

80MIS.

THE TRS-80 USERS JOURNAL

Vol. V, No. 6

\$3 per copy

June 1982



Leo Christopherson on games.
Chess tourney, horseracing,
math and word games.

NEWDOS/80 Version 2.0 The Support Keeps Coming.



Apparat's newest disk operating system for the TRS-80[®], NEWDOS/80 Version 2.0, has added many new enhancements and features to make your Model I or III computer more powerful. We've kept one thing the same. Our support. Version 2.0 is our second upgrade of our original NEWDOS for the TRS-80. Each version builds and improves on the capabilities of the preceding versions. Just as important, Apparat's commitment to supporting our products makes a good product even better. By providing our customers with zaps on an ongoing basis, we're continually making NEWDOS/80 Version 2.0 a more powerful tool.

Version 2.0...

High Performance DOS

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

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

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

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

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

303-741-1778

TRS-80 is a registered trademark of Tandy Corp.



Apparat, Inc.

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

"ON GOING SUPPORT FOR MICROCOMPUTERS"

Circle # 1



FORTRESS

Only the Fast Survive!



SSM SOFT SECTOR MARKETING, INCORPORATED

6250 Middlebelt • Garden City, MI 48135 • 800-521-6504/(313) 425-4020

Written by Larry Ashmun

Copyright © 1982 Soft Sector Marketing, Inc.

Prices per Game: TRS-80 16K Level II Mod I/Mod III Cassette \$15.95

TRS-80 32K Level II Mod I/Mod III Diskette \$19.95

10% discount for 2 items, 15% for 3 or more. Please add \$2.50 per order for postage & handling. Michigan residents add 4% sales tax. Outside USA (except Canada) please add \$10.00 per order for postage & handling.

Sound effects are playable through the cassette AUX plug. High scores are automatically saved after each game on disk versions.

Call or write for our complete catalog.



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 _____

ULTIMATE UPGRADES.

Buy direct from the manufacturer and save on high performance disk systems and other enhancements for Model I, II, and III.

Whether your TRS-80 is a Model I, II, or III, you've probably wished for more disk capacity. Now Lobo gives you that—and much more—at low, manufacturer-direct prices. With uncompromising quality, and the protection of Lobo's unique 1-year warranty.



Special for Model I owners: the LX-80 Expansion Interface

Radio Shack may have forgotten you, but Lobo hasn't! Our LX-80 expansion interface (plus LDOS operating system) gives your Model I more features and more expandability than a Model II or III. The sturdy steel enclosure fits under your monitor and adds:

- 32k additional RAM
- Interfaces for standard Radio Shack mini-floppy drives and Lobo high-performance disk systems
- Centronics-type printer port plus screen printer port
- Two RS-232C serial ports (optional)
- Plus a real-time clock, sockets for custom ROM, and a heavy-duty power supply for your keyboard unit

Discover the real power and potential of your Model I, with the bargain-priced Lobo LX-80!

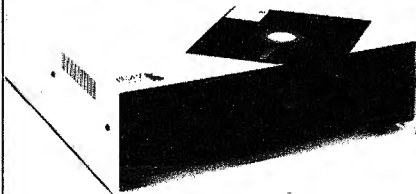
LX-80 with LDOS operating system (required)	\$510.00
LX-80 without LDOS (for current LDOS users)	\$460.00
Dual RS-232C serial port option	\$100.00

LDOS: the ultimate TRSDOS-compatible operating system

One of the few software products ever to receive a perfect box score from *Infoworld* magazine. The reviewer said: "LDOS 5.1 is awesome!... It performs nearly perfectly a straightforward and simple system to use... the best manual for software I've ever seen or reviewed, bar none... This DOS takes the TRS-80 from the hobby category and endows it with features that many a so-called business system does not have... LDOS offers unparalleled versatility and function..."

LDOS includes a powerful extended disk BASIC, smart terminal emulator, and many other useful utilities that make it worth far more than its low price. It runs on any Model I or Model III with at least one disk drive.

LDOS operating system (specify Model I or Model III) \$129.00



Add-on 8" floppies for Model II

Why pay Radio Shack prices to expand your Model II's disk capacity? The Lobo 8202C2 adds two 8" double-density floppy drives, for a total of 1.1 megabytes of additional storage. Installation and operation are identical, and you get the added benefit of Lobo's 1-year parts and labor warranty.

8202C2 dual-drive 8" floppy system for Model II \$1269.00

Add-on minifloppy drives for Model I

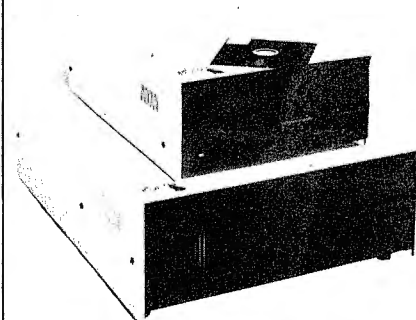
Completely compatible with all Model I hardware and software, but with an extra 5 tracks for data storage. Requires a Model I with either the Radio Shack expansion interface or the Lobo LX-80 (see left).

4401C Add-on 5 1/4" drive for Model I \$305.00

High-capacity minifloppy for LX-80

An economical way to get a big storage boost for your LX-80-equipped Model I. The double-sided, 96 track/inch drive stores 720 kB, and eliminates most tedious disk swapping.

Model 4801C high-capacity 5 1/4" drive for LX-80 \$465.00



Winchester disk systems for Model I and Model III

The ultimate mass storage devices! Enormous capacity and impressive speed give your system a dramatic performance boost. Add the impressive file-handling capabilities of LDOS (included), and you can outperform systems costing far more. IMPORTANT: Many Winchester disks now being sold have no provision for file backup. Lobo systems include a built-in high-density floppy drive that can store the entire contents of the hard disk on just 6 or 7 floppies. This backup drive is also usable for additional on-line storage of programs and data.

8" floppy systems for Model I and Model III

These rugged dual-drive systems attach to any Model I with LX-80 expansion interface, or any Model III, and add the mass storage you need for the big jobs. Double density recording stores 535kB on one side of the disk. Using the LDOS operating system (required) you get full compatibility with standard TRSDOS plus greatly increased capabilities.

8202C3 two single-sided drives (1.1 MB total) for Model III \$1625.00

8202CX same as above, for Model I with LX-80 (sold separately) \$1249.00

5202C3 two double-sided drives (2.2 MB total) for Model III \$2025.00

5202CX same as above, for Model I with LX-80 (sold separately) \$1749.00

5 1/4" Winchester System

Compact and exceptionally reliable, with 4.8 megabytes of high-speed Winchester storage plus a 720 kilobyte floppy drive. The value leader in mass storage.

950T for Model III or Model I with LX-80 (sold separately) \$3633.00

8" Winchester System

Over 9 million bytes of storage accessible in milliseconds. 8.2 MB on an 8" Winchester drive and another 1.1 MB on the backup floppy drive. Unsurpassed for maintaining very large data bases.

1850T for Model III or Model I with LX-80 (sold separately) \$4459.00

Ordering Information

All prices include shipping and handling. California residents add 6% sales tax. Credit card orders shipped within 24 hours. Personal checks require 2-3 weeks for clearance before shipment.

The Lobo Warranty

All Lobo hardware products carry a limited 1-year parts and labor warranty. Call or write for complete warranty statement.

TRS-80 and TRSDOS are trademarks of Tandy Corporation
© 1982 Lobo Drives International
Infoworld quote © 1982 Popular Computing/Inc
Subsidiary - CW Communications/Inc

TOLL-FREE ORDER NUMBERS:

U.S. (except California):
800-235-1245

In California: **800-322-6103** or

800-322-6104 Hours 7AM - 5PM Pacific Time

Write for free catalog.



Lobo Drives International

Dept. US 6
358 S. Fairview Ave.
Goleta, CA 93117

© 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 for this "Game" issue is a Seattle Daily Racing form with the horses and background painted by Pam Galloway, Spokane, Washington.

2 80-U.S. Journal

80-U.S.

THE TRS-80 USERS JOURNAL

TRS-80 is a trademark of the Tandy Corp.

Volume V. Number 6 — June 1982

ARTICLES

The gamester

16

Bob Krotts

The trials and tribulations of a computer game addict.

Sargon II vs. Sfinks 3.0

19

Don Scarberry

A chess game evaluation with the two opponents playing against each other.

A computer carrel

24

Leo B. Christopherson

A spoof of computer games as educational tools.

Dazzle

30

Model I/III

David Leupp

Head-to-head competition for two players in this word game. Requires quick reflexes and fast thinking.

Parimutuel horse race

32

Model I/III and Color Computer Alan Goozner and John Steiner

Use strings of color graphics to simulate horses. Place your bets according to the odds, and take your chances, with the computer deciding "the winner".

Almost a joystick

39

Model I

John T. Phillipp, M.D.

Connect the Atari™ joystick in parallel with Model I arrow keys without interfacing difficulties.

LDOS for beginners

43

Model I/III with disk

T. A. Daneliuk

Part I: Device independence, ROUTE, and LINK commands.

Play ball! 46
Model I/III Larry Krengel
A five minute baseball simulation with printed game sheets.

Robot math 50
Model I/III Jeffrey C. Ruble
An educational math drill for K-4 featuring an animated speaking robot.

Solitaire 57
Model I/III Robert D. Miller
This "Golf" version of the card game uses the computer to shuffle, deal and keep score.

Exploring the Color Computer 62
Color Computer T. R. Dettmann
How to produce sound from a cassette through your television using a BASIC program.

Quirks, fixes, tips and tricks 65
Pocket Computer R. Shane Causer
Every computer has a manual, but all manuals are not created equal. This article fills in some missing information for those not familiar with computer programming.

Checkbook 68
Model I/III J. L. Latham
Part I: Use NEWDOS/80 to write a checkbook management program and find out more about NEWDOS/80 operation.

Menus 75
All models with disk T. R. Dettmann
A sensible approach to building functional menus.

Files and foibles 91
All models T. R. Dettmann
Use binary trees to deal efficiently with large random access files.

ZBASIC 2.0 Compiler 104
Model I/III Jim Klaproth
An evaluation of Simutek Computer Products' latest compiler.

REVIEWS

Polaris 99
Reviewed by Pete Carr

Eliminator 100
Reviewed by Jim Klaproth

Quick Quiz 100
Reviewed by Cameron Brown

Cave Hunter 101
Reviewed by Bob Perez

Telewriter 102
Reviewed by Darrel Wright

DEPARTMENTS

Editorial 4
By Cathy Doud

Letters to the Editor 6, 8

Items at Random 12

Notes 56

@ News 78
By Spencer Hall

Captain 80 95
By Bob Liddil

Tandy Topics 97
By Ed Juge

New Products 106

Unclassified Announcements 112

Advertiser Index 112

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

Publisher/Editor-in-Chief
I. Mike Schmidt

Editor
Donald Scarberry

Associate Editors
Terry R. Dettmann
Jim Klaproth
Cameron C. Brown

Contributing Editors
Spencer Hall
Robert W. Liddil

Advertising Sales
Margaret G. Farrell

Promotion
Robert P. Perez

Production
Catherine D. Doud
Sherry Miksell

Editorial Secretary
Eva R. Jones

Circulation
Kristine E. Schmidt

Accounting
Helene Dalton

DISTRIBUTORS

Hofacker Verlag
Tegernseer Strasse 18
D-8150 Holzkirchen/Obb
West Germany

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

MKSS
40-A High Street
Stony Stratford
Milton Keynes, England

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

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

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

Computer Campus
11 Rundle Street
Kent Town
South Australia 5067

"What does an android look like?" I asked Mike after I'd been doing the typesetting and pasteup at *80-U.S. Journal* for about two months. I needed to know so that I could come up with some catchy art for a program in the February, 1982 issue that featured a tic tac toe grid with little android-like critters in it.

"Haven't you ever seen Android Nim?" Mike asked in amazement.

"No. I've never seen any computer games except one in a restaurant. *I don't play games.*"

Mike took a few minutes right then (in the middle of trying to produce that February issue) to give me my first introduction to computer games.

"Well, I don't play games either... but isn't this clever? Look at the way they *look* at each other... now watch! I know how to win, but I just made a mistake... let's see what happens!"

"We've got a real complicated new game in for review," Mike hinted to me one afternoon a few weeks later. It was Olympic Decathlon, which made a great effort to be realistic in effect. "Come, on Cathy—have a try at it," said Don Scarberry (our Editor), as he nudged me toward the Model III.

"But I don't play games. I've never had the least interest in them!" I tried to be as emphatic as possible, but Mike was standing behind me and said, "Oh, give it a try, just for the heck of it."

I slammed into the wall during the pole vault, plodded along in the running events, scratched in the long jump and went back to what I'd been working on. "But I don't *like* games," I muttered to myself.

It took me weeks of working at *80-U.S.* to realize that the crowd of people in the mail room (after about 4:00 p.m. every night) wasn't jammed around the Model III to find out about subscription information, they were *playing games*! Some nights the participants would even *work* as much as an hour overtime in that room. People wandering into the building late in the afternoon always seemed to disappear behind the mail room door.

Boomp, boomp, boomp, boomp,

boomp, boomp, boomp, giggle, giggle, giggle, boomp, boomp, boomp. I couldn't resist the open doorway to the editor's office and the sight on the screen of the Color Computer. "What's that, Bob?" (Bob is in charge of circulation.)

"Cave Hunters," he said, deep in concentration. Boomp, boomp, boomp, giggle.

Well, that did it. He was using a joystick and it looked like something I could handle. Besides, the game had a cute sound to it. I sat down for my first computer game in the middle of a hair-raisingly busy time in my production schedule.

After half an hour of not giving up that joystick to anyone else, I finally felt guilty and let Eva (our secretary) have a go at it. Pretty soon we were making so much noise that the editor couldn't continue phone conversations in the same room with us, gave us a dirty look that meant settle down, and marched off to the advertising department to continue his phone conversation with New York.

All afternoon, I kept wandering by the open doorway to admire Bob's skill in evading the Cave Creatures. I was hooked, but refused to play again.

We are starting to get some results back on the reader survey that appeared in the April issue, and I asked Mike how those results related to games. A random sample of the results showed that those readers bought approximately the same amount of game programs last year as business programs. I can't imagine *anyone* buying a micro-computer just to play games—those business programs and other *useful* applications were the reason for having the equipment. Amazing! Refined, intelligent people who use computers don't play games.

"It's time for lunch. What do you want?" Maggie (the comptroller) asked just now over my shoulder. Mike said, "Here's ten Pac-Mans. You know what I like."

We've been invaded! They've even got Mike (the Chief). What else (or who else) is left?

"But I don't play games..."

Cathy Doud

SPRING DISCOUNT SALE

SUPERKEYS

ADVANCED OPERATING SYSTEMS

SUPERKEYS is a powerful keyboard utility program which changes your TRS-80 keyboard into a superkeyboard. Now you can perform valuable time-saving single-key programming. Up to 255 different keyboard characters can be assigned to a key or keys. Functions such as RUN, LIST, ENTER, BREAK, and EDIT as well as frequently used graphic strings can be saved and recalled with one key.

Cat. No. 3612 MIII,16K,disk \$49.95

LDOS 5.1

LOGICAL SYSTEMS

The ideal Disk Operating System for your TRS-80, Model I or III computer. Many advanced features allow the novice or professional programmer to fully utilize the power of the Model I or III. Extensive documentation is included.

Cat. No. 3053 MI,1.2,32K,disk \$169.00
Cat. No. 3189 MIII,32K,disk \$169.00

DATALIFE DISKETTES

The symbol of quality for data storage on your TRS-80's or any soft-sector computer. Each disk is rated for 40-track, single or double density operation. Complete with hub rings. Box of 10.
Cat. No. 1147 SINGLE-SIDED \$28.00
Cat. No. 1492 DOUBLE-SIDED \$45.00

by VERBATIM

WHEN IN SOUTHERN CALIFORNIA, VISIT OUR RETAIL STORES

19511 Business Center Dr. 2301 Artesia Blvd.
Northridge, CA 91324 Redondo Beach, CA 90277

MODEL III DISK CONTROLLER

Now Model III owners can upgrade their systems for a fraction of the previous cost. Some of the outstanding features of this controller are:

- single or double density operation
- single or double sided drives
- 40 or 80 track capability

The Model III controller kit comes complete with all boards, cables, mounting hardware, and instructions. Recommended drives are Tandon drives. Installation requires a certain amount of mechanical aptitude.

Cat. No. 3383 \$395.00

COMPLETE DRIVE PACKAGES

Package includes controller kit plus choice of disk drive configurations. Drives used are the Tandon TM100-1 (single-side, 40 track, single/double density) and TM100-2 (double-side, 40 track/single, single/double density).

SINGLE DRIVE CONFIGURATIONS DUAL DRIVE CONFIGURATIONS

(1) TM100-1	\$549.00	(2) TM100-1's	\$795.00
Cat. No. 3426		Cat. No. 3427	
(1) TM100-2	\$725.00	(2) TM100-2's	\$1099.00
Cat. No. 3428		Cat. No. 3429	

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 June 30, 1982.

Mention this ad and we pay shipping (UPS ground only).

HW Electronics
19511 Business Center Dr.
Dept. UB
Northridge, CA 91324

FREE SHIPPING
FREE SHIPPING
FREE SHIPPING

HW ELECTRONICS

Letters

Your programs appear to be typed by typewriter rather than being copies of actual running programs. This is okay, but it does increase the chance for error on your part. The chance for error on my part remains almost the same either way, but I wish you would consider printing actual copies of running programs.

Please tell me what the symbol ^ is. This appears in line 80 of the "Payback" program on page 30 of your April 1982 issue...

**Jens E. Larsen, Jr
Cochran, GA**

The symbol your refer to is the caret. On Models I and III this is the same as the up-arrow and mathematically means "to the nth power". The Model II normally uses the caret instead of the up-arrow for exponentiation, as do most other computers. Acutally, it is the Model I and III which are the exception rather than the rule.

As for our program listings: They are actual print-outs of running programs. We list them on a C-Itch daisy wheel printer, which incidentally, has the caret instead of the up-arrow. We prefer the look and print quality of this printer over that obtained with a dot-matrix printer.
—Ed.

I am a 74-year old subscriber to your magazine which I think is the best for TRS-80 owners. Please keep up the Terry Dettmann series of tutorial articles. I think the ones on arrays are excellent! I like his other articles also. We need (or at least I do) the most basic and complete explanations and examples we can get. So many writers assume the reader is familiar with his subject. If they were, there would be no need for the articles at all! Keep up the good work.

**E. J. Hillstead
Maitland, FL**

I wish to express my professional displeasure at Associate Editor Jim Klaproth's review of Lazy Writer in the March 1982 issue of 80-U.S. Journal.

My wife and I have been using our

TRS-80 Model I and III microcomputers primarily as word processors for these past two years, and in that time we have struggled with the vagaries and vicissitudes of Electric Pencil, Scripsit and Prosoft. We were on the verge of purchasing two other Z-80 based micros just to have access to other, hopefully better CP/M based word processing programs when we decided to buy one last program — Lazy Writer. Over the past eight months, we have used it almost daily in our work (as syndicated travel writers, for television scripts, on a book, with reviewing, and handling numerous correspondence), and have therefore gained the perspective of experience with Lazy Writer that Klaproth lacks. Lazy Writer is, in our opinion, without exception the best, easiest and most versatile word processing available for the TRS-80. Period.

Naturally Lazy Writer is not perfect! I am occasionally frustrated by certain limitations that appear as our text requirements become more and more sophisticated. But what makes Lazy Writer superb is the responsive, personalized support that the Walshes and ABC Sales make to improve their product. Many times I have written or telephoned with queries, comments and criticisms, which have all been helpfully answered. What's more, a number of our suggestions and needs have been in fact incorporated into Lazy Writer updates. It's like having one's own personal programmer on tap. Lazy Writer functions so well for us that when we recently purchased a pair of more reliable and powerful micros to handle all of our work, we opted for LNW-80s just to be able to use this particular word processing program. (Theresa Walsh just wrote to me to say that they are working on a CP/M version of Lazy Writer that should be completed by June.)

As for Klaproth's opinion that the Lazy Writer documentation is only "fair", let me state with the authority of a member of the National Book Critics Circle and a former book editor for a major magazine that Theresa Walsh's manual is one of the more lucid, digestible and usable pieces of computer documentation written. Most computer documentation is utterly incompre-

hensible, exceedingly dry and totally useless without long and learned study and experimentation, but we were able to follow Lazy Writer instructions step by step the first time we initialized. Klaproth's criticism about specific printer documentation and support was premature nitpicking since Lazy Writer announced, produced and mailed out modules and additional documentation making use of several popular printers' capabilities nearly three months before the review was published. I know magazines work with substantial lead time between the writing and printing of an article, but there was sufficient time for you to verify and update your data before going to press.

Incidentally, this letter is being printed with the new Line Printer IV proportional spacing module. Until now, we have used this particular printer only for billing, labels and data processing, but the Lazy Writer module works so well that we are beginning to use it for some correspondence.

I hope that in future Jim Klaproth's software reviews will be more responsible and less subjective. Perhaps it would be a better editorial policy to assign such reviews to a user, rather than a critic, for a more accurate and objective analysis and evaluation. Thank you.

**Daniel Grotta; Writer
Boyetown, PA**

Thank you for your recent letter in regard to my review of Lazy Writer. I always welcome contrasting opinions and comments. My intention certainly was not to offend anyone who is currently using this excellent word processor. As a writer, I'm sure you realize that nothing one writes can be 100% objective. We as humans, are constantly making comparisons against similar known objects and standards. In the case of Lazy Writer, I used Scripsit and Newsprint as reference points to guide my overall impression of Lazy Writer. You, yourself, in your letter showed your lack of objectivity when you expressed your distaste for the other three word processors and your overwhelming support for Lazy Writer.

★ ★ ★ INTRODUCING ★ ★ ★

A COMPLETE INTERACTIVE A/R, A/P & GL ACCOUNTING PACKAGE FOR TRS-80 MODEL II ● III ● 16

Throw away all those TRS DOS commands but two. You won't be needing them. All file functions are handled automatically by the Program. All you will ever need is BASIC and BACKUP. It was our goal to make this the easiest to use package on the Market.

Written by individuals accustomed to creating data bases for some of the largest computers manufactured, we just couldn't see why smaller computers shouldn't be allowed these following advantages:

- * Easy to use Menu Screens
- * Program Execution Auditing
- * Timestamped Files
- * Update Recovery & Restart
- * Extensive Editing of Input Data
- * Double Balancing of Files to Assure Clean Data.
(Subsidiaries will always balance to General Ledger)
- * Two Level of Passwords

Additional Software Available

For more detailed information write address below:

NOTE: Later modification billed at \$25.00/hr. after your approval of estimated hours

HOW TO ORDER

Circle desired Column Letter and Price

Send check or money order to:
For personal checks allow 4 to 6 weeks

Arlington MICRO-Soft, Inc.
2303 Stillmeadow
Arlington, TX 76014

SYSTEMS	A	B	C	D	E	F	G
Double Entry General Ledger	*	*	*			*	
Accounts Receivable	*		*	*			
Customer Name & Address Maintenance	*		*	*	*		
Accounts Payable	*					*	*
Supplier Name & Address Maintenance	*					*	*
PRICE	350.00	150.00	250.00	150.00	40.00	250.00	150.00

Name _____ Model (II ● III ● 16) _____

Note: Model III needs minimum of 2 Disc Drives
48 K Memory

Street _____

City _____ State _____ Zip _____

Letters

One of the objectives of my reviews is to point out to prospective buyers that any particular product may not be suitable for all users. Obviously, *Lazy Writer* fit your needs quite adequately; but, at the time of the review, mine were not met. We were never informed, and I have yet to see anything officially in print, that a proportional spacing module is available for the *Line Printer IV*. Perhaps now that this module is available, I may begin to use *Lazy Writer* more frequently. However, after considering the price difference between *Lazy Writer* and *Newsprint* (which had *Line Printer IV* support all along), and the features of both, I would still personally choose to buy *Newsprint*. However, I would be the last one to recommend *Newsprint* to everyone.

As for the documentation, I personally found the content too brief and lacking in example and detail — attributes that you find appealing. The packaging of the Model I version in a 25-cent file folder and the use of a non-proportional printer to print the manual left a lot to be desired considering the premium price commanded by *Lazy Writer*. Perhaps this was nitpicking; but, the prospective buyer should be aware of these items.

Again, I thank you for your constructive comments on my review and hope you will feel free to comment on future 80-U.S. articles.—
Jim Klaproth

I wish to congratulate Chuck Tesler for having written what I consider to be tops in the word processing field: *Newsprint*, which I recently purchased from Prosoft after reading the review in the February 1982 edition of *80-U.S. Journal*. Of the numerous word processing programs I've used on my TRS-80 Model III — and they've been many — *Newsprint* by far outpaces the others. I make my living writing, and a good living it is...so every bit of electronic help I can get is appreciated.

Newsprint gives excellent software assistance, particularly in my case. Of course, I would honestly say this under any circumstances. As it is however, I work under a bit of a handicap — and therefore can add emphasis to my praise for Chuck's

program. I have only one hand to use on my computer keyboard.

This limitation has severely impeded my use of many facets of other programs. In *Scriptit*, for example, try spanning the keyboard from the control key "@" to "S" to insert a left-out word or letter, using one hand. Impossible. I have a rather large hand and I can't even come close. So a rewrite of a line—or sometimes an entire paragraph—is necessary. Aggravating! And, in my case, reducing *Scriptit*'s usability, not only in the insert function but in many others where the required handspan isn't feasible.

However, with *Newsprint*, I find only one case where I encounter the above roadblock...and that's the deletion function. No way can I reach across the space between the CLEAR key and the "D" to delete whatever needs to go. So I do it the hard way.

And this I can live with. The ease of the rest of the program more than makes up for this lone shortcoming. ...Pass along my word of thanks to Chuck. *Meaningfully*. He's made my work a lot easier!

Walt Crede
Des Moines, IA

While reading the reviews in the April 1982 issue of *80-U.S.* I noted the information reported by Thomas Dowd regarding the paper tractor he purchased for his MX-80 printer. I too, have an MX-80 printer and although mine is an F-T model with both feeds available, I had problems when I wanted to use small sheets or when I wished to fill a sheet close to the bottom. I am sure that the problem could be circumvented by programming but I looked for a simple solution since I use fan-fold or roll paper for most of my printing.

I found a device called a *Paper Porter* which is similar to the device described by Mr. Dowd. There is, however, a considerable difference. The price on my *Paper Porter* was \$4.50 including shipping anywhere in the continental U.S. when purchased in single lots and \$3.25 in lots of five. The source for these devices is: Beeline Services, 211 East Allegan Street, Otsego, Michigan 49078.

It doesn't seem to me that the device Mr. Dowd purchased for \$23.00 could be that much better so this letter will give your readers, with similar problems, an alternate source for a single sheet tractor.

Incidentally, the *Paper Porter* holds the sheets at the top, which allows me to leave my LPRINTTAB in my word processing program alone and only change the line length in FORMAT mode when using smaller paper sheets.

Larry Meehan
Bremerton, WA

I wanted to send you this short note to tell you how much I enjoy your fine magazine. You really hit the jackpot with the February 1982 issue. Keep those BASIC programs for Model I coming. Also, Jim Perry's excellent @NEWS column is my only source of what is happening at Exatron. Best wishes...

James Thompson
Lake Park, FL

There has been a change in writers of the @NEWS column. During the switchover, we missed an installment in the May, 1982 issue. Jim Perry's time is being utilized fully at Exatron, and Spencer Hall has taken over the column. If you have been following the articles in 80-U.S. with any regularity, you will have noted that Spencer is an avid Stringy Floppy fan and his first contribution to the column (in this issue) displays his enthusiasm. — Ed.

Those calculations by James King were good! (*Double precision function routines, James E. King, 80-U.S. February 1982*). But Dettmann is best time after time. The medical issue (*March 1982*) was good, but when Dettmann is on the cover — well, he should always wear a jacket and tie!

If you're in computing and serious, you're crazy; but at least I can prove I read *80-U.S.*. It is good! Thank you.

F. J. Eshlohm
Swedum
Nutley, NJ

Guilty as charged. — Ed.

For TRS-80 Models I and III

Introducing the Lowest Cost Hard Disk System Ever . . . Laredo's LS525.



\$1995*

5 million low cost bytes of on-line storage.

At \$1995.00 affordable hard disk storage is now within your reach.

The LS525 hard disk system is easier to use than your printer . . . just plug it in switch it on and your disk storage problems are over forever.

The LS525 gives you unheard-of speed and reliability. For starters we built a "mainframe like" controller that can detect disk surface defects and relocate the data to alternate tracks. Talking about speed the LS525 can access files 10 times faster than your floppy.

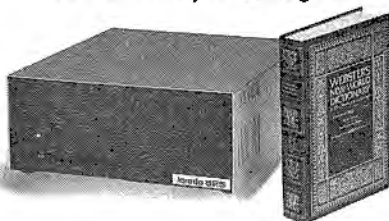
This coupled with proven "winchester" technology is what we mean by reliability and speed.

We also provide a user-friendly TRSDOS compatible operating system in which all of your existing soft-

ware can run on. It provides features that can make the LS525 look like one big 5M byte drive or four small 1.25M drives or whatever you like.

The LS525 is a compact (less than one half cubic foot) "color-keyed" package that will fit perfectly next to your TRS-80. So if your tired of seeing "Disk Space Full". . . .

. . . there's no excuse.



Call toll free and order yours now.

(800) 538-5137

Inside California call (408) 980-1888.

* Model I or III host adapter \$250 & LDOS \$160 extra, specify when ordering.

laredo systems inc.

. . .mass storage for personal computers.

Laredo Systems Inc. 2264 Calle De Luna, Santa Clara, California 95050
TRS-80 and TRSDOS are trademarks of Radio Shack a Tandy Co.

We've grown on you

With Acorn Programs, Your TRS-80 Does Things You Wouldn't Think Possible

Our sophisticated programs make sight and sound seem simultaneous—you're never disappointed when you select a program from us. *And*, our customer service is unparalleled in excellence.

Acorn Has a Program For Everyone

Whether you want games, adventure programs, word processing enhancement programs, teaching programs, utility programs that help serious programmers improve their programming and get more out of their computers. . . Acorn has them all.

NEW!



Your Mysterious Adventures Begin With Arrow of Death, Part I.

By Brian Howarth

The first in our brand new, exciting Mysterious Adventure Series with all the popular features of TRS-80 Adventures *plus* a new, challenging mental approach. In Arrow of Death, Part I, a mysterious blight has fallen on your land. It seems to come from the Golden Baton, once good but now a source of evil incarnate. Rain has destroyed the crops, friends are at each other's throats, despair and hatred fill the hearts of the people. The King implores you to aid his sorcerer, Zardra, in banishing this evil from the land. You agree, and the adventure begins. You'll face constant danger, possibly death—but you'll also have the opportunity to perform heroic tasks. All Mysterious Adventures have a "save the game" feature. Arrow of Death, Part I is complete in itself. . . but we think you'll find it so challenging, you'll want to continue with Part II. Other Mysterious Adventures will include **Time Machine** and **Golden Baton**—all written to give you many hours of gaming pleasure.

