

# 80 U.S.

THE TRS-80 USERS JOURNAL

Vol. V, No. 8 \$3 per copy August 1982

Education



0 60959



318585 08

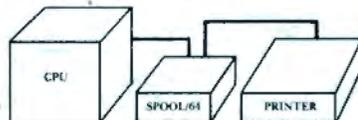


# How many times must your TRS-80 stop just to talk to your printer?

Your computer talks faster than your printer can listen. Expensive time is lost forever. SPOOL/64, a 64k byte hardware print spooler, keeps your computer processing while your printer is printing. No more waiting. No more wasting.

SPOOL/64 buffers your print output and transmits the information to your printer at the printer's specific print rate. It buffers up to 13 minutes of print output (at 80 characters per second).

SPOOL/64 plugs directly into both your printer and



computer, accepts input from parallel centronics cables (serial RS-232 available soon), and its user programming feature allows you to download your own programs so SPOOL/64 can handle sophisticated print

routines. And SPOOL/64, used with your software spooler, can give you the highest performance spooling available.



SPOOL/64 utilizes 64k of dynamic RAM, a Z-80 CPU, a 2716 ROM and a copy of the source program for the object code in the ROM is included.

SPOOL/64, priced at just \$399, is the most cost/effective print spooler on the market. Evaluate performance. Evaluate price. Then let SPOOL/64 get your computer back talking to you. Call or write Apparat today for a free brochure. Dealer inquiries invited.

 **Apparat, Inc.**

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

**"ON GOING SUPPORT FOR MICROCOMPUTERS"**

# 1



# Convert your TRS-80\* into a World Class Computer that REDUCES EYE FATIGUE AND DOESN'T FLICKER



...with LSI's new *Soft-View* Replacement CRT...

The black & white "TV Screen" CRT (picture tube) which came with your TRS-80\* model II or III is an inexpensive rapid "P4" Phosphor CRT intended for TV use. The display is actually strobing 60 times a second. No amount of "green plastic" will stop this strobing or eliminate the eye fatigue it causes. But a new *Soft-View* CRT display tube with a slower decaying, colored Phosphor will.

- Available in slow-decay green (similar to new IBM\* and APPLE III\* monitors) or medium decay "European Orange" (easy on the eyes, elegantly beautiful, and the standard for CRT displays in Europe)
- Leaded glass stops X-ray emission
- Optional Anti-Glare Frosted Glass available to reduce eye strain from glare
- Easy installation — tube comes with pre-mounted hardware
- 30-Day Money-Back Guarantee
- Ideal for Word-Processing & Programming, fast enough for Games & Graphics
- Finest quality double-dark glass and phosphor fields make the letters seem to be coming out of black space

## Try This Test:



Turn the brightness control on your TRS-80\* all the way up. Wave your hand up and down in front of the screen. See how jerky it seems? Just like in front of a strobe light! That's because the screen actually is strobing at you. A slower-phosphor CRT will reduce that troublesome strobe effect. That's why most of the newer monitors, from IBM\* to Apple III\* are using the new slow-phosphor CRT's.

LSI's new *Soft-View* CRT

\*IBM\*, APPLE\* and TRS-80\* are trademarks of IBM, APPLE Computer & TANDY Corp.  
# 2

LSI SYSTEMS *Soft-View* CRT's:

US82

- #GN42 Green Phosphor \$79.95
- #GN42G Green Phosphor with anti-glare \$89.95
- #OR34 Orange Phosphor \$89.95
- #OR34G Orange Phosphor with anti-glare \$99.95

ADD \$7 FOR PACKAGING AND HANDLING AND UPS SHIPPING

 **Langley-St. Clair**  
Instrumentation  
Systems, Inc.

To Order Call:  
1-800-221-7070  
Dealer Inquiries Invited

132 West 24th Street, New York, N.Y. 10011 212-989-6876

# So Far, So Good...



**Your Model III is a fine computer.  
So why settle for less than  
a fine disk storage system?**

A fast, reliable disk storage system — no other device is so vital to the satisfactory performance of your computer. At Percom we build quality, high-performance disk drive systems. From gold-plated connector contacts to goldcad metal chassis structures. From proven design through 100% reliability testing, Percom disk systems are the standard by which others are judged — the industry's "gold standard," in a sense. And since Percom is the largest independent manufacturer of disk systems for microcomputers, you get Percom quality at very competitive prices. Add-on drives for TRS-80\* computers start as low as \$399. Complete first-drive systems for the Model III start at only \$599. Put a quality Percom mini-disk storage system in your Model III. And save.

## #1 For Your Model III

Percom TFD drives for your TRS-80\* Model III computer are available in 40- and 80-track versions with single or dual heads. Single-head 40-track drives store 180 Kbytes; dual-head 40-track drives store 360 Kbytes. Eighty-track drives store slightly over twice these amounts. Of course these are formatted capacities. The Percom Model III controller handles up to four drives so it's possible to access almost three million bytes of on-line program and data files. You get Percom's OS-80 III Basic language DOS with each first-drive system, and your first drive may be either internal (add-in) or external (add-on) Percom TFD drives work with Model III TRSDOS and other Model III disk-operating systems. First-drive systems are pre-assembled. Installation is accomplished with simple tools

## #1 For Your Model I, Too

Percom TFD add-on drives for the TRS-80\* Model I computer are available with the same features and the same quality control measures as TFD Model III drives. As for Model III drives, all Percom Model I drives are double-density rated. Install Percom's popular DOUBLER II in your Model I Expansion Interface and upgrade your Model I to provide the same storage capacity as the Model III.

### Watch for Announcement of Percom's Low-Cost Hard Disk System for the Model III!

To order, or for the name of your authorized Percom retailer,  
call toll free 1-800-527-1222.



PERCOM DATA COMPANY, INC.  
11220 Pagemill Road • Dallas, Texas 75243  
(214) 340-7081

**The Drive People  
You get more out of  
Percom disk systems.  
Expect it!**

PRICES AND SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE

\*TRS-80 is a trademark of Tandy Radio Shack Corporation which has no relationship to Percom Data Company, Inc.  
PERCOM, DOUBLER II and OS-80 III are trademarks of Percom Data Company, Inc.



Yes... I'd like to know more about  
the best for my TRS-80 computer  
Send me free literature about  
quality Percom products

MODEL I    MODEL III

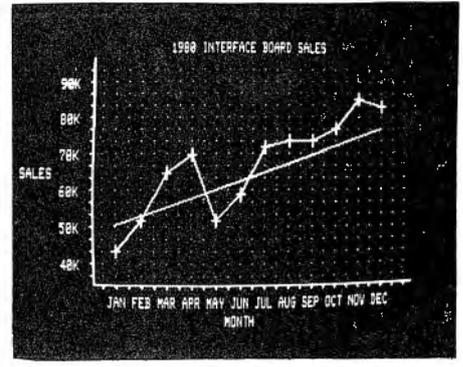
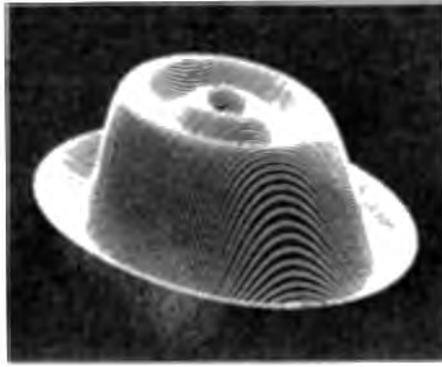
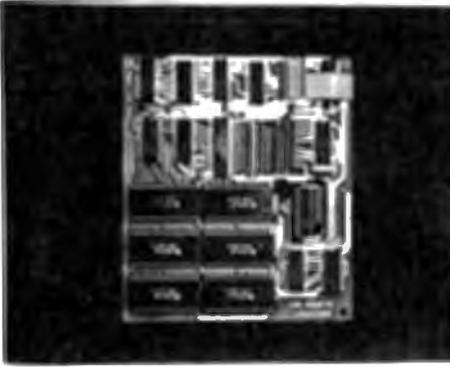
Send to:  
PERCOM DATA COMPANY, INC. Dept. 8-U  
11220 Pagemill Road Dallas, TX 75243

NAME \_\_\_\_\_

STREET \_\_\_\_\_

CITY \_\_\_\_\_ STATE \_\_\_\_\_

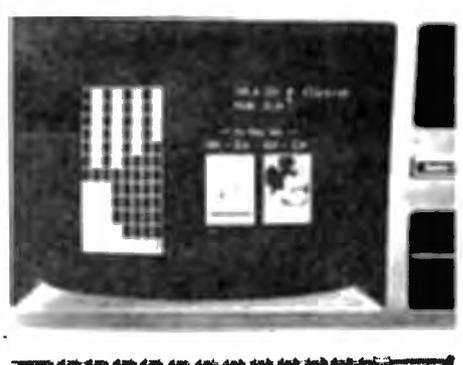
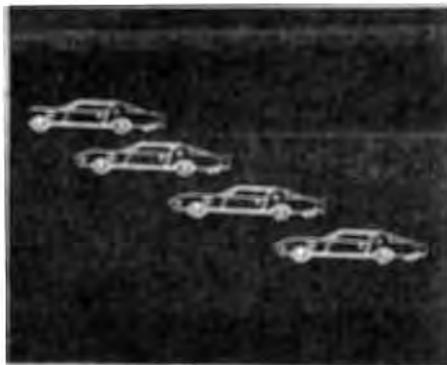
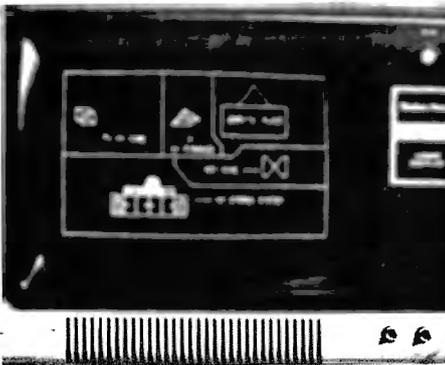
ZIP \_\_\_\_\_ PHONE NUMBER \_\_\_\_\_



**GRAFYX SOLUTION™ \$299.95**

- Open up new horizons with 512 × 192 dot graphics for Mod III
- Extensive business, games, personal, and scientific applications
- BASIC commands set & reset points, lines, circles, boxes, etc.
- 80 character display compatible with BASIC programs and DOS
- Outstanding software support (30+ programs) and documentation
- Anyone can upgrade the easy way since there is no soldering

# 3



**80-GRAFIX™ \$169.95**

- Adds 128 Programmable Characters which are easily displayed
- Effective resolution of 512 × 192 (384 × 192 for Mod I)
- Great for creating game figures, symbols, and alternate character sets
- Excellent software support and extensive documentation
- Model I & III versions are easily installed without soldering

Manual only \$15  
Dealers welcome

**μLabs, Inc 214-235-0915**  
902 Pinecrest, Richardson, TX 75080

Prepaid or COD  
Tx. res add 5%

August, 1982 1

© 1982 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 correspondence to: **80-U.S. Journal, 3838 South Warner Street, Tacoma, Washington 98409, telephone (206) 475-2219.**

**Advertisers:** 80-U.S. Journal will accept 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 to 6 weeks for review. Programs must be supplied in machine readable form on diskette or tape, clearly marked as to model and operating system. 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. 80-U.S. Journal pays upon acceptance rather than on publication.

**SUBSCRIPTION PRICE:** U.S.: \$16 for one year, \$31 for two years and \$45 for three years. **Canada and Mexico:** \$25 per year, no two or three year subscriptions are offered. **All other:** \$30 per year via surface mail, \$72 per year via airmail. Two and three year subscriptions are not offered.

ISSN Publication #0199-1035. The 80-U.S. Journal is published monthly by 80-Northwest Publishing, Inc., 3838 S. Warner St., Tacoma WA 98409-4698. Printed in the United States of America.

**POSTMASTER:** Please send change of address form 3579 to 80-U.S. Journal, 5615 West Cermak Road, Cicero, Illinois 60650. Second Class postage PAID at Tacoma, WA and at Aberdeen, SD.



**OUR COVER** shows a Model III in a third grade classroom at Sheridan Elementary School, Tacoma, WA. Fred A. Johnson has photographed another fine cover for us!

2 80-U.S. Journal

# 80-U.S.

## THE TRS-80 USERS JOURNAL

TRS-80 is a trademark of the Tandy Corp.

Vol. 5, No. 8 — August 1982

### ARTICLES

#### **Computer revolution in public schools** 14

Hal Broenkow

The economic reality of purchasing computers for use in classrooms.

#### **Computerize your individual educational programs** 16

Model I/III, 16K and up

Larry Krengel

To streamline paperwork, a special education teacher sets up a program of goals and objectives for students.

#### **Color Computer gradebook** 22

Color Computer w/Extended BASIC, 16K and up Lynn H. Davis

Maintain a record of grades and compute report card averages.

#### **Daisywheel printer for under \$900** 34

Mike Schmidt

Evaluation of the Smith-Corona daisywheel printer.

#### **"I've got it!"** 39

Mike Schmidt

An overview of Model 16.

#### **Testmaker** 42

Model I/III with or without ESF

Larry Krengel

A teacher's multiple choice test and printed answer sheet.

#### **Meet the Supermonitors** 47

Model I/III

Paul F. Secord

An evaluation of six sophisticated monitors: Micromind, Step-80, Tasmon, Ultra-Mon, SuperStep and Bugout-Pro.

## **DT-1**

An evaluation of Radio Shack's new multi-user terminal.

## **The DUMP command**

Model I, 32K with disk

Find machine language addresses with STAR (system tape address reader).

## **Basically BASIC**

Model I/II/III and Color Computer

Input screen control — make your input statements more attractive.

## **Microcomputers for a California school**

A math club earns money to buy computers for their school when property tax revenue was curtailed.

## **Checkbook**

Model I/III

Part III: Space saving with NEWDOS/80.

## **Reader survey**

Results of the April questionnaire.

## **Open ended geography**

Model I/III

A spelling/geography word game.

## **Files and foibles**

Model I/II/III and Color Computer

Use recursive programming to solve the Towers of Hanoi problem.

## **Decimal to fraction conversions**

Model I/III, 16K and up

Let your computer do the thinking while you learn about fractions.

## **Color disk directory**

Color Computer

A utility to enhance your DOS.

54

Harry Avant

57

Joe W. Roche

66

T. R. Dettmann

71

Dan Robinson

72

Jerry L. Latham

80

Mike Schmidt

83

Robert K. Fink

86

T. R. Dettmann

96

Jim Klapproth

99

Bob Waterhouse

## **REVIEWS**

### **Gobbler**

Reviewed by Tim Knight

100

### **DOSPLUS 3.3**

**User's Manual**

Reviewed by Paul M. Hine

101

### **The UPI-3 Serial Interface**

Reviewed by William Ramsey

101

### **Computer Based Math Lab**

Reviewed by Cam Brown

102

### **Armored Patrol**

Reviewed by Mark Renne

103

### **Space War**

Reviewed by Richard Rehaume

104

### **Three CAI Programs**

Reviewed by Cam Brown

105

## **DEPARTMENTS**

### **Editorial**

By Cam Brown

4, 6

### **Letters to the Editor**

By Mike Schmidt

8, 9

### **Items at Random**

By Mike Schmidt

12

### **Captain 80**

By Bob Liddil

64

### **@ News**

By Spencer Hall

93

### **New Products**

108

### **Bulletin Board**

112

### **Advertiser Index**

112

**Publisher/Editor-in-Chief**

I. Mike Schmidt

**Editors**Cameron C. Brown  
Donald Scarberry**Associate Editors**Terry R. Dettmann  
Jim Klapproth**Contributing Editors**Spencer Hall  
Robert W. Liddil**Advertising Sales**

Margaret G. Farrell

**Promotion**

Robert P. Perez

**Production**Catherine D. Doud  
Sherry A. Miksell**Editorial Secretary**

Eva R. Jones

**Circulation**

Kristine E. Schmidt

**Accounting**

Helen Dalton

# Editorial

The introduction of the microcomputer to our schools has been touted as a revolution in education. I believe that it has been a flop.

Only after the micro has affected a complete cultural change will it become a true companion to education. Schools are very slow to be at the forefront of any major change, let alone technological advance.

Classroom instructors are being inundated with Computer Assisted Instruction, Computer Managed Instruction, Computer Aided Instruction, Computer Science, Computer Literacy, and a plethora of other C's. But the instructors do not have the time nor the inclination to do an adequate implementation. When the microcomputer was first on the market, I was ecstatic. It brought a world of wonder and excitement to my students. It allowed for creativity, problem solving, individualized instruction, structure and demand for detail. I loved it. But the problems are vast and must be addressed.

### The People Problem

I have found most educators to be wary of the computer. They have been given little experience on any computer system and are not anxious to use machines that are not clear to them. Even today, most instructors do not use an overhead projector, video or other visual aids. Why should we expect something as complicated as a computer to be welcomed with open arms? Thirty years ago, television was going to be the panacea for education, yet most schools leave the telecourses to community centers and adult education, with a Sesame Street or Mr. Rogers thrown in for preschoolers. The classroom instructor tends to be very possessive of his time and the manner in which material is presented. The micros have yet to

convince the instructor that they can do an adequate job for him.

Most instructors have a set syllabus, and will only adopt materials that will match their time schedule, or text, or emphasis on an idea. Only when a piece of software can be slipped directly into a given day's lesson plan will any teacher even consider using it.

Computer fear is an emotion that has been observed by almost everyone in the business. Educators are no different, their adoption of the micro demands that they first be exposed and educated, yet how many schools have spent even one-tenth as much on staff training as they have on hardware or software?

### The Software Problem

Almost all software is sold on an as-is basis, with little or no user modification allowed. Most CAI that is currently offered is on the drill and practice level. An instructor is usually following a given text, but the software is not designed to match. There is little agreement on terminology or vocabulary and many times the instructor has to spend more time helping the student run the program than would be required to do the one-to-one tutoring. If software houses would also supply drill sheets, workbooks that coordinated with a given text, handouts for students and numerous other aids besides just a program, the teachers might be more apt to adopt their materials.

Computer-assisted management offers no real bonus to the classroom teacher. How many instructors are really gaining time by having grades and scores maintained on the machine? Most instructors have to keep a written log of scores, attendance and other data; what advantage is there in having to reenter the scores at a keyboard? The end of the semester grading can be simplified by the computer, but most instructors either keep just a

## RENEWING?

Check your label to be sure it's correct. For uninterrupted service include your label with your order.

## MOVING?

Please enclose your label or write your name and address as it appears on your label.

Name \_\_\_\_\_

Address \_\_\_\_\_

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

Write in new address:

Name \_\_\_\_\_

Address \_\_\_\_\_

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

## 80-U.S. Journal

Subscription Department  
5615 West Cermak Road  
Cicero, IL 60650



# HAPPINESS IS...NEWSCRIP<sup>TM</sup>

## THE WORD PROCESSOR FOR BUSINESSMEN AND PROFESSIONALS

We offer you ongoing support by answering your questions and providing reasonably priced enhancements.

### A FEW OF NEWSCRIP'S STANDARD FEATURES:

- \*Form Letters with merging of names and addresses
- \*Gives superb appearance to your final documents
- \*Comprehensive manual with hundreds of examples
- \*Centering, top/bottom titles, indents, pagination
- \*Underlining, boldface, double-width, italics<sup>†</sup>
- \*Sub-scripts, super-scripts, proportional pitch<sup>†</sup>
- \*Generates Table of Contents, sorted Index
- \*Allows block graphics, special symbols<sup>†</sup>
- \*Search and replace globally or within a range
- \*Block move, copy, delete, insert from other file
- \*AUTOSAVE, WHOOPS, DIRECTORY, KILL, REPEAT
- \*Based on IBM's "EDGAR" and "SCRIPT" systems
- \*Supplied ready-to-run on "tiny" DOSPLUS
- \*Easily transferred to NEWDOS, NEWDOS/80, LDOS, TRSDOS
- \*Includes handy Quick Reference Card

### NEWSCRIP CONTROLS THESE PRINTERS:

- \*EPSON MX-80, MX-100: all 12 fonts, plus underlining and block graphics; italics with GRAFTRAX
- \*Centronics 737, 739; Radio Shack L.P. IV, L.P. VIII, Prowriter, Daisy Wheel II, NEC PC-8023A, TEC 8500R, C.I.TOH 8510: Right-justified true proportional printing
- \*Good support for: Diablo, Spinwriter, Starwriter, QUME, Microline, Anadex, modified Selectric, standard line printers

**NOW AVAILABLE:** right-justified true proportional support for Diablo, Spinwriter, Starwriter, and Qume (DaisyWheel Option)\*\*

### TYPICAL USER AND REVIEWER COMMENTS:

"There is a new word processor on the market that will change the way people think about the capabilities of the TRS-80. Imagine a powerful mainframe text editor running on a TRS-80, with virtual compatibility between the two versions...on-going support second to none, with superb documentation." (Jim Klapproth, 80-U.S. JOURNAL February, 1982)  
the manual:

"It definitely rates the first '10' given to any documentation reviewed in this column." (A.A. Wicks, COMPUTRONICS, October, 1981)

the software: "An excellent Word Processor" (D.H.); "Absolutely fantastic" (S.E.S.); "You have features that I cannot duplicate on my \$14,000 system" (J.B.)

the support: "Your phone information system and the prompt and courteous staff that you provide to help your clients...are worth the cost of the system." (V.H.H.)

**REQUIRED CONFIGURATION:** 48K TRS-80 with one disk drive. Specify Model I or Model III.

<sup>†</sup> Some features work only if your printer has the mechanical capability.

\*\* DaisyWheel proportional is extra-cost option.

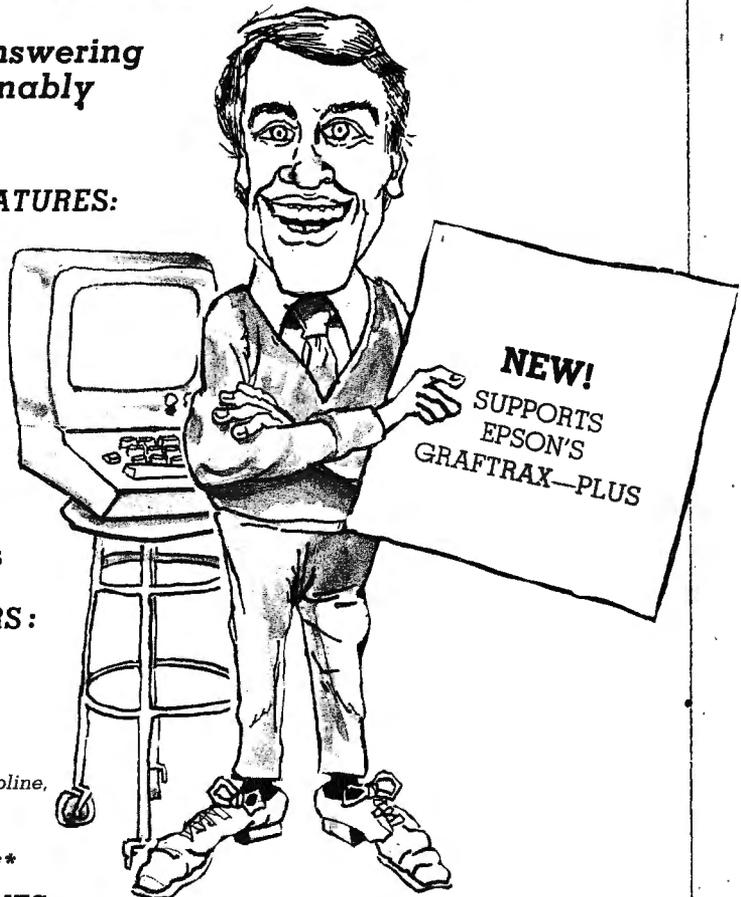
### TO ORDER, CALL NOW, TOLL-FREE:

(800) 824-7888, Operator 422  
CALIF: (800) 852-7777, Oper. 422  
ALASKA/HAWAII: (800) 824-7919  
FOR TECHNICAL INFORMATION CALL:  
(213) 764-3131, or write to us.

Order from your Software dealer, or from:

# PROSOFT<sup>TM</sup>

DEPT. C, BOX 560 • NO. HOLLYWOOD, CA 91603



<b>NEWSCRIP 7.0:</b>	<b>\$124.95</b>
<b>MAILING LABELS OPTION:</b>	<b>29.95</b>
<b>Special: NEWSCRIP + LABELS:</b>	<b>139.95</b>
<b>Daisywheel Proportional Option:</b>	<b>49.95</b>
<b>"PENCIL"/"SCRIPSIT" File Converter:</b>	<b>14.95</b>
<b>Manual Only (180 pages):</b>	<b>30.00</b>
<b>Reference Card Only:</b>	<b>2.50</b>
<b>Electric Webster + Correction Feature:</b>	<b>149.50</b>
<b>Graphics Editor and Programmer:</b>	<b>45.95</b>
<b>GEAP &amp; Dotwriter (Hi-Res. letters):</b>	<b>74.95</b>
<b>DOSPLUS 3.4:</b>	<b>149.95</b>

# 5

TERMS: We accept VISA, Mastercard, checks, Money Orders, C.O.D. and even cash. We pay shipping via surface UPS inside U.S.A. Please add \$3.00 for Blue Label, 6% tax in California, and 15% outside North America (air shipment).

simple percentage scale, or base grades on a unique system that would defy even the most sophisticated of routines. Overall statistics are extremely valid for a teacher, but those that would make use of such data are not the ones that have to be convinced that a micro could be useful.

We have had software on everything from algebra to calculus for over a year, and our Math/Sci department has everyone trained in the use of the micro, yet the packages have not been touched. Why? It is still easier to write out a ditto and drill than to have students go to the computers. The problems involved with getting 30 students to work on six machines are just too much. By the way, I still find the programs to be excellent examples of software and a source of discussion, but do I use them regularly? No.

### The Hardware Problem

Computers are not accessible to

other classes. Even the simplest of micros is difficult to move (let alone the TRS-80 Model I with its multitude of wires and cables). The movement of ten machines from room to room is unrealistic. This means that instruction involving computers would require the scheduling into a computer room, moving classes around, insuring that a knowledgeable computer user is available for running the machines, all of which is an added burden to the instructor and takes away from the class time. What is the value of it all if you lose time just due to logistics?

The industry is still not standardized. Model I, II, III, 16, Color and Pocket are just from one vendor. Combine that with Apple II, III, Pet, Atari 400, 800, IBM, etc., and you have a hodge-podge of machines that do not communicate, or allow for compatibility. After mixing in a few different operating systems and specialized drivers, who knows anymore what will work with what? Only the teacher that devotes days to learning, reading, transferring programs, can keep up. Many schools have opted for just one system, not because it is the best, but because it is the only feasible way to manage it. But, are the students getting the best introduction if they only see one style of machine and language? Hardware and software compatibility would allow for choices to be made based upon merit, not just because it is the only method that will work on a given configuration.

### The Game Problem

An earlier article by Leo Christopherson in this magazine pointed out how creativity and games go hand-in-hand. I agree completely, but how many educators have students who *write* games, not play them? Almost every teacher I talked to mentioned the amount of game playing that was being done. The students do find the computer a fascinating servant, but it is the rare student that will take the next step and attempt to program his own entertainment.

Our computer room is packed every day after school, and maybe only two terminals are being used for writing of programs, the rest are

full of asteroids, clipper ships and star trekkers. CAI material goes begging. Games are fun, and they do point the way for educators. The best response from students has been given to simulations, those programs that turn a learning situation into a game. The programs from *Creative Computing* have been excellent, and our students used them. Getting the teachers to fit it into their lesson plan was harder.

If the games are a way to entice students to come to the machines, then by all means use them. But we have to offer more to the students once we have them hooked.

### The Sex Problem

Also, it appears that the current situation is very male oriented, few schools can point to a balanced program. Where are the women? Most introductory classes have an equal number of men and women, but what happens after that? What are educators doing, or what image is being presented, that results in so few women getting really involved with the terminals?

There is no physiological or psychological reason for what is happening, but why are the women not showing up? If anything, their early development of hand-eye and fine motor skills says that the typing and attention to detail would be easier for them than the male students. Age also appears to be a key factor. The occupants of computer rooms tend to be underclassmen. Working on computers and holding a driver's license appear to be mutually exclusive events.

I do not mean to be a prophet of doom and despair. The potential is phenomenal. I have seen 15- to 18-year-olds make the computer jump through hoops. I have seen the dedication and involvement of a number of instructors. (If only running a computer room from 2:30 to 5:30 every day was funded as well as coaching!) What I am calling for is a concerted effort on the part of hardware and software manufacturers to look at education from the average classroom teacher's point of view. Once the teachers can call themselves computer users, the revolution will be a breeze.

Cam Brown

# MAINDEX<sup>®</sup>

## Main File Index

**MAINDEX is an easy to use, yet thorough program that will 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 file in seconds.**

- A main index of all your disks, giving you disk name, free grants, dates updated, number of tracks, and disk descriptions.
- Alphabetizes a list of your files, descriptions and their disk location.
- Search for files by name, category, or descriptions.
- Print disk labels with disk name and file names.
- Runs on both TRS-80 Model I and III.
- Uses the advanced file capabilities of Apparat's NEWDOS/80.
- Runs with NEWDOS/80 Ver. 2
- Includes 14 page easy-to-understand documentation.
- Labels included to get you started organizing your disks and files

Requires 48K, 1 disk drive, and NEWDOS/80. On cassette for easy transfer to disk. . . . . \$34.95

Add \$1.50 per order for shipping and handling  
(California residents add 6% sales tax.)

MasterCard

(415) 388-0238

VISA<sup>®</sup>

TRS-80 IS A TRADEMARK OF TANDY CORP. - NEWDOS IS A TRADEMARK OF APPARAT INC

# EZ

#6 SOFTWARE

DEPT EU, PO BOX 591, NOVATO, CA 94948

# GIMME FIVE! BIG FIVE, THAT IS

## DEFENSE COMMAND

Several months ago the Kromorkrom Empire invaded our planet and stole some of our newly developed and highly efficient "Krotnium" Star Cruiser fuel cells. Your mission is to infiltrate the Kromorkrom Empire and pass yourself off as the commanding officer of one of their fuel vessels. Eventually you will be discovered and then it's battle time! Sound and joystick control make this another winner.

Cat. No. 3853 Mod. I & III, 16K, cass \$15.95  
Cat. No. 3854 Mod I & III, 32K, disk \$19.95

## STELLAR ESCORT

Five billion light years from Kromorkrom, Federation forces have been at war with the hostile Cretonian Empire. Unfortunately, the Cretonians attacked by surprise and now your forces are almost out of supplies. It's up to you, the Escort fighter pilot, to save the Federation. Sound and joystick option are included.

Cat. No. 3855 Mod I & III, 16K, cass \$15.95  
Cat. No. 3856 Mod I & III, 32K, disk \$19.95

## GALAXY INVASION

Cruel and crafty invaders have been spotted in battle formation warping towards Earth. You must quickly eliminate the aliens as they swoop down upon you. Includes sound and joystick action.

Cat. No. 3847 Mod I & III, 16K, cass \$15.95  
Cat. No. 3848 Mod I & III, 32K, disk \$19.95

## ATTACK FORCE

In this fast-paced machine language game, eight alien Ramships are warping toward your ship. You must dodge them and fire missiles to destroy them before they get you! Sound and Joystick options are included.

Cat. No. 3849 Mod I & III, 16K, cass \$15.95  
Cat. No. 3850 Mod I & III, 32K, disk \$19.95

## ROBOT ATTACK

Evil robots from the planet Jidya have overtaken one of Earth's valuable Space Stations. Space Central is counting on YOU to invade the station and conquer the robots. You must act quickly and boldly in order to carry out your mission. ROBOT ATTACK features sound effects and either keyboard or joystick control.

Cat. No. 3851 Mod I & III, 16K, Cass. \$15.95  
Cat. No. 3852 Mod I & III, 32K, disk \$19.95

## COSMIC FIGHTER

Draft those pesky aliens! Your mission is to clear the skies of the invading aliens. As soon as space is clear, along comes another set. Keep shooting but watch out, your fuel is getting low. Good luck. Includes sound and joystick capability.

Cat. No. 3213 Mod I & III, 16K, cass \$15.95  
Cat. No. 3213 Mod I & III, 32K, disk \$19.95

## METEOR MISSION 2

Emergency! Your astronauts are in trouble. You must maneuver through the asteroids and meteors in order to save your men and get them to the space station. Complete with sound and joystick option.

Cat. No. 3214 Mod I & III, 16K, cass \$15.95  
Cat. No. 3215 Mod I & III, 32K, disk \$19.95

## SUPER NOVA

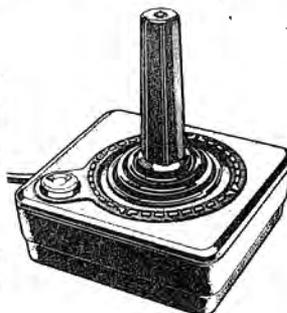
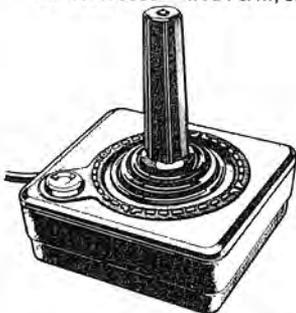
SUPER NOVA is a fast paced real-time game for one or two players. The object is to destroy as many asteroids and aliens as possible without getting destroyed. Hitting a large asteroid causes it to break into smaller asteroids. Aliens and their flagship will appear on the screen and try to shoot you out of the sky.

Cat. No. 3845 Mod I & III, 16K, cass \$15.95  
Cat. No. 3846 Mod I & III, 32K, disk \$19.95

## TRISSTICK

Model I and Model III owners may now use a joystick for better response in those fast-action programs. The TRISSTICK is compatible with all BIG FIVE software and comes complete with instructions for easy implementation into your own programs. It features the famous Atari joystick and plugs right in to your machine. There's no modification or wiring needed!

Cat. No. 3939 Model I \$39.95  
Cat. No. 3929 Model III \$39.95



## "EXTRA SPECIAL" SPECIAL

Purchase any three or more BIG FIVE programs and take 10% off. Combined with FREE SHIPPING offer, it's just too good to be true.

### HOW TO ORDER

Write or phone. Pay by check, M/C, VISA, or COD (add \$1.50 for COD). (800) 423-5387 (213) 886-9200. Offer expires July 31, 1982. Mention this ad and we pay shipping (UPS ground only). HW Electronics 19511 Business Center Dr., Dept. U7, Northridge, CA 91324

WHEN IN SOUTHERN CALIFORNIA, VISIT OUR RETAIL STORES

# HW ELECTRONICS

19511 Business Center Dr.  
Northridge, CA 91324

2301 Artesia Blvd.  
Redondo Beach, CA 90277

444 S. Indian  
Palm Springs, CA 92262

# Letters to the editor

Dear Don,

I received my June 1982 issue of *80-U.S. Journal* today and read the article on my chess program at least five times. I loved it! I still laugh when I think of you falling backwards over your chair from the sound of the "audio alert".

Sfinks may be a good program but without an enthusiastic article like yours, it would go on, unnoticed. Thank you. Maybe the moisture you saw on your monitor was a tear of my appreciation. Sincerely,

**Bill Fink**

**Pompano Beach, FL**

*It was our pleasure. —Ed.*

Dear Mr. Hall

Congratulations on your appointment as @NEWS column editor! I'm also a Stringy Floppy enthusiast and have followed your S-F articles with great interest!

I really believe one of the greatest needs of those equipped with S-F is the ability to convert disk programs to use on the S-F wherever possible. In the past, I've mentioned this to Jim Perry and also Exatron.

A series of tutorial articles incorporating the proper approach (and accompanied by S-F programs, etc.) would probably be the way to go. Exatron, so far, hasn't filled this need.

I believe this is all the more necessary now with the proliferation of disk articles at the expense of S-F and cassette-equipped owners. Sincerely,

**Daniel A. Armstrong**  
**Las Cruces, NM**

Dear Sir,

In @NEWS (June 1982) it is stated that one can save and load Exatron "stringy floppy" wafers with a 4 Mhz clock rate. Not true. I have the Holmes' Sprinter installed and find that my TRS-80 runs well with speeds up to 5.32 Mhz, but that the most the "stringy" will tolerate is 2.66 Mhz.

By the way, I don't understand all the praise for the Exatron system.

8 80-U.S. Journal

While faster than cassette recordings, it is quite frustrating because one has to search the whole tape to find a file. And one has to go through twelve keystrokes to activate the unit. Furthermore, the I/O program must be loaded separately — another series of strokes — and when loaded, it often interferes with the program that is supposed to use it. What a difference from disks!

**H. Hjortsvang**  
**Walnut Creek, CA**

Gentlemen,

...may I mention that I have three young teenagers who read your magazine and I find the ad from The Softcore Software Co. offensive.

It seems that people involved with personal computers should be above this "tacky" behavior. Adult book stores and X-rated movie houses are available to those with sexual hangups. Why degrade your magazine for the relatively small amount of revenue from this advertising?

**Joe Ames**  
**New Ringgold, PA**

Gentlemen,

The reason for this letter is to express my reaction to the obvious goals you have for yourselves in connection with *80-U.S. Journal*. Your choice of editorial material is intuitive and meets the needs of a hobbyist. Stick with your intuition. Your paper is easier to read, and your type size is legible. I guess you're after more advertising, but for goodness sake, leave room for editorial matter. . .

**Stephen L. Javna**  
**Englewood, NJ**

*Our editorial aims and goals were set with our first issue in September 1978. They haven't changed much since then, probably because they were broad enough to cover what came afterwards. We have always been less than 50% advertising, we don't like "continued from the front*

*to back" articles and we still hope to provide the reader with enough value in each issue to justify the whole subscription price. — Ed.*

Good morning:

We are neophytes in the world of computers . . . the new breed, to whom the computer is but a tool — albeit an effective one — to be put to work to process office chores. The school of hard knocks has been our instructor, and we try not to make the same mistake twice. Perhaps your readers would be interested in our experiences and decisions.

Salesmen are a poor source of advice on computers and comparable quality. Secondary school students are little better. Each is biased toward the single line of equipment they are familiar with. Fortunately, we sought advice from throughout a wide area of users and programmers. We discovered first hand the importance of the word "support". . . again, fortunately, before we made the decision on equipment purchases.

Ours is a small, but busy concern. We cannot afford to be "shut down" because of equipment/software failures. Our decision — the TRS-80 Model III. The support provided by the Tandy Corp. and the service network they have established have proven this to have been a most wise decision!

Our accounting requirements demanded computerization. Excellent AP/AR/GL programs are available for the Model III, but only one possessed the features we were looking for — Mini-Biz by Nepenthe Programs, of California. Problems? Certainly. Most of them due to our inexperience. However, we are impressed, again, with the tremendous support we have received from Nepenthe. In an instance or two, features we were looking for have been added by Nepenthe because they made an already excellent series of programs even better.

Most importantly, both Radio Shack and Nepenthe realize the

importance of providing their support and assistance when we need it; not when it is convenient for them.

We have learned, and are learning. Investigate. Evaluate. Weigh carefully, feature against feature. Discount, in most instances, at least 50 percent of the "advice" given by purveyors of equipment and software. Contact users! They are the real sources of information!

Perhaps some of your readers can benefit from our experiences. Hopefully, they too will become as pleased and satisfied should they try products with the backing and support of the quality of Tandy Corp. and Nepenthe. Have a good day.

**Richard A. Rechlicz**  
Executive Secretary  
Wisconsin School Bus Assn.  
Brookfield, WI

received a copy of that letter, and after calling Mr. Crede to discuss requirements, it was apparent that a better way of handling control key functions was needed. This was even more important with NEWSRIPT Release 7, since there are 19 sub-functions for control, many of which are on the left-hand side of the keyboard.

Our solution was to lock the control key for one keystroke, during which time the cursor indicates control mode. Control does not have to be held down thereafter, and pressing any sub-function key both executes the sub-function and also releases the one-stroke lock. This means that NEWSRIPT now can be operated with one hand, or even just one finger.

The capability is standard in NEWSRIPT, and may be of interest to others who can use only one hand when typing.

**Chuck Tesler**  
Prosoft  
North Hollywood, CA

This letter is *ex post facto* as I have been using one of your articles for so long and enjoying your publication as well that I think it is high time I wrote and told you so.

The write-up was "Survival" by Spencer Hall in the March/April 1981 issue and I have been using it ever since. I have a Model I Level II with 48K and a Lineprinter VIII. It is a cassette function which I hope to rectify by including a disk set-up.

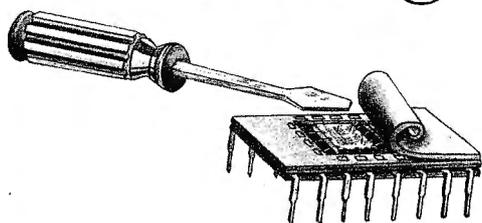
Because of the cassette operation it is really hard to run a decent budget program. Now, Survival doesn't do the budgeting for me, but it really helps keep track of the money and which bills were paid on whatever date.

I believe that Spencer (if he hasn't already) should get a real round of applause for this one, it's the best I've seen in any magazine. I hope that he will come up with another program equally as well done as this one was.

**Lorne L. Gordon**  
Edmonton, Alberta, Canada

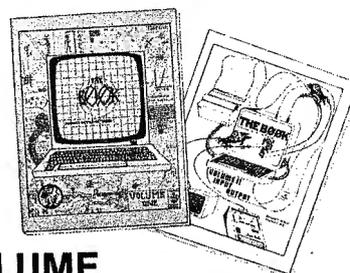
Dear Mike,  
A postscript to Mr. Walt Crede's letter in your June 1982 issue: We

# 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.

TRS-80\* Computer Owners...

# GREATER VALUES

## New Low Prices for Percom Model III Disk Drives!



### Complete First-Drive Systems from **\$449**

Internally mounted drives that feature double- or single-density storage, comprehensive pre-delivery testing, 48-hour burn-in and, best of all, Percom's widely acclaimed disk controller. A First-Drive System includes the four-drive disk controller, one or two drives, power supplies, cables and a fully illustrated owners manual. Use Model III TRSDOS\*, Percom OS-80+ and all other Model III compatible DOSs.

**Note:** If you prefer not to make the First-Drive System installation, we'll do it for only \$29.95 plus shipping. This includes a 48-hour operating burn-in of your Model III computer, installation of the drive system and final checkout of the expanded system.

### Our Own Fully Tested Drives from only **\$275**



- Every Access Floppy Disk drive is electrically tested, mechanically tested and burned-in 48 hours under operating conditions. Look for the signed test list in the shipping carton.
- AFD drives are capable of either single- or double-density operation. Store up to 364 Kbytes (formatted) in double density. Store twice the data on a single diskette using AFD "flippy" drives."
- 15-day free trial offer...comprehensive 90-day limited warranty...unbeatable prices...AFD-100 @ \$275.00, -100F @ \$329.00, -200 @ \$429.95, -200F @ \$449.95.

**How to order** - Order by calling Access Unlimited toll-free on 1-800-527-3475. Or order by mail. Orders may be charged to a VISA or Master Card account, or paid by cashier's check, certified check or money order. Sorry, we cannot accept personal checks. We pay freight (surface only) and insurance charges for shipments in U.S. on orders over \$1,000.00. Add approximate insurance and shipping charges for orders under \$1,000.00. If in doubt about these charges, ask when you call in your order. Texas residents include 5% sales tax. Minimum mail order \$20.00. Allow 2 to 4 weeks for delivery.

• Texas. (214) 340-5366

Save! VISA and Master Card charges are not deposited until the day your order is shipped.

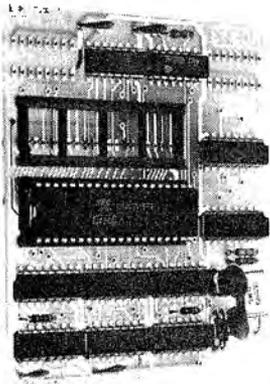
PRICES AND SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE.

### Everybody's Favorites - for Less!

Percom Data Separator	\$23.95
Green Screen I, II, or III	\$18.95
Head Cleaning Kit	\$24.95
Drive Numbering Tabs (pkg 0-3)	\$4.50
5 1/4" Flip-N-File	\$24.95
8" Flip-N-File	\$39.95

# — LOWER PRICES

## Percom's Proven DOUBLER II<sup>†</sup> Upgrade Your Model I to Double Density for only \$159.95



And not with some unproven hacker's kit, either. But with an assembled and fully tested Percom DOUBLER-II<sup>†</sup>. The DOUBLER II<sup>†</sup> simply plugs into the disk drive controller socket of your Expansion Interface. Then it lets you store over four times more on one side of a diskette, depending on the drive, than you can store on standard Tandy Model I drives. Other features: • Reads, writes and formats *either* single- or double-density • Includes DBLDOS™, a TRSDOS\* compatible disk-operating system • Runs TRSDOS\*, NEWDOS<sup>††</sup>, Percom OS-80<sup>†</sup> and other single-density software immediately. Change to double-density operation when convenient • Use Move 1-2-3 utility (\$29.95) or other appropriate software to read Model III programs on your Model I. • Includes on-card high-performance data separation and write precompensation circuitry.

## Clear-Out Sale on Microline-80 Printers!

only **\$379**



### Low Cost System Furniture

Modular design permits custom arrangements • Furniture styling and quality • TRS-80\* colors • OK for UPS shipping • Reassemble without tools

System desks from \$115  
Printer stands from \$144

### Arrick Products Quick-Switch<sup>‡</sup>

Just flick a switch to connect your TRS-80\* printer port from device #1 to device #2. Or, "Quick-Switch" a peripheral between computers. Versions for RS-232 or Centronics interfacing. Includes box-mounted 34-pin card-edge plugs. From \$89.95. Cables from \$29.95.

<sup>‡</sup> trademark of Arrick Products Company.

Save! Make ACCESS your one-call shopping center for TRS-80\* hardware and software. Call our toll-free order number for free product literature and latest prices. **Ask for our new, free software catalog.**

Toll-Free  
Order No.

**1-800-527-3475** ◊

(orders & literature only)

## ACCESS UNLIMITED

401 N. Central Expressway #600  
Richardson, Texas 75080  
(214) 340-5366

\*Trademark of Access Unlimited  
†Trademark of Percom Data Company, Inc.

™Trademark of Tandy Radio Shack Corporation.  
††Trademark of Apparat Corporation.

# Items at random

The circulation of *80-U.S. Journal* seems to jump in fits and starts. Seems we hold for awhile, then make a leap. For example, the July issue went to over 5,000 new readers! If this happened every month, we'd be bumping heads with the big boys but fortunately (or is it unfortunately?) it doesn't.

One thing about printing more copies is that our mistakes are copied just that many more times. Here are some corrections for past issues.

## Corrections

Jerry Latham has written to tell us the following:

"This to inform you of errors in the program listings that accompanied the first installation of my three-part article published in your June 1982 issue. The article was titled "Checkbook". The errors are all (darn it) in the listings. Luckily, they are minor and most readers will probably fix them on their own. But, I owe it to them to provide the proper code.

The first error is in Listing 1; line 600. The last statement should have a comma between the quote mark following the filename BUILDALL and the V. Examples of the correct format are lines 100 through 500.

The second error is in Listing 3, line 10190. The variable called AC in the string build command (it is in parentheses immediately preceding the second plus sign in the line) should be variable ZD.

The third error is in line 10 of Listing 4. The FOR...NEXT loop is set up wrong. The FOR statement in that line should read "FOR Y = ZO TO Z1:" The Y= was left out.

Please pass on my apologies for any inconvenience this caused. They deserve better. I will be typing in the code in each of the three articles right along with them to help catch this type of error.

An additional note should be passed along. Listing 5 (PRINTCK) was designed using an Epson MX-80 without the Grafrax-80 option. I

have since added the Grafrax option and find that not all of the codes are constant. The value in location 14312 actually "floats" during some operations. This causes this routine to give false error indications. The 191=Busy and 63=Ready status codes are valid. A possible quick cure for errors encountered is to delete lines 11030 through 11050 of that listing."

Then there is another letter from David S. Tilton, who wrote the NOTES on the Model II in the June 1982 issue:

"Why is it that mistakes are easiest to detect *after* they have been published? I found mistakes in the Model II information published in your June issue. A serious mistake concerns the address where the switch to video occurs. It should be F800H to FFFFH and not FF80H to FFFFH. If it started at FF80H that would provide only 128 bytes, nowhere near enough.

The next error deals with the refresh circuitry using wait states to hold off the CPU during the refresh period. At the time I wrote you I was under the impression that the refresh circuitry held off the CPU until retrace time. Not so. It only holds off the CPU until it has finished with the byte that it was processing at the moment. Since the refresh circuitry must be fast to keep up with the scan rate, this is not long, maybe a clock cycle or two. Even though my fears of excessive wait states were groundless, I still think that most programmers would be better off using the SVC via a USR call rather than with patched in PEEKs, POKEs, INs and OUTs."

In the @NEWS Column in June 1982 reference is made to a new 64K board for the Model I. The price indicated it was \$19.95. This is incorrect. The correct price is \$199.50.

In our April 1982 issue, page 32, the article titled "Un-number" makes reference to two program listings. Unfortunately, Listing 1 is incorrect. It should read:

```
65300 P=17129
65310 P1=PEEK(P)+PEEK(P+1)*
      256
65320 IF PEEK(P+2)+PEEK(P+3)
      *256=65300 THEN END
65330 POKE P+2,0:POKE P+3,0:
      P=P1:GOTO65310
```

## Name the Company Contest

We received many really nice suggestions for the name of our book division. There were so many, in fact, that we are having a hard time picking out the one that fits best. We had settled on one, but found that it was already in use. We are busy looking for another. It is a large list from which to select. Please hang on another month while we make up our minds.

## In This Issue

This is our educational issue. Our new editor, Cam Brown, takes a hard look at computers in education in his editorial. He should know, having spent some 15 years in the field and teaching computing for the last eight years.

Elsewhere, we have articles for the Color Computer, some with programs and one that keeps a student gradebook.

We take a look at the new Daisywheel printer from Smith-Corona, the DT-1 Terminal from Radio Shack and yes, I've got a Model 16 and give an overview of it.

There is an article on Supermonitors, one on the DUMP command and one on controlling your input commands on screen.

Captain 80 is off on his usual secret agent adventures and Terry Dettmann covers recursive programming in his Files and Foibles column.

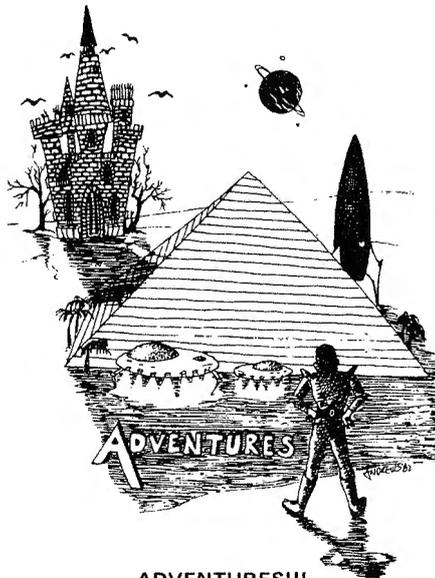
We are also covering the results of our reader survey, taken last April. Of course, there is more, but no more space to tell about it.

Our next issue will feature graphics for all models. Enjoy this one, and we will see you in a month. Make yourself a wonderful summer!

Mike



# QUALITY SOFTWARE FOR TRS-80 COLOR AND OSI



**ADVENTURES!!!**  
**For TRS-80 COLOR and OSI.** These Adventures are written in BASIC, are full featured, fast action, full plotted adventures that take 30-50 hours to play. (Adventures are inter-active 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 on COLOR-80 and TRS-80. 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.

**NEW!!**

**CIRCLE WORLD** — We got Kzinti and puppeteers and problems. Our newest and biggest adventure. Requires 12k on OSI and 16K on TRS-80 Color.

**NUCLEAR SUB** — You are trapped in a nuclear sub at the bottom of the ocean. Escape and even survival is in doubt. Plotted by three of the most sadistic — I mean "creative" minds in adventure programming.

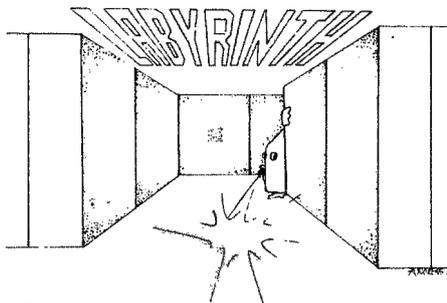


**VENTURER!**—A fast action all machine code Arcade game that feels like an adventure. Go berserk as you sneak past the DREADED HALL MONSTERS to gather treasure in room after room, killing the NASTIES as you go. Great color, high res graphics, sound and Joystick game for the TRS-80 Color or OSI machines. (black and white and silent on OSI.) Tape only. \$19.95.

**BASIC THAT ZOOMS!!**  
**AT LAST AN AFFORDABLE COMPILER FOR OSI AND TRS-80 COLOR MACHINES!!!** The compiler allows you to write your programs in easy BASIC and then automatically generates a machine code equivalent that runs 50 to 150 times faster.

It does have some limitations. It takes at least 8K of RAM to run the compiler and it does only support a subset of BASIC—about 20 commands including FOR, NEXT, END, GOSUB, GOTO, RETURN, END, PRINT, STOP, USR(X), PEEK, POKE, \*, /, +, -, X, X, =, VARIABLE NAMES A-Z, A SUBSCRIPTED VARIABLE, and INTEGER NUMBERS FROM 0 - 64K. TINY COMPILER is written in BASIC. It generates native, relocatable 6502 or 6809 code. It comes with a 20 page manual and can be modified or augmented by the user. \$24.95 on tape or disk for OSI or TRS-80 Color.

**LABYRINTH** — 16K EXTENDED COLOR BASIC — With amazing 3D graphics, you fight your way through a maze facing real time monsters. The graphics are real enough to cause claustrophobia. The most realistic game that I have ever seen on either system. \$14.95. (8K on OSI)



**PROGRAMMERS!**  
**SEE YOUR PROGRAM IN THIS SPACE!!**  
 Aardvark traditionally pays the highest commissions in the industry and gives programs the widest possible coverage. Quality is the keyword. If your program is good and you want it presented by the best, send it to Aardvark.



**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.



**SPACE ZAPPER** — Protect your central Star Base from ships that attack from all four sides: Fast reflexes are required as the action speeds up. Great for kids or Dads. This game has high speed high resolution graphics and looks as if it just stepped out of the arcades. — 16K extended or 32K disk. BASIC TRS-80. Color only. \$14.95.

*Please specify system on all orders*

This is only a partial listing of what we have to offer. We have arcade and thinking games, utilities and business programs for the OSI and TRS-80 Color. We add new programs every week. Send \$1.00 for our complete catalog.



**TRS 80 COLOR**    **AARDVARK - 80**  
 2352 S. Commerce, Walled Lake, MI 48088  
 (313) 669-3110

**OSI**

# Computer revolution in public schools

## *The economic reality of purchasing computers*

Hal Broenkow, Edmonds, WA

For over two years, I fretted that ours was the only high school in the country that was being denied the opportunity to use computers for instruction. This spring, however, an appeal to schools in our state who might be using the TRS-80 computer brought exactly one response. That came from a small private school. Most teachers seem to have had the same kind of luck in acquiring computers for their schools.

As a teacher, I am very aware that a school that does not teach its students about computers is not preparing those students for the world of tomorrow, or even for the world of later on today. In addition, many of us know that computers can do a very good job of teaching us about other subjects.

People who use computers and people who sell computers, nearly all agree that the information-handling ability of the computer, and the computer's nearly infinite patience, make it uniquely suited to teach.

Suddenly, a great deal of educational software is being offered for sale. A quick look at Radio Shack's latest computer catalog shows three pages devoted to displaying Tandy's "Commitment to Education." A number of the traditional publishers of textbooks are beginning to publish "courseware," as it has come to be called. Some of it works, although much of it is worthless.

It is tempting to say that computers are needed and are inevitable in the schools, both as a subject to study (computer literacy and programming classes) and as a way to learn (Computer Assisted Instruction). Unfortunately, the computer revolution is nearly

invisible in the schools. Most of the students in our district's high schools will never use a computer unless it is at home or at a local computer store. Why? The answer in part, is money. It's enough to make a teacher wish for another Sputnik crisis, like the one in the fifties, that brought millions of dollars worth of teaching equipment into the schools.

Suppose that a four-year high school with an enrollment of 1000 made the decision to allow each student just one classroom period (out of five) on a computer for just one semester (out of eight). This would require the purchase of twenty-five computers — not enough for a full-size class in my school, where the average class size will be thirty-three this year. Picking the Color Computer, for no other reason than its price (\$857 with a television and a cassette recorder), this would cost \$21,425. Now (as they say), if you want a motor in your new car, that will cost extra. Ten percent might be a reasonable figure for software. Add in a little for such things as outlets for all those computers and you find that the minimum investment for such a commitment on the part of a school is about \$25,000 for equipment. Labor costs (a teacher's time) would cost an additional \$10,000 or more per year.

In my own school district, falling enrollment (the "baby boom" just passed) and reduced state funding has forced the district to lay off teachers and increase class size at all levels. The same thing is true in the majority of school districts around the state. The administration says that to purchase computers, they would have to lay

off additional teachers. (I would regret this, because it would further raise class size. Thirty-three trigonometry students are enough, thank you.)

If there is a computer revolution going on, it is being well contained by both the economic restraints I have mentioned and by the conservative treatment of revolutionaries that (had the Tsar known about them) might have kept Russia a monarchy. Let me tell you what happened on the way to the revolution:

Three years ago, convinced that if I had a computer in my classroom, I would be able to do something good with it, I began requesting funds for one. After nine months of asking, I was told that the district was willing to buy a \$1,000 computer.

With a single computer and five classes of thirty students, about all I was able to do was get a hint of the sort of things fifteen or twenty computers would make possible. Another nine months of asking got me another answer: "No." No money, so no computer.

Another several months of asking got me a louder no, in the form of a district-wide moratorium on the purchase of computers. This meant no, not just in my high school, but in the other twenty-five schools in the district too. Further questions yielded the answer that we had a committee working on the issue. Until the district Computer Committee could pick the best computer for school use and the best uses of the computer in the schools, no money would be available.

I soon found myself on the committee, asking the logical (I thought) question, "suppose that the committee finds that computer-

assisted instruction (C.A.I.) shows great promise, and that Brand X computer is clearly the best one. Will the district buy some computers then?

The answers were always vague and usually rather negative. The one that really made me twitch was that after the committee made its report, the district would have to hire a computer consultant to recommend the selection of a machine and the software to go with it.

As a twenty-year veteran of public education, I have some insight into the pressures felt by administration — pressures that require a documented rationale for any decision which affects policy or spends money. The paper trail laid in our own district was easily as expensive as a single computer of reasonable configuration, and perhaps as expensive as five of them, and our computer consultant has not even been hired.

The simple facts (our computer committee even agrees with me) are:

There is no one best computer on the market today. Schools need number crunchers, sophisticated

BASIC and other languages, word processors, graphics displays, color, durability and simplicity. No one computer has all of these in good quantity.

If there were a valid answer to the hardware question today, the answer would be different tomorrow because of the rate at which the industry is developing new machines and changing existing ones.

Most of the software for education is junk. Any good teacher with a little training could write better material than most of the so-called educational programs. Simply putting a traditional workbook into a computer program usually results in a rather fragile and very expensive version of a paper workbook.

Publishers know better than to let teachers "review" a copy of an expensive program that is easily copyable by anyone with a computer to make it run. Any courseware purchased is therefore a pig in a poke. There is no good way to test it before buying.

Thus, deciding to purchase computers is a step that educational

administrators and school boards are reluctant to take, both from the standpoint of dollars and of educational soundness.

The private schools, on the other hand, seem to be better able to make the commitment. They have several advantages (as seen while standing on the grass on my side of the fence). Being smaller, they are better able to make decisions in a short time. In some cases, they spend several times as much per year to educate each student. That leaves some room for discretion. In many other cases, the private schools pay much lower salaries to their teachers, which also helps to leave some money for computers.

The computer revolution, it seems, may be a little late in arriving in many of the public schools.

Back in my own district? Well, this year we have another committee. I'm on it. We're dealing with the question, "Where do we get \$25,000?" One idea is that we ask businesses to contribute cash. What do you think will be the answer?

All I know is that it's hard to feel like a revolutionary when you're on the committee. ■

## CONVERT YOUR SERIAL PRINTER TO PARALLEL

The UPI serial printer interfaces allow an ASCII serial printer to be connected to the parallel printer port on TRS-80 Models I, II and III.

Software compatibility problems are totally eliminated because the TRS-80 "Thinks" that a parallel printer has been attached. No machine language driver needs to be loaded into high memory. VISACALC, SCRIPSIT, BASIC, FORTRAN, etc. all work as if a parallel printer was in use.

The UPI interfaces are completely self contained and ready to use. A 34 conductor cable and connector plugs onto the parallel printer port of the Model I expansion interface or onto the parallel printer port on the back of Models II and III. A DB25 socket mates with the cable from your serial printer. The UPI interfaces convert the parallel output of the TRS-80 printer port into serial data in both the RS232-C and 20 MA. loop formats.



