 82-A-364, 1300 One Tandy Center, Fort Worth, Texas 76102

**Radio Shack®**

**The biggest name in little computers™**

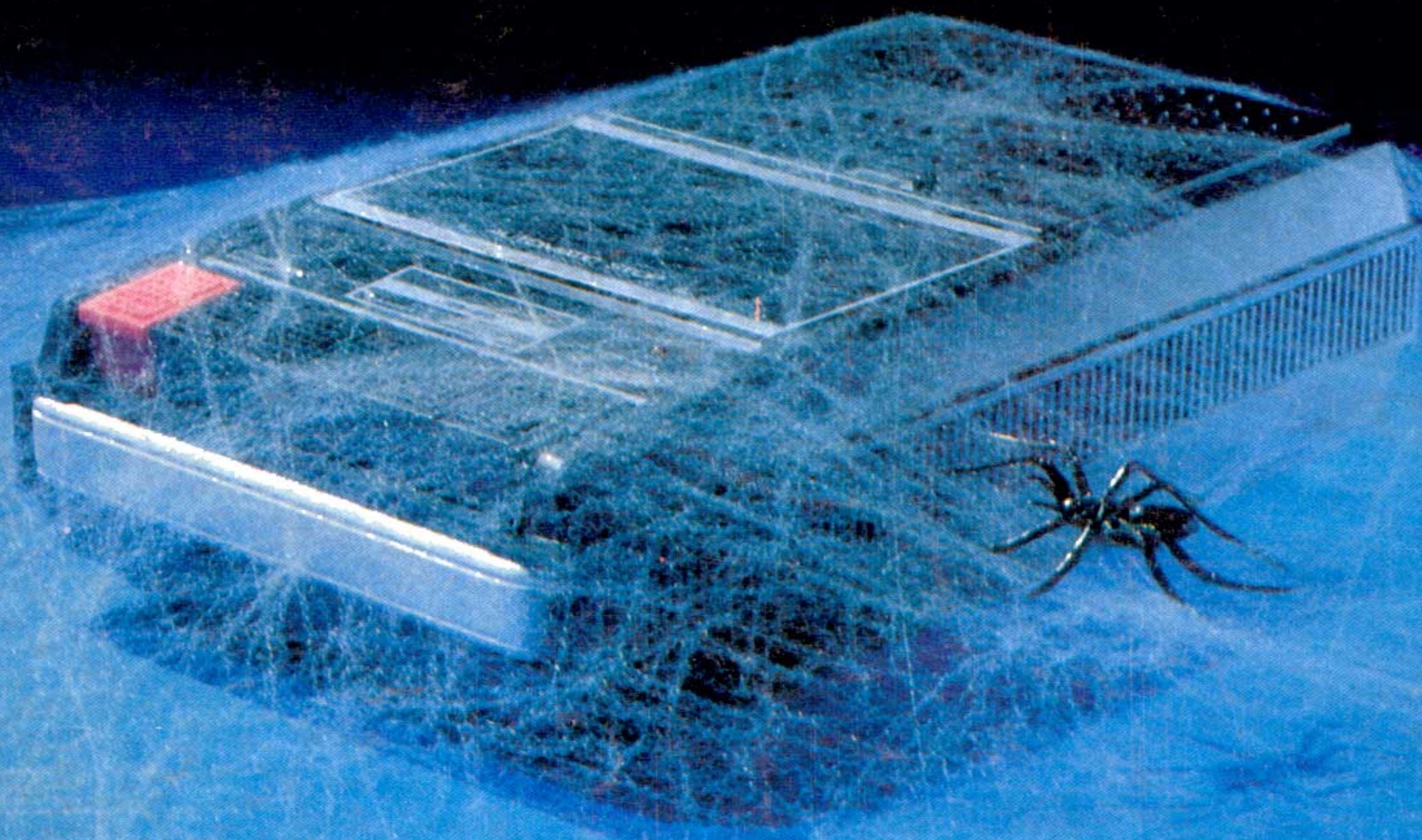
A DIVISION OF TANDY CORPORATION

Retail prices may vary at individual stores and dealers





# TIRED OF WAITING?



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

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

The ESF uses a miniature tape cartridge, about the size of a business card, called a wafer. The transport mechanism uses a direct drive motor with only one moving part. Designed to read and write

digital data only, the ESF suffers from none of the drawbacks of cassettes - without the expense of disks.

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



*excellence in electronics*

## exatron

To get further information about the ESF give Exatron a call on their Hot Line 800-538 8559 (inside California 408-737 7111).

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

181 Commercial Street  
Sunnyvale, CA 94086