16K Tape
or 32K Disk. **\$19.95**
TRS-80 I & III
plus \$2.00 shipping and handling



Everest Explorer

By William Godwin & Don Knowlton

Will you be one of the daring few to make it to the pinnacle of Mount Everest? Or will you succumb to the lack of oxygen, the unexpected violence of the storms, the incredibly rough terrain? You, as the leader of the Everest expedition, will have to choose the route, choose the timing, make sure your climbers are well-rested, set up a chain of camps and, if you reach the summit, get your followers back down to base camp. You'll have to manage money, climbers, Sherpas, tents, oxygen, food and fuel. Danger lurks at every step—can you get to the summit and return? "Save the game" feature on disk.

16K Tape
or 32K Disk. **\$19.95**
TRS-80 I, III,
Color Computer and Atari
plus \$2.00 shipping and handling



Lost Colony

By David Fiteberg

You are the Economic Manager of the world's first space colony. The next support ship from Earth isn't due for another 15 years and you have instructions either to make things go better or get out of office in shame. You must assure the survival of this struggling space colony—it's all up to you. You'll be presented with the human, natural and industrial resources of the planet. You must allocate labor, explore new territories, decide on production quotas, determine pay scales and taxes for the most productivity—you're armed with maps and charts. 10 levels of difficulty. "Save the game" feature on disk.

16K Tape
or 32K Disk.
TRS-80 I & III **\$29.95**
and Atari
plus \$2.00 shipping
and handling

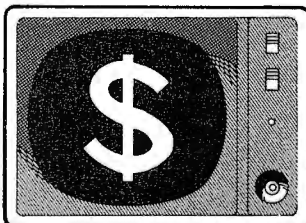
Because Our Programs Deliver What They Promise.

Instant Sort/Search Database

By Gordon Hatton

An easy-to-use fast information manager for home, personal or small business use. Even a novice can make full use of this program and it's extremely "user-friendly" in helping minimize operator errors. ISS comes in 3 parts: (1) lets you create, examine and save your custom-formatted data base; (2) sorts and searches the data base so you can pick out and print just the information you need; (3) provides powerful editing commands so you can modify and update your existing data files. Also includes "DEMO", a 500 record demonstration data file that lets the first time user familiarize himself with the command set. ISS handles both alphabetic and numerical data in a variety of combinations.

16K Tape
or 32K Disk. **\$49.95**
TRS-80 I & III
plus \$2.00 shipping and handling



Money Manager

By Andrew Bartorillo

In today's economy, we all need to monitor our expenses more closely. **Money Manager** will help you keep track of your income and expenses and give you an easy way to manage your budget. You define the categories according to your needs, including tax-deductible expenses... a great help at tax time. You can also reconcile your checkbook with the bank's balance. Full lineprinter capability allows you to print items by each category.

32K (Minimum) Disk.
TRS-80 I & III
and Atari **\$39.95**
plus \$2.00 shipping and handling

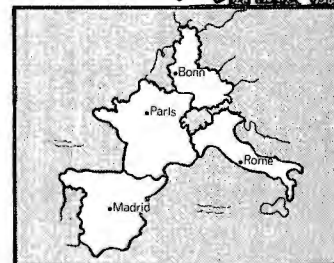


Your Family Tree

By Chuck Acree

Whether you're a professional genealogist or simply interested in your own ancestors, **YOUR FAMILY TREE** lets you avoid the limitations of paper-based charts. This program sets up your data base quickly and easily—holds name, date and place of birth, marriage and death information for each ancestor, plus a comment line. You can get a complete "pedigree" from any selected family member; or a 3 generation ancestral chart displayed or printed showing the number of known ancestors beyond each branch of the tree. The program will also display an outline map of the U.S. showing migration across the country. Use full or partial information to get full search capabilities by any key field.

16K Tape
or 32K Disk. **\$29.95**
TRS-80 I & III
plus \$2.00 shipping and handling



Language Teacher

By Cindy & Andrew Bartorillo

Teachers, students, and those who just want to learn a new language—Acorn's Language Teacher gives you your choice of French, Italian, German or Spanish. Use these programs at home or in the classroom. Students like this new way of learning and/or reviewing a previously learned language. Teachers can free themselves from tedious preparation of vocabulary lists and writing quizzes. Each Language Teacher offers hundreds of word combinations, verb conjugations and phrases. Choose the drill topic and foreign language-to-English or vice versa. Option for multiple-choice answers plus retest on missed items. Gives running percentage of correct answers.

Available: French, Italian, German I & II, Spanish I & II.

32K Disk. **\$29.95**
TRS-80 I & III
plus \$2.00 shipping and handling



Acorn

Software Products, Inc.

634 North Carolina Avenue, S.E. Washington, D.C. 20003

We've Grown On You.

And, our selection of programs for your TRS-80 I & III expands with a new program monthly.

Shop Acorn
by mail!
Mail this
coupon today
for your
FREE Acorn
catalog.

Mail to: ACORN SOFTWARE PRODUCTS
634 North Carolina Avenue, S.E.
Washington, D.C. 20003

NAME _____

ADDRESS _____

CITY _____ STATE _____ ZIP _____

B

Items at random

This issue marks the first half-year of *80-U.S. Journal* as a monthly. Talk about time flying when you are having fun! It seems that everyone around here is going at 150 mph instead of the usual 110. But how did we make the transition?

In some ways it was much easier than any of us anticipated. Everyone said "sure I can", and they did. But after about three or four issues it was apparent that even though they all could, it was next to impossible to ask everyone to keep up a pace at something more than full capacity. No time out for vacation or sick leave. So, going monthly clearly called for a couple of new people to ease the workload.

One of those new people is Sherry Miksell, who brought with her several years in typesetting and production. Cathy Doud and Sherry are now the production department. The fact that Cathy wrote the editorial for this issue shows what happens when everyone is too busy! (You don't really believe that everyone around here plays games — do you?)

Helene Dalton has joined us and has the position of accountant. The days of balancing the checkbook and paying the bills in 30 minutes are long gone. We have actually grown to the point where a full-time accountant is required.

Cameron Brown, who has been a reviewer (and chief proofreader) on a part-time basis for the past couple of years, has now come on full-time as an editor.

To find the physical space for these new people, we have converted one-half of our warehouse space into office space. The building is in progress while I write this (in April), and should be done by the time you read it.

We welcome these new people, and hope their stay with us will be pleasant and rewarding.

Corrections

In our April 1982 issue we published a review of *Berserk* submitted by author Roy Seney. He purchased his version from Microworks and listed this company as the source of the product. While Microworks is definitely a source, they are not the originators of the program. The original source should have been listed as Mark Data Products, 23802 Barquilla, Mission Viejo, CA 92691, Phone (714) 768-1551.

Also in the April 1982 issue, the article Vitamin BB by Negley Monet, says that BIONIC BASIC is for Models I and III. This is not true at all according to author Monet. BIONIC BASIC is for Model I only.

In our March 1982 issue we published an article called "JKL Patch" by John T. Phillipp, M.D. Dr. John has written us to say that you must be careful when choosing the correct listing to use. Listing 1 is designed to be used with the 35-track NEWDOS 2.1, but *not* the 40-track version. Listing 2 will work with NEWDOS 2.1, 35 or 40-track version as well as with NEWDOS80 1.0. You can use listing 2 and not have to worry about whether or not you have 35 or 40 track drives.

In this issue

This issue is devoted almost entirely to games. We figured that with summer on its way, and more leisure time available, games would be an appropriate topic.

The trials and tribulations of a computer game addict are spelled out by Bob Krotts in an article entitled "The gamester".

Shades of the old *Personal Computing* magazine return once again with Don Scarberry's chess tournament between Sargon II and Sinks 3.0. Our typesetter even has those little chessmen in it so we could print authentic boards! I chuckled all the way through this one during proofing. It's definitely Don at his best!

Leo Christopherson took time out of his busy schedule to write a spoof on games as educational tools. Leo ought to know, he is a school teacher. It's called "A computer carrel. Before you run off to your dictionary, a carrel is a small work space.

Dazzle is a rather long, but good, fast-action, two player word game with sound. It was written by David Leupp of Dayton, Ohio and made the rounds in our office quite well before we set it to print.

A simulated horse race is presented by Alan Goozner and John Steiner. It's for the Model I, III and Color Computer. No, you can't take it to the race track, but you can bring the race track to you.

John T. Phillipp tells us how to interface Atari joysticks to the TRS-80 for better control of games. Tim Daneliuk starts a two-parter on LDOS for beginners and Larry Krengel presents a computer baseball game. There is a robot math program by Jeffrey C. Ruble, "Golf Solitaire" by Robert D. Miller and Associate Editor Dettmann hits three times this issue with "Exploring the Color Computer", "Files and Foibles" and in Basically BASIC, "Menus".

R. Shane Causer gives us Quirks, fixes, tips and tricks for the Pocket Computer and J. L. Latham starts a series on using NEWDOS/80 to write a checkbook program.

Spencer Hall has taken over the @NEWS column and tells about the new Stringy Floppy for the Model III among other things.

There's also Tandy Topics, Captain 80 and a bunch of reviews to consider. All in all, a very fun issue to put together and we hope you enjoy it.

Remember that nice days are *made* not had! Tell them all that you saw it in *80-U.S. Journal!*

Mike

MORE BYTES FOR YOUR BUCKS

CP/M Compatibility Plus 64K RAM
for your TRS-80

Freedom Technology International --- PRESENTS

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

Freedom Option\$275.00
Freedom Plus\$490.00
Manual Only\$ 25.00

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

To order 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 MicroPro Int. Corp.
dBase II is a registered trademark of Ashton-Tate*

Freedom Technology International

119 North 18th Street, Philadelphia, PA 19103

Circle # 7

June, 1982 13

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.

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 FT	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
PAPER HANDLING FUNCTIONS						
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
PRINT MODES AND CHARACTER FONTS						
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
DOT GRAPHICS MODE						
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
CONTROL FUNCTIONS						
Software printer reset		X		X	X	X
Adjustable right margin			X	X	X	X
True back space		X		X	X	X
INTERFACES						
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.

```

ABCDEF GHI JKLMN abcdefghi jklmn ABCDEF GHI JKLMN abcdefghi jklmn 01234
ABCDEF GHI JKLMN abcdefghi jklmn ABCDEF GHI JKLMN abcdefghi jklmn 01234
ABCDEF GHI JKLMN abcdefghi jklmn ABCDEF GHI JKLMN abcdefghi jklmn 01234
ABCDEF abcdef ABCDEF abcdef 0123456
ABCDEF GHI JKLMNOPQRSTUVWXYZ abcdefghi jklmnopqrstuvwxyz ABCDEF GHI JKLMNOPQRSTUVWXYZ abcdefghi jklmnopqrstuvwxyz 01234567
ABCDEF abcdef ABCDEF abcdef 0123456
ABCDEF GHI JKLMN abcdefghi jklmn ABCDEF GHI JKLMN abcdefghi jklmn 01234
ABCDEF GHI JKLMNOPQRSTUVWXYZ abcdefghi jklmnopqrstuvwxyz ABCDEF GHI JKLMNOPQRSTUVWXYZ abcdefghi jklmnopqrstuvwxyz 01234567

```


The gamester

The trials and tribulations of a computer game addict

Bob Krotts, Kettering, OH

I am an addict—a computer addict. There is no drug that is capable of causing the dependency that I have on my TRS-80 Model III computer. It follows me to work and home daily. The power plugs are becoming worn due to constantly pulling them out of electrical receptacles every time I change the location of the computer. On occasion, my very understanding wife (with a tear in her eye and memories of the past) has gently removed the console from the bedside where I had fallen asleep from computer exhaustion.

I could care less about business programs—I love games—all types of games—adventure, arcade, graphic—any and all that require cunning, deduction, or practice, to master. During the past year that I have had my computer, I have accumulated over a hundred such programs and, hopefully, there is no end in sight!

I first realized how hooked I was when I noticed that all of the toll-free order numbers of the major software companies were etched in permanent memory. I began to mentally calculate when the next catalog from different sources would arrive at my doorstep. I even felt a hollow feeling in my stomach when a major computer magazine—like *80-U.S. Journal*—would arrive even a day late in the mail! I have been known to telephone individuals in the software business all over the country just to see if there are any good new games that are available but not yet in the catalogs and magazine ads.

I would like to devote this column

to giving helpful hints to the thousands of other game players throughout the world. Believe me, these hints are from the voice of experience!

How many times have you found yourself hunched over your computer console in the middle of the night—*totally stuck* at some point in an adventure-type game? Your mind refuses to accept defeat from this inanimate object and, subsequently, you refuse to get up and admit to yourself that you are stuck. To make matters worse, if a friend just happens to stop by, glance at the game, and suggest something really simple that *works* . . . you would really feel bad, right?

The solution is simplicity itself. Get up! Force yourself to leave the game for at least half an hour and do something entirely different (get a drink, take a short walk, etc.). Then return to the computer game. At this time, your mind will have forgotten some of the repetitive moves you performed which took you to this dead-end method of reasoning. Hopefully, you will try something new and different—and it should work!

Have you ever noticed that (upon attempting a game you gave up on the day before) you have been able to return to it and discover something really *simple* that you overlooked previously? My nickname for this syndrome is *computer burn-out*. Try my solution. If you try it and it doesn't work (and your friend *still* walks over and gives you a quick and easy solution), then either punch out your friend for being so smart, or toss a brick through the

screen! Seriously, though, all games on the market *must* have a solution. Don't be afraid to try something far-fetched or unusual—it may just be the clincher that you need to get out of your predicament!

Do you *laugh* at people who always make a *location map* while playing *adventures*? You have a *superb* memory and don't need simple maps—right? That might be the reason that you find yourself stuck in mazes or similar locations that suddenly pop up during the game. If two or more locations are outwardly identical—yet only *one* has (or can do) what you need, chances are that you will miss the difference and/or presume something to be true that is not.

Teleportations are becoming popular in various games (where the player is sent from one location to another), and often the gimmick is that both locations are *identical* in appearance! It really doesn't take very long to sketch a brief map, and it may save *hours* of frustration later in the game.

Once you have successfully completed a challenging game, you will find yourself basking in a happy glow of contentment. Your mind will then ask, "What next?". Before you try another game, (please) replay the same game and jot down in a notebook the places you had trouble, as well as the solution. You will be surprised just how easy it is to forget some of your moves. It can be extremely embarrassing if you tell a friend that you completed a game and, when he asks you the solution to a minor problem, you are unable to

reply. Of course, you can always act a bit snotty and tell him that *you* didn't need any help, but if he is *really stuck* and needs help, he will not appreciate your attitude.

Many programs have a *save game* feature that can be very handy. One of my favorite games, distributed by Adventure International, is called Galactic Empire. This particular "thinking man's game", has a different random setup every time it is played. Not only is it different—it can range from darn near impossible to reasonably challenging.

I took advantage of the save game feature. I made a backup copy of this CLOAD game, ran the program, and kept playing it until I found a beginning setup that I liked. Immediately following the backup copy, I recorded the saved game. In this manner, the program can be loaded, then easily reloaded (fresh, or at the position I saved) in the game.

It also can't hurt to save the game at least twice, since occasionally, you may get a bad load on the saved portion of your tape. However, if a bad load still runs, you can occasionally find yourself in very interesting situations that can be more fun than the original!

My philosophy is that—given enough time—any adventure-type game can be solved. However, most people become impatient and frustrated if they cannot find the solution after many serious attempts. Software companies are aware of this and—rather than be bothered by questions over the telephone—they came out with *hint sheets* for sale! Hint sheets are usually exactly that: just hints—not the solution! The sheets suggest a course of action that may indirectly give the answer or aid in the reasoning of some of the major problems to be found in the game. Remember, though, that some people still may not get the hint. In fact, some of the really tough and challenging games almost need a hint sheet for the hint sheet! Perhaps, after certain games have been available for a year or so, we may find complete *solution sheets* for sale some day.

Many of us have been known to sit at our sacred computer for hours



playing various arcade games. You can almost bet that every good arcade game is (or very soon will be) available for the home computer. It may not be exactly the same, but it usually is close enough!

I would like to make a prediction. The Gamester predicts that (during the next year) the original arcade game manufacturers are going to do their best to put a halt to similar unauthorized home computer programs. Subsequently, I believe that (unless agreements are made concerning royalties) sooner or later, many games that are almost the same will no longer be available legally to the general public. However, the *benefit* should outweigh the *loss* in the long run. Software authors will have to become more imaginative in creating original arcade games—and we should soon expect some really fantastic games!

Has it ever bothered you that a game will accept over a hundred words that it has in its vocabulary—but you are not told *what* words? If you are logical in your thinking, it will make sense.

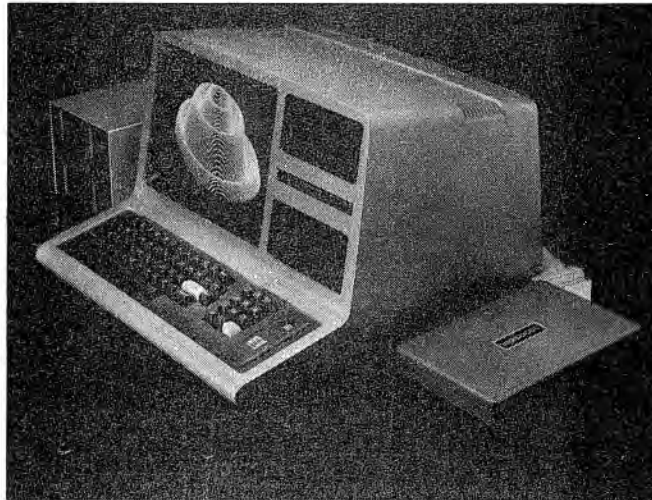
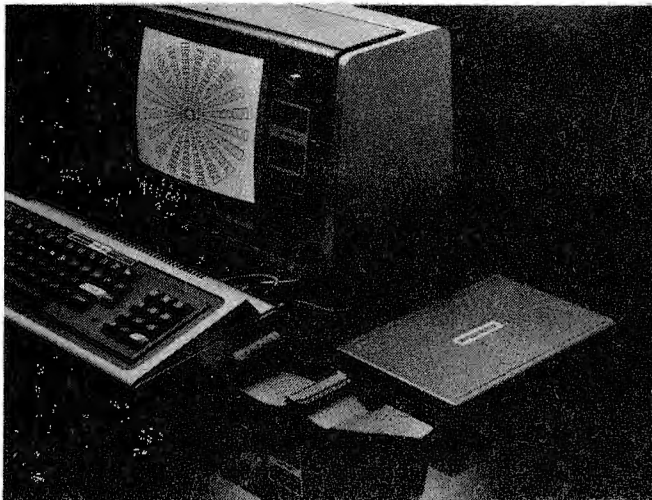
During the game, different locations are shown, and various

objects can be carried and/or used. Usually, the object is used as expected. For example: keys open doors, shovels can dig, etc. However, the more interesting games allow objects to be used in other ways. For instance, if you have a locked cabinet with hinges that are screwed in, and you *don't* have a screwdriver or key, try something else. Perhaps a coin or I.D. card in your possession will unscrew the hinges. Maybe you can pick the lock with a pin. If common sense doesn't seem to do the job—use your imagination. After all, *something* will work. Also, remember that occasionally, an object is inserted in the game that has absolutely *nothing* to do with your actions and *never* will be needed to complete the game. It is simply there to confuse you.

I sincerely hope that I have been of some assistance to my fellow game players. Games are becoming extremely diversified in category and method of play—so keep your eyes out for some really good stuff coming our way!

Remember: as long as there are games for the computer, there will always be The Gamester! ■

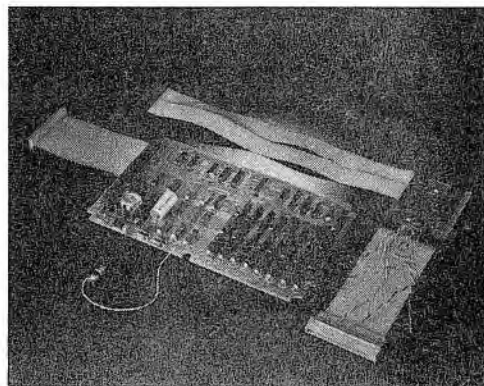
TURN YOUR COMPUTER INTO A GRAPHICS MACHINE



WITH THE MIKEEANGELO[®] GRAPHIC SYSTEM!!

[®] MIKEEANGELO is a hardware/software system designed for the TRS-80 model I & III computers. When installed, your 80 will come alive with graphic ability!!

If you've been waiting for a graphic system with the best dots/dollars ratio, take a look at our MIKEEANGELO. [®]



HARDWARE

- TOTAL SCREEN INVERSE VIDEO
- TWO MODES OF DENSITY:
384 × 192 or 191 × 192 for Model I
512 × 192 or 256 × 192 for Model III
- EVERY DOT CAN BE SET, RESET or TESTED
- 12288 BYTES OF FAST 200 ns MEMORY
- FUNCTIONS SELECTED BY OUTPUT PORT #254.
- MEMORY MAPPED FOR SPEED
- OCCUPIES LAST 16K BLOCK OF MEMORY
- CAN BE USED AS NORMAL MEMORY
(if you have 32K or more of memory)
- COLOR COORDINATED ENCLOSURE.
- DOES NOT CONFLICT WITH DISK OR CASSETTE I/O
- SELF SWITCHING POWER SUPPLY
(Powers up with Computer)
- COMES WITH IT'S OWN WALL TRANSFORMER
- NOT A CHARACTER GENERATOR!!
- EASY INSTALLATION
(Requires only 18 solder connections and one trace/pin cut)

SOFTWARE

- COMES WITH SAMPLE AND DRIVER SOFTWARE
- USABLE THROUGH BASIC OR MACHINE LANGUAGE
- EXCELLENT INSTALLATION/ OPERATION MANUAL

TOOL KITS AVAILABLE FOR JUST \$15.00

MANUAL AVAILABLE SEPARATELY FOR \$15.00

Full price of manual will be deducted from the Purchase Price of MIKEEANGELO when ordered.

PREPAID, COD, MASTERCARD, VISA, or MASTERCARD ORDERS ACCEPTED. FOB: Bellevue, Wa.

U.S. Currency ONLY. Stock to 30 days delivery.

DEALERS INQUIRIES INVITED.

ORDER NOW FOR ONLY \$369.

Complete with power supply, case software and manual.

MIKEE ELECTRONICS CORPORATION

P.O. Box 3813 Bellevue, Washington 98009
Telephone 206/451-0574

WRITE for FREE BROCHURE or call for more information.

*1 MIKEEANGELO is a trademark for Mikee Electronics Corp
*2 TRS-80 is a trademark for the Tandy Corp
*3 Opening your TRS-80 will void the limited warranty
*4 90 day warranty, full refund or replacement.

Sargon II vs. Sfinks 3.0

Chess tournament

Don Scarberry, Editor

The title of the ad read "Prize Winning Chess". There was a small profile of the Sphinx of Egypt just to the left of the title. The ad continued: SFINKS 3.0 (new) — "Prize winner in Paris in the 1981 Microcomputer Chess Championship; Sfinks 3.0 is the fastest and strongest chess program ever written.

These seemed like awfully strong words for the small, inconspicuous advertisement I'd seen while browsing through a recent issue of *80-U.S. Journal*. At any rate, the ad did its job. I was definitely interested! I wanted to see if the claims were justifiable, so I immediately solicited a Model III disk version for review purposes.

In the days when the Model I was popular, I had followed the success of Sargon, and the later Sargon II. Sargon was a very popular chess game. It wasn't superb, but it was one of the best around at the time. What better way to review a new chess game, especially one that boasts being the fastest and strongest chess program ever written, than to have it compete in a tournament with a formidable oppo-

nent—Sargon II? I scheduled a tournament.

The stage was set. Sfinks would be played on a new Model III TRS-80, and Sargon II would be played using an older Model I. Both machines contained dual disks and 48K of RAM. Sfinks had somewhat of a hardware advantage, however. It requested to have a printer and small audio amplifier installed before it would commence with the tournament.

I checked the rule book (Sfinks' documentation) and sure enough, after each pair of moves, Sfinks would provide a printout if a printer was attached. It would also provide us with an audible indication of each of its moves if connected to an audio amplifier. This guy was prepared to play chess!

The Tournament

Both opponents would battle it out in my recreation room while seated face-to-face on parallel tables. I was to mediate (be a key punch operator for) a chess tournament consisting of three games.

Sfinks was to my left—Sargon II

to my right. I went through some sophisticated mental calisthenics in order to determine which of the two players would start with white. Sargon II won the coin toss and Sfinks became the underdog by having to settle for black.

A major problem was determining which levels of difficulty to select for each player. Sargon II contains six levels, while Sfinks offers nine (see the table of response time for Sfinks later in the article). I chose level two for Sargon and reflected a bit about my choice for Sfinks. Sfinks sort of reminded me of Muhammed Ali. You know — high spirited and cocky. I decided that since he had made such brash claims in the advertisement, he ought to start at level two also. He just wouldn't be able to think about his moves as long as Sargon. Besides, no one was looking.

I fired up the machines, answered all of the prompts, and the first game was quickly underway. The ice was broken, and a chilly quiet settled over the room.

Sargon moved immediately D2-D4. Sfinks, just as quickly, replied with D7-D5. All of a sudden, the

Software evaluation

silence was shattered by what sounded like a Bantam rooster suffering from a lack of male hormones! I shot up from my place, fell backward over my chair and crashed into the wall.

As I slithered to the floor, I remembered the little amplifier that Sfinks uses to alert his opponent after each move. I had inadvertently turned the volume all the way up. After regaining my keypunching composure, I cursed my way back to my seat. "Loud mouthed son of a . . . (gun)!"

I punched Sfinks' move into Sargon's keyboard, and the game was on again. The first four moves were swift and to the point.

Game Number One

	Sargon	Sfinks
	-----	-----
1.	D2-D4	D7-D5
2.	C2-C4	C7-C6
3.	G1-F3	G8-F6
4.	B1-A3	E7-E6

Sfinks seemingly becomes the aggressor on move five, and takes Sargon's knight:

5.	E2-E3	F8-A3
----	-------	-------

Sargon, not to be outdone, replies on move six by capturing a bishop. Sfinks evidently senses a battle and castles early:

6.	B2-A3	E8-G8
----	-------	-------

Sargon replies

7.	F1-D3	-----
----	-------	-------

But Sfinks begins to get real pushy with:

7.	-----	D8-A5+
----	-------	--------

and puts Sargon in check. After:

8.	D1-D2	A5-D2+
----	-------	--------

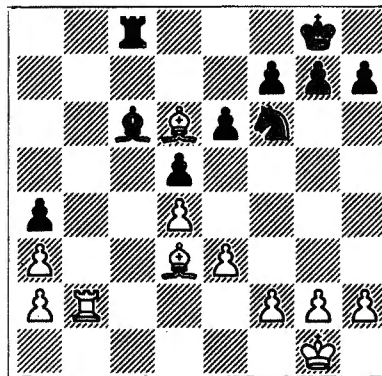
Sfinks has forced a queen swap and threatened Sargon's king again. A short verse began to run through my head: "Fly like a butterfly, sting like a bee."

Sargon manages to escape the ravages of Sfinks, and the game becomes a battle for position and control until move 18.

9.	C1-D2	B8-D7	33.	B2-C2	E7-D7
10.	D2-B4	F8-E8	34.	D3-A6	C8-A8
11.	E1-G1	B7-B6	35.	A6-D3	F7-F6
12.	C4-D5	C6-D5	36.	E5-F4	E8-D6
13.	A1-C1	C8-B7	37.	F2-G3	A8-B8
14.	C1-C7	A8-B8	38.	H2-H3	B8-B7
15.	F1-C1	A7-A6	39.	H3-H4	G7-G5
16.	B4-D6	E8-C8	40.	H4-G5	H6-G5
17.	C1-B1	A6-A5	41.	F4-D6	D7-D6
18.	F3-E5	D7-E5	42.	G3-G4	C6-E8

Sfinks appears to be in trouble, but continues.

19.	D6-E5	C8-C7	43.	G2-G3	E8-C6
20.	E5-C7	B8-C8	44.	D3-G6	B7-B8
21.	C7-B6	A5-A4	45.	G6-D3	B8-H8
22.	B6-C5	B7-C6	46.	F3-F4	G5-F4
23.	B1-B2	F6-D7	47.	G3-F4	H8-G8+
24.	C5-D6	D7-F6	48.	G4-F3	G8-G7
			49.	F4-F5	E6-F5
			50.	F3-F4	G7-C7
			51.	F4-F5	C6-B5



After move 24:
Sargon C5-D6
Sfinks D7-F6

At this point, Sargon seems to have overcome his initial shock over Sfinks' opening aggressiveness, and regains precious position as witnessed by the next moves.

25.	B2-C2	C6-B7
26.	D6-C7	G8-F8

Sargon is now on the attack:

27.	C7-D6+	-----
-----	--------	-------

but Sfinks replies:

27.	-----	F8-G8
-----	-------	-------

and the battle continues uneventfully for a while.

28.	D6-C7	G8-F8
29.	F2-F3	F8-E7
30.	G1-F2	F6-E8
31.	C7-E5	H7-H6
32.	C2-B2	B7-C6

Sfinks is again in trouble.

51. ----- C6-B5 seems like a bad move, but Sargon fails to take advantage of it.

52.	C2-D2	B5-D3+
53.	D2-D3	D6-E7
54.	E3-E4	D5-E4
55.	D3-E3	C7-C2
56.	E3-E4	E7-F7
57.	D4-D5	C2-D2
58.	E4-A4	D2-D5+

Sargon captures another pawn and Sfinks' game seems almost hopeless at this point.

59.	F5-E4	D5-D2
60.	E4-F3	D2-A2

Wait! All is not lost! Sfinks seems to have equalized the game. The excitement begins.

61.	F3-E4	F7-G6
62.	A4-A5	A2-F2
63.	A5-C5	F6-F5+

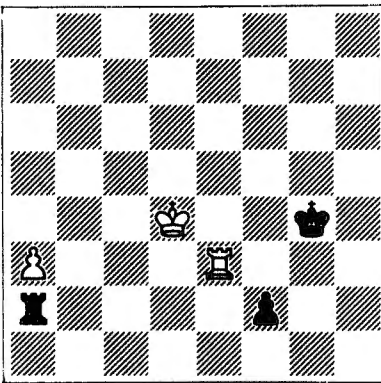
Sfinks is now on the attack and is very much the aggressor.

64.	E4-E3	F2-A2
65.	E3-F4	A2-F2+
66.	F4-E3	F2-A2
67.	C5-C3	G6-G5
68.	E3-D4	F5-F4
69.	C3-C5+	G5-G4
70.	C5-C3	F4-F3

With:

71.	C3-E3	F3-F2
-----	-------	-------

it is obvious that Sfinks is after a queen.



After move 71:
Sargon C3-E3
Sfinks F3-F2

After:

- | | | |
|-----|--------|-------|
| 72. | E3-E4+ | G4-F3 |
| 73. | D4-E5 | F2-F1 |

Sfinks has won a queen. The tension is mounting. Will Sfinks pull it off? Let's see for ourselves.