**BINARY DEVICES**  
Formerly SPEEDWAY ELECTRONICS  
11560 TIMBERLAKE LANE  
NOBLESVILLE, IN 46060  
(317) 842-5020

# 10

TRS 80 is a trademark of Tandy

VISA MasterCard

Switch selectable options include:

- Linefeed after Carriage Return
- Handshake polarity (RS232-C)
- Nulls after Carriage Return
- 7 or 8 Data Bits per word
- 1 or 2 Stop Bits per word
- Parity or no parity
- ODD or EVEN parity

### NEW VARIABLE BAUD RATE MODELS

Switch selectable from 110-4800 BAUD

UPI-3VB for models I or II \$159.95  
UPI-2VB for model II \$159.95

### CLOSEOUT ON SINGLE BAUD RATE MODELS

Our UPI-2 and UPI-3 will drive virtually any ASCII serial printer.  
UPI-3 for model I or III Closeout \$109.95  
UPI-2 for model II Closeout \$109.95  
Specify BAUD rate 50-4800. Quantities limited.

Shipping and handling on all orders. \$4.00  
90 day warranty on all interfaces  
Ten day return privilege on UPI-3VB and UPI-2VB  
Longer cables available

---

# Computerize your individual educational programs

*Hours become minutes when computers write IEPs*

Model I/III, 16K and up

Larry Kregel, Elmhurst, IL

Computers first earned their popularity as "number crunchers." They had the ability to boil down vast amounts of data into manageable numbers. Their computational speed amazed all. Today, computers still crunch numbers, but their popularity has spread to those who wish to crunch words: word processing.

Being an educator, I have need to communicate and record large amounts of information. This depends greatly on words, a field in which computers can now assist. More specifically, I am a special educator. I work with those students who have "special needs" (a term which founders of special education left appropriately vague).

My job is to deal with students who cannot benefit appropriately from the regular classroom. My colleagues and I deal with many different educational problems — mental retardation, blindness, deafness, learning disabilities, social adjustment . . .

Only a few years ago, the federal government passed a law governing special education. As with most areas in which the government becomes involved, the burden of paperwork multiplied many fold. Public Law 94-142 is the law that, among other things, requires an Individual Educational Program (IEP) for every special education student. Each IEP is divided into goals; each goal is divided into a series of short-term instructional objectives.

Wow, what a pile of paperwork! Multiply the number of subject (and social) areas by the number of goals, and that figure by the number of short-term objectives, and you have a nearly full time job without ever meeting with the student. To follow the law to the letter requires a very unusual person . . . or a computer.

## One Teacher's Solution

I have had an interest in computers since my college years back in the 1960s. However, it was not until I acquired a TRS-80 in 1978, that I was able to put that interest to work helping to solve my paperwork burden.

Much of the paperwork required for an IEP is repetitious. The goal for Johnny is often the same as for his classmate, George. The law requires that I delineate a set of objectives for each as if the other did not exist.

Developing goals is time consuming, but it is done two, three, or perhaps four times a year. Short-term objectives, however, need to be developed much more often if they are to be effective. Weekly would not be unusual.

I have chosen not to hand write short-term objectives, but to have the computer write the objectives from a sequential library of objectives written for a specific subject.

## The IEP Program

The accompanying program is written in Radio Shack Level II BASIC. It allows a teacher to deal with a group of five students at a time. Based on a bank of standard goals and objectives (listed in the DATA statements), he can plan for each student. When the objectives have been set, the computer's printer prints an "IEP Instructional Objectives" sheet for each student.

These sheets may be kept in a file by date of intended completion. On that date, the student's progress can be evaluated. A record of the evaluation is made in the space provided on the computer printout, using a rating scale which appears on each sheet. The completed sheet becomes part of the student's permanent file.

At this point, a new set of objectives can be set. My TRS-80 changes hours of work into minutes. To most teachers, that means less time for paperwork, more time for teaching kids!

## How to Adapt This Program

My first recommendation is that a teacher develop a program for each individual subject area (i.e., one for math, one for reading, one for social skills, etc.). Once that is done, the teacher needs to develop a logical sequence of goals, and for each goal, a sequence of short-term objectives. The law then requires the teacher to state the methods to be used and the criteria for judging success. These are then entered as DATA statements, beginning at line 8000. I chose to use a different line for each objective. For example:

Goal — To develop better addition skills.

**Objective** — Student will learn to carry when adding two three-digit numbers.

**Method** — Teacher produced worksheets.

**Criteria** — 90% success.

This becomes:

8010 DATA To develop better addition skills. Student will learn to carry when adding two three-digit numbers. Teacher produced worksheets. 90% success.

When these DATA statements have been developed, the teacher needs to change the dimension statement in line 90 to reflect the number of DATA lines. In lines 100 and 300, the "FORX=1TO.." statements need to be changed to read all of the DATA lines. If an OS error should occur, either the clear statement (line 80) needs to have a larger value, or the number of objectives must be cut.

**Printer Commands**

The LPRINT statements are written for an Epson MX-80. These should work appropriately for most similar printers. The IEP Objective sheet is printed using expanded, condensed and standard print sizes. Where it is possible, the emphasized print is used (causing the dot matrix letters to look more like letter quality).

Most teachers entered education because of the desire to teach children . . . that makes sense. The burden of paperwork which weighs heavily on many (particularly special educators) can and should be, eased by the use of computers. With the sharp upswing in the number of computers in schools of all levels, the teacher's burden should be eased by the use of this tool. The development of Short-term Instructional Objectives is one place where the computer can make a significant difference.

**Program Listing  
for I.E.P.**

```

80 CLEAR5000
90 DIM G$(20),O$(20),M$(20),C$(20)
100 FORX=1TO20:READG$(X),O$(X),M$(X),C$(X):NEXT
110 CLS
120 INPUT"enter beginning date(M/Y) - "
;BD$
130 INPUT"      enter ending date - "
;ED$
140 INPUT"enter name of implementer - "
;IM$
150 INPUT"      implementer's title - "
;IT$
160 CLS
170 PRINT"would you like a copy of the
library of goals? y/n";
180 A$=INKEY$

```

```

190 IF(A$="n")OR(A$="N")A$="":GOTO500
200 IF(A$="y")OR(A$="Y")A$="":GOTO300
210 GOTO180
300 FORX=1TO20
305 IFG$(X)=""GOTO500
310 LPRINTX;" ";G$(X)
320 LPRINTTAB(5)"short term objective:"
330 LPRINTTAB(10)O$(X)
340 LPRINTCHR$(10)TAB(5)"method:"
350 LPRINTTAB(10)M$(X)
360 LPRINTCHR$(10)TAB(5)"success criteria:"
370 LPRINTTAB(10)C$(X)
380 LPRINTCHR$(10)CHR$(10)
390 IFX/5=INT(X/5)LPRINTCHR$(12)
400 NEXT
500 CLS
510 PRINT"you may enter as many as 5 students at one time.":PRINT"      (just enter to print IEP's already entered)":PRINT
515 FORX=1TO5
520 PRINT:PRINT"enter name of student number ";X;:INPUTS$(X)
525 IFSS$(X)=""GOTO2000
530 PRINT"you may enter as many as 5 goals per student.":PRINT
540 INPUT"enter goal #1 - ";H(X):IFH(X)=0:J(X)=0:K(X)=0:L(X)=0:I(X)=0:GOTO590
550 INPUT"enter goal #2 - ";I(X):IFI(X)=0:J(X)=0:K(X)=0:L(X)=0:GOTO590
560 INPUT"enter goal #3 - ";J(X):IFJ(X)=0:K(X)=0:L(X)=0:GOTO590
570 INPUT"enter goal #4 - ";K(X):IFK(X)=0:L(X)=0:GOTO590
580 INPUT"enter goal #5 - ";L(X)
590 PRINT:PRINT"all correct (y/n)?"
600 A$=INKEY$
610 IFA$="y":A$="":GOTO1000
620 IFA$="n":CLS:A$="":GOTO520
630 GOTO600
1000 CLS:NEXT
2000 LPRINTCHR$(27)CHR$(69)CHR$(10)CHR$(10)
2010 PRINT"enter when the printer is ready":INPUTW
2020 CLS
2030 FORX=1TO5
2040 IFSS$(X)=""GOTO3000
2050 CLS:PRINT"now printing student number ";X
2060 LPRINTCHR$(14)TAB(4)"I.E.P. INSTRUCTIONAL OBJECTIVES"
2070 LPRINTCHR$(10)"STUDENT - ";S$(X);TAB(50)BD$;" TO ";ED$

```

## Computerize IEPs

```

2080 LPRINTCHR$(10)"IEP IMPLEMENTER - "
;IM$;" TITLE - ";IT$
2100 LPRINT"*****
*****"
2110 LPRINTCHR$(27)CHR$(70);CHR$(15)"ST
UDENT RATING SCALE- "
2120 LPRINTCHR$(10)"A = Accomplished
U = Unsatisfactory progre
ss"
2130 LPRINT"S = Satisfactory progress
U1 = Lack of motivation"
2140 LPRINT"M = Minimal progress
U2 = Frequent absence
2150 LPRINT"
U3 = Inappropriate behavior"
2160 LPRINT"
U4 = Goal found to be inappropri
ate"
2170 LPRINTCHR$(18)CHR$(27)CHR$(69)CHR$(
10)"*****
*****"
2180 LPRINTCHR$(10)
2190 FOR Y=1 TO 5
2200 IF Y=1 N=H(X)
2210 IF Y=2 N=I(X)
2220 IF Y=3 N=J(X)
2230 IF Y=4 N=K(X)
2240 IF Y=5 N=L(X)
2245 IF N=0 GOTO 2300
2250 LPRINTCHR$(14)Y;" ";CHR$(20);G$(N)
2260 LPRINT"Short-term: ";O$(N)
2270 LPRINT" Method: ";M$(N)
2280 LPRINT" Criteria: ";C$(N)
2285 LPRINT"Evaluation date-
evaluation results-"
2290 LPRINTCHR$(10)
2300 NEXT Y
3000 LPRINTCHR$(12):NEXT
4000 CLS:PRINT"Do you wish to enter mor
e students?"
4010 PRINT:PRINT"1- more students"
4020 PRINT"2- more students/change impl
ementer and date
4030 PRINT"3- done"
4040 A$="":A$=INKEY$
4050 IFA$="1"GOTO 500
4060 IFA$="2"GOTO 110
4070 IFA$="3"END
4080 GOTO 4040
8000 REM ##### DATA #####

```

Figure 1

### I . E . P . INSTRUCTIONAL OBJECTIVES

STUDENT - Jean E. Smyth

3/30/81 TO 4/16/81

IEP IMPLEMENTER - L. Krengel TITLE - Teacher

\*\*\*\*\*

STUDENT RATING SCALE-

A = Accomplished	U = Unsatisfactory progress
S = Satisfactory progress	U1 = Lack of motivation
M = Minimal progress	U2 = Frequent absence
	U3 = Inappropriate behavior
	U4 = Goal found to be inappropriate

\*\*\*\*\*

**1** To develop better addition skills.

Short-term: Student will learn to carry when adding long columns of numbers.

Method: Teacher produced worksheets.

Criteria: 90% success

Evaluation date-

evaluation results-

**2** To develop an understanding of the binary system.

Short-term: Student will learn to count to 16 in the binary system.

Method: TRS-80 computer exercise.

Criteria: Two consecutive "smile faces" at the conclusion of the program.

Evaluation date-

evaluation results-



# Birth of a legend.



## Epson.

A whole new generation of Epson MX printers has just arrived. And while they share the family traits that made Epson famous — like unequalled reliability and ultra-fine printing — they've got a lot more of what it takes to be a legend.

For instance, they've got a few extra type styles. Sixty-six, to be exact, including italics, a handy subscript and superscript for scientific notation, and enough international symbols to print most Western languages.

20 80-U.S. Journal

What's more, on the new-generation MX-80, MX-80 F/T and MX-100, you get GRAFTRAX-Plus dot addressable graphics. Standard. So now you can have precision to rival plotters in a reliable Epson printer. Not to mention true backspace, software printer reset, and programmable form length, horizontal tab and right margin.

All in all, they've got the features that make them destined for stardom. But the best part is that beneath this software bonanza beats the



# Uh...three legends.

heart of an Epson. So you still get a bidirectional, logical seeking, disposable print head, crisp, clean, correspondence quality printing, and the kind of reliability that has made Epson the best-selling printers in the world.

All of which should come as no surprise, especially when you look at the family tree. After all, Epson *invented* digital printers almost seventeen years ago for the 1964 Tokyo Olympics. We were

the first to make printers as reliable as the family stereo. And we introduced the computer world to correspondence quality printing and disposable print heads. And now we've given birth to the finest printers for small computers on the market.

What's next? Wait and see. We're already expecting.

**EPSON**  
EPSON AMERICA, INC.

3415 Kashiwa Street • Torrance, CA 90505 • (213) 539-9140

FEATURE	ORIGINAL MX-80	GRAFTRAX-80*	ORIGINAL MX-100	MX-80 with GRAFTRAX-Plus	MX-80 F/T	MX-100
Bidirectional printing	X	X	X	X	X	X
Logical seeking function	X	X	X	X	X	X
Disposable print head	X	X	X	X	X	X
Speed: 80 CPS	X	X	X	X	X	X
Matrix: 9 x 9	X	X	X	X	X	X
Selectable paper feed			X		X	X
<b>PAPER HANDLING FUNCTIONS</b>						
Line spacing to n/216		X		X	X	X
Programmable form length	X	X	X	X	X	X
Programmable horizontal tabs	X	X	X	X	X	X
Skip over perforation			X	X	X	X
<b>PRINT MODES AND CHARACTER FONTS</b>						
96 ASCII characters	X	X	X	X	X	X
Italics character font		X		X	X	X
Special international symbols				X	X	X
Normal, Emphasized, Double-Strike and Double/Emphasized print modes	X	X	X	X	X	X
Subscript/Superscript print mode				X	X	X
Underline mode				X	X	X
10 CPI	X	X	X	X	X	X
5 CPI	X	X	X	X	X	X
17.16 CPI	X	X	X	X	X	X
8.58 CPI	X	X	X	X	X	X
<b>DOT GRAPHICS MODE</b>						
Line drawing graphics				X	X	X
Bit image 60 D.P.I.		X	X	X	X	X
Bit image 120 D.P.I.		X	X	X	X	X
<b>CONTROL FUNCTIONS</b>						
Software printer reset		X		X	X	X
Adjustable right margin			X	X	X	X
True back space		X		X	X	X
<b>INTERFACES</b>						
Standard — Centronics-style 8-bit parallel	X	X	X	X	X	X
Optional — RS-232C current loop w/2K buffer	X	X	X	X	X	X
RS-232C x-on/x-off w/2K buffer	X	X	X	X	X	X
IEEE-488	X	X	X	X	X	X

\*Tandy TRS-80 block graphics only available with GRAFTRAX 80.

ABCDEFGHIJKLMNOP abcdefghi jklmn ABCDEFGHIJKLMNOP abcdefghi jklmn 01234  
 ABCDEFGHIJKLMNOP abcdefghi jklmn ABCDEFGHIJKLMNOP abcdefghi jklmn 01234  
 ABCDEFGHIJKLMNOP abcdefghi jklmn ABCDEFGHIJKLMNOP abcdefghi jklmn 01234  
 ABCDEF abcdef ABCDEF abcdef 0123456  
 ABCDEFGHIJKLMNOPQRSTUVWXYZ abcdefghi jklmnopqrstuvwxyz ABCDEFGHIJKLMNOPQRSTUVWXYZ abcdefghi jklmnopqrstuvwxyz 01234567  
 ABCDEF abcdef ABCDEF abcdef 0123456  
 ABCDEFGHIJKLMNOP abcdefghi jklmn ABCDEFGHIJKLMNOP abcdefghi jklmn 01234  
 ABCDEFGHIJKLMNOPQRSTUVWXYZ abcdefghi jklmnopqrstuvwxyz ABCDEFGHIJKLMNOPQRSTUVWXYZ abcdefghi jklmnopqrstuvwxyz 01234567

---

# Color Computer gradebook

*Maintain a record of grades and  
compute report card averages*

Color Computer with Extended BASIC, 16K and cassette

Lynn H. Davis, Clay, NY

It's not that I dislike doing report card averages — heaven knows how important they are. The problem is that they take me so . . . much . . . time. Add to that the boredom involved in doing the same mathematical calculations over and over again (once for each of my students), and you get an idea of why my stomach used to do a flip-flop everytime I found blank report card forms in my school mailbox.

## Electronic Technology

Fortunately, electronic technology has reduced the time and drudgery involved in coming up with a student's grade. When I started teaching ten years ago, we had two methods available to calculate report card averages. One way was to use pencil and paper. I remember it taking me (on and off), about a week to do all of the necessary addition and division.

The second method available to teachers was the school's adding machine. It was a big, green, electrical monster that printed out a student's grade average on adding machine tape, and gave a "remainder" when it divided, rather than the decimal equivalent. I fondly remember that the machine added numbers relatively quickly, but when you hit the divide key, the monster made all kinds of funny noises and took from 5 to 10 seconds before it could come up with the answer.

The adding machine was faster and more accurate than pencil and paper. Since it couldn't leave the school, teachers would race each other to the faculty room to be the first in line to use it. With the adding machine, I needed about four days to do my report card averages.

A few years later, hand-held calculators hit the market. For \$75.00, I got one that performed six functions (!) as fast as you could press the keys. At the time, the calculator was the marvel of technology. With it, I could do my report card grades at home in about six hours.

Two years ago, I bought one of those programmable

calculators. The little beauty has 40 keys, and performs 70 functions. It also has ten memories and will accept a 32-keystroke "formula" — all for \$25.99. With this calculator, report card time was reduced to a five-hour stretch.

Then I brought home my TRS-80 Color Computer. With 16K, Extended BASIC, a cassette, and the Line Printer VII, I was once again ready to cut down the time involved for one of my "favorite" activities. Almost before the computer was out of the box, I was searching the software for a report card grade calculation program.

## Problems

It didn't take me long to realize that the available programs (for Model I and III) were not what I was looking for. First of all, some of the programs required setting up files on cassette tape. If you're looking for speed, this is definitely not the place to find it. Besides, I knew that eventually I would end up recording new grades on top of old files, and really end up with a mess.

The second problem I found was that some software programs required the user to assign a "weight" (usually in terms of a percent) to every single grade given to a student. While most teachers know how much they want homework assignments, laboratory experiments, quizzes and tests to count, they don't want to sit down with a calculator and figure the weight of each grade to the nearest hundredth of a percent. This is, after all, what we have the computer for.

The third problem, and by far the most important, was that some of the programs assumed that every student did the same number of assignments. With the individualization that goes on in today's classroom, some kids end the marking period with fewer required assignments. Add to that, the fact that some kids are absent, and don't get in all their back work until after

report cards are handed in, and it becomes evident that a program must be able to take into account a variable number of grades.

I should also point out how the second and third problems react with each other. If you have a program that allows a variable number of grades, and also one in which every grade must be assigned a weight, the weight of each grade must be input for *each individual student*. For example, if student A has 10 assignments (and assuming the teacher wants to weigh each grade equally), each grade would be assigned a weight of 10 percent. But if student B only had to do nine assignments, the teacher has to input a weight of 11.11 percent for each grade.

The example above assumes that a teacher wants each grade to count equally. If different grades were to be assigned different weights, and different kids did different assignments, a teacher would then be locked into calculating different percentage weights for each student. It would be just as easy to forget about the weights and run all the grades right through the calculator.

### The Decision

With no software available that performed exactly as I wanted, I decided I would have to make my own. After some careful thought, I decided that the program should incorporate the following parameters:

(1) The program must be fast and easy to operate, using the hardware that I now have.

(2) The student names and grades should be part of the program, incorporated into DATA statements. DATA statements were chosen because I don't have a disk drive, and cassette files are just too slow.

(3) The program must allow for a number of different categories of grades (i.e., homework, labs, reports, quizzes, tests, etc.)

(4) The program must be flexible enough to allow for a weighting of grades, but not so inflexible that the weighting has to be calculated for every single grade.

(5) The program must allow for a variable number of grades per category for each student.

(6) The averages should show on the CRT and dump to the printer.

(7) Not only should the program be used to calculate individual marking period averages, but it should also serve as a vehicle to store those marking period grades until the end of the year. In that way, they can be used, with input of the final exam grade, to calculate the students final average.

(8) The student grades must be easy to update.

### The Program

With the above parameters in mind, the program I've designed is shown in the listing. The program is relatively straightforward with a number of REMarks to help you follow the flow. There are several important sections of the program that need to be discussed, as they directly control the end product.

The first thing you should notice are the DATA statements (the names and grades are fictitious in order to protect the innocent). There are two DATA lines for each student and they may look like the following

Introducing...

# Data-Writer™

A powerful information processing system that interfaces text processing and data management.

Users have praised Midwest Data System's Auto-Writer for its unique, versatile approach to data base management.

#### Now DATA-WRITER does even more:

- New Data Entry program to create your data base or add records to an existing data base. It has error checking features and supports both fixed and variable length fields.
- New File Editor lets you edit your data base without an independent word processor. Or, if you prefer, use your own word processor (Electric Pencil, Lazy Writer or Scripsit) to create and edit your data base.
- New Field Manager that lets you add, delete, re-order or append fields and merge or split data bases.
- New interactive, double-precision Math program that processes up to 20 equations of up to 255 characters using numbers you enter and your data base field labels. It includes an in-memory scratch pad to store temporary values. Insert them into other equations for a cascade of increasingly complex mathematical statements. Store your series of equations on disk as procedure files to use any time you need them.
- New two-level Sort that enables you to use nested sorts for complex ordering of data files. Sort on any field, without having previously designated it as a key.
- New Mailing Label program that allows you to print multiple labels from one to four across and to insert a variable from the keyboard or a fixed message on every label.
- Form Letter processor that allows you to insert data from your data base into a form letter or contract.
- Report Generator for columnar tabulations with automatic headings, pagination, totals and subtotals, and sophisticated formatting control. DATA-WRITER'S unique flexibility enables you to modify your report format as you wish, without the need to scrap it and start fresh.
- Powerful Select-If command that lets you define a subset of your data base. New instring selection capabilities. With Select-If and Sort, you can create dozens of new data bases for specific purposes.
- Statistical check on your data base to locate data entry errors. Stats also reports maximum entered data length for each defined field, a tremendous aid when designing a report.

DATA-WRITER is both powerful and easy to use. It has speed and versatility not available in any so-called data base management system. As one Auto-Writer user said, "Why hasn't someone done this before!"

For the TRS-80 Model I/III (48K, 2 disk drives, lower case required). Available at your favorite software store, or order from **Software Options**, 19 Rector Street, New York, N.Y. 10006. 212-785-8285. **Toll-free order line: 800-221-1624.** Price: \$125 (plus \$3 per order shipping and handling). New York State residents add sales tax. Visa/Mastercard accepted.

# 13



## Gradebook

---

example.

```
3000 DATA ANDERSON,80,90,83,1,1,74,85,1,92,1
```

```
3005 DATA 70,80,85
```

The DATA statement line numbers that end in zero contain the student's name and current grades for the marking period. The number 1 is a flag to the computer that separates one category of grades (with a certain weight) from another category of grades.

In this particular example, student Anderson has completed three homework assignments (grades of 80, 90 and 83), not yet completed his project (and thus no grade between the 1s), two lab experiment grades, and one test grade.

The second DATA statement (or the ones ending in five) contains student Anderson's averages for the previous three marking periods. The marking period grades in line 3000 will be used to calculate the fourth marking period average.

You can actually have from one to ten different categories of grades in line 3000 (a category being such things as homework assignments, quizzes, laboratory experiments, projects, tests, independent study, extra credit, etc.). The only drawback is that every student must have the same number of categories of grades in his DATA line (in other words, each line must have the same number of 1s). The saving grace is that you do not have to record marks into each category.

In the example using student Anderson, he hasn't done the project yet, so there is no grade recorded in that category. Lines 1020 - 1040 take care of the percentage weights assigned to categories where there is no grade yet.

If the empty category is anywhere on the DATA line, except in the last position, line 1020 recognizes that fact and automatically assigns that empty category weight to the next used category. In that way, student Anderson is not penalized because he didn't need to hand in his project yet. The percentage weight assigned originally to the project is just added to the next category (in this case the lab grades).

If the last category is empty of grades, then lines 1030 and 1040 automatically add that percentage weight into the student's total grade up to that point. This, again, does not penalize the student.

On the other hand, if student Anderson fails to complete his project by the prescribed date, then I would put a grade of zero between those 1s. The computer would read the zero, and multiply it by the percentage weight. This would penalize student Anderson as he may end up with, say, 20 percent of his grade based on a zero.

Lines 390 - 480 control the input of weights for each category, and line 2230 reminds me what each category is, and the order that they are in. If you know that certain categories may have no grades in them, care should be taken in their alignment so that the weight of an unused category is added to the category you desire.

### Why Two DATA Lines?

There are two DATA lines for each student, to save me  
24 80-U.S. Journal

some additional time. At the beginning of each new marking period, all I will have to do is some quick EDITing to get started. I'll HACK away all of the old grades, and put in any new marks for the next marking period. I will then EDIT line 3005 by EXTENDING it to include the fourth marking period average.

If both sets of grades were on the same line, the EDITing would be more time consuming, because I would have to take care to DELETE only classwork grades, and not marking period averages.

### Modifications

As the program is written, you can have from zero to 25 marks in each category of grades. This is controlled by line 990, and this upper limit can be changed to any number you wish. I used 25, because I doubt that I will ever have more than 25 grades in any one category.

If you have less (or more) than six marking periods in your school year, you will have to make the necessary modifications in lines 1370 - 1460 (which read the appropriate number of marking period averages). You would also have to modify the GOSUB in line 1180 which reads the six marking period averages at the end of the year.

If you have other than six marking periods, line 1200 would need to be changed to add together the appropriate number of marking periods and divide them by that number. You would also need to modify the PRINT#2 statements in lines 790, 800, 1560-1620, 1670 and 1780.

Line 1270 calculates the student's final average and is based on two-thirds of his marking period average (I) and one-third of his final exam score (L). This line would need to be changed if your school uses a different formula to calculate a final average.

### The End Result

In addition to the display on the CRT, there are two types of printouts that result from this program. Figure 1, is a typical printout showing the current marking period averages for each student. Next to that grade, is a space for any comments you may wish to make regarding that student or his grade (absent, incomplete work, etc.). The student's previous marking period averages are also shown so that you can note any progress (or lack of progress) the student is making.

The second printout, Figure 2, will be used only at the end of the year. You see the student's name, his six marking period averages, his final exam score (which must be input), and his final average.

The display on the CRT shows the student's name and average, and if the student's grade is below 65 percent (a failing grade in my district), his grade is underlined in red and a sound is generated by the computer to call your attention to it. Lines 1500, 1520, 1640 and 1670 control these features and can be modified to fit your own particular situation.

### The Highlights

This program offers several nice features that make using it very convenient.

(1) It uses a weighted grade feature, but the weights

# Expensive Expansion



**EXPENSIVE** - The *LNW System Expansion II* and built-in comes with a full 32K of 200ns RAM; RS232c 20 MA current loop serial interface. That's for starters. Next, consider our heavy gauge steel case, power indicator lamp, gold-plated connectors, FR-2 glass epoxy circuit board with solder mask and silk screen legends. Then there is the parallel printer port, screen printer port, real time clock, and extra heavy duty onboard power supply with over current protection, over voltage protection and thermal shutdown. If that's not enough then there is the floppy disk controller, guaranteed operation at a 4MHz CPU speed and our 6 month warranty. Every one of these features is **STANDARD**. This is true system expansion. You get every 'expensive' feature without spending more.

**CHEAP** - Our price is \$399.95. Any way you compare, features or price, LNW's *System Expansion II* is the clear winner. The LNW System has been field tested for over two years with thousands of users. It works with any DOS, is 100% TRS-80 Model I compatible and it works 'right out of the box'. If there is any doubt in your mind as to whether you should buy ours or the 'other guys', just ask an LNW owner!

**WE ARE #1** - Number one in price, features, reliability, performance and delivery. LNW is committed to 'expensive' features and quality at reasonable prices. LNW is committed to support, thorough documentation, and reliability.

## LNW Research Corp.

2620 WALNUT Tustin, CA. 92680  
(714) 641-8850 (714) 544-5744

This has made us the number one manufacturer of system expansion units and accessories for the Model I computer. **EXPANSION OPTION** - 8-inch drive capability is as easy as plugging in the *LN Doubler 5/8* option\*. Now you can have any combination of single- or double-density, single- or double-sided, 8"\* and/or 5" disks on-line! 8-inch disk storage increased to 591,360 bytes - 77-track single-sided, double-density or 1,182,720 bytes - 77-track double-density, double-sided.

The *LN Doubler's* unique 5/8 switch allows you to boot from 5- or 8-inch system disks and it's accessible from outside the interface. The \$219.95 *LN Doubler 5/8* comes with a double-density disk operating system (DOS+ 3.3.9), complete with BASIC and utility programs... ready to run your software.

Each of your present 40-track, single-sided 5-inch drives will store up to 184,320 bytes (formatted storage) - that's an 80% increase in storage capacity for only half the cost of just one disk drive. With three 8-inch double-density, double-sided drives your Model I will have 3.75 Megabytes of online storage - that's more storage than a Model II or Model III!



\*8" drive operation requires special cable, 8" double-density requires 3.55MHz CPU speed-up modification or LNW-80 4MHz computer.

## Gradebook

are by categories of grades rather than individual grades.

(2) You can have any number of grades per category (you can even have no grades in a category).

(3) There is no waiting for the cassette to load in files, as all of the students and their grades are part of the program.

(4) I use one cassette tape per class. All I have to do is load the program, EDIT the DATA statements, run the program for a current update and print out, and then CSAVE the program for the next update.

(5) It is very easy to modify the grades in the DATA statements. Extended BASIC gives us an EDIT command, and with it we can DELETE, INSERT, CHANGE, SEARCH and HACK very rapidly.

(6) There is plenty of memory space available for the usual number of kids in a class. The program, as shown in the listing (even with all the REMarks and the 15 students), will load into the computer without needing a PCLEAR 1 or POKE 25,6:NEW direct command. The PCLEAR 1 command is built into the program (lines 150 and 2170 - 2200) in case you need it. If you have a lot of DATA, you may have to give the computer a direct command before loading the tape.

(7) The program will calculate student marking period averages on a minimum of one grade. This is a desirable feature because I can get a printout of averages everytime I update the grades. This, in turn, will allow me to easily monitor all student grades, and will tell me almost immediately if a student is headed into academic trouble.

### How Fast Is It?

I know you're all wondering how much time it takes me to do my grades, now that they are "computerized." I usually update student grades four to five times per marking period, and it takes me around 50 minutes to EDIT in the new grades each time.

My total time is now down to about four hours. That time, however, is divided up over the six-week marking period, which to me means no "plop plop — fizz fizz" when I find those blank report cards hiding in my mailbox.

### Program Listing for Gradebook

```
10 REM *****
20 REM
30 REM REPORT CARD AVERAGES
40 REM
50 REM BY: MR. LYNN H. DAVIS
60 REM 4316 AMBLEWOOD LANE
70 REM CLAY, N.Y. 13041
80 REM
90 REM TRS-80 COLOR COMPUTER
100 REM 16K EXTENDED BASIC
110 REM LINE PRINTER VII
120 REM CASSETTE TAPE RECORDER
130 REM
140 REM *****
```

```
150 GOTO 2170
160 GOSUB 1850
170 CLS
180 PRINT:PRINT" THIS PROGRAM CALCULATE
S THE"
190 PRINT"INDIVIDUAL MARKING PERIOD"
200 PRINT"AVERAGES FOR STUDENTS, AND IS
"
210 PRINT"BASED ON A WEIGHTED VARIABLE
SYSTEM."
220 PRINT:PRINT" YOU WILL BE ABLE TO SE
E THE"
230 PRINT"STUDENT NAMES AND AVERAGES"
240 PRINT"SHOW ON THE SCREEN AND/OR PRI
NT"
250 PRINT"OUT ON A PRINTER."
260 PRINT:INPUT"PRESS <ENTER> TO CONTIN
UE";Z$
270 CLS
280 PRINT:PRINT" WHICH WOULD YOU PREFER
:"
290 PRINT" 1. SHOW AVERAGE ON SCREEN.
"
300 PRINT" 2. PRINT OUT OF AVERAGES."
310 PRINT" 3. INPUT OF FINAL EXAM TO"
320 PRINT" CALCULATE FINAL AVERAGE
-"
330 PRINT" WITH PRINT OUT."
340 PRINT:PRINT
350 PRINT"TYPE IN THE NUMBER OF YOUR"
360 INPUT"CHOICE AND PRESS <ENTER>";W
370 IF W<1 OR W>3 THEN 270
380 CLS:TB=0
390 PRINT:PRINT"HOW MANY DIFFERENT cate
gories"
400 PRINT"OF GRADES ARE ON THE FIRST DA
TA"
410 INPUT"LINE <1 TO 10>";DG:IF DG<1 OR
DG>10 THEN 380:IF W=3 THEN 490
420 PRINT:PRINT"WHAT IS THE WEIGHT OF E
ACH TYPE OF GRADE?"
430 FOR T=1 TO DG
440 INPUT D(T)
450 NEXT T
460 REM CHECK WEIGHTS TO MAKE SURE THEY
EQUAL 100
470 FOR T=1 TO DG:TB=D(T)+TB:NEXT T
480 IF TB<>100 THEN TB=0:CLS:PRINT"WEIG
HTS DO NOT EQUAL 100":GOTO 420
490 CLS
500 PRINT@192,"HOW MANY MARKING PERIOD
GRADES"
510 INPUT"ARE THERE ON FILE <0 TO 6>";B
1
520 IF B1<0 OR B1>6 THEN 490
530 IF W=3 AND B1<>6 THEN 540 ELSE 580
540 PRINT@32,"YOU MUST HAVE 6 MARKING P
ERIOD"
```

```

550 PRINT"GRADES ON FILE TO CALCULATE T
HE"
560 PRINT"FINAL GRADE."
570 GOTO 500
580 IF W=1 THEN 820
590 CLS
600 PRINT@229,"WHAT IS TODAYS DATE?"
610 LINEINPUT "      ";K$
620 CLS
630 REM CHECK STATUS OF PRINTER
640 Z=PEEK(65314)
650 IF Z=4 OR Z=6 THEN PRINT@160,"I SEE
    THAT YOUR PRINTER IS ON" ELSE 670
660 PRINT"LINE. PLEASE ALIGN THE PAPER.
"
670 IF Z=5 OR Z=7 THEN PRINT@160,"PLEAS
E TURN ON YOUR PRINTER" ELSE 690
680 PRINT"AND ALIGN THE PAPER."
690 PRINT:PRINT
700 INPUT"PRESS <ENTER> WHEN READY";Z$
710 CLS: PRINT@228,"printing heading on
    paper"
720 REM PRINT HEADING ON PAPER
730 PRINT#-2,CHR$(31);"C.J.H.S."
740 PRINT#-2,CHR$(30);"MR. L. DAVIS"
750 PRINT#-2,"6th PERIOD"
760 PRINT#-2,"STUDENT AVERAGES"
770 PRINT#-2,"UPDATE: "K$
780 FOR S=1 TO 2:PRINT#-2,CHR$(10):NEXT
    S
790 IF W=2 THEN PRINT#-2, "STUDENT
    AVERAGE      COMMENTS      MP1      M
P2      MP3      MP4      MP5      MP6"
800 IF W=3 THEN PRINT#-2,"STUDENT
    MP1      MP2      MP3      MP4      MP5      MP
6      EXAM FINAL AVE."
810 PRINT#-2,CHR$(10);
820 J1=1:L=0:L1=0:P=0:P1=0:HA=0
830 CLS
840 REM PLACES BORDER ON THE SCREEN
850 FOR Y=1 TO 10:PRINT@95+Y,C$;:PRINT@
117+Y,C$;:PRINT@383+Y,C$;:PRINT@405+Y,C
$;
860 NEXT Y
870 FOR Y=1 TO 14:PRINT@72+Y,C$;:PRINT@
424+Y,C$;:NEXT Y
880 PRINT@128,C$;:PRINT@159,C$;
890 PRINT@352,C$;:PRINT@383,C$;
900 REM GRADE CALCULATIONS
910 C=1:C1=0:H=0:HT=0:X=0:HA=0:T1=0:G=0
:T2=0:T4=0
920 REM READ THE STUDENT NAME
930 READ N$
940 IF N$="END" THEN 1700
950 REM COUNT THEN NUMBER OF STUDENTS
960 J=J1+J
970 REM READ THE GRADES FOR THE CURRENT
    MARKING PERIOD AND CALCULATE THE AVE.

```

TRS-80\* Model III

Hardware &  
Software  
at discount  
prices.

# COMPUTER HOUSE

	Sug. List.	Our Price
<b>ACORN SOFTWARE</b>		
Astro Ball (T or D).....	19 95	15 95
Everest Explorer (T or D).....	19 95	15 95
Invaders From Space (T).....	14 95	11 95
Lost Colony (T or D).....	19 95	15 95
Money Manager (D).....	39 95	31 95
Space Rocks (T or D).....	19 95	15 95
Superscript (D).....	50 00	40 00
<b>ADVENTURE INTERNATIONAL</b>		
Adventures 1 thru 12 (T) each.....	19 95	15 95
Escape From Traam (T).....	19 95	15 95
Maxi Manager (D).....	99 95	79 95
Star Fighter (T).....	24 95	19 95
Star Trek 3 5 (T).....	14 95	11 95
Stone of Sisyphus (D).....	29 95	23 95
The Curse of Crowley Manor (T).....	19 95	15 95
<b>AUTOMATED SIMULATIONS</b>		
Crush, Crumble & Chomp (T or D).....	29 95	23 95
Date Stones of Ryn (T or D).....	19 95	15 95
Rescue At Rigel (T or D).....	29 95	23 95
Star Warrior (T or D).....	39 95	31 95
Tuesday Morning Quarterback (D).....	29 95	23 95
<b>BIG FIVE SOFTWARE</b>		
Attack Force (T).....	15 95	12 75
Galaxy Invasion (T).....	15 95	12 75
Meteor Mission 2 (T).....	15 95	12 75
Robot Attack (T).....	15 95	12 75
Super Nova (T).....	15 95	12 75
<b>BRODERBUND SOFTWARE</b>		
Galactic Empire (T).....	14 95	11 95
Galactic Revolution (T).....	14 95	11 95
Galactic Trader (T).....	14 95	11 95
Galactic Trilogy (D).....	39 95	31 95
Tawala's Last Redoubt (T).....	19 95	15 95
<b>THE CORNSOFT GROUP</b>		
Scarfman (C).....	15 95	12 75
<b>DATASOFT</b>		
Arcade - 80 (T).....	19 95	15 95
<b>HAYDEN SOFTWARE</b>		
Sargon II (D).....	34 95	27 95
<b>MED SYSTEMS</b>		
Asylum (T).....	14 95	11 95
Asylum (D).....	19 95	15 95
Deathmaze 5000 (T).....	14 95	11 95
Labyrinth (T).....	14 95	11 95
<b>MICROSOFT</b>		
Adventure (D).....	29 95	23 95
Olympic Decathlon (T).....	24 95	19 95
<b>RADIO SHACK</b>		
26-2204 Compiler Basic (D).....	149 00	119 20
26-1552 General Ledger (D).....	99 95	79 95
26-1553 Inventory Control I (D).....	99 95	79 95
26-2014 Model III Disk Course (D).....	29 95	23 95
26-1596 Model III Visicalc (D).....	199 00	155 00
26-1556 Payroll (D).....	199 95	155 95
26-1592 Profile III Plus (D).....	199 00	155 00
26-1590 Super Scripsit (D).....	199 00	155 00
<b>STRATEGIC SIMULATIONS</b>		
Tigers In The Snow (T).....	24 95	19 95
<b>SYNTONIC SOFTWARE</b>		
Interlude (T).....	18 95	15 15

(T) = Cassette Tape (D) = Disk

REPRESENTING OVER 20+ COMPANIES WITH 300+ PROGRAMS AND HARDWARE.

WRITE FOR FREE MODEL II, III OR COLOR COMPUTER CATALOGS TO:

## Computer House

P.O. Box 538, Mammoth Lakes, CA 93546

(714) 934-6538

Terms: FOR FAST DELIVERY, send certified checks, money orders or Visa or MasterCard number and expiration date. Personal checks require 3 weeks to clear. ADD \$1.50 for postage. Orders over \$100 we pay shipping. All foreign orders add \$10. CALIFORNIA residents add 6% tax. Prices subject to change.

# 15

\* TRS-80 is a trademark of Tandy Corp.

## Gradebook

```
980 FOR A=1 TO DG
990 FOR X=1 TO 25
1000 READ H
1010 REM REARRANGE THE WEIGHTS IF A STUDENT HAS NO GRADES IN A CERTAIN CATEGORY
1020 IF H=1 AND C1=0 AND A<>DG THEN Q=D(A)+Q:ZA=1:GOTO 1060
1030 IF H=1 AND C1=0 AND A=DG AND ZA=1 THEN HA=(T3*(D(DG)+Q))/100:GOTO 1140

1040 IF H=1 AND C1=0 AND A=DG THEN HA=(T3*D(DG))/100:GOTO 1140
1050 IF ZA<>1 THEN Q=D(A)
1060 IF H=1 AND C1=0 THEN NEXT A
1070 IF H=1 THEN 1110
1080 HT=H+HT:REM ADD THE GRADES TOGETHER IN ONE CATEGORY
1090 C1=C+C1:REM TOTAL OF THE NUMBER OF GRADES IN A CATEGORY
1100 NEXT X
1110 IF ZA=1 THEN Q=D(A)+Q
1120 T1=0:T1=HT/C1:T2=T1+T2:T4=T4+1:T3=T2/T4:REM AVE. GRADE/CATEGORY,TOTAL & AVE
1130 HA=(T1*Q)/100:REM MULTIPLY THE AVERAGE BY THE PERCENTAGE WEIGHT
1140 G=HA+G:REM ADD TOGETHER THE AVERAGES IN EACH CATEGORY FOR MARKING PD. AVE

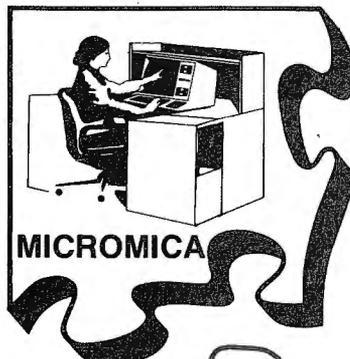
1150 HT=0:C1=0:ZA=0:Q=0
1160 NEXT A
1170 REM READ THE 6 MARKING PERIOD GRADES IF NEEDED
1180 IF W=3 THEN GOSUB 1460 ELSE GOTO 1310
1190 REM ADD THE 6 MARKING PERIOD GRADES TOGETHER
1200 I=(M1+M2+M3+M4+M5+M6)/6
1210 PRINT@192," STUDENT: ";N$
1220 PRINT@224," FINAL EXAM GRADE.....";
1230 INPUT L
1240 REM TOTAL ALL FINAL EXAM GRADES
1250 L1=L+L1
1260 REM CALCULATE THE STUDENT'S FINAL AVERAGE FOR THE YEAR
1270 P=(I+I+L)/3
1280 REM ADD TOGETHER ALL THE FINAL AVERAGES
1290 P1=P+P1
1300 GOTO 1620
1310 REM SOUND FOR A FAILING GRADE
1320 IF G<65 THEN FOR Y=150 TO 100 STEP -5:SOUND Y,1:NEXT Y
1330 REM ADD ALL THE MARKING PERIOD GRADES TOGETHER
1340 G1=G+G1

1350 REM CALCULATE THE CLASS MARKING PERIOD AVERAGE
1360 B=G1/J
1370 IF B1=0 THEN 1480
1380 REM IF MENU CHOICE WAS 1 OR 2 THEN READ THE RIGHT MARKING PERIOD AVERAGES
1390 IF W<>3 THEN ON B1 GOSUB 1410,1420,1430,1440,1450,1460
1400 GOTO 1480
1410 READ M1:RETURN
1420 READ M1,M2:RETURN
1430 READ M1,M2,M3:RETURN
1440 READ M1,M2,M3,M4:RETURN
1450 READ M1,M2,M3,M4,M5:RETURN
1460 READ M1,M2,M3,M4,M5,M6:RETURN
1470 REM PRINT ROUTINES
1480 IF W<>3 THEN PRINT@197,"student grade"
1490 REM UNDERLINE A FAILING GRADE IN RED
1500 IF G<65 AND W=2 THEN FOR Y=1 TO 5:PRINT@278+Y,CHR$(143+48);:NEXT Y
1510 PRINT@229, USING V3$;J,Q$,N$,G
1520 IF G<65 AND W=1 THEN FOR Y=1 TO 5:PRINT@278+Y,CHR$(143+48);:NEXT Y
1530 IF W=2 AND B1=0 THEN PRINT#-2, USING V4$; J,Q$,N$,G,F$:GOTO 1620
1540 IF W=2 THEN ON B1 GOSUB 1560,1570,1580,1590,1600,1610
1550 GOTO 1620
1560 PRINT#-2,USINGV1$;J,Q$,N$,G,F$,M1:RETURN
1570 PRINT#-2,USINGV1$+V2$;J,Q$,N$,G,F$,M1,M2:RETURN
1580 PRINT#-2,USINGV1$+V2$+V2$;J,Q$,N$,G,F$,M1,M2,M3:RETURN
1590 PRINT#-2,USINGV1$+V2$+V2$+V2$;J,Q$,N$,G,F$,M1,M2,M3,M4:RETURN
1600 PRINT#-2,USINGV1$+V2$+V2$+V2$+V2$;J,Q$,N$,G,F$,M1,M2,M3,M4,M5:RETURN
1610 PRINT#-2,USINGV1$+V2$+V2$+V2$+V2$+V2$;J,Q$,N$,G,F$,M1,M2,M3,M4,M5,M6:RETURN
1620 IF W=3 THEN 1630 ELSE 1680
1630 PRINT@192,"STUDENT EXAM FINAL AVE."
1640 IF P<65 THEN FOR Y=1 TO 9:PRINT@277+Y,CHR$(143+48):NEXT Y
1650 PRINT@224, USING"###%#%#%#%#%#";J,Q$,N$,L,P
1660 IF P<65 THEN FOR Y=150 TO 100 STEP -5:SOUND Y,1:NEXT Y
1670 PRINT#-2,USING V7$;J,Q$,N$,M1,M2,M3,M4,M5,M6,L,P
1680 PRINT:IF W=1 THEN INPUT " PRESS <ENTER> TO CONTINUE";Z$
1690 GOTO 910
1700 CLS
```



# A PERFECT FIT!

**MICROMICA  
DESK  
\$199.00  
YOUR PRICE  
\$159.00**



**ACE MAIL  
SOFTWARE  
\$79.00  
YOUR PRICE  
\$49.00**

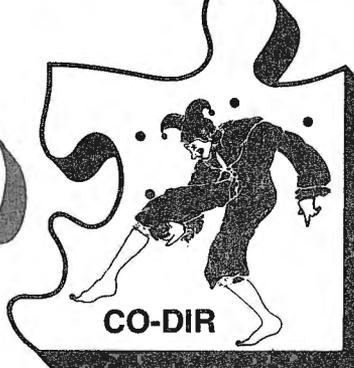


**MICROMICA  
SHELF TOP  
ORGANIZER  
\$99.00  
YOUR PRICE  
\$79.00**

**HAYES  
STACK  
SMARTMODEM  
\$279.00  
YOUR PRICE  
\$239.00**



**WILDCAT  
SOFTWARE  
\$59.00  
YOUR PRICE  
\$39.00**



**CO-DIR  
SOFTWARE  
\$69.00  
YOUR PRICE  
\$39.00**

## FINDING SOLUTIONS TO PUZZLING PROBLEMS

### TRS-80 ENHANCEMENT

ACE COMPUTER PRODUCTS presents a new generation of specialized software systems and furniture designed to professionally enhance your TRS-80 for maximum efficiency and enjoyment!

### ELECTRONIC MAIL

Now you can access other computers, time sharing systems, and information utilities nationwide over the telephone. The unique ACE MAIL software package allows you to receive and transmit ASCII files from your COMPLETELY UNATTENDED TRS-80! This sophisticated, high performance, data communications system works in conjunction with the popular Hayes Stack Smartmodem featuring auto answer/auto dial, RS232C compatibility, 7 LED indicators, an audio monitor, over 30 commands, and is programmable in

any language.

### WILDCAT

Wildcat is a remarkable disk directory catalogue system which allows files to be easily identified even with obscure or conflicting file specs. Catalogue contains FILESPEC, First Line Remark, Disk I.D., Disk Name, Disk Date, and free grants. Object code files are marked and files without remarks are noted. Includes first line of all BASIC, SCRIPSIT, PENCIL, EDTASM, DATA, and ASCII type files.

### DIRECTORY FILE PROCESSOR

CO-DIR is a rapid directory file processor which allows you to juggle programs listed on a disk directory using a pair of blinking cursors and a single keystroke. Never type a program name again! Access any directory page or program instantly! Accepts over 12

commands including Copy, Directory, Free, Help, "Do" file, Kill, List, Modify, Load Object, Print, Rename, Search, and Execute. Also features scrolling and word processing capabilities.

### MICROMICA MODULAR WORK CENTER

Our custom furniture features modular engineering for system arrangements and expansion. Each desk, shelf organizer, or printer stand comes in a choice of colors with designer styling and presents a unique snap-lock system for easy assembly or breakdown without any tools.

### CALL TOLL FREE!

Make ACE your one call shopping center for all software, hardware, furniture, or accessories. Call our TOLL FREE order line for prices or literature today!

ORDER TOLL-FREE

1-800-327-2283



**ACE COMPUTER PRODUCTS OF FLORIDA, INC.**

1640 N.W. 3rd St., Deerfield Beach, Florida 33441

VOICE (305) 427-1257/DATA (305) 427-6300

### SPECIFICATIONS

WILDCAT software for Model I using TRSDOS 2.3 or any version NEWDOS and Model III using NEWDOS 2.0 Requires 48K and two 5" drives. Specify Model and DOS when ordering.

CO-DIR software for Model I & III using DOSPLUS 3.3 & 3.4 or NEWDOS 80 1.0 & 2.0 Requires 32K and one 5" drive. Specify Model and DOS when ordering.

ACE MAIL software for Model I & III using DOSPLUS 3.3, & 3.4 or NEWDOS 80 1.0 & 2.0 Requires 48K and one 5" drive. Specify Model and DOS when ordering.

MICROMICA desk measures approx. 48"W x 24"D x 27"H. Desk top shelf organizer measures 48"W x 12"D x 21"H. Mica colors available in Almond, Light Oak, Walnut, or White. Specify color when ordering.

# 16

Write or call ACE TOLL FREE at 1-800-327-2283. Florida residents call 305-427-1257. Please use the toll free line

for orders, prices, or literature only. Technical assistance or service use the Florida line. MASTERCARD/VISA accepted. Add

freight on all orders. Florida residents add 5% sales tax. Prices subject to change without notice.

TRS 80 and TRSDOS trademark TANDY CORP. NEWDOS trademark Apparat, Inc Hayes Stack Smartmodem trademark Hayes Microcomputer Products, Inc. DOSPLUS trademark MICRO-SYSTEMS SOFTWARE, INC.

August, 1982 29

# Gradebook

```

1710 IF W<>3 THEN PRINT@231,USING"%
      %##.##";R$,B
1720 IF W=2 THEN PRINT#-2,"-----
-----"
1730 IF W=2 THEN PRINT#-2,USING"%
      % ##.##";R$,B
1740 IF W=3 THEN 1750 ELSE 1790
1750 PRINT@196,USINGV5$;"FINAL EXAM AVE
RAGE =",L1/J
1760 PRINT@228,USINGV5$;"      FINAL AVE
RAGE =",P1/J
1770 PRINT#-2,V8$
1780 PRINT#-2,USING V6$;"class averages
",L1/J,P1/J
1790 PRINT@289,"RUN PROGRAM AGAIN <Y OR
N>";
1800 INPUT U$
1810 G1=0:J=0
1820 IF U$="Y" OR U$="YES" THEN RESTORE
:GOTO 270
1830 END
1840 REM INTRODUCTION
1850 CLS(0):FOR Y=1 TO 500:NEXT Y
1860 FOR K=1024 TO 1535
1870 N=RND(128)+127
1880 POKE K,N
1890 IF N>200 AND N<245 THEN SOUND N,1
ELSE 1900
1900 NEXT K
1910 FOR Y=1 TO 1000:NEXT Y
1920 PRINT@170,"      ";
1930 PRINT@202,"      COLOR      ";
1940 PRINT@234,"      COMPUTER  ";
1950 PRINT@266,"      GRADEBOOK  ";
1960 PRINT@298,"      ";
1970 FOR Y=1 TO 2000:NEXT Y
1980 PRINT@202," BY:      ";
1990 PRINT@234,"      ";
2000 PRINT@266," LYNN DAVIS ";
2010 FOR Y=1 TO 2000:NEXT Y
2020 Y=0
2030 REM PRINT ROUTINES
2040 C$=CHR$(143+32)
2050 R$="class average ="
2060 Q$="."
2070 F$="....."
2080 V1$="#####          %###%
      %   ###"
2090 V2$="      ###"
2100 V3$="#####          %###"
2110 V4$="#####          %###%
      %"
2120 V5$="%"          %   ###%"
2130 V6$="%"          %
      #####   #####
"
2140 V7$="#####          %###   ###
      ###   ###   ###   ###   ###   ###"
2150 V8$="-----
-----"
"
2160 RETURN
2170 GOTO 2190
2180 GOTO 160
2190 PCLEAR 1
2200 GOTO 2180
2210 REM DATA STATEMENTS HAVE A 1 TO LO
CATE THE END OF EACH category OF GRADE.
2220 REM SECOND SET OF DATA STATEMENTS
NEEDED AFTER 1ST MARKING PERIOD.
2230 REM HOMEWORKS, FLAG, PROJECT, FLAG
, LABS, FLAG, TESTS, FLAG
3000 DATA ARMSTRONG,80,82,86,75,1,81,1,
78,84,1,80,80,1
3005 DATA 70,80,85
3010 DATA BRADFORD,1,60,1,55,69,45,1,52
,58,1
3015 DATA 74,68,60
3020 DATA CARDWELL,89,87,80,1,1,87,93,9
1,1,86,1
3025 DATA 95,82,87
3030 DATA FERGERSON,70,78,82,1,73,81,75
,1,1,80,76,1
3035 DATA 83,65,73
3040 DATA FLEMING,87,84,91,88,1,88,1,90
,1,1
3045 DATA 86,90,83
3050 DATA GOODWIN,1,1,52,65,59,1,70,61,
54,1
3055 DATA 65,50,53
3060 DATA HIGGINS,1,80,70,1,1,72,74,78,
1
3065 DATA 74,65,71
3070 DATA KING,1,81,74,1,83,84,75,79,1,
1
3075 DATA 82,72,77
3080 DATA LAWRENCE,84,85,90,81,83,1,1,1
,83,90,82,1
3085 DATA 87,88,91
3090 DATA LITTLEFIELD,85,88,83,86,1,1,8
0,92,87,83,92,1,1
3095 DATA 81,85,92
3100 DATA MAURER,54,60,67,58,72,51,1,56
,62,1,1,1
3105 DATA 75,66,60
3110 DATA RODGERS,1,1,1,95,93,96,100,1
3115 DATA 90,92,95
3120 DATA SHARPE,1,1,90,100,100,84,81,1
,1
3125 DATA 92,85,91
3130 DATA STEDMANN,1,84,89,92,84,1,1,1
3135 DATA 94,82,88
3140 DATA VINCENT,90,93,87,60,85,90,93,
1,1,1,1
3145 DATA 93,88,90
3150 DATA END

```

# II + II =

# (BUSINESS DYNAMICS)

## DOSPLUS II and the TRS-80 model II. The Dynamic Duo.

The TRS-80 model II was created to help you take care of your business. DOSPLUS II was created to help your TRS-80 help you and your business even more.

DOSPLUS II replaces your O.E.M. dos with an ultra-sophisticated operating system that is 5 or more times faster, more reliable and is totally compatible with all standard business oriented software designed for use with the model II. The result is a computer/operating system that far exceeds manufacturer's specs—with more potential and more capacity to be of service to you.

DOSPLUS II operating systems are available for either your floppy or hard disk drives. The hard drive operating system is compatible with Radio Shack,

QuCeS, Corvus Micro Mainframe, VR Data and other popular hard drive sub-systems.

DOSPLUS II... All the quality and dependability you'd expect from DOSPLUS.

For the dealer nearest you call  
1-800-327-8724

Dealer inquiries invited.

# \$249.95

For product information (305) 983-3390

## DOSPLUS

DOSPLUS first in quality!  
First in the industry!

To order call toll free 1-800-327-8724

## POWERSOFT

A Division of Breeze/QSD, Inc.  
11500 Stemmons Fwy., Dallas, Texas 75229  
(214) 484-2976 Micronet 70130, 203

# 17



**MICRO SYSTEMS  
SOFTWARE, INC.**  
4301-18 Oak Circle,  
Boca Raton, FL 33431

August, 1982 31

# Gradebook

C. J. H. S.  
MR. L. DAVIS  
6th PERIOD  
STUDENT AVERAGES  
UPDATE: 2/20/82

Figure 1 — This is an example of the printout received when calculating marking period averages for the students shown in the program. The current average results from inputting a 10 percent weight for homework grades, 20 percent for projects, 30 percent for lab experiments and 40 percent for tests.

STUDENT	AVERAGE	COMMENTS	MP1	MP2	MP3	MP4	MP5	MP6
1. ARMSTRONG	81	.....	70	80	85			
2. BRADFORD	57	.....	74	68	60			
3. CARDWELL	88	.....	95	82	87			
4. FERGERSON	78	.....	83	65	73			
5. FLEMING	89	.....	86	90	83			
6. GOODWIN	60	.....	65	50	53			
7. HIGGINS	75	.....	74	65	71			
8. KING	79	.....	82	72	77			
9. LAWRENCE	85	.....	87	88	91			
10. LITTLEFIELD	86	.....	81	85	92			
11. MAURER	60	.....	75	66	60			
12. RODGERS	96	.....	90	92	95			
13. SHARPE	91	.....	92	85	91			
14. STEDMANN	87	.....	94	82	88			
15. VINCENT	85	.....	93	88	90			
-----								
class average =								79.7%

C. J. H. S.  
MR. L. DAVIS  
6th PERIOD  
STUDENT AVERAGES  
UPDATE: 6/22/82

Figure 2 — This is the printout received at the end of the year. For the program to calculate a final grade, the DATA statements must contain the six marking period averages, and the final exam grade must be INPUT from the keyboard.

STUDENT	MP1	MP2	MP3	MP4	MP5	MP6	EXAM	FINAL AVE.
1. ARMSTRONG	70	80	85	81	88	83	84	82
2. BRADFORD	74	68	60	57	65	71	58	63
3. CARDWELL	95	82	87	88	90	85	90	89
4. FERGERSON	83	65	73	78	80	82	73	76
5. FLEMING	86	90	83	89	85	90	88	87
6. GOODWIN	65	50	53	60	55	70	57	58
7. HIGGINS	74	65	71	75	78	72	80	75
8. KING	82	72	77	79	80	75	82	79
9. LAWRENCE	87	88	91	85	83	88	84	86
10. LITTLEFIELD	81	85	92	86	88	90	81	85
11. MAURER	75	66	60	60	65	70	74	69
12. RODGERS	90	92	95	96	92	96	94	94
13. SHARPE	92	85	91	91	90	93	90	90
14. STEDMANN	94	82	88	87	85	90	93	89
15. VINCENT	93	88	90	85	83	81	82	85
-----								
class averages							81%	80%

# M-ZAL™

## Release Two Is Here!

Our Users asked for it, and we made the best TRS-80 disk assembler even better! Now M-ZAL has:

- Recursive MACROS with full symbolic parameter substitution
- Conditional assembly with unlimited nesting
- Text Editor warm-start/recovery option
- Support for all popular source file formats
- Load Module inspect/superzap using LINKER

and the features that made it famous:

- True multi-pass assembly
- Full Screen Option Menus
- ENTRY/EXTERN symbols, relocation, and object module linking
- 8 character labels with sorted symbol table
- Built-in symbol table cross-reference
- Nested \*INCLUDES (source file chaining/nesting)
- Lower case support (Model 3 only)
- Over 175 pages of documentation including Z-80 Technical Manual
- Full Screen Text Editing and much, much more!

M-ZAL provides a modular, structured development environment that makes programming your TRS-80 a truly enjoyable experience. Order yours today. (Requires 32k, 2 disk system)

#1050-10	Mod 1	\$149.00
#1250-10	Mod 3	\$149.00

### CAU Development Software— The Professionals Choice

Full Screen Text Editor for BASIC: we were the first to give the TRS-80 this indispensable ability! A must for every BASIC programmer:

#1010-20	Mod 1	\$24.95
#1210-20	Mod 3	\$29.95

T-ZAL: custom designed for the Model 3, this tape based assembler has many of M-ZAL's most desired features.

#1250-20	Mod 3 only	\$49.95
----------	------------	---------

XBUG: for machine language analysis and debugging—this tiny (2.5k) but powerful program lets you do it all!

#1020-10	Mod 1	\$19.95
#1220-10	Mod 3	\$19.95

FILEXFER: transfer any disk file between two TRS-80s. Use direct cable link or RS modems. Mod 1 and Mod 3 can be mixed. RS-232 and disk read.

#1040-10	Mod 1 and 3	\$49.95
----------	-------------	---------

"We've been using M-ZAL heavily for over two months now, and it's been worth its weight in gold."

—Chuck Jensen  
PROSOFT

"...well written software that is long overdue."

—Bruce Douglas  
80 Microcomputing  
BASIC Editor Review

"During the first 3 days of use, M-ZAL saved more money in programmers time than we had paid for the product."

—William Denman  
Author of Asylum  
MED SYSTEMS

"The editor has at least doubled my productive capacity...Having spent a good deal of money on so called 'utilities' that don't work, it's a delight to find one that not only lives up to its claims but surpasses the advertising."

—BASIC Editor user

Our choice for the best TRS-80 DOS:

DOSPLUS 3.4	Mod 1	\$149.00
DOSPLUS 3.4	Mod 3	\$149.00

Call or write for more information.

All products require level II.

Mail orders specify catalog #.

Send check, money order, or MC/VISA numbers and expiration date to:

### Computer Applications Unlimited

P.O. Box 214, Dept. ABO Rye, New York 10580

(914) 937 6286

N.Y. State residents add applicable sales tax. Outside USA and Canada add \$7.00 shipping. Dealer Inquiries Invited.



# CAU™ COMPUTER APPLICATIONS UNLIMITED™

a div. of CAU, Inc.

TRS-80 is a TM of Tandy Corp. M-ZAL is a TM of CAU, Inc. Z-80 is a TM of Zilog, Inc.

---

# Daisywheel printer for under \$900

## *Evaluation of the Smith-Corona daisywheel printer*

**Mike Schmidt, Publisher**

The daisywheel printer market has been able, up to now, to hold prices at least in the neighborhood of sixteen hundred plus dollars. Recently, the Smith-Corona Company made an announcement of an under \$900 daisywheel printer. This sounded too good to be true, so we ordered one and checked it out. Here is what we found.

The Smith-Corona printer is designated the TP-1. It is a microprocessor controlled, fully-formed character (daisywheel) printer. It is compatible with all of the major microcomputer systems in today's market. Although primarily designed as a high-quality word processing printer, it can also be utilized as a general purpose printer.

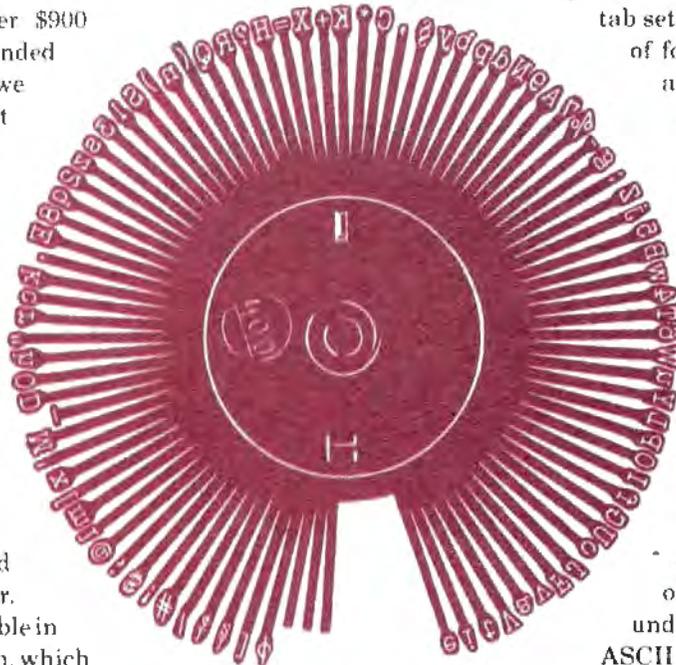
The TP-1 printer is available in two basic versions, a 10-pitch, which gives a 105-character line; or a 12-pitch version, which expands the printable line length to 126 characters.

There are two standard interfaces presently available

for the TP-1. One is a Centronics compatible parallel interface and the other is an RS232 serial interface.

Some of the features of the TP-1 daisywheel printer are programmable margins, tab settings, auto-underline and top of form. Programmable margins allow the user to set and release margins under program control. Tabs may be set by moving the printer carriage to the desired point and sending an ASCII DC2 character.

An ASCII DC4 character will remove a tab set. Auto-underline is enabled by sending an ASCII EM character (Hex 19). The EM character puts the printer into an underline mode, all characters printed following receipt of the EM character will be underlined. Receipt of another ASCII EM character will halt the underline mode and return the printer to normal. Top of form is under control of the top of form switch, located on the front panel of the printer. The operator can set top of form at any location



# Smith-Corona introduces the only daisy wheel printer under \$900\* for your TRS-80®.



You're putting together a desktop computer system for your office or home. And you want to add a letter quality printer so you can do word processing, too. But you don't want to spend a fortune.

Until now, you really had little choice but to settle for dot matrix printers. True, a dot matrix doesn't produce letter-perfect printing, but daisy wheel printers just cost too much. That is, they did.

Now, Smith-Corona® offers a daisy wheel printer at such an incredibly low price, you can't afford *not* to get it. (The fact is, you won't find a daisy wheel printer *anywhere* at a price so low.)

The Smith-Corona TP-I™ printer operates with microprocessor controlled daisy wheel technology, and is available with either standard serial or parallel data interface. It is compatible with your TRS-80. And, unlike many printers currently on the market, it's made in America.

Best of all, the TP-I produces results identical to those of our very finest office typewriters—printing with real character. So it can be used to send out letters that have to look perfect. As well as financial statements, inventory reports, direct mail campaigns, manuscripts. Even a letter to your son in college!

Anything at all you need printed.

The basic TP-I will handle letter or legal sized paper. An option that will be available soon will enable it to handle either fanfold or single sheet paper.

The TP-I is easy-to-use—just turn the power on, load the paper, and away it goes. There are drop-in ribbon cassettes and a choice of easy-to-change, snap-on daisy print wheels for a variety of fonts.

So stop thinking you can't afford a daisy wheel printer. Because, thanks to Smith-Corona, a printer with real character is no longer expensive. **Smith-Corona**

Please send me more information on the Smith-Corona TP-I daisy wheel printer.

Name \_\_\_\_\_

Title \_\_\_\_\_

Company Name \_\_\_\_\_

Business Address \_\_\_\_\_

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

Mail Coupon to:  
Dwight P. Newcomer, National Sales Manager—Office Products  
Smith-Corona  
65 Locust Avenue  
New Canaan, Connecticut 06840

US80-8

TRS-80® is a registered trademark of Tandy Corp. \*Manufacturer's suggested retail is under \$900, but prices may vary.

## Printer evaluation

on a page. When this has been done, the printer will be sensitive to the ASCII FF (form feed) character and any time it is received by the printer, will advance the page to top of form position.

The TP-1 uses standard SCM supplies and ribbon cassettes. Only detented daisywheel elements can be used in this printer. The print quality is excellent. The print speed averages 12 characters per second.

The standard 128 ASCII character set is supported by the TP-1. The unit prints 88 of these characters, those remaining are either control characters or are ignored by the printer. From the point of view of the computerist, the most notable of the missing characters were the "greater than," "less than," "up-arrow" and a slashed zero. We discussed these essential characters with Mr. Daniel McCarthy, Vice President of Special Market Sales at SCM. He has subsequently informed us that a new print wheel with additional ASCII characters is in the works. Availability to be announced.

The printer handles single sheet or fan fold paper. An optional tractor feed will be available but was not included for this evaluation. The printer will handle multiple copy documents or forms up to a maximum thickness of .022 inches. It has a manual "fine adjustment" line spacing which allows precise alignment for forms.

The TP-1 is very small and lightweight (20 lbs.) It was designed for desktop or tabletop use. Its small "footprint" allows it to fit in places where some competitive printers will not. It is 6.5 inches high, 19.5 inches wide and 13.5 inches deep.

The TP-1 has the following controls:

- Top of form
- Impression control
- Manual paper release
- Manual paper advance
- Paper position indicator
- Line spacing
- Hammer release
- On/Off switch

The TP-1 platten allows paper up to 13 inches wide (33 cm). Our only question here was why not go another inch and a half and use standard computer output paper? Mr. McCarthy told us the platten

was a standard typewriter platten. (Perhaps they are saving this feature for a model TP-2?).

The life of the printer is estimated to be between 30 and 40 million characters with periodic preventive maintenance. The daisywheel is expected to last 2.5 million characters. Single-strike film ribbons are good for about 57,000 characters. Multi-strike and long life fabric ribbons should go for about 250,000 characters. The mean time between failure on the printer is 10 million characters and the average repair time is one hour. These figures are taken from the manufacturer's specification sheet.

The printer utilizes the same ribbon cassettes as the Typetronic typewriter. The only difference in the printer is that the ribbon lift mechanism has been removed in the printer so the printer cannot support two-color printing or correction

tape. Used as a word processor, there should be little need for correction tape.

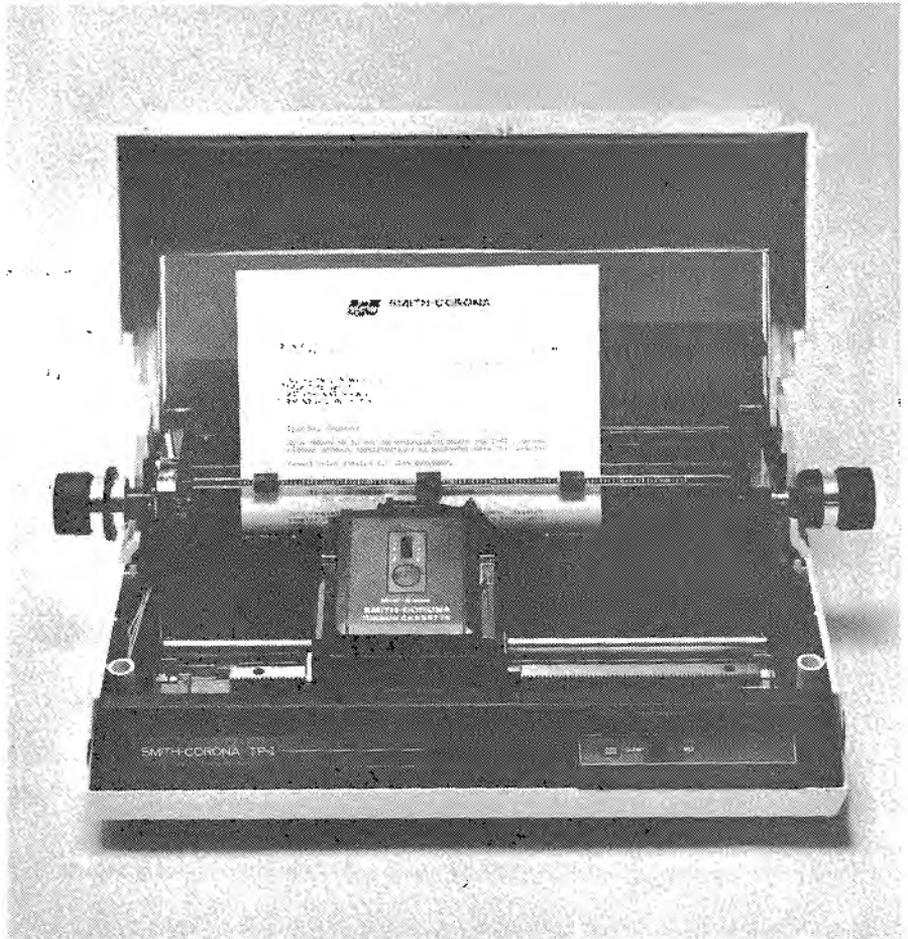
Presently eight typestyles are available: five for the 10-pitch and three for the 12-pitch. Additional print wheels will be announced shortly.

Our overall impression of this printer is excellent. True, its speed is such that continuous, heavy-duty printing would be out of the question. For occasional word processing and listing of programs for the home or small office computerist however, it is an exceptional bargain. ■

---

*Manufacturer's suggested retail price of the TP-1 daisy wheel printer is \$895. Additional information available from Smith-Corona at 65 Locust Avenue, New Canaan, CT 06840.*

---



**Marking Smith-Corona's entrance into the data and word processing fields, the new Smith-Corona TP-1 text printer utilizes advanced electronic technology. It offers the user the benefits of a dependable, high-quality printer at about half the price of other daisywheel printers.**



# Announcing the best Error Free Personal Computer Diskette Money can Buy. For Less.



- Error Free
- 1 year warranty
- Hub ring installed
- Write/Protect notch
- Next day delivery

**\$19.90/box of 10**

- No minimum order quantity

If you are a member of a user group or a school district please call for special terms on future offers. **TSS** is the largest specialty supplier of magnetic media in the Midwest. We have the products that you want when you need them. Please take advantage of this introductory offer and call us **now**.



22255 Greenfield Road  
Southfield, MI 48075

**CALL TOLL FREE**

1-800-521-5700

1-800-482-4770 (Michigan)

313-557-3036 (Detroit)

312-922-0076 (Chicago)

614-221-1788 (Columbus)

513-621-1518 (Cincinnati)

Telex 810-224-4646

**EXPECT A MIRACLE**

YES, **TSS** is the magnetic media supplier that I have always wanted.

Please send me \_\_\_\_\_, \_\_\_\_\_, @ \_\_\_\_\_ ea.  
Quantity Description Price

I am interested. Please send me more information  
or call me at ( ) \_\_\_\_\_

For faster order entry call any of our toll free or local numbers

Name \_\_\_\_\_ Title \_\_\_\_\_

Company \_\_\_\_\_

Address \_\_\_\_\_

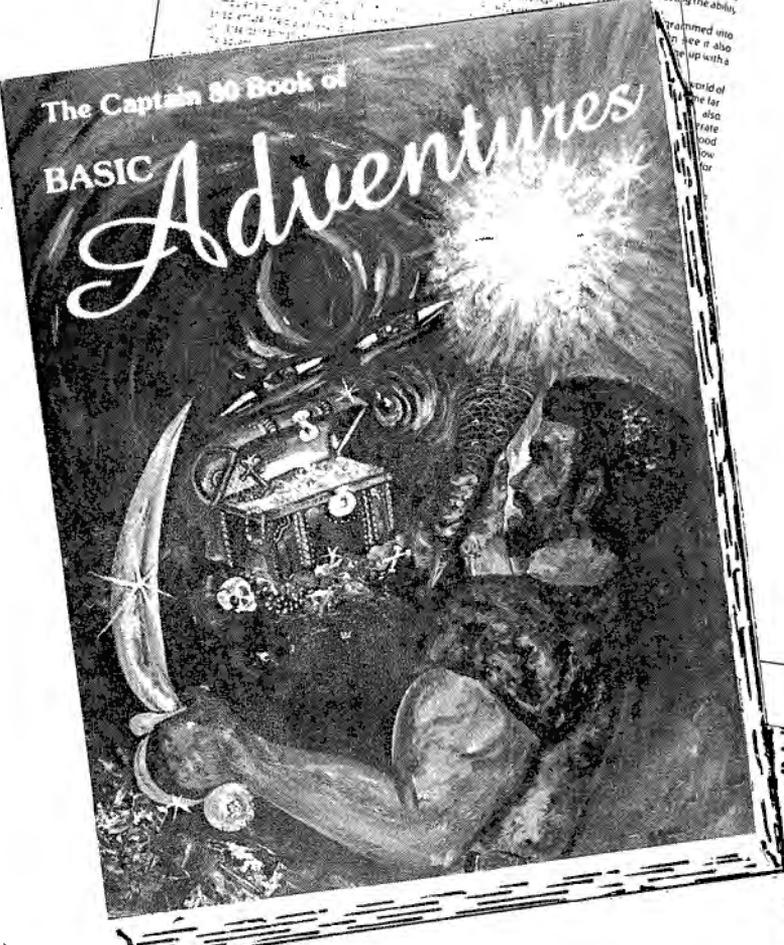
City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_

Purchase order number \_\_\_\_\_

Amex/Master Card/Visa orders are accepted Expiration Date

month \_\_\_\_\_ year \_\_\_\_\_

"Well done, highly readable, easy to use. The book is a delightful adventure." —George Blank, Editorial Director, *Creative Computing*



**CONTENTS**

**Part I**

Chapter 1 On the Road to Adventure ..... 3  
 Chapter 2 What is Adventure? ..... 5  
 Chapter 3 How to Play Adventure ..... 7  
 Chapter 4 How to Write an Adventure ..... 10  
 Chapter 5 Ten Adventure Ideas ..... 12  
 Chapter 6 Where to Sell Adventures ..... 15  
 Chapter 7 The Adventure Hit Parade ..... 17

**Part II**  
 The Adventure Generator, by David Huntress

Chapter 1 Adventure Generator, Documentation and Comments ..... 21  
 Chapter 2 Adventure Generator, Sample Run ..... 23  
 Chapter 3 Adventure Generator Program ..... 27

**Part III**  
 Eighteen BASIC Adventures to Type In

Chapter 1 Atlantean Odyssey	Terri Li	37
Chapter 2 Dog Star	Lance Micklus	87
Chapter 3 Thunder Road	Don & Freda Boner	97
Chapter 4 Deadly Dungeon	Don & Freda Boner	107
Chapter 5 Revenge of Balrog	Don & Freda Boner	117
Chapter 6 The Fortress at Times End	Don & Freda Boner	125
Chapter 7 Temple of the Sun	Jack Powers	134
Chapter 8 Lost Ship	Charles Forsythe	148
Chapter 9 Spider Mountain	Terri Li	157
Chapter 10 Lost Dutchman's Gold	Terri Li	167
Chapter 11 Journey to the Center of the earth	Greg Hassett	177
Chapter 12 King Tut's Tomb	Greg Hassett	187
Chapter 13 Voyage to Atlantis	Greg Hassett	197
Chapter 14 House of Seven Gables	Greg Hassett	206
Chapter 15 Sorcerer's Castle	Hugh Lampert	225
Chapter 16 CIA Adventure	Harry McCracken	234
Chapter 17 Arctic Adventure	Scott Adams	241
Chapter 18 Adventureland		

BASIC Adventures I

- The first book of its kind!
- Just \$19.95 (+ 2.05 s/h)
- Contains a unique adventure generator!
- Famous adventures by famous authors (see table of contents, above).
- See it at your local dealer, or order direct from:

**80-Northwest Publishing Inc**  
 3838 South Warner Street  
 Tacoma, Washington 98409  
 (206) 475-2219

# Have an adventure!

*Dealer inquiries invited*

Please send \_\_\_\_\_ copy(s) of the ADVENTURE BOOK for only \$19.95 each, plus \$2.05 shipping and handling. Check, M.O., VISA/MC# enclosed. COD orders accepted.

Name \_\_\_\_\_

Address \_\_\_\_\_

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

VISA/MASTERCARD# \_\_\_\_\_

Exp Date \_\_\_\_\_ Signature \_\_\_\_\_

Send to: 80-Northwest Publishing Inc, 3838 South Warner Street, Tacoma, Washington 98409

# “I’ve got it!”

## An overview of Model 16

Mike Schmidt, Publisher

It finally arrived. The new Model 16 sports an off-white case, green phosphor screen and a smart-looking keyboard. It also has two thinline disk drives and comes with 128K of memory.

There are three monster-sized manuals and one pamphlet included. The pamphlet says “Read me first.” I did. Then I read the other manuals, and went back to “Read me first.” Two hours later, I had yet to insert my first diskette into the machine. I am not that slow, but I wanted to make sure (with only one system diskette at that point) that I would not be trying to backup all over it.

Reading the documentation reminded me of the problems we sometimes encountered when trying to put together an issue of *80-U.S. Journal*. Imagine this: the manuals must cover a Model II which is upgraded (but not quite all of the way); Model II diskettes being read by the Model 16; Model 16 running in Model II (TRSDOS-II) mode; and finally, Model 16 actually running as a Model 16! I’m amazed it only took two hours of reading.

The first thing I wanted to know more about was that 128K. Was it really 128K, and of what size words? The answer is 128K of eight-bit bytes. That equates to 64K of sixteen-bit words.

My burning curiosity about dual-sided diskettes led me next to the disk drives. Could you really get drive zero, one, two and three with just two physical diskettes? No, you can’t. But, you can get 154 tracks on just one diskette, since it writes both sides. I formatted a data diskette in drive one and checked for free space.

It said 1.26 megabytes! Our Model II (with four drives) only has two megabytes total.

On the Model 16, the drives don’t run all of the time like they do on the Model II. That’s nice. There is something in my puritan upbringing that rebels at diskettes turning for hours when they are not being accessed.

Another thing they have done to the diskettes is to change them to 32-sector tracks. Also, there are no more granuals. (Yaaay!) Each sector can contain 256 bytes. They have done away with the free space map. (Boo.) Instead, it just tells you how many extensions there are and where they start. I miss the security of seeing the layout of the diskette.

You may ask what happens to compatibility now that there are 32 sectors per track. That is taken care of very nicely with a utility called FCOPY. With it, you can insert a Model II diskette in drive one and FCOPY it (or any part of it, including system files) to a dual-sided, TRSDOS-II diskette in drive zero. You can also reverse the process. It works.

The Model 16 also runs as a Model II — just insert your TRSDOS system diskette in drive zero and boot up. There really is not much difference between normal Model II TRSDOS and TRSDOS-II. There are a few new library commands in TRSDOS-II — FCOPY is one of them. DRIVE lets you set the access time of the drives and other things like wait on error and door detect on/off. FILES will show you an alphabetical list of the files on your diskette. It’s like DIR, except that you don’t have to look at all of

the other information that normally accompanies DIR. ANALYZE is no longer there (who used it anyway?).

You’re probably wondering why I haven’t mentioned the M68000. So far, it hasn’t gotten into the act. The only thing available for it (at this point) is an editor, an assembler, and a linker — no BASIC or operating system. I say “at this point,” because you know somebody just *has* to do it.

Terry Dettmann (associate editor) came down one night to see the new machine and we fired up the editor. There is a sample program in the manual which we typed in. After making the usual number of mistakes with a new editor, we finally got it right and assembled it without errors. It wouldn’t run, because even though there is one program, it must be linked. So we linked it and were finally able to execute the program. It printed the letter “A” on the screen and went back to TRSDOS-16 Ready! We’re going to have to get hot with 68000 assembly codes until a BASIC comes out for it.

Oh, did I mention that you can hang up to eight drives on this dude? It really floored me when it came up and said “Drive (0-7) . . .” You could run 10 megabytes with the Model 16 without even having a hard disk.

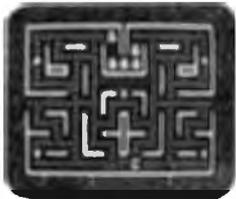
Playing at being an oracle, I see us going to a hard drive, more memory (you can get up to 512K), a couple of terminals and timesharing! We will be running a full-scale evaluation on the Model 16 by Harry Avant in a future issue. I just thought it would be nice to let you know of my first impressions. ■

**CALL TOLL FREE  
800 424-2738**

**Annual Summer Madness  
Sale 20% OFF  
Sale Ends Aug. 10**

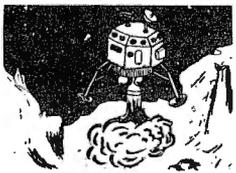


**SCARFMAN**



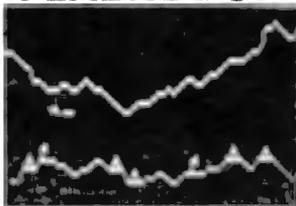
From Cornsoft Grop  
Race your Scarfman around a maze, gobbling up scoring dots. You are pursued by five monsters: If you eat a "+" they'll lower their eyes and you can eat them, otherwise they'll eat you! SCARFMAN may be played using the keyboard, Alpha Joystick or Trisstick.  
**WARNING: MAY BE HABIT-FORMING!**  
32K Disk ..... \$20.95 16K Tape ..... \$16.95  
**NOW THRU AUG. 10 YOU PAY JUST ... 16.76 32 K Disk  
13.56 16K Tape**

**LUNAR LANDER**



By Wall & Moncrief from Adventure Int. You get a vast lunar landscape, graphically depicted in both long range and close up, with many choices for landing sites. Choose a more difficult site and get more points—if you can land successfully. Great graphics and sound add to the realtime challenge and fun. Joystick compatible  
32K disk ..... \$20.95 16K tape ..... \$14.95  
**NOW THRU AUG. 10 YOU PAY JUST ... \$16.76 32K disk  
\$11.96 16K tape**  
*Save 20%!*

**PENETRATOR**



By Philip Mitchell from Beam  
Armed with missiles and bombs, you must fly your fighter to the enemy's cache of neutron bombs and destroy them. Your mission is in four stages, involving rugged terrain, caverns and manmade obstacles—not to mention enemy radar, missiles and paratroopers. This new departure in arcade gaming allows you to set up your own terrain and enemy emplacements, then save them for future use. Make your mission as hard or easy as you like. Joystick compatible.  
16K Tape or 32K disk ..... \$24.95  
**NOW THRU AUG. 10 YOU PAY JUST ..... \$19.96**  
*Save 20%!*

**COSMIC FIGHTER**

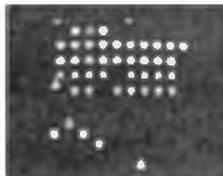
By Hogue & Konyu from Big-Five  
Terrific sound, graphics and unique challenges mark this space game a winner! While fighting off the alien convoys—each more skillful than the last—you must keep track of your rocket fuel or risk explosion. Finally your space station appears. Can you dock immediately, or is the station overrun by aliens? Find out by ordering Cosmic Fighter today. Joystick Compatible.  
16K tape ..... \$16.95 32K disk ..... \$19.95  
**NOW THRU AUG. 10 YOU PAY JUST ... \$12.76 16K tape  
\$15.96 32K disk**  
*Save 20%!*

**SPACE CASTLE**



From Cornsoft  
Ahead of you lies the menacing castle, floating in space amidst its layers of orbiting shields. At intervals, smart mines spin off the shields and head for your ship. Dodging the mines and destroying the shields isn't your only problem, though: once you penetrate the innermost shield, The evil Yugdab will unleash all his fury in an attack! A fast-paced and challenging arcade game, indeed. Joystick compatible.  
16K tape ..... \$15.95 32K disk ..... \$18.95  
**NOW THRU AUG. 10 YOU PAY JUST ... \$12.76 16K tape  
\$15.96 16K disk**  
*Save 20%!*

**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! Joystick compatible.  
16K tape ..... \$15.95 32K disk ..... \$18.95  
**NOW THRU AUG. 10 YOU PAY JUST ... \$12.76 16K tape  
\$15.96 32 K disk**  
*Save 20%!*

**NEW ROBOT ATTACK VOICE Sound Effects**



By Hogue & Konyu from Big-Five  
One of the top names in TRS-80 arcade games adds a new dimension: voice sound effects! It's you against the robots in this fast-moving shoot-em-up. Electrified Mazes and the "Flagship" complicate things as you stalk the evil androids. The innovations built into ROBOT ATTACK take your TRS-80 near the limits of its capabilities. You MUST see and hear it! Joystick Compatible.  
16K tape ..... \$15.95 32K disk ..... \$19.95  
**NOW THRU AUG. 10 YOU PAY JUST ... \$12.76 16K tape  
\$15.96 32K disk**  
*Save 20%!*

**SUPER NOVA**

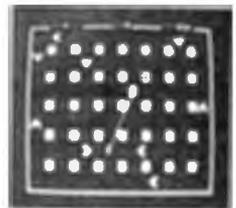
By Hogue & Konyu from Big Five  
Asteroids surround your ship. You must shoot the asteroids, as well as any of the five types of alien spaceships. Use your thrusters for full movement and rotation of your ship—if you are overwhelmed, you can even jump to hyperspace! Written in fast machine code with superb graphics, this game is GREAT! Joystick Compatible.  
16K tape ..... \$16.95 32K disk ..... \$19.95  
**NOW THRU AUG. 10 YOU PAY JUST ... \$12.76 16K tape  
\$15.96 32K disk**  
*Save 20%!*



**-80 SPACE RAIDERS**

From Bosen Electronics  
You are in command of the Starship "Defiant." The center of the screen is your window to the vastness of three dimensional space. Your orders are simple enough: Patrol the area and destroy all enemy spacecraft; return to base as needed for repairs and supplies. Carrying out these orders is more difficult! An exciting and fast-paced game, it presents an animated pilot's-eye view.  
16K tape ..... \$24.95  
**NOW THRU AUG. 10 YOU PAY JUST ..... \$19.96**  
*Save 20%!*

**ATTACK FORCE!**



By Hogue & Konyu from Big Five  
Unlike the usual "shoot-em-ups," Attack Force lets you control both speed and direction as you maneuver all over the screen in search of the alien Ramships and Flagships. Enemy ships chase you everywhere, and the Flagships' lasers can fire in any direction! The Ramships can even impersonate your spacecraft, so don't look away even for an instant. Machine language action with sound. Joystick Compatible.  
16K tape ..... \$16.95 32K disk ..... \$19.95  
**NOW THRU AUG. 10 YOU PAY JUST ... \$12.76 16K tape  
\$15.96 32K disk**  
*Save 20%!*



By Sparky Starks from Adventure Int.  
As mercenary and galactic police officer, you must maintain the condition and control of all parts of your spacecraft. You sit at the controls while peering out of the digital spaceview port. Suddenly something appears on your screen: Is it a Starpirate or a friendly merchant ship? You can't tell yet, and at this speed you may have only a fraction of a second to make an attack/no attack decision.  
16K tape ..... \$24.95  
32 disk ..... \$29.95  
**NOW THRU AUG. 10 YOU PAY JUST ... \$19.96 16K tape  
\$23.96 32K disk**  
*Save 20%!*

**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. 8208 Box 9609  
Washington, D.C. 20016

MAIL ORDERS: Send check or M.O. for total purchase price, plus \$1.00 postage & handling. D.C., MD. & VA.: add sales tax. Charge cards: include all embossed information on the card.



By Jeff Zinn from Big Five

This new arcade game from Big Five continues their tradition of bringing you the most exciting action in innovative space games. Your fighting spacecraft must run the gauntlet of the attacking alien's weaponry in order to accomplish your defense mission. You'll use all your skill and dexterity just to survive! Joystick Compatible.

16K tape ..... \$15.95 32K disk ..... \$19.95  
**NOW THRU AUG. 10 YOU PAY JUST ... \$12.76 16K tape  
\$15.96 32K disk**

## ARMORED PATROL

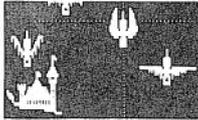


By Westmoreland & Gilman from Adventure

As commander of a lumbering T-36 tank you have the firepower to destroy the enemy—if you can find them. They may be hiding behind the houses scattered about, the bleak terrain and your only view is thru the drivers port (your screen). Impressive animation in this arcade game.

16K tape ..... \$19.95 32K disk ..... \$24.95  
**NOW THRU AUG. 10 YOU PAY JUST ... \$15.96 16K tape  
\$19.96 32K disk**

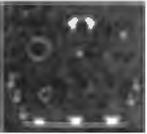
## VOYAGE OF THE VALKYRIE



By Leo Christopherson from AOS

Combine the animation and music techniques pioneered by Christopherson with the challenge of his first fast-moving arcade game and you have VOYAGE OF THE VALKYRIE! You speed through a magical maze guarded by ferocious birds that swoop down to attack if you don't get them first. To list all the play and options of this exciting game would take the 16 pages of instruction included.

16K tape ..... \$34.95 32K disk ..... \$39.95  
**NOW THRU AUG. 10 YOU PAY JUST ... \$27.96 16K tape  
\$31.96 32K disk**



## 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 realtime action game now or live with the astronauts' pitiful screams forever. Joystick Compatible.

16K tape ..... \$15.95 32K disk ..... \$19.95  
**NOW THRU AUG. 10 YOU PAY JUST ... \$12.76 16K tape  
\$15.96 32K disk**

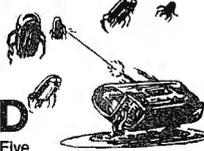


## CATERPILLAR

©1982 Soft Sector Marketing Inc.

16K tape ..... \$16.95 32K Disk ..... \$19.95  
**NOW THRU AUG. 10 YOU PAY JUST ... \$12.76 16K tape  
\$15.96 32K disk**

## DEFENSE COMMAND



By Hogue & Konyu from Big Five

You are the lone defender of 10 Krotnium fuel cells essential for the survival of the planet. Aliens swoop down from above to steal the fuel; it's your job to destroy them. You can still save the cells after a raid, but you must shoot the alien and simultaneously move under the cell to catch it. If things look bad you can set off one of your 4 antimatter bombs and destroy all enemies on the screen! Arcade fun with action and sound. Joystick Compatible.

16K tape ..... \$15.95 32K disk ..... \$19.95  
**NOW THRU AUG. 10 YOU PAY JUST ... \$12.76 16K tape  
\$15.96 32K disk**

## MISSILE ATTACK



By Phillip 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  
**NOW THRU AUG. 10 YOU PAY JUST ... \$11.96 16K tape  
\$16.76 32K disk**



## ELIMINATOR

By Westmoreland & Gilman from A.I.

You'll need all your keyboard manipulative skills to keep up with the action in this arcade game. You travel across the planet's low-altitude airspace in an effort to prevent the marauding enemy from capturing your energizer cells. All manner of alien craft await your arrival with destructive forces. For 1 or 2 players, with sound.

32K disk ..... \$24.95 16K tape ..... \$19.95  
**NOW THRU AUG. 10 YOU PAY JUST ... \$19.96 32K disk  
\$15.96 16K tape**



## Crush, Crumble and Chomp!

From Epyx

It's a monster movie, and you are the monster! You can be The Glob, Kraken, Mantra, Mechismo, Arachnis, or Goshilla—or even design your own "custom" monster (disk version only). This hilarious action game is loaded with graphics and sound as you practice your villainy.

16K tape or 32K disk ..... \$29.95  
**NOW THRU AUG. 10 YOU PAY JUST ..... \$23.96**



## FORTRESS

By Larry Ashmun from Soft Sector

You are in charge of a massive fortress. Your number one priority is its defense against alien attackers. With your protection and firepower, fending off the first attackers is like swatting flies—but just wait!! Joystick Compatible.

16K tape ..... \$16.95 32K disk ..... \$19.95  
**NOW THRU AUG. 10 YOU PAY JUST ... \$12.76 tape  
\$15.96 disk**

## INVADERS FROM SPACE



By Carl Miller from Acorn

A fast machine language approach to this classic (and addictive) space game. The aliens drop bombs and move from side to side trying to overrun your bases. You choose the speed, enemy bomb frequency and accuracy, your number of shots on screen and bases. Unlike most such games, you can move your base and simultaneously fire at the invaders. Full sound effects add even more excitement to the incredible action of INVADERS FROM SPACE. Fun for all ages and skill levels.

16K tape ..... \$14.95 32K disk ..... \$20.95  
**NOW THRU AUG. 10 YOU PAY JUST ..... \$11.96 tape  
\$16.76 disk**

## ALIEN ARMADA

By Waldron Hodsdon from Liberty

Hmmm. Looks like another "Space Invaders" type game. Nice neat racks of aliens poised over your defensive base...but WATCH OUT! Here they come, swooping down with their bombs and Kamakazi-like dives. There are individual attackers plus group flights—all intent on destroying your three bases before you destroy them. ALIEN ARMADA allows up to two players and has three levels of difficulty from beginner to expert.

16K tape ..... \$14.95 32K disk ..... \$17.95  
**NOW THRU AUG. 10 YOU PAY JUST ... \$11.16 16K tape  
\$14.36 32K disk**

THE PROGRAM STORE • Dept. 8208 Box 9606 • 4200 Wisconsin Avenue, NW • Washington, D.C. 20016

Item	Tape/Disk	Price	Postage	\$1.00	name	_____
_____	_____	_____	Total	_____	address	_____
_____	_____	_____	<input type="checkbox"/> CHECK	<input type="checkbox"/> VISA	city	_____ state _____ zip _____
_____	_____	_____	<input type="checkbox"/> MASTERCARD	Card #	_____	Exp _____

# Testmaker

## Multiple choice test and answer sheet

Model I/III with or without ESF

Larry Krengel, Elmhurst, IL

Here is a program that I, as a teacher, use regularly to help me produce multiple choice tests. It is not a fancy program, but a useful one. I have set it up to drive my MX-80 printer.

The program analysis should provide you with insight into the structure of the program. I have tried to highlight those portions of the program which a fellow part time do-it-yourself programmer might be able to capitalize on.

You may note that provisions are made for using the @FREEZE program and a Stringy Floppy.

### Program Analysis

100 clear 12000 — makes for 12000 bytes of string data.

110 dimensions arrays: 50 questions (Q\$(50)) — 250 answers (A\$(250)) — and 50 correct choices (C\$(50)).

120-210 prints introductory information then waits (INPUT W\$) — the reason for the \$ making W a string is to allow for any erroneous input without receiving a "redo."

500-550 prints the menu.

560-610 an inkey\$ loop. This looks for a single character input to move the program to the next step... no enter is necessary. 560 begins with A\$="" so the loop always starts with A\$ being a null.

1000-1140 enter questions and answers.

1050 causes the program to return to the menu if no question is entered for a given number.

1090 prints the prompt (letters A thru E) for the five answers. CHR\$(64+Y) prints the letters in response to the Y=1to50 loop. The CHR\$ code for the letters A-E are 65-69. The fancy A\$((X-1)\*5+Y) positions the answer in the A\$ array which is 250 large. (e.g., the answers to question #2 are at 6 through 10 in the A\$ array.)

1100 interrupts the loop before the fifth answer is given when no answer is entered. Sends the program to 1120 where the correct answer is entered.

1130 checks to see that the correct answer that is entered is really in the A to E range. If it is not, it re-asks the question.

2000-2800 allows the author to delete, correct or examine the questions.

2020-2090 an inkey\$ loop that gives the program direction.

2100-2170 is used for deleting an unwanted question.

42 80-U.S. Journal

The question is printed out before the question is deleted to confirm the identity of the question. Once again an inkey\$ loop is used in 2140-2170.

2300-2440 is used to correct questions.

2500-2800 list the questions one at a time for examination.

3000-3400 prints the test.

3020 the author must now name his test.

3030 informs the author that he may stop the printing by entering a "S". The inkey\$ command is placed throughout the printing instructions to accomplish this. This allows the author to stop a bad printing. There is nothing as frustrating as watching a bad printout all the way to the end!

3050 P= page number LN= line number (to know when to page) Q= question number (allows for deleted questions in the Q\$ array). TAB((40-(LEN(TN\$)))/2) prints the test name (TN\$) centered on the page (using 40 char./line).

3080 skips any questions in the Q\$ array that are blank. 3090 prints any question less than 50 characters in length. It will fit on one line. LN=LN+2 acknowledges the fact that it required one line to print and skipped a line in preparation for the next line.

3100 prints the first 40 characters of lines that have more than 50 characters.

3110 begins printing with the 41st character and prints until it finds a space (" "). When the space is found, 3120 prints the remainder of the question on the following line.

3130 begins printing the answers.

3140 stops printing answers when an answer is blank ("").

4000 begins the routine that allows those authors with an Exatron Stringy Floppy to @FREEZE (store in total) the program and questions.

Figure 1  
Sample Test and Answers

NAME:  
DATE:

### Astronomy Quiz

CHOOSE THE BEST ANSWER.

1. If you were to look in an astronomy book from the year 1900 how many planets would be mentioned?

- A. 6
  - B. 7
  - C. 8
  - D. 10
- 2 . Which planet is larger than the earth?
- A. Mercury
  - B. Neptune
  - C. Pluto
  - D. Mars
- 3 . What is the earth's period of rotation?
- A. 1 day
  - B. 365.25 days
  - C. neither of the above
- 4 . The moon has an atmosphere similar to that of the earth's.
- A. True
  - B. False
- 5 . STS is an abbreviation for
- A. Standard Terrestrial Systems
  - B. Space Temperature Systems
  - C. Space Transport System
  - D. Solar Travel System
- 6 . The temperature on Mercury is
- A. very hot
  - B. very cold
  - C. both hot and cold
  - D. not known
- 7 . The canals on Mars were first noted by
- A. Jules Verne
  - B. Percival Lowell
  - C. Albert Einstein
  - D. Galilei Galileo
- 8 . We live in the Milky Way Galaxy.
- A. True
  - B. False
- 9 . Some solar systems have more than one sun.
- A. True
  - B. False

**Astronomy Quiz - ANSWERS**

- 1 C
- 2 B
- 3 A
- 4 B
- 5 C
- 6 C
- 7 B
- 8 A
- 9 A

*Holmes Engineering*

**expanding microcomputing horizons for TRS-80® Model I/III and PMC®-80/81**

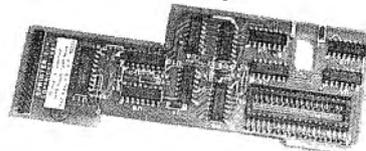
**MORE THAN AN EXPANSION INTERFACE!**



EXPAND your computer with the **HOLMES** expansion mainframe and one or more plug-in modules.

- Mainframe includes case, power supply, connectors (2 mainframe styles available).
- Single/Double density disc module
  - State-of-the-art LSI data separator
  - 5" & 8" drives, single and double density (optional)
  - Compatible with standard hardware & software
- 80 Column Video Module
  - 80 character x 16 lines for TRS-80® monitor
  - 80 character x 25 lines for standard monitor
  - 80 x 25 mode supports Model II video functions
  - Software/patches for many popular programs
- RS-232 / Modem Module
  - Software compatible with RS systems
  - Supports standard operating modes
- Other modules are being developed.
  - A single-module case is available to support only ONE module.
  - Due to the number of options available, please call or write for prices.

**SPEED UP YOUR COMPUTER and add a printer**

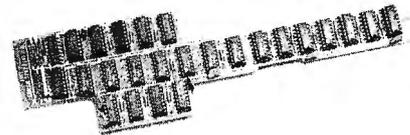


The **SPRINTER II™** plugs into the Z-80 socket in your computer case with no soldering.

- Select from 2/3 to 3 times normal speed via the "OUT 254" software command (or add a switch for hardware control)
- Automatic slowdown for disc & I/O operations
- Wait function allows use with slow ROM's.
- Includes **FAST Z-80B MP**.
- For \$24.50 we'll install a standard parallel printer port on your Sprinter II™

SPRINTER II™ ..... \$99.50  
 printer option ..... \$24.50  
 printer cable ..... \$19.50

**48 K Memory INSIDE your Keyboard**



IM-2™

The **INTERNAL MEMORY™** plugs inside your computer to give you 48k of reliable memory.

- simple installation
- easily removed
- guaranteed 4 MHz operation
- extremely reliable
- compatible
- thousands in use throughout the world!

IM-1 (32k) ..... \$86.00 (66.00 less RAM)  
 IM-2 (48k) ..... \$139.50 (99.50 less RAM)

See reviews of the **INTERNAL MEMORY™** in 80 Microcomputing® (Dec. '81) and 80 US Journal (March '82)



All products are completely assembled and tested and come with a one-year warranty and a 30-day "no questions asked" return privilege. Please add \$3.00 shipping in U.S. & Canada; all others add 15% shipping & handling

Dealer Inquiries Invited

3555 South 3200 West Salt Lake City, Utah 84119 (801) 967-2324

prices subject to change without notice.

Send S.A.S.E. for more information

Program Listing for  
Test Maker

```

1 ' TESTMAKER BY LARRY KRENGAL
2 REM ### produces a multiple choice test with up to 50 questions ###
3 REM ### each question may have as many as 5 answers ###
4 REM ### a list of correct answers is printed at the end ###
5 REM
6 REM ### 11/81 ###
7 REM
8 REM
100 CLEAR1000
110 DIM QS(51),AS(250),CS(50)
120 CLS
130 PRINTTAB(15)"TESTMAKER":PRINT:PRINT
140 PRINT"THIS PROGRAM WILL PRODUCE A MULTIPLE CHOICE TEST WITH UP TO 50 QUESTIONS. EACH QUESTION MAY HAVE AS MANY AS 5 ANSWERS.":PRINT
150 PRINT"TO END TEST ENTER NO QUESTION FOR A NUMBER. IF LESS THAN FIVE ANSWERS ARE DESIRED FOR A GIVEN QUESTION, JUST ENTER"
160 PRINT"FOR QUESTION LETTER (ANSWERS ARE LETTERED)."
```

```

190 PRINT:PRINT"A LIST OF CORRECT ANSWERS WILL BE PRINTED AT THE END.":PRINT
200 PRINT"ENTER TO CONTINUE"
210 INPUTWS
500 REM ### MENU ###
510 CLS:PRINTTAB(15)"TESTMAKER":PRINT:PRINT
520 PRINT"1- ENTER QUESTION
530 PRINT"2- EXAMINE/CORRECT QUESTION"
540 PRINT"3- PRINT TEST
550 PRINT"4- @FREEZE"
560 AS="" :AS=INKEY$
570 IFA$="1"GOTO1000
580 IFA$="2"GOTO2000
590 IFA$="3"GOTO3000
600 IFA$="4"GOTO4000
610 GOTO560
1000 REM ### ENTER QUESTIONS ###
1010 FORX=1TO50:IFQS(X)<>"":NEXT
1020 CLS:IFX=51GOTO500
1030 PRINT"ENTER QUESTION NUMBER ";X:PRINT:PRINTX;" ";
1040 INPUTQS(X)
1050 IFQS(X)=""GOTO510
1060 PRINT:PRINT"INPUT ANSWERS -":PRINT
1080 FORY=1TO5
1090 PRINTTAB(8)CHR$(64+Y);". ";:INPUTAS$(X-1)*5+Y)
1100 IFA$(X-1)*5+Y=""GOTO1120
1110 NEXTY
1120 PRINT:INPUT"ENTER CORRECT ANSWER -";CS(X):IFCS(X)=""GOTO1120
1130 IF(ASC(CS(X))<65)OR(ASC(CS(X))>69)GOTO1120
1140 GOTO1010
2000 REM ### CORRECT QUESTION ###
2010 CLS
2020 PRINT"1- DELETE QUESTION
2030 PRINT"2- CORRECT A QUESTION
2040 PRINT"3- LIST ALL QUESTIONS AND ANSWERS
2045 PRINT"4- BACK TO MENU"
2050 AS="" :AS=INKEY$
2060 IFA$="1"GOTO2100
2070 IFA$="2"GOTO2300
2080 IFA$="3"GOTO2500
2085 IFA$="4"GOTO510
2090 GOTO2050
2100 CLS
2110 INPUT"ENTER NUMBER OF QUESTION YOU WISH TO DELETE";N
2120 PRINT:PRINTQS(N)
2130 PRINT:PRINT"DO YOU WISH TO DELETE THIS QUESTION? Y/N"
2140 AS="" :AS=INKEY$
2150 IFA$="Y"QS(N)="" :FORX=(N-1)*5+1TO(N-1)*5+5:AS(X)="" :NEXT:GOTO510
2160 IFA$="N"GOTO510
```

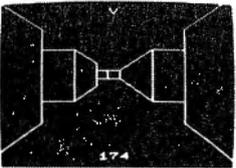
**VIC-20®**  
COMMODORE



**VICTORY**  
SOFTWARE INC.®

**TRS-80**  
COLOR  
TANDY CORP.

**WE SELL FUN!™**



**MAZE** **\$12.95**  
Trapped inside your computer's memory, you must find your way through the seemingly endless corridors to the outside world. The excellent 3-D graphics will stir up any claustrophobia you may have. Machine code subroutines allow you to move as quickly as you can push buttons.  
Plus, there are over 6x10<sup>23</sup> different mazes that the program can generate. There is little chance that you (or your heirs) will see the same maze twice!

Send for free catalog.  
Programs require std. VIC-20 or 16K TRS-80 color computer. All programs on cassette tape.  
Ordering—please add \$1.50 postage & handling per order. PA residents please add 6% sales tax.

**ADVENTURES**

Adventures are interactive fantasy games in which you solve a mystery by exploring an unknown environment with the assistance of your computer. You tell the computer what to do with plain English commands like "OPEN THE DOOR", and the computer tells you what it sees! Average solving time 6 hours.

**Big Bad Wolf** **\$5.95**  
NOT for kids only! A full packed adventure based on the Three Little Pigs fairy tale. Don't let the wolf gobble you up!

**Computer Adventure** **\$5.95**  
Re-live the "excitement" of getting your computer. An adventure with a very different flavor.

**Moon Base Alpha** **\$5.95**  
You must find a way to destroy the meteor that is racing towards your base, or else all moon colonies will be demolished!

**\*\*\* SPECIAL DEAL \*\*\***  
Adventure Pack—All 3 for \$14.95!

**VICTORY SOFTWARE INC.**  
2027-A S. J. Russell Circle  
Elkins Park, PA 19117  
# 23 (215) 576-5625



*There's a wealth of good information  
in these*

# BACK ISSUES of 80-U.S. Journal!

## May/June 1979

String packing techniques exposed.  
Program to determine analytical or intuitive functions of the brain.  
How to win NIM-type games.  
Produce sound with your TRS-80.

## July/August 1979

How to create fast graphics.  
Lifeboat — a game program.  
How to renew lost programs.  
A no-hardware lowercase mod.

## November/December 1979

Function grapher/root finder program.  
Home heat loss program.  
Hydraulic piston calculation program.  
Restoring killed disk files.  
How to do fast sorts.

## May/June 1980

Telecommunications with the TRS-80.  
Programming technique with BASIC game programs.  
Produce sound with BASIC programs.

## November/December 1980

Simple payroll program.  
Digital plotter interface.  
A different maze program.  
How to produce keyboard typeahead.

## May/June 1981

Line packing techniques.  
How to use "PRINT USING."  
Animation and the TRS-80.  
Space Marauder — a game program.

## July/August 1981

Descending lower case for Model I.  
Sundance — game for Model I, III and CC.  
A student timetable program.  
Easy tape loading for Model I.

## September/October 1981

Keyword search — database program.  
Computer a retail installment contract.  
The vertical mill: a 3-D plotter?  
Gameshow simulation.

## November/December 1981

A comparison shopper program.  
Program using only 4 BASIC statements.  
Scrabble on the TRS-80.  
Real time clock construction.  
Pocket Computer biorhythms program.  
Supergraph math functions program.

## February 1982

Auto tape save program.  
Tic Tac Toe — game program.  
Make posters with your TRS-80.  
Hard disk evaluation.  
Double precision function routines.  
Voice actuated control for TRS-80.

**Please send the following back issues postpaid:**

- |   |   |   |
|---|---|---|
| <input type="checkbox"/> May/June 1979          | <input type="checkbox"/> May/June 1980          | <input type="checkbox"/> July/August 1981       |
| <input type="checkbox"/> July/August 1979       | <input type="checkbox"/> November/December 1980 | <input type="checkbox"/> September/October 1981 |
| <input type="checkbox"/> November/December 1979 | <input type="checkbox"/> May/June 1981          | <input type="checkbox"/> November/December 1981 |
|   |   | <input type="checkbox"/> February 1982          |

Name \_\_\_\_\_

Address \_\_\_\_\_

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

Visa/MasterCard # \_\_\_\_\_ Exp. Date \_\_\_\_\_

Please remit \$4.00 for each back issue ordered.  
80-U.S. Back Issues  
3838 South Warner St., Tacoma, WA 98409, (206) 475-2219

# Testmaker

```

2170 GOTO2140
2300 CLS
2310 INPUT"ENTER NUMBER OF QUESTION YOU
      WISH TO CORRECT - ";N
2320 PRINT:PRINTQ$(N):PRINT
2330 PRINT"ENTER CORRECT QUESTION - (NO
      ENTRY = NO CORRECTION)"
2340 INPUTCR$
2360 IFCR$ <> ""Q$(N)=CR$:CR$=""
2370 N1=(N-1)*5+1
2380 CLS:PRINT"ENTER CORRECTED ANSWERS
      - (NO ENTRY = NO CORRECTION)"
2390 L=65:FORX=N1TON1+4
2400 PRINTTAB(8)CHR$(L);". ";A$(X):PRIN
      TTAB(8)CHR$(L);". ";:INPUTCR$
2420 IFCR$ <> ""A$(X)=CR$:CR$=""
2430 L=L+1:NEXT
2440 PRINT:INPUT"Enter correct answer -
      ";C$(N)
2450 GOTO510
2500 REM ### LIST QUESTIONS ###
2510 Q=1
2520 FORX=1TO50:CLS
2530 IFQ$(X)=""GOTO2700
2540 PRINT"QUESTION #";Q;TAB(30)"ARAY
      #";X:PRINT
2550 PRINTQ$(X):PRINT
2560 FORY=1TO5:IFA$( (X-1)*5+Y)=""GOTO26
      90

```

```

2570 PRINTCHR$(64+Y);". ";A$( (X-1)*5+Y)
      :PRINT
2690 NEXTY:Q=Q+1:INPUTW$
2700 NEXTX
2800 GOTO510
3000 REM ### PRINTING TEST ###
3010 CLS
3020 INPUT"ENTER NAME OF TEST";NT$
3030 PRINT:PRINT"ENTER WHEN PRINTER IS
      READY..."
3040 INPUT"'S' WILL STOP PRINTING AND R
      ETURN TO MENU.";W$:LPRINTCHR$(27)CHR$
      (69);
3050 P=1:LN=8:Q=1:LPRINTTAB(50)"NAME:";
      LPRINTTAB(50)"DATE:";LPRINTCHR$(10)CH
      R$(14)TAB((40-(LEN(NT$)))/2)NT$:LPRIN
      TCHR$(10)"CHOOSE THE BEST ANSWER."CHR
      $(10)
3055 N=1
3060 A$=""A$=INKEY$:IFN>50GOTO3340
3080 IFQ$(N)=""GOTO3300
3090 IFLN(Q$(N))<60LPRINTQ;". ";Q$(N)
      :LN=LN+2:GOTO3130
3100 LPRINTQ;". ";LEFT$(Q$(N),50);
3110 FORX=51TOLEN(Q$(N)):A$=INKEY$:IFMI
      D$(Q$(N),X,1)=""GOTO3120
3115 LPRINTMID$(Q$(N),X,1);:NEXT
3120 LPRINTCHR$(10)TAB(6)RIGHT$(Q$(N),L
      EN(Q$(N))-X):A$=INKEY$:LN=LN+3
3130 FORX=1TO5:A$=INKEY$
3140 IFA$( (N-1)*5+X)=""LPRINTCHR$(10):
      GOTO3190
3150 LPRINTCHR$(10)TAB(6)CHR$(64+X)". ";
      TAB(10)A$( (N-1)*5+X)
3160 IFLN>50LN=2:P=P+1:LPRINTCHR$(12)"P
      AGE ";P
3170 IFA$="S"GOTO510
3180 LN=LN+2:NEXTX:LPRINTCHR$(10)
3190 Q=Q+1
3300 IFLN>50LN=2:P=P+1:LPRINTCHR$(12)"P
      AGE ";P
3310 IFA$="S"GOTO510
3320 N=N+1:GOTO3060
3340 LPRINTCHR$(12)CHR$(14)NT$;" - ANS
      WERS"CHR$(10)
3350 N=1:FORX=1TO50:IFQ$(X) <> ""LPRINTN;
      " ";C$(X):N=N+1
3360 NEXTX
3400 GOTO510
4000 REM ### @FREEZE ###
4010 CLS:INPUT"IS @FREEZE LOADED? Y/N";
      A$:IFA$ <> "Y"GOTO510
4020 INPUT"WHAT FILE NUMBER DO YOU WISH
      ?";F
4030 INPUT"ENTER WHEN WAFER IS READY..."
      ";W$
4040 @FREEZEF
4050 GOTO510

```

<b>MICRO IMAGES</b>	
<b>FREE SHIPPING WITHIN CONT. U.S.A.</b>	
<b>EPSON</b>	CALL <b>OKIDATA</b>
FOR OUR LOW PRICES	
RS232 Not. Req.	<b>LYNX</b> Mod I/III <b>\$259.95</b>
includes auto dial/answer, cables and terminal software	
<b>SUPER UTILITY PLUS</b> by Kim Watt Specify 40 or 80 Track	<b>\$69.95</b>
<b>SUPERSCRIPT</b> BY Acorn - Req. 32K, Scripsit & L/C - Disk	<b>\$44.95</b>
<b>EDITOR ASSEMBLER PLUS</b> BY Microsoft - 16K Tape	<b>\$27.95</b>
<b>DOSPLUS</b> Newest Version - 3.4S/3.4D/3.4 III ea	<b>\$134.95</b>
<b>MAXI MANAGER</b> by Adventure Int'l Mod I/III Latest Version 48K Disk	<b>\$84.95</b>
<b>UNITERM</b> by Pete Roberts - Mod I/III Works with most modems	<b>\$74.95</b>
<b>MICROSOFT - FORTRAN 80</b> -\$89.95 - A.L.D.S-\$89.95 - BASIC COMPILER-\$179.95	
<b>EDAS</b> by MisoSys Sophisticated Editor & Assembler	<b>\$75.95</b>
<b>LDOS</b> Version 5.1 - Mod I or III	<b>\$118.95</b>
<b>LAZYWRITER</b> LATEST VERSION A Best Buy in Word Processors - Mod I or III	<b>\$164.95</b>
<b>Proofreader</b> by Aspen Software	Mod I - 49.95 Mod III - 49.95
<b>Proofedit</b> by Aspen Software	Mod I 28.50 Mod III - 28.50
<b>Grammatik</b> by Aspen Software	Mod I - 55.95 Mod III - 55.95
<b>MX 80 Ribbon Reloads - \$3.50 ea/\$38.00dz.</b> Min. 5 ribbons	
We also carry the full line of ADVENTURE INT'L, ACORN, BIG FIVE, BRODERBUND, AVALON HILL, MICROSOFT, DATASOFT, MISOSYS, AUTOMATED SIMULATIONS and most other fine software at discount prices.	
SEND FOR YOUR FREE CATALOG	
No credit cards at these low prices. Add \$2.00 on all COD 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? # 24	
<b>146-03 25th Road, Flushing, New York 11354</b>	
Mon-Fri 10 AM-9 PM	(212) 445-7124
	Sat 10 AM-5 PM

---

# Meet the Supermonitors

*Make A. L. programming easy*

## Model I/III

Paul F. Secord, Houston, TX

If you started doing assembly language programming on the TRS-80 a couple of years ago, and if you are like many users, you may still be using T-BUG and RSM-2 to debug your programs. Radio Shack's T-BUG was the first monitor available, and it provided a valuable register display, but it would not disassemble a machine language program. Small System Software soon filled that gap by supplying its RSM series of monitors, which offered many other useful features, in addition to disassembly. You may well have been quite satisfied with what you have been using. If so, you are in for a surprise.

The new monitors on the market are highly sophisticated and extremely powerful. You can greatly shorten the time it takes to get your program debugged and running. Moreover, some of them make learning assembly language easier than ever before. This article will outline their features and indicate their advantages and limitations, as well as the various purposes for which they might be used.

First, let's get clear on some terms. A *disassembler* is a program that will take a machine language program consisting of hex bytes, and translate it into the mnemonics of assembly language, which are much easier to understand. Instead of CD0050, you get CALL 5000H, which is like a GOSUB command in

BASIC.

A *debugger* examines a program that you have written, with the aim of helping you to find out why it doesn't work. Typically, it contains many routines to serve this end, such as search, convert hex to ASCII, examine registers, change memory or registers, trace, etc. the TRON function (trace on) of BASIC is an example of a debugging routine.

Finally, *monitor* is a more general term that often combines disassembly and debugging routines, and which sometimes includes additional utilities (e.g., tape loading and tape reading routines). These various distinctions are important. Which monitor is best for you depends partly upon what you want to use it for.

Disassemblers play a part in debugging, but they also have a somewhat different use. Undocumented machine language programs are notoriously difficult to understand. If you failed to document a program that you wrote yourself, after a month or two of not using it, you are apt to have considerable difficulty understanding how it works! Given this, imagine how difficult it is to make sense out of an undocumented program written by someone else! Yet, we often are motivated to do this because we want to make some changes. Perhaps you want to modify SCRIPSIT so that you can

send commands to the printer that will change type fonts. Whatever the reason, disassembly of machine language into Z-80 mnemonic instructions is the first step.

The general purpose monitors reviewed here are: MICROMIND, STEP-80, TASMOM, ULTRA-MON, SUPERSTEP and BUGOUT-PRO. Two earlier versions of BUGOUT are also available at lower prices. They have many of the features of BUGOUT/PRO, but are not relocatable, they lack search and a few other features. All references, from this point on, to BUGOUT should be taken to mean BUGOUT/PRO. These six are the best general purpose monitors that I have been able to find for tape/disk users who have either TRS-80 Model I or III. Table 1 provides some general information concerning their cost and vendor sources.