- | | | |
|-----|--------|--------|
| 74. | E4-F4+ | F3-G2 |
| 75. | F4-F1 | G2-F1 |
| 76. | E5-D4 | A2-A3 |
| 77. | D4-C5 | A3-D3 |
| 78. | C5-C4 | F1-E2 |
| 79. | C4-B4 | D3-D4+ |
| 80. | B4-B5 | E2-D3 |
| 81. | B5-C5 | D3-E4 |
| 82. | C5-C6 | D4-D5 |
| 83. | C6-C7 | D5-C5+ |
| 84. | C7-D6 | E4-D4 |
| 85. | D6-E6 | C5-D5 |
| 86. | E6-F6 | D5-E5 |
| 87. | F6-F7 | D4-D5 |
| 88. | F7-F6 | D5-D6 |
| 89. | F6-G7 | E5-E6 |
| 90. | G7-F7 | D6-D7 |
| 91. | F7-G8 | E6-E7 |
| 92. | G8-F8 | D7-D8 |
| 93. | F8-G8 | D8-E8 |
| 94. | G8-H8 | E8-F7 |

At this point, it is no less than obvious that Sfinks has come from the position of underdog all the way to the winner's circle. And he knows it. His next statement is "checkmate in two". To prove his point, the game is ended quickly:

- | | | |
|-----|-------|--------|
| 95. | H8-H7 | E7-E6 |
| 96. | H7-H8 | E6-H6+ |
- Checkmate**

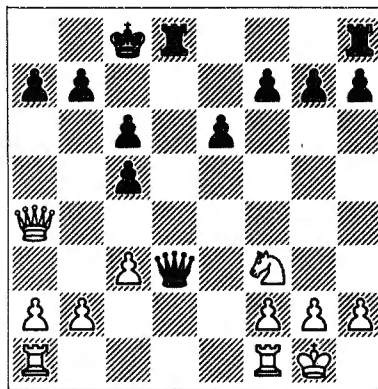
In light of the fact that Sfinks was black and was playing at level two, he did a remarkable job of making a

comeback. The next two games prove that Sfinks' claims do at least hold water. Whether or not he is the "best" remains to be seen.

Game Number Two

The next two games convinced me that Sfinks was, indeed, a formidable chess opponent. I will not bore you with a line-by-line description, merely print the moves as they developed. You can set up your own chess board and play out the moves to verify the shrewd, devious manner in which Sfinks crushes his opponent. Sfinks has white.

- | | Sfinks | Sargon |
|-----|--------|--------|
| | ----- | ----- |
| 1. | E2-E4 | C7-C5 |
| 2. | G1-F3 | B8-C6 |
| 3. | F1-B5 | G8-F6 |
| 4. | B5-C6 | D7-C6 |
| 5. | D2-D3 | C8-G4 |
| 6. | C1-F4 | E7-E6 |
| 7. | B1-D2 | F8-D6 |
| 8. | F4-D6 | G4-F3 |
| 9. | D2-F3 | D8-D6 |
| 10. | E4-E5 | D6-E7 |
| 11. | E5-F6 | E7-F6 |
| 12. | C2-C3 | E8-C8 |
| 13. | E1-G1 | F6-F5 |



After move 14:
Sfinks D1-A4
Sargon F5-D3

- | | | |
|-----|--------|-------|
| 14. | D1-A4 | F5-D3 |
| 15. | A4-A7 | D3-D5 |
| 16. | A7-A8+ | C8-C7 |
| 17. | A8-A3 | D8-D7 |
| 18. | C3-C4 | D5-D6 |
| 19. | A1-E1 | H8-D8 |
| 20. | F3-G5 | H7-H6 |
| 21. | G5-E4 | D6-D4 |
| 22. | E4-C5 | D7-D6 |
| 23. | E1-E4 | E4-F6 |
| 24. | E4-G4 | F6-E5 |
| 25. | A3-A5+ | C7-C8 |
| 26. | A5-A8+ | C8-C7 |

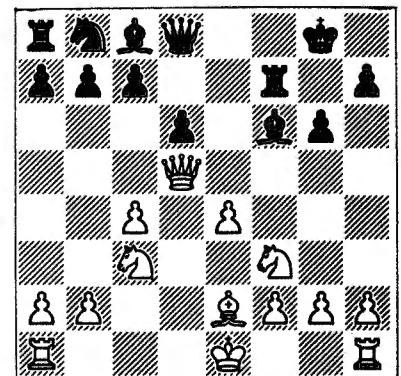
Sfinks literally crushes Sargon. This game was played at level three for both machines. Technically, Sfinks was the underdog, even though he started with white, because Sargon was able to "think" about his moves for a longer period of time. Remember, however, that Sfinks thinks while his opponent is thinking.

Game Number Three

I had intended game number three to be played at level four, but hardware problems and deadlines forced me to go back to level two. At about the 27th move, using level four, my Model I crashed. Each move at this level was taking up to twenty minutes. Multiply that by 27 moves, and you will see why I was running out of time.

One subsequent attempt at a level four game resulted in the Model III going off into never-never land after about the 34th move. I gave up and played the last game as quickly as possible using level two. Sargon has white:

- | | Sargon | Sfinks |
|-----|--------|--------|
| | ----- | ----- |
| 1. | D2-D4 | G8-F6 |
| 2. | C2-C4 | G7-G6 |
| 3. | B1-C3 | F8-G7 |
| 4. | E2-E4 | D7-D6 |
| 5. | G1-F3 | E8-G8 |
| 6. | F1-E2 | E7-E5 |
| 7. | D4-E5 | F6-E8 |
| 8. | C1-G5 | F7-F6 |
| 9. | D1-D5+ | F8-F7 |
| 10. | E5-F6 | E8-F6 |
| 11. | G5-F6 | G7-F6 |



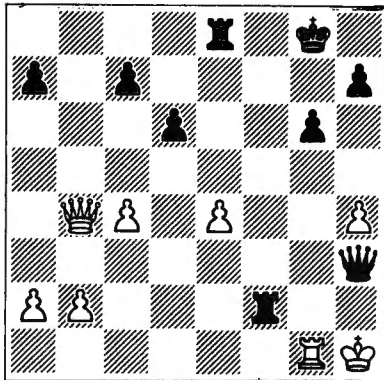
After move 11:
Sargon G5-F6
Sfinks G7-F6

- | | | |
|-----|-------|-------|
| 12. | A1-C1 | B8-C6 |
| 13. | E1-G1 | C8-G4 |
| 14. | F1-D1 | D8-E7 |

Software evaluation

15.	D1-D2	A8-E8
16.	E2-D3	F6-C3
17.	C1-C3	C6-B4
18.	D5-B7	G4-F3
19.	B7-B4	E7-G5
20.	D3-F1	G5-D2
21.	G2-F3	F7-F3
22.	G1-H1	D2-E1
23.	H2-H4	F3-F2
24.	C3-G3	E1-F1+
25.	G3-G1	F1-H3+

Checkmate



After move 25:
Sargon G3-G1
Sfinks F1-H3 Checkmate!

This final game was decisive. Sfinks again crushes Sargon. Time permitting, I would have preferred to set both computers at their highest levels and let them battle it out. Things might be a little different under these circumstances, but, quite frankly, I don't see how. As far as this tournament is concerned, Sfinks demonstrated superior performance. I thoroughly enjoyed watching Sfinks as he demonstrated human-like chess playing ability.

I lit a cigarette and sat back to rest for a moment as I reflected on the outcome of these events. I haven't enjoyed myself this thoroughly in a long time. Both monitors sat quietly watching my actions. I reached over, pulled the diskettes from the drives, and laid them to the side. A sparkle coming from the direction of Sargon's monitor caught my eye. Poor thing. I pulled a handkerchief from my pocket, reached over and dabbed the small drop of moisture that had accumulated in the corner of the video screen. It couldn't be... could it?

A Look at Sfinks 3.0

Now, for a little background on

Sfinks 3.0. The program is available on cassette or disk and requires 32K of memory. Documentation is provided which consists of five pages of instructions. This might seem rather skimpy at first, but not so. The instructions are simple, concise, and explain everything you need to know to get into trouble on the chess board.

Sfinks 3.0 will play at levels from one to nine. Each level of play represents the maximum response time of the computer. Below, is a table which lists those times:

Level	Max. Response Time
1	6 seconds
2	20 seconds
3	50 seconds
4	1 min. 10 seconds
5	1 min. 50 seconds
6	2 min. 14 seconds
7	2 min. 50 seconds
8	3 min. 50 seconds
9	unlimited

After selecting the level of play, a crystal clear representation of a chess board will be displayed, complete with chess pieces. The graphics used to represent each piece are very nicely done considering the limitations of the Model III. The screen not only displays a chess board, but virtually all other information you will need which pertains to the game.

In the upper left corner is the level chosen, while in the lower left, a digital clock (you didn't expect one with hands, did you?) displays the seconds, minutes and hours of each move. The space along the left side of the screen will display all of the moves up to the most current. When the number of moves exceeds the display capacity, they are scrolled upward without interfering with any other displayed information.

Entering moves into the computer is a snap. To enter the move P-K4 for white, press E2 and E4 in succession, without the hyphen. The hyphen is needed, but Sfinks enters it for you. This feature will save a lot of extra keystrokes during the course of a game. If you wish to correct an entry before the ENTER key is depressed, you may change it after first pressing the CLEAR key. If an illegal move is made, Sfinks will display "ERROR" and allow

you to reenter a correct one.

During a game, Sfinks will let you know he is thinking by blinking an asterisk near the left of the screen. He also keeps you informed of the best move presently being considered and as better moves are discovered, the display will be updated. He will continue updating the moves under consideration until a "best" move is found, and then move the appropriate piece on the board. An additional feature allows you to stop Sfinks at any point during his analysis, and respond with a move.

If you are using the audio alert, Sfinks will audibly indicate each of his moves as they occur. Simultaneously, if you have a printer connected, Sfinks will print each pair of moves for later scrutiny. This feature saved me much time in preparing this article. The printout is excellent for post game analysis.

If Sfinks is checking your king, he will display a + after his move. If he has no legal move, he will respond with, "I LOSE". I never got to see this feature, however, since I only play average (my average) chess.

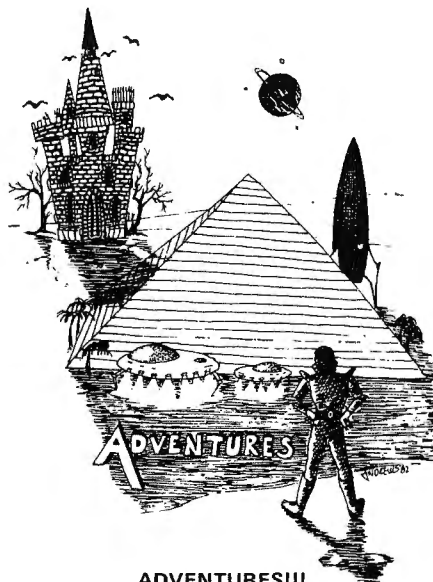
At times, if Sfinks can checkmate you, he will indicate his intention several moves prior to the actual mate. Was I shocked during a game when I saw the words "Checkmate in 2" appear on the screen! You never saw anyone perk up so fast in all your life! Sfinks can also detect a "drawn" game.

A handy feature for novice chess players is the "HELP" feature. Simply type S and Sfinks will usually suggest a move, if he can. To play a move other than the one suggested, simply remove the suggestion by depressing the CLEAR key and enter the desired move.

Herein lies much of the power of Sfinks as a formidable chess opponent. After he moves and is waiting for your response, the little asterisk doesn't stop blinking. As you are contemplating a move, Sfinks tries to anticipate what it will be. Sfinks thinks while you think! ■

Sfinks 3.0 is available from William A. Fink, P.O. Box 5912, Lighthouse Point, FL 33074, (305) 942-5706, \$39.95 for either version (cassette or disk).

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.

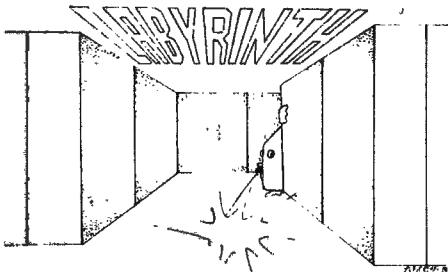
BASIC THAT ZOOOMMS!!

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)

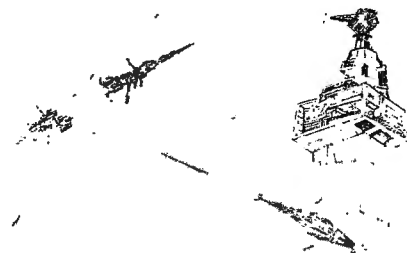


PROGRAMMERS!

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.



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

OSI

A computer carrel

A spoof of games as educational tools

Leo B. Christopherson, Tacoma, WA

The Start of It

Mr. Skrushon looked up from his desk to see that Tom Higgins was on his way up to talk to him. "Here we go again," he thought, "He's come up with yet another idea designed to let him get out of doing his work properly."

"Excuse me, Mr. Skrushson," the boy began, eyes lit up with excitement, "but you know that sort problem you gave us to do? Well, I think maybe I've found a way to do that job faster!"

Skrushon sighed. What was this kid doing in his class, anyway? He should be in Krashet's instead. Those two really deserve each other.

As patiently as possible, Skrushson asked, "Tom, does your method use the bubble sort I explained to the class? Or are you off into some other area we're not studying yet?"

"Well, sir, I just thought that I had found a better way to do it, is all," Tom replied.

"All right, let me explain this to you one more time, Tom," he began. "You are here to learn good, solid programming methods. You are to do the work the way I specify because until you know the basics, you won't have a complete enough background in computers to compete with other programmers who do have that background. Though you don't recognize it yet, this work really is for your own good."

"And another thing, Tom," he went on, "no more talk about using our valuable time playing computer games! If you want games, play them after school on your own time, not ours. Or, of course, transfer to Krashet's class across the hall."

"I've tried, sir, but the class is full," Tom mumbled.

"What's that?" asked Skrushson.

"Nothing, sir. I guess I'd better get back to work," the boy said, turning away and heading back toward his seat, his eyes no longer lit up with excitement.

Skrushson thought sadly of the three students who had transferred out during the last month. Maybe it's true that they won't be playing games over there *all* of the time, but they will be wasting *some* of their time with them.

The door opened then, as a late student arrived. Skrushson glanced toward the door in annoyance at the sound of bleeps and crashes also arriving in the room from those infernal games across the hall. It was obviously "Game Day" again.

"Computer games!" he said to himself with conviction, "Bah, Humbug!"

Marler's Visit

That night at home, after the usual time spent with his family for dinner and other pleasantries, Skrushson headed for the computer carrel. The carrel was actually a small former bedroom into which he had placed his personal computer equipment. In addition to the computer and its peripherals, he had managed to squeeze in an adequate bookshelf, a few chairs, and a desk. Skrushson often thought this room had to be his favorite place in the whole house; perhaps in the whole world! Here, he could be alone and enjoy the tremendous feeling of accomplishment he experienced from programming.

Skrushson's wife did not share his

enthusiasm for the room, however. In fact, one night a few months ago, just before Christmas, she had dragged him out of there yelling, "Ebenezer, you come out of that stupid carrel and say hello to our guests, or I'm going to pound the dickens out of you!" The combination of his first name and the words "carrel" and "dickens" were enough to set everyone laughing, including Skrushson. From then on, his computer room was known as "a computer carrel". The kids had even taped a sign to that effect on the door, adding, "Do Not Disturb—by order of Ebenezer Scrooge!"

He figured the "Scrooge" part was the result of his not allowing the kids to use the computer for the arcade game his wife had mistakenly bought them for Christmas. Oh, well. Some day they'd understand.

His thoughts were interrupted by his wife's voice saying, "Right in here, Professor Marler. I'm sure Eb will be delighted to see you!"

And so he was. Marler was one of the few people who would be welcomed to Skrushson's hideaway. The professor used to occupy the room across the hall from Skrushson's room at the high school until he accepted a college position a few years back. Skrushson sorely missed the professor, particularly considering his replacement, gamester Bob Krashet.

"What the dickens are you up to, Ebenezer? It's old Marler come to see you tonight!" the professor said, and both men laughed.

"Terrific timing, Jake," said Skrushson to his friend, "I could use your advice with the program I'm

"Please Stand By for Three Important Messages!"

Unable to tear his eyes from the screen, Skrushson watched as another set of almost hypnotic whirls appeared. They seemed to draw him closer, until the screen was all he could see. It became his whole world. He felt himself falling forward . . .

The First of the Three Spirits

Skrushson awoke to a blank computer screen and to the sound of a voice calling his name, "Hey, Ebby, wake up! I've got to talk to you."

When he turned and saw who had said those words, Skrushson almost jumped from his chair in surprise! "What are you doing here, Billy? You died in that car wreck back in college! I went to your funeral!"

"Right you are, Ebby," the spirit answered. "But I've come back to have a little talk with you. For this special occasion, I wear the impressive title of "The Ghost of Computer Games Past." What do you think of that?"

"Ghost? I must be dreaming!" Skrushson said.

"Well, be that as it may, we have a little reminiscing to do, tonight, old friend," answered the ghost.

"You remember that time in computer class," Billy began, as Skrushson tried to adjust himself to his old roommate's presence, "when you reset the master program so that whenever Professor Black pressed the restart button, the computer would ring the fire alarm bell? You really had the old guy jumping!"

"No worse than your trick of making the printer spew out reams of paper when the BREAK key was pressed," retorted Skrushson, chuckling in spite of himself at the memory of paper flying straight up almost to the ceiling as the printer went into that nonstop, line feed routine of Billy's.

His former friend went on, "Remember those beautiful printer pictures of Snoopy made out of letters and asterisks and stuff? Or, how about that one Mr. Black caught you with: the present for me

on my birthday of the pretty lady in her birthday suit!"

Skrushson said wistfully, "I remember that time I got the computer and the printer so well synchronized that it would play The Star Spangled Banner as it printed out a picture of the flag. Now, that was really something!"

"Why did you do it?" asked Billy, suddenly.

"What? Do what?" Skrushson asked, coming out of his reverie.

"Why did you write that flag program, Ebby?" Billy seemed serious, now. "I mean, what possible good was there in it?"

"Why did I write that program to print the flag?" Skrushson thought about it. "I guess it wasn't very useful. I suppose I just wrote it for the fun of it," Skrushson confessed. "So what? What did you ask that for, anyway?"

"My job here tonight," responded the ghost, "was to remind you that no matter how you may feel now, there was a time when you occasionally took computers a little less seriously."

"Yes, we had fun, now and then," Skrushson admitted to the spirit, who was becoming less substantial by the second. "I don't have anything against computer games as such; it's just that I don't feel them to be of any use to a serious programmer. Do you disagree, Billy?"

But the spirit didn't answer. It had now faded away completely, leaving Skrushson with a feeling of something lost, and perhaps of something found again.

Turning back to the computer, he saw the now familiar pattern forming there. As the room began to fade around him, he remembered the promise of two messages still to come.

The Second of the Three Spirits

"I am the Ghost of Computer Games Present," said a familiar voice.

Ebenezer Skrushson could hardly believe his eyes. The form that was appearing before him was that of his old college teacher, Professor Black.

"It's good to see you again, Professor," said Skrushson, "but I would hardly expect you to be the

one to represent computer games of any sort."

"I know!" agreed Black. "This is the most ridiculous thing I've ever gotten into. I'm supposed to show you around and give you a look at the sort of stuff that passes for computer activity for some of today's scatterbrained, immature programmers.

Professor Black came over and took Skrushson's arm, saying, "Well, let's get this stupid dream of yours over with. You always were a trouble maker, Skrushson. Imagine, turning our computer center into a pornographic print shop!"

Skrushson's smile at that remark turned into a frown as he saw that his computer room had become Mr. Krashet's room at school. Though the room was full of students and activity, no one seemed to take any notice of the two newcomers.

Black said, "Well, here's a den of iniquity, if I ever saw one. Look at this, games in every computer. These kids will never amount to anything at all."

Partly from curiosity, and partly to get away from the professor's negativism, Skrushson moved over to a computer to watch what was going on. Two students were in a heated argument. It involved something or other about where to put their gold: into buying food for their people, or into more military expansion. As the game proceeded, Skrushson saw that the goal was to become a successful ruler of a small, ancient kingdom. He was about to make some suggestions to the players, when he remembered that they couldn't hear him.

He moved on to the next machine. This machine had a chess game in it. The student seemed to be doing a pretty good job of trouncing the computer.

Next, they joined a small group of laughing students gathered around a computer which showed a graphic representation of a small humanoid doing a crazy sort of dance to some simple music. "Simple toys for simple minds," observed Black. Skrushson, thinking of his old flag and music program, couldn't quite agree.

Impressed at the advances in video graphics since his college days, Skrushson approached a

group of computers that were making all sorts of space war sounds. "This must be the stuff I hear from across the hall," he thought.

He was amazed at what he saw. These games moved fast! They were in real time! The graphics were excellent! The sound effects were great, now that he experienced them along with the actual games. Many of the games were in terrific color, too. He found himself wondering if his machine at home was capable of this kind of fast graphics work.

At the next computer, a group of students were planning some kind of war campaign. They were exploring a graphic landscape to gather money and supplies before they could launch themselves in a ship to carry on their game. It seemed to have more to it than first met the eye, and did look entertaining.

"Bah, Humbug!" said the Ghost of Computer Games Present.

Skrushson came upon Bob Krashet over in a corner of the room. He was talking to a few of his students. One boy was talking excitedly about a game idea.

Krashet heard the boy out, and then said, "That's one of the best ideas I've heard in quite a while! Go to it, Jack!"

"Well, I'll need some help with the graphics, and also with the sound effects. I don't exactly know how to get the program to run really fast, yet, either," Jack answered.

Krashet's response was, "Jack, I'm not going to write that program for you. If you know your computer can do certain things you need for your game, but you don't know how to program the machine to do those things yet, I'd say you're not ready to start your game program. There's no substitute for the hard work it takes to learn how to program a computer. Even though a writer may come up with a fantastic idea for a novel, he won't write much of a book if he can't understand many words in English, will he?"

Skrushson couldn't believe his ears. Here was Krashet giving Skrushson's own favorite little lecture. Perhaps he had misjudged the man.

Krashet looked directly at Skrushson and said, "These games

certainly stimulate creativity, don't they?"

"Yes, sir, they certainly do!" answered Jack as Skrushson realized that Krashet couldn't actually see him and had just happened to turn his head in his direction. It had given him quite a scare, and he was surprised to find himself starting to answer "yes" to the question, along with Jack.

Skrushson watched the Ghost of Computer Games Present fade away and the computer carrel reappear. He felt confused, and he knew he would need to give some thought to what he had seen tonight. Before he had time to accustom himself to his return, the whirls began to fill the computer screen and he knew he was about to experience the third message.

The Third of the Three Spirits

A wall of his room seemed to melt away. He found himself looking down the length of an endless corridor. Its exact shape was impossible to see. The long tunnel was in constant movement. All along the hallway were doors.

"Welcome, Ebenezer!" a voice boomed out.

"I'll bet you call yourself The Ghost of Computer Games Future, is that true?" ventured Skrushson.

"Right you are, Ebenezer," answered the ghost. "We are about to take a peek at the future. You must understand that the future is represented by a balance between various potentials which are continually changing and shifting. Thus, what we see here in the corridors of time, could actually come to pass, although they may well not, either. Is that understood, Ebenezer?"

"Yes," said Skrushson, who now thought he could explain the constantly changing path before them. "This looks very interesting, ghost, let's begin."

Skrushson could not exactly see the ghost. It was a wavering, hazy creature. It said, "Very well, follow me. Where I stop, you may open a door and look beyond. Most doors are locked, however, so we will not visit every future possibility."

Later, after the journey through time had ended, and Skrushson was back in his computer room, he went

back over what he had seen.

He had watched a young man working on a computer program which could accurately predict trends in our economy. Another group of people was putting a war games computer into operation, which was designed to accurately represent the reactions of countries in the world to each other. The program's purpose was to find the path to peace.

The young lady who had been playing chess in Krashet's room, was working on an artificial intelligence program which showed signs of learning chess well enough to beat the pants off any human player. What else might it be capable of?

Skrushson had witnessed a series of grownup arcade games. They had become trainers of various sorts: learn to drive a car, learn to fly a plane, learn to drive a Mars buggy, etc.

He had even recognized the student who had played with the dancing humanoid. The man was now designing whole ballets which could be performed using the computer's holographic, 3D image output. He was amusing himself by requiring the computer to show him the effects of the ballet being performed on the moon, with its lesser gravity.

Ebenezer Skrushson knew he had a whole lot to think about now. What had he learned from all of this? he wondered.

The End of It

The next morning, the family awoke to the sound of zaps, pops, whines, and crashes from the computer carrel. They ran into the room to find Skrushson intently playing that arcade game purchased last Christmas by his wife!

As the kids happily took their turns at it, too, Skrushson explained excitedly to his wife how he had an idea for a terrific program that blended graphics and sound effects into a game that could teach students what sorting in a computer meant.

He made up his mind to try to encourage creative tendencies, and to definitely get to know a certain Mr. Robert Krashet better. ■

100+ Reasons

DOS FEATURES

- A 252+ page technical manual with index and detailed table of contents.
- Commands **SYSTEM** and **PDRIVE** allow the user to configure/customize his/her own DOS
- Depending on installed hardware, **NEWDOS/80**, via the **PDRIVE** command, supports within one system, mixtures of single/double density, single/double head, 5 or 8 inch drives with single/double volume diskettes of up to 7680 standard 256 byte sectors. 80 track drives can read 35/40 track diskettes. Parameters for 10 drives may be pre-specified though only a maximum of 4 are in use at anytime. ADR not provided.
- LNW 5/8 and Omikron mapper boards supported.
- APPARAT, AEROCOMP, AM, LNW, and PERCOM, disk doublers supported.
- Most CPU speed up mods may be used though not specifically supported.
- Model I/III data diskette interchangeability when both computers are operating under **NEWDOS/80** version 2.0.
- Model I 2.3 TRSDOS compatible.
- **COPY** to/from Model I 2.3B and Model III TRSDOS diskettes (no other useage allowed).
- Single drive **COPY** and Copy By File features.
- Depending on installed hardware, the system volume may be single/double density, single/double sided, 5 or 8 inch and up to 7680 sectors.
- **RUN-ONLY** program mode restricts the operator to program defined input only.
- **MINI-DOS** allows the executing program to be interrupted by the operator to perform one or more of the 51 DOS commands executable under **MINI-DOS**, and then continue the interrupted program's execution.
- **CHAIN** or **DO** commands activate chaining whereby keyboard input comes from the specified disk file, allowing a pre-determined set of commands and/or parameters to be automatically inputted.
- Dump display to printer function.
- Enhanced **DEBUG** facility (14 commands) allows interrupting current program execution, inspecting/altering memory or disk, and resuming execution, continuous or single step, with/without stops.
- DOS vectors defined for Assembly Language programmers.
- **DOS-CALL** allows user programs and **BASIC** to execute DOS commands.
- The programmer may create his own resident DOS commands.
- Programs may enable/disable user routines driven off the timer interrupt.
- The programmer may create his/her own resident DOS commands.
- Model I built-in lower case driver, blinking cursor, auto key repeat.
- **ROUTE**ing of keyboard, display, printer and (Model III only) RS232C. May be routed to a user routine in memory, but not to/from disk unless via a user routine.
- Except for the spooler, there are no high memory routines for DOS or **BASIC**; this includes **ROUTE** and **CHAIN** functions.
- Lower case DOS commands honored
- Full error messages displayed instead of error codes.
- 31 enhanced **COPY** parameters.
- Copy By File allows 6 criteria for file selection.
- 15 enhanced **FORMAT** parameters.
- Partial diskette **REFORMAT** permitted.
- File **PURGE** by wildcard extents and/or user files.
- **DIR**ectory command allows wildcard extents, user files, short or extended format, dump to printer.
- User may specify diskette's directory location.
- Expanded directory provides for up to 222 file entries.
- Some DOS commands may be aborted without reset.
- **R** command repeats last performed DOS command.
- **CREATE** command to pre-allocate a disk file.
- **ERROR** command displays error message associated with error code.
- **HIMEM** command sets/displays DOS/**BASIC** high memory address.
- **DATE** command sets/displays computer's date.
- **TIME** command sets/displays computer's time.
- Model III **FORMS** command for printer control.
- Model III **SETCOM** command for RS232 control.
- Enhanced **LIST/PRINT** commands for ASCII files with pause, abort and partial file listing.
- Alter chaining state via the **CHNON** command or commands within the chain file.
- A program or a chaining sequence may display a message with/without pause.
- **CLEAR** command to zero memory and to purge routes, user DOS commands and user timer routines.
- Commands to enable/disable **BREAK** key, blinking cursor, lower case driver
- **PROT** command to change diskette **NAME/DATE/PASSWORD**
- **ATTRIB** command to change a file's attributes.
- **CLS** command to clear screen.
- **AUTO** specifies the command to execute automatically at reset/power-on.
- **SYSTEM** specifies the default system configuration values (usually enable or disable) which become effective on **RESET/POWER UP**.
 - Diskette/file password checking
 - **RUN-ONLY** mode
 - Keyboard debounce (Model I)
 - Screen dump to printer (JKL)
 - **DEBUG 123** entry
 - **MINI-DOS**
 - Break key as keyboard key
 - Hardware lower case (Model I)
 - Assign default drive number for **DIR**
 - Assign default drive number for file creation
 - Memory protect value
 - Clear key as keyboard key
 - Disk master password required for full diskette or **CBF COPY**
 - Auto Repeat key function
 - **TIME/DATE** question on power-up
 - **TIME/DATE** question on reset
 - Display disabled until operator/program reenables
 - Manual operator chaining pause/abort
 - Manual operator **AUTO** command override
 - **R** = repeat last DOS command performed
 - Built-in lower case driver (Model I)
 - Lower to upper case toggle
 - Blinking cursor
 - Number of physical drives on computer
 - Number of disk I/O retries
 - Time delay for 1st repeat of auto repeat key
 - Specify the cursor character
 - Specify the write of the directory sector's address mark for Model I single density diskette in Model III format for easy Model I, Model III diskette exchangeability



Apparat, Inc.