The specialized TLDIS disassembler (Instant Software) and MISOSYS Disassembler 1.2 (Acorn Software) are not covered here because they are designed only for disassembling, not for debugging. Several general purpose monitors are not reviewed because of serious deficiencies.

Radio Shack's new DEBUG for Model I/III tape users is far more powerful than T-BUG. But alas, it is located at 4200H to 49FFH, and will interfere with many programs because it is not relocatable. Worse yet, to use DEBUG, Model I users

have to keep the Expansion Interface turned off!

Howe Software's Monitor 3 does not have "single step," and the otherwise excellent X-BUG does not have a disassembler. Microsoft's excellent Z-BUG can be purchased only with their Editor-Assembler Plus. Although at \$29.95, the whole package is a steal, Z-BUG is not relocatable.

The six monitors reviewed have none of these limitations. MICROMIND is designed only for the Model I, but the other five monitors are suitable for either the Model I or III. All can be used with disk or tape.

## Common Features of General Purpose Monitors

Let's look at the features that are common to most general purpose monitors. Following that, I will discuss the special features of each of the monitors, including some unique innovations.

### Register Displays

All of the monitors display the contents of the registers (AF, BC, DE, HL, IX and IY), as well as the alternate, or prime set (AF', etc.). They also include the program counter with the address of the instruction currently pointed to, the stack showing the address at the top, and the state of each of the flags. Additional information is provided. For example, registers often contain an address which in memory holds a byte of information or another address. MICROMIND shows this byte for each register. STEP80 displays such contents for HL and for each address given in Z-80 instructions. TASMON shows such contents only for the address in HL, but ULTRA-MON, SUPER-STEP, and BUGOUT provide full screen displays with a great deal of extra information, along with additional display windows, or blocks, that can be called up as needed. Displays for SUPERSTEP and BUGOUT are discussed in the last section.

### Breakpointing

Breakpointing is similar to inserting a STOP command in a BASIC program, in order to determine whether (at that point)

what is supposed to happen actually has taken place. For example, if an instruction should have been printed on the screen, but it's not there, you know that something is wrong with that part of the program. All of the monitors reviewed here include breakpointing. It's also especially valuable for executing part of a program at normal speed in order to quickly reach a suspected bug.

### Single Stepping

The most powerful routine for finding bugs is single stepping, and the absence of this feature in T-BUG and the RSM monitors is their most serious limitation. Single stepping is typically used when you have an especially ornery bug that refuses to be trapped. It also is a great tutoring aid for learning assembly language. This routine executes one program statement at a time, and pauses until commanded to execute the next statement in order. During that pause, you can examine what has happened by looking at register and block displays, and you can change any element in RAM, or in the registers. In that way you can find out exactly what is going on at each point in the program.

An especially valuable feature of all of these monitors is that, while single stepping, they "remember" their place. You can stop single stepping to examine or change registers or memory, and then automatically return to where you left single stepping.

You might think that single stepping through an entire program would be very instructive, and that it would easily identify all bugs. You would be right, except that it would take an enormous amount of time. Most programs involve many repetitions of instructions, so that tens of thousands of instructions are apt to be executed. A simple delay loop for holding a display on the screen for 60 seconds might, itself, execute thousands of instructions. Looking at an entire program, one instruction at a time, is much too tedious.

One way around this problem is to insert breakpoints just before suspected bugs. This allows execution at full speed to the breakpoint; then single stepping

can be used to explore only problem areas. Other powerful routines have been devised to make single stepping more efficient, such as variable speed stepping and executing calls to subroutines at full speed. Stepping automatically from instruction to instruction at a convenient speed set by you is another helpful feature. All of the monitors reviewed permit automatic stepping at various speeds.

### Execution of Calls, Jumps and RSTs

A feature associated with single stepping pertains to calls, and other branch points like conditional jumps. When stepping automatically at slow motion speeds, it is sometimes desirable to pause at branch points or calls. MICROMIND and STEP80 do this. By holding down a key, MICROMIND and STEP80 have the option of rapidly stepping through (at about 100 instructions per second) all non-branching instructions, always stopping for calls, jumps and RSTs. The other monitors do not have this manual option (except by setting breakpoints), but all have variable speed automatic execution while single stepping.

In a sense, stopping at branch points is like having automatic breakpoints which do not have to be set or removed. For example, you may wish to see whether the registers have the proper contents before entering a particular subroutine. If you know that the subroutine is right, you would want to execute it at full speed, then return to single stepping. The subroutine call might be to ROM, and it might contain a delay loop. To single step through such a subroutine would be extremely tedious and non-informative. The ability to execute the subroutine immediately is a powerful aid.

All of the other monitors have the option of either stepping through one instruction at a time, or executing calls in full (including calls within the calling routine). Full execution is invaluable for going rapidly through a long, unfamiliar program, in order to determine its general structure. With it, you can very quickly

# This Hand Is A Winner!



- **MASTER** Assembly/Machine language fast. Save months over other methods! Ideal for beginners. Two books plus disk/tape.
- **EXPERTS** The most powerful monitor/debugger ever written for Mod I/Mod III computers.
- **FREE** Detailed information package with coupon, or **See Your Dealer** for demonstration.
- **DEALER** Inquiries invited. Thousands of obsolete monitors can be easily replaced with this product.
- **GERMAN** Language edition available from:

Hanspeter Schmid  
Lenastr 2  
6906 Leimen / W. Germany



**THE SOFTWARE PLANTATION, INC.**  
P.O. BOX 44623 • TACOMA, WA 98444  
(206) 531-1506

**THE SOFTWARE PLANTATION, INC. — DEPT. 8A**  
P. O. BOX 44623 • TACOMA, WA 98444

Please **RUSH** information about **BUGOUT/PRO** to:

Name \_\_\_\_\_

Address \_\_\_\_\_

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

identify the major routines, momentarily ignoring the lesser ones. Without it, stopping at every call in a complicated program can quickly lead you to lose your bearings.

### Control and Interpretive Traces

Anyone who has used a monitor has discovered what Allen Gelder calls dangerous bends; taking these, causes the monitor and program to crash. Of course, program errors can cause control to jump to some part of ROM or RAM which takes it out of the monitor and the program. But there are many other ways of losing control. For example, a monitor necessarily must control its video display, and thus must place a jump to itself in the video driver. But if the program being examined also places in the video driver a jump to itself, then ZAP!!! The monitor display disappears! At least it does in most cases.

The monitors reviewed here have developed a technique for avoiding this kind of crash. Instead of actually executing the program, instruction by instruction, these monitors simulate execution, and display what the registers would be as if each instruction were executed. In this way, the monitor retains control under almost all circumstances. Moreover, this technique makes it possible to single step and to set breakpoints in ROM as well as RAM. This feature is lacking in MICROMIND.

With an ordinary monitor, the attempt to trace a program through single stepping is blocked with a hangup whenever that program calls for keyboard input. This occurs because accessing the keyboard requires a fast scanning loop which continues until a key is pressed. Single stepping executes only one instruction at a time, too slowly for sensing a key press. Our monitors have eliminated this problem, too, by automatically reverting to a normal scanning loop whenever a program calls for keyboard input.

### Graphics Displays

One of the most valuable features possessed by some of these monitors is the ability to display the program

graphics in slow motion, along with the Z-80 instructions that produce the features of the display. MICRO-MIND, STEP80, and SUPERSTEP do this by reducing the disassembled instruction to one or two lines of minimal information at the bottom of the screen, leaving the rest of the screen available for program displays, including graphics. As you step along, each new portion of the graphic display corresponds to the instructions at the bottom. In this way, you can see how some of the exciting graphics (in such games as *Supernova*) are created. Or, you can watch *Sargon II* constructing, bit-by-bit, the board and pieces on the screen. Of course, this feature also helps to find the bug in your own program where the display goes awry.

Another method of dealing with graphics, used by TASMOM and BUGOUT, allows you to view the entire screen by switching back and forth between the whole-screen register display and the whole-screen graphics display. BUGOUT does this automatically if commanded, while TASMOM requires keyboard commands for each alternation. ULTRA-MON has no provision for single stepping graphics displays.

### Line Printing

MICROMIND lacks an option for line printing and so does the present version of SUPERSTEP. The new STRETCH SUPERSTEP (for disk users only) will remedy this shortcoming. STEP80 provides several lineprint options while disassembling or single stepping. BUGOUT is the most flexible here. An "enable printer" command allows line printing of virtually any of the operations: single stepping, interpretive tracing, contents of memory, etc. TASMOM and ULTRA-MON allow a screen print at any time, as well as several other printing options.

### Utilities

The monitors differ considerably in providing utilities. There is always a compromise between using up additional memory and providing conveniences. MICRO-MIND has a search command,

ASCII displays and dumps, hexadecimal conversions, and provisions for recording a program on tape in systems format. STEP80 and ULTRA-MON are similarly equipped except that they lack conversions and a search command. ULTRA-MON also has a utility for relocating object code programs. TASMOM has these utilities as well as a unique one for converting opcode programs to source program format. SUPERSTEP has fewer utilities, but is unique in having a utility for punching fast-loading tapes. BUGOUT has almost every utility that a programmer might want (e.g., see search commands in the next section).

### The Ultimate Monitors

SUPERSTEP and BUGOUT deserve separate discussion, for they represent the current state of the art and have powerful features not generally found. In fact, the latter two monitors are just entering their latest phase at the time of writing. Allen Gelder tells me that a new version called STRETCH SUPERSTEP (for disk users only) is about to become available, and I am reviewing BUGOUT from a preliminary manual to be replaced by a final version soon.

These two supermonitors are superbly designed to let the computer do some of the intelligent work of debugging a program. This is reflected in their full-screen displays and in additional windows or blocks that can be called up. Their displays include intelligent RAM windows that (as each instruction is stepped), automatically display the content of an address in HL, in the index registers IX and IY, or in the instruction itself. You need to see the screen displays to fully appreciate them.

These block displays provide many options. They can be set not only to any address in ROM or RAM, but also to the stack pointer or any of the registers. As new instructions are stepped, their contents will change automatically (if the instruction is relevant to the block contents). If nearby information is not covered by the block, it can be scrolled to lower or higher addresses! Many other

display options are available. The blocks can be removed, and so can the registers, to display a simple disassembly.

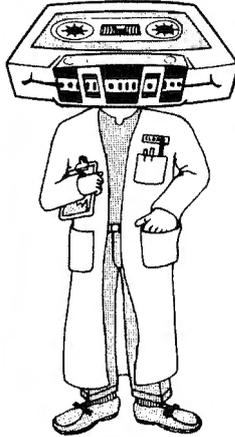
SUPERSTEP has a very different (but equally impressive) format and capability. Its initial display consists of two full sets of registers. One set displays states preceding the current instruction, and the other, states following execution. Also included is a floating block like that of BUGOUT, automatically displaying the contents of a register or address in the current instruction, including adjacent addresses. Moreover, the "before" execution display block can be replaced by five blocks ranging in size from one to eight bytes. Each can be set to reveal various address contents automatically, as the instructions are stepped through. As mentioned earlier, SUPERSTEP's display can be reduced to a single line in the bottom left corner of the screen, allowing the user's program to control the screen as instructions are stepped through. An option, unique to SUPERSTEP, displays the execution time of the current instructions with a cumulative record of time elapsed from the starting point in an earlier instruction. Like BUGOUT, the various displays can be scrolled backward or forward.

Intelligent displays, such as these, lessen the need for search commands. SUPERSTEP has only one. BUGOUT has 10 search commands including byte, word, ASCII and various opcode searches. For example, you can search for CD0050 if you want to find all instances of the instruction, CALL 5000H, and you can search for any ASCII string up to 22 characters long. You can also insert XX in any search command wherever you don't want to specify one or more bytes: Searching for CDXXXX would provide a list of all unconditional CALL instructions.

These supermonitors allow the use of breakpoints at specific ROM or RAM addresses, as described earlier. BUGOUT has some unique breakpointing features. Breakpoints can be set to stop at a given byte, word, register content, or register pair content. Suppose that

## Sick of the same TRS-80 software?

### Here's a CHEAP CURE!



The prescription for the Model I and III:  
**CLOAD Magazine!**

A CASSETTE TAPE with 6 to 8 programs a month!

Some past sensational medications:

Game — Caterpillar, Suns; CIA Adventure, Reversi  
Practical — Securities, Energy, Tape Directory, Checkbook.  
Utility — Variable Dump, Display, Edit, Code It.  
Tutorial — Planets, Spell Egg, Atomic Table, Geometry.

At about **75 cents** a program, a subscription to **CLOAD Magazine** is just what the doctor ordered.

#### The Bottom Line:

1 year (12 issues)	\$50.00
6 months (6 issues)	\$30.00
Single copies	
Back issues	\$ 6.00
Good Games #1	\$12.00
Adventures #1	\$13.00

#### The Fine Print

All issues from Oct '78 on available — ask for list (24 Level I issues also). Programs are for 16K Level II, 16K Model III, and occasionally for disks. **TRS-80** is a trademark of Tandy Corp.

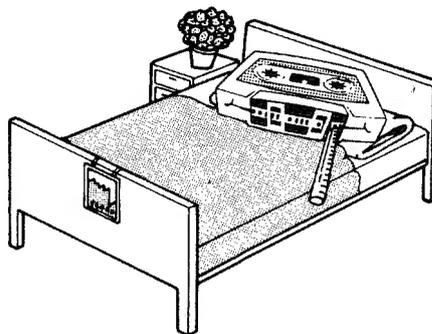
MasterCard/Visa welcome!

California residents add 6% to single copies  
North America — First-Class Postage Included  
Overseas — add \$10 to subscriptions, and \$1 to single copies Sent AO rate

**CLOAD Magazine Inc.**  
P.O. Box 1448, Santa Barbara,  
CA 93102 (805) 962-6271

# 26

## For the Extended BASIC COLOR COMPUTER POCKETBOOK SURGERY NOT REQUIRED



Is your CoCo table-ridden, drinking up electrical juice but not getting any software solids? A prescription of **CHROMASETTE Magazine** will stop the hardening of the ribbon cables.

The doctor explained that **CHROMASETTE Magazine** is a cassette tape with 6 to 8 quality programs on it. A healthy mixture of games, tutorials, utilities, and practical programs to nurture your computer every month. No finger exercises necessary. Just load and run.

Keep CoCo's health costs low. A subscription to **CHROMASETTE Magazine** is good, cheap medication (under 75 cents a program).

#### The Bottom Line:

1 year (12 issues)	\$45.00
6 months (6 issues)	\$25.00
Single copies	\$ 5.00

Calif. residents add 6% to single copies.  
North America — First Class Postage Included.  
Overseas — add \$10 to subscriptions, and \$1 to single copies. Sent AO rate.

MasterCard/Visa welcome!

#### The Fine Print:

All issues from July 81 on available — ask for list. Programs are for the Extended BASIC model only.

MasterCard/Visa welcome!

**Chromasette Magazine**  
P.O. Box 1087 Santa Barbara,  
CA 93102 (805) 963-1066

# 27

you wanted to stop interpretive tracing when a particular graphics byte (say BFH) appeared at address 3D00H on the screen. You could do this by using a breakpoint command that recognizes when 3D00H contains BFH! Or, if you wanted to stop at all unconditional calls and jumps, you could do this by putting the hex byte CD in one breakpoint, and C3, in the other.

SUPERSTEP has a very convenient feature for changing registers or other content displayed on the screen. A command activates a cursor controlled by the directional arrows on the keyboard. To make a change, you move the cursor to the display contents that you want to change, and type in the new byte. In BUGOUT, you simply call up the register (or register pairs) that you wish to change. Another special feature of BUGOUT (also TASMOM) allows users to add their own custom commands to it, and a variety of key addresses in BUGOUT are documented to aid in this extension.

Finally, BUGOUT (like TASMOM and ULTRA-MON) provides a relocater that will do most of the work of relocating any machine language program. Using this routine, it took me only five minutes to move Sargon II to high memory and have it running. The main pitfall is that data or jump tables can be misinterpreted by the relocater, and have to be handled instead as block moves. Sargon II was easy only because I was very familiar with its structure. Both BUGOUT and TASMOM provide helpful comments for finding and moving those parts of your program that are not Z-80 instructions.

### Which is the Monitor for You?

If you are just getting into assembly language programming, if you program mostly in BASIC, if your budget is very limited, or if you have only 16K, then STEP80, ULTRA-MON or TASMOM are your best choices. The otherwise excellent MICROMIND lacks a command that sends material to the printer. A printer command could be patched in. 16K users might value the printer command's brevity; it

occupies only 3.8K bytes. All three monitors are inexpensive. STEP80 occupies only 4.1K bytes, and has most features one would need. ULTRA-MON, with only 4.5K bytes, has full screen capabilities almost as good as BUGOUT and SUPERSTEP. It is somewhat lacking in utilities, though, as might be expected from its compact size. TASMOM occupies 8K bytes, and while it has a more limited display than ULTRA-MON, it has excellent utilities, like writing and reading system tapes, and writing and loading disk files. TASMOM is also the only general purpose monitor that generates a disassembly which substitutes labels for addresses, and which provides a symbol table. You need to use your ingenuity to distinguish data sections from program (and clean these up), but ultimately, you can put the resulting source program into an Editor/Assembler for changing and reassembling.

If you do very much assembly language programming, if you want to achieve mastery of assembly language, or if you want the very best, then you should definitely purchase either SUPERSTEP or BUGOUT. You would be delighted with either, but your best choice depends upon your own needs.

BUGOUT comes with an exceptionally well-organized, clearly written 135-page manual (currently being revised and further improved) that is designed to teach novices how to use the Z-80 instruction set, as well as to thoroughly acquaint the user with BUGOUT routines. In addition, it has a separate manual for experts. BUGOUT has virtually every conceivable operation that might be desired by the novice or pro; it contains well over 100 commands.

SUPERSTEP is pitched more exclusively toward the expert. Novices (and even some experienced amateurs) would probably have difficulty with its limited documentation. It is the only monitor that provides a command for calculating execution times for Z-80 instructions, that has convenient commands for opening up space in your program for inserting new machine language bytes, and which provides a utility for punching fast-loading tapes. (Like other fast loaders, this works only if you haven't added the XRX cassette load modification.)

Whatever your choice among these six monitors, you will save countless hours in debugging and revising your programs, or in patching unfamiliar programs! ■

Table 1  
VENDOR SOURCES AND SYSTEM REQUIREMENTS

MICROMIND — Mumford Micro Systems, P.O. Box 400D, Summerland, CA 93067.		
Model I	3.8K bytes	\$16.95
STEP80 — Mumford Micro Systems, P.O. Box 400D, Summerland, CA 93067.		
Models I, III	4.1K bytes	\$16.95
TASMOM — The Alternate Source, 1806 Ada St., Lansing, MI 49810.		
Models I, III	8K bytes	\$29.95
ULTRA-MON — Interpro, P.O. Box 4211, Manchester, NH 03108.		
Models I, III	4.5K bytes	\$24.95
*SUPERSTEP — Allen Gelder Co., P.O. Box 11721, San Francisco, CA 94101.		
Models I, III	12.4K bytes	\$19.95 + T-BUG
BUGOUT/PRO — The Software Plantation, P.O. Box 44623, Tacoma, WA 98444.		
Models I, III	12.5K bytes	\$69.95
*Requires T-BUG		**Including T-BUG



# How to Buy or Sell Computer Equipment and Software

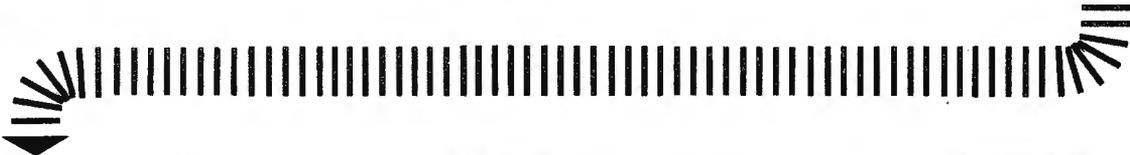
**START HERE WITH...**



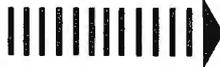
Begin your search in the index of Computer Shopper's bargain filled pages. Locate the category and page number of items that interest you from TRS-80 and Apple to software and peripherals.



Start or add to your computer system by finding money saving bargains in each month's issue from individuals who no longer need their personal equipment.



You've got your computer hardware, but what about the software? Use a Computer Shopper ad to find what you need. Someone advertising in Computer Shopper probably has what you want.



If you need help with any computer related problem whether it's an interface problem or advice on the right peripheral for a homebrew system, use the free HELP column especially designed for that purpose.



As you outgrow your system or want to trade up (most dealers won't take trade-ins), use Computer Shopper ads to sell your items to 20,000 readers nationwide for the low cost of 12 cents per word.

Computer Shopper is THE nationwide magazine for buying, selling and trading Micro and Mini-computer equipment and software. Each issue has over 60 pages full of bargains of new and used equipment.

You can save hundreds of dollars by getting the equipment you need from the hundreds of classified ads individuals place in Computer Shopper every month.

Now is the time for you to join over 20,000 other computer users who save time and money with a subscription to Computer Shopper.

Subscribe today and get your first issue and a classified ad absolutely FREE. Type or print your ad on a plain piece of paper and send it along with your subscription.

Just fill in the coupon or MasterCard or VISA holders can phone **TOLL FREE 1-800-327-9920** and start making your computer dollar go further today.

**Cut out and mail to: COMPUTER SHOPPER**  
P.O. Box F115 • Titusville, FL 32780

Yes, I'll try Computer Shopper, I understand that if I'm not satisfied with my first issue I can receive a full refund and keep the first issue free.

1 year \$10.00 (\$30.00 in Canada)

I have enclosed my free classified ad.

I want to use my free ad later, send me a coupon.

NAME: \_\_\_\_\_

ADDRESS: \_\_\_\_\_

CITY: \_\_\_\_\_

STATE: \_\_\_\_\_ ZIP: \_\_\_\_\_

# DT-1

## *An evaluation of Radio Shack's new multi-user terminal*

Harry Avant, La Crescenta, CA

What do you do if you are in the market for a video terminal and you need an 80 x 24 display with capabilities for half intensity, reverse video, variable cursor, baud rates up to 19,200 bps, ability to attach either a serial or parallel printer? What happens if you can't make up your mind between four of the top-selling terminals currently available? The answer is easy. Buy a Radio Shack DT-1 video terminal.

Tandy's new terminal incorporates several features, some of which are lacking in competitive terminals on the market. In addition to the 80 x 24 display, baud rates may be set via the keyboard from 75 to 19,200, and video attributes include normal, reverse, invisible, blink, underline and half intensity. A unique character generator displays special symbols for control codes in addition to easy-to-read standard alphanumeric characters.

This is Radio Shack's first entry, along with the new Model 16, to the world of multi-user data processing. As an integral part of the new Model 16 multi-user system, it is totally compatible with the 16's hardware and software, but that is only a beginning. In the past, Tandy has been content to limit its hardware compatibility to only those products

produced in-house. The DT-1, however, is not limited in this sense. Data Terminal 1 is a complete stand-alone terminal that is capable of providing communication with many other systems, from the S-100 types used in homes and small business to the largest mainframe computers used by industry and business, as well as Models I, II, III and 16.

The keyboard has the Model III's feel, but the differences are very noticeable. Keys are grouped into two sections. The main section has 58 keys and a 12-key multifunction keypad. Those who have used a Model I or III for communication with a large computer, and have lamented over missing escape and control keys, will find the DT-1 keyboard a real joy. Not only does it have escape and control keys, but several other special keys that are required for convenient communication with another system, such as a true backspace, delete, line feed, caps lock, reverse slash, square and curly brackets. In fact, all ASCII control codes and escape sequences can be generated on the keyboard. The alphanumeric keys are arranged in standard "typewriter format" which will be a minor nuisance to someone used to a Model I or III, but a real help to those who

are used to a conventional typewriter keyboard layout.

The most interesting feature of the DT-1 is its emulation ability. It is possible to configure the terminal to emulate four popular terminals now on the market: a Televideo 910, Lear Seigler ADM-5, ADDS 25 or Hazeline 1410. The emulation mode, as well as I/O parameters, are entered via keystroke entry and stored in an EEPROM (electrically erasable programmable read-only memory). The following parameters may be programmed into the EEPROM:

### Function Abbreviation During Setup

Terminating character ..	TC1, TC0
Emulation mode .....	EM1, EM2
Reverse video .....	REV
Data terminal ready .....	DTR
Data set ready .....	DSR
Data carrier detect .....	DCD
Stop bit select .....	STB
Odd or even parity .....	O/E
Parity select .....	PAR
Word length .....	WDL
Baud rate ...	BR0, BR1, BR2, BR3
Automatic line feed .....	ALF
Auto wrap around .....	AWP
Full or half duplex .....	F/H
Cursor select .....	CT1, CT0

To set I/O parameters, or to



codes used in terminal emulation modes. All information necessary to effect special video characteristics (reverse, half intensity), as well as cursor positioning control codes, is given. This completeness will make programmers happy. Detailed instructions on how to interface the DT-1 to Models I, II, III and 16 are included in with this manual. A few typos have slipped into the manual, but these are very obvious, and should not present any problems. By the time this goes to press, Tandy should have errata sheets out for the typos.

Peeking into the vents of the DT-1 indicates the same video board as is used in the Model III. I wish Tandy had used a green phosphor with this terminal. It certainly would have made it a better match for the Model 16. The power supply is located on the bottom behind the panel that hides the disk cutouts. The video board is attached to the top cover on

the left.

The balance of the electronics are on a single board, approximately 4 x 10 inches, that lies horizontally at the back. This board also carries two RS-232 connectors and the Centronics compatible printer port. This board is fitted with quick disconnect type of cable connectors that should allow for very rapid servicing in the field. I would estimate that the main board could be replaced in less than thirty minutes. This is an important feature, as it can really minimize down time, which is quite costly if the terminal is used in a business application.

While it's reliability is unknown, one can expect very good performance from the video, as it is the same as the Model III. Modular design of the major subsystems indicates a very short down time if problems do develop. There are some things that I wish Tandy had

done differently. One is the lack of a green screen, which would have been a good match for the Model 16. Next, is the placement of the escape key. The escape key is located next to the right shift key. I would have preferred to see this where the tab key is located (next to q). Perhaps I'm just used to having left-hand access to escape and control keys. My final observation is of the parallel printer port. It does have the required eight addresses, strobe and busy, but lacks the ability to check for other printer parameters such as out of paper or end of ribbon.

I would like to acknowledge the help and cooperation of the Radio Shack Computer Center in Glendale, California. They are always willing to provide me with a quiet corner for a couple of hours to pour over new documentation, and are a real help (as in the case of the DT-1) for allowing me an extended session with it. ■

# Introducing low cost, TRS-80 compatible disk drives

Up to one megabyte for Models I and III

## Low Cost Storage

### Model III Internal Drives

- single sided, 40 tracks with 250K ..... \$215
- double sided, 40 tracks with 500K ..... \$335
- double sided, 80 tracks with 1000K ..... \$435

### Model I and III External Drives

(Includes disk drive, power supply, cable and color coordinated cabinet)

- single sided, 40 tracks with 250K ..... \$315
- double sided, 40 tracks with 500K ..... \$435
- double sided, 80 tracks with 1000K ..... \$535



## External and internal mounting

Now you can have up to one megabyte of unformatted storage for your TRS-80 Model I or III. Drives can be mounted internally or externally on the Model III and externally on the Model I.

## Eight color cabinets to choose from

Cabinets for external mounted drives are available in black, chrome, off-white, lime green, dark green, bright orange, computer blue, and brilliant yellow.

## Unconditional warranty and service

90-day unconditional warranty plus service center for out-of-warranty service.

For more information on the TRS-80 compatible disk drives, call or write:

**I**<sup>2</sup>

INTERFACE, INC.  
7630 Alabama Ave., Unit 3  
Canoga Park, CA 91304  
(213) 341-7914

Dealer and quantity discounts available upon request. MasterCard, VISA or COD orders accepted. TRS-80 is a registered trademark of Tandy Corporation.

# PLEASE ANSWER THESE 5 QUESTIONS

- |   | YES                      | NO                       |
|---|--------------------------|--------------------------|
| 1. Do you have information that must be kept organized and accessible? .....  | <input type="checkbox"/> | <input type="checkbox"/> |
| 2. Do you ever need to perform statistical analyses? .....  | <input type="checkbox"/> | <input type="checkbox"/> |
| 3. Would you like to have a tool that will allow you greater flexibility in managing your own or your company's money? .....  | <input type="checkbox"/> | <input type="checkbox"/> |
| 4. Could you use a mail list program that will be easy to use, maintain an unlimited number of names, allow you great sorting flexibility, and even interact with a word processor? ..... | <input type="checkbox"/> | <input type="checkbox"/> |
| 5. Do you own or have access to a TRS-80 microcomputer? .....   | <input type="checkbox"/> | <input type="checkbox"/> |

If you answered "yes" to any of these questions, we can be of assistance to you. Our Maxi Series of applications programs are designed to give you maximum versatility with a minimum of hassle. These programs were created for business use, but you'll find yourself using them for personal applications as well.

**Thorough support** — Of course, each program comes with in-depth, user-oriented documentation, and is menu-driven to make it easy to use. When necessary, the Maxi programs are compatible with each other, and, whenever pertinent, are interactive with the major word processing and spreadsheet programs published by other manufacturers. Also, we maintain a telephone support line to provide you with any assistance you might require.

**Maxi Manager** by Dale Kubler

Maxi Manager is a remarkable data base manager. Its fast machine language sort complements its large data storage capacity. The sophistication of its data entry, management, and printing capabilities makes Maxi Manager a versatile tool for many applications.

The program now includes Maxi Utility, which allows you to rescue files on diskettes that have been damaged by excessive wear or misuse and lets you expand, add, or delete fields from an existing data base. Let the unmatched capabilities of Maxi Manager handle your data management!

**Model I & Model III. Minimum 1 disk drive required 012-0196 \$149.99**

**Maxi Cras** by Dale Kubler

(Check Register Accounting System)

Maxi Cras is a system that will computerize check writing, recording and analysis for business and personal finance. The system features 223 income and expense accounts, each of which will handle an unlimited number of transactions. Extensive register and report printing capabilities make Maxi CRAS an indispensable tool for managing money effectively.

**Model I & Model III. Minimum 2 drives required 012-0145 \$99.95**

**Maxi Mail** by Dale Kubler

Maxi Mail is a powerful mail list management system that:

1. Is easy to use.
2. Has virtually unlimited storage capacity.
3. Interfaces with the major word processors to generate form letters and other text.
4. Prints mailing labels up to four-across in any format desired.
5. Has virtually unlimited coding capabilities with thirteen fields of information for each record.

Maxi Mail is the most sophisticated user-oriented mail list program available.

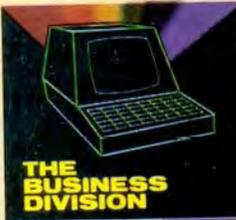
**TRS-80 Model III only. 2 disk drives required 012-0148 \$99.95**

**Maxi Stat** by David Walonick

Maxi Stat is the most useful statistical analysis package on the market today. It was developed to allow maximum flexibility in designing customized analysis. Maxi Stat handles the three main components of statistical analysis:

1. Complete menu-driven codebook creation and editing.
2. Menu-assisted data entry.
3. User-created control files to describe the statistical analyses to be performed and printed out on the variables of your choice.

**Model I & Model III. Minimum 2 drives required 012-0153 \$199.95**



A Division of Scott Adams, Inc.

Send \$1.00 for our 16 page booklet "Getting The Most From Your Micro" All 16 pages are packed with indepth explanations and printout samples from the Maxi Series of applications programs.

**THE BUSINESS DIVISION**  
 BOX 3435  
 LONGWOOD, FL 32750  
 (305) 830-8194

# Shop Radio Shack for a Complete Selecti



Get the most from your TRS-80 (or other computer) with these quality computer items. You can rely on Radio Shack to have what you need to make your work go easier. Why wait for mail order? It's in stock now at Radio Shack!

**[A] Anti-Glare Mask.** Solves reflection problems. No loss of resolution. For TRS-80 Models I, II and III. Not for color monitors. #26-511, \$16.95

**[B] Anti-Static Spray.** Prevents static electricity build-up that can attract dust and damage equipment. Apply to work surfaces, video display and carpet. #26-515, \$5.95

**[C] Disk Drive Head Cleaning Kit.** Helps prevent read/write errors. Easy and safe—just apply solution to a cleaning diskette (two included) and run in drive for 30 seconds.

**For 5 1/4" Drives.** #26-407, \$29.95

**For 8" Drives.** #26-4909, \$29.95

**[D] Genuine TRS-80 Diskettes.** Best you can buy. Certified error-free. Extra-long life, double density, soft sector.

**5 1/4" Single Diskette.** #26-305, \$4.95

**5 1/4" Three-Pack.** #26-405, \$13.95

**5 1/4" Ten-Pack.** #26-406, \$39.95

**8" Single Diskette.** #26-4905, \$7.50

**8" Ten-Pack.** #26-4906, \$59.95

**[E] New! Diskette Mailers.** Protects disk for safe transportation. Dust-free inner envelope.

**For 5 1/4" Diskettes.** #26-1317, \$5.95

**For 8" Diskettes.** #26-4954, \$7.95

**[F] Diskette File Boxes.** Ideal protection for your 5 1/4" or 8" floppies. Holds 50 disks. Index dividers simplify filing. Durable acrylic.

**For 5 1/4" Diskettes.** #26-1453, \$29.95

**For 8" Diskettes.** #26-4953, \$39.95

**[G] Logic Flowchart Template.** This durable, clear plastic "stencil" with ANSI flowchart symbols and 1/10" layout grid makes it easy to draw pro-quality charts. #26-1312, \$3.95

**[H] Printviewer.** Magnifies and highlights a single line of your printout. Reduces errors. Clear plastic with yellow "line window". Includes 10 and 12 cpi scales. #26-1313, \$2.95

**[I] Power Line Filter.** Limits AC power line interference to your Model I or Color Computer system. Effective dual-isolated design. Single switch controls all eight outlets. U.L. listed. #26-1451, \$49.95

**[J] Universal Data Binder.** Three-ring binder for cassette pages, diskette envelopes, and 8 1/2 x 11" documents. #26-1310, \$5.95

# on of Computer Accessories and Supplies



**[K] Diskette Holders.** Ideal for protection and storage. Holds two 5 1/4" disks or one 8" disk. Punched to fit Universal Data Binder. Clear vinyl.

**For 5 1/4" Diskettes.** #26-510, Pkg. of 10/\$7.95

**For 8" Diskettes.** #26-4907, Pkg. of 10/\$7.95

**[L] Computer Cassette Holder.** Holds six cassettes. Fits Universal Data Binder. #26-1311, Pkg. of 2/\$4.95

**[M] TRS-80 Computer Cassettes.** Ideal for cassette-based systems. Use these high-quality tapes for program and data storage.

**C-20 Certified Leaderless Cassette.** #26-301, \$3.79

**C-10 Low-Cost Cassette.** Standard leader. #26-302, \$1.79

**[N] Diskette Library Cases.** Hold 10 diskettes. Protect against dust, prevent curling. Easel inserts "pop up" for easy selection. Polystyrene.

**For 5 1/4" Diskettes.** #26-1452, \$3.95

**For 8" Diskettes.** #26-4952, \$4.95

**[O] Stacking Data Trays.** For standard 14 7/8"-wide printouts. Eliminates damage to paper caused by using an undersized tray. #26-1309, each \$8.49

**TRS-80 is the Best-Supported Microcomputer in the World.** Besides our accessories, Radio Shack offers a wider variety of software, peripherals, literature and services than any other microcomputer manufacturer.

**Insist on Genuine TRS-80 Products.** They're your best value, and they're all backed by Radio Shack. Stock up at over 6300 Radio Shack stores and participating dealers, and over 275 Radio Shack Computer Centers nationwide.

**Radio Shack®**  
**The biggest name in little computers™**  
 A DIVISION OF TANDY CORPORATION

I want to see the complete line of TRS-80 supplies.  
 Send me your free TRS-80 Computer Catalog

Mail To: Radio Shack, Dept. 83-A-39  
 1300 One Tandy Center, Fort Worth, Texas 76102

NAME \_\_\_\_\_  
 ADDRESS \_\_\_\_\_  
 CITY \_\_\_\_\_ STATE \_\_\_\_\_ ZIP \_\_\_\_\_

Retail prices may vary at individual stores and dealers. Some items may require special order.

# Freedom Technology International

## ANNOUNCES

# BigScreen

## 80 X 24 Video Display for your TRS-80

From the company that brought you  
CP/M Compatibility Plus 64K RAM

### Freedom Option

CP/M Compatibility for your TRS-80 Model I and III, PMC 80 and 81, and LNW 80 systems.

### Freedom Plus

CP/M Compatibility Plus 64K RAM for your TRS-80 Model I and III.

#### **TWO SYSTEMS IN ONE**

Run CP/M application programs in addition to TRSDOS

#### **INDUSTRY STANDARD**

Enter the world of powerful CP/M application programs; WordStar, dBase II, etc.

#### **OPEN AND SHUT CASE**

EASY to install, plug-in boards; no wires or traces to cut; no soldering.

#### **TECHNICAL BACKGROUND**

Over 50 years of high technology experience...from Maxi's to Micro's...both Hardware and Software.

#### **FREEDOM OF CHOICE**

T8/OS (our powerful Z-80 code operating system) and CP/M 2.2 if you choose.

- Dealer Inquiries Invited
- Six Month Warranty
- 30 Day Money Back Guarantee

MANUAL . . . . . \$25.00

Call us for information about our large selection of CP/M application programs.

SEE YOUR LOCAL  
DEALER OR CALL  
TOLL FREE

**1-800-523-4067**

In Pennsylvania call  
**(215) 569-2381**

TRS-80 is a registered trademark of Tandy Corp.

LNW-80 is a registered trademark of LNW Research Corporation

PMC 80,81 is a registered trademark of Personal Microcomputer Inc.

TRSDOS is a registered trademark of Tandy Corp.

CP/M is a registered trademark of Digital Research Inc.

WordStar is a registered trademark of Micro-Pro Int. Corp.

dBase II is a registered trademark of Ashton-Tate

## Freedom Technology International

119 North 18th Street, Philadelphia, PA 19103



---

# The DUMP command

## *Find machine language addresses with STAR (system tape address reader)*

Model I, 32K with disk

Joe W. Roche, Ridgecrest, CA

Advantages of the DUMP function included on most disk operating systems (DOS) are probably the least understood of all DOS functions. Properly used, it is one of the simplest, yet most powerful functions available to the user. DUMP can be used to:

Save a system load program from tape to disk.

Link a series of machine code modules into a single program.

Salvage a file lost due to a system 'crash.'

### **The DUMP Function**

The DUMP function is usually included as a DOS library feature. Its purpose is to enable the user to "dump" specified portions of memory contents to disk. The typical usage format is as follows:

```
DUMP Filespec:d, (START=X  
'aaaa', END=X 'eeee', TRA=X 'tttt')
```

Where "Filespec" is the name assigned to the file to be dumped; "d" is drive number; "aaaa" is memory address for start of the dump; "eeee" is address at which dump is to end; and "tttt" is transfer address (sometimes called entry point) for execution of the filespec if it is a standalone program.

While the actual format will vary with different DOSs, the important factor is use of the memory

addresses. These addresses are essential. They specify the portion of memory to be dumped to disk. Should an error be made in specifying the address, the result could be inclusion of extraneous bytes, or absence of bytes vital to the filespec use. In specifying an end address it is better to use a high memory address than too low an address. The extra bytes are usually no problem, whereas a conservative guess at the end may result in a loss of data. If in doubt about a transfer address, use 402D hex which will return control to DOS while leaving the salvaged file intact in memory.

Conventional use of the DUMP function is to save a system load tape program to disk. However, attempts to do so may be a riddle for the user unfamiliar with machine code program structure. The program start, end and transfer address are an absolute must in this application. Unfortunately, this information is seldom included in program documentation . . . especially if it is a purchased program. Thus, the programmer must use a utility that will provide the needed memory addresses.

The "Reader" program in Sept./Oct. 80-U.S. Journal is an example of this type of program, except that it does not provide program addresses. For the benefit of readers who do not have a utility

which provides system load tape addresses, a system tape address reader (STAR) program listing is included at the end of this article. Only the most expensive DOS provides a utility of this type. Without a suitable tool such as this, the user is left with little alternative other than to use a debug utility and search out the addresses. This can be a frustrating experience unless one is familiar with the debug- or zap-type utilities.

### **Modular Program Creation**

The DUMP function is a dynamic tool for the assembly language programmer. It provides a means for linking individual program modules into one master program. This is especially important when working with a limited random access memory (RAM) capability. In some cases, there is insufficient RAM buffer space available to hold the entire assembly language source code. This leaves the programmer with no choice but to divide the program into modules that can later be linked into a complete program. This operation can be compared to using the Disk BASIC Merge function to link two BASIC programs.

To elaborate on the need for modular construction, let's review the typical editor/assembler. Most

use a minimum system to conserve as much memory space as possible. It must be able to load a file disk, create new files, and maintain a library of user utilities including the assembler. While this may be considered a minimum system, it still requires about 6K of RAM. This leaves a buffer of only 16K for user entry of the source code (assuming a 48K system). While you may never write a 16K assembly language program, the buffer area soon fills if many remarks are used. Fortunately, the DUMP and LOAD functions included in the DOS library provide a way around this limitation.

Using an editor/assembler, one can develop a program as a series of modules, each tailored in length to the buffer space available. Likewise, each can be saved to disk as an individual module. Upon completion of all modules, they can be linked together into a single program. The process of creating the modules can be summarized as follows.

1. Type in source code to the buffer limit.
2. In the first module, EQUate any labels that will be used in subsequent modular segments of the program, or assign a dummy address that can be changed later using a debug.
3. Keep a "crib sheet" of these labels and addresses as they are typed in, for reference or use in subsequent modules.
4. Originate the first module above DOS (i.e., above 5200 hex).
5. Assemble the module, noting the starting and ending addresses on the crib sheet.
6. Save the assembled module to disk as a core memory (/CIM) file.
7. Clear the buffer and continue typing in source code. Use ending address of Module 1 plus one as the ORG (origin) of Module 2.
8. Repeat the foregoing process as many times as necessary to complete the program source code entry.

The end result of this effort is a series of individual (but related) modules. None will function as a standalone program. Linked together, they form a complete program. This is where the DUMP function enters the picture; it is used

in the module linking operation.

### Linking Modules

To explain the linking of our hypothetical program, we will give the modules a pseudo memory address. For the purpose of illustration, we will use the following addresses. Note that the second module is originated to follow the end address of the first module.

MODULE1/CIM  
5300H (origin)  
5800H (last of listing)  
53FFH (entry point on Module1)

MODULE2/CIM  
5801H (1st line)  
6ABCH (ending address)

There are several ways these modules could be linked, but we will take the easy way! Using the LOAD and DUMP functions, the procedure is as follows:

1. LOAD MODULE1/CIM  
<ENTER>
2. LOAD MODULE2/CIM  
<ENTER>

Note the use of the LOAD command in the foregoing instruction. This, too, is a common library command found in most DOSs. When used from the command mode, it will load a file to memory without causing it to execute. In this case, the LOAD function serves an important purpose. Without it, any attempt to load the modules would result in a system crash. At this point, both modules are in memory, occupying memory locations 5300 hex through 6ABC hex.

The DUMP function is now used to combine the modules. A typical calling format would be as follows:

```
DUMP MODULE3/CMD:1  
(START=X '5300', END=X '6ABC',  
TRA=X '53FF')
```

This will result in dumping the contents of memory from 5300 hex to 6ABC hex onto the disk under the filename MODULE3/CMD, with the DOS address used as a transfer address.

Modules 1 and 2 remain intact on the disk in their original form and location. MODULE3/CMD is stored at a different location selected by the disk controller. Note use of the /CMD extension when formatting the DUMP statement. As we are assuming this is a standalone program, the CMD extension is required to enable calling the program from DOS. Since Modules 1 and 2 are no longer needed, they may be deleted from the disk directory if desired.

### Crash Insurance

The DUMP function can also be used as a basis for salvaging a program in the event of a system crash. To illustrate, let's assume that a system crash occurs as a data file is being created, and system control is restored with a system RESET. Chances are that most of the data in memory when it crashed is still intact. If the file start and end addresses are known, this portion can be saved using the DUMP command. In doing so, the important thing to keep in mind is to assign a new filespec name. This is to prevent over-writing an existing file if the dump is made to the same disk. A new name also serves to identify the salvaged file. The salvaged file can subsequently be examined using a debug or disk modifier utility to restore missing codes, if such action is necessary.

A case in point is salvaging a file when using a word processor program such as PENCIL™ or SCRIPSIT™. In my case, Pencil files have been lost by forgetting to turn the printer on before beginning a printout. (Turning on the printer causes a transient that freezes my keyboard.) In most cases, it is possible to salvage the file using the DUMP function. The general procedure in such cases is as follows:

1. Press the system RESET button (do not power down).
2. DUMP the contents of memory, beginning with the origin of the word processor as the start address, and top of memory as the end address, with transfer to DOS (402D hex).
3. Clear memory and LOAD the CIM file created by the DUMP.

4. Call up your DOS debug, and use it to jump to the origin of the word processor. Both the program and file should be intact.

This manner of salvaging memory contents is especially pertinent to business applications. The best programs and systems are not entirely crash proof. A static discharge, momentary glitch in the powerline, or invalid entry by an inexperienced operator can cause havoc with the best of systems.

While the loss of a Pencil file may not be catastrophic, loss of a business data file can be. Therefore, it behooves anyone who is depending upon computer data files to prepare for possible system crashes. No system is immune to the "if it can happen, it will" part of Murphy's law. Therefore it is wise to observe the scout motto and "be prepared."

This point is illustrated by use of a simplified example:

An inexperienced operator is inputting data to a financial data base file. In the process, the system

crashes for reasons left to your imagination. Two hours' work lost, plus possible loss of the original data base! The obvious question is

"what to do now?"

The important thing is to save as much of the contents of memory as possible. If steps have been taken

**Program Listing for  
DUMP Command**

```

00010 ;      .... VERSION 3.1      2/27/82
00015 ; BY JOE W. ROCKE .... RIDGECREST, CA 93555
00020 ;*****
00030 ;** 'STAR' - SYSTEM TAPE READER PROGRAM LISTING - **
00040 ;*****
00050 ;** UTILITY PROGRAM TO IDENTIFY A CASSETTE TAPE AS **
00060 ;** SYSTEM LOAD OR BASIC FORMAT. **
00070 ;** DISPLAYS START, END & TRANSFER ADDRESS IF TAPE **
00080 ;** IS IN SYSTEM FORMAT. **
00090 ;*****
00100 ;
00110 ;
=====
00120 BASIC EQU 06CCH ;USE FOR TAPE SYSTEM
402D DOS EQU 402DH ;RETURN FOR DISK SYSTEM
01F8 CASOFF EQU 01F8H ;TURN CTR OFF
021E CASON EQU 021EH ;TURN CTR ON
01C9 CLS EQU 01C9H ;CLEAR SCREEN FROM ROM
0033 DSP EQU 0033H ;DISPLAY BYTE IN REGISTER
28A7 DSMSG EQU 028A7H ;DISPLAY MESSAGE ROUTINE
002B KBD EQU 002BH ;KEYBOARD SCAN
0235 READ8 EQU 0235H ;READ 8 BITS ROUTINE
0296 SYNC EQU 0296H ;LOOK FOR SYNC BYTE
000D CRLF EQU 0DH ;CARRIAGE RETURN/LINE FEED
00230 ;
=====
6000 ;
6000 F3 00240 ; ORG 6000H ;CHANGE FOR 32 OR 48K SYS
00250 START DI ;CLOCK OFF FOR 'DOS'
    
```

# DISCOUNT COMPUTERS

**100% RS COMPONENTS, NO FOREIGN DRIVES OR MEMORY  
FULL WARRANTY**

16K Color Computer .....	449.00	Line Printer V.....	1499.00
32 K Color Computer.....	549.00	Line Printer VI.....	975.00
16K Model III .....	815.00	Line Printer VII.....	299.00
48K Model III, 1 Dr.....	1549.00	Line Printer VIII.....	599.00
48K Model III, 2 Dr. RS232 .....	1889.00	Daisy Wheel II.....	1599.00
64K Model II, 1 Dr. ....	2920.00	1 Dr. Expansion Mod II .....	919.00
128K Model 16, 1 Dr. ....	4250.00	8.4 MEG Hard Disk Mod II/16 .....	3685.00
128K Model 16, 2 Dr. ....	4930.00	All RS Software.....	20% OFF

**ALL OTHER ITEMS CARRY SIMILAR DISCOUNT. CALL FOR PRICES.**

**CASHIERS CHECK OR MONEY ORDER MUST ACCOMPANY ALL ORDERS.  
SHIPPED FREIGHT COLLECT**

**(214) 271-2955**

**NOCONA ELECTRONICS • DLR #F-731 • Box 2063 • Garland, TX 75041**

# DUMP

beforehand to prepare for such a contingency, the following can be done.

1. Recover system control by means of a reset.

2. Insert a previously formatted file disk in the second disk drive. (Any business system worth its salt will have two drives, right?)

3. Perform a memory DUMP of the entire memory contents above the DOS, to top of memory. For example:

DUMP CRASH/CIM:1, (START=X '5200', END=X 'FFFF', TRA=X '402D') <ENTER>

4. Shut down and wait for the "expert" to return from lunch!

The DUMP will save every byte in memory from 5200 hex (assumed end of DOS) to top of memory (FFFF hex). The DOS entry point, 402DH, was added so the file can be loaded back to memory, followed by a jump to the DOS mode. The "expert" can load the CIM (core image in memory) file to memory using the LOAD command. This will be followed by automatic transfer of system control to the DOS command mode. With the salvaged

6001	21003C	00260	START2	LD	HL, 3000H	;HOME CURSOR
6004	222040	00270		LD	(4020H), HL	
6007	CD0901	00280		CALL	CLS	;CLEAR SCREEN
600A	215661	00290		LD	HL, MSG1	;GET MSG 1
600D	CD0728	00300		CALL	DSMSG	;DISPLAY IT
6010	CD2B00	00310	SCAN	CALL	KBD	;BEGIN KEYBOARD SCAN
6013	E7	00320		OR	A	
6014	28FA	00330		JR	Z, SCAN	
6016	FE0D	00340		CP	0DH	;CHECK FOR =ENTER=
6018	20F6	00350		JR	NZ, SCAN	;CONTINUE SCAN IF NEITHER
601A	AF	00360		XOR	A	;MAKE A=0
601B	CD1202	00370		CALL	212H	;DEFINE DRIVE
601E	CD9602	00380		CALL	296H	;FIND SYNC BYTE
6021	214861	00390		LD	HL, MBUFF	;LOAD BUFFER
6024	0608	00400		LD	B, 8	;8 BYTES TO BUFFER B
6026	CD3502	00410	LPI	CALL	READ8	;READ 1ST 8 BYTES
6029	77	00420		LD	(HL), A	;INTO
602A	23	00430		INC	HL	;MEMORY BUFFER
602B	10F9	00440		DJNZ	LPI	;LOOP
602D	214861	00450		LD	HL, MBUFF	;BEGIN TEST
6030	3E55	00460		LD	A, 55H	;CHECK FOR
6032	BE	00470		CP	(HL)	;SYSTEM HEADER
6033	2838	00480		JR	Z, STEST	
6035	3ED3	00490		LD	A, 0D3H	;CHECK FOR
6037	BE	00500		CP	(HL)	;BASIC HEADER
6038	2817	00510		JR	Z, BTEST	
603A	CD0D00	00520		CALL	CRLF	
603D	21F061	00530	DEFAULT	LD	HL, MSG2	;DEFAULT MSG2
6040	CD0728	00540		CALL	DSMSG	;DISPLAY MSG 2
6043	ED5B2040	00550		LD	DE, (4020H)	;DESTINATION
6047	214861	00560		LD	HL, MBUFF	;SOURCE
604A	010800	00570		LD	BC, 8	;BYTE COUNT
604D	EDB0	00580		LDIR		;XFER DATA
604F	184D	00590		JR	TOFF	
6051	23	00600	BTEST	INC	HL	;TEST FOR 3
6052	BE	00610		CP	(HL)	;D3'S IN A ROW
6053	20EB	00620		JR	NZ, DEFAULT	
6055	23	00630		INC	HL	;DEFAULT IF
6056	BE	00640		CP	(HL)	;NOT FOUND

## WARNING!

**Electric Power Pollution.  
Spikes & Lightning  
HAZARDOUS to  
MICROCOMPUTERS!!**

Patented ISOLATORS provide protection from ...

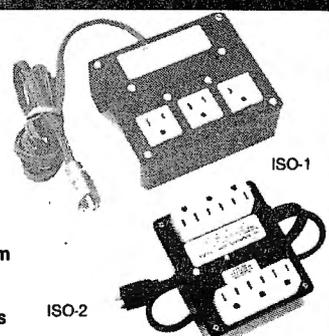
- Computer errors cause by power line interference
- Computer errors due to system equipment interaction
- Spike damage caused by copier/elevator/air conditioners
- Lightning caused damage

**MONEY BACK GUARANTEE!**

- ISOLATOR (ISO-1) 3 Isolated 3-prong sockets; Spike Suppression; useful for small offices, laboratories, classrooms. .... \$69.95
- ISOLATOR (ISO-2) 2 isolated 3-prong socket banks; (6 sockets total); Spike Suppression; useful for multiple equipment installations. .... \$69.95
- SUPER ISOLATOR (ISO-3) similar to ISO-1 except double isolation & oversize Spike Suppression; widely used for severe electrical noise situations such as factories or large offices. .... \$104.95
- SUPER ISOLATOR (ISO-11) similar to ISO-2 except double isolated socket banks & Oversize Spike Suppression; for the larger system in severe situations. .... \$104.95
- MAGNUM ISOLATOR (ISO-17) 4 Quad Isolated Sockets; Multiple Spike Suppressors; For ULTRA-SENSITIVE Systems in extremely Harsh environments. .... \$181.95
- CIRCUIT BREAKER, any model (Add-CB) ..... Add \$9.00
- REMOTE SWITCH, any model (Add-RS) ..... Add \$16.00

**AT YOUR DEALERS** MasterCard, Visa, American Express

**ORDER TOLL FREE 1-800-225-4876 (except AK, HI, PR & Canada)**



ISO-1  
ISO-2  
Pat. #4,259,705

**ESP Electronic Specialists, Inc.**  
171 South Main Street, Box 389, Natick, Mass. 01760  
(617) 655-1532

## A Pot Of Gold For YOUR Color Computer

*"I buy practically every computer magazine there is, but the RAINBOW is the only one I read cover-to-cover as soon as it comes in the mail" - A subscriber*

The RAINBOW gets that sort of response for more reasons than one but the primary one is simply it is the premier magazine for TRS-80 Color Computer users. And because it devotes every page of each monthly issue exclusively to the Color Computer it is the single best source of information for everything you want to know.

Tired of trying to convert other computer programs to your Color Computer? No worries. Each program in the RAINBOW is written exclusively for your computer — and many take advantage of all the excellent graphics commands unavailable on other machines! The nation's leading software authors have contributed every month.

The RAINBOW's Hints Tips and Pipeline feature give you the best up-to-the-minute information available on the Color Computer. If you are looking for ways to do screen prints, alphabetize disk directories, save machine language programs or print Videotex input on your printer, the RAINBOW has programs for you! And if you want to know when some promised software will really be available for purchase, you'll get that answered, too.

Our tutorials have been praised for the clear, concise way they explain — in detail — various functions of the Color Computer. And the RAINBOW's reviews are an excellent and honest buyer's guide to software and other purchases.

Whether your Color Computer is 4K, 16K or 32K. Whether you have Color Basic or Extended. Whether you're into assembly language (or want to get into it) or not. Printers, Disks, Rom packs. The RAINBOW surveys the whole world of the Color Computer each month and provides what one reader called "A pot of gold full of fabulous information."

Because it is journalistically-oriented, the RAINBOW gives fast turnaround to meet its monthly deadline. So you can expect fresh news when it is news and the latest information available.

If all this sounds like a lot for \$16 per year, it may be. But we'll make one more promise. If after you see your first issue you don't agree that the RAINBOW is the premier monthly magazine for Color Computer users, we'll happily, cheerfully and immediately refund your money.

Trademark of Sandy Corp.



# the RAINBOW

the RAINBOW  
5803 Timber Ridge Drive P.O. Box 209  
Prospect, KY 40069 (502) 228-4492

Gentlemen: YES! Sign me up right away for a one-year (12 issues) subscription to the RAINBOW. My payment is enclosed.

Name \_\_\_\_\_

Address \_\_\_\_\_

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

Payment Enclosed  Charge my MasterCard # \_\_\_\_\_

Charge my VISA # \_\_\_\_\_

Signature \_\_\_\_\_ Card Exp. Date \_\_\_\_\_ Interbank # \_\_\_\_\_

Subs. return in the RAINBOW are \$16 per year or the U.S. Canadian and Mexican rates are \$22 per year. Subscribers living in other countries pay \$21. All rates in other currencies are \$40. All subscriptions begin with the current issue. Please allow 4-6 weeks for first issue.

**# 35**

file back in memory, the memory contents can be examined using a debug utility. In most cases, the majority of information in memory can be salvaged by using debug. To do so, one must have a good knowledge of machine code and debug techniques.

The DUMP function is a useful command when one understands its range of applications. Simply put, it dumps the bytes in memory to disk, creating a core image memory copy of the area specified by the start and end addresses. What one does with this file is dependent upon the imagination, skill and knowledge of the individual.

**System Tape Address Reader (STAR)**

The STAR program is a utility that will scan a tape-based machine code (system load) program and provide the start, end and transfer addresses in hexadecimal form. This information is necessary in order to dump a tape system load program to disk. The original program name is

6057 20E4	00650	JR	NZ, DEFAULT	;
6059 213E62	00660	LD	HL, MSG3	; BASIC FORMAT MSG
605C CDA728	00670	CALL	DSMSG	; DISPLAY MSG 3
605F 214B61	00680	LD	HL, MBUFF+3	
6062 7E	00690	LD	A, (HL)	; PRINT THE
6063 CD3300	00700	CALL	DSP	; FILE NAME
6066 3E22	00710	LD	A, 22H	; CLOSE
6068 CD3300	00720	CALL	DSP	;
606B 1831	00730	JR	TOFF	; TURN OFF CASSETTE
606D CD3502	00740 STEST	CALL	READ8	; READ 8 BYTES
6070 47	00750	LD	B, A	; COUNT & LOAD
6071 CDC060	00760	CALL	HLADDR	; START ADDRESS
6074 225061	00770	LD	(STARTA), HL	
6077 85	00780	ADD	A, L	
6078 4F	00790	LD	C, A	
6079 CDC960	00800	CALL	BLOCK	
607C CD3502	00810 LOOPD	CALL	READ8	; READ 8 BYTES
607F FE78	00820	CP	78H	; CHECK FOR ENTRY
6081 285F	00830	JR	Z, ENDSYS	; POINT HEADER
6083 FE3C	00840	CP	3CH	; CHECK FOR START
6085 20F5	00850	JR	NZ, LOOPD	; OF DATA HEADER
6087 CD3502	00860	CALL	235H	;
608A 47	00870	LD	B, A	; BYTE COUNT
608B CDC060	00880	CALL	HLADDR	;
608E 85	00890	ADD	A, L	
608F 4F	00900	LD	C, A	
6090 CDC960	00910	CALL	BLOCK	
6093 18E7	00920	JR	LOOPD	
6095 46	00930 OUTPUT	LD	B, (HL)	; PRINT A STRING
6096 23	00940	INC	HL	; OF ASCII CHARACTERS
6097 7E	00950	LD	A, (HL)	
6098 CD3300	00960	CALL	DSP	; DISPLAY BYTES
609B 10F9	00970	DJNZ	OUTPUT+1	;
609D C9	00980	RET		;
609E 212020	00990 TOFF	LD	HL, 2020H	; TURN OFF
60A1 223E3C	01000	LD	(3C3EH), HL	; BOTH *'S
60A4 CDF801	01010	CALL	CASOFF	; CASSETTE OFF

MARATHON  SOFTWARE

**PIK'EM**  
1982



**64% ACCURATE**  
AGAINST POINTSPREAD FOR 1981 SEASON (Games 2-16)

A COMPLETE FOOTBALL PREDICTION PROGRAM FOR THE 1982 NFL PROFESSIONAL REGULAR SEASON STARTING SEPT. 12, 1982\*

★ ★ ★ ★ ★

ONLY 20 MIN. DATA INPUT PER WEEK WILL GIVE YOU THE EDGE ON EVERYONE\*\*

CAN BE UPDATED FOR 1983



ORDER BY



PHONE OR MAIL

NAME \_\_\_\_\_  
 ADDRESS \_\_\_\_\_  
 CITY \_\_\_\_\_ ST \_\_\_\_\_ ZIP \_\_\_\_\_  
 PIKEM 24<sup>95</sup> PAYMENT ENCL0   
 VISA  MASTERCHARGE  AC# \_\_\_\_\_  
 MY CARD EXPIRES:

**\$24<sup>95</sup> INCLUDES:**  
 DATA DISKETTE  
 COMPLETE INSTRUCTIONS  
 SPECIFY:

TRS80 MODEL I/III  
 AT LEAST 32K

\*\*

DATA NEEDED TO RUN PROGRAM AVAILABLE IN LOCAL NEWSPAPERS OR CAN BE FURNISHED BY MARATHON SOFTWARE.

—FEATURES—

- DISPLAYS PREDICTED SCORES 210 GAMES
- DISPLAYS ACCUMULATED STATS EACH TEAM
- DISPLAYS AVERAGE STATS EACH TEAM
- GIVES PRINTOUT: PREDICTIONS—STATS—AVERAGE
- AUTOMATICALLY STORES DATA — NO 'SAVE'

\* IF PROGRAM IS BOUGHT AFTER SEASON STARTS — ALL PREVIOUS STATISTICS WILL BE INCLUDED NO EXTRA CHARGE.

FOR MORE INFORMATION CONTACT:

MARATHON SOFTWARE DEPT. U  
 P. O. BOX 1493  
 JACKSONVILLE, TEXAS 75766  
 (214) 586-8212

DEALER INQUIRIES INVITED

# DUMP

not important as a user specified name can be used in making the disk dump.

The assembly language source code for STAR is presented in Listing 1. As written, it is structured for CTR tape system operation. The minor changes required for disk system operation are noted in the listing remarks. This program is for a Model I Level II. Minor changes in ROM address calls are required for Model III compatibility.

STAR program application is guided by display prompts. The following steps summarize its use in a tape-based system.

1. Load STAR from the BASIC tape operating mode.

2. Replace the STAR cassette upon completion of the load with the subject tape to be read.

3. Follow the STAR prompts. The program addresses will be displayed upon completion of the "read" operation.

4. Jot down the addresses for future reference.

Do be aware of the fact that STAR may not be able to read some tapes. Programs that include a preloader, or a special copy prevention feature, cannot be read. In such cases, you may as well resign yourself to using these tapes in the normal Level II BASIC mode.

The subject program is not loaded to memory in the reading process. The STAR program only scans the tape, picking out pertinent addresses for display. To save the program to disk using the DUMP command, proceed as follows:

1. Return to DOS mode, and call Disk BASIC mode.

2. Load subject tape to memory using your conventional Disk BASIC tape loading procedure.

3. Do not execute the program by typing a slash (/) upon completion of the load.

4. Insert a formatted disk in the drive that is to receive the memory dump.

5. Assuming that your DOS permits a DUMP command call from the BASIC mode, type the DUMP call per your DOS instructions. Be sure to add the "/CMD" extension to the filespec name so the program may be called from the DOS command mode.

60A7	E5	01020		PUSH	HL	
60A8	219162	01030		LD	HL,MSG5	;"REPEAT" MSG
60AB	CDA728	01040		CALL	DSMSG	
60AE	E1	01050		POP	HL	
60AF	CD2B00	01060	WAIT	CALL	KBD	;"CALL KBD SCAN
60B2	FE01	01070		CP	01	;"BREAK?"
60B4	2807	01080		JR	Z,EXIT	;"EXIT IF YES
60B6	FE0D	01090		CP	0DH	;"ENTER?"
60B8	CA0160	01100		JP	Z,START2	;"REPEAT IF <E>
60BB	20F2	01110		JR	NZ,WAIT	;"LOOP IF NEITHER
60BD	C3C006	01120	EXIT	JP	06CCH	;"RETURN TO BASIC
		01130	;"TURN	CLOCK ON (EI) & US 'JP		DOS' FOR DISK
60C0	CD3502	01140	HLADDR	CALL	READ8	;"READ NEXT 2
60C3	6F	01150		LD	L,A	;"BYTES FROM
60C4	CD3502	01160		CALL	READ8	;"TAPE & LOAD
60C7	67	01170		LD	H,A	;"INTO THE HL
60C8	C9	01180		RET		;"REGISTER
60C9	85	01190	BLOCK	ADD	A,L	;"READS A BLOCK
60CA	4F	01200		LD	C,A	;"OF DATA UP TO
60CB	CD3502	01210		CALL	READ8	;"256 BYTES LONG
60CE	23	01220		INC	HL	;"BUMP POINTER
60CF	81	01230		ADD	A,C	;"KEEP CHECKSUM
60D0	4F	01240		LD	C,A	;"IN REGISTER C
60D1	CD2B00	01250		CALL	2BH	;"KEYBOARD SWEEP
60D4	FE01	01260		CP	1	;"STOP ON
60D6	28C6	01270		JR	Z,TOFF	;"BREAK
60D8	10F1	01280		DJNZ	BLOCK+2	;"LOOP TILL DONE
60DA	CD3502	01290		CALL	READ8	;"
60DD	B9	01300		CP	C	;"IS CHECKSUM VALID?"
60DE	CC2C02	01310		CALL	Z,22CH	;"THEN BLINK '*'
60E1	C9	01320		RET		;"
60E2	2B	01330	ENDSYS	DEC	HL	;"STORE END ADDRESS
60E3	225261	01340		LD	(ENDA),HL	;"
60E6	CDC060	01350		CALL	HLADDR	;"
60E9	225461	01360		LD	(ENTRYA),HL	;"
60EC	216362	01370		LD	HL,MSG4	;"SYSTEM MESSAGE
60EF	CDA728	01380		CALL	28A7H	;"DISPLAY MSG4
60F2	0606	01390		LD	B,6	;"PRINT
60F4	214961	01400		LD	HL,MBUFF+1	;"THE
60F7	7E	01410	LOOPF	LD	A,(HL)	;"FILE
60F8	CD3300	01420		CALL	33H	;"NAME
60FB	23	01430		INC	HL	;"
60FC	10F9	01440		DJNZ	LOOPF	;"DECREMENT B & JR IF B=0
60FE	21BE62	01450		LD	HL,MSG6	;"
6101	CDA728	01460		CALL	28A7H	;"DISPLAY MSG6
6104	2A5061	01470		LD	HL,(STARTA)	;"
6107	CD1F61	01480		CALL	COMPU	;"PRINT START ADDRESS
610A	CD2661	01490		CALL	COMMA	;"
610D	2A5261	01500		LD	HL,(ENDA)	;"LOAD END ADDRESS
6110	CD1F61	01510		CALL	COMPU	;"
6113	CD2661	01520		CALL	COMMA	;"
6116	2A5461	01530		LD	HL,(ENTRYA)	;"LOAD ENTRY ADDRESS
6119	CD1F61	01540		CALL	COMPU	;"
611C	C39E60	01550		JP	TOFF	;"PREPARE TO TURN OFF CTR
611F	7C	01560	COMPU	LD	A,H	;"WRITES HL REGISTER
6120	CD3161	01570		CALL	OUTHL	;"CONTENTS AS A
6123	7D	01580		LD	A,L	;"HEX ADDRESS
6124	180B	01590		JR	OUTHL	;"
6126	3E2C	01600	COMMA	LD	A,2CH	;"LOAD A ','
6128	CD3300	01610		CALL	33H	;"DISPLAY IT
612B	3E20	01620		LD	A,20H	;"LOAD A 'SPACE'
612D	CD3300	01630		CALL	33H	;"AND DISPLAY IT
6130	C9	01640		RET		;"
6131	F5	01650	OUTHL	PUSH	AF	;"
6132	0F	01660		RRCA		;"SWAP PLACES
6133	0F	01670		RRCA		;"WITH BITS 0-3
6134	0F	01680		RRCA		;"AND BITS 4-7
6135	0F	01690		RRCA		;"
6136	CD3A61	01700		CALL	BIASCI	;"
6139	F1	01710		POP	AF	;"
613A	E60F	01720	BIASCI	AND	15	;"CLEAR BITS 4-7
613C	FE0A	01730		CP	10	;"JUMP IF A=10
613E	3802	01740		JR	C,NUMBER	;"IF A>9 THEN
6140	C607	01750		ADD	A,7	;"CHANGE TO LETTER
6142	C630	01760	NUMBER	ADD	A,'0'	;"ASCII OFFSET
6144	CD3300	01770		CALL	33H	;"
6147	C9	01780		RET		;"
6148	0000	01790	MBUFF	DEFW	0	;"FIRST 8 BYTES
614A	0000	01800		DEFW	0	;"READ FROM TAPE

**Address Conflict**

While many system load tape programs are compatible with DOS operation, some are not. Programs that load to low memory may displace some DOS functions. At best, these programs will execute with no apparent problems, but may require a reset upon exiting the program. The worst case situation is one whereby the program wipes out the ability to call the DOS DUMP function during the foregoing load and dump sequence. If this should occur, you will not be able to dump the program in memory to disk.

A conflict between DOS and programs that load to low memory may be resolved by changing the program addresses. This requires use of a debug utility, and the expertise needed to accomplish the task. However, if the ability to use a tape-based program on your disk system is the only concern, having to do a reset upon program completion is a small price to pay for fast program accessibility.

614C 0000	01810	DEFW	0				
614E 0000	01820	DEFW	0				;ARE STORED HERE
6150 0000	01830	STARTA	DEFW	0			;STORE START ADDRESS
6152 0000	01840	ENDA	DEFW	0			;END ADDRESS HERE
6154 0000	01850	ENTRYA	DEFW	0			;AND ENTRY ADDRESS HERE
	01860						MESSAGE GROUP
6156 2A	01870	MSG1	DEFM	'**	STAR - SYSTEM TAPE ADDRESS READER	'**'	
617F 0D	01880		DEFB	0DH			
6180 2A	01890		DEFM	'*STAR*	READS A 500 BAUD TAPE HEADER	'	
61A4 0D	01900		DEFB	0DH			
61A5 41	01910		DEFM	'AND PRINTS	SYSTEM LOAD TAPE ADDRESSES.'		
61CB 0D	01920		DEFB	0DH			
61CC 0D	01930		DEFB	0DH			
61CD 2E	01940		DEFM	'... LOAD TAPE AND HIT	=ENTER= ...'		
61EE 0D	01950		DEFB	0DH			
61EF 00	01960		DEFB	00H			;END OF MSG1
61F0 54	01970	MSG2	DEFM	'THE HEADER JUST READ	WILL NOT LOAD. THE		
6218 0D	01980		DEFB	0DH			
6219 46	01990		DEFM	'FIRST 8 BYTES AFTER SYNC	CODE ARE: '		
623C 0D	02000		DEFB	0DH			
623D 00	02010		DEFB	00H			;END OF MSG2
623E 54	02020	MSG3	DEFM	'TAPE IS IN BASIC FORMAT.	USE CLOAD		
6261 0D	02030		DEFB	0DH			
6262 00	02040		DEFB	00H			;END OF MSG3
6263 54	02050	MSG4	DEFM	'TAPE IS MACHINE CODE	FORMAT. FILE NAME IS:		
6290 00	02060		DEFB	00H			
6291 0D	02070	MSG5	DEFM	'=ENTER= TO READ ANOTHER	TAPE, ELSE =BREAK=		
6292 3D	02080		DEFM				
62BD 00	02090		DEFB	00H			;END OF MSG5
62BE 0D	02100	MSG6	DEFB	0DH			
62BF 48	02110		DEFM	'HEX START, END & ENTRY	ADDRESSES ARE: '		
62E5 0D	02120		DEFB	0DH			
62E6 00	02130		DEFB	00H			;END OF MSG6
6000	02140		END	START			;AUTO START
00000	TOTAL ERRORS						

# GEAP DOT WRITER

Another GEAP expansion module for Epson Graftrax Owners

**FEATURES: GEAP CHARACTER FONTS** • Create High Res Drawings without TRS-80 modifications or programming knowledge • Create or modify fonts • Print time options such as magnify, dot, spacing control, reverse and more • Library function allows saving to disk printing or re-editing.

ACTUAL CHARACTER FONTS / SIZE

SAMPLES - High Res and Modified Characters

**NOTICE**



A B C D ABCD



A B C D ABCD

A B C D



a b c d A B C D E

A B C D

a b c d



A B C D E F

a b c d

GEAP is modular in form. We have a package for just about every system. If you don't see components for your system, call us, we probably didn't have room to list it.

**16 - 48K SYSTEMS — CASSETTE - DISK - OR STRINGY**

**GEAP 1.3 \$25.99** - The famous GEAP editor; draw, rotate, magnify, "paintbrush" merge, write basic program — just a few of the options.

Here is what the reviewers have said about **GEAP 1.3**:

"I have seen other programs that claim to do what GEAP does, but no other has lived up to my expectations"—Richard McGarvey, 80 Microcomputing, March 1982, p. 57.

"Of all the TRS-80 programs that have passed my way, none has exceeded my expectations as this one has, GRAPHICS EDITOR AND PROGRAMMER by Bill Mason"—Margaret M. Grothman (Softside Magazine, Jan. 1982)

**EXPANSION MODULES 1-5 \$16.99.** More magnify, rotation and other commands, "INSTANT BLOCK" letters to speed up your drawing. Magnification allows manipulation of the Instant Letters, giving you many variations.

**48K SYSTEMS**

**GEAP 2.1 \$45.95.** A special enlarged GEAP 1.3 Editor plus over 10 GEAP Expansion Modules. Instant Letters, EPSON/OKIDATA Block "block graphics" support. Quickcursor module with 2 speed controllable cursors, rectangle, line and circle commands. 2.1 also includes the NEWSSCRIPT interactive module. (For other printer support - call)

**GEAP DOT WRITER** - You get all of the 2.1 Package plus all of the Dot Writer's high resolution capabilities. With this package you enter a new world. (Epson Printer Support only at this time). **\$75.95**

# 37

# Captain 80

## The adventures of a software secret agent

© 1982 Bob Liddil

"You're two hours late," complained Max as I flipped on the lights to the huge attic computer room that occupies the third floor of Professor Megabyte's palatial Peterborough, New Hampshire mansion. I moved here two months ago to assume the disguise of a mild-mannered software reviewer in hopes of discovering the whereabouts of the missing professor. Max is a sentient computer program residing in an oversized aluminum prototype expansion interface with more bells and whistles than a train station at nine a.m.

"Don't be pushy," I growled, "it's Sunday, and I don't even *work* on Sunday."

"Nonetheless," chided Max, "there are several new programs to review over on the computer desk. So get with it! You're on deadline."

Spectral Associates has been, for several months, advertising a program called Magic Box, which they say will allow you to load and execute BASIC language programs from Model I/III format to the Color Computer. I thought it would be nice to be able to load Spider Mountain into the Color Computer without a lot of typing, so I tried it.

One of the unique (to me) properties of Magic Box is the fact that it loads through the joystick port rather than the cassette port. All of the Model I/III software does likewise. Make sure that you have a 32K Color Computer unless you are loading tiny programs. Nothing commercial will fit symbiotically with Magic Box in 16K.

Included with the program (which *isn't* a box, but which *is* quite magical), is the tape (containing the program), a short input cable interfacing the joystick port to the

cassette recorder, and, of course, the instructions. It does work, by the way, assuming there is enough memory to hold both the host and guest programs. I loaded Spider Mountain into the 32K computer and proceeded to begin translating it.

Don't expect miracles. Magic Box does not translate. It merely loads so that *you* can translate. There are some inconsistencies between Extended Color BASIC and Level II BASIC. Still, I enjoyed using it, to the extent a utility can create joy. It is worth its price in time-saving alone. Magic Box is a *must* for a Color Computer owner who likes to tinker with Model I/III software and who knows his language.

"That review was a little dry," commented Max.

"What do you mean *dry*?" I shot back. "There's only so much you can say about utilities. They work or they don't, they cost too much or they don't. Magic Box is priced right and works perfectly. End of case.

What's to say?"

Max let out the electronic equivalent of a sigh.

As I sat there in front of the computer, musing about arguing with a computer over magazine article syntax, I was suddenly aware of the strangest feeling. The room melted into a glop of colors, then blended into a gray blur.

"Max!!" I shouted, but it was too late. The program/human interfacing device that had done in Professor Megabyte had now taken hold of me. I'd just been downloaded into the next piece of software in the drive for review.

I closed my eyes, braced myself for impact. The time that Max downloaded me into Zork, I nearly broke my neck in the landing.

When I opened my eyes, I found myself sitting in the sheriff's office, badge on my chest, gun on my hip, staring out into the dusty streets of an old western town. Max had put me in Comp-U-Things' new Challengem program called Time





for the Sheriff, written by Anthony Targonski.

I read the posters on the wall, then gingerly stepped into the street. A tall, menacing figure loomed in front of me, silhouetted in the sun. He moved his arm and my lightning draw cut him down before he could breathe. Blast. It was the undertaker, welcoming me to town.

Shaken, I retired to the saloon for a glass of redeye. Casing the place, I noticed a card game going on. They invited me to join them, so I did. One of the players looked like he was cheating, so I told him so. He turned out to be the mayor and I got thrown out on my ear.

I had taken no more than two steps when three bandits came running out of the bank, guns-a-blazin'. After a running firefight, I arrested them and took them to jail. With the miscreants locked up, I took stock of my situation in the comfort of the sheriff's chair.

Time for the Sheriff is a little simulation. It'll never be a blockbuster by any stretch of the imagination. It's a *good* program in that it works well and entertains the under 12 crowd it is designed for. The closed circuit situations are pat. You may go to the saloon, bank, general store or Indian reservation, shoot it out with any number or combination of bad and good guys.

The door opened and in came the marshall. Would he reward me for a job well done? I felt Max tugging on me from the CPU. The scene melted away and I was once more back home. Aha, Toto! There's no place like home!

Max was contrite.

"I don't know what happened, boss," he sniffled electronically. "One minute you were there, the next, *poof!*" (He still hasn't licked the problem of downloading people into software.) I can see that I have to be much more careful of what I review.

Let's see. The letter begins "Too hot for Radio Shack to handle." Hmm, must be Bob Krott's new misadventure, Wet Tee-Shirt Contest. Well, I'm ready, Max. Download me. Max? *Max!*

Boy, you just can't depend on some programs when you really need them. Maxxxxxx! ■

# Now...from Dr. David Lien, the master of making the difficult simple, comes the complete way to **HARNESS YOUR TRS-80**

Face it. Until you can talk to and understand your Model I, II, III or 16 Tandy TRS-80\*, it's nothing more than a mass of microcircuits in a plastic box.

You need help to harness your TRS-80 and make it work for you. And that's just what you get from *Learning TRS-80 BASIC*.

Written by David Lien, author of the popular *TRS-80 User's Manual for Level I*, *Learning Level II* and *The BASIC Handbook*, *Learning TRS-80 BASIC* is at once entertaining, informative and easy to understand. It's the perfect guide to entering the world of microcomputers.

In *Learning TRS-80 BASIC*, David Lien gives you simple, step-by-step instructions, including programs you can use in business or home finance, for entertainment, or to help troubleshoot problems. You'll even learn to write your own custom software. Ideal for the classroom, too.

Included are short Question and Answer sections which help make sure you understand everything you've learned — it's almost like a correspondence course... without the correspondence!

No matter if you own the Model I, II, III or 16, *Learning TRS-80 BASIC* is one book no TRS-80 owner should be without.

Available at better computer and book stores,  
or call (800) 854-6505

In California (714) 588-0996

Ask about the Basic Handbook, too. To order by mail, send check or money order for \$19.95 (California residents add 6%), plus \$1.65 shipping and handling. Overseas orders send \$19.95 plus \$2.50 surface shipping and handling. All books have a 30-day money-back guarantee — you can't lose.



# 38

## CompuSoft® Publishing

1050-E Pioneer Way, Dept. G, El Cajon, CA 92020

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

# Basically BASIC

## Input screen control

### Model I/II/III and Color Computer

Most of us have been impressed with some of the advanced programs which always have such nice forms on their screens. Using one of them, you almost (remember I said *almost!*) can't make an input mistake because the program very carefully controls where and when you can do input.

If you're like a number of people I've talked to, you probably thought that the technique was difficult to use and very hard to understand. Certainly, to judge from some of the programs that I've seen on the market, there are a large number of "professional" programmers who think so or they would be using the techniques themselves.

Well, it turns out that the techniques themselves are neither mysterious nor hard to master. Just a little work on basic keyboard input techniques along with our knowledge of screen control using the PRINT@, is enough to make very powerful screen input available.

Let's look at three input techniques and see what they can do.

#### INPUT Statements

The basic form of the input statement is just the keyword INPUT followed by a list of variables that you want to input to. By adding in a string prompt, you can display a line to explain what you want during the input.

For example, we might say:

```
INPUT"AMOUNT";AMT
```

to input the amount of something into the program. This will display the word AMOUNT followed by a question mark (?) on the screen and then wait for you to type a number. Typing a string in response is an error.

One problem with some systems is that when you press enter to complete an input line, the rest of the line is cleared. This isn't so bad for most input situations, but if you already have a form displayed on the screen with more than one input field per line it gets pretty messy.

To see if your system does this, try this simple program:

```
10 CLS:PRINT@0,STRING$(30,"=");
```

```
20 PRINT@0,;INPUT"SOMETHING";A
```

```
30 GOTO30
```

```
66 80-U.S. Journal
```

© 1982, T.R. Dettman, Associate editor

This will print a string of 30 "=" signs on the first line of the screen and then ask you to input a number in that space. If the rest of the line disappears, you have this problem. Rather than tell you which models do it and which don't, try it for yourself.

Another fault of the INPUT statement is that no matter what, you *always* get a question mark prompt. What if you want something else? This can also be a strength. You don't have to worry about the prompt and if you ever ask for input, the system will always show a question mark. That makes it easy.

Even more, since INPUT is a normal function in BASIC systems for all computers, programs from other systems are generally easy to use if they use this form of input.

There is one final problem which is critical. Whenever an INPUT sees a "delimiter" (a comma), it stops the variable it is currently inputting and moves to the next. For numbers that's no problem, but if you're trying to input a line of text (say in a text editor) then this becomes more than just troublesome, it becomes impossible.

Still, INPUT is a fundamental statement and still very valuable for general use. For simple programs, you can't go wrong with it.

#### Line Input

On Model I/III disks systems and all Model IIs and Color Computers, there is a special INPUT statement called LINE INPUT. This was created especially for text line input. It gets rid of the last problem we mentioned above with the comma.

With LINE INPUT, the only thing which stops the input into a variable is the end of line (ENTER key). Because of this, it can only enter one (1) variable. Further, that variable *must* be a string.

The limitation to one string variable is both the strength and the major weakness of LINE INPUT. For its particular purpose, it's hard to beat (but we will). You can prompt with it by including a prompt string like INPUT. Better yet, there's *no question mark!*

LINE INPUT allows you to use whatever you want for a prompt character or nothing at all. Try the same experiment above with LINE INPUT instead of INPUT (remember to replace the variable with a string variable).

LINE INPUT allows you flexibility in dealing with input lines. For example, you could use LINE INPUT to enter a command line including commands and

numbers and so forth and then build a routine into your program which breaks the line up, interprets the commands, and converts the numbers to appropriate variables.

As flexible as it is, LINE INPUT still has some major limitations. You can't control how many characters someone is bringing in, nor can you do special processing if a key is pressed that you want to immediately identify.

**Character Input**

Still another way to bring things into the computer is to do it one character at a time. Does this sound too slow, or too hard? Well, it isn't if you do it carefully.

The disadvantage of this approach is that you lose all the special abilities of normal INPUT or LINE INPUT routines. But this is also its major advantage. If you want special controls, you put them in. If you don't want them you leave them out.

If you want the ability to limit the length of a line, you can program that in. If you want to put a field size on the screen, you can. If you want to keep certain characters out of your line, you can do that also. In short, it's up to you what to include and what to leave out.

The key to individual character input is to be able to get individual characters and control them. Sounds obvious right? But there's a catch, how do we do it?

TRS-80 BASIC provides us with a simple-to-use solution, INKEY\$. INKEY\$ is a BASIC function which takes a look at the keyboard any time it's called and returns a character if it finds one pressed and nothing otherwise.

To use INKEY\$, we need a character entry subroutine that we can call anytime we want a character from the keyboard. A general one looks like this:

```
500 REM ----- CHARACTER ENTRY -----
510 C$=INKEY$:IF C$="" THEN 510
520 RETURN
```

In line 510, we look for a character at the keyboard (C\$=INKEY\$). If we don't find one (C\$="") then we keep looking, otherwise, we return (line 520).

To use this, we have a Line Input routine that gets characters and makes them available to our program. Let's say that we will return the characters we type into string IN\$, then the line input routine would look like this:

```
600 REM ----- LINE INPUT -----
610 IN$=""
620 GOSUB500: IF ASC(C$)=13 THEN RETURN
630 IF ASC(C$)=8 THEN IF LEN(IN$)>0 THEN
PRINTCHR$(8); IN$=MID$(IN$,1,LEN(IN$)-1):
GOTO620 ELSE 620
640 IF LEN(IN$)>=ZF THEN 620
```

**TRS-80™**  
By  
**RADIO SHACK**

**1-800-841-0860 Toll Free**

**BUY DIRECT**  
**PURE RADIO SHACK EQUIPMENT**  
**LOW DISCOUNT PRICES**

TRS-80 Color Computer



BUY DIRECT

PRICED FROM **\$309**

TRS-80 Model II Computer



BUY DIRECT

PRICED FROM **\$3098**

TRS-80 Model III Computer



BUY DIRECT

PRICED FROM **\$609**

TRS-80 Model 16 Computer



BUY DIRECT

PRICED FROM **\$4158**

Smith Corona TP-1 Daisy Wheel Printer



BUY DIRECT

\*LIST \$895<sup>00</sup>\* **\$695**

Commodore  
**VIC-20**

The Friendly Computer

**\$249**

TM - TANDY CORPORATION  
FREE COPY OF WARRANTY  
UPON REQUEST

CENTRONICS 739-1  
**\$499**

**WRITE FOR YOUR FREE CATALOG**

We Carry The Full TRS-80 Product Line

**MICRO MANAGEMENT SYSTEMS, INC**

PARCEL DIVISION - DEPT. NO. 5

2803 Thomasville Road East

Cairo, Georgia 31728

GA. & INFO 912-377-7120

**SCM** SMITH-CORONA

# 39

**VIC-20**  
The Friendly Computer

Thousands of Satisfied Customers Since '78

# PMC SOFTWARE

PRESENTS

**SPECIAL  
DOSPLUS**

V 3.3  
Disk \$49.00  
Save \$50.00

**NEW  
Stellar Escort**

by **BIG 5**  
Tape 12.00  
Disk 15.00

**Electric Pencil**

PMC version of orig.  
for PMC/Mod I/III  
Tape \$24

**UNBEATABLE PRICES!**

BUSINESS	DISK		CASS	
	LIST PRICE	OUR PRICE	LIST PRICE	OUR PRICE
<b>SMALL BUSINESS SYSTEMS GROUP</b>				
Accounts Payable (48)	195.00	155.00	n/a	
Accounts Receivable (48)	195.00	155.00	n/a	
General Ledger (48)	195.00	155.00	n/a	
Inventory Control (48)	195.00	155.00	n/a	
Payroll (48)	195.00	155.00	n/a	
<b>GAMES</b>				
<b>Adventure International</b>				
Armor Patrol	24.95	19.00	19.95	15.00
Barlog - Macs and Magic #1	29.95	23.00	n/a	
Conquest of Chestwood	20.95	16.00	19.95	15.00
Earthquake San Francisco 1906 (I)	20.95	16.00	19.95	15.00
Eliminator	24.95	19.00	19.95	15.00
Lunar Lander	20.95	16.00	14.95	11.00
Missile Attack	20.95	16.00	14.95	11.00
Morton's Fork - Macs and Magic #3 (I)	29.95	23.00	n/a	
Planetoids	20.95	16.00	19.95	15.00
Scot Adam's Adventure #1 #2 #3	39.95	31.00	n/a	
Scot Adam's Adventure #10 #11 #12	39.95	31.00	n/a	
Scot Adam's Adventure #4 #5 #6	39.95	31.00	n/a	
Scot Adam's Adventure #7 #8 #9	39.95	31.00	n/a	
Sky Warrior	20.95	16.00	14.95	11.00
Space Intruders	20.95	16.00	19.95	15.00
Star Fighter	29.95	23.00	24.95	19.00
Star Trek 3.5	19.95	15.00	14.95	11.00
Stone of Sisyphus - Macs and Magic #2 (I)	29.95	23.00	n/a	
<b>Big Five</b>				
Attack Force	19.95	15.00	15.95	12.00
Cosmic Fighter	19.95	15.00	15.95	12.00
Defense Command	19.95	15.00	15.95	12.00
Galaxy Invasion	19.95	15.00	15.95	12.00
Meteor Mission	19.95	15.00	15.95	12.00
Robot Attack	19.95	15.00	15.95	12.00
Super Nova	19.95	15.00	15.95	12.00
<b>Cornsoft</b>				
Scarman	19.95	15.00	15.95	12.00
Space Castle	19.95	15.00	15.95	12.00
<b>INFORMATION PROCESSING</b>				
<b>Adventure International</b>				
Maxi Manager (48)	99.95	79.00	n/a	
<b>OPERATING SYSTEMS</b>				
<b>Micro Systems Software</b>				
Dos Plus V3.3 (I)	100.00	80.00	n/a	
<b>UTILITIES</b>				
<b>Howe</b>				
MON3 (I)	n/a		39.95	31.00
MON4 (I)	49.95	39.00	n/a	
STERM (I)	n/a		69.95	55.00
System Diagnostic	99.95	79.00	n/a	
<b>WORD PROCESSING</b>				
<b>Michael Shrayer Software</b>				
Electric Pencil (I)	n/a		100.00	24.00
<b>Aspen Software</b>				
Grammatik (I)	59.00	46.00	n/a	
Proof Edit (I)	30.00	23.00	n/a	
Proofreader (I)	54.00	42.00	n/a	
Soft-Screen (I) (48)	69.00	54.00	n/a	
Soft-Text (I) (48)	69.00	54.00	n/a	
<b>MISCELLANEOUS</b>				
Box of 10 5 1/4-Inch Diskettes Microsette			25.00	
Box of 10 C-10 cassettes Microsette			7.50	
Box of 10 C-20 cassettes Microsette			9.00	
Box of 10 C-60 cassettes Microsette			11.00	
Box of 10 C-90 cassettes Microsette			15.00	
Adventure 1 thru 12 - Hints Sheets per adventure			1.00 ea.	

Software runs on PMC/LNW/MOD I/III  
32K DISK/16K CASSETTE UNLESS MARKED. # 40

475 ELLIS ST., MT. VIEW, CA 94043

Order Only CALL (415) 962-0318  
Information CALL (415) 962-0220

Terms: FOR FAST DELIVERY, send certified checks, money orders, Visa or Master Card number and expiration date. Personal checks require 3 weeks. U.S.A. sales only. PRICES INCLUDE U.P.S. continental delivery (do not use P.O. Box). CALIFORNIA customers add 6 1/2% tax. Prices subject to change.

## Basically BASIC

650 IF ASC(C\$)<32 THEN 620

660 IN\$=IN\$+C\$:PRINTC\$;:GOTO620

The routine works like this:

1. In line 610, we erase the string we're going to fill with characters.

2. Now we get a character (GOSUB500) and look to see if it's the ENTER key (ASC(C\$)=13). If it is, we're done and so we go back to wherever the routine was called.

3. Next we check to see if what was pressed was the backspace key (ASC(C\$)=8). If there are characters in IN\$ (LEN(IN\$)>0) then we backspace on the screen (PRINTCHR\$(8);) and get rid of the last character in IN\$ (IN\$=MID\$(IN\$,1,LEN(IN\$)-1)). Then we look for another character. If there were no characters in IN\$, then we just go back to get another character and ignore this one.

4. If we have ZF characters already in IN\$ (this will be set when we call the routine) then we ignore the character just typed.

5. If the character is a special code (ASC(C\$)<32), we ignore it as well.

6. If we made it through all the tests, then we add it to the string (IN\$=IN\$+C\$) and print it on the screen (PRINT C\$;). Notice the semicolon (";") after the print, this prevents each print from putting the next character on a new line.

Now that we have a routine to input characters and make lines out of them, we can input anything we want. Admittedly, this isn't going to be as fast as using a regular INPUT or LINE INPUT which works in machine language. But how many of you can type fast enough to outstrip it?

The program included with this installment demonstrates the three types of input. Try it, you may find some ideas for your next program.

### Program Listing for Basically BASIC

```

10 REM *****
20 REM
30 REM SCREEN CONTROL INPUT
40 REM TERRY R. DEITTMANN
50 REM
60 REM VERSION 1.0 05/01/82
70 REM
80 REM
90 REM *****
95 REM CLEAR STRING SPACE FOR
INPUT AND SET LINE LENGTH FOR SCREEN
100 CLEAR1000:LL=80:REM LL=80 MOD II,
64 MOD I/III, 32 COLOR COMPUTER
105 REM DA$ WILL BE THE DATA AR
RAY
106 REM PM$ IS THE ARRAY OF PRO
MPTS FOR DATA
107 REM LC IS THE SCREEN LOCATI
ON TO PUT THE PROMPT
    
```

## Basically BASIC

```

108 REM          LF IS THE SCREEN LOCATI
ON TO PUT THE INPUT FIELD
109 REM          FL IS THE FIELD LENGTH
(NUMBER OF CHARACTERS) IN THE INPUT
110 DIM DA$(10),PM$(10),LC(10),LF(10),F
L(10)
115 REM          READ IN THE PROMPTS AND
FIELD LOCATIONS
120 FOR I=1 TO 10:READ PM$(I),FL(I),CA,CB,
FA,FB
125 REM          CA & CB ARE THE ROW AND
COLUMN POSITION, THIS IS CONVERTED
126 REM          TO LC FOR THE PROMPT LO
CATION. FA & FB ARE THE ROW & COLUMN
127 REM          POSITIONS FOR THE INPUT
FIELD
130 LC(I)=CA*LL+CB:LF(I)=FA*LL+FB
140 NEXT I
200 REM - - - - - COMMAND LOO
P - - - - -
205 REM          EVERY PROGRAM NEEDS A M
ENU DOESN'T IT????
210 CLS:PRINT"DATA ENTRY SCREEN DEMONST
RATION"
220 PRINT:PRINT
230 PRINTTAB(10)"1. USING INPUT STATE
MENT"
240 PRINTTAB(10)"2. USING LINE INPUT"
250 PRINTTAB(10)"3. USING CHARACTER I
NPUT"
260 PRINT:PRINT
270 INPUT"SELECTION";S
275 REM          CHECK FOR LEGAL SELECTI
ON
280 IF S<1 OR S>3 THEN 200
285 REM          EXECUTE SELECTION
290 ON S GOSUB 2000,2100,2200
300 GOTO200

500 REM - - - - - PRINT SCREE
N - - - - -
505 REM          BY DEFINING THE PROMPTS
IN ARRAYS, WE CAN SIMPLY LOOP OVER
506 REM          THEM EASILY WITHOUT ALO
T OF TYPING, AFTER ALL, I'M
507 REM          BASICALLY LAZY
510 FOR I=1 TO 10:PRINT@LC(I),PM$(I);:PRIN
T@LF(I),STRING$(FLD(I),"");
520 NEXT I:RETURN
900 REM - - - - - SCREEN DATA
- - - - -
905 REM          STORED IN THE ORDER NEE
DED BY THE READ STATEMENT
906 REM          ONE DATA STATEMENT PER
DATA LINE TO ENTER
907 REM          THIS STRUCTURE IS FOR T
HE PROGRAMMER'S CONVIENIENCE

```

# ACCEL3

**ACCEL3**  
\$99.95

...  
**YOU OWE IT TO YOUR BASIC PROGRAM**

**BASIC Compiler, Model I/III, all DOS**

**ACCEL2 Plus:**

- Bigger optimized subset
- Quicker compilation
- More compact output
- Almost total compatibility

developed in England  
by Southern Software

**ALGORIX**  
Allen Gelder Software  
(415) 387-3131  
Box 11721 San Francisco CA 94101

- ① Includes INP, OUT, multi-dimensional arrays.
- ② About 40 lines/second.
- ③ Only 10% -35% code growth.
- ④ Even unstructured for-next loops, variable-bound arrays.

\$99.95 +\$2 Shipping  
CA add 6%

**ALGORIX**  
Allen Gelder Software  
(415) 387-3131  
Box 11721 San Francisco CA 94101

# 41

Also **EDIT** Full screen BASIC editor. **\$40**

```

908 REM          IT MAKES IT EASIER TO C
CHANGE FIELDS AROUND LATER
910 DATA NAME1,20,3,0,3,10
920 DATA NAME2,20,4,0,4,10
930 DATA ADDRESS,20,6,0,6,10
940 DATA CITY,20,7,0,7,10
950 DATA STATE,2,8,0,8,10
960 DATA ZIP,9,9,0,9,10
970 DATA PHONE,12,10,0,10,10
980 DATA BIRTHDAY,8,12,0,12,10
990 DATA ANNIV,8,13,0,13,10
1000 DATA MISC,20,14,0,14,10
2000 REM - - - - - INPUT STAT
EMENT ENTRY - - - - -
2010 CLS:PRINT"INPUT FORM DATA ENTRY":G
OSUB500
2015 REM          NOTICE THAT THE POSITIO
N TO START THE INPUT IS
2016 REM          2 SPACES LEFT OF THE IN
PUT FIELD, ROOM FOR A
2017 REM          QUESTION MARK (?) AND A
SPACE
2020 FORI=1TO10:X=LF(I)-2
2030 PRINT@X,;:INPUTDA$(I):PRINT@X," ";
2040 NEXTI
2050 RETURN
    
```

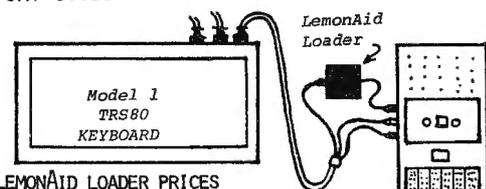
```

2100 REM - - - - - LINE INPUT
ENTRY - - - - -
2110 CLS:PRINT"LINE INPUT DATA ENTRY":G
OSUB500
2120 FORI=1TO10:X=LF(I)-1
2125 REM          WITH LINE INPUT, THERE
IS NO PROMPT UNLESS YOU PUT IT THERE
2130 PRINT@X,">":LINE INPUTDA$(I):PRIN
T@X," ";
2140 NEXTI
2150 RETURN
2200 REM - - - - - CHARACTER
ENTRY - - - - -
2210 CLS:PRINT"CHARACTER INPUT DATA ENT
RY":GOSUB500
2215 REM          HERE I'VE ALLOWED A 2 S
PACE PROMPT THAT LOOKS LIKE AN ARROW
2220 FORI=1TO10:X=LF(I)-2
2225 REM          IT'S IMPORTANT TO CLEAR
THE STRING BEFORE CALLING
2226 REM          THIS ENTRY ROUTINE (OR
CLFAR IT THERE)
2230 PRINT@X,"=>":DA$(I)="" :GOSUB2300:
PRINT@X," ";
2240 NEXTI
2250 RETURN
2300 REM - - - - - READ A LINE
CHARACTER BY CHARACTER - - - - -
2305 REM          GET A SINGLE CHARACTER
2310 GOSUB2400
2315 REM          IS IT IS <ENTER> THEN W
E'RE DONE SO RETURN
2320 IF ASC(C$)=13 THEN RETURN
2325 REM          IF IT IS BACK-SPACE TH
EN CHECK THE STRING TO SEE IF
2326 REM          IT HAS ANYTHING IN IT Y
ET, IF IT DOES, THEN REMOVE ONE
2327 REM          CHARACTER FROM THE STRI
NG AND FROM THE SCREEN
2330 IF ASC(C$)=8 THEN IF LEN(DA$(I))>0
THEN DA$(I)=MID$(DA$(I),1,LEN(DA$(I))-
1):PRINTC$;:GOTO2300
2335 REM          LIMIT THE STRING TO A M
AXIMUM OF THE FIELD LENGTH
2340 IF LEN(DA$(I))>=FLD(I) THEN 2300
2345 REM          IGNORE ALL SPECIAL CHAR
ACTERS
2350 IF ASC(C$)<32 THEN 2300
2355 REM          IF IT FINALLY PASSES AL
L THE TESTS, ADD IT TO THE STRING
2356 REM          AND PRINT IT (NOTICE TH
E SEMI-COLON ';')
2360 DA$(I)=DA$(I)+C$:PRINTC$;:GOTO2300
2400 REM - - - - - GET A SINGLE C
HARACTER - - - - -
2410 C$=INKEY$:IFC$=""THEN2410 ELSE RET
URN
    
```

NOW...\$1.00 Credit on PHONE ORDERS  
(417) 345 7643 til 10PM. MC-VISA-COD

**TAKE LOADS OFF YOUR MIND!**

PLUG IN LEMONAID LOADER IN SECONDS...  
SAY GOODBY TO TAPE LOAD WOES FOR GOOD!



LEMONAID LOADER PRICES  
Deluxe Model LLQ...\$18.99  
Std Model LL.....\$12.99

CTR80, 80A, 41, etc.

➔ MORE Features to Take the CLOAD Off Your Mind! ➔  
Now the LemonAid is easier to use...a quick set-up switch for mulish pre-recorded tapes. AND a "loud" output jack with BUILT-IN volume adjust; use speaker or earphone to Pre-position tapes precisely, AND hear saves/loads automatically, OR, listen to games or other computer sound WITHOUT a separate amplifier!

AND like the original LemonAid...ends SYSTEM and CLOADing woes for TRS-80\* model 1 AND low-speed model 3. Install in seconds. Plugs in. No rewiring. No tricky CTR volume. AutoMAGIC power. AND great for tape speedups like KWICOS\*\* too!

➔ Our GUARANTEE: The LemonAid will outload ANY loader at ANY price or your money back, NQA. Use with CTR80, 80A and similar recorders.  
New Model LLQ [as described above] ... \$18.99 postpaid\*\*\*  
Model LL [Original...the loader leader] ... \$12.99 postpaid\*\*\*  
We Ship in A Hurry! Order by Model From:

**LEMONS TECH SERVICES**

325 N. Highway 65 P.O. Box 0429  
Buffalo, MO. 65622 [417] 345-7643

\*TRS-80, CTR-80, CTR-80A are trademarks of Tandy, Inc.  
\*\*KWICOS is trademark of KWIK Software  
\*\*\*Add \$3.00 Overseas. Post. and fees charged on CODs.

# 42

VISA\* master charge

# Microcomputers for a California high school

Dan Robinson, Pacifica, CA

California's Proposition Thirteen hit the state's computer projects like an earthquake, but some schools are learning to cope with the fiscal disaster through self help.

Proposition Thirteen severely curtailed the property taxes that support local schools, barely leaving enough funds to provide for existing programs. There were none at all for such new and expensive projects as computer instruction courses.

Terra Nova High School in Pacifica, California (on the fringes of San Francisco), is one school where the students have raised the funds which the tax collectors could not. When the public purse snapped shut, the school had four TRS-80s. At the end of the last school year, they were up to nine and growing.

The users of the Terra Nova computers were members of the school's Math Club. They reddened their knuckles knocking on doors throughout the community selling candy bars and collecting aluminum cans to raise funds. They raised money on campus by selling their personalized, computer-printed Terra Nova calendar, complete with the TN Tiger.

This year, the students plan to box up their computers and join the community's elementary school carnivals. They'll bring along an array of arcade games to cash in on that two-bits-a-game craze, and expect to net between \$50-\$100 for each of the dozen carnivals in the district.

Last year, the Math Club invested in a coffee urn and supplies to establish a navy-style coffee mess in the faculty room. Even at a reasonable fifteen cents per cup, the coffee sales netted enough last year

to provide one more computer for the school.

A program written to overcome a common problem was made into an article for a computer magazine, together with an offer to provide the utility on disk at a reasonable price. Sales, so far, have been sufficient to add a disk drive to the school's system.

Club members are now writing scoring programs for the school's athletic events. They hope to tap the Booster Club's treasury by providing computer services at the games.

At the same time that the students were raising funds, they were exploring means to expand their systems. It was discovered that a company was replacing their old Selectric-type terminals, and the company was persuaded to sell eight of the machines to the school at a token price. Their maintenance technicians volunteered the time to show the students how to interface the units to the computers as printers. The business community was canvassed. One business donated a computer, the others some needed software.

With nine computers up and operating, Terra Nova was able to schedule computer classes this year — the first high school in the district to do so. With this, district officials have begun to take the computer project seriously and have promised that, somehow, they will find the funds to keep the project not only going, but growing.

Proposition Thirteen shook California's computer projects severely. But from it, the students have learned that they can pull themselves up pretty high by their own bootstraps. ■



TRS-80  
MODEL I

**DISK  
INTERFACING  
GUIDE**

**\$5.95**

POSTPAID  
FIRST CLASS

*(United States Only)*

**\$7.95 Foreign Airmail**  
*(U.S. Funds)*

*Send to:*

**80-U.S. Journal**  
3838 South Warner St.  
Tacoma, WA 98409  
(206) 475-2219

*Dealer Inquiries Invited*

TRS-80 is a registered trademark of Tandy Corporation.

Send \_\_\_\_\_ Copies of the Guide

Check Enclosed \_\_\_\_\_

Visa or MasterCard

# \_\_\_\_\_

Exp. Date \_\_\_\_\_

Signature \_\_\_\_\_

Name \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_

State \_\_\_\_\_ Zip \_\_\_\_\_

A Division of 80-Northwest Publishing, Inc.

**80-U.S.**

---

# Checkbook

## *Part III: Space saving with NEWDOS/80*

### Model I/III

Jerry L. Latham, Midwest City, OK

We are at the end of this three-part series and are ready for the final two program modules which will make our checkbook management package work smoothly for us. You will see some interesting things you can do when you combine the NEWDOS/80 command `RUN"filename",V` with the runtime `DELETE` command. We will also take another look at the `CMD"O"` method of sorting arrays.

With just a little pre-planning, you should be able to come up with some other uses for the technique you are about to see. Because the use of the NEWDOS/80 command `RUN"filename",V` passes all variables to the file named, you may pass parameters to the new program that is to be run. This really isn't much different than what we have been doing for the last two months. But, up until now, we really haven't cared what choice was made in the `MENU` program to get us to the program currently in memory. This time we will be. `MENU` gave us six program options, and you may remember that there were only four different program names mentioned in the list. `BUILDALL` and `FIXSERCH` were both called twice. The listings and the explanations that follow should show how NEWDOS/80's runtime options for passing variables and deleting program lines can actually turn one program into two or more different programs. If you can store two (or more) similar programs, where you formerly stored those two, three or four programs on disk, then you have saved yourself that much disk space.

Listing 1 shows the program called `BUILDALL`. This program's only purpose is to take all of the monthly statement files and turn them into one big file so that we can use it to obtain long-term data. The two choices for building these composite files are to build them with, or without, your outstanding bank transactions. By checking at the start of the program and asking which choice was made in the `MENU` selection, you may

choose to delete, or not to delete, the one-item data statement in the files program which contains the name of the file storing those outstanding items. In this case, we only delete one line, but just as easily could have deleted many more. That one line is the only difference in the two programs. By not having to keep both programs separately on disk, you have immediately saved about 3 grans, 1½ tracks, or the equivalent of 3840 bytes of disk storage.

The operation of "both" of these programs is relatively easy. You supply the name that you want the composite file to have (this can either be an existing file or a new one). If the file already exists, its contents will be written over, as we are using the `OPEN"O"` command and not the `OPEN"E"` command here. You also are given the option to include all files listed in the data base, or to select from them, as the program runs. If you decide to be selective, you will have to babysit the program to pick and choose. Normally, you should let the program run on "auto-pilot" and build a file from all files listed in the data base. This requires no more attention from the operator. If you decided not to include all files in the composite file, you can bet that the balance shown for that composite file will *not* be correct.

When we set up the transaction description array, I told you that the first item (element zero) of the array should be "BAL FWD". Now you will see why. After all chosen files are read, the composite file is sorted by type transaction code, which places all "BAL FWD" items together at the beginning of the file. Next, a pointer moves through the array to find the first non-zero item. It is the data from that first non-zero item, to the last item, that is written into the composite data file. This is also the reason that the deposit you used to open your account should be shown as a deposit and not as a "BAL FWD" type transaction.

If you elected to only use two files for your records (one for outstanding items and one for all cancelled items),



there is really no need for you to keep BUILDALL on your disk. Options 5 and 6 could be deleted from the MENU.

Drum roll please — and trumpets. Here is the program module you have been waiting for (even if you didn't know it). Listing 2 shows FIXSERCH. By far the longest program, it is also the hardest working of the four major modules. FIXSERCH allows you to quickly correct or change any piece of data in any file. But that is not its major strength.

FIXSERCH makes extensive use of the CMD"O" command to allow searching files for a particular transaction, or for a group of related transactions. You can search for one particular check or deposit, or search for all checks in the file that were used to make you car payments, or to pay your doctor. You could search for all deposits that were, for example, in excess of \$100.00. The versatility of this routine is not bad. It could be better, but for now it is not bad. Notice that if you chose the search option from MENU, all lines referring to correction of data are deleted before the run really begins. By allowing this module to double as two that would need much the same coding, we have saved seven grams, or three and one-half tracks of disk space. Combined with what we saved with BUILDALL, that is five tracks saved. If you figure what you probably saved by having DATEIN, DATEOUT, PRINTCK and FILES on the disk only once, you have saved about seven tracks of space. That is room for another program the size of FIXSERCH!

In order to achieve the flexibility needed for this module, I found that the CMD"O" command of NEWDOS/80 was invaluable. Unless you have some other enhanced operating system, such as ENHBAS or INFINITE BASIC, machine code sorts are probably not readily available to you, especially sorts that handle several arrays at once. BASIC itself would be impossibly slow for this job. With this function, we can change method of search in a jiffy, and get all the versatility we need.

Notice when a sort is done with the CMD"O" command, all associated arrays are sorted at the same time. This is necessary to keep all of the data together. The variable X is always used as the maximum number of items to sort. That keeps us from including null elements of the array in the sort. Zero is always used as the starting element in all arrays to assure that all elements of the arrays are considered in the sort. Immediately following each sort routine, is the search routine that finds the item or items you want to see. These are binary searches. Even when searching through a full 1501-element array, you will never have to "look" at over eleven elements to find the item, or to decide that the item doesn't exist in the array being searched.

Just a few random comments before finishing. There are some disadvantages to using DELETE in your programs. If you choose to delete introductory lines from your program, you may not RUN the program again in BASIC. To run from scratch, you must use the RUN"filename" command. You may, of course, stop

TRS-80 MODELS I OR III, 32K, 1 DISK DRIVE

# Your personal money manager, DOUGHFLO!

Doughflo is a complete accounting system that grows as you need it — **FEATURING:**

- ✓ Excellent for use as a general ledger, tax preparation system, or accounts payable system.
- ✓ Reports which compare totals from up to 24 months. Automatically form income and expense averages, and budgets.
- ✓ Interactive checkbook balancing while expenses are being entered. Complete check-writing logic customized to your own checks.
- ✓ Versatile report generator searches and lists all totals and balances.
- ✓ User friendly documentation — includes sample data ready to run.

**Pay your bills, and gain valuable insight.** Create a complete financial data base for your home or office... **\$79.95 complete.** Demonstration disk available for \$12.00 postpaid, to be put towards future purchase. For more information check reader service number. Specify Model I or III.

## "A Perfect Clod Every Time"\*



\*From a review in September-October 1980 Elementary Electronics Reprints available

TRS-80 TAPE DIGITIZER ► **\$49.95!**

**At last there is a cure for TRS-80 tape cloding blues!** For over three years, Alphanetics has been selling the TRS-80 Tape Digitizer, a proven hardware solution for your software problems. No longer need you juggle the recorder's volume control endlessly, trying for a perfect clod of a pre-recorded program. Just pop the tape into the cassette recorder, process the signal through our digitizer, and you're ready to RUN a perfect load!

Just check out the Tape Digitizer's features . . .

- ✓ Makes tape program loading virtually independent of volume control setting.
- ✓ Allows copying system and normal tapes without using computer.
- ✓ Makes a perfect digital copy of any tape without using computer, removing hum, noise, and cures minor dropouts.
- ✓ Cassette switch allows manual control of cassette recorder, independent of computer control.
- ✓ "GOOD DATA" indicator easily enables setting proper volume . . . doubles as a tape monitor.
- ✓ A.C. powered — no batteries to replace.
- ✓ Housed in a sturdy, attractive metal case.
- ✓ Completely compatible with Level I & II, also LOW speed (500 baud) Model III.

Feed your cassette to the Alphanetics Tape Digitizer and feed your computer the exact digital waveform the TRS-80 gave your tape. Get rid of your tape bugs today — \$49.95 postpaid to continental North America, or return within 10 days for a full refund!

**We welcome Visa or MasterCard.**

# 109

**alphanetics**

Box 597, Forestville, CA 95436  
24 hr. phone (707) 887-7237

# Checkbook

program execution and use a GOTO to pick up the program wherever you want. Although I didn't go into it in the main part of the article, you may have noticed that some program lines were deleted, based on either the detected absence of a printer, or the response "N" to the "... HARDCOPY ..." query.

The lines actually deleted contained the actual LPRINT statements. If they are no longer in the program, you certainly don't have to worry about hanging up the computer trying to do the impossible. This way, you don't have to set a flag to jump around LPRINT statements. Just check once, and press on with the program. All of the listings were typed with extra spaces for ease of reading. To save more space in memory, and on disk, load each program module or routine into the computer and give the CMD"C" command. This will remove all extra spaces and REMarks. All parts of this program will run after this operation has been done. Of course, you should save the compressed program back to disk with its same filename.

That about winds it up. I hope that you feel you have learned something from this series, and that the example program package was a good one. I have intentionally been brief in my description of the inner workings of the program so that we could focus on using the operating system rather than the program.

*For those who would like more detailed information on the operation of the program, send me \$2.00. If you*

*got lost typing in the program and would like a full operating version (with some enhancements that didn't fit into the article), send \$15.00 and you get a non-system diskette with all of the program on it, a complete listing, and the operating instructions. J. L. Latham, 1409 Evergreen Cir., Midwest City, OK 73110.*

## Listing 1 Checkbook

```
4000 REM PROPERTY OF:
JERRY L. LATHAM
1409 EVERGREEN CIRCLE
MIDWEST CITY, OK 73110

4010 CLS:PRINTTAB(18)"CHECKBOOK 1.0":PR
INTTAB(21)"BUILDDALL":PRINT:PRINT"INIT
IATING":IFPEEK(&H6818)<>205THENRUN"ME
NU"
4020 PRINT"MERGING DATEOUT":MERGE"DATEO
UT"
4030 PRINT"MERGING FILE DATA":MERGE"FIL
ES"
4040 IFA%=5THENCMD"F",DELETE12010
4050 IFPEEK(14312)=255THENA="N"GOTO4100

4060 PRINT"DO YOU REQUIRE HARDCOPY OF T
HE RESULTS (Y/N)? ";:GOSUB4430:IFA="N
"THEN4100
4070 PRINT"CHECKING PRINTER STATUS":MER
GE"PRINTCK"
4080 GOSUB11000
4090 CMD"F",DELETE11000-11080
4100 IFA="N"THENCMD"F",DELETE4320-4380
4110 CMD"F",DELETE4010-4110
4120 IFAF<>" "THENPRINT"FILENAME IN USE
IS ";AF;"
DO YOU WISH TO CONTINUE USING THIS FILE
AS THE
OUTPUT FILE FOR THE COMPOSITE FILE (Y/N
)? ";:GOSUB4430:IFA="N"THENGOTO4160
4130 AF="":PRINT:INPUT"ENTER FILENAME T
O WORK WITH (/DAT:1 EXTENSION WILL BE
ADDED)
FILENAME ";AF:P=USR0(VARPTR(AF))
4140 IFLEN(AF)<1ORLEN(AF)>8ORLEFT$(AF,1
)<"A"ORLEFT$(AF,1)>"Z"THENPRINT"INVAL
ID FILENAME, RE-ENTER.":GOTO4130
4150 AF=AF+"/DAT:1"
4160 PRINT"DO YOU WANT ALL FILES IN THE
DATA LIST INCLUDED? IF NOT, THEN Y
OU MUST BE PRESENT TO CONTROL WHICH F
ILES ARE INCLUDED.
REPLY Y OR N ";:GOSUB4430:PC=0:IFA="Y"
THENPC=1
4170 RESTORE:CLS:PRINT"BEGINNING BUILDI
NG OF FILE ";AF
```

OUR SOFTWARE IS WRITTEN WITH YOUR OPERATOR IN MIND.

AFTER ALL THAT'S WHO'S GOING TO BE USING IT.

OUR **BUSISOFT** SOFTWARE IS MENU DRIVEN AND USES ONE-LETTER COMMANDS TO HELP SPEED UP PROCESSING. EACH OF OUR JOURNAL ENTRY PROGRAMS GIVES THE OPERATOR THE ABILITY TO GO BACK AND EDIT BEFORE ANYTHING IS ACTUALLY PRINTED, AND ALL THE DATA THE OPERATOR TYPES IN IS SAVED PERMANENTLY AND CAN BE RE-RUN IF NECESSARY. IF PART OF AN ENTRY IS THE SAME AS PREVIOUSLY TYPED IN (I.E. DATE, REP, ...) THEN IT CAN BE DUPLICATED BY JUST PRESSING THE (ENTER) KEY AND FOR POSITIVE FEEDBACK THE ENTRY IS RE-PRINTED ON THE SCREEN.

**MCS** WRITES SOFTWARE EXCLUSIVELY FOR BUSINESS. YOU CAN DEPEND ON MCS FOR ONGOING SUPPORT, OCCASIONAL REFINEMENTS THAT ARE MADE TO THE PROGRAMS ARE FREE, AND ANY CHANGES YOU REQUEST CAN BE PROGRAMMED FOR YOU.