800/525-7674 (order line only)
303/741-1778
4401 South Tamarac Parkway
Denver, Colorado 80237

Why **NEWDOS/80™** VER. 2.0 Is the Best DOS for your TRS-80 Model I or III Computer

DISK BASIC FEATURES

- In one statement from DOS READY, BASIC can be brought up, the number of files set, the memory size set and a program LOAded or RUN.
- **RUN-ONLY** prevents the operator from getting to READY or DOS READY, thus giving the program almost total control.
- Via the CMD function, all DOS commands are executable from BASIC, either directly or dynamically.
- **MINI-DOS** is available from BASIC.
- **DEBUG** is available from BASIC.
- **CHAINing** is available from BASIC.
- Variable passing between programs via the V parameter of RUN.
- Abbreviated commands:
(A)uto; (D)elete; (E)dit or comma; (L)ist or period
- Accidental text line deletion more difficult
- Text line scrolling forward or backward.
- Text page scrolling forward or backward.
- **DI** moves text line to new position
- **DU** duplicates text line to new position
- Built-in **RENUM**ber with line number and limited syntax error check. A portion of text may be moved to another part of the program with all references to that code resolved.
- Built-in **RE**ference function will display/print references to all line numbers, integers and variables. It will display references to a single line number, integer, string, function code (reserved word) or a group of packed or unpacked characters, and then allows displaying of each referencing text line in turn with editing as necessary.
- A program may be loaded into reserved high memory via CMD or MINI-DOS and its execution address extracted from the two bytes at 17411 (4403H).
- **MERGE** functions with packed or ASCII text files.
- Built-in text space eliminator and/or remark deleter.
- Built-in calendar date conversion.
- Dynamic **ERASE** of selected variables, keeping all others.
- Dynamic **KEEP** selected variables, **CLEARing** all others.
- After clearing an array via **ERASE** or **KEEP**, the array may be redimensioned via **DIM**.
- Dynamic text line deletion.
- Dynamic text line insertion via **MERGE**, which with dynamic **DELETE**, allows use of overlays.
- **SWAP** contents of 2 variables of the same type.
- Single Stepping starting at specified text line number.
- In-memory sort of up to 9 arrays in either ascending or descending order
- **RENEW** function to reinstate **NEW**ed program.
- Full BASIC error messages, including associate DOS error message, if applicable
- With default start up parameters and no reserved high memory, 48K RAM has 38261 bytes available.
- **SUPERZAP**, **DIRCHECK** and other programs using only memory from 5200H to 6FFFH can be executed directly from BASIC without disturbing the program text or variables (if 8K BASIC free memory available, exclusive of string area).

FEATURES of NEWDOS/80 enhanced BASIC disk file I/O.

- In addition to TRSDOS sequential and random file types, **NEWDOS/80** has two new file types (Marked Item and Fixed Item) divided into five subtypes (**MF**, **MU**, **MI**, **FF** and **FI**)
- These five subtypes do not require **LSET**, **RSET**, **MKIS**, **MKSS**, **MKDS**, **CVI**, **CVS** or **CVD**; instead, **GETs** and **PUTs** are done directly to/from the variables named in a list.
- The string separating character sequence ";", ";"; used with **PRINT** is not used with the new file types; instead only a comma is used as the separator.

- **MU** files are used as an option to the older **PRINT/INPUT** files.
- **FF** files are used as an option to the older **RANDOM** files.
- Record lengths up to 4095 bytes supported.
- Records may be all of the same length (**MF** and **FF**), of varying lengths (**MU**) or unknown length (**MI** and **FI**).
- Sequential files may be accessed randomly.
- Files may be accessed by **Relative Byte Address** to allow accessing of variable length or unknown length records.
- Existing files may be extended.

UTILITY PROGRAMS INCLUDED WITH NEWDOS/80

- **SUPERZAP** is a disk/memory display and modification program, also used as the vehicle for installing patches to **NEWDOS/80**.
- **DISASSEM** is a Z80 load module (CMD) disassembler that builds cross reference tables for all location references including those by **JR** instructions, includes in the disassembly printable characters for all hex bytes to help locate character strings and sends the disassembly to the display, printer or a disk file. The disk file can then be edited and/or assembled using **EDTASM**, if it is not too large.
- **DIRCHECK** is a program that displays directory contents and checks directory integrity (its primary function), displaying specific error codes to assist user attempts at directory trouble shooting and/or repair. Optionally will zero out unused (dead) file names.
- **EDTASM** is Apparat's enhancement of Radio Shack's 1978 tape editor/assembler program to operate from disk and with disk files. Requires purchase of that Radio Shack program (not a newer one) as a pre-condition of use of Apparat's **EDTASM**.
- **LMOFFSET** allows load module (CMD) transfer between disk and tape. Displays program start, end and entry addresses. Optionally allows load address relocation (not execution relocation) and subsequent execution as from non-disk BASIC via **SYSTEM**.
- **CHAINBLD** is a mini-text editor for creating/maintaining chaining files.
- **NEWDOS/80** manual chapter titles and page counts
 1. Introduction (5)
 2. DOS Library Commands (52)
 3. DOS Routines (12)
 4. DOS Features (14)
 5. DOS Modules, Data Structures, and Miscellaneous Information (12)
 6. Additional Programs Supplied on **NEWDOS/80** Diskette (22)
 7. Disk BASIC, non-I/O Enhancements (17)
 8. Disk BASIC I/O Enhancements and Differences (21)
 9. Error Codes and Messages (2)
 10. Glossary (9)
 11. Error Reporting, Incompatibility Handling, and Patching (8)
 12. Conversion Information and Miscellaneous Comments (9)
 13. ZAPs (increasing with time)
 14. Appendix A: Marked and Fixed Item File discussion (47)
 15. Appendix B: Marked and Fixed Item File examples (18)
 16. Index (4)
- Full time support staff
- Information, minor enhancements and corrections to **NEWDOS/80** are issued, at no charge, to registered owners only.

NEWDOS/80 Version 2.0 for the model I is a separate and distinct product from the model III. Each is sold separately.

\$149.00

"On-going Support for Microcomputers"

®REGISTERED TRADEMARKS OF APPARAT, INC.



June, 1982 29

Dazzle

A fast-action, two player word game with sound

Model I/III

David Leupp, Dayton, OH

Despite the thousands of computer games available, there are few that provide good head-to-head competition for two players. "Dazzle" is one that does. Dazzle is derived from the Parker Brothers "box" game called "Razzle", and is a word game requiring quick reflexes and fast thinking. A good vocabulary doesn't hurt, either!

The game is played as follows: A set of six letters is displayed on the screen. Each player tries to find a word using at least four of the letters in the set. The first to find a word is rewarded by the movement of a pointer toward his end of a score line at the bottom of the screen. The pointer starts each "set" in the middle of the six-interval score line, and the first player to move it to his end wins a point.

Points are registered on a separate score line on each player's side of the screen. The bottom pointer is reset when a point is won (finishing a "set"), and the game continues for a predetermined number of sets. During play, if either player feels that it is not possible to make a word from the six letters given, he may "challenge" his opponent, forcing him to find a word within a timed interval, or lose the point. If, on the other hand, the challenged player manages to find a word, he wins the point.

The computer performs a number of functions which make the game enjoyable to play. It selects the six-letter word combinations (ensuring that at least one vowel is always present), graphically keeps track of the scoring, and provides a visual countdown timer when either player challenges. The game includes a sound routine which provides appropriate sound effects for the timer, scoring, and other functions. The sound signal is sent to the cassette port, and is generated by a machine language routine POKEd into memory from the BASIC program. The program performs still another useful function by detecting and displaying which player responds first with either a guess or a challenge.

In terms of mechanics, each player uses three keys on his side of the board to make required inputs during play. The "Z" and "?" keys are used by the left and right player respectively to start the challenge timer. The timer is displayed on the screen on the side of the challenged player. The down arrow and "clear" keys are used by the players to signify when the word is guessed. The computer detects which is pressed first, and displays an arrow on the corresponding side of the board. The up arrow key is pressed by the left hand

player to signify that he has won a point. The right arrow key is pushed by the right hand player to register his points. These keys are pressed in response to a query by the computer, and are necessary in the event a player presses his "word" button before he has actually thought of a valid word.

The program has been written to work on either a Model I or III. Several minor enhancements are apparent when run on a Model III. The bottom pointer is displayed as one of the Model III special characters, and the shift keys can be used as "challenge" buttons. The latter is not possible on the Model I, as the left and right shift keys return the same value when pushed. The Model III enhancements are minor, and require some extra programming, but I feel the effort is worthwhile. If the effort isn't made, we'll continue to program for the Model I exclusively, and never make use of the nice features available on the Model III.

The program is also designed to work on any disk-based machine with 32K (or more) RAM. By replacing line 1410 with line 1460 (minus the REMark), it will run on Level 2 cassette-based machines with 16K (or more). The only peculiarity involved in running the program, beyond swapping the lines for cassette-based operation, is the setting of variable M in lines 1250 and 1380. M should be set to the same value at both places. The first routine sizes memory to the value of M, while the second POKEs the sound routine into memory starting at M. Suitable values for typical systems are given in the program comments.

Please note that the program is interspersed with comments. These will aid when the time inevitably comes that you want to make modifications or additions. The lines are numbered consecutively at intervals of 10 to aid in typing the program. This is a simple procedure, but one that we too often see neglected. The important variables are identified by comments at the initialization point, primarily in the block starting at line 2040.

Included with the BASIC program listing is an assembled version of the machine language sound routine which is POKEd into memory. The values sent to the cassette port, loaded into the A register in lines 230 and 270, are 09 and 10 to set the signal high and low respectively. The sound signal is actually controlled by bits zero and one (values of one and two), but bit four

See DAZZLE page 80

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
Lenaustr 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 _____

Parimutuel horse race

Win, place, or show at home with color option

Model I/III and Color Computer

Alan Goozner, Moorhead, MN (Model I/III version)

John Steiner, Riverside, ND (Color Computer version)

After walking into a Radio Shack outlet one Saturday afternoon, I impulsively walked out with a TRS-80 Color Computer (paid for, of course). I hurried home to put it to work, but little did I know what I was getting into. Having only a passing interest in computers until recently, I had to start learning a new language, something called "Extended Color BASIC".

I hungrily devoured the manuals and typed in and saved to cassette, all of the sample programs included in the sample program section, and even some of those I wrote while becoming familiar with the computer. Then, I went through the stage of buying every program book in sight, looking for programs that I could run on my computer. As luck would have it, very few programs would run (unmodified) on my machine, unless they were the most simple in structure. I attempted to rewrite some of them, and was even successful in modifying a few.

One of the major problems with a new model computer, is the lack of software available. Radio Shack has provided a large selection of games and a few utility and personal use programs on plug-in ROM cartridges. However, since I spent the money on the computer, my spouse had other plans for money than to invest it in software. This left me no alternative but to beg and plead with my friends and acquaintances who had already bought Model Is or Model IIIs, to let me have listings of their favorite programs.

One of my friends, Al Goozner, finally relented and gave me a listing of his Parimutuel Horse Race program. He wrote it while his Model I was new, and he was looking for software for his machine. After many hours spent hunched over the keyboard, and a few on the phone to Al, I succeeded in making it almost completely unrecognizable to the author.

The program uses strings of color graphics characters to simulate horses. (Well, they sort of look like horses, if you use your imagination.) The program is divided into five routines entered from a menu. After initialization and inquiry of player names, the menu is displayed.

The routines are: Review Pool, Place a Bet, Review

Odds and Program, Review Your Bets, and Call to the Post.

The win pool is displayed when one (1) is selected. Two (2) selects a routine to place your bet. After asking for player number, and horse number, it asks for the amount of your bet. Three (3) displays the horses names and their "odds" of winning. As you can see by reviewing the listing, the odds are completely random, so don't expect the odds chart to give you any insight as to which horse might win. The routine called Review Your Bets, displays the individual bets for each player upon request. Selecting number five (5) runs the race.

If you have a 16K non-extended BASIC machine, you must substitute the PLAY MU\$ in line 590 with a FOR...NEXT loop. A count of about 500 will allow you to read line 580 before it is written over by the print statement in line 590. Then you may also delete line 40, which is the "music" extended BASIC "play's".

I have also included the original listing for those with a Model I or III. The original program had some interesting features that I couldn't program. For example, there is a feature that prints and updates the leading horse's name as the race is run. Unlike the original program, there are only six players and horses instead of eight. This was done due to the 16-line screen format on the Color Computer. There was no more room for horses on the screen. I also added an option that allows the computer to bet at random on the horses if there are less than six players. This allows one person to bet against the computer and win.

Now, to get out the *Going Ahead With Extended Color BASIC* book . . . What was that PMODE command?

Parimutuel Horse Racing Model I/III Program Listing

```
11 REM *** PARIMUTUEL HORSE RACE ***
12 REM *** BY : AL GOOZNER ***
15 CLS:DEFINT I-L:CLEAR 344:DIM A$(8),I
    BETS(8,8),ITBET(8),L(8)
```


HAPPINESS IS...NEWSCRIPT™

THE WORD PROCESSOR FOR BUSINESSMEN AND PROFESSIONALS

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

A FEW OF NEWSSCRIPT'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†
- *Sub-scripts, super-scripts, proportional pitch†
- *Generates Table of Contents, sorted Index
- *Allows block graphics, special symbols†
- *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

NEWSSCRIPT 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.

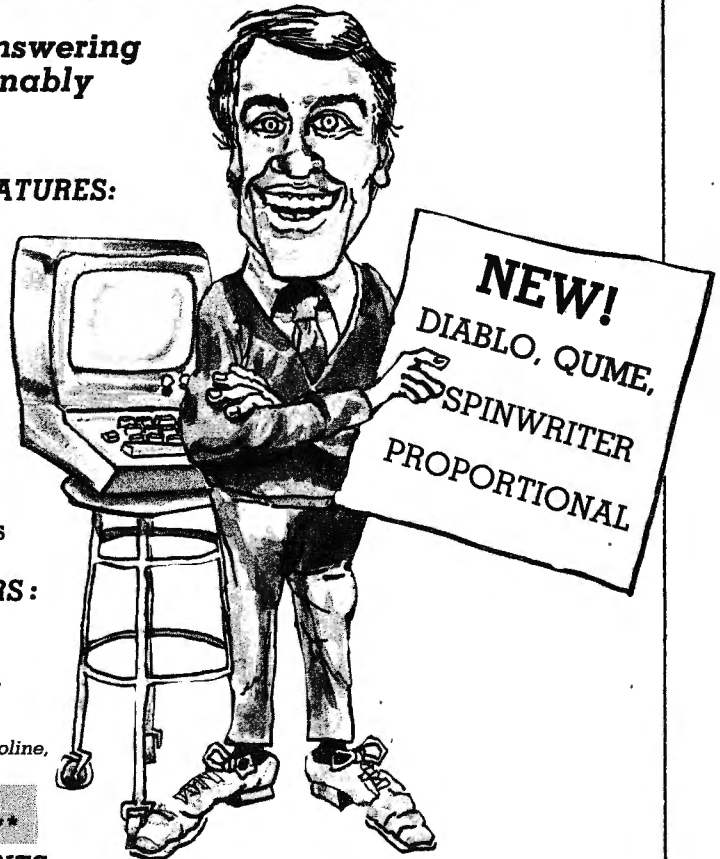
† Some features work only if your printer has the mechanical capability.
** DaisyWheel proportional is extra-cost option.

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



NEWSSCRIPT 7.0:	\$124.95
MAILING LABELS OPTION:	29.95
Special: NEWSSCRIPT + LABELS:	\$139.95
Daisywheel Proportional Option:	49.95
"PENCIL"/"SCRIPTSIT"	
File Converter:	14.95
Manual Only (180 pages):	30.00
Reference Card Only:	2.50
Electric Webster + Correction Feature:	149.50
Graphics Editor and Programmer:	45.95
DOSPLUS 3.4:	149.95

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).

Game

```

35 FOR I=1 TO 8
40 PRINT"PARIMU(JEL HORSE RACE PROGRAM"

45 PRINT"WHAT IS THE NAME OF PLAYER # "
  ;I
46 INPUTA$(I):CLS:NEXTI:CLS
50 PRINT"WHAT DO YOU WANT TO DO? REVIEW
  POOL = 1, PLACE A BET =2
60 PRINT"REVIEW ODDS AND PROGRAM = 3, R
  EVIEW YOUR BETS =4"
65 PRINT"RUN THE RACE = 5":INPUTI
70 IF I>5 GOTO 50
75 IF I=0 GOTO 50
80 ON I GOTO 500,200,300,400,600
200 INPUT"PLAYER # ";K:CLS
202 IF K>8 GOTO 200
203 IF K=0 GOTO 200
210 PRINT"OK ";A$(K);" ENTER POST POSIT
  ION":INPUT IP
211 IF IP>8 GOTO 210
212 IF IP=0 GOTO 210
230 INPUT"HOW MUCH DO YOU WANT TO BET";
  IBETS(K,IP)
235 ITBETS(IP)=ITBETS(IP)+IBETS(K,IP)
240 INPUT"PRESS ENTER TO CONTINUE";Z$:K
  =0:CLS:GOTO50
300 CLS:PRINT"HORSE LINE UP":PRINT
330 PRINT"POST POSITION","HORSE NAME","
  RATING"
340 FOR I=1 TO 8 : READ B$,C$
350 PRINTI,B$,C$:NEXTI
370 RESTORE:INPUT"PRESS ENTER TO CONTIN
  UE";Z$:CLS:GOTO50
400 INPUT"PLAYER # ";I:CLS
410 PRINT"OK ";A$(I);" HERE'S HOW MUCH
  YOU BET SO FAR"
420 PRINT"POST POSITION","AMOUNT BET"
430 FOR J=1 TO 8:PRINTJ,IBET(I,J):NEXTJ

440 INPUT"PRESS ENTER TO CONTINUE";Z$:C
  LS:GOTO50
500 CLS
504 PRINT"TOTAL WIN POOL"
505 PRINT"HORSE #"," TOTAL BET"
510 FOR J=1 TO 8:PRINTJ,ITBETS(J):NEXTJ

540 INPUT"ENTER ";Z$:CLS:GOTO50
600 CLS:FOR I=1 TO 1500:NEXTI
605 PRINT:PRINT:PRINT:PRINT" C
  ALL TO THE POST"
610 FOR I=1 TO 2000:NEXTI
620 CLS:PRINT"THEY ARE ENTERING THE STA
  RTING GATE"
630 FOR I=1 TO 3000:NEXTI:CLS:PRINT:PRI
  NT:PRINT
640 PRINT:PRINT"THEY'RE OFF !!!":FOR I=
  1 TO 100:NEXTI

645 CLS
650 PRINT"POST POSITION",,, "FINISH LINE
  "
660 PRINT:PRINT:FOR I=1 TO 8:PRINTI:NEX
  TI
670 FOR I=4 TO 35:SET(7,I):NEXTI
680 FOR I=4 TO 35:SET(112,I):NEXTI
690 FOR I=7 TO 112:SET(I,4):NEXTI
700 FOR I=1 TO 8:LET L(I)=7
710 NEXTI
720 I=RND(390):IF I<56 THEN K=2 ELSE 72
  5
722 GOTO 900
725 IF I<111 THEN K=3 ELSE 730
727 GOTO 900
730 IF I<166 THEN K=4 ELSE 735
732 GOTO 900
735 IF I<221 THEN K=7 ELSE 740
737 GOTO 900
740 IF I<271 THEN K=8 ELSE 745
742 GOTO 900
745 IF I<321 THEN K=1 ELSE 750
747 GOTO 900
750 IF I<371 THEN K=5 ELSE 755
752 GOTO 900
755 LET K=6
900 L(K)=L(K)+2:I=7+3*K:SET(L(K),I):IFL
  (K) > 112 THEN 940
905 FOR K=1 TO 8:IF L(K)>PW THEN PRINT@
  862,"IN THE LEAD # ";K
907 IF L(K)>PW THEN PW=L(K)
908 NEXT K
927 GOTO 720
940 PRINTK;" IS THE WINNER"
950 INPUT"PRESS ENTER TO CONTINUE";Z$
955 IF ITBETS(K)=0 PRINT"NO BETS ON THE
  WINNER":END
960 CLS:PRINT:PRINT:PRINT:FORI=1 TO 8:B
  =B+ITBETS(I):NEXTI:J=B/ITBETS(K)
970 PRINT"THE WINNING NUMBER ";K;" PAYS
  $ ";J;" FOR EACH DOLLAR BET"
980 FOR L=1 TO 8
985 FOR N=1 TO 8
987 M=M+IBESTS(L,N):NEXTN
990 ITBET(L)=(IBETS(L,K)*J)-M
992 PRINTUSING"% %";A$(L);:
  PRINT" WON (LOST) $ ";ITBET(L)
993 M=0
1000 NEXTL
2000 DATA "HOT DOG","LONG SHOT","LADY L
  UCK","FAVORITE"
2010 DATA "HOT SHOT","FAVORITE","MAN-O-
  WAR","MEDIUM"
2020 DATA "GO-FER-BROKE","LONG SHOT","B
  ROKE-DOWN","LONG SHOT"
2030 DATA "MANFRED","MEDIUM","NASHUA","
  MEDIUM"

```

"There is simply no finer program available..."
(Creative Computing, March 1982)

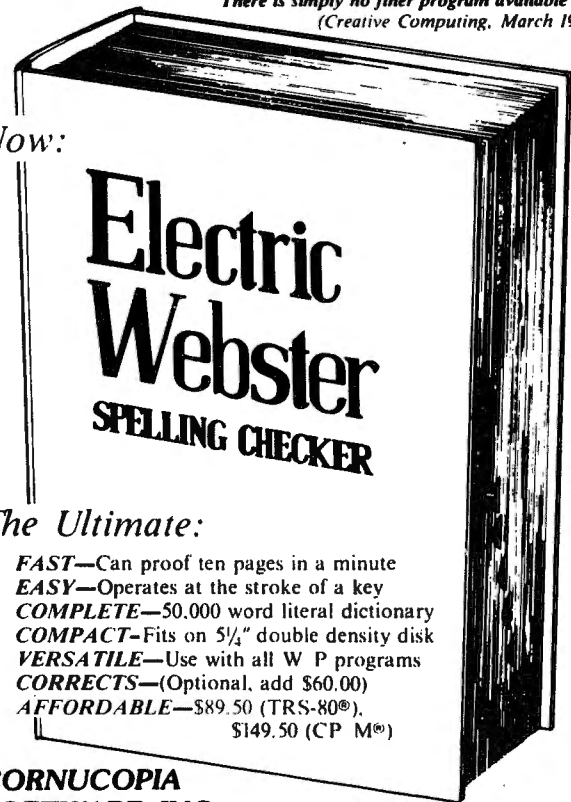
Parimutuel Horse Racing
Color Computer Program Listing

```

10 CLS: CLEAR344: DIM A$(6), B$(6), C$(6), I
BETS(6,6), ITBET(6), L(6)
15 REM READS HORSE NAMES
20 FORI=1TO6: READB$(I), C$(I): NEXT
30 PRINT@64, "PARIMUTUEL HORSE RACE
35 REM "CALL TO THE POST" $
40 MU$="T6L4O2GO3CEGL8GGL4GEL8EEL4ECECO
2L2GL4GO3CEGL8GGL4GEL8EEL4EO2GL8GGL4GL2
O3C
50 PRINT@128, "HOW MANY PLAYERS (1-6)?":
GOSUB1160
60 A=VAL(A$): D=A
70 IFA<1ORA>6 THEN PRINT "ENTER 1 TO 6 ONL
Y": GOTO50
80 C=D+1: IFC=2 THEN 130
90 IFC<6 THEN PRINT "DO YOU WISH TO HAVE T
HE COMPUTER BET (Y/N)"; : GOSUB1160
100 IFD=6 THEN 140
110 IFA$="Y" THEN 130
120 IFA$="N" THEN 140
125 REM COMPUTER BETS
130 A$(C)="COMPUTER": FORI=1TO6: IBETS(C,
I)=RND(10)*10: ITBETS(I)=ITBETS(I)+IBETS
(C, I): NEXTI
140 REM NAME ROUTINE
150 FORI=1 TO D
160 CLS: PRINT@64, "PLAYER "; I, ", ": PRINT"
WHAT IS YOUR NAME";
170 INPUT A$(I): CLS: NEXTI: CLS
175 REM MENU SCREEN
180 PRINT@64, "1--REVIEW POOL": PRINT"2--
PLACE BET": PRINT"3--REVIEW ODDS AND PRO
GRAM
190 PRINT"4--REVIEW YOUR BETS": PRINT"5--
-CALL TO THE POST": PRINT"ENTER 1 TO 5":
GOSUB1160
200 A=VAL(A$)
210 IFA<1 OR A>5 THEN PRINT"ENTER 1 TO 5
ONLY": GOTO180
220 ON A GOTO 500, 230, 360, 400, 560
225 REM BET ROUTINE
230 CLS: PRINT@64, ""; : FORI=1TOD
240 PRINT"PLAYER #"; I, A$(I): NEXT
250 IFD=1 THEN K=1: GOTO290
260 PRINT"INPUT PLAYER NUMBER (1 TO"; D;
")?": GOSUB1160
270 K=VAL(A$)
280 IF K<1 OR K>D THEN PRINT"ENTER 1 TO
"; D; " ONLY": GOTO260
290 PRINT@32*9, "OK, "; A$(K): PRINT"ENTER
POST POSITION (1 TO 6)": GOSUB1160
300 IP=VAL(A$)
310 IFIP<1ORIP>6 THEN PRINT"ENTER 1 TO 6
ONLY": GOTO290

```

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 5/4" 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

Circle # 15

Contact your local dealer, or order direct -- (415) 524-8098

```

320 PRINT"HOW MUCH DO YOU WISH TO BET
330 INPUT"(BE SURE TO PRESS <ENTER>"); I
BETS(K, IP)
340 ITBETS(IP)=ITBETS(IP)+IBETS(K, IP)
350 GOSUB1170: K=0: CLS: GOTO180
355 REM ODDS & LINEUP ROUTINE
360 CLS: PRINT@70, "TODAY'S LINE UP": PRIN
T
370 PRINT"POSITION, NAME", "RATING
380 FORI=1TO6: PRINTI; B$(I), C$(I): NEXT
390 GOSUB1150: CLS: GOTO180
395 REM BET TOTAL ROUTINE
400 CLS: PRINT@64, ""; : FORI=1TOD: PRINTI; A$
(I): NEXT
410 IFD=1 THEN I=1: GOTO450
420 PRINT"ENTER PLAYER #": GOSUB1160
430 I=VAL(A$)
440 IFI<1 OR I>D THEN 420
450 PRINT"OK, "; A$(I): PRINT"YOUR BET TO
TAL SO FAR IS
460 PRINT"POST POSITION", "AMOUNT BET"
470 FORJ=1TO6: PRINTJ, IBET(I, J): NEXT
480 PRINT
490 GOSUB1150: CLS: GOTO180
500 CLS
505 REM WIN POOL SCREEN
510 PRINT@70, "TOTAL WIN POOL": PRINT
520 PRINT"HORSE #", "TOTAL BET"

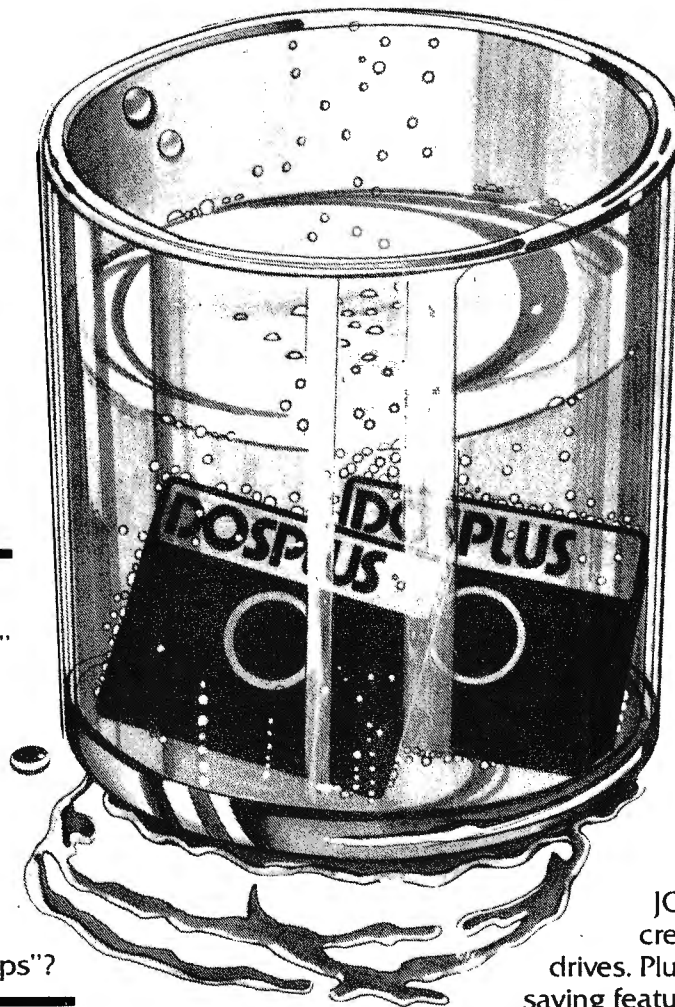
```


Game

```
530 FORJ=1TO6:PRINTJ,
540 PRINT USING"#####";ITBETS(J):NEXT
550 GOSUB1150:CLS:GOTO180
560 GOSUB810
570 GOSUB1200
575 REM START ROUTINE
580 PRINT@260,"CALL TO THE POST";
590 PLAY MU$:PRINT@260,"THE HORSES ARE
";
600 FORI=1TO500:NEXT:PRINT@260,"ENTERIN
G THE STARTING GATE";
610 FORI=1TO999:NEXT:PRINT @260,"THEY'R
E OFF !!!";:FORI=276TO286:PRINTCHR$(128
);:NEXT
615 REM RACE GRAPHICS
620 FORI=1TO500:NEXT:FORI=260TO284:PRIN
T@I,CHR$(128);:NEXT
630 GOTO910
640 FORI=1TO500:NEXT:CLS:PRINT@224,B$(K
);" IS THE WINNER"
650 GOSUB1150
660 IFITBETS(K)=0THENPRINT"NO BETS ON T
HE WINNER":GOTO1240
665 REM PAYOFF ROUTINE
670 B=0:CLS:PRINT@64,"";:FORI=1 TO 6:B=
B+ITBETS(I):NEXTI:J=B/ITBETS(K)
680 PRINTB$(K):PRINT"THE WINNER NUMBER
";K;" PAYS
690 PRINTUSING"$\$####.##";J;:PRINT" FOR
EACH DOLLAR BET
700 FORL=1TO6
710 FORN=1TO6
720 M=M+IBETS(L,N):NEXTN
730 ITBET(L)=(IBETS(L,K)*J)-M
740 IFA$(L)<>" "THENPRINTA$(L); " WON (L
OST)";:PRINT USING"$\$####.##";ITBET(L)
750 M=0
760 NEXTL
770 GOTO1240
780 DATA HOT DOG, LONG SHOT, LADY LUCK,
FAVORITE, HOT SHOT, FAVORITE
790 DATA MAN-O-WAR, MEDIUM, MANFRED, LO
NG SHOT
800 DATA BROKE-DOWN, LONG SHOT
805 REM RACE TRACK PRINT SUBROUTINE
810 CLS(0)
820 FORI=2TO482STEP32
830 PRINT@I,CHR$(133);:NEXT
840 FORI=30TO510STEP32
850 PRINT@I,CHR$(138);:NEXT
860 S$="STARTING":G$="GATE":L$="LINE":F
$="FINISH"
870 PRINT@0,S$;:FORI=8TO29:PRINTCHR$(32
);:NEXT
880 PRINT@480,G$;:FORI=485TO506:PRINTCH
R$(32);:NEXT:PRINTL$;
890 PRINT@24,F$;
900 RETURN
905 REM PRINTS HORSES
910 C$(1)=CHR$(128)+CHR$(142+48)+CHR$(1
41+48)+CHR$(136+48)
920 C$(2)=CHR$(128)+CHR$(142+16)+CHR$(1
41+16)+CHR$(136+16)
930 C$(3)=CHR$(128)+CHR$(142+32)+CHR$(1
41+32)+CHR$(136+32)
940 C$(4)=CHR$(128)+CHR$(142+96)+CHR$(1
41+96)+CHR$(136+96)
950 C$(5)=CHR$(128)+CHR$(142+112)+CHR$(
141+112)+CHR$(136+112)
960 C$(6)=CHR$(128)+CHR$(142+80)+CHR$(1
41+80)+CHR$(136+80)
965 REM SETS INITIAL HORSE POSITION
970 A=96:B=224:C=352:D=160:E=288:F=416
975 REM CHOOSES MOVING HORSE
980 ONRND(6) GOSUB 1080,1090,1100,1110,
1120,1130
985 REM UPDATES HORSE POSITIONS
990 PRINT@A,C$(1);:PRINT@B,C$(2);:PRINT
@C,C$(3);
1000 PRINT@D,C$(4);:PRINT@E,C$(5);:PRIN
T@F,C$(6);
1010 IFA=96+27THENK=1:GOSUB1140
1020 IFB=251THENK=3:GOSUB1140
1030 IFC=379THEN K=5:GOSUB1140
1040 IFD=187THENK=2:GOSUB1140
1050 IFE=315THENK=4:GOSUB1140
1060 IFF=443THENK=6:GOSUB1140
1070 GOTO980
1075 REM SETS NEW SCREEN POSITIONS
1080 A=A+1:RETURN
1090 B=B+1:RETURN
1100 C=C+1:RETURN
1110 D=D+1:RETURN
1120 E=E+1:RETURN
1130 F=F+1:RETURN
1140 GOTO640
1145 REM INKEY$ SUBROUTINE
1150 PRINT@448,"PRESS ANY KEY TO CONTIN
UE
1160 A=0:A$=INKEY$:IFA$=""THEN1160ELSE
SOUND100,1:RETURN
1170 PRINT@448,"ANOTHER BET(Y/N)?
1180 Z$=INKEY$:IFZ$=""THEN1180
1190 IFZ$="Y"THEN230ELSERETURN
1195 REM PRINTS LINEUP BY STARTING GATE
1200 PRINT@36,"LINEUP";:PRINT@100,B$(1)
;:PRINT@228,B$(3);:PRINT@356,B$(5);
1210 PRINT@164,B$(2);:PRINT@292,B$(4);:
PRINT@420,B$(6);
1220 FORI=1TO999:NEXT
1230 FORI=36TO420STEP64:PRINT@I,CHR$(12
8);:FORJ=1TO11:PRINT@I+J,CHR$(128);:NEX
T:NEXT:RETURN
1240 PRINT:PRINT"ANOTHER RACE(Y/N)?
1250 Z$=INKEY$:IFZ$=""THEN1250
1260 IFZ$="N"THENENDELSEL10
```

FOR FAST RELIEF

Take DOSPLUS 3.4



Do you have that tired dragged out feeling known as "DOS Drag" from an operating system that is just **too** slow? Do you have "Computis Interruptous" because you spend more time with your DOS manual than you do at your computer? Has an undependable DOS got you down with the inadvertent "Dumps"?

Then you need DOSPLUS 3.4. DOSPLUS 3.4 contains all the active ingredients for a quick recovery. Dependable fast action features like instant boot-up, BASIC array sort (multi-key, multi-array), Tape/Disk-Disk/Tape utility (with program relocater), Input@ (controlled screen input from BASIC), and complete disk editing features including random access file editing and ASCII modification on sector dump utility.

And who wouldn't feel better with proven features like the ability to use a "DO" (command chaining) file from within a BASIC program, and more reliable BACKUP and FORMAT utilities.

In addition, you have the convenience of repeating the last DOS command with "/" <ENTER>, a single file convert from Model III TRSDOS, file directory supported for Model III TRSDOS disks, complete device routing supported with FORCE and JOIN, and the ability to read or create 40 track disks in 80 track drives. Plus many other time and effort saving features.

Of course, in order for a prescription to work, you've got to follow instructions — in this case the instructions are contained in the new easy to use easy to follow 240 page DOSPLUS users guide with system technical reference section. So, if you're experiencing any DOS related discomfort, get instant relief. **\$149⁹⁵** Get DOSPLUS 3.4

DOSPLUS

First in the Industry backed by a lifetime warranty.



**MICRO SYSTEMS
SOFTWARE, INC.**

5846 Funston Street • Hollywood, FL 33023

(Outside of Fla.)
CALL TOLL FREE
1-800-327-8724

FOR VISA/MASTERCARD/C.O.D. ORDERS
TOLL FREE LINES WILL ACCEPT ORDERS ONLY!
For Applications and Technical information,
call (305) 983-3390 or drop us a card. Dealers inquiries invited.

LDOS

VERSION 5.1
THE TRS-80™ OPERATING SYSTEM
MODEL I AND III

WE ARE NOW NUMBER 1
OUR MASSIVE VOLUME HAS ALLOWED US TO REDUCE OUR
PRICE TO JUST

\$129⁰⁰
REDUCED FROM 169⁰⁰

*New
Low
Price*

**FOR THE POWERFUL
LDOS 5.1 OPERATING SYSTEM.**

**The Ultimate In
Operating Systems
For Model I & III**

- * Model I LDOS provided on 35 track single density media.
 - * Model III LDOS provided on 40 track double density media.
 - * LDOS can be provided on special media configurations at an additional charge.
 - * Prices & Specifications are subject to change without notice.
- † Although not required, LSI recommends two or more drives when using LDOS.

For Further Information Contact The Distributor Or Dealer Nearest You:

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

(Central)
GALACTIC SOFTWARE LTD.
11520 N. Port Washington Rd.
Mequon, WI 53092
(414) 241-8030

(East)
MISOSYS
5904 Edgehill Dr.
Alexandria, VA 22303
(703) 960-2998

(The Common Market)
MOLIMERX LTD.
1 Buckhurst Rd., Bexhill
Sussex, England
(0424)-220391

DEALER INQUIRIES WELCOME. LDOS is a product of LSI. TRS-80 & Radio Shack are trademarks.

**LOGICAL
SYSTEMS
INC.**

Mequon, WI 53092
(414) 241-3066

Almost a joystick

Joysticks without interfacing headaches

Model I

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

One of the things lacking on the TRS-80 Model I, is the ability to use a joystick. While hardly a major deficiency, many programs, especially arcade-style games, are improved immeasurably by joystick input.

There have been several articles written on how to interface joysticks to the TRS-80, and some versions are available commercially. A true joystick consists of a shaft, connected by a linkage, to two potentiometers (variable resistors) in such a manner that they vary in resistance as the shaft is moved to the points of the compass. For every position of the shaft, there is a unique value of the two resistors. Think of it as similar to SET/RESET graphics: for every point on the screen, there is a unique value of X and Y. The computer must convert the values of resistance into X/Y values.

This presents great difficulties in interfacing. The computer is a digital device, but the potentiometers are "analog" devices. That is, their resistance is proportional to the position of the shaft of the joystick. Connecting such joysticks to the computer requires an "analog-to-digital converter" (usually in hardware), and the software to support it. Another problem is that programs must be rewritten to accept input from the joystick. This is not difficult if the program is in BASIC, but what if you have to rewrite the input routines of a machine language pro-

gram? And most of the really good arcade games are in machine language!

In order to get around these problems with interfacing, I present "Almost A Joystick". If a program doesn't use a joystick for input, then it must use the keyboard. In game programs, it is common to find the "arrow" keys used to control the position of something on the screen, and the <SPACE BAR> used to "fire" a missile, ray, torpedo, or whatever. Since the TRS-80 keyboard consists of nothing more than 58 single-pole, single-throw switches, it should be possible to connect a joystick in parallel with the "arrow" keys in such a way that pushing the shaft of the joystick "north" is the same as pressing the up arrow, pushing the shaft "east" is like pressing the right arrow, and so on.

A special kind of joystick is needed for this, though. Pushing the shaft in different directions must close switches, not change the resistance of potentiometers. Such a joystick is available on the market—the Atari™ joystick (available from Computer Age, Inc., 4688 Convoy St., San Diego, CA 92111, two joysticks for \$18.00). Inside its case is a circuit board with five "bubble switches" on it. Four of these are at the points of the compass (N, S, E, W), and close when the shaft is moved. The fifth switch is closed when the "fire" button is pressed.

All that remains is to connect the joystick in parallel with the keyboard.

The TRS-80 keyboard is memory mapped. Each eight characters of the keyboard are assigned to one memory address, one bit for each character. Pressing a key sets (converts to binary "1") one of the eight bits of the byte at that address. Software in the ROM converts the value of the byte at that address to the ASCII code for the key. Fortunately, all of the keys we are interested in are on one row (row six) of the keyboard, so they are all values at the same address, 3840 hex (or 14400 decimal):

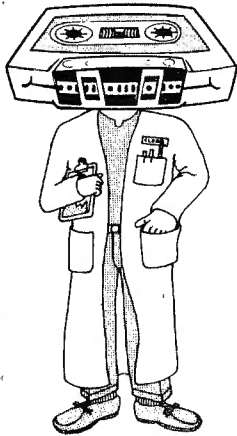
Bit	0	1	2	3	4	5	6	7
Val.	1	2	4	8	16	32	64	128
Key	ENT	CLR	BRK	UP	DN	LT	RT	SPC

Pressing a key will cause its value to be read from memory location 14400. For example, pressing the up arrow will cause "8" to be read. Pressing the space bar will cause "128" to be read, and so on. Pressing two keys at once will cause their sum to be read. The up arrow and the right arrow will cause $8 + 64 = 72$ to be read.

The Atari joystick has a nine pin connector, but only six wires: north (UP) white, south (DN) blue, west (LT) green, east (RT) brown, fire button (SPC) orange, and common—black. The TRS-80 keyboard has four integrated circuits on it: Z1 to

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) . . . \$42 00
6 months (6 issues) . . . \$23 00
Single copies
Back issues . . . \$ 4.50
Good Games #1 . . . \$12 00
Adventures #1 . . . \$13 00

* Temperature and prices rising July 1, 1982

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

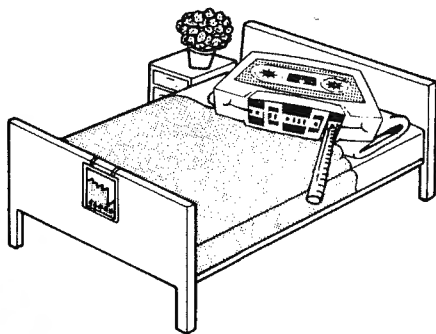
The Fine Print

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!

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

Circle # 18

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 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

Circle # 19

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!

Evaluation

Z4, Z1 and Z2 select the memory address of the keyboard row, and Z3 and Z4 identify the bit which is set (which key of the row has been pressed). Since all of the keys we are interested in are on one row, we only have to solder the common wire (black) to the correct pin of Z1 or Z2, and the colored wires to the correct pins of Z3 and Z4, and the installation is complete.

Unfortunately, Radio Shack has made it difficult. It seems that there are several versions of the keyboard in use. I have one of the keyboards with a single-sided printed circuit board (PCB), the pins to which, I have to connect the joystick wires are not the same as those described in the *TRS-80 Microcomputer Technical Reference Handbook*, page 107 (keyboard schematic). This may have something to do with the use of the double-sided versus single-sided PCBs. I used an ohmmeter to check for continuity (zero ohms resistance) between the key contacts on the PCB and the pin of the integrated circuit before soldering, insuring that the wires were being soldered to the pin connected to the desired key.

key	Wire color (j.stick)	IC pin (mine)	IC pin (schem. in serv. manual)
common	black	Z2 pin 4	Z1 pin 12
UP	white	Z3 pin 15	Z3 pin 6
DN	blue	Z4 pin 15	Z4 pin 10
LT	green	Z3 pin 2	Z4 pin 4
RT	brown	Z4 pin 2	Same
space	orange	Z4 pin 6	Same

Once the wires have been soldered, run the following program:

```
10 CLS:PRINT@448,PEEK(14400):GOTO10
```

Pushing the shaft of the joystick north should give the same value on the screen as pressing the up arrow. Pushing it northeast should give the same value as pressing the up arrow and the right arrow at the same time, and so on. All programs that were controlled by the arrow keys and the space bar will work with the joystick without modification. Since the joystick is in parallel, the arrow keys will still function as usual. ■

SAVE / on Software and Hardware for TRS-80

CHEXTEXT®

Let your TRS-80® do the proofreading on your SCRIPSIT™ text files!

Features of this program include:

- Complete dictionary maintenance including the addition and deletion of words.
- Menu driven for ease of operation.
- Spelling Checker
- FREE expanded dictionaries available, depending on your drive storage capabilities.

NEW LOWER PRICE \$59.95

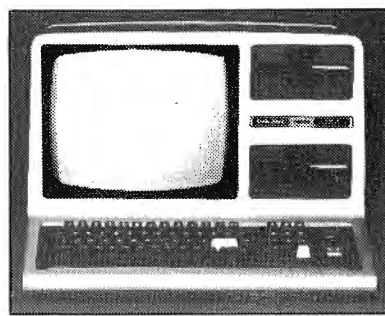
MODEL III PRICE LIST

(All 48K with TANDON drives)

1 single sided 40 track drive	\$1695.00
2 single sided 40 track drives	1895.00
1 dual sided 40 track drive	1820.00
2 dual sided 40 track drives	2145.00
2 single sided 80 track drives	2175.00
2 dual sided 80 track drives	2395.00
with RS-232 C Add	115.00

The above computers include NEWDOS 80 Version 2.0.

NOTE: These Model III computers contain Apparat installed disk drives and memory. They are warranted by Apparat, Inc. for 90 days



MISCELLANEOUS SUPPLIES

DISKETTES

Double density-soft sectored-replacement guaranteed. Spindle/Hub protected (5¼" only)

Verbatim Datalife 5¼" 40 track	\$24.95
Apparat's No Name 5¼" 40 track	\$19.95
Verbatim Datalife 8" model II	\$39.95

PAPER

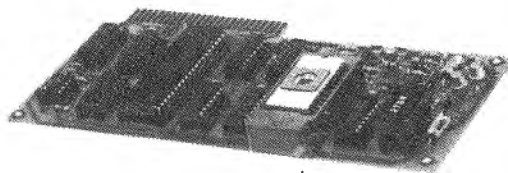
9½"x11" blank white, tractor feed paper, full box 15# or 20#	\$24.95
14½"x11" green bar, tractor feed paper, full box	\$34.95
3½"x15/16" tractor feed mailing labels	\$19.95

OTHER

5¼" plastic library case	\$ 1.95
8" plastic library case	\$ 4.95
5¼" Flip-sort	\$18.95
8" Flip-sort	\$31.95
16K memory kits	\$19.95

APPARAT'S PROM BLASTER

An eprom programmer for all 25 X X and 27 X X chips. TRS-80® MOD I & III \$149.00
 CABLE \$ 17.95
 BUS EXTENDER
 mini version with 2 card slots and no enclosure \$ 69.95



SPECIAL - FREE GRAFTRAX

with EPSON MX-80 Printers

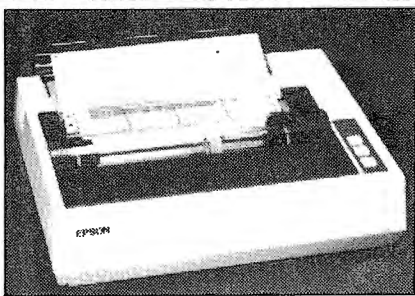
MX-80 \$499.00

MX-80F/T \$575.00
with Graftrax, add \$79.95

MX-100 \$775.00

Printer Cables \$24.00
(Specify Computer Type)

**WE ALSO STOCK OKIDATA & NEC PRINTERS
CALL FOR PRICES**



ASSORTED ITEMS OF INTEREST

MICRO CLINIC, Mod I \$24.95, Mod III \$29.95

The ultimate in memory & disk diagnostics

MEAL MASTER, Mod I & III Disk \$24.95

meal planning & grocery shopping aid

FLEXTXT/80 (requires Graftrax) \$34.95

utilize the additional features of the MX-80 printers under model I & III scripsit

MICRO ACCOUNTING SYSTEM, \$479.00

Interactive G/L, A/R, A/P & checkbook manager

UNI-TERM/80, \$89.00

Universal terminal program that takes advantage of the extended NEWDOS/80 commands

BASIC BETTER & FASTER BOOK, \$23.95

NEW LOWER PRICES ON TANDON DISK DRIVES

Complete with power supply, chassis & configured for TRS-80® Model I or III

- Single sided 40 track **\$285.00**
- Dual 40 or Single 80 track **\$415.00**
- Dual sided 80 track **\$515.00**
- **Special - 2 Dual sided 80's \$999.00**
(ADDS ALMOST 1.5 MEGABYTES OF STORAGE TO A D D. MOD I OR A MOD III)

MODEL I DOUBLE DENSITY PACKAGE

Converts a standard TRS-80 Model I to Double Density.

Apparat Doubler & NEWDOS/80 V 2.0.

\$278.00 value for only **\$219.00**

Doubler alone **\$129.00**



NEWDOS 80 Version 2.0

The most sophisticated DOS ever produced for the TRS-80® Models I and III. It provides the user with "MAINFRAME" power on a "MICRO".

Some Features available are:

- Jobstream Control Language
- Mod I/Mod III Diskette interchangeability
- Double Density Support on Model I
- Pagenation of BASIC listings on the screen
- Basic program single stepping
- Dynamic variable manipulation
- Multiple array sorts with BASIC CMD
- Complete technical support provided

All this plus much more for only

\$149.00

InfoWorld Software Report Card

NEWDOS/80 Version 2.0

	Poor	Fair	Good	Excellent
Performance	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Documentation	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Ease of Use	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Error Handling	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>



Apparat, Inc.

"On-going Support for Microcomputers"

4401 S. Tamarac Pkwy • Denver, CO 80237 • (303) 741-1778 • (800) 525-7674

Scrpsit & TRS 80 are a registered trademark of Tandy Corporation.

Freight F.O.B. Denver call for shipping charges. Foreign Orders shipped Air Freight



MODEL III DISK UPGRADE !!

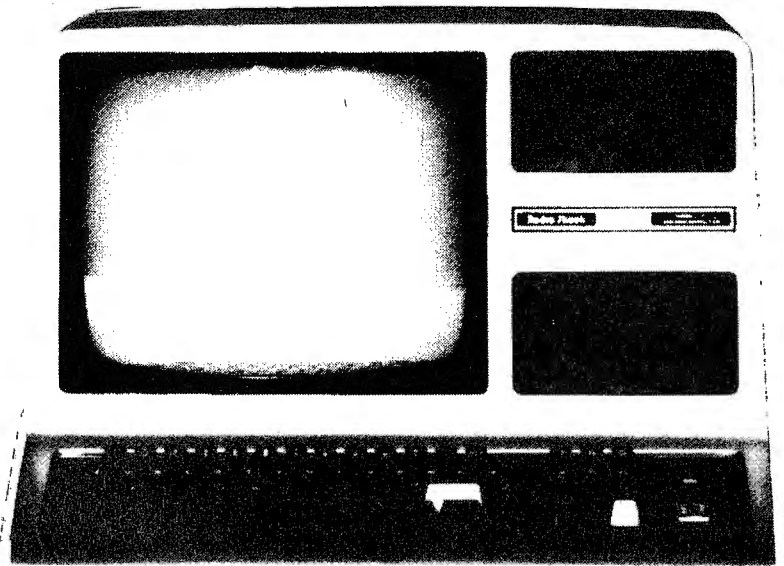
FEATURES:

- 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.

Kit alone \$279.95
 Kit with 2/Tandon 100-1 40 track disk drives
 (Same as R/S) and 32K 150ns (FAST) RAM
 Memory \$649.95

DosPlus 3.4 III Operation System \$99.95
 NewDos/80 Ver 2.0 III Oper Sys . \$99.95

** Regularly 149.95 - This price with Kit
 purchase only. 1 per order!!



Put disk drive into your TRS-80 Model III. Easy to install and lower in cost than other kits.
 Compare our features with others and the choice is clear.

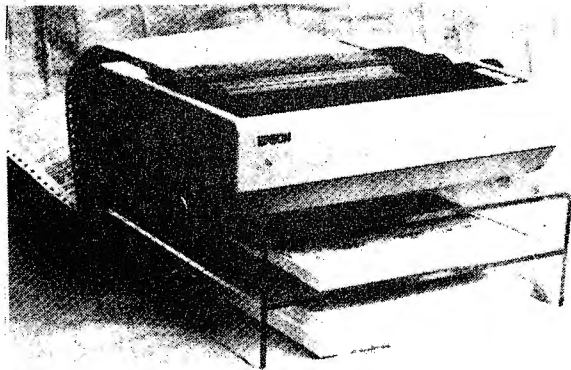


171 Hawkins Rd.
 Centereach, N.Y. 11720
 (516) 981-8568 (voice)
 (516) 588-5836 (modem)



Dealer Inquiries Welcome
 N.Y.S. Residents Add Tax
 Add \$2 shipping - handling
 Prices subject to change

WELCOME



PRINTER STAND

End the paper mess from your desk-top printer. Paper is fed from under the printer to allow easy stacking behind the printer of the printer output. Extra Shelf (SHOWN ABOVE) is available for easy forms change. Large Stand is available with slot cut for bottom feed printers (Anadex, etc). Available without shelf only.

Regular	(300010)	\$29.95
Regular w/shelf	(300011)	\$44.95
Large	(300020)	\$34.95
Large w/shelf	(300021)	\$49.95
Large w/slot	(300050)	\$49.95

EPSON RIBBON RELOADS

Reload your MX 70/80/100 cartridges with new Black, Red, or Blue ribbon. Just load these silver dollar loops into your old cartridge and save! Buy 12 and save even more! Complete instructions.

Black .. (500000) ... \$3.95 ea.	Black . (500001) ... \$39.50 dz.
Red (500010) ... \$4.95 ea.	Red ... (500011) ... \$49.95 dz.
Blue (500020) ... \$4.95 ea.	Blue... (500021) ... \$49.95 dz.

MX 70/80 CARTRIDGES

MX 70/80 Ribbon Cartridge ... Black (500050)	\$10.95 ea.
MX 70/80 Ribbon Cartridge ... Red . (500060)	\$11.95 ea.
MX 70/80 Ribbon Cartridge ... Blue . (500070)	\$11.95 ea.
MX 70/80 Ribbon Cartridge ... Black (500051) ... 3 pack	\$29.95 pk.
MX 70/80 Ribbon Cartridge ... Red . (500061) ... 3 pack	\$31.95 pk.
MX 70/80 Ribbon Cartridge ... Blue . (500071) ... 3 pack	\$31.95 pk.

DISKETTES

Elephant Memories Systems Diskettes at a special LOW price !!!

Single Density/Single Sided /Soft Sector	500351	\$22.50
Double Density/Single Sided/Soft Sector	500352	\$26.50
Double Density/Double Sided/Soft Sector	500353	\$32.50

PORTABLE DISK BULK ERASER

Clean all old data off of your diskettes before reusing them! This is a MUST for your computer room. Easy to use. non-electric, portable!!!
 500102 Only ... \$4.95

Circle # 59

LDOS for beginners

Part I: Device independence, ROUTE, and LINK commands

Model I/III with disk

T. A. Daneliuk, Chicago, IL

Introduction

With the advent of the LDOS operating system for the TRS-80 Models I and III, a whole new world of sophisticated systems software has been opened to the computer user. There are, of course, other "advanced" operating systems for these machines, but not one of these competing products offers the diversity of hardware support, breadth of features, and ease of use in one package as does LDOS.

It is not my purpose here to start another endless debate on the merits of one DOS versus another (otherwise known as DOSWARS!). It is also not my purpose to do a product review of LDOS. This has already been done in the pages of many magazines by various authors, including myself. Rather, my purpose is to discuss some of the highlights of the LDOS system. In particular, I'd like to stress the main philosophy and concepts of LDOS, because they are such a radical departure in the field of microcomputer operating systems. In other words, this is not a rehash of the LDOS manual, but rather an attempt to understand *why* the system is constructed the way it is.

When I started to write this article I had intended to cover much more

of the LDOS system than I actually ended up doing. It is simply impossible to cover in-depth, a system with as many facets as LDOS. Instead, I've tried to hit the real high points, and give you a flavor of what can be done once you learn to use the system.

A DOS overview

If you are new to the world of disk operation, the terminology and "buzz words" can be confusing. To understand the value of a package like LDOS it is important to have a good grasp of just what a disk operating system (DOS) is supposed to do.

We should first understand the notions of "devices" and "files" and how they differ. A device typically refers to one of the hardware peripherals like a keyboard or printer. Files (or "data sets") on the other hand, are collections of data arranged in some logical fashion. These collections are stored on the disks and given "filespecs" or names. A file could consist of pure data (like a mailing list), or it could be a program. The point is, that normally, devices and files are completely separate entities. As we shall shortly see, however, LDOS has the unique ability to

interchange devices and files.

In its simplest form, a DOS is responsible for controlling and communicating with the disk memory systems attached to the computer. These may be five-inch or eight-inch floppy disks, or the newer sealed hard disk systems. The DOS is in charge of allocating space for each file and keeping track of where on the disk each file is kept. It is also given the task of "file maintenance". This includes showing the user a directory of all available files, eliminating unwanted files and making archival copies of all important files.

Normally, a DOS is also given charge of controlling all the other peripheral devices. These include the keyboard, the video screen, the line printer and the RS-232 serial ports. The exact reason why this is done will become clear in the following section, but for the moment it is important simply to realize that the DOS controls all input and output (I/O) between the computer and its associated peripherals. The DOS is also usually responsible for managing the memory inside the computer, by determining where programs are to load and if certain memory areas are "protected" from having new data written in them. The programs

**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 Forth: 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)

mmsFORTH

**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 upgrade 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) ... \$69.95*

MMSFORTH GAMES DISKETTE: real-time graphics & board games w/source code. Includes BREAKFORTH, CRASHFORTH, CRYPTQUOTE, 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. ... \$15.95*

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 SH 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

Circle # 22

Tutorial

which control or "drive" the peripherals are called "Peripheral Drivers". The various commands which the user may use in the DOS comprise the "DOS Library". Also, there are certain specialty programs supplied with a DOS which simplify the chores associated with using disks. These are called "Utilities" and typical examples are the FORMAT and BACKUP programs which all good DOS (and most bad DOS!) systems have. Notice that FORMAT and BACKUP are not part of the DOS library, but are actually separate programs. You can prove this to yourself by doing a disk directory of all files (including the invisible ones). While you won't see a separate file named DIR or LIST which are DOS library commands, you will see the files called BACKUP and FORMAT.

Since the TRS-80 computers were designed to be able to work without disks attached, many of the driver programs are already incorporated into the TRS-80 ROM (Read Only Memory). When disks and a DOS are used, the DOS may use the existing drivers in the ROM, or it may have its own special drivers to control peripheral operation. It is also important to realize that at any given time the entire DOS is not resident in the computer memory. Only the bare necessities of the DOS are permanently loaded into the computer to conserve memory usage. Thereafter, when a DOS command is issued, the appropriate part of the DOS is loaded from the master or "system" disk for that one command. This technique is called "Overlaying".

It is not difficult to see that a well-written DOS is the key to using a computer efficiently. It will allow the user maximum control of the peripheral devices without requiring a Ph.D. in computer science to understand the commands!

LDOS and device independence

As I suggested earlier, LDOS is very flexible in its treatment of devices and files. It sees them as being entirely interchangeable (with a few limitations). To be sure, the system has special drivers written for each specific piece of hardware,

but these drivers all share a common heritage which makes device/file interchange very simple.

What exactly does "device independence" mean? In its purest form, device independence permits any device (i.e., a peripheral) to take the place of any other device as a source or destination of data. Moreover, a truly device independent system will allow the user to substitute a data set (i.e., a file) for a device as a source or destination of data. LDOS very nearly meets these criteria completely.

Some restrictions were imposed on the Model III because of a change Tandy made in the new ROM, but for all practical purposes, LDOS is fully device independent. In case you are wondering who came up with this great concept, it has its roots in an operating system called UNIX. UNIX was written some time ago at Bell Laboratories to run on Digital Equipment Corporation minicomputers. It is therefore most impressive to see this concept successfully implemented on a microcomputer like the TRS-80.

LDOS gives the user control of its devices with two commands. The ROUTE command simply changes the source to one of the other peripherals. For example, normally the LPRINT command in BASIC sends its data to the line printer. Using the LDOS ROUTE, you could tell the system to send everything intended for the printer to the video screen. From then on, all LPRINT statements would result in data being displayed on the video screen *instead* of the printer. Notice that *any* device in the system (capable of some kind of output) could have been the new destination for the LPRINT statement. For example, we could have LPRINTed to the serial port. Notice also, that the device had to be capable of output. It wouldn't make much sense to try and LPRINT to the keyboard!

Another fascinating possibility with ROUTE is to substitute a file in place of a device. We could, for example, ROUTE all printer data to a file by the name of PRINTER/DAT.PASSWORD:1. Each LPRINT statement after that would store the data normally printed into a disk file instead. Do you want a practical

example? Ok, how about this: you're doing a long complicated computation in BASIC, and the program is written to print the results on the screen. You would like to keep a permanent copy of the results because computations take four hours each (also you can't use the printer because it took you until midnight to debug the program and the cat is asleep already!). Rather than rewrite the program, you simply ROUTE the screen to a disk file, and thereby permanently save the data.

A similar command to ROUTE is LINK. The difference between them is that, while ROUTE provides a new destination for data, LINK simply adds additional destinations. In our midnight example earlier, we might want to send the data to a disk file, the video screen, and the printer (the cat sleeps too much anyway). By LINKing the two devices and the file together the data would be sent to the multiple destinations. LINK can also be used to create multiple sources of data. I have used this command to force the system to recognize two different keyboards, one in the computer and one via the RS-232 port. Oh, by the way, the keyboard on the serial port was in another part of town and was communicating to me through a modem! Presto — instant remote data entry without a "host" program. One last example really shows off the versatility of LDOS. Since devices and files are interchangeable in the system, certain commands can be made to do unusual things. Instead of LISTing a file, try COPY FILENAME/EXT TO *DO (*DO is the video screen). Another useful application would be to send a file directly to the serial port (device *CL) by keying in COPY FILENAME/EXT to *CL.

All the possibilities of device independence cannot really be dealt with in depth here. Suffice it to say that the system is capable of doing much more than you will be able to dream up for it! ■

Part two of this article, covering file handling and the job control language, will appear in the next issue. — Ed.

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.



CompuSoft® Publishing

1050-E Pioneer Way, Dept. G, El Cajon, CA 92020

Circle # 23

*TRS-80 is a registered trademark of the Tandy Corporation.

Play ball!

Model I/III

Larry Kregel, Elmhurst, IL

Batter up! It's that time of the year again... but, of all things, a baseball strike. How disturbing to have a warm summer afternoon, an easy chair and a can of beer, but no baseball game on TV.