**BUSISOFT** SOFTWARE FOR THE TRS-80 MOD 1 & III:

**GENERAL LEDGER/FINANCIAL STATEMENTS:**  
A COMPLETE BOOKKEEPING SYSTEM WITH AUDIT TRAIL. A SEPARATE JOURNAL PRINTING STEP VERIFIES ACCOUNT NUMBERS BEFORE PRINTING. JOURNALS CAN BE ADDED TO AND RE-PRINTED. FAST MOD III SORT OR MOD I BASIC SORT. THE GENERAL LEDGER HOLDS UP TO 3000 ACCOUNTS. UP TO 10 FILES CAN BE POSTED SIMULTANEOUSLY WITH A MAXIMUM OF 3000 ENTRIES PER RUN. ACCOUNT GROUP TOTALS CAN BE PRINTED IN THE GENERAL LEDGER. PRINTS CURRENT ACTIVITY AND COMPARATIVE CUSTOMER FINANCIAL STATEMENTS INCLUDING INCOME STATEMENT AND BALANCE SHEET. PRINTS AT ANY TIME THE CHART OF ACCOUNTS, EACH ACCOUNT BALANCE, AND A TRIAL BALANCE WORKSHEET. INCLUDES OPERATOR'S MANUAL, SOURCE LISTING EXTRA ..... 450.00

**A/R FOR RENT COLLECTION:**  
AN ACCOUNTS RECEIVABLE RECORD KEEPING SYSTEM FOR COMMERCIAL OR RESIDENTIAL APARTMENTS. INCLUDES FEDERAL & LOCAL SUBSIDY AMOUNTS, MARKET EXCESS, LOSS ON DELAY, VACANCY AND CONCESSIONS. HOLDS UP TO 470 TENANTS PER BUILDING. PRINTS LATE RENT LIST, RECEIPTS JOURNAL, TENANT REGISTER, SUBSIDY TOTALS, TENANT LISTS, AND ADDRESS LABELS. CAN POST TO INDIVIDUAL LEDGER CARDS. RENTS ARE POSTED AUTOMATICALLY. RECEIPTS IN FULL POSTED WITH ONE KEY. INCLUDES OPERATOR'S MANUAL, SOURCE LISTING EXTRA ..... 450.00

**A/R AND INTERNAL COSTS FOR THE PROFESSIONAL:**  
AN ACCOUNTS RECEIVABLE AND JOB COST SYSTEM FOR THE TIME-ORIENTED PROFESSIONAL. HOURS FOR EACH EMPLOYEE'S TASK IS RECORDED BY CLIENT AND SERVICE PERFORMED. THE BILLABLE AMOUNT FOR EACH CLIENT IS EXTENDED & POSTED. SEPARATE COLUMNS FOR EXPENSES, ADJUSTMENTS, BILLED AMTS, AND PAYMENTS ARE INCLUDED ON THE CARDS. POSTS UP TO 1500 ENTRIES TO A MAXIMUM OF 1400 CLIENTS PER RUN. PRINTS EMPLOYEE PRODUCTIVITY REPORT FOR UP TO 90 EMPLOYEES AND BILLABLE SERVICE REPORT FOR UP TO 90 SERVICES. A TRIAL BALANCE CAN BE PRINTED AT ANY TIME INCLUDES OPERATOR'S MANUAL, SOURCE LISTING EXTRA ..... 400.00

**ACCOUNTS RECEIVABLE/CUSTOMER BILLING:**  
AN ACCOUNTS RECEIVABLE SYSTEM FOR CUSTOMER BILLING. POSTS CHARGES, CREDITS, ADJUSTMENTS AND PAYMENTS TO CUSTOMER FILE AND PREPARES BILLS, AGED TRIAL BALANCE, SALES REPORT, AND ADDRESS LABELS. CAN POST UP TO 4000 TRANSACTIONS TO 1340 CUSTOMERS PER RUN. AUTOMATICALLY CALCULATES FINANCE CHARGE AND PAST DUE AMOUNTS ON A MONTHLY BASIS. INCLUDES OPERATOR'S MANUAL, SOURCE LISTING EXTRA ..... 450.00

MODERN COMPUTER SERVICE  
428 PLEASANT ST. RM 217  
NEW BEDFORD, MA 02740  
1-617-992-2794

# 44

```

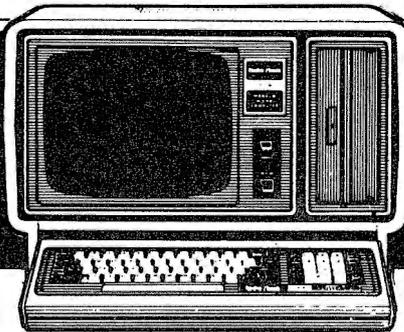
4180 READB:IFB="LAST"THENCLOSEL:GOTO427
Ø
4190 IFPC=1THEN421Ø
4200 PRINT"DO YOU WANT FILE "B" INCLUDE
D IN THE OUTPUT FILE (Y/N/E)?"::GOSUB
443Ø:IFA="N"THEN418ØELSEIFA="E"THEN42
5Ø
4210 PRINT"READING DATA IN FROM FILE ";
B
422Ø CLOSE:OPEN"I",1,B
423Ø IFLOC(1)$=-1THEN425Ø
424Ø INPUT#1,WT(X),DA(X),ZD(X),TY(X):X=
X+1:GOTO423Ø
425Ø X=X-1:CLOSEL:PRINT"DATA READ SUCCE
SSFULLY FROM FILE ";B
426Ø GOTO418Ø
427Ø PRINT"ALL DATA FILES READ. PREPAR
ING FOR DATA SORT.":FORY=ØTOX:SZ(Y)=S
GN(WT(Y)):WT(Y)=ABS(WT(Y)):DA(Y)=ABS(
DA(Y)):ZD(Y)=ABS(ZD(Y)):NEXTY:PRINT"S
ORT PREPARATION COMPLETED."
428Ø PRINT"NOW SORTING ALL INPUT DATA":
CMD"O",X+1,TY(Ø),DA(Ø),ZD(Ø),WT(Ø),SZ

```

```

(Ø):PRINT"DATA SORTED. NOW CHECKING F
OR BALANCE FORWARD VALUES.":Y2=Ø:FØR
Y=ØTOX:IFTY(Y)=ØTHENY2=Y2+1:NEXTYELSE
NEXTY
429Ø PRINT"DATA SORTED, BALANCE FØREWAR
D VALUES REMOVED. PREPARING FOR SAVE.
":FØRY=ØTOX:WT(Y)=WT(Y)*SZ(Y):DA(Y)=D
A(Y)*SZ(Y):ZD(Y)=ZD(Y)*SZ(Y):NEXTY:PR
INT"SAVING DATA IN FILE ";AF:CLOSE:OP
EN"O",1,AF
430Ø FØRY=Y2TOX:PRINT#1,WT(Y);DA(Y);ZD(
Y);TY(Y)::NEXTY:CLOSE
431Ø PRINT"DATA NOW ON FILE IN FILENAME
";AF
432Ø LPRINT"ITEM/NUMBER";TAB(15);"DATE"
;TAB(3Ø);"DESCRIPTION";TAB(5Ø)"AMOUNT
";TAB(62);"BALANCE";TAB(75);"AR #"
433Ø DB=Ø:A1="$##,###.##":FØRY=Y2TOX:ZD
=ABS(ZD(Y)):GOSUBLØ15Ø
434Ø IFABS(WT(Y))=1THENAC="DEPOSIT":GØT
O437Ø
435Ø IFABS(WT(Y))=32767THENAC="SVC CHAR
GE":GOTO437Ø
436Ø AC=STR$(ABS(WT(Y)))

```

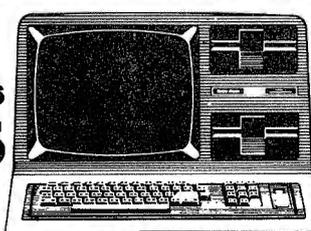


# TRS-80®

## DISCOUNT

**TRS-80 MODEL II**  
64-K \$3279  
26-4002

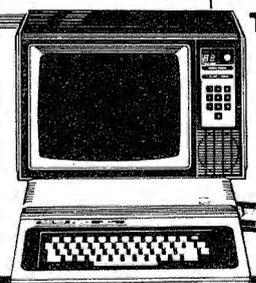
**TRS-80 MODEL 16**  
128-K \$4925  
26-6002



**TRS-80 MODEL III**  
48-K \$2049 16-K \$819  
26-1066 26-1062  
WITH 2 DISK RS-232 TAPE VERSION  
(ALL RADIO SHACK EQUIPMENT)

8.4 MEGABYTE HARD DISKS (PRIMARY UNIT) \$4000.

WE ALSO CARRY EPSON AND OKIDATA PRINTERS, XEROX 820 AND ALTOS COMPUTERS. NO OUT-OF-STATE TAXES.  
Sold with the manufacturer's limited warranty. Copies of such warranty may be obtained for review from Perry Oil and Gas Co. # 45



**TRS-80 COLOR**  
4-K \$309 26-3001  
16-K \$455 32-K \$525 26-3002 26-3003

**COLOR DISK DRIVES**  
0- \$475 1-2-3- \$315

— T.M. TANDY CORP.

DEALERS' INQUIRIES INVITED.  
WE ACCEPT CERTIFIED CHECKS, CASHIERS CHECKS AND MONEY ORDERS.

**PERRY OIL & GAS INCORPORATED**  
Dept. No. C-3 137 NORTH MAIN ST., PERRY, MICHIGAN 48872  
PHONE (517) 625-4161, MICH.  
FOR OUR PRICES, PLEASE CALL TOLL FREE **1-800-248-3823**

# Checkbook

```

4370 DB=DB+DA(Y):LPRINTAC;TAB(15);AD;TA
B(30);BT(TY(Y));TAB(50);"";:LPRINTUSI
NGAL;DA(Y);:LPRINTTAB(62);"";:LPRINTU
SINGAL;DB;:LPRINTTAB(75)Y
4380 NEXTY
4390 IFDB=0THENPRINT"COMPUTING BALANCE"
:FORY=Y2TOX:DB=DB+DA(Y):NEXTY
4400 PRINTUSING"BALANCE IS $$$,###.##"
;DB
4410 CLOSE:PRINT"PRESS ENTER TO RETURN
TO MENU";
4420 A=INKEY$:IFA<>CHR$(13)THEN4420ELSE
RUN"MENU",V
4430 A=INKEY$:IFA=""THEN4430ELSEP=VARPT
R(A):IFA<>"N"ANDA<>"Y"ANDA<>"E"THEN4
430ELSEPRINTA:RETURN

```

Listing 2  
Checkbook

```

FIXSERCH
5000 REM          PROPERTY OF:
JERRY L. LATHAM
1409 EVERGREEN CIRCLE
MIDWEST CITY, OK 73110

```

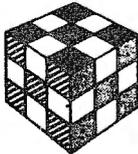
```

5010 CLS:PRINTTAB(18)"CHECKBOOK 1.0":P
RINTTAB(21)"FIXSERCH":PRINT:PRINT"INI
TIALIZING":SC=0:IFPEEK(&H6818)<>205TH
ENRUN"MENU"
5020 PRINT"MERGING DATEIN":MERGE"DATEIN
"
5030 PRINT"MERGING DATEOUT":MERGE"DATEO
UT"
5040 IFPEEK(14312)=255THENGOTO5080ELSEP
RINT"DO YOU REQUIRE HARDCOPY OF THE R
ESULTS (Y/N)? ";:GOSUB6280:IFA="N"THE
NGOTO5070
5050 PRINT"CHECKING PRINTER STATUS":MER
GE"PRINTCK"
5060 GOSUB11000:CMD"F",DELETE11000-1108
0
5070 IFA="N"THENCMD"F",DELETE6220-6260
5080 IFA=3THENCMD"F",DELETE6080-6230
5090 A="":IFAF<>" "THENPRINT"FILE IN USE
IS ";AF;"
DO YOU WISH TO EXAMINE/CORRECT DATA IN
THIS FILE (Y/N)? ";:GOSUB6280
5100 CMD"F",DELETE5010-5100
5110 IFA="Y"THEN5190
5120 ONERRORGOTO6300:Y=0:X=1500:SC=0:AF
="":INPUT"ENTER FILENAME FOR INPUT FI
LE (/DAT:1 EXTENSION WILL BE ADDED)
INPUT FILENAME ";AF:P=USR0(VARPTR(AF))
5130 IFLEN(AF)<1ORLEN(AF)>8ORLEFT$(AF,1
)<"A"ORLEFT$(AF,1)>"Z"THENPRINT"INVAL
ID FILENAME, RE-ENTER.":GOTO5120
5140 AF=AF+"/DAT:1"
5150 Y=0:CLOSE:OPEN"I",1,AF:ONERRORGOTO
0:CLS:PRINT"LOADING DATA ITEM FR
OM FILE ";AF;
5160 IFLOC(1)$=-1THEN5180ELSEPRINT@18,Y
;
5170 INPUT#1,WT(Y),DA(Y),ZD(Y),TY(Y):Y=
Y+1:GOTO5160
5180 CLOSE:PRINT:PRINTY;"ITEMS LOADED S
UCCESSFULLY. FILE CLOSED.":X=Y-1:Y=0:
PRINT"PREPARING DATA FOR SEARCHES. ST
AND BY."
5190 FORY=0TOX:PRINT@62,"*";:SZ(Y)=SGN
(WT(Y)):WT(Y)=ABS(WT(Y)):DA(Y)=ABS(DA
(Y)):ZD(Y)=ABS(ZD(Y)):PRINT@62,"* ";:
NEXTY:CLS:PRINT:PRINT"PRE-SEARCH ORGA
NIZATION COMPLETED.":FORY=0TO1000:NEX
TY:CLS
5200 PRINT"HOW DO YOU WISH TO SEARCH FO
R ITEMS:
1) NO SEARCH-RETURN TO MAIN MENU
2) EXAMINE ANOTHER FILE
3) SEARCH BY NUMBER/TYPE OF ITEM
4) BY DATES
5) BY DESCRIPTION
6) BY AMOUNT"

```

**QUICK**

TRS-80#  
Model  
I/III



**CUBE**

Level II  
16 K

Guaranteed to solve any Rubik's Cube (TM) or triple your money back. Enter 54 color faces of cube or let program set up random pattern to be solved. Program run can be interrupted to allow user to enter his/her own moves. Interesting program. Send \$19.95 plus \$1.50 postage & handling to:

**ALPHA QUEUE SYSTEMS**  
Dept. C  
P. O. Box 20885  
Dallas, TX 75220  
Texas residents add 5% (\$1.00) sales tax. Checks only please.

# Trademark of Tandy Corp. #46  
TM Trademark of Ideal Toy Corp.

```

5210 PRINT"7) NO SEARCH-GET BALANCE OF
THIS FILE

ENTER YOUR CHOICE (1-7) ";
5220 A=INKEY$:IFA<"1"ORA>"7"THEN5220ELSE
EPRINTA:YQ=VAL(A):ONYQGOTO5230,5300,5
320,5520,5680,5840,6340
5230 IFCH%=0ANDYQ=2THEN5120ELSEIFCH%=0A
NDYQ=1THENCLOSE:RUN"MENU",V
5240 PRINTCH%:"CHANGES HAVE BEEN MADE T
O THIS FILE. SAVE IT (Y/N)?":GOSUB62
80:IFA="N"THENCH%=0:GOTO5230
5250 PRINT"SAVING REVISED FILE ";AF:CLO
SE:CMD"O",X,ZD(0),WT(0),DA(0),TY(0),S
Z(0)
5260 FORY=0TOX:ZD(Y)=ZD(Y)*SZ(Y):WT(Y)=
WT(Y)*SZ(Y):DA(Y)=DA(Y)*SZ(Y):NEXTY:O
PEN"O",1,AF
5270 FORY=0TOX:PRINT#1,WT(Y);DA(Y);ZD(Y
);TY(Y);:NEXTY:PRINT"FILE SAVED.":CLO
SE:PRINT"FILE CLOSED.":CH%=0
5280 IFYQ=1THEN5230
5290 GOTO5120
5300 IFCH%=0THEN5120
5310 GOTO5240
5320 GOSUB6290:PRINT"ENTER CHECK NUMBER
, OR
"A9"DEP"A9" OR
"A9"SC"A9"
ENTER CHOICE ";:INPUTAL:P=USR0(VARPTR(A
L)):IFAL="END"THENCLS:GOTO5200
5330 IFAL="DEP"THENTS=1:GOTO5420
5340 IFAL="SC"THENTS=32767:GOTO5420
5350 TS=VAL(AL)+1:IFTS<2THENPRINT"CHECK
NUMBER ";AL;" CANNOT EXIST.":GOTO532
0
5360 IFSC<>1THENPRINT"SORTING FOR SEARC
H.":CMD"O",X+1,WT(0),DA(0),ZD(0),TY(0
),SZ(0):SC=1:PRINT"SORT COMPLETED."
5370 PRINT"SEEKING ITEM # ";AL:GOSUB641
0
5380 PM=(PH-PL)/2+PL:IFTS=WT(PM)THENGOS
UB6020:GOTO5320
5390 IF((PL+PH)=PC)OR(PM<=PB)OR(PM>=PT)
THENCLS:PRINT"ITEM ";AL;" NOT FOUND I
N FILE ";AF:GOTO5320
5400 PC=PL+PH:IFWT(PM)>TSTHENPH=PM:GOTO
5380
5410 PL=PM:GOTO5380
5420 INPUT"ENTER DATE OF ITEM TO SEEK (
MM/DD/YY)";AD:GOSUB10000
5430 IFTS=1THENINPUT"ENTER AMOUNT OF DE
POSIT ";F1
5440 IFSC<>1THENPRINT"SORTING FOR SEARC
H.":CMD"O",X+1,WT(0),DA(0),ZD(0),TY(0
),SZ(0):SC=1:PRINT"SORT COMPLETED."
5450 Y=0:IFTS=32767THENY=X:GOTO5490

```

```

5460 IFWT(Y)<>1THENPRINT"DEPOSIT OF ";A
D;" FOR $";F1;"NOT FOUND.":GOTO5320
5470 IFZD=ZD(Y)ANDEF1=CSNG(DA(Y))THENPM=
Y:GOSUB6020:GOTO5320
5480 Y=Y+1:IFY<=XTHENGOTO5460ELSEPRINT"
DEPOSIT OF ";AD;" FOR $";F1;"NOT FOUN
D.":GOTO5320
5490 IFWT(Y)<>32767THENPRINT"SERVICE CH
ARGE FOR ";AD;" NOT FOUND.":GOTO5320
5500 IFZD=ZD(Y)THENPM=Y:GOSUB6020:GOTO5
320
5510 Y=Y-1:IFY>-1THENGOTO5490ELSEPRINT"
SERVICE CHARGE FOR ";AD;" NOT FOUND."
:GOTO5320
5520 CLS
5530 GOSUB6290:INPUT"ENTER EARLIEST DAT
E TO SEEK (MM/DD/YY)";AD:P=USR0(VARPTR
(AD)):IFAD="END"THENCLS:GOTO5200ELSE
GOSUB10000:V1=ZD
5540 INPUT"ENTER LATEST DATE TO SEEK (M
AY BE SAME AS EARLIEST)";AD:GOSUB1000
0:V2=ZD:IFV2<V1PRINT"LAST DATE CANNOT
BE EARLIER THAN EARLIEST DATE!!!":PRI
NT:GOTO5530
5550 IFSC<>2THENPRINT"SORTING FOR DATE

```



IS THIS YOU?

You know you saw their ad in one of those magazines stacked in the corner... but which one? You are ready to buy their hard/soft Thing-a-magig, but how are you going to find them? What can you do?

THE COMPUTERIST'S DIRECTORY YELLOW PAGES is the one national reference to companies (large and small) and individuals producing and selling the hardware, software, services and supplies that you need. Extensive indexing and cross referencing by product makes it easy to find what you are looking for in the personal and small business field.

THE COMPUTERIST'S DIRECTORY WHITE PAGES list Individuals, Clubs, Associations and Bulletin boards including network I.D. Numbers (Source, CompuServe etc) and a short description of their interests and projects. Find people and clubs who share your interests. Form local and national networks. And if your computer nomenclature is rusty... Just check with the Glossary included in each issue. All from the Computerist's Directory White Pages! THE COMPUTERIST'S DIRECTORY is published twice each year. A one year subscription costs just \$10.00 and includes a free listing in the White Pages and two issues of the Directory, one in January and one in July. It's the best investment you'll make this year!

YOU ONLY HAD TO LOOK IN ONE PLACE!

**the Computerist's Directory**  The National Phone Book of Computing  
 PO BOX 405 (707) 887-1857  
 FORESTVILLE, CA 95436

## Checkbook

```
SEARCH." :CMD"O",X+1,ZD(0),WT(0),DA(0)
, TY(0),SZ(0):SC=2:PRINT"SORT COMPLETE
D."
5560 PRINT"SEARCHING.":GOSUB6410
5570 PM=(PH-PL)/2+PL:IF(ZD(PM)=>V1)AND(
ZD(PM)<=V2)THENGOTO5610
5580 IF((PL+PH)=PC)OR(PM<=PB)OR(PM)=PT)
THENCLS:PRINT"NO ITEMS FOUND WITHIN D
ATES SPECIFIED.":GOTO5530
5590 PC=PL+PH:IFZD(PM)>V1THENPH=PM:GOTO
5570
5600 PL=PM:GOTO5570
5610 IFPM=0THEN5640
5620 PM=PM-1:IFZD(PM)>=V1ANDZD(PM)<=V2T
HEN5610
5630 PM=PM+1:IFPM>PTTHENGOTO5670
5640 GOSUB6020
5650 PM=PM+1:IFPM>PTTHEN5670
5660 IFZD(PM)>=V1ANDZD(PM)<=V2THEN5640
5670 PRINT:PRINT"ALL ITEMS WITHIN DATES
SPECIFIED HAVE BEEN LISTED.":GOTO5530
5680 CLS
5690 PRINT@PA-64,"ENTER NEGATIVE VALUE
TO RETURN TO MENU":FORP=0TO3:PRINTA(P
);:NEXTP:INPUTTY:IFTY<0THENCLS:GOTO52
00
5700 IFTY<0ORTY>YBTHENCLS:PRINT"INVALID
TYPE CODE.":GOTO5690
5710 IFSC<>3THENPRINT"SORTING FOR SEARC
H.":CMD"O",X+1,TY(0),WT(0),DA(0),ZD(0)
),SZ(0):SC=3:PRINT"SORT COMPLETE."
5720 PRINT"SEARCHING.":GOSUB6410
5730 PM=(PH-PL)/2+PL:IFTY(PM)=TYTHENGOT
O5770
5740 IF((PL+PH)=PC)OR(PM<=PB)OR(PM)=PT)
THENCLS:PRINT"NO ITEMS OF TYPE #";TY;
"FOUND.":GOTO5690
5750 PC=PH+PL:IFTY(PM)>TYTHENPH=PM:GOTO
5730
5760 PL=PM:GOTO5730
5770 IFPM=0THEN5800
5780 PM=PM-1:IFTY(PM)=TYTHENGOTO5770
5790 PM=PM+1:IFPM>PTTHENGOTO5830
5800 GOSUB6020
5810 PM=PM+1:IFPM>PTTHEN5830
5820 IFTY(PM)=TYTHEN5800
5830 PRINT"LAST MATCH IN FILE HAS BEEN
LISTED.":PRINT:GOTO5690
5840 CLS
5850 INPUT"ENTER THE LEAST AMOUNT TO SE
ARCH FOR, OR
ENTER A NEGATIVE AMOUNT TO RETURN TO ME
NU";F1:IFF1<0THENCLS:GOTO5200
5860 INPUT"ENTER THE GREATEST AMOUNT TO
SEARCH FOR.
THIS MAY BE EQUAL TO THE LEAST AMOUNT A
LREADY ENTERED.":F2
5870 IFF2<F1THENPRINT"GREATEST AMOUNT M
AY NOT BE LESS THAN LEAST AMOUNT.":PR
INT:GOTO5850
5880 IFSC<>4THENPRINT"SORTING FOR SEARC
H.":CMD"O",X+1,DA(0),WT(0),ZD(0),TY(0)
),SZ(0):SC=4:PRINT"SORT COMPLETED."
5890 PRINT"SEARCHING.":GOSUB6410
5900 PM=(PH-PL)/2+PL:IFCSNG(DA(PM))>=F1
ANDCSNG(DA(PM))<=F2THENGOTO5940
5910 IF((PL+PH)=PC)OR(PM<=PB)OR(PM)=PT)
THENCLS:PRINT"NO ITEMS FOR VALUES EN
TERED FOUND.":GOTO5850
5920 PC=PH+PL:IFCSNG(DA(PM))>F1THENPH=P
M:GOTO5900
5930 PL=PM:GOTO5900
5940 IFPM=0THEN5970
5950 PM=PM-1:IFCSNG(DA(PM))>=F1CSNG(DA(
PM))<=F2THEN5940
5960 PM=PM+1:IFPM>PTTHEN6000
5970 GOSUB6020
5980 PM=PM+1:IFPM>PTTHEN6000
5990 IFCSNG(DA(PM))>=F1ANDCSNG(DA(PM))<
=F2THEN5970
6000 PRINT"ALL ITEMS WITHIN VALUE LIMIT
S IN FILE HAVE BEEN LISTED.":PRINT:GO
TO5850
6010 END
6020 CLS:IFWT(PM)=1THENAL="DEP":GOTO605
0
6030 IFWT(PM)=32767THENAL=" SC":GOTO605
0
6040 AL=STR$(WT(PM)-1)
6050 PRINT"ITEM ";AL;" DESCRIPTION:
";BT(TY(PM))
6060 PRINT"DATE: ";ZD=ZD(PM):GOSUB1015
0:PRINTAD
6070 PRINTUSING"AMOUNT: $$$,###.##";DA(
PM):PRINT
6080 PRINT"DO YOU WISH TO MAKE ANY CORR
ECTIONS TO THE ITEM (Y/N) ? ";:GOSUB6
280:IFA="N"THENRETURN
6090 PRINT"CORRECT THE DATE (Y/N/E) ? ";
:GOSUB6280:IFA="N"THEN6110ELSEIFA="E"
THEN6210
6100 CH#=CH#+1:INPUT"ENTER NEW DATE (MM
/DD/YY)";AD:GOSUB10000:ZD(PM)=ZD
6110 PRINT"CORRECT THE AMOUNT (Y/N/E) ?
";:GOSUB6280:IFA="N"THEN6130ELSEIFA="
E"THEN6210
6120 CH#=CH#+1:INPUT"ENTER THE CORRECT
AMOUNT";DA(PM)
6130 PRINT"CORRECT THE ITEM NUMBER (OR
CHANGE TYPE ITEM) (Y/N/E) ?";:GOSUB628
0:IFA="N"THEN6190ELSEIFA="E"THEN6210
6140 CH#=CH#+1:PRINT"ENTER THE CORRECT
ITEM NUMBER OR "A9"DEF"A9" OR "A9"SC"
A9" ";:INPUTAL
```

```

6150 IFAL="DEP"THENSZ(PM)=1:WT(PM)=1:GO
      TO6190
6160 IFAL="SC"THENSZ(PM)=-1:WT(PM)=3276
      7:GOTO6190
6170 WT=VAL(AL)+1:IFWT<2THENPRINT"CHECK
      NUMBER "AL" CANNOT EXIST.":GOTO6140
6180 SZ(PM)=-1:WT(PM)=WT
6190 CH% =CH%+1:PRINT"CORRECT THE ITEM D
      ESCRIPTION OF ITS TYPE (Y/N)":GOSUB6
      280:IFA<>"Y"THEN6210
6200 GOSUB12000:TY(PM)=TY
6210 PRINT"
FIND FUNCTION TERMINATED
"
6220 LPRINT"CORRECTED DATA:"
6230 LPRINT"ITEM ";AL;" DESCRIPTION
      : ";BT(TY(PM))
6240 LPRINT"DATE: ";ZD=ZD(PM):GOSUB101
      50:LPRINTAD
6250 LPRINTUSING"AMOUNT: $$$,###.##";DA
      (PM):LPRINT
6260 RETURN
6270 PRINT:PRINT"PRESS Y, N, OR E TO C
      ONTINUE ";
6280 A=INKEY$:IFA=" "THEN6280ELSEP=USR0(
      VARPTR(A)):IFA<>"Y"ANDA<>"N"ANDA<>"E"

```

```

THEN6280ELSEPRINTA:RETURN
6290 PRINT:PRINT"ENTER "A9"END"A9" TO R
      ETURN TO MENU":RETURN
6300 IFERR/2+1=54THENPRINT"FILE ";AF;"
      NOT FOUND ON DISK.
RETRY WITH DIFFERENT FILE NAME.
FILES AVAILABLE ON DRIVE 1 ARE:" :FORYQ=
      0TO600:NEXTYQ
6310 RESUME6320
6320 ONERRORGOTO0:CMD"DIR 1"
6330 GOTO5120
6340 CLS:PRINT"COMPUTING TOTAL FOR FILE
      ";AF
6350 DB=0:DT=0:FORY=0TOX:DT=DT+(DA(Y)*S
      Z(Y)):IFTY(Y)=0THEN6370
6360 DB=DB+(DA(Y)*SZ(Y))
6370 NEXTY
6380 PRINT"BALANCE FOR FILE ";AF"; IS "
      :PRINTUSING"$##,###.## WITH BAL FWD.
      ";DT:PRINTUSING"$##,###.## W/O BAL FW
      D.":DB
6390 PRINT:PRINT"PRESS <ENTER> TO CONTI
      NUE";
6400 A=INKEY$:IFA<>CHR$(13)THEN6400ELSE
      CLS:GOTO5200
6410 PL=0:PB=0:PT=X:PH=X+1:PC=0:RETURN ■

```

## Marymae INDUSTRIES, INC.

In Texas, Orders,  
Questions & Answers  
1-713-392-0747

22511 Katy Freeway  
Katy (Houston), Texas 77450

To Order  
1-800-231-3680  
800-231-3681

### SAVE BIG DOLLARS ON ALL TRS-80® HARDWARE & SOFTWARE

TRS-80® by Radio Shack. Brand new in cartons delivered. Save state sales tax. Texas residents, add only 5% sales tax. Open Mon-Sat. 9-6. We pay freight and insurance. Come by and see us. Call us for a reference in or near your city. Ref: Farmers State Bank, Brookshire, Texas.

#### WE OFFER ON REQUEST

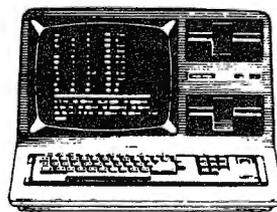
Federal Express (overnight delivery)

Houston Intercontinental Airport  
Delivery, Same Day Service

U.P.S. BLUE—Every Day

References from people who have  
bought computers from us probably  
in your city. We have thousands  
of satisfied customers. WE WILL  
NOT BE UNDERSOLD!

ED McMANUS



In stock TRS-80 Model  
II and III

No Tax on Out of Texas Shipments!

Save  
10% 15%  
OR MORE

Reserve your Model 16 Today!

TELEX: 77-4132 (FLEXS HOU)

#### WE ALWAYS OFFER

NO extra charge for Master Card or Visa

We use Direct Freight lines. No long waits

We always pay the freight and insurance

Toll free order number

Our capability to go to the giant TRS-80®  
Computer warehouse 5 hours away, in  
Ft. Worth, Texas, to keep you in stock.

® TRS-80 is a Registered Trademark of Tandy Corp.

JOE McMANUS



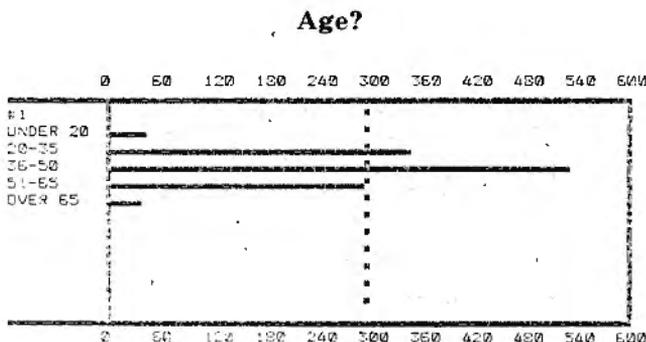
# 48

# Reader survey

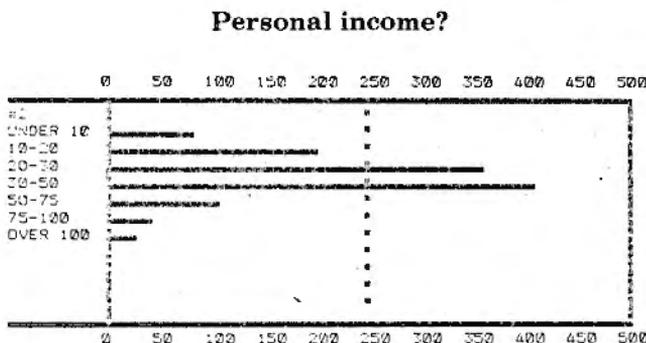
## Results of the April questionnaire

Mike Schmidt, Publisher

The results of our April 1982 reader survey have been tabulated. The findings of this survey are based on 1264 respondents. The numbers above the graphs which follow indicate the number of responses to a given class or category. In many cases, the total number of responses exceeds the total number of surveys returned because multiple answers were possible.



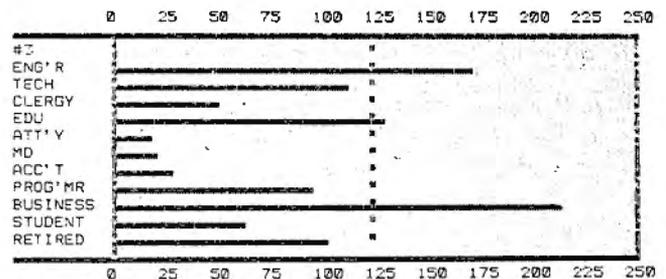
As you can see from Figure 1, the bulk of our readers are in the 36- to 50-year range. Comparison to our survey taken two years ago indicates that our average reader is slightly older. The number of people in the 20- to 30-year-old group has dropped by six percent since the last survey. Almost 60 percent of our readers have a personal income in the \$20,000 to \$50,000 range.



The distribution of professions has stayed largely the

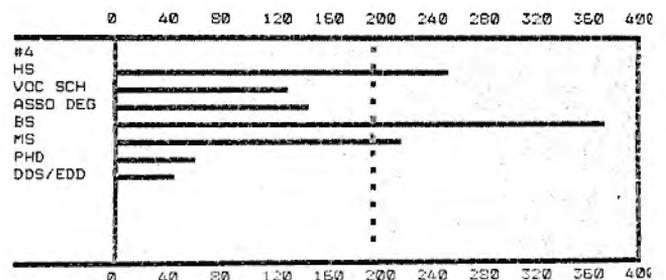
same over the past two years. Two years ago, there were so many who wrote in "clergy" or "retired" that we added them to the current survey. Clergy now account for about four percent, and retired about eight percent of the respondents. Business people are still the largest group of readers.

### Occupation?



Over 50 percent of our readers still hold college or graduate degrees. The average educational level of our readers is approximately a B.S. degree. The Ph.D. is getting rarer, but we show gains on the M.S. degree.

### Education?



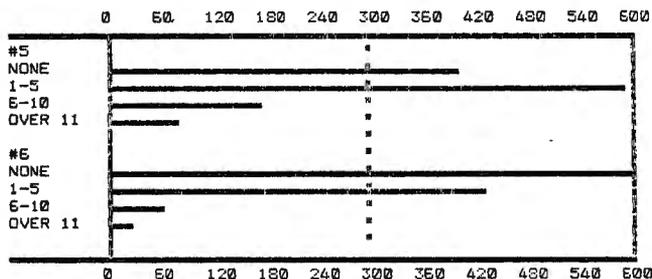
The number of games purchased has grown. This is expected, since the number available has increased, and the quality of games has improved. Over 20 percent of our readers bought over five games within the last year as compared to only 12 percent who did so in 1980.



## Survey

How many computer games have you purchased in the past year?

How many educational programs have you purchased in the past year?

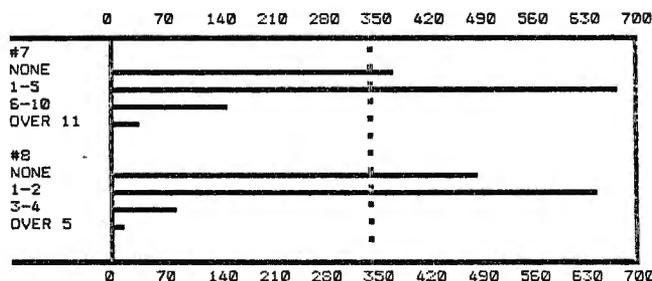


Educational software is still not getting the play expected of it. Over half of those answering this question have bought none in the past year.

Business software is the big seller. Over 68 percent have purchased business software in the past year.

How many business programs have you purchased in the past year?

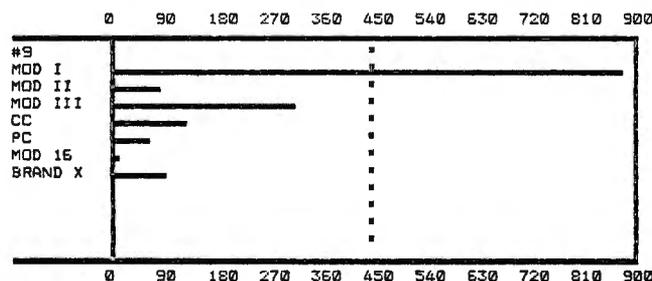
How many operating systems have you purchased in the past year?



Operating systems are popular. Over half of our readers have purchased one or two in the past year. This is interesting, since the TRS-80 comes *with* an operating system.

The distribution of TRS-80 models has changed drastically — many new models have been introduced since our last survey. The Model I is still owned by the largest group: 55.5 percent. There are even 11 proud owners of the Model 16. (Remember that this survey was taken in April and the Model 16 was not available. Actually, the wording of the question was "Model 16 on order.") The most surprising response to this question was that over one-third of the people owned more than one TRS-80 computer.

Which computers do you own?



# DISCOUNT

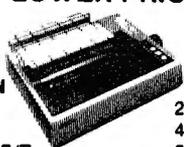
COMPARE OUR PRICES!  
CALL FREE



## EPSON

NEW LOWER PRICES!

EPSON MX-70	299.00
MX-80	469.00
MX-80 F/T	569.00
MX-100	\$749



## PARAGON

Gold magnetics DISKETTES

premium Single-Sided Soft-Sector Double-Density, 5 1/4 inch diskettes with reinforcing HUB-RINGS Individually 100% ERROR-FREE certified Invest in GOLD! PARAGON MAGNETICS GOLD \$23.95



INTERFACE CARDS	Price
8141 (RS-232)	\$ 75
8150 (2K Buffered RS-232)	\$ 150
8161 (IEEE 488)	\$ 55
8131 (Apple Card)	\$ 85
8230 (Apple Card)	\$ 25
8220 (TRS-80 Cable)	\$ 35

OKIDATA MICROLINE 82A	549.00
OKIDATA MICROLINE 83A	799.00
OKIDATA MICROLINE 84	1199.00

(DOUBLE-DENSITY) Single-sided soft-sector 5 1/4 inch 100% error free certified. These diskettes are fully guaranteed for one year against defects (return any bad diskette) and we will replace FREE.

MODEL I complete MODEL III  
**DISK DRIVES**

Includes Case, Power Supply and External Drive Connector

**\$289<sup>95</sup>**

**BARE DRIVES TANDON 5 1/4 INCH**

100-1 SINGLE HEAD 40 TRK	219.00
100-2 DUAL HEAD 40 TRK	299.00
100-3 SINGLE HEAD 80 TRK	299.00
100-4 DUAL HEAD 80 TRK	429.00

**MODEMS**

UDS 103 LP DIRECT CONNECT	175.00
UDS 103 JLP AUTO ANS	209.00
HAYES MICROMODEM II (APPLE)	299.00
HAYES 100 MODEM (S-100)	325.00
HAYES SMART MODEM (RS-232)	249.00

MDS Disk Pak Box of 10 ..... \$21.95  
5 Boxes of 10 Disks ..... \$99.95

## VERBATIM

Soft-Sector Diskettes	Price
5 1/4" 1S/D/Den (MD525-01)	\$26.95
5 1/4" 2S/D/Den (MD550-01)	\$39.95
5 1/4" 2S/4Den (MD557-01)	\$51.50
8" 1S/D/Den (FD34-8000)	\$43.95

Hard-Sector Diskettes	Price
5 1/4" 1S/D/Den 10-sector (MD525-10)	\$26.95
5 1/4" 2S/D/Den 10-sector (MD550-10)	\$39.95
5 1/4" 2S/4Den 10-sector (MD557-10)	\$51.50

Supplies	Price
HUB RING KIT for 5 1/4" disks	\$10.95
HUB RING KIT for 8" disks	\$12.95
REFILLS (50 Hub Rings)	\$ 5.95
CLEANING KIT for 5 1/4" drives	\$24.95
5 1/4" inch diskette case	\$3.50
8-inch diskette case	\$3.95
5 1/4" inch File Box for 50 diskettes	\$24.95

# MODEL III DISK UPGRADE !!

## 100% Compatible

- Switching Power Supply (Runs cooler)
- 40/80 Track supported
- Single/Dual Head supported
- Metal disk drive brackets
- All hardware and cables for 2 disk drive
- 1 Hour or less for installation.

Single drive assy.†	<b>\$549</b>
Two drive assy.	<b>\$764.00</b>
Assy. w/out drives # 49	<b>\$329.00</b>

MOST ORDERS SHIPPED WITHIN ONE BUSINESS DAY  
Products damaged in transit will be exchanged.

Prices, Specifications, and Offerings subject to change without notice.

WE ACCEPT  
• VISA  
• MASTER CHARGE  
• CHECKS  
• MONEY ORDERS  
• C O D

• Add \$3.00 for shipping & handling  
• \$3.00 EXTRA for C.O.D.  
• Ohio residents add 6.5% sales tax.

## MDS MICRO DATA SUPPLIES

7541 MENTOR AVENUE/#108  
MENTOR, OHIO 44060  
Just Call Collect: (216) 951-6502

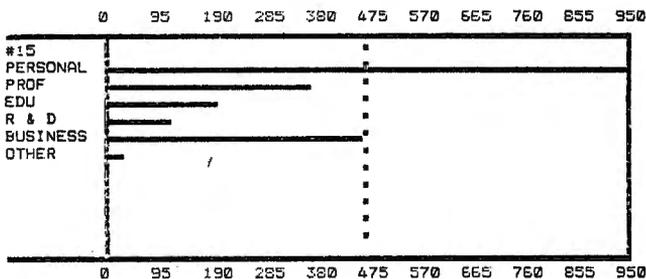
FOR VISA/MASTERCHARGE/C.O.D. ORDERS  
TOLL FREE LINES WILL ACCEPT ORDERS ONLY!

August, 1982 81

Over 71 percent of our readers now have disk drives, compared to 50 percent in 1980. Most software is purchased via mail order (43 percent), followed closely by purchase through local stores (32 percent).

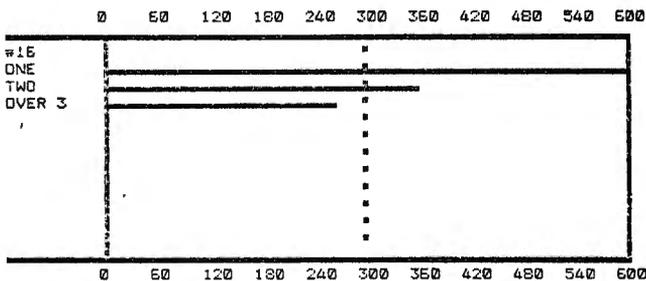
The computer itself is purchased from local stores (62 per cent) and from mail order businesses (34 percent). Local stores lead in the sale of line printers (48 percent), and mail order comes in at 34 percent.

**How is your computer used?**



This question prompted some very interesting answers. Personal/hobby use of the computer was double that of any other category. Business usage was second, with professional being third. Educational use was next, followed by research and development. These results clearly show that the microcomputer is, indeed, a "personal" computer.

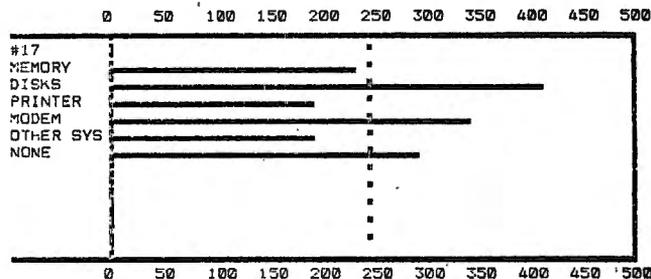
**How many people in your household use personal computers?**



About half of the households surveyed contained individual operators. Approximately 30 percent have two people using personal computers, and a surprising 21 percent are used by three or more people.

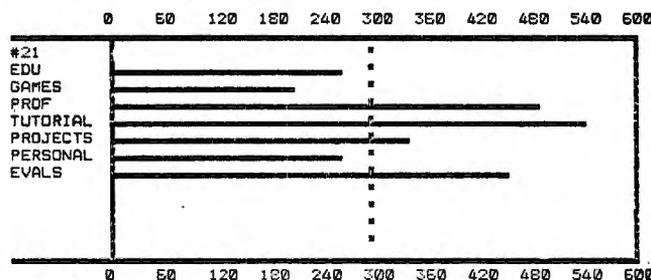
Plans for expansion in the next year included adding disk drives (24 percent), adding a modem (20 percent), adding memory (14 percent) and adding a printer (12 percent). Two years ago, adding disks was first, followed by adding memory and buying a printer. Modems were low on the list then. Now, a modem is the second most-wanted expansion.

**What are your plans for expansion in the next year?**



Most readers want to know of more ways to use their computers. Over 20 percent suggested more tutorial articles. Building projects are wanted by 12 percent. Sixteen percent would like to see more evaluations and reviews.

**Which articles would you like to see more of in the future?**



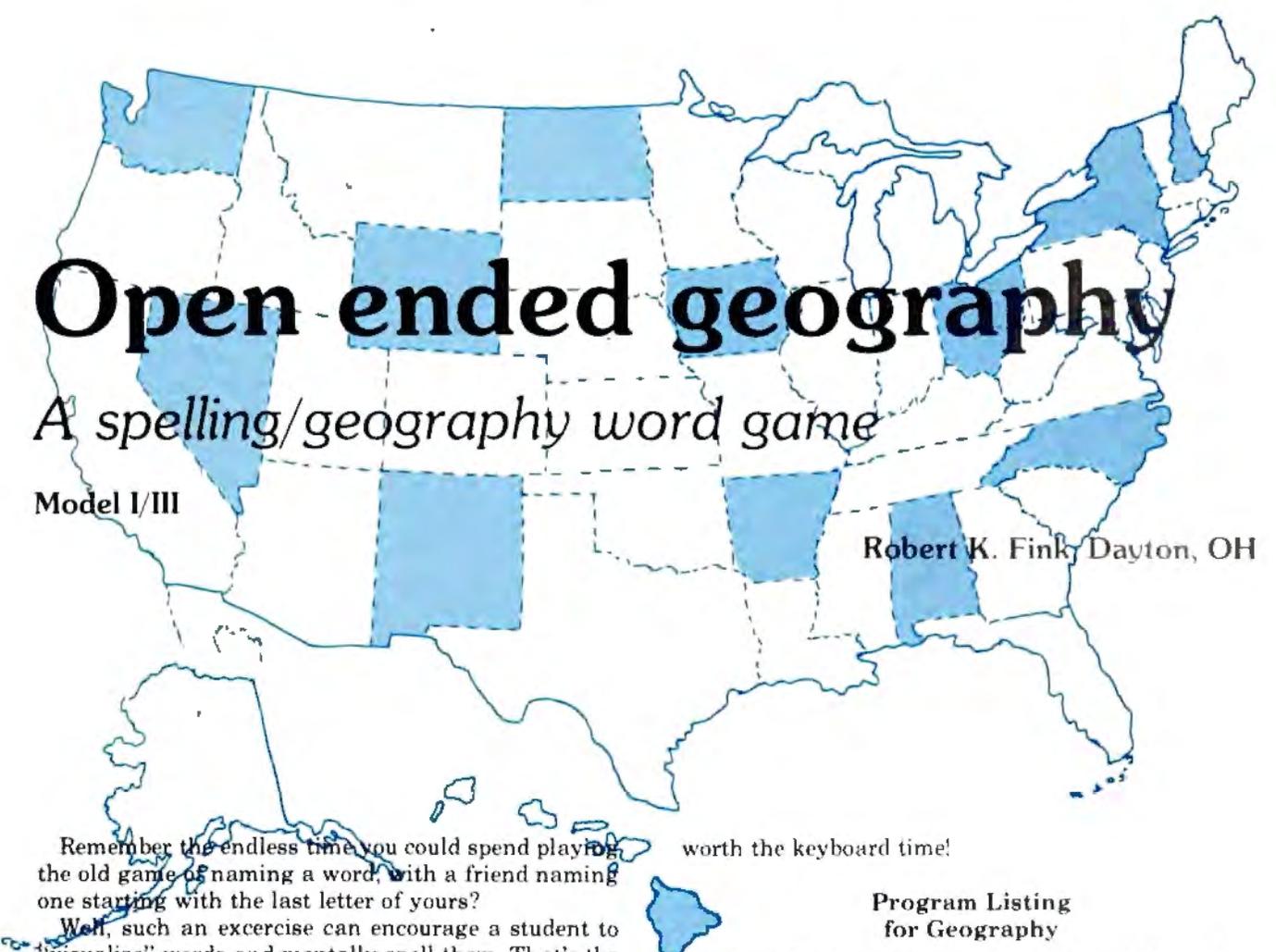
Eighty-six percent evaluated readability of the magazine as good/excellent as opposed to only 68 percent in 1980. We have been working hard on readability and content value. It's rewarding to know that the effort has not gone unnoticed.

Now that all of the clinical stuff is out of the way, just what does all of this prove? You bought a good computer (probably at a fair price), and are having a good time learning how to use it. It probably keeps you out of the bars and pool halls. You spend money on new additions to your system whenever the price meets what you see as a fair value.

What will this do for *80-U.S. Journal*? It gives that added "tweek" to our editorial direction. We live with the industry daily and try to keep on top of new directions. Your input serves not only as a measuring stick of what is needed, but tells us how well we are actually reading our audience.

The last question on the survey, having to do with providing the programs in *80-U.S. Journal* on tape or diskette, has caused quite a stir around here. Sixty-two percent of you said you would go for it. There are several ways we could do this and the methods available are under serious consideration. The problems, now that there are several models to consider, are with compatibility. For example, tape will not work with Model II. There are different diskette formats for Model I, III and the Color computer. Also with diskettes, there are different densities and tracks to consider. It may turn out that the only common link between all the models will be RS-232 and telecommunication. We are looking at the available alternatives.

Your input has been useful. We will make adjustments to our editorial direction because of it and we thank you for your participation. ■



# Open-ended geography

## A spelling/geography word game

Model I/III

Robert K. Fink, Dayton, OH

Remember the endless time you could spend playing the old game of naming a word, with a friend naming one starting with the last letter of yours?

Well, such an exercise can encourage a student to "visualize" words and mentally spell them. That's the first step toward mastering the art of good spelling. If we couple some recognition of the names of the states, we come up with a handy, "fun" way of teaching two concepts.

In "Open-Ended Geography," we allow more flexibility in the responses. You may put a word in front of the last, or behind it. This means you need to match the last letter of the new word to the first of the former, or vice versa. It offers a challenge, and it will surprise you how many combinations continue to come up as the 50 states are used. No state can be played twice.

To avoid frustration, the computer will take your turn if you call for "help." Score is given to the player for a successful entry, or to the computer on "his" turn. Scoring can easily be deleted if you don't want competition involved.

The program was written on a TRS-80 Level II machine. It uses fairly "standard" BASIC statements, however. Without the remarks, it occupies very little memory. The general "flow" can be adapted to many "turns" type games, and will offer you a chance to exchange a second player's response for the computer's turn, if you want a two-player game.

After you play the game, I think you'll pick up some forgotten knowledge of the letter arrangement of the states. Plus, if you follow the coding, you'll see other programming possibilities.

A double payoff for "teacher" and "learner" has to be

worth the keyboard time!

### Program Listing for Geography

```
1 '*****
2 ' OPEN ENDED G E O G R A P H Y
3 ' R.K. FINK 10/20/80 MOD I/III
4 '*****
20 '
90 ' INITIALIZE AND DECIDE WHO'S FIRST

100 CLEAR2000:DIMS$(50)
110 CLS:PRINT" WHO'S FIRST... FOR SO
ME":GOSUB5000:CLS:PRINT@256,CHR$(23);
"G E O G R A P H Y...":PRINT
120 INPUT"... 'YOU' OR 'ME' ..";ANS
130 IF AN$="YOU"THEN TR=1:GOTO160
140 IF AN$="ME" THEN TR=0:GOTO160
150 CLS:GOTO110
155 ' :: INITIALIZE THE STATES ARR
Y ::
156 ' :: EACH NEW GAME WILL START H
ERE ::
160 T=TR:FORI=1TO50:READS$(I):NEXTI
170 F=0:CLS
180 IF T=1 THEN200 ELSE GOTO 500
190 '
195 ' :: COMPUTER MOVES FIRST ('MAINE
' IS NOT ALLOWED) ::
200 R=RND(50):IFR=1THEN200
```

```

210 A$=S$(R):N=R:NR$=RIGHT$(A$,1):NL$=L
    EFT$(A$,1):GOSUB1000
220 F=0:GOSUB2000
230 C=C+1:GOSUB900:T=0:GOTO250
240 '
245 '   ::: ALL SUBSEQUENT MOVES START
    HERE   :::
250 IF T=0 THEN300 ELSE 400
290 '
295 '   ::: HUMAN'S SUBSEQUENT MOVE   ::
    :
300 GOSUB3000:IF IP$="HELP" THEN 600
310 FF=0:GOSUB3500
320 IF FF=3THENPRINT@832,CHR$(31);"OOPS
    ...THAT ONE'S BEEN USED BEFORE!!";GO
    SUB5000:GOTO300
330 F=0:GOSUB4000
340 IF F=3THEN PRINT@832,CHR$(31);"THAT
    ONE WON'T FIT EITHER END!!..TRY AGAI
    N";:GOSUB5000:GOTO300
350 GOSUB1000:GOSUB2000
360 H=H+1:GOSUB900:T=1:GOTO250
380 '
390 '   ::: COMPUTER'S SUBSEQUENT MOVE
    S   :::
400 GOSUB5000:R=RND(50):FORN=1TO50
410 A$=S$(R):IF A$<>" " THEN450
415 R=R+1:IF R>50THEN R=1
420 NEXTN:GOTO700
450 GOSUB4000:IF F=3 THEN415
460 N=R:GOSUB1000:GOSUB2000
470 C=C+1:GOSUB900:T=0:GOTO250
480 '
490 '   ::: HUMAN MOVES FIRST   :::
500 GOSUB3000:IF IP$="MAINE" THENPRINT@

```

```

832,CHR$(31);"OH COME ON... THAT'S TO
O EASY A WIN. TRY ANOTHER.":;GOSUB50
00:GOTO500
510 GOSUB3500:NR$=RIGHT$(A$,1):NL$=LEFT
$(A$,1):GOSUB1000:F=0:GOSUB2000
520 H=H+1:GOSUB900:T=1:GOTO250
580 '
590 '   ::: HUMAN NEEDS HELP!!   :::
600 PRINT@832,CHR$(31);"OK... I'LL TAKE
    YOUR TURN TO HELP YOU!!";:GOSUB5000
610 T=1:GOTO250
680 '
690 '   ::: NO MORE MOVES... END THE GA
    ME   :::
700 CLS:PRINTCHR$(23):GOSUB900:PRINT:PR
    INT"WELL...
    NO PLAYS ARE LEFT >>>"
710 PRINT:PRINT:INPUT"THANKS.. GOOD GAM
    E
    PLAY AGAIN???..(Y/N)";AA$
730 IF AA$="N" THEN END
740 IF TR=1 THEN TR=0 ELSE TR=1
750 H=0:C=0:RESTORE:GOTO160
760 '
770 '
800 DATAMAINE,HAWAII,GEORGIA,FLORIDA,MO
    NTANA,MISSOURI,SOUTH CAROLINA,RHODE I
    SLAND,WYOMING,WISCONSIN,MISSISSIPPI,M
    INNESOTA,PENNSYLVANIA,OREGON,WEST VIR
    GINIA, WASHINGTON
810 DATAVIRGINIA,VERMONT,UTAH,OKLAHOMA,
    OHIO,NORTH DAKOTA,MICHIGAN,MASSACHUSE
    TTS,MARYLAND,DELAWARE,CONNECTICUT,COL
    ORADO,CALIFORNIA,LOUISIANA,KENTUCKY,K
    ANSAS

```

# 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, or Microconnection modem. 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 Fort.

**Lindbergh Systems**

41 Fairhill Road, Holden, MA 01520 (617) 852-0233

Source: TCA818 CompuServe: 70310.267 TRS-80 is a "™ of Tandy Corp

```

820 DATANORTH CAROLINA,NEW YORK,TEXAS,T
ENNESSEE,SOUTH DAKOTA,NEW MEXICO,IOWA
,INDIANA,ARKANSAS,ARIZONA,ALASKA,ILLI
NOIS,IDAHO,ALABAMA,NEW JERSEY,NEBRASK
A,NEW HAMPSHIRE,NEVADA
830 '
840 ' ::: DISPLAY THE SCORE :::
900 PRINT@0,"ME... ";C,"YOU..... ";H;:R
ETURN
990 '
995 ' ::: THESE ARE THE UTILITY SUBROU
TINES :::
999 ' ** NULL ARRAY AFTER ACCEPTA
BLE ENTRY **
1000 S$(N)="" :L=LE:LE=LEN(A$):R$=NR$:L$
=NL$:RETURN
1990 '
1995 ' ** DISPLAY AN INPUT F IS RT, L
EFT OR MIDDLE FLAG **
2000 IF F=0 THEN S=478:GOSUB2030:GOTO20
40
2010 IF F=1 THEN S=477-LE:GOSUB2030:GOT
O2050
2020 IF F=2 THEN S=SR:GOSUB2030:GOTO205
0
2030 FORN=1 TO LE:POKE15360+S+N-1,ASC(M
ID$(A$,N,1)):NEXTN:RETURN
2040 SR=479+LE:RETURN
2042 '
2045 ' ** MOVE LAST WORD IN TO CENTER
**
2050 GOSUB5000:B$=STRING$(LE+L+2,32):IF
F=2 THEN 2130
2060 FOR N=1 TO LE+1

```

```

2070 PRINT@S,B$;
2080 PRINT@S+N,A$;
2090 FORT=1TO15:NEXT
2100 NEXTN
2110 S=478:SR=479+LE
2120 RETURN
2130 FOR N=S TO 478 STEP-1
2140 PRINT@478,B$;
2150 PRINT@N,A$;
2160 FORT=1TO15:NEXT
2170 NEXTN
2180 GOTO2110
2980 '
2990 ' ** INPUT A HUMAN MOVE **
3000 PRINT@832,CHR$(31);"O K ... YOUR T
URN, WHAT STATE???"
3010 INPUT"(IF YOU'RE STUMPED TYPE...'H
ELP')";IP$
3020 PRINT@832,CHR$(31);
3030 RETURN
3480 '
3490 ' ** GET STATE ARRAY NUMBER **
3500 FOR N= 1TO 50
3510 IF S$(N)=IP$ THEN A$=S$(N):RETURN
3520 NEXTN
3530 FF=3:RETURN
3980 '
3990 ' ** SEE WHICH END FITS **
4000 NL$=LEFT$(A$,1):NR$=RIGHT$(A$,1)
4010 IF NL$=R$ THEN F=2:GOTO4040
4020 IF NR$=L$ THEN F=1:GOTO4040
4030 F=3:RETURN
4040 RETURN
4990 ' ** DELAY TIMER **
5000 FORTT=1TO1000:NEXT:RETURN ■

```

## DISCOUNT TRS® 80 COMPUTERS BUY DIRECT

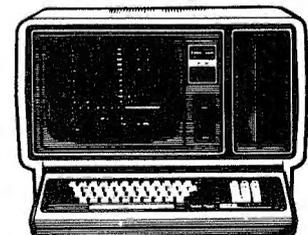
- ✓ No Out-of-State Taxes
- ✓ Large Inventory
- ✓ 100% TRS-80 Equipment
- ✓ Visa or Mastercard Accepted
- ✓ Bank Cashier's Check
- ✓ Bank Money Order
- ✓ Wire Transfers

1-800-835-9056  
 Kansas Residents  
 316-624-8610 (Collect)  
 Call Today For Your  
 Price List!

**Jimscot, Inc.**

1023 N. Kansas — Box 607  
 Liberal, Ks. 67901

# 51



26-4002  
 Model II 64K

TRS-80 is a registered Trademark of Tandy Corp.

# Files and foibles



## Recursive programming

Model I/II/III and Color Computer

©1982, T.R. Dettmann, Associate editor

On our travels through techniques for dealing with files, we've covered quite a few foibles. This time we'll cover still another that's needed to get back to binary trees: 'recursive' programming.

Technically speaking, I really haven't found a definition of 'recursion' adequate for the job. I think the Devil's D.P. Dictionary (Stan Kelly-Bootle, McGraw-Hill, New York, \$7.50) defined it best:

recursive, adj., See RECURSIVE

Simply put, something which is recursive uses itself in its own definition.

In programming, it is occasionally useful in solving a problem to be able to have a subroutine call itself. In every case I know of, there is always a way of solving the problem in a non-recursive manner. However, in some cases, expressing the problem solution in non-recursive terms makes it more difficult to follow. This clouds the solution, and can make the program harder to write and debug.

Recursive techniques were first studied in a systematic fashion in the 1920s by mathematicians. Many functions are most simply defined in terms of 'recurrence' relations.

For example, the 'Fibonacci' numbers are defined by the sequence:

```
f(0)=1
f(1)=1
:
:
f(n+1)=f(n)+f(n-1)
```

Fibonacci numbers are named after Leonardo Pisano,  
86 80-U.S. Journal

sometimes called Leonardo Fibonacci, who originated them in 1202, to solve the problem of how many pairs of rabbits can be produced from a single pair in a year's time. These numbers occur frequently in biological problems and computer science.

We'll find that the technique for printing a binary tree in alphabetical order will involve some recursive programming (or its equivalent). Let's deal with recursion first, without having to worry about file handling.

### Programming Recursion

Some computer programming languages (such as Pascal) can handle recursion directly. If you want a subroutine (procedure in Pascal) to call itself, you simply call it. This makes the use of recursive techniques natural in this kind of language. BASIC isn't that capable.

There is no problem with BASIC calling itself. You can GOSUB to anywhere, from anywhere, without restriction. (Try Program 1 to see what I mean.) The problem is that you really can't get much from it.

In BASIC, all variables are shared by every subroutine. This makes them "global." In most cases, however, we want to deal with different numbers at each call to a subroutine. We have to save the status of the subroutine before we have it call itself again. When it returns, we have to get back what we were using when we called it. Confusing, isn't it?

That's the problem with recursion for most people. Just talking about it makes your head swim. In some cases, it's kind of like pulling yourself up by your bootstraps. If we do sort out the problem, and make sense of it, it becomes a powerful technique that expands what you can do with your programming.

I'd like to explain recursion by example — a rather



1. If the number of disks to move is greater than 1, then move n-1 disks to tower C.
2. Move nth disk to tower B.
3. If the number of disks is greater than 1, then move n-1 disks from tower C to tower B.

Each time we say move some number of disks, we start over at step 1 with the new number of disks to move. Look at Figure 1 to see how to move three disks from tower 1 to tower 2.

To program this, we have to remember where 'from,' 'to,' and 'temporary' are, as well as the number of disks to move each time we make a recursive call to the subroutine. The simplest way to do this is with a stack.