Well, that's where I can help. Or, should I say, Tom, my TRS-80, can help. We treat him like one of the family. The only thing is, he gets a special diet. He eats electricity instead of hamburgers.

One Sunday afternoon last winter, even before spring training started, I became tired of watching basketball. I have never developed a taste for TV basketball. My 10-year old daughter and I were talking about the absence of baseball. That was all it took.

Suddenly, a program began to take form. The three of us (my daughter, Tom and I) began working on a program. The result of our collaboration was rather amusing. We played for most of the afternoon and produced enough game boards that both of my daughters could take them to school the next day.

Once again, in the wake of a baseball strike, there is an absence of baseball, and we have resurrected the program. Here it is. We are happy to share it with you.

The computer's role in developing the game is twofold. It produces continuous variations on a matrix which is used to determine if a "pitch" is a ball (B), strike (S), hit (H) or an out (O). It also prints out the game sheets. One is required for each player in a game.

Each game is one inning long. Each player is allowed either three outs or nine batters, whichever comes first.

The player that is at bat selects a coordinate on his "call matrix" (A1 to I9). He marks it off as he announces his choice to his opponent. His opponent then looks on his "pitch matrix." There, he sees the B, S, H or O, which tells the results of that call.

A player keeps track of the number of balls and strikes for each batter and the number of outs and men who get on base.

At the end of the game, all players convert the number of men who reached base safely to runs, by means of a chart provided by the computer.

If it sounds simple, you're right. A game takes about five minutes.

In teaching Tom to print out the game sheets, we have arranged for him to print as many as we request. He even calls us when he is done (CHR\$(7))!

OK! Let's... play ball!

Sample Game Sheet for Baseball

PITCH MATRIX										CALL MATRIX									
	A	B	C	D	E	F	G	H	I		A	B	C	D	E	F	G	H	I
1	S	B	B	S	O	B	B	B	S	1	.....	.....	.....	.....	.....	.....	.....	.....	.....
2	H	B	B	B	S	B	O	B	B	2	.....	.....	.....	.....	.....	.....	.....	.....	.....
3	S	S	S	H	B	S	B	S	B	3	.....	.....	.....	.....	.....	.....	.....	.....	.....
4	B	B	B	S	S	S	S	S	S	4	.....	.....	.....	.....	.....	.....	.....	.....	.....
5	S	S	S	B	S	B	B	H	H	5	.....	.....	.....	.....	.....	.....	.....	.....	.....
6	B	H	S	B	S	H	S	S	S	6	.....	.....	.....	.....	.....	.....	.....	.....	.....
7	B	S	S	S	S	S	S	H	O	7	.....	.....	.....	.....	.....	.....	.....	.....	.....
8	B	B	B	B	S	B	B	B	S	8	.....	.....	.....	.....	.....	.....	.....	.....	.....
9	S	H	B	B	B	S	B	H	B	9	.....	.....	.....	.....	.....	.....	.....	.....	.....

SCORE CHART				
BATTER	BALLS	STRIKES	OUT	HIT/WALK
1	B B B B	S S S	O	H
2	B B B B	S S S	O	H
3	B B B B	S S S	O	H
4	B B B B	S S S	O	H
5	B B B B	S S S	O	H
6	B B B B	S S S	O	H
7	B B B B	S S S	O	H
8	B B B B	S S S	O	H
9	B B B B	S S S	O	H

RUN CHART	
<3 HITS OR WALKS = 0 RUNS	6 HITS OR WALKS = 4 RUNS
3 HITS OR WALKS = 1 RUN	7 HITS OR WALKS = 5 RUNS
4 HITS OR WALKS = 2 RUNS	8 HITS OR WALKS = 6 RUNS
5 HITS OR WALKS = 3 RUNS	9 HITS OR WALKS = 7 RUNS

Program Listing for Baseball

```

20 REM *****
30 REM *   BASEBALL   *
40 REM * BY LARRY KRENGEL *
50 REM *****
100 DIM D$(81),M$(9,9)
110 CLS:PRINTTAB(15)"BASEBALL GAME"
120 PRINT:PRINT:INPUT"HOW MANY GAME SHEETS WOULD YOU LIKE";HM
200 GOSUB 2000
210 RANDOM
    
```


Baseball game

```
220 N=81:A=1:B=1
300 FOR X=1 TO 81
310 Y=RND(N)
320 C=0
330 FOR Z=1 TO 81
340 IF D$(Z) <>"" THEN C=C+1
350 IF C=Y THEN GOTO 400
360 NEXT Z
400 M$(A,B)=D$(Z)
410 A=A+1
420 IF A=10:A=1:B=B+1
430 IF B=10 THEN GOTO 500
440 N=N-1
450 D$(Z)=""
460 NEXT X
500 LPRINTTAB(15)CHR$(14)"BASEBALL"
L"
510 LPRINTCHR$(10)CHR$(10)
515 LPRINTTAB(11)"PITCH MATRIX";TAB(47)
"CALL MATRIX";CHR$(10)
520 LPRINT"      A B C D E F G H
I";TAB(41)"A B C D E F G H
I";CHR$(10)
530 FOR X=1 TO 9
535 LPRINTX;" ";
540 FOR Y=1 TO 9
550 LPRINTM$(X,Y);" ";
560 NEXT Y
565 LPRINTTAB(35)X;" ";".:.....
.:.....";CHR$(13)
570 NEXT X
600 LPRINTCHR$(10)CHR$(10)CHR$(14)TAB(1
1)"SCORE CHART";CHR$(10)
610 LPRINT"BATTER          BALLS
STRIKES          OUT          HIT/WALK"
620 FOR X=1 TO 9
630 LPRINT" ";X;"          B B B B
S S S          O          H"
640 NEXT
650 LPRINTCHR$(10)CHR$(14)TAB(10)"RUN C
HART"
660 LPRINT" <3 HITS OR WALKS = 0 RUNS
6 HITS OR WALKS = 4 RUNS"
670 LPRINT" 3 HITS OR WALKS = 1 RUN
7 HITS OR WALKS = 5 RUNS"
680 LPRINT" 4 HITS OR WALKS = 2 RUNS
8 HITS OR WALKS = 6 RUNS"
690 LPRINT" 5 HITS OR WALKS = 3 RUNS
9 HITS OR WALKS = 7 RUNS"
710 HM=HM-1
720 IF HM=0 THEN PRINT"THAT'S ALL FOLKS
I":LPRINTCHR$(12)CHR$(7)CHR$(7):END
730 LPRINTCHR$(12):GOTO 200
2000 FOR X=1 TO 34:D$(X)="S":NEXT
2010 FOR X=35 TO 69:D$(X)="B":NEXT
2020 FOR X=70 TO 78:D$(X)="H":NEXT
2030 FOR X=79 TO 81:D$(X)="O":NEXT
2040 RETURN
```

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



CA add 6 /



ALGORIX

Allen Gelder Software

(415) 387-3131

Circle # 24

Box 11721 San Francisco CA 94101

TRS-80* Computer Owners...

GREATER VALUES

New Low Prices for Percom Model III Disk Drives!



Complete First-Drive Systems

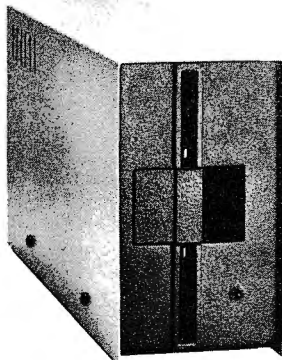
from **\$449**

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!

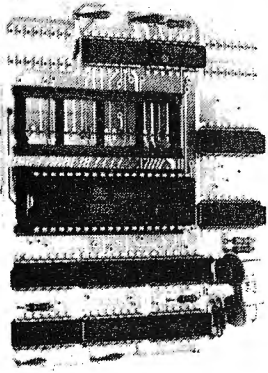
Percom Data Separator	\$23.95
Green Screen I, II, or III	\$18.95
Head Cleaning Kit	\$24.95
Drive Numbering Tabs (pkg 0-3)	\$4.50
5 1/4" Flip-N-File	\$24.95
8" Flip-N-File	\$39.95

Circle # 25

— LOWER PRICES

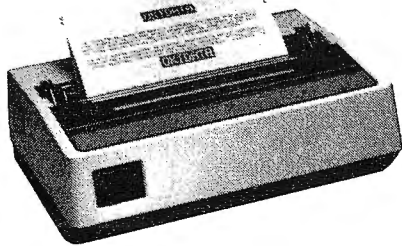
Percom's Proven DOUBLER II†

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†*. The DOUBLER II† 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††, Percom OS-80† 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‡

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.

‡ 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

™Trademark of Access Unlimited
†Trademark of Percom Data Company, Inc.

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

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

Robot math

Plus and minus math for K-4

Model I with or without voice synthesizer
 Model III without voice synthesizer

Jeffrey C. Ruble, Port Angeles, WA

When my son Peter entered first grade, I decided to write some programs for our TRS-80 that he could use for drill work in math skills. Since first graders are just beginning to read, I felt that it was important to keep the amount of reading required of the child to a minimum. To help in this, I made use of Radio Shack's voice synthesizer (RSC#: 26-1180). My efforts yielded a program I have called Robot Math.

Robot Math features a talking robot who presents the student with a choice of five addition problems or five subtraction problems. Once the choice is made, the problems are presented by the robot, who nods his head if the answer is correct, and shakes his head if the answer is incorrect. The student is given two tries as the correct answer. The correct solution is given if the student fails on the second try.

What sets this drill program apart from others is the use of animation and voice. For example, if the student takes too long to respond to a question, the robot will begin to tap his foot impatiently. If the student gets a perfect score, he/she will be treated to a rocket blastoff with voiced countdown.

The program was "field tested" for two hours in a first grade class containing 30 kids. It, and the TRS-80, performed flawlessly, without the slightest adult intervention. I considered that a very rigorous test! Whenever I see one of those 30 kids, they usually ask me when I plan to bring Robot Math back to class. It evidently made quite a hit.

Robot Math will work on both Model I and III. While the voice synthesizer adds considerably to the program, it is optional. The number of questions asked, the number of tries at the correct answer, and the level of difficulty, can all be changed in lines 1140 to 1170. In addition, the data statements already contain the necessary phonemes, etc., to handle questions in multiplication and/or division.

Program Listing for Robot Math

```
1000 *****
1010 '*      R O B O T M A T H      *
1020 '*                                          *
```

```
1030 '* AN EARLY CHILDHOOD MATH *
1040 '*      DRILL PROGRAM      *
1050 '*      FOR TRS-80      *
1060 '*      WITH VOICE      *
1070 '*      SYNTHESIZER (OPTIONAL) *
1080 '*                                          *
1090 '*      AUTHOR: JEFF RUBLE *
1100 '*      PORT ANGELES, WA. *
1110 '*****
1120 '
1130 CLS: CLEAR 1000
1140 XP=5: '      NUMBER OF PROBLEMS
1150 MB=9: MA=0: '      MB, MA = MAX, MIN
      FOR PROBLEM FACTORS
1160 MS=12: '      MAX ANSWER FOR ADDITION
      PROBLEMS
1170 MT=2: '      MAX NUMBER OF TRY'S ALLO
      WED ON EACH PROBLEM
1180 '
1190 GOSUB 2370
1200 '
1210 '      MAIN PROGRAM
1220 '
1230 IM=0: CLS: PRINT CHR$(23)
1240 FOR I=32 TO 77: SET(I,1): SET(I,6): NEXT
      : '      DRAW BOX AND TITLE
1250 FOR I=2 TO 5: SET(32, I): SET(77, I): NEXT

1260 WP=82: W$="ROBOT MATH": GOSUB 2780: I
      FPEEK(293)=73 THEN 1270 ELSE VO$=WV$(7):
      GOSUB 2840: TL=600: GOSUB 2720
1270 P=296: PRINT@P, HD$(1);: PRINT@P+64, N
      K$(1);: PRINT@P+128, AR$(1);: PRINT@P+19
      2, LG$(1);: PRINT@P+256, FT$(1);: '      DRAW
      ROBOT
1280 TL=600: GOSUB 2720: WP=P+322: W$="HEL
      LO": GOSUB 2780: VO$=WV$(1): GOSUB 2840:
      TL=600: GOSUB 2720
1290 TL=100: FOR I=1 TO 2: PRINT@P+128, AR$(3
      );: GOSUB 2720: PRINT@P+128, AR$(1);: GOS
      UB 2720: NEXT: '      WAVES ARMS
```



```

1300 '
1310 TL=600:GOSUB2720 :PRINT@P,HD$(2);:
  PRINT@P+128,AR$(2);:' PRESENT MENU
1320 PRINT@P+322,"      ";WP=324:W$="PR
  ESS":GOSUB2780 :VO$=WV$(8):GOSUB2840
  :WP=390:W$="1 FOR <+>":GOSUB2780 :VO$
  =NV$(1)+" "+NV$(4)+" "+OV$(1):GOSUB28
  40 :WP=454:W$="2 FOR <->":GOSUB2780
  :VO$=NV$(2)+" "+NV$(4)+" "+OV$(2):GOS
  UB2840
1330 '
1340 K$=INKEY$:TL=20:' INPUT CHOICE
1350 OP$=INKEY$:PRINT@P+256,FT$(2);:PRI
  NT@P+192,LG$(2);:GOSUB2720
1360 IM=IM+1:IFIM=500THEN1210
1370 PRINT@P+256,FT$(1);:PRINT@P+192,LG
  $(1);:GOSUB2720 :IFOP$=""THEN1350
1380 OP=VAL(OP$):FORI=0TO2:PRINT@320+64
  *I,BL$;:NEXT
1390 PRINT@P,HD$(1);:PRINT@P+128,AR$(1)
  ;:TL=600:GOSUB2720
1400 IF (OP=1) OR (OP=2) THEN1430
1410 PRINT@P-58,"?";:PRINT@P+64,NK$(2);
  :PRINT@P+128,AR$(4);:TL=200:GOSUB2720
  :PRINT@P-58," ";:PRINT@P+64,NK$(1);:
  PRINT@P+128,AR$(1);:GOTO1310
1420 '
1430 GOSUB1490
1440 GOSUB1710
1450 GOTO1210
1460 '
1470 '          END MAIN PROGRAM
1480 '
1490 '          PROBLEM GENERATION
1500 '
1510 RANDOM:WP=388:W$="1 SECOND PLEASE"
  :GOSUB2780 :VO$=NV$(1)+" "+WV$(5)+" "
  +WV$(6):GOSUB2840
1520 F1(1)=INT(5*RND(0)):F2(1)=INT(5*RN
  D(0))
1530 IF(OP=2)AND(F1(1)<F2(1))THEN1520
1540 P$(1)="#+STR$(1)+" "+STR$(F1(1)
  )+OP$(OP)+STR$(F2(1))+" =":IF(OP=1)TH
  ENA(1)=F1(1)+F2(1)ELSEA(1)=F1(1)-F2(1
  )
1550 FORI=2TOXP
1560 PRINT@P+256,FT$(2);:PRINT@P+192,LG
  $(2);
1570 F1(I)=INT((MB-MA+1)*RND(0))+MA:F2(
  I)=INT((MB-MA+1)*RND(0))+MA:' GENE
  RATE FACTORS
1580 IF(OP=1)AND(F1(I)+F2(I)>MS)THEN157
  0
1590 IF(OP=2)AND(F1(I)<F2(I))THEN1570
1600 P$(I)="#+STR$(I)+" "+STR$(F1(I)
  )+OP$(OP)+STR$(F2(I))+" ="
1610 FORJ=1TOI-1
1620 IFP$(J)=P$(I)THEN1570
1630 PRINT@P+256,FT$(1);:PRINT@P+192,LG
  $(1);
1640 NEXTJ
1650 IF(OP=1)THENA(I)=F1(I)+F2(I)ELSEA(
  I)=F1(I)-F2(I)
1660 NEXTI
1670 PRINT@384,BL$;
1680 '
1690 RETURN:' END PROBLEM GENERATION
1700 '
1710 '          TESTING ROUTINE
1720 '
1730 WP=704:W$="# RIGHT":GOSUB2780 :NR
  =0:NR$="":WP=832:W$="# WRONG":GOSUB2
  780 :NW=0:NW$=""
1740 FORI=1TOXP
1750 TR=1:' TR=NUMBER OF TRY5
1760 CU=384+2*LEN(P$(I))+1:IFCU<>2*INT(
  CU/2)THENCU=CU+1:' CUR
1770 PRINT@384,BL$;:PRINT@P,HD$(2);:PRI
  NT@P+128,AR$(2);:WP=384:W$=P$(I):GOSU
  B2780 :' PRESENT PROBLEM
1780 IFPEEK(293)=73THEN1800 :' TEST F
  OR MOD III
1790 VO$=WV$(2):GOSUB2840 :VO$=NV$(I):G
  OSUB2840 :VO$=WV$(3)+" "+WV$(4):GOSUB
  2840 :VO$=NV$(F1(I)):GOSUB2840 :VO$=O
  V$(OP):GOSUB2840 :VO$=NV$(F2(I)):GOSU
  B2840
1800 CT=0:AS$="":AL$=INKEY$:' CT=COUNT,
  AS$=ANSWER STRING
1810 CT=CT+1:PRINT@CU,"?";:TL=20:GOSUB2
  720 :IFCT>100THEN1840
1820 A$=INKEY$:PRINT@CU," ";:GOSUB2720
  :IFA$=""THEN1810
1830 GOTO1860
1840 CT=CT+1:PRINT@CU,"?";:TL=18:PRINT@
  P+192,LG$(2);:PRINT@P+256,FT$(2);:GOS
  UB2720 :IFCT>200THENNW=NW+1:NW$=NW$+C
  HR$(138):PRINT@848,NW$;:GOTO1930
1850 A$=INKEY$:PRINT@CU," ";:PRINT@P+19
  2,LG$(1);:PRINT@P+256,FT$(1);:GOSUB27
  20 :IFA$=""THEN1840
1860 PRINT@CU,"";:AS$=AS$+A$:IFASC(A$)=
  13THEN1900
1870 PRINTA$;
1880 A$=INKEY$:CT=CT+1:IFA$=""THEN1880
1890 IFASC(A$)<>13THENPRINTA$;:AS$=AS$+
  A$:IFLEN(AS$)<3THEN1880
1900 A=VAL(AS$):GOSUB2090
1910 IFA=A(I)THEN1970
1920 TR=TR+1:IFTR<MT+1THEN1770
1930 PRINT@P+192,LG$(1);:PRINT@P+256,FT
  $(1);:PRINT@384,BL$;:WP=384:W$=P$(I):
  GOSUB2780 :PRINTA(I);:TL=500:GOSUB272
  0

```

Math game

```

1940 TL=200:FORJ=1TO3:PRINT@384,BL$:;GO
SUB2720 :PRINT@384,P$(I);:PRINTA(I);:
GOSUB2720 :NEXT
1950 IFPEEK(293)=73THEN1970 :' CHECK
FOR MOD III
1960 VO$=NV$(F1(I)):GOSUB2840 :VO$=OV$(
OP):GOSUB2840 :VO$=NV$(F2(I)):GOSUB28
40 :VO$=WV$(4):GOSUB2840 :VO$=NV$(A(I
)):GOSUB2840 :TL=1500:GOSUB2720
1970 PRINT@P,HD$(2);:PRINT@P+128,AR$(2)
;:IFPEEK(293)=73THEN TL=200ELSE TL=1000

1980 GOSUB2720
1990 TL=20:FORJ=0TO5:PRINT@P+126,"*";:G
OSUB2720 :PRINT@P+126," ";:GOSUB2720
:NEXT
2000 FORJ=P+127TO384STEP-1:PRINT@J,"*";
:NEXT:' RAYGUN
2010 FORJ=P+127TO384STEP-1:PRINT@J," ";
:NEXT
2020 TL=200:GOSUB2720 :PRINT@P,HD$(1);:
PRINT@P+128,AR$(1);:GOSUB2720
2030 NEXTI
2040 IFNR=XPIHENGOSUB2220
2050 TL=500:GOSUB2720
2060 '
2070 RETURN:' END TESTING ROUTINE
2080 '
2090 ' RESPONSE
2100 '
2110 PRINT@P+128,AR$(1);:PRINT@P,HD$(1)
;

2120 IFA=A(I)THEN2160
2130 TL=75:FORJ=1TO3:GOSUB2720 :PRINT@P
,HD$(2);:GOSUB2720 :PRINT@P,HD$(1);:G
OSUB2720 :PRINT@P,HD$(3);:GOSUB2720 :
PRINT@P,HD$(1);:NEXT
2140 WP=P+322:Q=RND(4):W$=ES$(Q):GOSUB2
780 :VO$=EV$(Q):GOSUB2840 :IFTR=2THEN
NW=NW+1:NW$=NW$+CHR$(138):PRINT@848,N
W$;
2150 TL=1000:GOSUB2720 :GOTO2180
2160 TL=75:FORJ=1TO3:GOSUB2720 :PRINT@P
,HD$(4);:GOSUB2720 :PRINT@P,HD$(1);:N
EXT
2170 WP=P+322:Q=RND(6):W$=PS$(Q):GOSUB2
780 :VO$=PV$(Q):GOSUB2840 :NR=NR+1:NR
$=NR$+CHR$(138):PRINT@720,NR$;:TL=100
0:GOSUB2720

2180 W$="" :GOSUB2780
2190 '
2200 RETURN:' END RESPONSE ROUTINE
2210 '
2220 ' ROCKET
2230 '
2240 CLS:PRINTCHR$(23)

2250 FORJ=29TO41:SET(60,J):SET(68,J):NE
XT
2260 FORJ=56TO72:SET(J,41):NEXT
2270 PRINT@864,CHR$(181);
2280 SET(57,39):SET(56,40):SET(53,41):S
ET(69,39):SET(72,40):SET(73,41)
2290 SET(64,27):SET(61,28):SET(65,28)
2300 TL=10000:FORJ=10TO0STEP-1:PRINT@12
8+(10-J)*64,J;:VO$=NV$(J):GOSUB2840 :
GOSUB2720 :NEXT:PRINT@832,"BLASTOFF!!
";:VO$="BL99SST 21FF":GOSUB2840 :GOSU
B2720
2310 FORJ=10TO-1STEP-1:PRINT@128+(10-J)
*64," ";:NEXT
2320 TL=50:FORJ=1TO16:PRINT@928,CHR$(13
2):PRINT:GOSUB2720 :NEXT
2330 CLS:TL=1000:GOSUB2720
2340 '
2350 RETURN:' END ROCKET
2360 '
2370 ' PROGRAM DATA INPUT
2380 '
2390 ' ROBOT BODY PARTS
2400 HD$(1)=" "+CHR$(136)+CHR$(183)+CHR
$(191)+CHR$(187)+CHR$(132)+" ":' HEAD
LOOKING STRAIGHT
2410 HD$(2)=" "+CHR$(187)+CHR$(187)+CH
R$(191)+" ":' HEAD LOOKING LEFT
2420 HD$(3)=" "+CHR$(191)+CHR$(183)+CH
R$(183)+" ":' HEAD LOOKING RIGHT
2430 HD$(4)=" "+CHR$(160)+CHR$(159)+CHR
$(191)+CHR$(175)+CHR$(144)+" ":' HEAD
LOKING DOWN
2440 NK$(1)=" "+CHR$(179)+CHR$(191)+CH
R$(179)+" ":' NECK
2450 NK$(2)=" "+CHR$(160)+CHR$(179)+CHR
$(191)+CHR$(179)+CHR$(144)+" ":' SHRU
GGED SHOULDERS
2460 AR$(1)=" "+CHR$(150)+CHR$(191)+CHR
$(191)+CHR$(191)+CHR$(169)+" ":' ARMS
AT SIDE
2470 AR$(2)=CHR$(131)+CHR$(131)+CHR$(19
1)+CHR$(191)+CHR$(191)+CHR$(153)+" ":'
OUTSTRETCHED ARM
2480 AR$(3)=CHR$(131)+CHR$(131)+CHR$(19
1)+CHR$(191)+CHR$(191)+CHR$(131)+CHR$(
131)
2490 AR$(4)=" "+CHR$(133)+CHR$(191)+CHR
$(191)+CHR$(191)+CHR$(138)+" ":' ARMS
UP FOR SHRUG
2500 LG$(1)=" "+CHR$(171)+CHR$(131)+CH
R$(151)+" ":' LEGS
2510 LG$(2)=" "+CHR$(171)+CHR$(131)+CH
R$(183)+" ":' LEGS FOOT UP
2520 FT$(1)=" "+CHR$(131)+" "+CHR$(131
)+" ":' FEET
2530 FT$(2)=" "+CHR$(131)+" ":' FEE
T RIGHT UP

```

Math game

```

2540 '
2550 BL$=STRING$(21,128):OP$(1)=" +":OP
    $(2)=" -"
2560 '
2570 '          WORD AND PHONEMES
2580 DIMNV$(20),OV$(4),WV$(8),PS$(6),PV
    $(6),ES$(4),EV$(4)
2590 FORI=0TO20:READNV$(I):NEXT
2600 FORI=1TO4:READOV$(I):NEXT
2610 FORI=1TO8:READWV$(I):NEXT
2620 FORI=1TO5:READPS$(I),PV$(I):NEXT
2630 FORI=1TO4:READES$(I),EV$(I):NEXT
2640 DATA "Z*#R8^U", "W877NN", "T(UU", "=
    R.&", "FOOR", "FA;#&VV", "SI#K0S", "S54V4
    NN", ") *&T", "N;4&N", "T33NN", "#8L45V5N
    N", "T0W38LVV", "=RRITTEENN", "F^ORTTEENN
    ", "F#IFTT.ENN", "SIK0STEENN", "S3V4NTEE
    NN", ") *TTEEN", "NAA&NTEENN", "T0W3NT&"
    : ' 0-20
2650 DATA "PL76S", "MAA5#&NN76S", "T;5&MS"
    , "DE.V;7A#EDID B;5E": ' +,-,X,/
2660 DATA "H38L8^U", "N6MBL", "W867T", "IIZ
    Z", "S54K5NT", "PL.&Z", "RO^BA;8T M99="
    , "PR33SS": ' HELLO,NUMBER,WHAT,IS,SECO
    ND,PLEASE,ROBOT MATH,PRESS
2670 DATA "GOOD", "G<$5D", "GREAT", "GR@*&T
    ", "RIGHT", "R;5ET", "YES", "Y43SS", "SUPE
    R", "S(UUP//": ' PRAISES
2680 DATA "NO", "N8OU", "SORRY", "S;8RRE", "
    NOPE", "N8OP", "WRONG", "R21+N": ' ERROR
    ANNOUNCEMENTS
2690 '
2700 RETURN: '      END PROGRAM DATA INPUT
2710 '
2720 '          TIME OUT
2730 '
2740 FORTI=1TOIL:NEXT
2750 '
2760 RETURN: '      END TIME OUT
2770 '
2780 '          ROLL OUT WORDS
2790 '
2800 FORK=1TOLEN(W$):PRINT@WP,RIGHT$(W$
    ,K);:TL=20:GOSUB2720 :NEXT
2810 '
2820 RETURN: '      END ROLL OUT WORDS
2830 '
2840 '          VOICE GENERATOR
2850 '
2860 '          VO$=PHONEME COMING IN
2870 IFLEN(VO$)=0THENRETURN
2880 POKEL6383,63:POKEL6383,32
2890 FORVX=1TOLEN(VO$):POKEL6383,ASC(MI
    D$(VO$,VX,1)):NEXT
2900 POKEL6383,32:POKEL6383,63:POKEL638
    3,32:TL=200:GOSUB2720
2910 '
2920 RETURN: '      END VOICE GENERATOR

```



NOW—A MODEM AND MUCH, MUCH MORE!

AUTOTERM—The ultimate TRS-80[☆] terminal package that exploits the full capabilities of your computer and the MICROCONNECTION[™] with Autodial/Autoanswer. It has ALL the features of the "other" smart terminal programs, plus:

- Dials MICROCONNECTION[™] from terminal
- Allows full I/O translation
- Complete modem control and handshaking
- Paged screen scrolling
- Spooled printer output
- Parity, overrun and framing errors status
- Fully user-configurable
- Includes 77-page manual
- Text editor and hex conversion utilities
- Requires TRS-80 Model I or III, 32K and 1 disk drive
- Price—\$99.50. Documentation alone—\$15.00

SMART SERIES SOFTWARE FROM THE
MICROPERIPHERAL CORPORATION

All terminal programs feature manual or automatic upload/download, two user-defined messages, auto prompt message entry, transfers EDTASM and Orchestra-80 files, formats screen line length, file transfer speed selection, upper/lower case drivers, auto-repeat key, "beep" function for keystroke entry, buffered print output, compatible with SCRIPSIT and PENCIL. Comes with text generator for those who do not have a word processor.

SMART 80D (disk)—\$29.95 purchased alone or FREE [★]
Requires Model I 32K plus one disk drive. Available for both RS232 and Buss-decoding MICROCONNECTION[™].

SMART 80C (cassette)—\$29.95 purchased alone or FREE [★]
Requires Level II 16K-48K system. Available for both RS232 and Buss-decoding MICROCONNECTION[™].

SMART 80E (wafer)—\$29.95 purchased alone or FREE [★]
The first and only smart terminal program for the EXATRON "Stringy Floppy." Requires Level II 16K plus one ESF drive.

SMART IIID (disk)—\$49.95 purchased alone or \$20.00 with purchase of MICROCONNECTION.

The FIRST smart terminal program for the Model III. Offers popular features of SMART 80D plus several new features associated with the Model III. Requires Model III 32K plus one disk drive and RS232 board.

SMART IIIC (cassette)—\$29.95 purchased alone or FREE [★]
The FIRST cassette-based smart terminal program for the Model III. All the power of SMART 80C plus numerous other features. Requires Model III Level II 16K plus RS232 board.

[★] One software package included with the purchase of each MICROCONNECTION[™].

[☆] Trademark of the Tandy Corp.

the microperipheral corporation

2643 151st Pl. NE
Redmond, WA 98052
206/881-7544



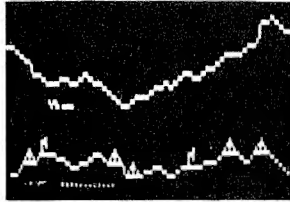
Circle # 26

**CALL TOLL FREE
800 424-2738**



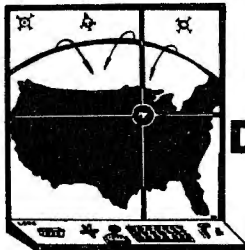
**the
PROGRAM
STORE**

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!

Tape or disk...\$24.95



**LASER
DEFENSE**

By Simon Smith from Med Systems
As ground controller for our Laser Satellite Defense System, you can view Eastern Europe or North America. Your job is to knock out enemy missile silos, or failing that, to zap the missiles themselves before they destroy our cities. You must be fast because the enemy is developing an anti-satellite laser of their own!

16K tape...\$14.95 16K disk...\$17.95



**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

**MYSTERIOUS
ADVENTURE I**

ARROW OF DEATH - part 1

By Brian Howarth from Acorn
In the first of a series of adventures by this English author, an engulfing sense of bitterness and ill feeling spreads across the kingdom. It becomes so menacing that the ruler is forced to flee the palace in fear. It is up to you and sorcerer Zarda to solve the puzzle and restore the kingdom to normalcy.