The program that solves the Towers of Hanoi problem remembers what the current parameters are every time the subroutine itself is called (except for the very first) by pushing all four numbers into a stack array which is two-dimensional. Just before returning from the routine, we get back the last set of parameters, since we'll be returning into the middle of the routine (except for the very last time).

Let's look through the program. Lines 100 through 150 initialize the program, while lines 200 through 260 form a simple command loop.

The important parameters are FRM (the tower we're moving disks from), TT (the tower we're moving disks to), TMP (the tower we're going to use for temporary storage), and N (the number of disks to move). After

setting these parameters to move all of the disks from tower 1 to tower 2, we initialize the towers in subroutine 900 by setting the value of the first N places of the array for tower 1, and zeroing the others.

The subroutines at 1200, 1300 and 1400 display the towers, stack, and number of moves, respectively. After the display is complete, we start the recursive process by the GOSUB1000.

The subroutine from line 1000-1050 is a simple translation of our design above. If there's more than one disk, we GOSUB2000, which pushes N, FRM, TT and TMP onto the stack. Then we set up to move the N-1 disks above the bottom to TMP by setting TT to TMP and TMP to TT and then GOSUB1000. This is the first recursive call.

When we finally get down to N=1, we pass to line 1020, where we move a single disk (GOSUB1100) and then display the result (GOSUB1200). This also happens if we return after the subroutine call above.

When N>1, we save N, FRM, TT and TMP again, and set up to move the disks back from TMP to TT. This makes the second recursive call in the subroutine.

Whenever we're ready to leave the subroutine, we have to do a GOSUB2100 to get the last set of parameters off of the stack to be ready for the completion of the previous step.

After you get the program typed in (remember that only line numbers which are multiples of 10 are needed), try running it for 1-10 disks. The display will be slow enough to follow the steps as they proceed. If you watch it long enough, you'll begin to anticipate the moves.

Watch the display of the stack also, as the problem proceeds, and see just what is kept there.

Enjoy playing with this one. Your mind may feel like a pretzel before you figure it out, but once you do, you will have a new technique and have had some interesting (although frustrating) times. You might try replacing the subroutine which displays the towers with one that draws the towers and disks with graphics instead of numbers.

No matter how you do it, have fun.

### Sequence of Moves for Three Disks

We'll symbolize a call to the move disks subroutine (GOSUB1000) like this:

MOVE(N,FRM,TT,TMP)

where N, FRM, TT and TMP are the program variables. The table below summarizes the operations and shows the line number trace for all lines in the 1000 subroutine.

Figure 1

Operation	Line Numbers
1. MOVE(3,1,2,3)	1000
2. MOVE(2,1,3,2)	1010 1000
3. MOVE(1,1,2,3)	1010 1000 1010
4. move disk 1 to twr 2	1020 1030 1040 1050

## Gosub International, Inc.

### SOFTWARE SOFTWARE

**STRATEGY SIMULATIONS FOR THE TRS-80 & COLOR COMPUTER**

<p><b>MERCENARY FORCE</b> 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)      <b>\$16.95</b></p>	<p><b>SPACE MERCHANT</b> 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)      <b>\$9.95</b></p>
--	--

**WARRIOR** — Head to head combat in a game where you and your opponent are the rulers of warring city-states, each trying to destroy the other. You decide how many of your population will be warriors, farmers, factory workers and scholars.      **\$9.95**

**YAHTZEE!**      **\$10.95**

**GOSUB'S MX80/70 Friction Feed Kit \$49.95 ppd**

- Use Single Sheet Paper
- Use Your Own Letterhead
- Use Inexpensive Roll Paper ●
- Does Not Affect Pin-feed Use ●

**THE PRINTER STAND ..... \$29.95**

Kansas residents add 3% sales tax  
All prices subject to change without notice  
**FREE CATALOG UPON REQUEST**  
(TRS-80 is a trademark of Tandy Corp.)  
Dealer Inquiries Invited  
**SEND CHECK OR MONEY ORDER**

<p><b>Gosub Int'l. Inc.</b> 501 E. Pawnee, Suite 430 Wichita, KS 67211 (316) 265-9992</p>	<p><b>Gosub of Framingham</b> P.O. Box 2566 Framingham, MA 01701 (add 5% sales tax)</p>
---	---



## Files

```

5. move disk 2 to twr 3      1020
6. MOVE(1,2,3,1)           1030 1000 1010
7. move disk 1 to twr 3      1020 1030 1040 1050
                             1040 1050
8. move disk 3 to twr 2      1020
9. MOVE(2,3,2,1)           1030 1000
10. MOVE(1,3,1,2)           1010 1000 1010
11. move disk 1 to twr 1      1020 1030 1040 1050
12. move disk 2 to twr 2      1020
13. MOVE(1,1,2,3)           1030 1000 1010
14. move disk 1 to twr 2      1020 1030 1040 1050
                             1040 1050 1040 1050

```

### Program Listing for Recursion

```

10 REM *****
20 REM
30 REM RECURSION DEMO 1
40 REM TERRY R. DETTMANN
50 REM
60 REM *****
70 CLEAR1000
80 M=0
90 GOSUB1000
100 END
1000 REM - - - - - RECURSIVE SU
BROUTINE - - - - -
1010 PRINT"ENTERING SUBROUTINE ... M =
";M
1020 IF M<5 THEN M=M+1:GOSUB1000:M=M-1
1030 PRINT"LEAVING SUBROUTINE ... M =
";M
1040 RETURN

```

### Program Listing for Towers of Hanoi

```

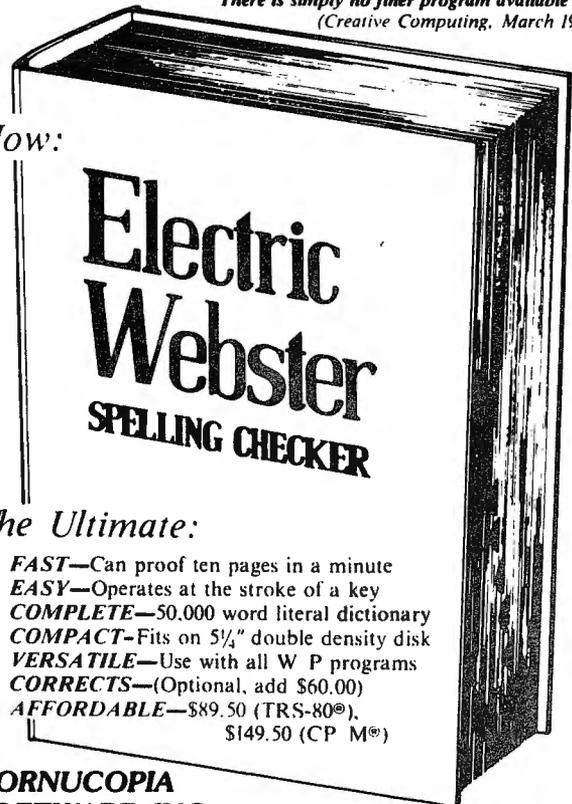
10 REM *****
20 REM
30 REM TOWERS OF HANOI
40 REM DEMO OF RECURSION IN BASIC
50 REM TERRY R. DETTMANN
60 REM
70 REM VERSION 1.0 05/01/82
80 REM
90 REM *****
95 REM CLEAR SOME STRING SPACE
100 CLEAR1000
105 REM SET A 25 ELEMENT STACK
FOR 4 ITEMS STK
106 REM TWR IS THE STATUS OF TH
E DISKS ON THE TOWER
107 REM TP IS THE TOP OF EACH O
F THE THREE TOWERS

```

First came MICROPROOF™:

"There is simply no finer program available..."  
(Creative Computing, March 1982)

Now:



The Ultimate:

**FAST**—Can proof ten pages in a minute  
**EASY**—Operates at the stroke of a key  
**COMPLETE**—50,000 word literal dictionary  
**COMPACT**—Fits on 5¼" double density disk  
**VERSATILE**—Use with all W P programs  
**CORRECTS**—(Optional, add \$60.00)  
**AFFORDABLE**—\$89.50 (TRS-80®),  
 \$149.50 (CP M®)

**CORNUCOPIA  
SOFTWARE, INC.**

1625 Beverly Place  
Berkeley, CA 94707

# 53

Contact your local dealer, or order direct — (415) 524-8098

## Gompu- Things

TRS-80 Mod 1&3  
SOFTWARE

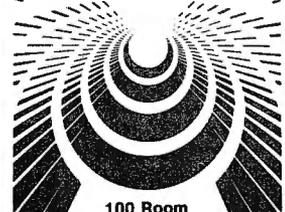
These and other programs  
available from your local  
Computer Stores or from:

**Gompu-  
Things**

SUITE #2  
270 BROADWAY  
REVERE, MA 02151  
(617) 289-8868

VAULTS OF CYMARRON

GRAPHIC  
ADVENTURE



100 Room  
Graphic Adventure  
W/Sound  
\$39.95



COMPU-BOWL  
THE DAVE HUNTRESS

W/Graphics  
\$ 14.95



ROMAN  
CONQUEST

W/Graphics  
\$ 14.95

Free catalog of other Apple, TRS 80, Atari, programs on request.

DEALER INQUIRIES WELCOME

```

108 REM      LB$ IS AN ARRAY OF LABELS
LS FOR THE STACK PRINTOUT
110 MX=25:DIM STK(25,4),TWR(10,3),TP(3)
, LB$(4)
115 REM      SP IS THE INITIAL STACK
POINTER (0) AND BL$ IS A
116 REM      BLANK STRING USED TO CLEAR
THE REMAINDER OF A LINE
120 SP=0:BL$=STRING$(20," ")
125 REM      INITIALIZE THE STACK LABELS
130 FOR I=1 TO 4:READ LB$(I):NEXT I
140 DATA N,FRM,TO,TEMP
145 REM      LL IS THE SCREEN LINE LENGTH
SET DEPENDING ON THE COMPUTER
150 LL=80:REM LL=64 MOD I/III, LL=80
MOD II, LL=32 COLOR COMPUTER
200 REM ----- COMMANDS -----
-----
205 REM      INITIALIZE THE PROBLEM
(HOW MANY DISKS)
210 CLS:PRINT "TOWERS OF HANOI":INPUT "HOW
MANY DISKS (1-10)";N:IF N>10 OR N<1 THEN
210
215 REM      NUM IS THE NUMBER OF MOVES
MADE

```

```

216 REM      EX IS THE THEORETICAL NUMBER
OF MOVES NEEDED
217 REM      FRM, TT, & TMP ARE THE TOWER
TO MOVE FROM, THE TOWER TO MOVE TO,
AND THE TOWER TO USE FOR A TEMPORARY
DURING THE MOVE
218 REM      PRINTCHR$(2) TURNS OFF THE
CURSOR ON THE MODEL II
220 NUM=0:EX=2^N-1:FRM=1:TT=2:TMP=3:PRINT
CHR$(2)
225 REM      INITIALIZE THE TOWERS, PRINT
THE TOWERS, STACK, AND
226 REM      NUMBER OF MOVES ON THE SCREEN
230 GOSUB 900:GOSUB 1200:GOSUB 1300:GOSUB
1400
235 REM      MOVE N DISKS FROM TOWER
(FRM) TO TOWER (TT) USING
236 REM      TOWER (TMP) AS A TEMPORARY
240 GOSUB 1000
245 REM      SETUP FOR ANOTHER PROBLEM
250 LX=15*LL:PRINT@LX,;:INPUT "AGAIN (Y/N)";
YN$:IF YN$="Y" THEN 200 ELSE IF YN$<>"N"
THEN 250
260 END
900 REM ----- INITIALIZE N TOWERS -----
-----
905 REM      PUT ALL THE DISKS ON TOWER 1
& NONE ON TOWER 2 & 3
906 REM      DISKS ARE PUT ON LARGEST
(HIGHEST NUMBER) AT BOTTOM
907 REM      (ARRAY LOCATION 1)
910 FOR I=1 TO N:TWR(I,1)=N-I+1:TWR(I,2)=0
:TWR(I,3)=0:NEXT I
915 REM      SET THE TOPS OF EACH STACK
920 TP(1)=N:TP(2)=0:TP(3)=0
930 RETURN
1000 REM ----- MOVE N TOWERS -----
-----
1005 REM      THIS SUBROUTINE MOVES N
DISKS RECURSIVELY
1006 REM      IF THERE IS MORE THAN 1
DISK TO MOVE, STACK THE CURRENT
1007 REM      PARAMETERS (N,FRM,TT,TMP),
RESET N TO N-1 AND FIRST MOVE
1008 REM      N-1 DISKS FROM TOWER FRM
TO TOWER TMP
1010 IF N>1 THEN GOSUB 2000:N=N-1:FRM=FRM
M:T=TT:TT=TMP:TMP=T:GOSUB 1000
1015 REM      AFTER N-1 DISKS ARE MOVED,
MOVE THE ONE DISK FROM TOWER
1016 REM      FRM TO TOWER TT THEN PRINT
THE TOWERS
1020 GOSUB 1100:GOSUB 1200

```



**IS THIS YOUR CUSTOMER?**

When your customer needs you, he needs you NOW! Why make him search through a ton of local phone books or back issues of magazines for your number?

**THE COMPUTERIST'S DIRECTORY YELLOW PAGES** are the one quick reference to your products or services for the personal and small business computerist. Hardware, software, services, supplies and much more are conveniently indexed and cross referenced, placing your company on your customer's desk six months at a time. Now you can have inexpensive advertising insurance assuring that once your product announcement and ads have made their impression, your customers will be able to find you when they are ready to buy!

**THE COMPUTERIST'S DIRECTORY WHITE PAGES** are the first attempt by any publication to catalog the individuals and groups that are creating the Information Revolution. The White Pages contain listings by individuals, clubs, user groups, computerized bulletin boards and professional associations. Many listings also include network I.D. numbers (Source, CompuServe, etc.) making the Computerist's Directory a pioneer in facilitating Electronic Mail & Conferencing.

One Computerist's Directory is worth a room full of local phone directories.

**HE ONLY HAD TO LOOK IN ONE PLACE!**

**the Computerist's Directory**  The National Phone Book of Computing

PO BOX 405 (707) 887-1857  
 FORESTVILLE, CA 95436 # 56

## Files

```

1025 REM      NOW MOVE THE N-1 DISKS
BACK TO TOWER TT RECURSIVELY
1030 IF N>1 THEN GOSUB2000:N=N-1:T=FRM:
FRM=TMP:TT=TT:TMP=T:GOSUB1000
1035 REM      AFTER ALL MOVES ARE DON
E AT THIS LEVEL,, UNSTACK THE
1036 REM      LAST SET OF PARAMETERS
AND RETURN TO THE PREVIOUS LEVEL
1040 GOSUB2100
1050 RETURN
1100 REM - - - - - MOVE ONE DIS
K - - - - -
1105 REM      TO MOVE ONE DISK FROM T
HE TOP OF TOWER FRM TO THE TOP
1106 REM      OF TOWER TT, GET THE NU
MBER ON TOP OF FRM (TWR(TP(FRM),FRM))
1107 REM      DECREASE THE TOP OF TOW
ER FRM
1110 T=TWR(TP(FRM),FRM):TP(FRM)=TP(FRM)
-1
1115 REM      INCREASE THE TOP OF TOW
ER TT BY ONE AND PUT THE DISK THERE
1120 TP(TT)=TP(TT)+1:TWR(TP(TT),TT)=T
1125 REM      INCREMENT THE COUNT OF
MOVES AND PRINT THE NUMBER OF MOVES
1130 NUM=NUM+1:GOSUB1400:RETURN
1200 REM - - - - - PRINT TOWERS -
- - - -
1205 REM      LOOP OVER ALL THE TOWER
S
1210 FOR J=1 TO 3
1215 REM      PRINT THE TOWER LOCATIO
N
1220 LX=2*LL+J*LL:PRINT@LX,USING"TOW
ER ##>>"J;
1225 REM      IF THERE'S NOTHING ON T
HE TOWER, THEN JUST BLANK THE LINE
1230 IF TP(J)=0 THEN 1260
1235 REM      PRINT THE NUMBERS OF AL
L DISKS ON THE TOWER
1240 FOR I=1 TO TP(J)
1250 PRINTUSING"###";TWR(I,J
);:NEXTI
1255 REM      BLANK THE REST OF THE L
INE
1260 PRINTBL$:NEXTJ
1270 PRINT:PRINT:RETURN
1300 REM - - - - - PRINT STACK VA
LUES - - - - -
1305 REM      PUT THE STACK POINTER O
N THE SCREEN
1310 LX=7*LL:PRINT@LX,USING"SP>>##";SP
1315 REM      LOOP OVER ALL FOUR ELEM
ENTS OF THE STACK
1320 FORJ=1TO4
1325 REM      PRINT THE ELEMENT IDENT
IFICATION

```

## PRIZE WINNING CHESS

— The Finest Available —  
See 80 U.S. Journal, June '82

**SFINKS 3.0** Prize winner in Paris, plays ruthless chess! Problem set-up, infinite levels of play, 32 book openings, audio alert, printer output, thinks even while you're thinking!

**32K Tape or Disk Only \$39.95**

**SFINKS CHESS TUTOR** Step-by-step programmed learning for the newcomer, includes 3-level chess game, problem set-up, printer output, audio alert, and book openings.

**32K Disk Only Only \$19.95**

**SFINKS 1.81** Plays prize-winning chess, pre-chess and transcendental chess, nine levels, problem set-up, audio alert, move suggestion and takeback.

**32K Tape or Disk Only \$24.95**

Please specify tape or disk and Model I or III. Include \$2.00 shipping and handling.

**William Fink (904) 377-4847**  
1105 North Main, Suite 24-B  
Gainesville, FL 32601



# 56

## ZORLOF<sup>TM</sup>

THE MAGNIFICENT

### WORD PROCESSING SYSTEM

For the TRS-80\* Model I and III



- Written in fast Z80 machine language
- Full screen editing
- Single key control of all editing functions for ease of use.
- Dynamic display of word count, line count, and free memory count
- Hold down repeat on all keys
- Superscripts and Subscripts
- Underlined, bolded, expanded, and condensed type styles - combine and intermix within a line
- Justifies lines to left margin, right margin, both margins, and centered
- Automatically justifies and word-wraps on the screen as you type
- Shift and shift lock for upper case
- Search, Replace, and Automatic Search & Replace
- Automatic labeling
- Odd and even page user-definable headers, footers, and page number lines
- User-definable linespacing, sheet size, top, left, and bottom margins
- Move block of text.
- Copy block of text to disk.
- Insert block of text from disk.
- Examine disk directory on any disk and kill files while editing.
- Full screen editing of EDTASM\* and BASIC text files.
- Automatic renumbering for EDTASM\* and BASIC files.
- Print contents of screen function.
- Print previewing formats text, inserts headers, numbers pages, etc. on the screen without printing it on paper.
- Page by page pausing capability for sheet fed printers
- Supports both parallel and serial printers
- Printer control code access.
- Supports proportional spaced justifying on Centronics 737 and Line Printer IV\*.
- Also supports special capabilities of Epson MX-80, Microline Diablo, Starwriter, and Dume printers.
- Can be used with any TRSDOS\* compatible disk operating system

Note: Some features will only work if your printer has the mechanical capability

**GUARANTEE**  
Many word processing systems claim theirs are the best, but few would dare to guarantee them. Not us! We are confident that you will find ZORLOF to be the most useful word processing system for the money, or you can return it for a full refund and you may have up to 30 days to decide.

**ANITEK<sup>TM</sup>**

ANITEK  
Software Products  
P O Box 1135  
Melbourne, FL 32935  
(305) 259-9397

**\$70.00**

Specify Model I or III when ordering. Add \$2.00 shipping & handling. Florida residents add 5% sales tax. Visa and Master Card accepted, checks require 3 weeks to clear bank.

\*Trademarks of Tandy Corporation and Apparat. Inc.



# 57

```

1330 LX=7*LL+J*LL:PRINT@LX,USING"\  

\>>" ;LB$(J);
1335 REM IF THERE'S NOTHING ON T  

HE STACK, THEN NOTHING ELSE TO PRINT
1340 IF SP<=0 THEN 1380
1345 REM PRINT THE ITEMS ON THE  

STACK
1350 FORI=1TOSP
1360 PRINTUSING"###";STK(I,J);
1370 NEXTI
1375 REM BLANK THE REST OF THE L  

INE
1380 PRINT BL$;:NEXTIJ
1390 RETURN
1400 REM - - - - - PRINT NUMBER O  

F MOVES - - - - -
1405 REM PRINT THE NUMBER OF MOV  

ES AT PRESENT AND THE THEORETICAL
1406 REM NUMBER EXPECTED
1410 LX=7*LL+LL/2:PRINT@LX,USING"MOVES>  

> #### EXP>> ####";NUM;EX;
1420 RETURN
2000 REM - - - - - PUSH PARAMETER  

S ON THE STACK - - - - -
2005 REM IF WE EVER OVERFLOW THE

```

```

STACK, WE CAN'T GO FURTHER
2006 REM SIMPLY END THE PROGRAM,  

TRY AGAIN WITH FEWER DISKS
2007 REM IF YOU STAY WITHIN THE  

PROGRAMS LIMITS, THIS SHOULDN'T
2008 REM HAPPEN TO YOU
2010 IF SP>=MX THEN PRINT"ERROR - STACK  

FULL":END
2015 REM STACK ALL FOUR PARAMETE  

RS
2020 SP=SP+1:STK(SP,1)=N:STK(SP,2)=FRM:  

STK(SP,3)=TT:STK(SP,4)=TMP
2025 REM PRINT THE STACK
2030 GOSUB1300:RETURN
2100 REM - - - - - POP PARAMETERS  

OFF THE STACK - - - - -
2105 REM IF THE STACK POINTER RE  

ACHES 0, NOTHING IS LEFT TO
2106 REM UNSTACK
2110 IF SP<=0 THEN RETURN
2115 REM UNSTACK ALL 4 PARAMETER  

S
2120 N=STK(SP,1):FRM=STK(SP,2):TT=STK(S  

P,3):TMP=STK(SP,4)
2125 REM PRINT THE STACK
2130 SP=SP-1:GOSUB1300:RETURN ■

```

# CompuKids

## magazine & club

Help your child discover the world of Microcomputing.

Club includes: • One Year Magazine Subscription

- Program Exchange • Free Computer Advice
- Educational Programs • Exciting Contests
- and more

**Membership**  
**\$24.00**

**Subscription Only**  
**\$16.00**

— WANTED —

Articles, Stories, Cartoons,  
and Programs of interest to  
the young people.

# 58

MAIL YOUR CHECK TODAY TO COMPUKIDS  
P.O.B. 874 SEDALIA, MISSOURI 65301 PHONE 816/826-0689

---

# @ News

Spencer Hall, Contributing editor

If you don't own a Stringy Floppy . . . don't go away just yet. ESF and Level II go together like ham and eggs, salt and pepper, etc. It's hard to say something about ESF without including a few tidbits of general interest to all Level II owners. Our lead story is a case in point.

## An Open Letter to Dr. J. C.

Yes, the mailbag finally arrived from Sunnyvale. Along with some other items we'll mention later, there was your letter. Wow! I've heard of a group in England which is loyal to Level I and which meets regularly to share the exotic things that can be done with it (in machine language, mostly). Your own loyalty to Level I and your dogged determination to decipher its ROM and adapt your ESF to it have my profound respect. If you have succeeded by the time this appears in print, let's hear about it.

There is one line in your letter, however, that needs a polite response. I hope you won't mind my quoting it verbatim because it does, indeed, express the way many people feel about good old Level II. You say, in part "I have no intention of giving up the robustness of Level I for the flaky keyboard and cassette I/O of Level II."

Level II is an incredibly powerful language. We'll be another fifty years discovering all of the computer magic which it can do. I sincerely encourage you to apply your considerable talents to exploring its possibilities instead of knocking your brains out trying to harness a race horse to a donkey cart.

Here's a surprise for you and thousands of others. The best cure for the famous keybbounce on older Model I Level IIs (before the new style keyboard was introduced) is not a machine language patch cluttering up RAM. It isn't an electronic fix either. Go to a supply house which carries industrial lubricants and get a tube of Dow Corning Molykote 4X Lubricant. Carefully lift each key off by prying gently from the lower right corner. Squirt a bit of lubricant into the make-break mechanism. Replace the key by pressing firmly. Look ma! No more keybounce. It's tedious work, I'll admit, and you'll have to pry the space bar from the middle to get at its switch. But once done, it lasts for years. Just don't try to pry up those new style keys on later Model Is that don't bounce



anyway. It's not necessary — and very fatal! As for the "flaky cassette I/O," who needs it if they have an ESF?

## Slowing Your Computer Down

If you're into BASIC programming in Level II, this also is of interest even if you don't have an ESF system. It works especially well with ESF, but it operates also

August, 1982 93

# tele-communications

Send E-mail, download programs and files, chat, buy merchandise, access the Source\* and other exciting data bases with the MICROCONNECTION, a quality direct connect modem for your TRS-80 The Autodial/Autoanswer MICROCONNECTION automatically dials other computers and answers too! The busdecoding MICROCONNECTION eliminates the need for the RS-232 board, the expansion interface, and the "obsolete" acoustic coupler Free SMART80 terminal software for the TRS-80 included

Busdecoding MICROCONNECTION for TRS-80 with Autodial/Autoanswer	\$209 00
RS-232 MICROCONNECTION with Autodial/Autoanswer	\$259 00
MICROCONNECTION for TRS-80* Color	\$159 00
	\$199 00

## the microperipheral corporation

2643 151st Pl NE, Redmond, WA 98052

(206) 881-7544

\*Trademark of Lanity Corp. and Reader's Digest Inc.

# 59

with cassette or disk. For Model III, substitute these lines:

```
70 POKE 16561, 118:POKE 16562,X
80 A=120+256*X: IF A>32767 THEN A=A-65536
90 V=124+256*X: IF V>32767 THEN V=V-65536
120 PRINT "MEMORY SIZE IS SET AT" 118+256*X
140 PRINT "TO DEACTIVATE: POKE 16389,29
```

Ever want to LIST slowly in order to search for a place to modify or find some vacant lines to use without the need for world-class eye and finger coordination? Ever want to RUN with TRON and see the numbers come up slowly so that you can find out just how your program is getting from here to there? Listing 1 (let's call it SLOWPOKE) is a BASIC program which installs and protects a slower-downer at the top of memory. You can erase it when it has done its job. Run it and make notes of the instructions which appear on the screen. That will be your only chance. Then you can wipe out the code. The slowdown will not occur until you poke the proper number into address 16389 (for 16K,127; for 32K,191; for 48K,255).

Slowdown is widely variable. The display will tell you where to poke a speed control number (from 0 to 255). You can normalize your computer action by POKE 16389,48. When you want slow action again, just poke the proper number back into 16389. SLOWPOKE works on the execution of LIST, RUN (with or without TRON), the EDIT call, any direct mode instruction, etc. When it's active, your cassette recorder won't work, but your ESF will if you call it again! Unfortunately, using ESF deactivates the slowdown so that you will have to repoke 16389.

It's written to be near the top of 16K, 32K and 48K systems. The screen display will tell you where memory size is set. Radio Shack's classic Blackjack is a fun game to play in slowdown mode, especially if you're slow at counting card values the way I am. High speed control numbers, producing low speeds, are great for LISTing. Numbers under 50 are better for watching programs operate with TRON. You can see what language takes the most time to execute and which the least. If your BASIC program DIM's a large matrix or uses a long FOR . . . NEXT loop, plan to bring your lunch!

### The Lore of the ESF

Exatron has been the most successful of any hardware manufacturer to date in encouraging production of public domain software for its product. They also have wafer versions of various copyrighted programs, enhanced patches for the classics like Pencil, Scripsit, EDTASM, the MISOSYS Disassembler, etc. ESFOA, the national ESF owners association, makes it possible to obtain copies of many programs which have appeared in national computer magazines as well as excellent software written and donated by members. These cost just the price of the medium they're on (wafer) plus handling. To date, I've seen nothing done on disk that can't be done on ESF using some of Exatron's proprietary software for which you generally pay less than the disk equivalent. Under the above section title, I'll be reviewing some of these products in

#### COLOR COMPUTER SOFTWARE

## BASIC AID HELP FOR THE BASIC PROGRAMMER

At last, the development tools you need! All available instantly at power-up. Look and see what Basic Aid can do.

**MERGE COMMAND:** Insert programs stored on cassette into your Basic program. You can even assign new line numbers to the file you read in. Create your own tape library!

**MOVE COMMAND:** Lets you renumber any part of your Basic program. GOTO's, GOSUB's, etc. automatically changed.

**AUTOMATIC LINE NUMBERING:** You'll love this. Never type in another line number.

**PLUS** 45 common Basic commands available as single key Control characters. Comes with convenient, easy to remove, plastic keyboard overlay. All of this in a convenient ROM cartridge that uses almost none of your valuable memory. . . . . CARTRIDGE \$34.95

### COLORCOM/E SMART TERMINAL PROGRAM

We didn't wait for the competition to catch up with us! We've added even more features to COLORCOM/E, our superb Smart Terminal program.

- Complete upload & download support
- On line cassette reads & writes
- Automatic capture of files
- Pre-enter data before calling
- Send all 127 ASCII characters
- Word mode eliminates split words
- Off line AND on line scrolling
- Selectable RS232 parameters

We've got the best cassette and upload/download support available. And you can conveniently print any portion of the received buffer you want. . . . . CARTRIDGE \$49.95

### EDITOR ASSEMBLER DEBUGGER **\$6.95**

**CCEAD:** This 8K Basic Program supports cassette files, has full cursor control, line insertion/deletion, and much more. Two pass assembler supports full 6809 instruction set & addressing modes, lists to screen or printer. Debugger allows memory examine/modify, program execution. If not delighted return within 2 weeks for a full refund. You get fully commented Basic source & complete instructions. Requires Ext. Basic & 16K. . . . . CASSETTE \$6.95

**STRIPPER:** The Stripper takes off all that excess fat in your Basic Programs. Three valuable commands: (1) Delete Remarks, (2) Pack Lines, (3) Delete Spaces. Fully automatic, is not fooled by GOTO's, GOSUB's, etc. Your programs will run faster and take up much less memory. . . . . CASSETTE \$7.95

**CUSTOM CARTRIDGES:** Put YOUR Basic program into a convenient ROM Cartridge. It's easy! Runs instantly at power-up, frees up memory. Use for Ad displays, schools, etc. Call or write for info. . . . . FROM \$41.95

Send check, money order, or Visa/MC Number. Include \$1 for postage and handling, Visa/MC: Phone for fast service.



P O Box 10234  
Austin, Texas 78766  
(512) 837-4665

# 60

future issues. Next month it will be (if it arrives in time) FMS Volume 2. This is an improvement on Exatron's already popular File Management System.

Setting the Record Straight

This column has a reputation, in some quarters, as an advertising blurb for one manufacturer. As of my editorship, it isn't any more. 80-U.S. picks up the tab and I can say whatever I like, as long as I don't swear.

Here are some observations:

Plus: Disk owners who smoke, eat your hearts out! I puff on my pipe like a chimney as I write this with SCRIPSIT and the ESFs love the smell.

Plus: My two ESFs take less space than one tape deck.

Plus: They cost about the same as a disk drive and I don't need an expansion interface (which, of course, I have!).

Plus: The operating system uses just four (4 - count 'em) bytes of RAM unless I need data I/O, which ties up 914 bytes.

Minus: The new ESF for Model III is going to use 4K of high memory (you get I/O automatically) and you can't put any other stuff in protected high memory.

Looks like the best bet in the future for a minimum cost computer system will be a Model I Level II workalike and some conventional ESFs.

Program Listing for SLOWPOKE

```
10 ' -- POKE-LOAD FOR DELAY ROUTINE --
20 CLS:INPUT "ENTER YOUR SYSTEM SIZE (1
6/32/48)";S
30 IF S<>16 THEN IF S<>32 THEN IF S<>48
THEN 20
40 IF S=16 THEN X=127
50 IF S=32 THEN X=191
60 IF S=48 THEN X=255
70 POKE 16561,128:POKE 16562,X
80 A=130+256*X:IFA>32767 THEN A=A-65536
90 V=134+256*X:IFV>32767 THEN V=V-65536
100 FOR J=A TO A+12:READ B:POKE J,B:NEX
T
110 PRINT "DELAY NOW IN PLACE"
120 PRINT"MEMORY SIZE IS SET AT" 128+25
6*X
130 PRINT "TO ACTIVATE: POKE 16389,"X
140 PRINT "TO DEACTIVATE: POKE 16389,79
150 PRINT "VARY SPEED BY :POKE"V",NN
160 PRINT " MAXIMUM SPEED - NN=0"
170 PRINT " MINIMUM SPEED - NN=255"
180 PRINT:PRINTTAB(9) "NOTE THESE VALUE
S - THIS PROGRAM MAY THEN BE ERASED"
190 DATA 245,197,1,0,64,205,96,0,193,24
1,195,120,29 ■
```

FREE business software directory

- Radio Shack's Model I, II, III.
• Heath's MBASIC and HDOS
• CPM: Xerox, Alto...
• IBM Personal Computer

"IDM2 is GREAT !" -publisher of 80-US

"(GL) superior to either the Osborne (SBSG & Taranto) or Radio Shack...MAIL-X has a greater capacity... more flexible than (R.S.)" -columnist of 80-microcomputing

"imperceptively fast...(DBMS) is a good and reliable workhorse" -publisher of Interface Age

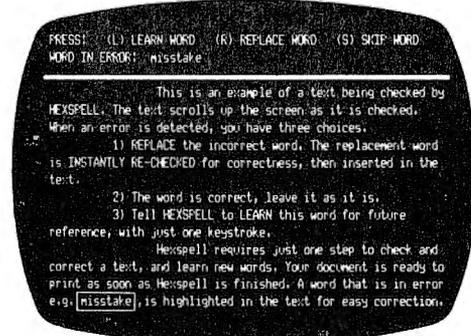
Data base manager, integrated accounting package (AR, AP, GL & Payroll), inventory, word processing, and mailing list. Compare and be selective !

# 61



Micro Architect, Inc.
96 Dothan St., Arlington, MA 02174

Looking for a Spelling Checker? Get more than just a spelling checker - get HEXSPELL 2 the EVERYTHING checker



Hexagon Systems is proud to announce another first in text checking - an everything checker Hexspell 2 checks not only dictionary words, but learns and checks codes, formulas and numbers which are so essential in many commercial and technical documents. With Hexspell 2 you define what characters make up a word, then teach Hexspell the new "words" it needs to check your text. This advanced system builds on the unique features of the original Hexspell (the first TRS-80 spelling checker). Hexspell 2 features a one-step interactive process, a word list that adapts itself to your word usage, a 25,000 word initial word list and more than three years of research and experience.

Hexspell 2 upgrade for registered owners of Hexspell Vers. 1 - \$35 from Hexagon Systems or your nearest dealer. Hexspell requires a TRS-80 Mod I or Mod III with 2 drives and 48K. US\$99. Manual \$12.



P.O. Box 397, Station A
Vancouver, B.C. Canada V6C 2N2
Telephone (604) 682-7646
Micronet 70235,1376

# 62

---

# Decimal to fraction conversions

*Let your computer do the thinking while you learn about fractions*

Model I/III, 16K and up

Jim Klaproth, Associate editor

Let's see. When you multiply two fractions, do you invert and multiply, or is that in division? How do you find the least common denominator of those fractions? How do you add two fractions? Can't remember all those rules you learned back in grade school? Well, here is a wonderful program that allows you to let your computer do all of your thinking, and possibly teach you a thing or two about fractions.

This program was written in response to a college chemistry course exercise involving operations on multiple fractions. It was originally written for a TI-58 programmable calculator and was recently converted for the TRS-80. The 80 version has been expanded to include a basic 4-function fractional calculator.

What the program does is allow the user to enter a decimal number in double precision format, and calculate the corresponding fraction. The algorithm that accomplishes this is quite simple, but may not have occurred to you. It also demonstrates a powerful use for one of the built-in math functions buried in your Level II ROM.

If we take a decimal such as .25 and invert it, we get 4. In this case, it yields a whole number. It is easy to see the relationship between the decimal .25, the fraction  $\frac{1}{4}$ , and the inverted decimal 4. The inverted decimal number turns out to be the denominator of the fraction. Let's look at another example. The decimal .5 inverted is 2, which is the denominator of  $\frac{1}{2}$ . So far, so good.

Let's look at the decimal .75. Inverting it yields 1.33333333, which is not the denominator of  $\frac{3}{4}$ . What went wrong? If we look back at the previous examples, we see that the numerator in both cases was 1. The numerator of  $\frac{3}{4}$  is 3. What if we multiplied the inverted decimal 1.33333333 by 3? We would get 4, the correct denominator. Are you still with me?

OK, let's design a program that will take a decimal number input and we will initialize a loop counter to 1. First invert the input decimal number and then test to see if it is an integer. If it is, the integer will be the denominator and the loop counter value will be the

numerator. If it is not an integer, increment the counter and multiply its value by the inverse of the original number. Retest this result for an integer and branch to either the answer or loop back for another try.

Let's see how the decimal .75 would be processed. The first time through, the counter equals 1 and the inverse is 1.33333333, which is not an integer. Increment counter to 2 and multiply by 1.33333333, still not an integer. Third time through, the counter equals 3 and yields the value 4, which was an integer the last time I checked. The denominator is 4 and the numerator is 3. How about that!

Well, just how do we test for an integer? We do that by using the FIX function in Level II. FIX truncates, or removes, all digits to the right of the decimal point. If we subtract the truncated number from the original, the result will tell us if we have an integer or not. For example,  $\text{FIX}(45)=45$ . If we subtract 45 from 45, we will get 0 (zero). A number such as 45.099 minus  $\text{FIX}(45.099)$  will leave .099 as a result. By testing for a zero result, we can determine if the number is an integer. Neat, huh?

There is only one small problem with this. Some numbers are not always going to come out as integers, even though they should. This is a result of having only 16 digits of precision in BASIC. To get around this, we have to allow a fudge factor in order to detect every integer. Therefore, this program may not find the correct solution when dealing with very large denominators. I have tested it with up to five digits in the denominator with no problem.

The other part of the program allows the operator to enter two fractions and one of the basic four math functions, and arrive at the correct answer (expressed as a fraction). Each fraction is converted to its double precision decimal equivalent and then merge with the proper sign. The result is run through the converter. No guarantees are made on accuracy when dealing with denominators over two or three digits, due to the fact that the double precision errors are increased by a factor of two or more.

One caution about inputting decimals into the



converter: always enter them as double precision. To get the double precision decimal for 1/3, simply enter the number as 1/3D. The D tells the interpreter that you are asking for a double precision solution.

This program may not be the most efficient way to convert a decimal number to a fraction, but it is the only way this would-be mathematician could figure out how to do it.

**Program Listing for  
Decimal to Fractions**

```

10 REM * DECIMAL TO FRACTION *
15 REM * CONVERSION PROGRAM *
20 REM * BY JIM KLAPROTH *
30 CLEAR 100:DEFDBL A-Z
40 DIM I$,LC%,I#,C#,F1#,A#,DL%,S$,I%,S#,
    N#,D#,F#
50 CLS:PRINT CHR$(23)
60 PRINTTAB(2)"DECIMAL TO FRACTION PROG
    RAM"
70 GOSUB 1020
80 REM *** MENU
90 CLS:PRINTTAB(6)"D E C I M A L   T O
    F R A C T I O N   P R O G R A M"
100 PRINT STRING$(64,"=");
110 PRINT" THIS PROGRAM WILL CONVERT A
    
```

```

    DECIMAL NUMBER TO A FRACTION AND W
    ILL ALLOW YOU TO ADD, SUBTRACT, MULTI
    PLY, OR DIVIDE FRACTIONS.";
120 PRINT STRING$(64,"=");
130 PRINT:PRINT:PRINT
140 PRINT"          CONVERT DECIMAL TO FR
    ACTION ..... 1"
150 PRINT
160 PRINT"          MANIPULATE FRACTIONS
    ..... 2"
170 PRINT
180 PRINT"          EXIT THE PROGRAM ....
    ..... 3"
190 PRINT@980,"ENTER YOUR CHOICE";
200 I$=INKEY$:IF I$="" THEN FOR DL%=1 T
    O 200:NEXT:PRINT@980,"
    ";FOR DL%=1 TO 200:NEXT:GOTO190
210 I%=VAL(I$)
220 IF I%=1 THEN 260
230 IF I%=2 THEN 460
240 IF I%=3 THEN CLS:PRINT@538,"GOODBYE
    ":FOR DL%=1TO1000:NEXT:CLS:END
250 GOTO 200
260 REM *** MAIN PROGRAM STARTS HERE
270 CLS:PRINT"TASK: CONVERT DECIMAL TO
    FRACTION"
    
```

Subscribe  
to CCGN

Color Computer News



Are you tired of searching the latest magazine for articles about your new Color Computer? When was the last time you saw a great sounding program listing only to discover that it's for the Model I and it's too complex to translate? Do you feel that you are all alone in a sea of Z-80's? On finding an ad for a Color Computer program

did you mail your hard earned cash only to receive a turkey because the magazine the ad appeared in doesn't review Color Computer Software? If you have any of these symptoms you're suffering from Color Computer Blues!

**But take heart there is a cure!  
It's COLOR COMPUTER NEWS.**

The monthly magazine for Color Computer owners and only Color Computer owners. CCGN contains the full range of essential elements for relief of CC Blues. Ingredients include: comments to the ROMS, games, program listings, product reviews, and general interest articles on such goodies as games, personal finances, a Kid's page and other subjects.

The price for 12 monthly treatments is only \$21.00 and is available from:



**Mail  
Today!**

**REMarkable Software**

P.O. Box 1192  
Muskegon, MI 49443

# 63

NAME \_\_\_\_\_  
 ADDRESS \_\_\_\_\_  
 CITY \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_

Allow 8-10 weeks for 1st issue.

80 US

## Conversions

```

280 PRINTSTRING$(64, "=");
290 PRINT
300 INPUT"ENTER THE DECIMAL NUMBER (DOUBLE PRECISION)";A
310 IF A=0 THEN GOTO 300
320 PRINT@330,"THE DECIMAL ";A;" IS EQUAL TO"
330 IF A<0 THEN S=1 ELSE S=0
340 A=ABS(A)
350 LC%=1
360 I=1/A*LC% 'INVERT NO.
370 IF LC%/2 - FIX(LC%/2)<>0 THEN PRINT@590," * * WORKING * *"; ELSE PRINT@590," ";
380 C=FIX(I)
390 IF (I-C)> 1E-04 THEN LC%=LC%+1:GOTO 360
400 IF S=1 THEN PRINT@397, "THE FRACTION -"; LC%;"/";INT(I)
410 IF S=0 THEN PRINT@397, "THE FRACTION "; LC%;"/";INT(I)
420 PRINT:PRINT:PRINTTAB(10);"ANOTHER CONVERSION? (Y/N)"
430 I$=INKEY$:IF I$="" THEN 430
440 IF I$="Y" THEN 260 ELSE IF I$="N" THEN 80
450 GOTO 430
460 REM *** MANIPULATE FRACTIONS
470 CLS
480 PRINT"TASK: MANIPULATE FRACTIONS"
490 PRINTSTRING$(64, "=")
500 PRINT
510 PRINT"ENTER FRACTIONS AND FUNCTIONS AS FOLLOWS:"
520 PRINT" NUMERATOR <ENTER> DENOMINATOR <ENTER> FUNCTION <ENTER>"
530 PRINT" FUNCTIONS ARE AS FOLLOWS:"
540 PRINT" + ADDITION"
550 PRINT" - SUBTRACTION"
560 PRINT" * MULTIPLICATION"
570 PRINT" / DIVISION"
580 PRINT:PRINT
590 PRINT"ENTER THE NUMERATOR FOR FRACTION #1";:INPUT N1
600 IF N1=0 THEN 590
610 PRINT"ENTER THE DENOMINATOR FOR FRACTION #1";:INPUT D1
620 IF D1=0 THEN 610
630 PRINT"ENTER THE FUNCTION SIGN ";:INPUT S$
640 IF S$<>"+" AND S$<>"-" AND S$<>"/" AND S$<>"*" THEN 630 ELSE 650
650 PRINT"ENTER THE NUMERATOR FOR FRACTION #2";:INPUT N2
660 IF N2=0 THEN 650
670 PRINT"ENTER THE DENOMINATOR FOR FRACTION #2";:INPUT D2

```

```

CTION #2";:INPUT D2
680 IF D2=0 THEN 670
690 REM *** EVALUATE EXPRESSION
700 CLS
710 PRINT@0,"THE EQUATION IS:"
720 PRINT
730 PRINT:PRINT
740 PRINT@128, "(";N1;"/";D1;")"; " ";S$;" ";("";N2;"/";D2;")"; " =";
750 F1=N1/D1
760 F2=N2/D2
770 IF S$="+" THEN F1=F1+F2: GOTO 810
780 IF S$="-" THEN F1=F1-F2: GOTO 810
790 IF S$="*" THEN F1=F1*F2: GOTO 810
800 IF S$="/" THEN F1=F1/F2: GOTO 810
810 REM * FRACTION FINDER
820 LC%=1
830 IF F1<0 THEN S=1 ELSE S=0
840 F1=ABS(F1)
850 IF F1=0 THEN PRINT F1: GOTO 970
860 I=1/F1*LC% 'INVERT NO.
870 IF LC%/2 - FIX(LC%/2)<>0 THEN PRINT@596," * * WORKING * *"; ELSE PRINT@596," ";
880 C=FIX(I)
890 IF FIX(I-C)=1 THEN I=I-1 : GOTO 910
900 IF (I-C)> 1E-06 THEN LC%=LC%+1:GOTO 860
910 PRINT@596, " ";
920 PRINT@0, "THE SOLUTION IS:"
930 PRINT@128, "(";N1;"/";D1;")"; " ";S$;" ";("";N2;"/";D2;")"; " =";
940 IF S=0 THEN PRINT" ";LC%;
950 IF S=1 THEN PRINT" -";LC%;
960 IF INT(I)=1 THEN 970 ELSE PRINT"/";INT(I)
970 PRINT:PRINT:PRINTTAB(10);"ANOTHER PROBLEM? (Y/N)"
980 I$=INKEY$:IF I$="" THEN 980
990 IF I$="Y" THEN 460 ELSE IF I$="N" THEN 80
1000 GOTO 980
1010 END
1020 PRINT STRING$(32, "+")
1030 PRINT" 1
.25 = -
2"
1040 PRINT
1050 PRINT" 1
.166667 = -
6"
1060 PRINT
1070 PRINT" 1
.333333333334 = -
3"
1080 FOR DL%=1 TO 1000:NEXT:RETURN ■

```

# Color disk directory

## A utility to enhance your DOS

Color Computer

Bob Waterhouse, Gardena, CA

This program will display the files (three across in a row) in a manner similar to that of the Model I/III. The program will also allow you to view only those files with a given extension which you define (i.e., /BAS). You also have the option of using a <\*> wildcard to view all files with any extension, including dead files which haven't been overwritten!

This program can be invoked by merely typing RUN "DIRS". I gave this program the filename "DIRS" to differentiate from "DIR", used by the operating system. After the program starts, you will be asked for the DRIVE number, it will default to the drive number currently defined by the operating system. Next, you will be asked for the file extension. At this time, enter the file extension that you desire viewing. If you want to look at all files on the disk, you should enter an <\*> which acts like a wildcard. After pressing <ENTER>, you will see the files on your disk, as well as the free space remaining on the disk. Although this program is written for a two-disk drive system, the user should find little difficulty in adapting it to a three- or four-drive system.

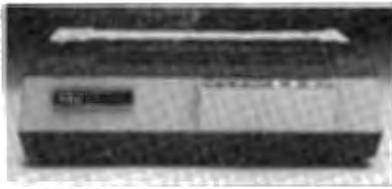
Dead files can be recognized by the absence of the first character in the filename. For example, if the file "DIRS" were killed on a diskette, it would appear as "IRS" when viewed with the wildcard option. Filenames that seem alien, and aren't present under the system "DIR" command, are dead files.

By leaving the program on your "0"(zero) drive diskette, and giving it the filename "DIRS/BAS", it will always be available to you as a utility to enhance your Disk Operating System.

### Program Listing for Color Disk Directory

```
30 CLEAR1000
```

```
40 CLS:FORX=1TO10:PRINT:NEXT
50 PRINTSTRING$(31,"-")
60 PRINT"** LIST PROGRAMS BY EXTENSION
**";
70 INPUT"DRIVE#";D
80 IF D=1 THEN 90 ELSE 100
90 DRIVE 1
100 INPUT"FILE EXT";Z$
110 PRINT"FILE TYPE = /";Z$
120 FOR X=3 TO 11
130 DSKI$ D,17,X,A$,B$
140 C$=A$+LEFT$(B$,127)
150 NAM$(0)=LEFT$(C$,8)
160 EXT$(0)=MID$(C$,9,3)
170 FOR N=1 TO 7
180 NAM$(N)=MID$(C$,N*32+1,8)
190 EXT$(N)=MID$(C$,9+N*32,3)
200 NEXT N
210 FOR N=0 TO 7
220 IF Z$="*" GOTO 230 ELSE 240
230 IF LEFT$(NAM$(N),1)<>CHR$(255) THEN
PRINT NAM$(N);" ";:GOTO250
240 IF EXT$(N)=Z$ AND LEFT$(NAM$(N),1)<
>CHR$(0) THEN PRINT NAM$(N);" ";
250 Q=PEEK(1517)
260 IF Q<>96 GOSUB330
270 NEXT N
280 NEXT X
290 POKE &HFF40,0
300 PRINT FREE(D)"FREE GRN:";D,
310 DRIVE 0
320 END
330 N=N+1:PRINT NAM$(N):RETURN
```



**NEC PC-8023A-C Printer**  
\$499<sup>88</sup> DELIVERED

- 100 cps bi-directional printing
- Adjustable tractor/friction feed
- Proportional spacing
- Hi-res dot-addressable graphics
- True descenders in 5 fonts
- Subscript, Superscript & underlining

**Okidata Printers**

MICROLINE 80.....	\$369 <sup>88</sup>
MICROLINE 82A.....	\$479 <sup>88</sup>
MICROLINE 83A.....	\$739 <sup>88</sup>
MICROLINE 84 (Parallel).....	\$1059 <sup>88</sup>
MICROLINE 84 (Serial).....	\$1194 <sup>88</sup>
OKIGRAPH ROM—adds Hi-Res capabilities to 82A and 83A Printers.....	\$89 <sup>88</sup>

**IDS Printers**

PRISM 132 (Color).....	\$1699 <sup>88</sup>
PRISM 80.....	\$989 <sup>88</sup>

**Epson Printers**

MX-80 W/GRAFTRAX.....	\$474 <sup>88</sup>
MX-80/F-T.....	\$569 <sup>88</sup>
MX-80/F-T W/GRAFTRAX.....	\$619 <sup>88</sup>
MX-100.....	\$719 <sup>88</sup>
GRAFTRAX.....	\$89 <sup>88</sup>

**Centronics Printers**

CENTRONICS 739 (Parallel).....	\$539 <sup>88</sup>
CENTRONICS 739 (RS-232-C).....	\$644 <sup>88</sup>
2-Color Adapter.....	\$69 <sup>88</sup>

**C.Itoh Printers**

C.ITOH COMET I.....	\$284 <sup>88</sup>
C.ITOH PRO WRITER W/3K buffer (parallel and serial).....	\$639 <sup>88</sup>
C.ITOH F-10 DAISY WHEEL (40cps).....	\$1539 <sup>88</sup>

Cables and interfaces available for the APPLE, ATARI, CBM/PET, IBM, OSBORNE, and TRS-80.

**Orders & Information:**

**CALL (603)-673-8857**

Orders Only: CALL (800)-343-0726

We accept CODs—No surcharge for credit cards  
No charge for UPS shipping—Stock shipments next day—All equipment shipped factory fresh with the manufacturer's warranty

# 64

Prices subject to change

HIGH TECHNOLOGY AT AFFORDABLE PRICES

**THE BOTTOM  
LINE**

12 Johnson Street, Milford NH 03055-0423

100 80-U.S. Journal

**Reviews**

**Gobbler**  
Model I/III  
Superior Software  
P.O. Box 11676  
Kansas City, MO 64138  
\$16.95 cassette  
\$19.95 disk

Ever since "Pacman" hit the arcades, there have been quite a few simulations of the game made for the TRS-80 computer: Scarfman, TRS-man and Ghost are some of them. There is a new one out, by Superior Software, named "Gobbler." In playing the game and trying to judge it, I decided it would be best to compare it with the original "Pacman" arcade game, rather than putting it side-by-side with Scarfman.

**What's the Story?**

Gobbler is loaded using the SYSTEM command since it is in machine language, as are most good arcade games. After getting the program to run, an impressive title page appears announcing "Superior

Software presents . . . Gobbler." After hitting ENTER, the title page clears.

One thing found in this game (that is not found in Pacman) is the ability to chose a skill level. Any skill level, from one to four, may be selected, depending upon the difficulty you would like. One or two players may play the game, a feature not found in the game "Scarfman" by Phil Oliver.

After those two options, the game begins. The maze is very "dense"; that is, there are many parts. Instead of being just a few lines with a very loose maze configuration, the programmer has packed as much maze as he could onto the screen.

The player is represented by a figure which may be moved around the screen by arrow keys. One thing that I do not like about the controls, though, is that you must hold them down to move. In Scarfman, pressing an arrow key will take you as far as you can go. Gobbler does not do this.

This trouble with directions can make for some pretty difficult manuevers. Trying to squeeze through parts of the maze is especially difficult by having to hold down the arrow keys contantly and having to be in precise positions to move. One soon gets used to it, however.

**Skillfully Crafted**

Depending upon the skill level chosen, one or more men will begin the chase. Gradually, all of them are after you, and they do a pretty good job of chasing you. Eating a "big dot" will give you the ability (for a short time) to consume your enemies for points (as in Pacman).

If you are fortunate enough to complete the game with a high score, there is a part where you may enter your name for the glory of it. It is very similar to the arcade-type way of inputing high scorer's names, thus bringing this emulation even closer to the real thing.

**Point /Counterpoint**

This game has advantages and disadvantages, just like any other game. The sound is good, and so are

**The  
Lawyer's  
Microcomputer™**

**A Newsletter for Lawyers  
Using the TRS-80\***

- Articles for Lawyers
- Law Office Applications
- Lawyer Information Exchange
- Software Reviews
- Hardware Reviews
- Advertisements Directed to Lawyer Users
- Technical Tips
- Letters and Suggestions
- And Much More

**A New Monthly Newsletter  
For Lawyers**

Send \$28 For A  
One Year Subscription

**The Lawyer's Microcomputer™**  
P.O. Box 1046B  
Lexington, SC 29072

\*TM Tandy Corp # 65

the graphics. Gobbler is an excellent reproduction of the original "Pacman," and for all arcade fans, I recommend that you buy Gobbler.

Tim Knight



**DOSPLUS User's Manual  
TRS-80 Model I/III  
Advanced Operating Systems  
450 St. John Rd.  
Michigan City, Indiana 46360  
(800) 348-8558  
\$29.95**

Reviewers of the DOSPLUS operating system have noted that only marginal documentation has been provided for this otherwise excellent piece of software. The documentation of DOSPLUS version 3.3 consisted of 46 pages of material, which was at best, a sketchy augmentation or amendment of the Radio Shack TRSDOS/DISK BASIC Reference Manual.

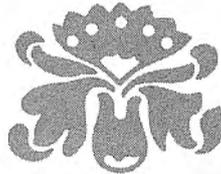
The offering from Advanced Operating Systems consists of an attractive looseleaf display binder with 120 pages of printed documentation of DOSPLUS 3.3. The format is 5½ by 8½ inches with a standard three-ring punch. Selection of good paper and a variety of bold face and italic gothic fonts make for readability and quick reference. Green "highlighting" of displays helps to round out the presentation.

The technical section introduces RAM addresses of DOS calls which can be accessed from machine language programs. These include I/O (disk, printer, video, and keyboard calls), and a full table of error messages. In addition to the technical section, all of the extensions, library commands and utilities unique to DOSPLUS are well covered in the new manual. The writers still assume a familiarity with the operating protocols and information contained in the TRSDOS manual and the DOSPLUS user is well advised to have one available.

The format makes the manual convenient, as it fits easily beside the TRS-80 or LNW-80 keyboard. A

fold-back cover turns the notebook into a display binder, increasing its convenience. The serious user can readily augment the manual as there is room for another 150 looseleaf pages. I find this to be an expensive, but handsome and worthwhile, addition to my DOSPLUS system.

Captain Paul M. Hine, USN



**The UPI-3  
Serial Interface  
for TRS-80  
Model I  
Binary Devices  
11560 Timberlake Lane  
Noblesville, IN 46060  
(317) 842-5020  
\$139.95**

A problem which many TRS-80 owners have experienced is the inconvenience of using a serial printer with the Model I. Use of the former is not possible without an interface such as the RS232C, and generally, a printer driver (a machine language program stored in protected high memory). The expansion interface provides a "Centronix-type" port for a parallel printer, but Radio Shack made no provision for serial printers other than the RS232C board.

For serial printer owners, the simultaneous use of the RS232C for telephone communications and hardcopy was not easily achieved since the RS232C was generally used by both the printer and the modem. Because of these difficulties, various articles have been published which detail alternative solutions; "Build Your Own Parallel-to-Serial Interface," etc. For those of us who are not adept with soldering irons, schematic diagrams, and the building of power supplies, there is an excellent product available which will solve your problems with ease: the UPI-3 from Binary Devices.

Of the various interfaces which are commercially produced (I have personally installed and used four



**From Aspen Software**  
The Only Complete Document Proofreading System  
For CP/M®, TRS-80® and IBM-PC Word Processors

## PROOFREADER™

**Featuring Random House® Dictionary**

- Complete Accuracy—looks up every word; does not use less accurate root word analysis, plus Random House Dictionary
- + Full Interactive Correction—standard
- Instant Access to Dictionary
- Compact—Random House Dictionary supplied in sizes to fit your system (50,000 words standard)

## GRAMMATIK™

**Beyond Spelling Checking**

- Detects typos, punctuation and capitalization errors, misused words and phrases
- Analyzes Writing Style
- Suggests Alternative Usages

## = NO ERRORS

*"The programs together (Proofreader and Grammatik) offer a dynamic tool for comprehensive editing beyond spelling corrections."*

--Dona Z. Meilach in *Interface Age*, 5/82

*"Grammatik is the perfect complement to a spelling check program."*

--Dr. Alan R. Miller in *Interface Age*, 5/82

*"If you use a word processor and a spelling checker, then you should investigate the unique capabilities of this program. Grammatik is a surprisingly fast and easy to use tool for analyzing writing style and punctuation."*

--Bob Loudon in *InfoWorld*, 12/81

*"For the user who is as tight with his dollar as I, Proofreader is the program of choice."*

--Stephen Kimmel in *Creative Computing*, 3/82

*"Anyone involved with word processing in any way, whether writing manuals, letters, brochures, newscopy, reports, etc. is encouraged to get the excellent program Grammatik."*

--A.A. Wicks in *Computronics*, 6/82

Grammatik and Proofreader are compatible with all CP/M, MS-DOS (incl. IBM-PC), and TRS-80 word processors. Current CP/M formats: standard 8", Northstar, Omikron, Osborne, Apple. Please call/or write for details of minimum system sizes and availability of additional disk and operating system formats. Shipping costs included. Please specify your system configuration when ordering. Dealers inquiries invited.

	Proofreader	Grammatik	Both
CP/M, MS-DOS	\$129.00	\$150.00	\$250.00
TRS-80 Model II	n/a	\$99.00	
TRS-80 Mod. I/III	\$89.00	\$59.00	\$139.00

Random House is a registered trademark of Random House, Inc. Other registered trademarks: CP/M: Digital Research; TRS-80: Tandy Corp.; MS-DOS: Microsoft; IBM: IBM; Proofreader, Grammatik: Aspen Software Co.

**Aspen Software Co.**

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



**FOR TRS-80 MODEL I OR III  
AND SOON FOR THE NEW  
IBM PERSONAL COMPUTER!**

- ★ **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 or IBM with keyboard repeats, upper/lower case display driver, full ASCII, single- & double-width graphics, etc.
- ★ **MORE POWER**  
Forth operating system  
Interpreter AND compiler  
8080 or 8088 Assembler  
(Z80 Assembler also available for TRS-80)  
Intermix 35- to 80-track disk drives  
Model III and IBM can read, write and run each other's and Model I diskettes!  
VIRTUAL I/O for video and printer, disk and tape (10-Megabyte hard disk available)



**THE PROFESSIONAL FORTH  
FOR TRS-80**

(Thousands of systems in use)

MMSFORTH Disk System V2.0 (requires 1 disk drive, 32K RAM) For Radio Shack TRS-80 Model I or III . . . \$129.95  
For IBM Personal Computer (advance order) . . . \$249.95

**AND MMS GIVES IT  
PROFESSIONAL SUPPORT**

Source code provided  
MMSFORTH Newsletter  
Many demo programs aboard  
MMSFORTH User Groups  
Inexpensive updates 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 which 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\*

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. . . \$13.95\*

FORTH SPECIAL ISSUE, BYTE Magazine (Aug. 1980) - we stock this collector's item for Forth users and beginners . . . \$4.00\*

\* - ORDERING INFORMATION: Software prices include manuals and require signing of a non-transferable single system, single-user license. Describe your hardware. 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 (B4)**

61 Lake Shore Road, Natick, MA 01760  
(617) 653-6136

# 66

**Reviews**

different brands), the UPI-3 is both the most versatile and the easiest to use. The UPI-3 Interface is simple to install; it plugs directly on the parallel printer edge-card of the expansion interface. A plug-in transformer provides the power to the UPI-3 and must be connected to 110-120-volt AC outlet.

Many parallel-to-serial interfaces require that the user supply the voltages to power the interface, either from the TRS-80, the printer, or a separate power supply. Although many users have successfully obtained the required voltages for other parallel-to-serial interfaces from the expansion interface, the separate power supply which is included with the UPI-3 is far less taxing to the system and is much easier to install (no soldering, wiring or even opening of the expansion interface).

When using the UPI-3, the computer "thinks" it is communicating with a parallel printer. If a program won't work with the UPI-3 and an ASCII serial printer, it won't work with a Radio Shack parallel printer either. It, therefore, takes the place of both the RS232C interface and the nuisance of a machine language driver.

A variety of options are available to the user which make the UPI-3 an adaptable piece of computer hardware. Included in the interface are eight dip switches which allow the user to set the configuration of the interface to match that of the printer. Handshaking, line feed after carriage return, nulls after carriage return, odd or even parity, number of bits per word, number of stop bits, parity/no parity, and adjustable baud rate (110 to 4800) are options. Binary Devices will adjust the baud rate to your specifications.

The UPI-3 is shipped with a 90-day warranty from the date of delivery. The interface is everything that I expected, and I am happier with this piece of hardware than any I have purchased for my TRS-80 Model I. Although the price may seem high, the product is excellent. Support from the manufacturer equals the excellence of the product. My dealings with Binary Devices have convinced me that they are a reliable company who stands by

their products. If you have the driver blues, the UPI-3 may be the best solution to your problem.

William Ramsey



**Computer Based Math Lab  
Model I/II/III/16  
Entelek Incorporated  
42 Pleasant Street  
Newburyport, MA 01950  
\$24.95 Paperback**

This text is a good example of the best and the worst in software. The book contains 35 CAI (computer assisted instruction) programs, all written in BASIC. The introduction to the user tells him to copy a relevant program into his terminal, and then let the students go to it. Sorry. It's not that easy.

A number of the programs make use of data files for their execution (e.g., values of coefficients, etc.), yet you are given no information about their contents or purpose. To be able to implement the program, you have to study it carefully and deduce what the file must contain to make any sense out of it. The programs are not well remarked, which gives an added challenge to the problem. Development of the programs in the book began in 1968, and BASIC has undergone much evolution since then. I did expect to do some conversions due to dialect differences, but reconstruction of data files is too much to expect.

Now, some of the good news. Once a program is up and running, it does a fine job of emphasizing the concepts covered. The programs are well-suited to a high school mathematics curricula. There are 11 programs that work to increase a student's skill at estimation of roots, trigonometric values, powers, logarithms, solutions to quadratic, linear or cubic equations. Nine programs develop the introductory concepts of probability and statistics, including a Monte Carlo trial to estimate areas and volumes of figures. Six programs work on polynomials and solutions, two on rational versus irrational numbers,

and another two programs that look at graphs and numerical analysis of functions.

The programs are written with a view toward time-share BASIC, so no use is made of TRS-80 graphics. Any graphing to be done is printer-oriented, so either turn your video sideways, or change appropriate PRINTS to LPRINTS.

The text is a Xerox copy of program listings, and some are difficult to read. One program in the Table of Contents was not included. With each program is an introduction that identifies the objectives, methodology used and theory behind the concepts presented. You also get a samplerun of a student's use of the program. This was invaluable in deciphering how to get the routines to work. At the end is an Appendix that coordinates each program to chapters and sections of most currently-used high school texts.

The authors state that the text is experimental and they desire the readers comments. I hope that the second draft is out soon, the programs are worth having, but no instructor has the time to make the large number of modifications needed.

Cam Brown



**Armored Patrol  
Model I/III**

**Adventure International  
Box 3435  
Longwood, FL 32750  
(800) 327-7172  
\$19.95 cassette  
\$24.95 disk**

Reveille sounds! Boy, 4:30 a.m. seems earlier every day. After breakfast and a workout, you hop into your massive T-36 tank. Knowing this may be your last day, you lay your hands on the computer keyboard of this planet's most sophisticated land weapon. Feeling the energy through your fingertips, you press the correct sequence and begin to search for the invading tanks and robots.

Armored Patrol from Adventure International is a fast, exciting

arcade-type game. The object is simple: destroy the enemy tanks and energy-stealing robots. You're sitting inside of your tank looking out onto the horizon. Being an elite weapon, your tank is equipped with the ultimate plasma weapon and radar. Radar indicates direction to the enemy. It will indicate left, right, forward or rear. If a robot should appear anywhere, an asterisk will appear in the center of the radar screen. No indication of direction to the robot is given, though. Robots fire at your tank, drawing energy from your initial 20 units. If your tank's energy should reach zero, the tank will be destroyed. Your fleet consists of four tanks with an extra awarded at 20,000 points. Enemy tanks score 1000 and robots 5000.

Movement of your tank is somewhat tricky. It is *not* done with arrow keys. Some tankers might find this annoying. I, however, have played similar games in arcades, and can tell you that a great deal of the challenge to this game is in learning the controls. I'm glad the authors didn't choose the easy way out.

Obstacles, actually small buildings with windows, are placed throughout the landscape. You can even see the enemy through the windows. Buildings may not be destroyed or run through. You must go around them. The bad guys just love to hide behind buildings. After you have the enemy in your sights, you fire a plasma blast (space bar) to destroy him. Don't forget—he will be firing at you, too!

Robots appear from time to time to gather energy from your tank. They're easily destroyed with a plasma blast when found. Figuring out where they're at is the hard part. Visually, they're very clever. They appear to be double six-gun totin' cowboys. I'm almost sure they have a Scott Adams smile when they kill you, but I could be wrong.

The game is a real-time machine language program. It must be CONVERTed for a Model III. Available on tape or disk, it will save high scores on the disk version. It plays smoothly with great graphics and sound effects. Sometimes the sound effects are even too clever. Armored Patrol is

# MAILING LIST SYSTEM

For TRS-80\*

(\*Tandy trademark)

Model I & III

## \$89.95

- Simply to use...even for the novice.
- Maintain virtually an infinite number of disks all in continuous alph. or zip order...essential for large lists.
- Sort 2260 entries (2 full 40 track double density disks) in only 32K or an incredible 4640 entries (2 full 80 track disks) in only 48K!
- Super fast sort by alph. or zip order (8 sec. for 1000 entries)...both orders can exist simultaneously on disk.
- High speed recovery of entries from disk...pulls in over 11 per sec!
- Transfer old files to our system.
- Less than 5 digit zips have leading 0's appended.
- Supports 9 digit zips, **Canadian zips**.
- Zip order is "sub-alphabetized".
- System adjusts to any DOS.
- Backup data disks are easily updated as entries are created, edited, or sorted...extremely useful!!
- Optional reversal of name about comma.
- Permits telephone numbers, etc.
- Prints on envelopes or on labels, 1, 2, 3 or 4 across.
- Test label/envelope printing lets you make adjustments with ease.
- Master printout of your list in several formats.
- Selective printing by specific zips or by zip range.
- Editing is simple and fast...automatic search. Batch transfer of edited entries to backup disks.
- Provides for duplicate labels.
- Deleted entries have "holes" on disk filled automatically.
- Automatic "repeat" feature.
- Load and "scroll" through entries.
- Optional "ATTN:" line.
- Plenty of user defined fields with various options for **simultaneously** purging and selecting the printout.
- All 0's in address labels are replace by easier to read O's.
- Continuous display of numbers of labels/envelopes printed.
- Each disk entry automatically "remembers" how many mailings have been made.
- Primarily written in BASIC for **easy modification**...embedded machine code for those speed sensitive areas.
- Hardware requirements: 32K, printer, and 1 or 2 drives.

# 67

**Precision Prototypes**

410-E East Roca  
Refugio, Texas 78377  
512-526-4758





it down) rapid fire.

I encountered no errors while loading the game and could find nothing wrong with the program while executing it.

I would recommend it for two players, although one player could probably do all right with a little practice.

**Richard Rehaume**



**Three CAI Programs  
Model I/III with 16K  
Cassette \$12.95 ea.  
Edu-Soft**

**4639 Spruce Street  
Philadelphia, PA 19139**

Our school recently purchased a number of programs from Edu-Soft for CAI purposes. Each one is a gem. Each tape comes with two programs on it for only \$12.95.

The first tape (catalog #T-03) included the program's plot and "Guess the Rule." The plot routine is as good a program for graphing equations as I have ever seen on the TRS-80. You can enter up to two equations at one time and have them graphed simultaneously, (I do wish both graphs were not using SET commands since the overlap is hard to follow). The results can be saved, new equations entered, and comparisons made. Any function that can be written in BASIC is allowed, undefined values create no problem. You have complete control over X and Y axis limits. The routine is clean and simple, although it does take some time while plotting the values.

Our department sent for this tape for the plot program, but the second program will probably be more popular with our instructors. The routine called "Guess the Rule" is just that. A student is presented with X and Y values and is asked to figure out the  $Y = ??$ . The computer randomly selects the coefficients for linear ( $Y = AX + B$ ) and quadratic ( $Y = AX^2 + BX + C$ ) functions. Points are awarded for guessing correct X, Y values and then guessing the complete function. The graphics and display for this program are excellent.

Our second tape (catalog #T-04) contains the programs "Simulated

Computer" and "Comuta-Doodle." Simulated Computer will give your students (and yourself) an excellent introduction to machine language programming. You have a set of OP codes and registers. By writing simple programs in this "language," you can actually see what is going on inside of a computer. The program even allows for display options: RUN SLOW (I used that one often), and RUN AT NORMAL SPEED. You can even edit your routines without having to reenter. I can't think of a better way to be introduced to the inner workings of a computer. With the program is an excellent manual that includes simple lessons and questions for study.

The other program on this tape is Comuta-Doodle. Here, you can move a dot around the screen, draw lines, and shift your picture up, down, right or left. There are some options that make this "Etch-A-Sketch" routine more useful than most. Sketches can be saved to tape for input later, and you can command that a given sketch be listed out in graphics codes (CHR\$ values) for use in other programs.

The last tape we ordered (catalog #T-05), includes two programs aimed at practice with integers. The "Integer" program drills student on the four operations: +, -,  $\times$ , and /. Good graphics present each problem in larger-than-life symbols, and students easily master running the program. The "Estimate" program is a drill guessing an approximation for the multiplication of whole numbers. Students are scored as to their accuracy and speed. Again, the graphics are large, clean and easy-to-read. Student input is a breeze. The estimation routine can be excellent when trying to get your students to check answers for reasonableness.

At only \$12.95 per tape, these are an excellent buy. All programs are in BASIC, loaded from tape with no problem, and can easily be put to disk. Each tape came with a simple booklet of instructions. I am looking forward to our next catalog from Edu-Soft. They seem to know how to write just what a school needs (and can afford).

**Cam Brown**

## The Programmer's Guild Software

<b>Gauntlet of Death</b> 16K L2 Mod I/III cassette	<b>\$19.95</b>
<b>Maze of Darkness</b> 16K L2 Mod I/III cassette	<b>\$19.95</b>
<b>Trampmaze Duality:</b> Gauntlet of Death & Maze of Darkness for 32K L2 Mod I/III disk	<b>\$29.95</b>
<b>Timequest</b> 32K L2 Mod I disk (converts to III)	<b>\$24.95</b>
<b>Timequest</b> 16K L2 Mod I/III cassette	<b>\$19.95</b>
<b>Temple of the Sun</b> 16K L2 Mod I/III cassette	<b>\$19.95</b>
<b>Temple of the Sun</b> 32K L2 Mod I/III disk	<b>\$24.95</b>
<b>Domes of Kilgari</b> 16K L2 Mod I/III cassette	<b>\$19.95</b>
<b>Domes of Kilgari</b> 32K L2 Mod I/III disk	<b>\$24.95</b>
<b>Deadly Dungeon</b> 16K L2 Mod I/III cassette	<b>\$14.95</b>
<b>Deadly Dungeon</b> 32K L2 Mod I/III disk	<b>\$19.95</b>
<b>Dreadnaught Chronicles:</b> Death Dreadnaught & Domes of Kilgari	<b>\$29.95</b>
32K L2 Mod I/III disk	
<b>Graylock Chronicles Trilogy:</b> Spider Mountain, Deadly Dun- geon & Dragonquest	<b>\$35.00</b>
32K L2 Mod I/III disk	
<b>Tower of Fear</b> 16K L2 Mod I/III cassette	<b>\$19.95</b>
<b>Tower of Fear</b> 32K L2 Mod I/III disk	<b>\$24.95</b>
<b>Color Computer</b> Tower of Fear	<b>\$19.95</b>
16K Ext. BASIC cassette	

## Hardware

Model III 16K L2 — retail \$995	<b>\$839</b>
Model III 48K dual drive with RS-232 retail \$2495	<b>\$2095</b>
Color Computer 16K with Ext. BASIC retail \$599	<b>\$499</b>
Daisy Wheel II Printer retail \$1995	<b>....\$1745</b>
Line Printer VII retail \$399	<b>\$329</b>

## The Programmer's Guild

**c/o Radio Shack Dealer  
Shopping Village  
Peterborough, NH 03458  
(603) 924-6065**

VISA/MC or Certified Check  
Allow two weeks for delivery

# 69



## Architectural Engineering Library

### 10 Programs

Structural Timber Design  
Structural Concrete  
Structural Steel  
Light Frame Trusses  
Pole Frame  
Plybeam  
Heat Loss/SLR

Individual programs \$35 ea.  
Library \$225

For TRS-80 Mod I & III  
ESF, Disk or Cassette

### VENTURES DESIGN LTD.

Eric Clough  
Box 52, Winlaw, B.C.  
Canada V0G2J0

# 79

## DISKETTES CASSETTES

Error-Free 5 1/4-inch Diskettes (MD-5) single-sided, soft sector, single or double density, reinforced hub.

Item	Qty 10	Qty 50
MD-5	\$25.00	\$110.00
C-10	\$ 7.50	\$ 32.50
C-20	9.00	39.00
C-60	11.50	50.00
C-90	15.00	70.00

UPS SHIPPING INCLUDED  
in Continental USA  
CA Customers add taxes

## MICROSETTE

475 Ellis St., Mt. View,  
CA 94043 (415) 968-1604

# 80

# FOTO- FILE

Organize your slides, negatives or albums by code, location, category or title. A MUST FOR PHOTOGRAPHERS.  
**L2 16K Tape \$1995 Disk \$2995**

Also available:  
DAILY APPOINTMENT CALENDAR  
HOME BARTENDER GUIDE  
LEARN GERMAN & others  
Write for free brochure

**TAPE-TRONICS**  
346 N. Western Ave.  
Los Angeles, Ca. 90004

## EPROM PROGRAMMER

- \* Build your own and save many \$\$'s
- \* Complete plans, software & bareboard
- \* More features than most costing much more.
- \* Programs most popular 5 volt EPROM's

Mod III only, Mod I available soon. Send SASE for full details. Specify mem. size & tape/disk (supplied on tape, transfers to disk). \$39.95

High Desert Engineering  
1630 So. Downs  
Ridgecrest, Ca. 93555

# 81

## HAYES SMARTMODEM

\$229<sup>88</sup>

ENTERED



High performance data communications system for small computers. SMARTMODEM is a stand-alone 300 baud modem system including the SMARTMODEM unit, power pack, and modular telephone cable. Completely programmable, the SMARTMODEM can be controlled using any programming language.

- FCC approved direct-connect
- Auto-answer/Auto-dial
- Full/half duplex
- Touch-tone/Pulse-dialing
- Audio monitor
- 7 status LED lights

NO MORE HITCHHIKING AT AFFORDABLE PRICES!

**THE BOTTOM  
LINE**

Orders & information  
(603)-673-8857

Orders Only  
(800)-343-0726

12 Johnson Street, Milford NH 03055

# 82

BARCLAY WHYTE ASSOCIATED.

"THE BEAR WITH THE SOFTWARE." TM

Presents Mel Patrick's

WordProc I/III -

VER 2.0 - BASIC-MACHINE LANGUAGE WORD PROCESSOR.

TRS-80 Model I or III

DOCUMENTATION INCLUDES COMPLETE PROGRAM LISTINGS

JUSTIFIES-CHAINS FILES-MERGES FILES-AUTO CENTERS  
TITLES-HEADINGS-SUBHEADINGS-PAGE NUMBERS-MORE

48K Mod I/III disk.

EASILY MODIFIED FOR OTHER CONFIGURATIONS

\$14.95 With disk.

\$10.95 Documentation only.

BARCLAY WHYTE ASSOCIATED, DEPT. D,

349 WEST COLUMBIA STREET,

P.O. BOX 948, NEW WESTMINSTER,

B.C. CANADA. V3L 5C3.

ADD \$1.00 FOR POSTAGE & PACKAGING. ADD \$0.01  
B.C. residents add Provincial Social Service Tax.

TRS-80 Trade Mark of Tandy Corporation.

# 83

## DAISY WHEEL PRINTER

NEW



LETTER  
QUALITY

- RS232C. Serial Interface
- Parallel Interface
- Microprocessor Controlled

**\$645**

### MICRO TECHNOLOGY

7817 Ivanhoe Ave  
La Jolla, CA 92037  
(714) 457-2149

# 84

## Professional REAL ESTATE SOFTWARE

for APPLE, TRS-80 & CPM SYSTEMS

### PROPERTY MANAGEMENT SYSTEM: \$375

- Tenant History
- Late Rent Report
- Vacancy Report
- Income Report
- Auto Late Charge
- Returned Checks
- Operating Stmt.
- Building Reports
- Utilities Report
- Tax Expense Report
- Prints Checks
- Prints Receipts

### PROPERTY LISTINGS/COMPARABLES: \$325

- SCREEN BY
- 22 Items/Listing
  - 1000 Listing/Disk
  - Listing Memo Field
  - Max/Min Price
  - Units/Zone/City
  - Max Price/Income
  - Max Price/Sq Foot
  - Min Cashflow

### REAL ESTATE ANALYSIS MODULES: \$50/Module

- Home Purchase
- Income Prop. Analysis
- Property Sales
- Construction Cost/Profit
- Tax Deferred Exchange
- APR Loan Analysis
- Loan Amortization
- Depreciation/ACRS Analysis

### WORD PROCESSOR - MAGIC WAND: \$265

**Real Estate  
Software  
Company**

All Computer Stores Everywhere  
or Order COD Direct  
Cal Residents add 6% Sales Tax

(213) 372-9419

Suite E, 1116-8th Street, Manhattan Beach, CA 90266

# 85



## ABS Suppliers

3352 Chelsea Circle  
Ann Arbor, MI 48104  
(313) 971-1404

**B17 TAPE OPERATING SYSTEM** will let you

- Save & Load programs 6X faster than Model-1.
- Save & Load Data Arrays over 800X faster.
- Backup standard System tapes that load-n-go.
- Certify cassette tapes for B17 use.

**\$24.95** Specify Model 1/3 16K/32K/48K RAM.  
Inexpensive Upgrades available. 3rd year of sales.

**B17 DISK/BAS** is a Disk version. Lets you save any disk file to cassette at 3000 baud. Inexpensive way to backup your files. Works with any DOS. Includes tape certifier. Requires 32K RAM-up.  
**\$19.95** Specify Model 1/3.

**WORDSMITH** Word-processing program in BASIC. A "Trainer" for more complex W/P programs. Easy-to-use. Specify Tape/Disk version. Tape version requires B17 Tape Operating System (above). Disk version requires 32K RAM-up. Uses MX-80 Printer.  
**\$19.95** Specify Model 1/3.

Add \$1.50 postage/handling per item.

# 86

---

# New Products

## New Computer Demonstrator

Radio Shack now offers both parents and educators an inexpensive way to introduce young children to the way a computer operates with a cardboard training aid and accompanying manual workbook. The Radio Shack Computer Demonstrator (62-1080) is available for \$3.95 at Radio Shack stores, Computer Centers and participating dealers.

The cardboard Computer Demonstrator measures an easily-manageable 8.5 x 16 inches. It uses sliding cardboard strips to illustrate various computer functions. These include program line number indicator; and equal/unequal number comparing unit; "key-board" input; "TV" output; a storage unit; a register; and a print function completed by the user. Arrows on the demonstrator card indicate the sequence of functions by charting the direction of work flow.

#200

---

## ColorForth

ColorForth is a fig Forth version of Forth, tailored for the TRS-80 Color Computer. It requires at least 16K of RAM but *does not* require Extended BASIC. In addition to the standard fig Forth words, ColorForth has several additional words to customize it for the Color Computer. Among these are CSAVEM (for non-Extended BASIC users), and special DUMP and printer functions. ColorForth includes the standard fig editor. Cassette and disk versions with manual are \$49.95, available from Armadillo Int'l. Software, P.O. Box 7661, Austin, TX 78712.

#201



## New Video Monitor

Replacement picture tubes with green and orange phosphor and an anti-glare face are now available for TRS-80 Model II and III microcomputers from Langley-St. Clair Instrumentation Systems of New York City.

The new "soft-view" CRT brings the green or orange letters out of a nearly black field, increasing contrast and readability. With flicker eliminated, it is like looking at a printed page, and the optional "Data-view" frosted faceplate substantially cuts glare. The picture tubes are shipped with the metal mounting band and ears already attached, and installation only involves removing a few screws and plugging in the new tube. Extensive installation instructions are included. Available for \$79.95 (green) and \$89.95 (orange) from LSI Systems, 132 West 24th St., New York, NY 10011. The optional anti-

glare "Data view" etched faceplate is an additional \$10.00

#202

---

## Softside Sampler

The Softside Sampler of TRS-80 Entertainment Programs is a compilation of the 29 most interesting and entertaining programs published in *Softside Magazine*. Edited by Joan Witham and published by the Hayden Book Co. Inc., of Rochelle Park, NJ, the 199-page book offers a variety of short, simple programs and longer, more complex adventures. Size is 6 x 9, price is \$8.95, available from Hayden Book Co., Inc., 50 Essex St., Rochelle Park, NJ 07662.

#203

---

## CC Home Money Minder

Computerware has introduced The Home Money Minder, a checkbook manager program for the Color computer. It can tell you in a

nutshell how much money you have spent on what and where your income came from. It provides reports and makes tax time a snap. The program requires 32K, Extended BASIC and a cassette recorder. The Home Money Minder is available from Computerware, Box 668, 4403 Manchester Ave., Encinitas, CA 92024 for \$19.95 plus \$2 shipping and handling.

#204

**Dr. Lien Announces New Book**

CompuSoft Publishing of San Diego, CA just released the latest book in the CompuSoft learning series — *Learning TRS-80 BASIC for Models I, II/16 and III*. This new text was written by David A. Lien, who also wrote the original Level I User's Manual and *Learning Level II*.

Learning TRS-80 BASIC, according to Dr. Lien, is the ultimate tutorial work for anyone wishing to learn TRS-80 BASIC or expand programming knowledge. Written in the relaxed and amusing Lien style, this book leads the beginner step-by-step through the many aspects of BASIC programming. The book is available for \$19.95 plus \$2 shipping & handling from computer and book stores or directly from the publisher at 1050 Pioneer Way, Suite E, El Cajon, CA 92020.

#205

**Syzygy Switchbox**

Syzygy announces the availability of their RS-232 Serial Switchbox (P/N 232SB). The box measures 7 x 10 x 3 and permits manual switching of a common port to any of three distribution ports. All components are solidly mounted on a 9 x 6 inch printed circuit board. There are four internally mounted 10-pole socket-mounted DIP switches which allow each port to be separately configured for normal or null-modem use and can enable, disable and jumper lines 4,5,6,8 and 20. The versatile switching permits rapid configuration of the box for CRT terminals, printers and CPU ports. A CPU port may select any of three different printers or terminals, or three different CPU ports may select one printer or terminal, etc. No batteries or external power is required and no wires are used. For more information contact Syzygy, 256 West San Bernardino Road, Covina, CA 91723.

#206

**Small System Network**

Radio Shack now offers an improved small system network capability with up to 16 TRS-80 Model III computers accessing a host TRS-80 Model III computer's disk drives and optional printer. The new Network 3 Controller (26-1212) is available for \$599.00 at Radio Shack stores, Computer

Centers and participating dealers. The Network 3 Controller allows each of the 16 workstations (which require no disk drive, but do require the RS-232C interface) to function as if they were independent, disk-equipped computers able to execute disk load and store commands. They are, in fact, communicating these commands to the disk-equipped host computer. Each station has the capability of printing either on a printer attached to that individual station, or on a printer connected to the host computer.

#207

**New Book from Radio Shack**

The Beginners Guide to Personal Computers (62-2003) from Radio Shack, is a comprehensive guide to personal and business computer applications for the novice. The book, written by Forrest M. Mims, III, is available for \$1.95 at Radio Shack stores, Computer Centers and participating dealers.

**Dual Mode Impact Printer**

Data Impact Printer, Inc., (formerly known as DIP, Inc.) announces the DIP-92, the industry's first totally modular and dual mode impact printer. It is modular because the user can specify and pay for only the features he needs. It is dual mode because the printer can do data processing printing at a higher speed as well as correspondence printing for good letter quality. The DIP-92 has two basic program selectable printing modes. The data processing mode uses a 7 x 9 matrix font, while the correspondence mode uses an 11 x 9 font. With each printing mode, under program control, the user can specify six different character sizes and one or two-pass printing. The 11 by 9 font, with two-pass printing, as well as descenders and underline, enables the DIP-92 to produce correspondence quality documents. The single unit list price for this printer is \$695.00. It is available from Data Impact Printer, Inc., 745 Atlantic Ave., Boston, MA 02111.

#208



# CALL FREE FOR VERBATIM FLEXIBLE DISKS!

Toll-Free 1-800-835-1129

Exceptional prices quick delivery  
Visa/Master Card/Checks/COD  
Ask about our other TRS accessory  
and equipment buys

## DATA SERVICES, INC.

DATA SERVICES, INC.  
Computer services since 1970  
P.O. Box 1157 Wichita, Kansas 67201 1157  
(In Kansas call 1-316-838-9021)

# 87

## VECTOR/FIX MODEL I/III

- Puts machine language programs on cassette to disk and adds a patch to make them run!
- Ideal for programs which wipe out DOS such as Deathmaze, Eliza, Galaxy Invasion, etc.\*
- Scan in uppercase & lowercase ASCII, or HEX — send to printer.
- High speed string search.
- Even patches programs saved to disk by other load module programs (above 81FFH).
- Either version will dump the ROM & DOS area to printer in ASCII or HEX.  
Min. Req. 32K, 1 disk drive, TRS-80\*\*  
**Model I Disk \$19.95**  
**Model III Disk \$23.95**

Includes Shipping and Handling

Send Check or Money Order To:

### MICRO-MEDIA

P.O. Box 538, Linden, MI 48451

\* Not designed to load 'protected' tapes.  
\*\* TRS-80 is a trademark of Tandy Corporation.

# 88

## ☆☆ SUPER™☆☆ ISA's DATABASE

The only DBMS with all these features:

- ★ PROVEN in one year of test marketing
- ★ TOUGH, reliable file structure
- ★ MENU driven for simplicity and easy use
- ★ ARITHMETIC with stored calculations
- ★ FAST set-up and report formatting
- ★ CLEAR user-oriented documentation
- ★ PRINTS totals & subtotals — mail labels
- ★ REFORMATS and merges data files
- ★ MULTI-DISK files: Up to 128K records
- ★ SORTS full disks on up to 40 fields
- ★ PRODUCTION input of repetitive data
- ★ COUPLES to word processor & statistics
- ★ POSTS transactions to master file
- ★ SEARCH by strings, ranges, comparisons
- ★ DATA COMPRESSION: Over twice as many labels as the other system

For TRS-80\* Models I, II, & III — 250.00

CDC  
13715 Vanowen Street  
Van Nuys, CA 91405  
(213) 873-6621

\*TM Tandy Corp

# 89

## LDOS™ \$99.95

(Specify Model I or III)

25% Off List on Software from:  
GALACTIC SOFTWARE  
ADVENTURE INTL.  
AUTOMATED SIMULATIONS  
STRATEGIC SIMULATIONS  
and much more. . .

Send check or money order to:

**SoftHart Enterprises**  
1105 S. Beloit Ave.  
Forest Park, IL 60130

For catalogue information, or VISA,  
MasterCard orders, phone (312) 771-2857.  
Add \$2<sup>00</sup> shipping and handling;  
Illinois residents add 6% tax.

# 90

## 'MITYLOAD' TAPE ANALYSIS/ TRANSFER UTILITY

\*TRS-80 Model I/III 32k Disk

- Transfers machine language programs to disk
- Resolves memory conflicts — automatically
- Appends disk loader to relocated programs
- Identifies the contents of unlabeled tapes
- Displays name-start-end-transfer addresses
- Displays copyrights contained in programs
- Calculates & displays DOS transfer command
- Works with standard format 500 baud tapes

To Order Your 'MITYLOAD' Diskette  
Send check or money order  
for \$29.95 to:

### MITCO INCORPORATED

2798 Nehalem S • Salem, OR 97306  
\*TM Tandy Corp.

# 91

## MODEL III TRS-80® Software on Disks!

At last! All Model III.

Put it in — Watch it run.

GUARANTEED — SEND FOR  
FREE CATALOG. INCLUDE \$9.95  
FOR DISK VERSION AND  
A FREE PROGRAM.

## STAR★WARE™

Rt. 5, Box 277-C  
Benbrook, TX 76126

# 92

## NEW! From RONTEL



—SPOOKS— Rack up points following trails and eating dots — but watch out for the spooks! When you get tough —SPOOKS— will get tougher. • SOUND • FAST GRAPHICS • RECORDS BEST SCORES

—SPOOKS— (cassette, postage paid) . \$16.95

**NEW! From RONTEL** **SSBUG Single Stepper**  
For serious machine code debugging SSBUG displays all registers and more within a small moveable area of screen. This utility examines and alters memory, breakpoints, and single-steps using a user-selectable key, suppresses following calls, and much, much more SSBUG is human engineered so as not to interfere with regular program execution. • EASY TO OPERATE • USES ABOUT 2K  
**SSBUG (cassette, postage paid) . \$19.95**

Both Programs for TRS-80 MOD. I and III  
Send Check or Money Order to:



903 Shady Drive Dept. U Vienna, VA 22180  
VA RES ADD 4% SALES TAX  
TRS-80 IS A REG. TRADEMARK OF TANDY CORP.

# 93

## WHO NEEDS DISKS FOR RELIABLE, HIGH QUALITY WORD PROCESSING?

MOST HOME USERS DON'T!

For long texts or short what you need is TXMODE

TXMODE is a new, sophisticated machine language program that extends ROM edit capability to text material and adjusts line lengths for any desired output format. No limit on manuscript size—has been used to revise a 300-page novel. Commands added to BASIC direct mode, plus many prompts, make proofreading, tape operations and page formatting easy. Works with any printer; special options with Epson MX80.

Model 3, 16K up (Model I users please inquire)  
\$29.95 + \$2 P&H. FREE BROCHURE.

TOPS Programming Enterprises  
QUALITY TAPE OPERATING SYSTEMS  
AND COMPATIBLE SOFTWARE FOR HOME USE  
7427 S.W. Garden Home, Suite 105  
Portland, Oregon 97223

# 94

## 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: \$375.  
+ shipping, insurance & tax

WHEN ORDERING SPECIFY DISK OR TAPE

### SCIENTIFIC ENGINEERING LABORATORIES

11 Neil Drive • Old Bethpage, NY 11804  
Telephone: (516) 694-3370

\*Trademark of Tandy Corp.  
There is no affiliation between Scientific Engineering Laboratories and Tandy Corp. or Radio Shack.

# 95

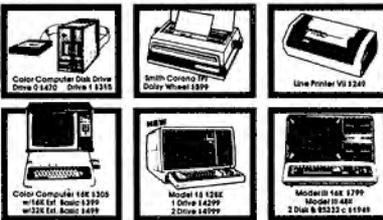
**MAGAZINE SAMPLES**  
**FREE listing** of over 150  
 magazines offering a  
 sample copy - 50¢ per  
 sample. Send stamped  
 self-addressed #10  
 envelope to:

**PUBLISHERS  
 EXCHANGE**

PO Box 1368, Dept 278  
 Plainfield, New Jersey  
 07060

# 96

From Computer Plus to YOU...  
**PLUS after PLUS after PLUS**



**BUY DIRECT** Here are just a few of our fine offers...  
 call TOLL FREE for full information.

COMPUTERS	MODEMS	DISK DRIVES
Model 16 128K 3300	Link Direct Connect M2M 278	5.5 Megabyte 15" Drive 579
Model 11 128K 3100	Auto-Are-Dial 150	Telex Terminal 40" Disc 44 289
Model 16 32K 3450	Telephone Interface II 160	Color Computer Drive I 315
Model 11 32K 3150	5.5 Modem I/C 140	Color Computer Drive II 425
Model 16 48K 4000	5.5 Modem II/C 210	Primary Hard Disk 2999
Model 11 48K 3750	PRINTERS	SOFTWARE
Model 16 48K 4000	Daisy Wheel II 1805	5.5 Software 10% off list 140
Model 11 48K 3750	Smith Corona 17" Daisy Wheel 479	Hardware 80 Mail 140
Model 16 80K 4500	Epoch Matrix 759	Color Computer File D O S 49
Model 11 80K 4250	Epoch Matrix II 569	87C 87C 87C
Model 16 128K 5000	Epoch Matrix III 759	Verbatim Double Density 52
Model 11 128K 4750	Line Printer VI 249	Verbatim 5" Diskette 49 95
Model 16 128K 5000	Line Printer VII 420	Ch 80K Records 25
Model 11 128K 4750	Line Printer V 1610	C C Utilities 25
Model 16 128K 5000	Microline 80 325	16K RAM Kit C 200 N 5 chips 15
Model 11 128K 4750	Microline 82A 400	Add Rom Chips 25
Model 16 128K 5000	Microline 82B 400	16K RAM Kit C 200 N 5 chips 15
Model 11 128K 4750	Microline 84 Parallel 1000	Add Rom Chips 25
Model 16 128K 5000	P C Printer Format 199	16K RAM Kit C 200 N 5 chips 15
Model 11 128K 4750	Color Computer Keyboard 199	16K RAM Kit C 200 N 5 chips 15
Model 16 128K 5000	Color Computer Keyboard 199	16K RAM Kit C 200 N 5 chips 15
Model 11 128K 4750	Color Computer Keyboard 199	16K RAM Kit C 200 N 5 chips 15
Model 16 128K 5000	Color Computer Keyboard 199	16K RAM Kit C 200 N 5 chips 15

We have the lowest possible Fully Warranted Prices AND a full complement of Radio Shack Software.

DEALER INQUIRIES ARE INVITED. Prices subject to change without notice. Not responsible for typographical errors. We do not guarantee replacement of third party.

CALL TOLL FREE 1-800-345-8124

**computer plus**

2344 Great Road, Littleton, CO 80120

# 97

**MICRO  
 MOONLIGHTER  
 NEWSLETTER**

The ONLY publication devoted exclusively to helping you create, build, and maintain a home-based business using your micro-system. **SUBSCRIBE NOW** to what may be the most important publication in YOUR FUTURE!

1 Year (12 issues) only \$25 U.S., \$29 Canada, \$35 World Wide

J. Norman Goode, Publisher  
**Micro Moonlighter  
 Newsletter**

2115-J Bernard Avenue  
 Nashville, TN 37212

Visa and Mastercard welcome. Send account number and expiration date.

# 98

**Pascal-80** Phelps Gates

This friendly, easy to use version of Standard Pascal, as reviewed in the December 1981 Byte, is now even better! New version works on TRS-80 Model I and Model III, under TRS-DOS, NewDOS, NewDOS 80, DOSPlus, LDOS, and DoubleDOS. An author package allows you to create your own .CMD files without any royalty payments! Upper and lower case is fully supported. You can protect memory and call machine language programs. New extensions include SET, RESET, POINT, RND, and the UCSD include procedure. Utilities are provided to convert to and from ASCII files. Pascal 80 now comes in a binder with an 80 page manual by George Blank.

With monitor, editor, and compiler in memory at the same time, no other Pascal is easier to learn! One college found that it could teach half again as many students on the same number of computers after switching from UCSD Pascal to Pascal 80.

Full 14 digit accuracy on all math functions, including log and trig functions, makes this a serious Pascal. Disk file handling is supported, with a mail list program included as a demonstration.

Upgrades are available for those who bought Ramware Pascal 80. Call or write for information.

Send \$101 (includes shipping) to: New Classic Software  
 238 Fox Hill Road, B  
 Denville, NJ 07834

Credit card orders: (201) 625-8838  
 (PASCAL-80 does not implement variant records, pointer and window variables or functions and procedures used as parameters.)

# 99

**Save Grief & Aggravation**

—Know Before You Buy—

**READ  
 "Consumer Protection for  
 the Microcomputer Owner"**

COVERS:

1. Preliminary Considerations before Buying
2. Legal Differences between Mail Order and Local Store
3. Pitfalls and Protection of Paying by Cash, Check, Credit Card, etc.
4. What a Warranty Really Is
5. How to Complain Effectively
6. How to Legally Reject and Revoke Acceptance of Goods
7. Miscellaneous Hints and Suggestions

**ONLY \$15 Post Paid (COD \$3 Extra)**

Send Check or Money Order to

L. J. KUTTEN, ATTORNEY  
 201 South Central  
 P.O. Box 16185  
 St. Louis (Clayton), MO 63105

314-721-6644

Mo. Residents add 4.625% sales tax  
 Compuserve ID #70655,378 Source ID# TCK092

# 100

**COLOR COMPUTER  
 COLORFORTH**

FORTH is a high level computer language like BASIC or PASCAL. **COLORFORTH**, a version of figFORTH, is available NOW for the TRS-80C computer. **COLORFORTH** execution time is as much as 10 times faster than BASIC. **COLORFORTH** requires a minimum of 16K ram, but does not require either Extended Basic or disk system. When you purchase **COLORFORTH**, you receive both cassette and disk versions, the standard figEDITOR, and an extensive instruction manual.

**ALL FOR ONLY..... \$49.95**



**Armadillo Int'l Software**  
 P.O. BOX 7661 PH. (512) 459-7325  
 AUSTIN, TEXAS 78712

# 101

**COLOR SOFTWARE**

- :BERSERK.....\$30.95
- :COLOR TREK...\$34.95
- :COLORTERM...\$40.95
- :MOON LANDER...\$19.95
- :RAC ATTACK...\$30.95
- :TELEWRITER...\$61.95

IN CANADIAN DOLLARS  
 WRITE FOR CATALOGUE

**COLOR PRODUCTS  
 UNALIKE**

#211 990 EAST 8TH  
 VANCOUVER B.C.  
 (CANADA) V5T-1T8  
 PH. (604) 873-2372

# 102

**Eight good reasons**

for using a **Mod III:**

1. Minibiz<sup>(tm)</sup> General Ledger Accounting System
2. Accounts Receivable
3. Accounts Payable
4. Full-Service Payroll
5. Order Entry & Invoicing  
 -with Inventory Interface  
 -with Accts. Rec. Interface
6. Fixed Assets Accounting
7. Job Cost Accounting
8. Cost Estimating Systems  
 -for Manufacturing  
 -for Food Service

At selected Dealers or from the publisher

**Nepenthe Programs**  
 44 Third Ave., Ste. F  
 Chula Vista, CA 92010

# 103

**SUPER BASIC V3.1**

Adds these features to Level II Basic:

- RAM Printer Spooler
- Programmable Shift Key Entries
- Keyboard Debounce
- Auto Repeating Keys
- Spelled Out Error Messages
- Blinking Graphics Cursor
- Graphics at Machine Language Speeds
- Change Line Numbers
- LPRINTTABS > 63
- JKL-TO-PRINTER Function
- Unlimited USER Routines
- Sound & Much More!!!

Requires 16K Level II  
 Only \$19.95 from:  
 Maine Data & Financial  
 Systems Inc.  
 S.R. 79, Box 103  
 Orland, ME 04472

# 104

**I AM INTERESTED IN** trading programs on business forecasting, stock market forecasting, statistics and games. Please write to me what you have available. Charles Wilfong, 2813 Angus Rd., Philadelphia, PA 19114.

**THE TRS-80 MODEL I** Users Group of West Los Angeles is a informal users group which meets the last Tuesday of each month. All users are invited to attend and participate in the exchange of ideas and public domain software. For further information call (213) 836-4103.

**PROGRAM HI RESOLUTION** graphics board. Just like new, never soldered in, with manual and software. Postpaid \$70. TC-8 high speed cassette unit with book and software. (Has switch added so no cable changing needed.) Postpaid \$75. Percom data separator, as new, postpaid \$17.50. Ian Webb, 20621 Canyon View Dr., Saratoga, CA 95070, (408) 867-9533, 6-7 p.m. Pacific time.

**FOR SALE OR TRADE:** PMC-80 (16K, Level II TRS-80 workalike) for sale \$450.00 or will trade for OSI C4P or K1M — compatible boards. PMC has lower-case mod installed, plus some software and books. Paul Miller, 7623 Pecan Villas #7, Houston, TX 77061, (713) 799-5509 days, (713) 641-3923 nights and weekends.

**I HAVE JUST BOUGHT THE MX-80** with 2K buffer. I am unable to LLIST or PRINT#-2 or (P)rint from the Color Computer. Anyone with a solution please contact me: John Gordon Reid, 40-15 — 61 St. Apt. 3H, Woodside, NY 11377.

**WHERE CAN I FIND** games like Bridge, Cribbage, Gin Rummy, Eukre, Pitch, Hearts, Pinochle and Solitaire for the Color Computer? If you know, contact Charles Marvin, 3112 Latimer Road, Rock Creek, OH 44084.

**I NEED LEADS** towards interfacing the H-P Optical Wand or other optical wands with the Model I TRS-80, and/or software to read/write information in bar code format. J. Trinique, 7 Terrance Ave, Clinton, MA 01510.

**I HAVE A TRS-80** Color Computer 16K, Ext. BASIC Rom 1.1 and an Epson MX-80 with grafrax and interface board #8150 with 2K buffer. I want to be able to draw a picture on the screen using a short program such as "polygon" or "joystick draw" and then print the result. Also, I have the art gallery ROMPAK and would like to draw or create a picture then save to tape and load it back in and print it. Is this possible? Mike Davis, 6166 Char Mar Drive, Westerville, OH 43081, (614) 882-1954.

RSN	Advertiser	Page
9	Aardvark-80.....	13
86	ABS Suppliers.....	107
8	Access Unlimited.....	10, 11
16	Ace Computer Prod. of Fla.....	29
41	Algorix.....	69
106	Alpha Products.....	Cover 6
109	Alphanetics.....	73
46	Alpha Queue Systems.....	76
57	Anitek Software Products.....	91
1	Apparat.....	Cover 2
101	Armadillo Intl. Software.....	111
★	Aspen Software Co.....	101
83	Barclay Whyte Assoc.....	107
10	Binary Devices.....	15
64	Bottom Line, The.....	100
82	Bottom Line, The.....	107
30	Business Division, The A Div. of Scott Adams, Inc. Center 1	
89	CDC.....	110
27	Chromasette Magazine.....	51
26	CLOAD Magazine, Inc.....	51
102	Color Products Unalike.....	111
58	CompuKids.....	92
38	CompuSoft Publishing.....	65
54	Compu-Things.....	89
18	Computer Applications Unltd.....	33
15	Computer House.....	27
97	Computer Plus.....	111
28	Computer Shopper.....	53
47	Computerists Directory, The.....	77
55	Computerists Directory, The.....	90
53	Cornucopia Software, Inc.....	89
71	Data Services, Inc.....	106
87	Data Services, Inc.....	110
70	Dental Computer Newsletter.....	106
77	Disk 'n Data.....	106
75	EAP Company.....	106
60	Eigen Systems.....	94
★	Eighty Syst. Newsletter.....	104
★	80-U.S. Journal.....	38, 45, 71
34	Electronic Specialists.....	60
12	Epson America, Inc.....	20, 21
74	Excellonix.....	106
6	E-Z Software.....	6
78	Fielding, Donald M.....	106
56	Fink, William.....	91
32	Freedom Technology.....	Center 4
★	Gosub International, Inc.....	88
29	Hacks.....	55
62	Hexagon Systems.....	95
81	High Desert Engineering.....	107
22	Holmes Engineering.....	43
★	H. W. Electronics.....	7
43	I <sup>2</sup> Interface, Inc.....	56
7	Insiders Software.....	9
37	J. F. Consulting.....	63
51	Jimscot, Inc.....	85
100	Kutten, L. J., Attorney.....	111
76	KWIK Software.....	106
2	Langley Systems, Inc.....	Cover 3
65	Lawyer's Microcomputer, The.....	100
108	Leading Edge, The.....	Cover 8
42	Lemons Tech Services.....	70
50	Lindbergh Systems.....	84
14	LNW Research Corp.....	25
105	LNW Research Corp.....	Cover 5
104	Maine Data & Fin. Sys., Inc.....	111
36	Marathon Software.....	61
48	Marymac Industries, Inc.....	79
61	Micro Architect, Inc.....	95
49	Micro Data Supplies.....	81
24	Micro Images.....	46
3, 4	Micro Labs.....	1
39	Micro Management Sys., Inc.....	67
88	Micro Media.....	110
98	Micro Moonlighter Newsletter.....	111
17	Micro Systems Software, Inc.....	31
84	Micro Technology.....	107
59	Microperipheral Corp., The.....	94
80	Microsette.....	107
66	Miller Microcomputer Services.....	102
52	Misosys.....	87
91	Mitco, Inc.....	110
44	Modern Computer Service.....	74
103	Nepenthe Programs.....	111
99	New Classic Software.....	111
33	Nocona Electronics.....	59
★	Percom.....	Cover 4
45	Perry Oil & Gas, Inc.....	75
40	PMC Software.....	68
67	Precision Prototypes.....	103
21	Program Store, The.....	40, 41
69	Programmer's Guild, The.....	105
5	Prosoft.....	5
96	Publisher's Exchange.....	111
31	Radio Shack.....	Center 2-3
107	Radio Shack.....	Cover 7
35	Rainbow, The.....	60
72	Randall, Jim, Micro. Prog.....	106
85	Realty Software Co.....	107
63	REMarkable Software.....	97
93	Rontel Corp.....	110
95	Scientific Engineering Labs.....	110
73	Skeberdis, Pete.....	106
19	Smith-Corona.....	35
90	SoftHart Enterprises.....	110
13	Software Options, Inc.....	23
25	Software Plantation.....	49
11	Software Support.....	19
92	Star★Ware.....	110
68	Suncoast Rec. & Data, Inc.....	104
★	Tape-Tronics.....	107
94	TOPS Programming Enterprises.....	110
20	Transaction Storage Sys., Inc.....	37
79	Ventures Design Ltd.....	107
23	Victory Software, Inc.....	44
★	<b>Contact these advertisers directly.</b>	



# GALAXY OF FEATURES

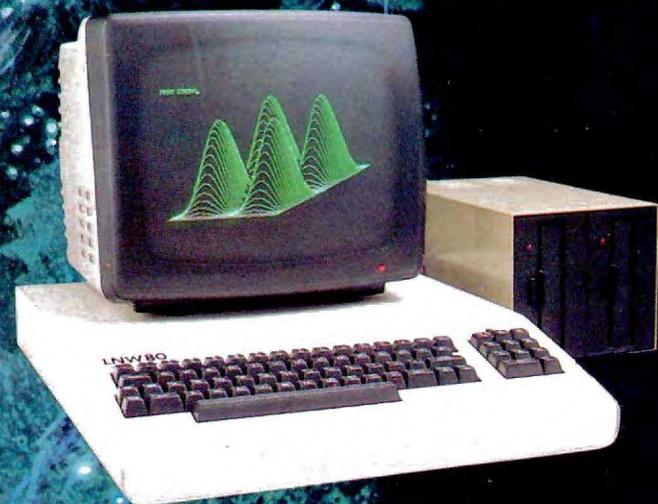
A **GALAXY** of features makes the **LNW80** a remarkable computer. As you explore the **LNW80**, you will find the most complete, powerful, ready to run, feature-packed personal and business computer ever made into one compact solid unit.



**QUALITY CONSTRUCTION** – Instrumentation quality construction sets **LNW80** computers apart from all the rest. Integrated into the sleek solid steel case of the **LNW80** is a professional 74-key expanded keyboard that includes a twelve key numeric keypad.

**HIGH RESOLUTION GRAPHICS & COLOR** – The stunning 480 X 192 resolution gives you total display control – in color or black and white. The choice of display formats is yours; 80, 64, 40 and 32 columns by 24 or 16 lines in any combination of eight colors.

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



**MODEL I COMPATIBILITY** – The **LNW80** is fully hardware and software compatible with the Model I. Select from a universe of hardware accessories and software – from VisiCalc® to space games, your **LNW80** will launch you into a new world of computing.

**FULLY LOADED** – A full payload includes an on-board single and double density disk controller for 5 1/4" and 8" single or double sided disk drives. RS232C communications port, cassette and parallel printer interfaces are standard features and ready to go. All memory is fully installed – 48K RAM, 16K graphics RAM and 12K ROM complete with Microsoft **BASIC**.

Our down to earth price won't send you into orbit

## LNW Research Corp.

2620 WALNUT, TUSTIN, CA. 92680  
(714) 641-8850 (714) 544-5744

# A Sweet Deal...

Buy an Alpha Joystick and games together and deduct up to \$14.00 from your order.



## THE ALPHA JOYSTICK

**ONLY \$39.95**

MODEL I OR III SPECIFY WHEN ORDERING. PRICE INCLUDES ATARI JOYSTICK + ALPHA INTERFACE + INSTRUCTIONS + DEMO PROGRAM LISTING.

The Alpha Joystick adds arcade style control to TRS-80 action games. Simply plug it in and begin playing joystick compatible games. No modification, wiring or batteries are required, and the Alpha Joystick is compatible with other TRS-80 accessories. The instructions are clear and complete. We even show how easy it is to experiment in BASIC (A=INP(0) reads stick) and convert BASIC programs to Joystick control.

**MODEL I** - Plugs directly into any Level II Keyboard (card edge on rear) or expansion interface (left side next to printer port).

**MODEL III** - Works with any Model III BASIC System and plugs into the 50 pin I/O bus (largest edge connector underneath).

Joystick + 1 game Deduct \$ 6.00  
 Joystick + 2 games Deduct \$12.00  
 Joystick + 3 games Deduct \$14.00

**14 DAY MONEY BACK GUARANTEE** - if you are not delighted, return it within 14 days for a prompt and courteous refund.

Choose from any of the Joystick Compatible games below. Be sure to mention the "Sweet Deal" discount when ordering.



### PENETRATOR

Soar swiftly over jagged landscape swooping high and low to avoid obstacles and enemy missile attacks. With miles of wild terrain and tunnels to penetrate, you're well armed with bombs and multiple forward missile capability. From Melbourne House. Features sound, trainer mode and customizing program.



### SCARFMAN

This incredibly popular game craze now runs on your TRS-80! It's eat or be eaten. You control Scarfman around the maze gobbling up everything in your path. Try to eat it all before nasty monsters devour you. Excellent high speed machine language action game from the Cornsoft Group. With sound.



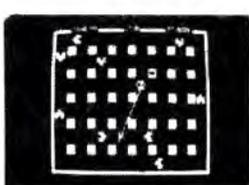
### SUPER NOVA

Attracting thousands of players, Super Nova is the most exciting space action game ever. You control a ship that can fly through a field of stars, dodging enemy ships and shooting them down. It's a fast-paced, action-packed game that's perfect for the TRS-80. With the use of a joystick, you can move the ship with precision.



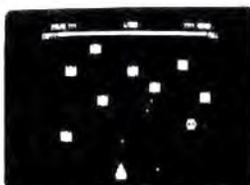
### LUNAR LANDER

Control a lunar lander as it descends to the surface of the moon. You must land precisely on a landing strip, avoiding obstacles and using your limited fuel. A classic challenge for the TRS-80.



### ATTACK FORCE

As your ship appears in the bottom of the maze, eight alien ships appear in the top. Use joystick controls to guide your ship through the maze, avoiding the aliens and the obstacles. A strategic challenge for the TRS-80.



### COSMIC FIGHTER

Control your ship as it battles a fleet of alien ships in space. You must maneuver your ship to avoid the enemy and shoot them down. A fast-paced action game for the TRS-80.



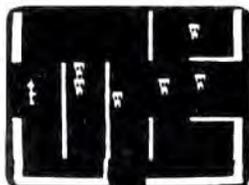
### GALAXY INVASION

Control your ship as it battles a fleet of alien ships in space. You must maneuver your ship to avoid the enemy and shoot them down. A fast-paced action game for the TRS-80.



### DEFENSE COMMAND

The invaders are back! Alone, you're the most important member of the team. You must defend your planet from invading alien ships. A strategic challenge for the TRS-80.



### TALKING ROBOT ATTACK

This game takes you through a maze with a hand laser in a remote section of the space station. You must avoid obstacles and shoot the robots. A strategic challenge for the TRS-80.



### ARMORED PATROL

A regular tank battle, only from your view is a 3-D perspective of an alien landscape. Maneuver your tank to avoid and destroy enemy tanks and obstacles. A strategic challenge for the TRS-80.

### GAME PRICES

Penetrator Disk or 2 Cassette Package \$24.95  
 Armored Patrol Cassette \$19.95 Disk \$24.95  
**ALL OTHER GAMES**  
 16K Level 2 Model I - Model 3 Cassette \$15.95  
 32K Level 2 Model I - Model 3 Diskette \$19.95

These games are Alpha Joystick Compatible. They may be played with or without Joystick using arrow keys.

## Toll Free Order Line

**800-221-0916**

ORDERS ONLY HOURS 9 AM - 5:30 PM EST  
 FOR INFO CALL (212) 296-5916

ADD \$2.00 PER ORDER FOR SHIPPING AND HANDLING.  
 WE ACCEPT VISA, MASTERCARD, CHECKS, M.O.  
 C.O.D. ADD \$3.00 EXTRA.  
 NY RESIDENTS ADD SALES TAX.  
 OVERSEAS: EPD, APO, ADD 10%  
 DEALER DISCOUNTS AVAILABLE



79-04 Jamaica Ave., Woodhaven, NY 11421

(212) 296-5916

# 106



# SAVE \$361 RADIO SHACK PROFESSIONAL PRINTER



Now Only  
Reg. 1160.00 **799<sup>00</sup>**

Hurry—Sale Ends August 24, 1982

## Add the Efficient Line Printer VI to Your TRS-80® Today!

Our most affordable professional-grade line printer is now even more affordable! We've slashed the price over 30% on the Line Printer VI. You can get fast reports and listings in your own home or office.



Protect Your LP VI with a Dust Cover (#26-507,\$5.95)

Seven-wire dot-matrix head is bi-directional and logic-seeking to maximize printing speed—100 characters per second, thirty-three 132-column lines per minute! It prints a full set of upper and lower case alphanumeric, plus European letters, symbols and block graphics in four software-selectable print densities.

Seven-wire dot-matrix head is bi-directional and logic-seeking to maximize printing speed—100 characters per second, thirty-three 132-column lines per minute!

The adjustable, removable tractor-feed (included) makes using fanfold paper a breeze, yet lets you convert to single sheets in seconds. You can use any size paper from 4" to 15" wide, original and two copies, and there's an automatic "paper-out" sensor. It's designed and built especially for connection to TRS-80 Model I, II, III and 16—just add a parallel interface cable. The Line Printer VI is on sale now at Radio Shack Computer Centers, stores and participating dealers nationwide.

**Print Head:** 7-wire, dot-matrix, bi-directional, logic-seeking.

**Carriage:** 15" wide, 132-columns at 10 cpi.

**Character Set:** Full ASCII English and European upper and lower case, plus symbols and graphics.

**Print Density:** 10 characters per inch; 5, 7.5, 15 cpi optional.

**Print Speed:** 100 characters/second; thirty-three 132-col. lines/minute, forty 80-col. lpm.

**Manual Controls:** line feed, 1/4 line feed, self-test, reset, on-line/off-line.

**Radio Shack®**  
The biggest name in little computers™  
A DIVISION OF TANDY CORPORATION

Send me your free TRS-80 Computer Catalog.

Mail To: Radio Shack, Dept. 83-A-37  
1300 One Tandy Center, Fort Worth, Texas 76102

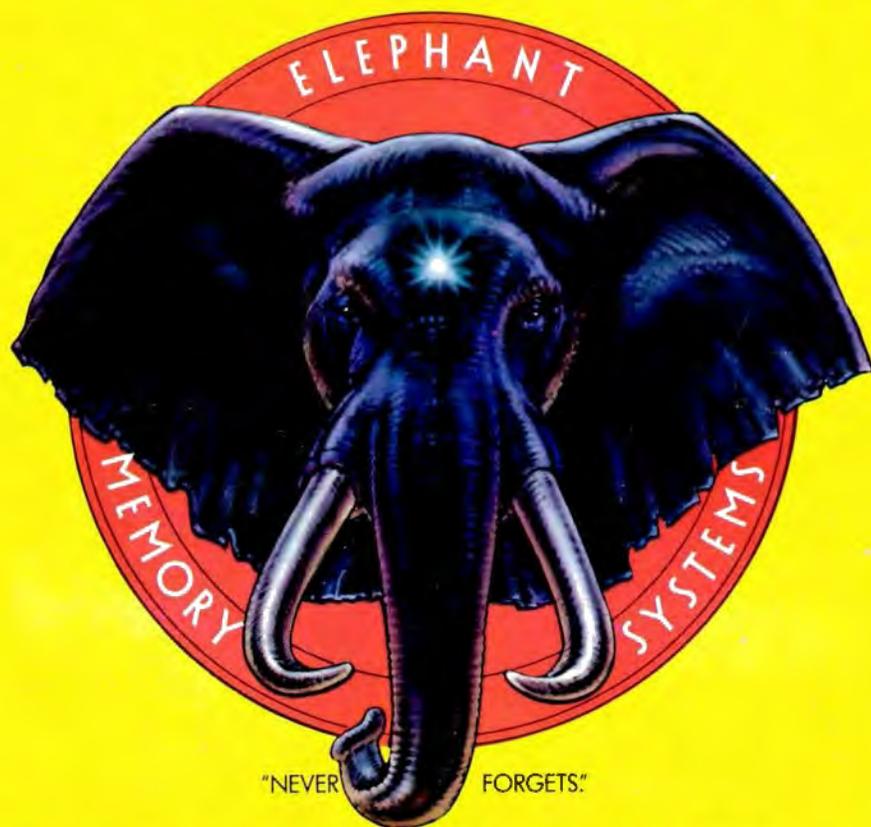
NAME \_\_\_\_\_

ADDRESS \_\_\_\_\_

CITY \_\_\_\_\_ STATE \_\_\_\_\_ ZIP \_\_\_\_\_

Retail prices may vary at individual stores and dealers. Special order required at most stores.

# REMEMBER:



## MORE THAN JUST ANOTHER PRETTY FACE.

Says who? Says ANSI.

Specifically, subcommittee X3B8 of the American National Standards Institute (ANSI) says so. The fact is all Elephant™ floppies meet or exceed the specs required to meet or exceed all their standards.

But just who is "subcommittee X3B8" to issue such pronouncements?

They're a group of people representing a large, well-balanced cross section of disciplines—from academia, government agencies, and the computer industry. People from places like IBM, Hewlett-Packard, 3M, Lawrence Livermore Labs, The U.S. Department of Defense, Honeywell and The Association of Computer Programmers and Analysts. In short, it's a bunch of high-caliber nitpickers whose mission, it seems, in order to make better disks for consumers, is also to

make life miserable for everyone in the disk-making business.

How? By gathering together periodically (often, one suspects, under the full moon) to concoct more and more rules to increase the quality of flexible disks. Their most recent rule book runs over 20 single-spaced pages—listing, and insisting upon—hundreds upon hundreds of standards a disk must meet in order to be blessed by ANSI. (And thereby be taken seriously by people who take disks seriously.)

In fact, if you'd like a copy of this formidable document, for free, just let us know and we'll send you one. Because once you know what it takes to make an Elephant for ANSI . . .

We think you'll want us to make some Elephants for you.

## ELEPHANT™ HEAVY DUTY DISKS.

For a free poster-size portrait of our powerful pachyderm, please write us.

Distributed Exclusively by Leading Edge Products, Inc., 225 Turnpike Street, Canton, Massachusetts 02021

Call: toll-free 1-800-343-6833; or in Massachusetts call collect (617) 828-8150. Telex 951-624.