16K tape or disk...\$19.95

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



STELLAR ESCORT

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!

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

NEW TRISSTICK JOYSTICK FROM BIG FIVE!
Can be used for all Big Five games plus programs you write. Utilizes the Atari joystick with special interface. Plugs right in!

Specify model I or III...\$39.95



**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.

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



By Cleo Hughes from Liberty
The BRIGHT & EARLY series makes learning fun by rewarding accomplishment with video entertainment. Designed for ages six and older, the math skills package contains: "Add-a-pet" (Addition), "TheBigBoom" (Subtraction), "SpacemanMath" (Multiplication), "MoonLander" (Division), and "Basic Math" (Flash card review).

16K tape...\$13.95



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! :

tape...\$15.95 disk...\$19.95

**Instant Search/Sort
DATABASE**

By G. Hatton from Acorn
An easy-to-use, yet powerful database management tool, ISS alleviates many of the complications usually found in setting up and maintaining information files. Written in machine language, ISS can provide a multitude of sorts, subsorts, searches and categorizations in seconds. Because the processing is done in memory, you can manipulate the data at will without risk to your database on tape or disk. The number of records is limited only by your file format and the amount of RAM in your system.

16K tape or 32K disk...\$49.95



BASIC FASTER & BETTER

By Lewis Rosenfelder from ILG
One of the most useful books ever published for TRS-80 owners. Contains a wealth of information on how to optimize your programs with special techniques. Includes libraries of functions and subroutines that can eliminate most of the drudgery of writing programs -- you can write complete programs as a series of subroutine calls! With the optional library and demonstration disks, you'll have all these tools at hand without having to type them from the text.

Book, 290 pages...\$29.95
Library Disk...\$19.95 Demo Disk...\$19.95



TO ORDER CALL TOLL FREE 800 424-2738

For information
Call (202) 363-9797

THE PROGRAM STORE

4200 Wisconsin Avenue NW, Dept. 8 205 Box 9609
Washington, D.C. 20016

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

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

The Program Store

CALL TOLL FREE
800 424-2738

DEATH-MAZE

5000



From Med Systems
Venture through a graphically represented 3-D maze, with halls that could dead end -- or recede to infinity. Step through the doors or drop into the pits. Will you encounter monsters and mayhem, or will you be treated to useful objects and information? Will you ever get out alive?

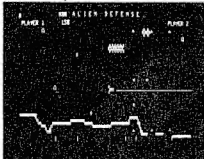
16K tape...\$14.95 32K disk...\$19.95



-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



ALIEN DEFENSE

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

Tape...\$15.95 Disk...\$19.95

MONEY MANAGER

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

32K disk...\$39.95



MISSILE ATTACK

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

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



By Chuck Acree from Acorn
A comprehensive genealogical program. It lets you set up a database to display/print a complete "pedigree" for any family member or a 3-generation chart. The program will also display a U.S. outline map showing migration across the country. Capacities: 16K tape: 45-55 ancestors. 32K tape: 175; disk: 100. 48K tape: 300; disk: 225.

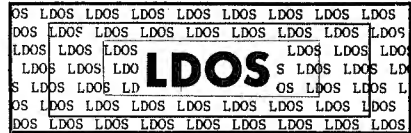
16K Tape or Disk...\$29.95



SYSTEM SAVERS

By Tom Stibolt from Acorn
This two-program package will make "SYSTEM" use and programming easier for you. FLEXL lets you make backup copies of any "SYSTEM" format tape. This usually means easier loading and lets you store the original for security. FLEXL copies also display the filename of each program as it loads. TDISK lets you save any "SYSTEM" format tape onto disk. Why wait for slow tape loading? TDISK files load in seconds.

Two Program Pack...\$14.95

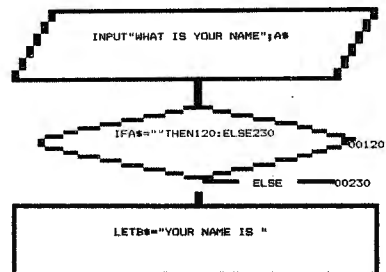


LDOS

From Lobo
An advanced operating system that offers benefits to everyone from novice to advanced system programmers. LDOS comes with one of the most complete and well written documentation books ever, with easy-to-follow instructions to get started plus a wealth of advanced information for when you need it. Completely device independent, LDOS provides for routing, linking, setting, and filtering of the input/output of a number of peripherals. Up to eight disk drives are supported in almost any mixture: 5", 8", single/double density, up to 80 tracks, even hard disks.

Disk with manual: \$129.95
Specify model I or III

THE DOCUMENTER



From P80NUT Software

If you would love to be able to document your programs with a flowchart this program is for you. THE DOCUMENTER will produce a logical flowchart directly from any suitable BASIC program and print it on the screen or most lineprinters. You get a flowchart and branch map that will help you follow program flow and aid your debugging efforts.

16K tape...\$19.95 32K tape...\$19.95
48K tape...\$19.95 48K disk...\$39.95

ACCEL 2 BASIC COMPILER

From Allen Gelder

Turns your BASIC program into a machine language/BASIC hybrid that may run many times faster. For those who plan to sell their programs, compiling by ACCEL 2 offers the additional advantage of protection: the source code and REMarks are not included in the compiled version.

While all compilers may require some modification of the BASIC program (usually because of improper structuring), we have found that ACCEL 2 requires the least, and even works with program "tricks" like string-packing, etc.

ACCEL 2 works with models I or III, requires a minimum amount of memory, supports either disk or tape (with TSAVE, optional at \$9.95), and does not require extensive rewriting of your BASIC programs. Unlike other compilers, no royalty is required when selling ACCEL-compiled programs.

Supplied on tape for 16-48K...\$88.95
©1982, The Program Store, Inc.

THE PROGRAM STORE • Dept 8 205Box 9606 • 4200 Wisconsin Ave, NW • Washington, D.C. 20016

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

Notes

Model III DEBUG PATCH

DEBUG, supplied on your TRSDOS Model III system disk, cannot display or modify memory below 5600H. Here is a three byte which will solve that problem. Under TRSDOS READY, type:

```
PATCH *5 (ADD=4EDA,FIND=56,CHG=00)
<ENTER>
PATCH *5 (ADD=4F00,FIND=56,CHG=00)
<ENTER>
PATCH *5 (ADD=5069,FIND=56,CHG=00)
<ENTER>
```

Your DEBUG utility can now display all of memory and alter any part of RAM. *Thanks to Daniel Schultz, Carmel, Indiana*

General information for Model II

The methods of handling input and output on the Model II are very different from the methods used on the Model I. Model I input and output are almost completely memory mapped. Blocks of addresses were assigned to input and output devices and either had the address decoding circuits directly cause the input or output device to accept or deliver data via the data bus or contained memory that was independently accessible by the input or output circuits. This meant that with the exception of the cassette, all input and output could be, in theory, accessed directly via PEEK and POKE. It was not practical with the floppy disks because they were operating too fast for the slow BASIC PEEK and POKE to keep up with them.

Many who upgraded from Model I to II were distressed to find that POKE and PEEK had been dropped from the Model II BASIC. Even if they manage to patch them into their Model II, they will be much less useful because the Model II is not memory mapped for input and output. Even the video, which has nearly 2K of video memory, is directly written by the CPU and not memory mapped as the Model I video memory is. In the Model II, normally all addresses from 0000H to FFFFH have regular RAM assigned to them.

The 4K of ROM in the Model II and the video memory are accessed by a form of bank switching. At start-up, the ROM is automatically switched in to replace the lower 4K of RAM. This happens when the machine is powered up or the RESET switch is pressed. After it has served its purpose, it is switched back to RAM via one of the ports.

The video memory is switched in place of the top 2K of RAM via output port FFH. If the byte output to this port has the most significant bit set, (a value of 128 or larger), then addresses FF80H through FFFFH will access the video memory but if output to port FFH does not have this bit set these addresses will refer to ordinary RAM. Even if the PEEK and POKE devotees also had acquired OUT so that they could set this bit, they would probably find that PEEK and POKE were not such a

fast way of getting their information to or from the screen. They even stand a good chance of fouling up or even crashing the system. Other bits of the output to this port are used for other purposes and it would be possible to accidentally turn off the video altogether or have the computer trying to use banks of RAM that do not exist. Access to the video memory by the CPU is limited to the vertical retrace time and if access is attempted at other times, wait states will be used to hold off the CPU while the video is being refreshed from the video memory. The relatively slow BASIC commands might wind up being even slower due to the CPU being in wait states for so much of the time. Too much waiting may also interfere with memory refresh and crash the entire system.

Assembly language programmers can take advantage of an SVC to access the video memory via the normal operating system. Perhaps BASIC programmers would do better to use a machine language subroutine that calls this SVC for access to video memory. The SVC can either copy a buffer in RAM into the video memory or copy the video memory into a buffer in RAM. The buffer must be located below FF80H, since it is impossible to access both the upper 2K of RAM and the video memory at the same time.

The use of other bits output to port FFH is interesting. Besides bit seven being set for video memory access and cleared for normal RAM access, the other bits control various functions. Bit six can be set to disable the video and so blank the screen without disturbing the video memory. Bit five must be set to enable the real-time clock interrupts to be generated. Setting bit four switches to the 40 character line display instead of the usual 80 character line. Bits zero through three are probably the most interesting of the other bits, although their function is not yet implemented. They are part of the provision for expansion beyond 64K. For the time being, you are well advised to leave these bits as zeros, otherwise you may be telling your computer to address memory that does not exist. In theory, this provision could handle up to a total of 256K of memory using a bank switching system. The memory is divided into pages of 32K. Page zero is always addressed by addresses 0000H through 7FFFH, but the numbers output through the lower four bits of port FFH determine which of the other pages is addressed by addresses 8000H through FFFFH.

Although the Model II has a 4 Mhz clock, for critical timing you can't simply count up the states as listed in Z-80 programming books and divide by four to get the time in microseconds. The memory used in the Model II is rated at 200 nanoseconds and during an MI cycle there is only about 250 nanoseconds from the time the CPU puts out the signals and the time it reads the data bus. Considering the timing tolerances and the delays of the signals in going through the various gates and buffers, this 50 nanosecond leeway is not enough for reliable operation, so a wait state is introduced in every MI cycle. The other memory cycles have a bit more time so that the extra wait state is not required. Therefore, add one quarter of a microsecond for each byte of opcode, but not for bytes of data or addresses. *Thanks to David S. Tilton, Manchester, New Hampshire.* ■

THEY CAME OUT OF THE BLUE OF THE WESTERN SKY

and it's up to you to stop them!

REAR GUARD

**FEATURING ARCADE ACTION
GRAPHICS AND SOUND**

You know those alien residents who look like blue jello and smell like a cow pasture on a warm day? Well, they're up in arms about something and have declared war! Their weapons are Cyborg ships with their intelligent parts suspended inside. These Cyborgs pursue like crazed bats to try and kamikaze your crew pods. You're armed with an unlimited supply of Guided Energy Darts, but even when you blast 'em, their doomsday missiles come right at you! Good luck. (You'll need it!)

REAR GUARD features many extras which are usually found only on coin-operated video arcade machines. These include advanced play levels, running high score (with high score "clear" option), two player option, brilliant horizontal scrolling, and great sound effects.

APPLE VERSION

by John Anderson

PERFORMANCE COMPARED TO ORIGINAL



48K DISK \$29.95

ATARI VERSION

by Neil Larimer

Assisted by Sparky Starks



16K TAPE \$19.95 24K DISK \$24.95

TRS-80 VERSION

By Wayne Westmoreland
and Terry Gilman



16K TAPE \$19.95 32K DISK \$24.95

TO ORDER!

Adventure
INTERNATIONAL
A DIVISION OF SCOTT ADAMS, INC.

BOX 3435, LONGWOOD FL 32750
(305) 862-6917 (QUESTIONS)
ORDER FROM YOUR FAVORITE DEALER
or CALL TOLL FREE (800) 327-7172
(ORDERS ONLY PLEASE)

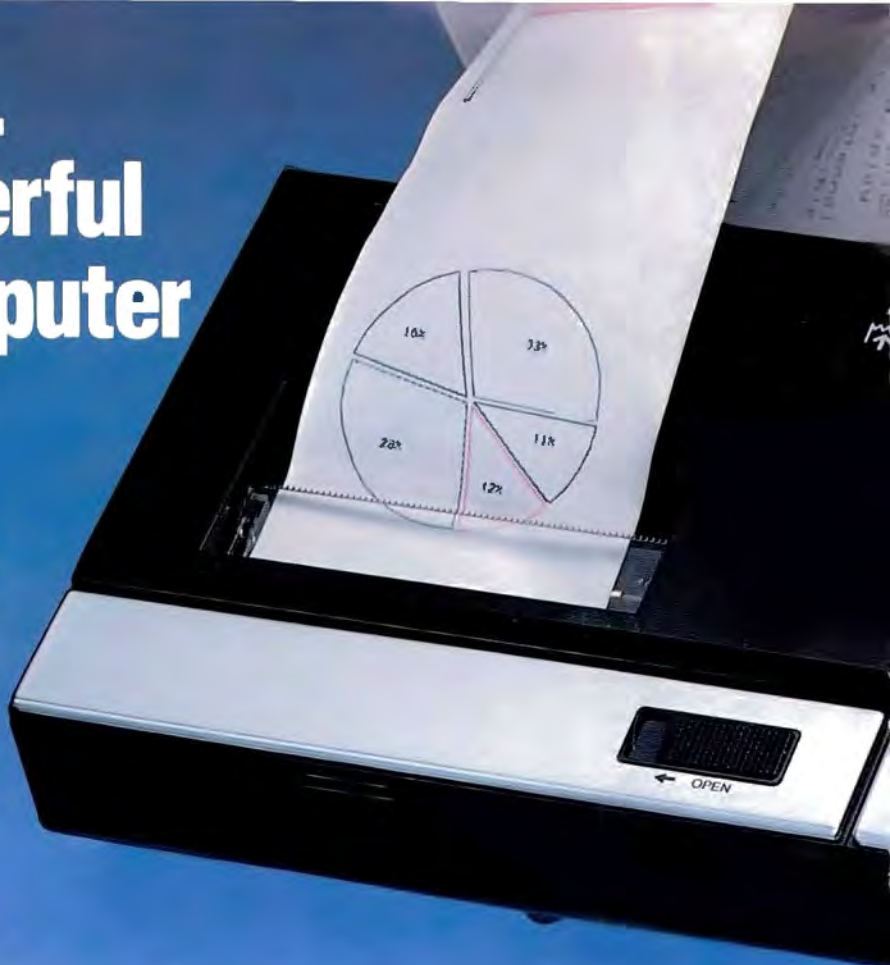
Circle # 28

Introducing . . . The Most Powerful Hand-Held Computer System Ever!

Radio Shack's New TRS-80[®] Pocket Computer PC-2 and Printer/Plotter/Interface

TRS-80 Pocket Computer
Model PC-2 **\$279⁹⁵**

PC-2 Printer/Plotter and
Dual Cassette Interface **\$239⁹⁵**



The future of pocket computers is here today! Radio Shack's new TRS-80 Pocket Computer Model PC-2 puts powerful computing features in the hands of engineers, students, businessmen, professionals—anyone with problems to solve on-the-go.

Loaded with Deluxe Features!

The 26-character Liquid Crystal Display produces upper and lower case characters, plus it's fully graphics programmable. Graphics are dot-addressable over the full matrix, seven dots high by 156 dots long. The 65-key keyboard features a typewriter layout and 10-key numeric pad—with 18 programmable key functions and 18 user-definable label keys. There's a real time quartz clock and a programmable variable tone beeper, too. The TRS-80 Model PC-2 includes 2640 bytes of user memory for program and data storage, which is retained even when the power is off. (Cat. No. 26-3601)

Easy to Program. The PC-2's powerful Extended Pocket BASIC language includes 42 statements, 34 functions, 6 commands, 2-dimension arrays, variable length character strings, program chaining, and much more.

Versatile. The PC-2 permits program applications never before possible on a computer of this size. And compatibility with Radio Shack's original Pocket BASIC allows many programs to be keyed in and run on the PC-2.



The term "personal" computer takes on new meaning! The new Model PC-2 is just 1¹/₁₆ x 7¹/₁₆ x 3³/₈" and weighs only 16 ounces, yet comes close to many desktop computers in terms of power and speed!

It's Expandable. The PC-2 expands internally with one plug-in memory module and externally through a 60-pin I/O connector. An RS-232 interface, an 8K RAM module and ready-to-run applications software will be available soon.



The Perfect Companion for Color Printing and Cassette Storage. The unique PC-2 Printer/Plotter/Dual Cassette Interface (Avail. June, Cat. No. 26-3605) turns your PC-2 into a powerful, completely portable computer system.

Outstanding 4-Color Graphics. Special graphics statements make it easy to plot X/Y/Z graphics in red, green, blue and black. Upper and lower case characters can be printed in nine sizes.

Dual Cassette Operation. Use two recorders to store and load programs. Data can be read from one cassette, updated, and stored on a second cassette under program control automatically.

Ready to Use. Just slip your PC-2 into the Printer/Interface and you're ready to go! Rechargeable batteries also power the PC-2. Includes charger.

The PC-2 is the Newest Dimension in Personal Computers. See it at your nearest Radio Shack Computer Center, store or participating dealer!



Need more memory? Plug in a 4K RAM Module (Cat. No. 26-3615, \$69.95)! Other modules with up to 8K RAM available soon.

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

Tell me more about this "go anywhere" computer system. Send your free TRS-80 Computer Catalog.

Mail To: Radio Shack, Dept. 82-A-363
1300 One Tandy Center, Fort Worth, Texas 76102

NAME _____
ADDRESS _____
CITY _____ STATE _____ ZIP _____

Retail prices may vary at individual stores and dealers.

Solitaire

A version known as "Golf"

Model I/III

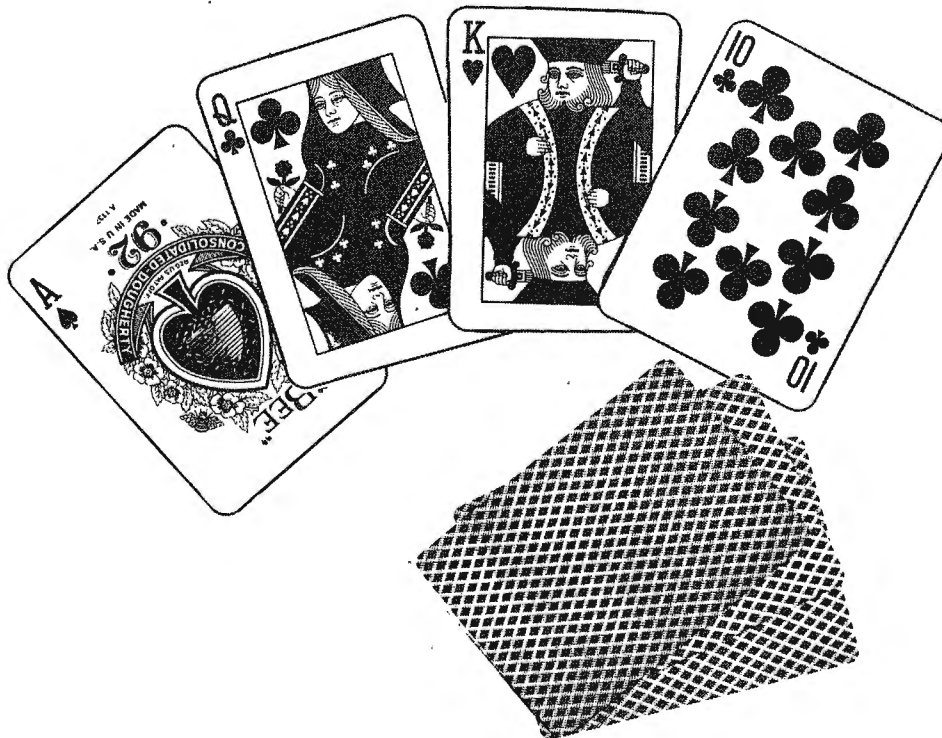
Robert D. Miller, Hopewell, VA

Before computers there was Solitaire! Actually, there still is Solitaire, but many of us have forsaken the age-old pastime for a more sophisticated means of whiling away the hours, namely the home computer. As a recreational tool, the computer has been programmed to play chess, checkers, backgammon, bridge, poker and a seemingly endless variety of games. Why not program the computer to play Solitaire as well?

Certainly the most tedious part of any game of Solitaire is the shuffling and dealing of the cards, not to mention keeping the layout tidy as the game progresses. Of course, there's that problem of avoiding the temptation to "cheat" in order to make the game come out right. Well, the computer is a proven whiz at dealing a deck of cards! Keeping the layout tidy is certainly not a problem and when it comes to keeping potential "benders-of-the-rules" in line, the computer can be merciless. The computer can take away the drawbacks of the game and still leave behind the challenge that has always been the drawing (pardon the pun) card of Solitaire. Why not give it a try?

Actually, Solitaire is not an individual game, but rather a collective term encompassing well over a hundred card games. The varieties are almost endless, but most versions have one thing in common, and that is dealing out part of a deck of playing cards into a layout (or tableau). Then, the remaining cards (stock) are used along with the cards in the tableau to build a stack or stacks of cards, usually based on rank, color or suit. The object of most games is to use all the cards in the tableau and the stock in building the stack(s).

The version of Solitaire I selected to adapt to the computer is known as "Golf." It is not one of the more widely known versions of Solitaire, but it is, nonetheless, quite a challenge to play. It requires skill as well as luck in order to win. An added feature is that it is not based on the color or suits of cards, but just the rank, so it lends itself quite easily to a black and white video screen. Before getting into the computer version of the game, let me briefly describe how the game is played with a regular deck of 52 playing cards.



Card game

After the cards are shuffled, 35 of them are dealt face up into a tableau of seven columns by five rows. The cards in each column overlap in such a fashion that the top half of each card can be seen, with the lowest card in each column being fully exposed. The 36th card is dealt face up below the tableau as the start of the discard pile. It is upon this card that play begins.

The object of the game is to selectively remove cards from the tableau, placing them on the discard pile, thus reducing the number of cards in the tableau to a minimum (ideally, zero). Only the bottom (fully exposed) cards from each of the seven columns are available for play. In order for one of these cards to be used, its rank must be one higher or one lower than that on the discard pile (Ace is low, King is high). For example, a six on the discard pile can have either a five or a seven played on top of it, a Jack can be topped with a Queen or a ten, and an Ace (the lower extreme) can be topped with (only) a deuce. The only exception to this rule is when a King (the upper extreme) is present on the discard pile. At this point, the sequence must end. In other words, a King can be played on a Queen, but a Queen may not be played on a King. Other than this, the sequence can continue up and down, indefinitely, until no more cards are eligible for play. When this occurs, the top card of the remaining 16 cards is turned up and placed on the discard pile. Play then continues as before, with additional cards being turned up as necessary. The game ends when either no more play can take place (you may only go through the deck once) or the tableau has been completely removed to the discard pile.

It should be noted that it is not mandatory that every qualifying card from the tableau be used before turning up the next card from the stock. In some cases, it may be good strategy to "hold off" on playing a certain card until later. Experience will be the best teacher when it comes to this matter.

In playing this game, it is possible to keep score by counting the number of cards left in the tableau at the end of each hand. In this way, one can compete with another player. In fact, it is from this concept that the game gets its name, Golf. Each deal of the cards is a "hole" and one plays either nine or 18 holes in an attempt to get the lowest score possible. Incidentally, if you are fortunate enough to dispose of all the cards in the tableau and still have undealt cards left over, then the number of those cards becomes a negative score for that "hole." Believe me, that doesn't happen too often!

The computer version of Golf follows the rules just described. A few other features have been added to make the game more enjoyable.

A few seconds after entering RUN, the CRT will display a graphic representation of the tableau of 35 cards and the discard pile. The columns are numbered one through seven. To select a card from the bottom of any column for play on the discard pile, just press the key corresponding to the appropriate column number. The card will disappear from that column and reappear as the top card of the discard pile. To turn up a card from the undealt portion of the deck, press the @ key. The outline of the discard pile will appear to "flip" over as the new card appears as the top card.

Don't worry about making a wrong move! First of all, the computer checks to make sure each move is legal. If it isn't, it will simply ignore your keystroke. Likewise, if you press @ when there are no cards remaining in the deck, nothing will happen. To keep you posted on the status of the game, the computer always displays the number of cards remaining in the tableau as well as the number of undealt cards yet to be played.

What about those "extra's" I mentioned? Well, for one, if you "change your mind" (we won't call it cheating!), you can literally "take back" a move by pressing the "up arrow" key (displayed as a left bracket on some systems). In fact, you can play the entire hand in reverse by repeatedly pressing this key! You can use this feature to test different strategies from a given position.

When you have completed playing a hand and want to play another, press the "N" key, and the computer will reshuffle the deck and deal the cards again. If you would like to play the exact same hand over again, press the "S" key and the computer will deal the cards exactly as they were dealt the time before. Now, if someone is watching you play and boasts that they could have done better with a given deal, you can make them eat their words! Just press "S" and let 'em try!

When you are finished using the program, just press "E" and the computer will return you to a BASIC ready condition. Here is a summary of all the commands:

Summary of commands

1-7— Select card from numbered column of tableau for play on discard pile.

@— Turn over next card from undealt portion of the deck.

Up arrow— Reverses play one move.

N— Start new game with reshuffled deck.

S— Start same game over with same deck.

E— End of game.

The program listing that follows has sufficient REMarks in it to guide you through. I would like to point out some of the techniques used, particularly in generating the graphics.

Lines 260-330 are used to form the graphic outlines of the cards as they appear in the tableau and the discard pile. B1\$ is a concatenation of graphic and cursor control characters that forms the outline of the upper half of one card. B2\$ is the sum of seven B1\$'s to form an entire row. Similarly, B3\$ and B4\$ are used to generate the graphics necessary to represent the lower halves of a row of cards. B5\$ is the complete outline of the single card used as the discard image and B6\$ and B7\$ are used to "blank out" a portion of the CRT when a card is removed from the tableau.

Lines 340-440 are used to create the sequence of images needed in order to make the discard pile appear to "flip" when a card is dealt. Seven different card images are used, each successive one representing a proportionally smaller outline of a card. The subroutine at line 890 is then used to flash the images from large to small and then to large again in such a succession that the card image appears to be flipping on the CRT.

There are four arrays used by the program. A\$(52) is used to store the string values of the deck of cards. B(5,7) is used to store the numeric representation of each card

Card game

in the tableau, with the "zereth" element of each column (e.g., B(0,1), B(0,2), etc.) being used to store the number of cards remaining in each column. The array C(52) is used to keep track of the cards played so that the game may be "backed up" one step at a time. In conjunction with this D(52) is used to store the origin of the card played so that it can be returned to its original position when play is reversed.

Lines 660-760 are used as a simple INKEY\$ function to accept keyboard input and check it for applicability to the game situation. If the input keystroke doesn't meet the proper conditions for play, the program loops back to the INKEY\$ line as if nothing happened.

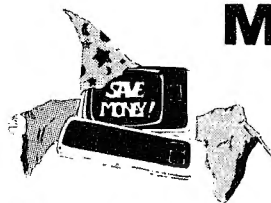
I believe that Golf is an entertaining and challenging version of Solitaire. I had played it for months before the thought occurred to me to try to adapt it for play on the computer. That, too, has proved to be a challenge, but a very worthwhile one. I hope that you will find the resulting program to be enjoyable. Fore!

```

100 'GOLF->A SOLITAIRE GAME
110 'VERSION 1.3->MARCH 1981
120 REM *** ROBERT D. MILLER ***
130 REM *** 4005 YORKTOWN DRIVE ***
140 REM *** HOPEWELL, VA 23860 ***
150 REM *** (804) 458-4140 ***
160 REM *** SET UP ARRAYS ***
170 CLS: CLEAR 3000: DEFINT A-Z: DIM A$(52),
    B(5,7), C(52), D(52)
180 REM *** PRINT TITLE IN EXPANDED PRI
    NT ***
190 PRINT CHR$(23): PRINT@156, "GOLF"; : PRI
    NT@394, "A VERSION OF SOLITAIRE"; : PRIN
    T@734, "BY"; : PRINT@912, "ROBERT D. MILL
    ER";
200 REM *** READ IN CARDS ***
210 FOR I=1 TO 52: READ A$(I): NEXT
220 DATA A S,2 S,3 S,4 S,5 S,6 S,7 S,8 S
    ,9 S,10 S,J S,Q S,K S
230 DATA A D,2 D,3 D,4 D,5 D,6 D,7 D,8 D
    ,9 D,10 D,J D,Q D,K D
240 DATA A C,2 C,3 C,4 C,5 C,6 C,7 C,8 C
    ,9 C,10 C,J C,Q C,K C
250 DATA A H,2 H,3 H,4 H,5 H,6 H,7 H,8 H
    ,9 H,10 H,J H,Q H,K H
260 REM *** CREATE GRAPHICS FOR CARD OU
    TLINES ***
270 B1$=CHR$(151)+CHR$(24)+CHR$(26)+CHR
    $(149)+CHR$(27)+STRING$(6,131)+CHR$(1
    71)+CHR$(24)+CHR$(26)+CHR$(170)+CHR$(
    128)+CHR$(27)
280 B2$=B1$+B1$+B1$+B1$+B1$+B1$+B1$+CHR
    $(26)
290 B3$=CHR$(149)+CHR$(24)+CHR$(26)+CHR
    $(181)+STRING$(6,176)+CHR$(186)+CHR$(
    24)+CHR$(27)+CHR$(170)+CHR$(128)
300 B4$=B3$+B3$+B3$+B3$+B3$+B3$+B3$+CHR
    $(26)
310 B5$=B1$+STRING$(9,24)+STRING$(2,26)
    +B3$

```

MONEY MAGIC!



doughflo

DOUGHFLO. The Most Useful Program a Home or Business Manager Can Have!

Designed For The Decision Maker, Doughflo is an interacting system of programs for cash flow analysis, budget planning, and bookkeeping.

In The Home, Doughflo becomes a key tool in solving the puzzle of balancing expenses vs. income. Doughflo shows you where the money goes.

Fire Your Bookkeeper! You, the new bookkeeper, will have easy access to all expense records. Rapidly find and display any number of entries by description, type, amount, date, or number.

Simple To Use, Doughflo is quick and efficient, carefully guiding you from data entry to report generation.

900 Entries In Memory at one time with 48K machines. No time consuming disk access.

Sort 900 Entries In Only 2 Seconds! Sort by check number, description, date, or month.

User Friendly! Detailed instructions. Input screens and single keystroke commands allow quick and easy data entry and computer interaction.

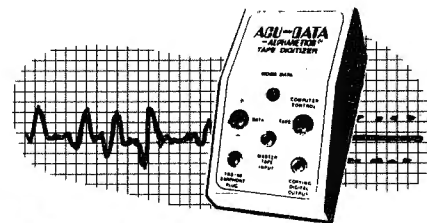
Amazingly Versatile! Indispensable in home or business for:

- Budget Planning
- Tax Preparation
- Bookkeeping
- Financial Analysis

Reports! Compare expenses and income vs. budget, total expenses, percent of total expenses, etc. Up to 24 months can be compared at once.

Gain Valuable Insight. Doughflo is ready to save you time and money. Requires 32K and one or more disk drives, specify Model I or III. *\$44.95 postpaid to continental North America. For more information check reader service number.

**"A
PERFECT
CLOAD
EVERY
TIME!"***



tape digitizer™

*From a review in September-October 1980 Elementary Electronics. Reprints available.

At last there is a cure for TRS-80 tape loading 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 cload 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 — \$69.95 postpaid to continental North America, or return within 10 days for a full refund!

Circle # 31

alphanetics

Box 597 Forestville, Ca. 95436
24 hr. phone (707) 887-7237

TRS-80* Model III

COMPUTER HOUSE

Hardware & Software at discount prices.

ACORN SOFTWARE	Sug. List.	Our Price
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
ADVENTURE INTERNATIONAL		
Adventures 1 thru 12 (T) each	19.95	15.95
Escape From Traum (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
AUTOMATED SIMULATIONS		
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
BIG FIVE SOFTWARE		
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
BRODERBUND SOFTWARE		
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
Tawata's Last Redoubt (T)	19.95	15.95
THE CORNSOFT GROUP		
Scarfman (C)	15.95	12.75
DATASOFT		
Arcade - 80 (T)	19.95	15.95
HAYDEN SOFTWARE		
Sargon II (D)	34.95	27.95
MED SYSTEMS		
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
MICROSOFT		
Adventure (D)	29.95	23.95
Olympic Decathlon (T)	24.95	19.95
RADIO SHACK		
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 Viscalc (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
STRATEGIC SIMULATIONS		
Tigers In The Snow (T)	24.95	19.95
SYNTONIC SOFTWARE		
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.

Circle # 32

* TRS-80 is a trademark of Tandy Corp.

Card game

```

320 B6$=STRING$(9,128)+STRING$(9,24)
330 B7$=B6$+CHR$(26)+B6$+CHR$(26)+B6$+CHR$(26)+STRING$(9,128)
340 REM *** CREATE GRAPHICS FOR FLIPPING G OF CARD ***
350 C0$=STRING$(8,128)+STRING$(8,24)
360 C1$=CHR$(151)+STRING$(6,131)+CHR$(171)+STRING$(8,24)
370 C2$=CHR$(156)+STRING$(6,140)+CHR$(172)+STRING$(8,24)
380 C3$=STRING$(8,176)+STRING$(8,24)
390 C4$=CHR$(181)+STRING$(6,176)+CHR$(186)+STRING$(8,24)
400 C5$=CHR$(141)+STRING$(6,140)+CHR$(142)+STRING$(8,24)
410 C6$=STRING$(8,131)+STRING$(8,24)
420 C7$=CHR$(149)+STRING$(6,128)+CHR$(170)+STRING$(8,24)
430 Z$(1)=C1$+CHR$(26)+C7$+CHR$(26)+C7$+CHR$(26)+C4$:Z$(2)=C2$+CHR$(26)+C7$+CHR$(26)+C5$:Z$(3)=C3$+CHR$(26)+C7$+CHR$(26)+C7$+CHR$(26)+C6$
440 Z$(4)=C0$+CHR$(26)+C1$+CHR$(26)+C4$+CHR$(26)+C0$:Z$(5)=C0$+CHR$(26)+C2$+CHR$(26)+C5$+CHR$(26)+C0$:Z$(6)=C0$+CHR$(26)+C3$+CHR$(26)+C6$+CHR$(26)+C0$:Z$(7)=C0$+CHR$(26)+C0$+CHR$(26)+C0$+CHR$(26)+C0$
450 REM *** SHUFFLE CARDS ***
460 RANDOM
470 FORI=52TO1STEP-1:K=RND(I):A$(0)=A$(K):A$(K)=A$(I):A$(I)=A$(0):NEXT K
480 REM *** DETERMINE VALUES OF CARDS IN TABLEAU ***
490 FORI=1TO35:J=INT((I-1)/7)+1:K=I-(J-1)*7:GOSUB510 :B(J,K)=C:B(0,K)=5:NEXT T:GOTO560
500 REM *** SUBROUTINE TO DETERMINE VALUE OF CARD ***
510 C$=LEFT$(A$(I),1):C=VAL(C$)
520 IFC=1THENC=10
530 IFC$="A"THENC=1ELSEIFC$="J"THENC=11ELSEIFC$="Q"THENC=12ELSEIFC$="K"THENC=13
540 RETURN
550 REM *** PRINT CARD TABLEAU OUTLINE ON CRT ***
560 CLS:FORI=1TO5:PRINTB2$:NEXT:PRINTB4$:PRINT@795,B5$;:FORI=1TO7:PRINT@(I-1)*9+4,RIGHT$(STR$(I),1);:NEXT
570 REM *** FILL IN OUTLINE WITH CARD NAMES ***
580 J=1:FORI=64TO639STEP9:PRINT@I+3,A$(J);:IFINT(J/7)=J/7THENI=I+65
590 REM *** SET COUNTERS AND PRINT FOOTERS ON CRT ***
600 J=J+1:NEXTI:I=J:X=35:L=1:M=1:D(M)=I

```

```

610 PRINT@832,"# OF CARDS IN TABLEAU:";
:PRINT@872,"# OF CARDS IN HAND:";:PRI
NT@896,"PRESS @ FOR NEXT CARD";:PRINT
@960,"PRESS ^ TO TAKE BACK MOVE";:PRI
NT@936,"PRESS N FOR NEW DECK";:PRINT@
1000,"PRESS S FOR SAME DECK";
620 REM *** UPDATE STATUS OF REMAINING
CARDS ***
630 PRINT@854," ";:PRINT@854,X;:PRINT
@892," ";:PRINT@892,52~J;:PRINT@862
," ";:PRINT@862,A$(I);
640 REM *** GO COMPUTE VALUE OF THE UP
CARD ***
650 GOSUB510
660 REM *** ACCEPT INPUT AND TEST FOR V
ALIDITY ***
670 Z$=INKEY$:IFZ$=""THEN670
680 IFZ$="@ "THENJ=J+1:IFJ>52THENJ=52:GO
TO670 ELSEI=J:C(L)=0:L=L+1:M=M+1:D(M
)=I:GOSUB890 :GOTO630
690 IFZ$="^"THEN830
700 IFZ$="N"THENCLS:GOTO460
710 IFZ$="S"THENCLS:GOTO490
720 IFZ$="E"THENCLS:END
730 Z=VAL(Z$):IFZ<1ORZ>7THEN670
740 IFB(0,Z)=0THEN670
750 IFC=13THEN670
    
```

```

760 Y=B(B(0,Z),Z):IFABS(C~Y)<>1THEN670
770 REM *** COMPUTE CRT POSITION OF SEL
ECTED CARD ***
780 REM *** AND MOVE SELECTED CARD TO D
OWN PILE ***
790 I=(B(0,Z)-1)*7+Z:B(0,Z)=B(0,Z)-1
800 Q=(I-1)*9+INT((I-1)/7)*65:PRINT@Q,B
7$;
810 IFB(0,Z)>0THENPRINT@Q,B3$;
820 X=X-1:C(L)=Z:L=L+1:M=M+1:D(M)=I:GOT
O630
830 REM *** ROUTINE TO TAKE BACK PREVIO
US MOVES ***
840 IFL=1THEN670
850 L=L-1:IFC(L)=0THENM=M-1:J=J-1:I=D(M
):GOSUB890 :GOTO630
860 B(0,C(L))=B(0,C(L))+1:I=(B(0,C(L))-
1)*7+C(L)
870 Q=(I-1)*9+INT((I-1)/7)*65:PRINT@Q,B
5$;:PRINT@Q+65," ";:PRINT@Q+67,A
$(I);:IFB(0,C(L))=1THENPRINT@(C(L)-1)
*9+4,RIGHT$(STR$(C(L)),1);
880 M=M-1:I=D(M):X=X+1:GOTO630
890 REM *** SUBROUTINE TO FLIP CARD ***
900 FORN=2TO7:PRINT@795,Z$(N);:NEXT
910 FORN=6TO1STEP-1:PRINT@795,Z$(N);:NE
XT:RETURN ■
    
```

EDITOR'S NOTE: THE [IN THIS LISTING IS THE UP-ARROW.

EDUCATIONAL

MATH-PAK-1: MATH-PAK-2: MATH-PAK-3

Interactive drill programs that let the user enter the answer digit by digit, just like paper and pencil. With user selected difficulty levels, carryovers, simplification, reducing, pointing off, scoring, games and more. The MATH-PAK's are used throughout the U.S. and Canada and are recommended by the 80US Journal, S-80 Bulletin, and the Computing Teacher. Order MATH-PAK-1 for integers, MATH-PAK-2 for fractions, and MATH-PAK-3 for decimals. (L2-16K Min)Mod 1,3 \$14.95 ea/cass

THE WORD PAK

An interactive language arts program for tape or disc. You can selectively show definitions, synonyms, antonyms, or related, contrasting, or any other word form that you desire, and then play one of three games to solve for the word. Save your own word lists and tailor the program to your own textbooks. (L2-16K)Mod 1,3 \$19.95/cass

GAMES

Pyramid

A challenging game of logic and deductive reasoning. Can you solve the computer generated code? The computer will give you clues on each entry but it will take all your skill to break the code. With 3 difficulty levels, sound, high speed graphics, and save a game on disc or tape. (L2-16K) Mod 1,3 \$11.95/cass

THE ARGUS CHRONICAL

STARDATE 12756.3.....An explosion has destroyed the main engines aboard the deep space explorer, the ARGUS. The ship is drifting with only maneuvering power. The life support systems are failing and the main radios are dead. Ahead lies Spacestation ALPHA. A frantic call for help on the emergency transmitter brings only silence. Your only chance for survival is to reach the safety of spacestation ALPHA.

SPACESTATION ALPHA DEAD AHEAD, THE DOCKING LAMP IS LIT.....

For an out of this world mystery, order this classic machine language adventure. \$19.95/cass(L2-16K) \$24.95/disc(32K) Mod 1,3

HOME/BUSINESS

H-O-R-K-S

Low cost, single entry accounting system for the home or office. With 66 user assigned account codes, auto audit trail, search with totals, 32 or 48K, 1 to 4 drives, credit and debit reports with 3 options, and up to 9200 entries. \$24.95/cassette \$29.95/disc

INVENTORY +

Why settle for just an inventory listing? Get aging reports with 2 options, reorder reports, total listings with purchase dates, amounts, and vendors, total costs, items sold, profit/loss, and more. Use as a stand alone system with daily updates, delete, change, and file packing routines. (32K-1 disc minimum). \$24.95/cassette \$29.95 disc

CASH REGISTER 80

Use your TRS-80 as a point of sale terminal with automatic inventory lookup, pricing, updating, discounting, and more. Print sales slips with user adjusted formats, end of day reports with all cash, charge, and check sales by salesperson. CR80 requires INVENTORY +, 48K, and 1 disc minimum (2 drives recommended). \$24.95/cassette \$29.95 disc

CASSETTE DUPLICATION

Cassette duplication for the TRS-80, A/V in mono or stereo. Low rates, top quality screw cassettes, all tapes guaranteed or free replacement. Write or call for rates.

Mass. residents add 5% tax. Visa, M.C. and phone orders accepted. Overseas orders add \$2.00 for air shipment. Dealer inquiries invited. TRS-80 is a registered trademark of the Tandy Corp.



EDU-WARE EAST
P.O. Box 336
Maynard, MA 01754
617-568-8641
MODELS I & III



Exploring the Color Computer

Sound from cassette to TV with BASIC

Color Computer

T. R. Dettmann, Associate editor



If you have a Color Computer, you have probably played music with the system in the form of games and other programs that use the ability of the machine to generate sound. But what if you would like to play other, more complex music? Or, what about having a voice accompanying a program?

Suppose you would like to have a teaching program that combines the unique ability of the Color Computer to present fascinating visuals, and the ability of the cassette recorder to play back recorded information. You would also like to have the computer control the cassette and play the information through the speaker on the TV accompanying the visuals. Sound hard? Think it's going to involve you in soldering? Will you have to build complicated computer interfaces? What would you say if I told you it was *built into the Color Computer!*

It's true! The Color Computer has built-in circuitry to allow you to control the cassette port directly, and redirect what comes from the cassette to the speaker on your TV.

So far, I haven't really seen this used anywhere (or even mentioned outside the service manual and other technical manuals on the system). Nor have I seen *any* information to suggest that this could be of use to anyone other than assembly language programmers.

This ability is available from BASIC if you want it.

Cassette Control

In the Color Computer, all input/output (I/O) is handled through a pair of chips called "6821 PIAs" (Peripheral Interface Adapters). The 6821 is a two-way communication chip that allows the programmer an immense amount of flexibility in communicating with the outside world. There are command bits in the PIA that we can set (turn on to 1) or reset (turn off to 0). If we know where the bits are that we want, and which way we want them, we can establish whatever control we want.

Eventually, what we want to control is the sound output controller (an MC14529B chip). We also want to control the cassette motor (on and off). We could use MOTOR ON and MOTOR OFF, but we'll go direct for the moment.

The control bits we're interested in are the following:

Address (Hex)	Bit	Function
FF01	3	SEL1—first selection line
FF03	3	SEL2—second selection line
FF21	3	Cassette motor control
FF23	3	Sound enable

The Color Computer Service Manual (page 34) has a table of functions of the SEL1, SEL2, and sound enable bits:

Enable	SEL1	SEL2	Source Selected
1	0	0	6 bit D/A
1	1	0	Cassette
1	0	1	Cartridge
1	1	1	Not used
0	(can be anything)		Single bit sound

To use the cassette sound source, we need to set SEL1 on, SEL2 off, and enable on. This means we have to set bit three in an eight bit number to 1 or 0 without disturbing the rest of the bits. If we mess up and change the other bits, we'll change some other I/O function.

Most of us have used AND and OR at one point or another, without thinking about what they really stand for. If we think about using values 0 and 1 only, then an AND operation leaves the result: *1, only if both original items are 1.* Specifically,

- 1 AND 1 = 1
- 1 AND 0 = 0
- 0 AND 1 = 0
- 0 AND 0 = 0

The OR operation leaves the result: *1, if either of the original items are 1.* Specifically,

- 1 OR 1 = 1
- 1 OR 0 = 1
- 0 OR 1 = 1
- 0 OR 0 = 0

If we do an AND (or an OR) in BASIC, between two numbers, the result of the operation is found by doing the AND (or OR) operation on each number, *bit by bit!*

Think about what would happen if we OR'd the eight bit number 00000000 (that's binary for zero) with the number 00001000 (that's binary for eight). Doing a bit-by-bit OR, we get:

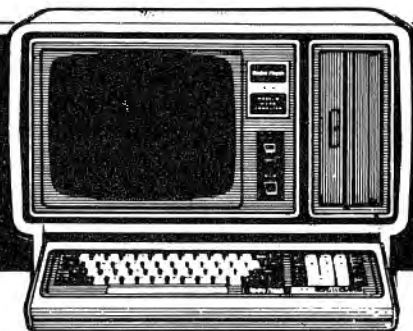
```

00000000
00001000
-----
00001000  result has bit 3 set!
    
```

This is called masking, and the 00001000 (eight decimal) is our mask. In order to set a particular bit, we use an OR with the number that corresponds to having that bit set.

Similarly, an AND operation is used to reset a bit that we want off. Simply AND with a number where that bit is reset. To set bit three of a number, OR with the number 8. To reset bit three, AND with 247:

Decimal	Binary	
8	00001000	Sets bit 3 with OR
247	11110111	Resets bit 3 with AND



TRS-80 MODEL II 64-K \$3279
26-4002

TRS-80 MODEL 16 128-K \$4925
26-6002

8.4 MEGABYTE HARD DISKS (PRIMARY UNIT) \$4000.



DISCOUNT



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)



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

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.

Circle # 33 — 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**

Article

Now, try out your cassette system. Hook up your cassette recorder, put some music in the recorder, and turn it on to play. We'll turn it on from the keyboard and direct the music to the TV.

Type each command directly (no line numbers). This will show the method. Later, this can all be incorporated into programs that you might want to do this in. The commands given are for the Extended BASIC system specifically, but don't require any particular amount of memory.

S1=PEEK(&HFF01) (Get current value in FF01)
S2=PEEK(&HFF03) (Get current value in FF03)
CM=PEEK(&HFF21) (Get current value in FF21)
SE=PEEK(&HFF23) (Get current value in FF23)

Turn cassette motor on

CM=CM OR 8 (Set bit 3 on for cassette motor)
POKE(&HFF21),CM (Cassette should turn on now)

Turn on the sound

S1=S1 OR 8 (Set bit 3)
S2=S2 AND 247 (Reset bit 3)
POKE(&HFF01),S1 (Put it back in the PIA)
POKE(&HFF03),S2 (Put it back in the PIA)

SE = SE OR 8 (Set bit 3)

POKE(&HFF23),SE (Put it back in the PIA)

At this point, the music (or whatever) from your cassette should be coming through your TV set. If it's not, check the volume controls on the cassette and on the TV as well as the cables. If everything is right, RESET the computer and try again.

If you aren't too confident about typing in the commands, put them in with line numbers as a BASIC program and then RUN the program after you've verified it.

This technique has great potential for such things as computer-aided instruction, interesting games, instructions for running programs, and so forth. I leave it to you to dream up your own possibilities. ■

Ed. Note— Now that you've digested the material in this article, it's time to learn the easy way to perform the same function. Place an audio cassette in the recorder and press the play button. In the command mode, type MOTOR ON: AUDIO ON and press ENTER. The sound should come from the TV speaker. To turn off the sound, type AUDIO OFF: MOTOR OFF, and press ENTER. The sound and recorder will both stop. This procedure may also be used in a BASIC program.

The method for using this procedure, as described in the article, is a good exercise for dealing with Hex numbers and turning bits on and off, etc. That is why we had you learn the hard way first. Now, aren't you glad we handled it in that manner?

Marymae INDUSTRIES, INC.

In Texas, Orders,
Questions & Answers
1-713-392-0747

21969 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

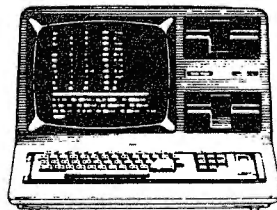
Federal Express (overnight delivery)

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



Circle # 34

Quirks, fixes, tips and tricks

For the Pocket Computer

Pocket Computer

R. Shane Causer, Brunswick, GA

The first rule to observe when buying a new computer: Every computer has a manual, but all manuals are not created equal!

The Pocket Computer is no exception to this. The manual, while being better than some, is not the best it could be. It was written, it seems, for someone already familiar with computer programming, and thus has several omissions. The purpose of this article is to discover these omissions and bring them out into the open.

Since I am primarily a game writer, the first problem I encountered was the absence of a command to produce a random number, such as RND(x). The manual gives a routine that produces a random number (page 112), but it did not satisfy my every need. Another routine had to be written, and here it is:

```
R=((pi=R) ^ 5)-INT((pi+R) ^ 5):RETURN
```

The routine is meant to be used as a subroutine, as can be deduced from the RETURN command at the end (elementary, Watson!). This routine will produce a number from zero to .9999 (the value being contained in the variable R). Notice that "pi" in the routine is actually the symbol (a shifted up-arrow) and the character before the 5s is a shifted square root symbol.

To use the routine, GOSUB nnn where nnn is the line number of the routine. Take the R variable and multiply that with the number that you want the randomly-produced number to be between (huh?).

In other words, to produce a number between zero and 27, you would type the following:

```
GOSUB 999:A=INT(27*R)
```

The integer function is taken to get rid of the digits after the decimal point.

One problem bytes the dust! (Sorry about that rotten pun—I just couldn't resist.)

There is one serious omission in the Pocket Computer's manual. The writer(s) neglected to tell us poor readers that string manipulations are not possible on the Pocket Computer. Concatenation is possible, but only when it (the string) is sent to the display. This routine:

```
1:A$="ABC":B$="DEF":PRINT A$,B$
```

concatenates A\$ and B\$, but it is the only type of concatenation available.

There is a peculiar quirk with the execution time of the Pocket Computer. A tight loop, such as:

```
1:FOR A=1 TO 100:NEXT A
```

takes approximately 24 seconds to execute. If the routine is rewritten to:

```
1:FOR Z=1 TO 100:NEXT Z
```

the execution time is dropped to approximately 20 seconds.

While we're on the subject of loops, the final number must have no more than three digits in it. Thus:

1:FOR A=1 TO 1000:NEXT A

will produce an error. Also, on loops: if added instructions are placed between the initializing of the loop (FOR z = n TO w) and the NEXT statement, execution time increases tremendously.

If you use the INS (insert) feature to add characters to a line, all empty brackets (the symbol representing an empty spot) will be deleted from the line after ENTER is pressed. For example, type this into the Pocket Computer:

1:PRINT"X":END

Now use the INS feature to put a bracket on both sides of the X. Do not put another character into these brackets, just press ENTER. When you LIST line number one, it will look exactly as it did before you inserted the brackets. This is handy if you want to change a message in a PRINT statement, but do not want to retype the entire line of code. Just insert a liberal amount of brackets inside the quotation marks, and type in the new message, pressing ENTER when you are finished. Any extra brackets will be deleted from the line. You have no idea how many brackets I DELETED before I discovered this one!

If you've got a Model I or III, and you have compared that model's BASIC to the BASIC in the Pocket Computer, you will have noticed that both have the PRINT USING command. This is the command that allows printed variables to be formatted in a desired manner. You probably did like I did: assumed that the commands function in the same way. *Wrong!* First, you cannot assign a string variable to a certain format when you

are PRINTing. This is common in the BASIC on the Model I and Model III. In other words:

1:U\$="###.##":N=123.45:PRINT USING U\$;N:END

would generate an error in Pocket Computer BASIC, but would be perfectly "legal" in Level II BASIC.

Second, you must allow for the number's sign when you are printing a variable in a format using PRINT USING. Therefore, to PRINT 123.45, you would have to use something like this:

1:USING"####.##":N=123.45:PRINT N

I wore out the arrow keys trying to find an error in a line where that happened!

The INPUT statement differs between BASICs, too. When I first opened the box and removed my Pocket Computer, I turned it on and typed:

1:INPUT"HELLO";A\$:PRINTA\$:END

After a few minutes, the program was up and running. Two surprises came out. One was the lack of a question mark following the prompt statement "HELLO". The other came out when I read in the manual that if the semicolon was replaced by a comma, the prompt would only be seen on the screen until a key was pressed. Up until that time, I used only a semicolon and watched as I typed in what I wanted and saw the prompt scroll sideways off the screen.

Also on the INPUT statement, remember that you can edit anything on the screen including what you are INPUTing. This included INSerting, DELETing, and changing a character by typing over it with another. Also keep in mind that the backspace key does not actually erase a character from the computer's memory. It simply moves the cursor backward. Any character erasing you want to do must be done using the editing commands.

Whenever you PRINT more than one variable in a row, all variables except the first must be presented alone. Thus:

1:A=123.45:PRINT A*3;A*5:END

would produce an error. The line would have to be rewritten as:

1:A=123.45;B=A*5:PRINT A*3;B:END

Credit should go to Radio Shack for telling us that sometimes the Pocket Computer will "lock up" (ignore any attempt to recognize a key being pressed). I mention it here, because about thirty minutes after I turned on the Pocket Computer, it locked up. Because I had not read the manual thoroughly, I did not expect it. After looking in the manual, I discovered that pressing the reset button on the back would solve the problem. I mention it here as a classic example of why you should read the manual before you dive into programming anything. You will discover things that you may otherwise learn the hard way! ■

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 contributions 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. Ram 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 Tandy Corp.

Circle # 35



the RAINBOW

the RAINBOW
5803 Timber Ridge Drive P.O. Box 209 (502) 228-4492
Prospect, KY 40059

Gentlemen YES! Sign me up right away for a one year (12 issues) subscription to the RAINBOW. My payment is enclosed.

Name _____

Address _____

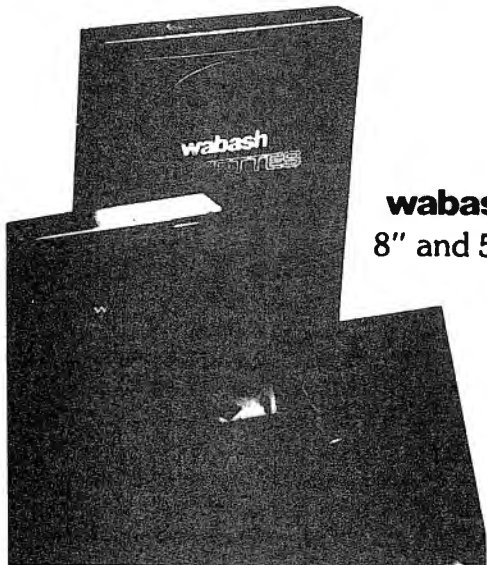
City _____ State _____ Zip _____

Payment Enclosed Charge my VISA # Charge my MasterCard #

Signature _____ Card Exp. Date _____ Interbank # _____

Subscription to the RAINBOW is \$16 per year in the U.S., Canada and Mexico and \$22 per year. Software and other equipment are extra. All subscriptions begin with the current issue. Please allow 5-6 weeks for delivery.

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



wabash
8" and 5¼"

- 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**.



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

Circle # 108

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 _____

Checkbook

Part I: Using NEWDOS/80 to write a checkbook program

Model I/III

J. L. Latham, Midwest City, OK

Do you have a Model I or III computer that seems to be short of memory? Does your disk mass storage media seem to think it is a micro storage media? If the answer to either question is yes, then perhaps you ought to continue reading this article to find out how you can help! your computer to serve you better in these areas. Before you are through here, you will know how to more effectively use disk space and RAM memory, and get a nice program as a reward for your time spent.

The ideas presented in this article will work with any home computer. The package is specifically designed for a TRS-80 Model I/III using NEWDOS/80 version 2.0 as the Disk Operating System. All routines used within the programs are compatible with the Model III computer if NEWDOS/80 is used. Rather than take a shotgun approach and touch briefly on all of the commands available through NEWDOS/80 version 2.0, I will focus on the MERGE, DELETE, and CMD"O" commands, touch lightly on the OPEN"E" method of opening disk files, and show how the RUN"filename",V option for running another program, works to save memory.

Before you are through with this series of articles, you should have a good idea of how to use these commands. You will get a couple of generally useful subroutines for use anytime, and will even find where you can get to some reserved memory without having to specify it directly when you go from DOS to BASIC. Eventually, we will put together a compact and versatile checkbook management program.

I said this would be a compact program. Well, for all that it does, I think it is. The program will be modular. That is, different programs will control different areas of checkbook management. It will be made even more compact by the use of the NEWDOS/80 commands I have mentioned. Using them, we will end up saving ten grams (read that as 12.5K) of disk storage, and about 7K of runtime memory! I must warn you again, that even with all that going for it, this program package takes most of a 35-track single density diskette (with the DOS on it), needs at least two disk drives to do its best, and was written with a 48K system in mind. Don't despair if you have a smaller system, there are plenty of tidbits for you to glean from this article.

Before we can really use any command to its fullest, we must understand both its abilities and its limits. The

MERGE command is described fully in the NEWDOS/80 manual on page 7-5. As stated there, you can use MERGE as either a direct statement or from within a program. You may even merge packed text files (that's where disk space savings can be made). You are no longer restricted to only merging ASCII files.

You cannot use the MERGE statement from within a subroutine, or as part of a FOR...NEXT loop, nor as part of a DEFFN statement. The command must be either on a program line by itself, or at the end of a multi-statement line. The next line of the program must be the one that program execution will continue with when the MERGE function is completed, however, the next line can be any legal statement, even another MERGE command.

Finally, the file to be merged cannot contain any line numbers that already exist in the program resident in RAM, and there must be enough memory left to allow the entire file to be merged. Any error encountered will cause a program halt. The use of the MERGE command does not affect any variables that have been defined or used within the program.

The second NEWDOS command we will be using is the DELETE command. This one works from within a program, just as it does in the command mode, but with a little different format. You must tell the system that you intend to use some special functions of the DOS by preceding the command with a CMD"F" statement, and DELETE is one of those. The format really isn't too tough, simply CMD"F",DELETE followed by the line number, or range of line numbers, to be deleted. If you want to delete lines 1000 through 2000, then the format would be CMD"F",DELETE 1000-2000. Yep, that's it. The limits of the DELETE statement are much the same as for the MERGE command, except you can disregard the memory size requirement, and the lines must exist in the program when the command is made.

Before going on, let me tell you a couple of things about DELETE that Apparatus didn't mention. It would appear that when the DELETE command is used to get rid of a line with data statements in it, the pointer to the next DATA statement gets lost. This is the reason you will see RESTORE statements in some of the program listings later.

The RENUM command does not change any line

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 reqd.

#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 Tesler
PROSOFT

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

—Bruce Douglass
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.

numbers referenced in DELETE statements. This is understandable, but is something you need to be aware of. When you RENUM a program that will have other programs MERGED, you will have to put in dummy line numbers (i.e. 100 REM DUMMY) if you mention lines that only exist in the other program. Use the RENUM command to find out what dummy numbers you will need. Be sure to delete these dummy lines before SAVING the program to disk. Also be careful about using RENUM on line numbers that exist in your program that will be DELETED by the program. Do not include line numbers mentioned in DELETE statements unless you are willing to manually change the DELETE statement to agree with the new number sequence.

The next command to look at is CMD"O". Model III owners will probably already be familiar with this one. CMD"O" allows an in-memory sort of up to nine arrays to be performed. There are direct and indirect sorts, but we will only be concerned with the direct sort of single dimension arrays. The format for this operation is CMD"O",n,av1(av2,...av9).

The CMD"O" function is a very powerful command by itself. Our program will use it to sort five arrays, to allow searching in a variety of ways. The command allows both ascending and descending ordering of the arrays, and even allows a mixture of ascending and descending sorting. You may mix various types of arrays, and sort a specific range of an array, even to the point of picking out a specific number of elements in the middle of a group of arrays to sort.

In the format shown above, the "n" can be either a variable or a numeric constant. Either way, it specifies the *total* number of elements to sort. If you wanted to sort an entire array that was dimensioned with a DIM AR(20) statement, then "n" should equal 21.

The part of the format shown as av1, av2 and so on, refers to the names of the arrays to sort. They are entered in the form AR(s) where "s" may, like the "n", be either a variable or constant value. The "s" determines which element of that array will be first considered in the sort. In the example with AR(20), to sort all 21 items, we would use the number zero, or a variable that evaluated to zero, as "s" to make sure all items of the array were sorted.

If more than one array is listed in the command, then the arrays are used as sorting keys, with priority given from left to right. This routine is reasonably fast and can sort nine single dimension integer arrays (with 1501 random values stored in each array) in about 48 seconds on a standard 1.77 MHz Model I computer.

Next, a few words about OPEN"E" and RUN"filename, V", and we can get on with programming . . . I think. The OPEN"E" method of opening a disk file for output works much the same as the TRSDOS OPEN"O" command. In fact, if the file does not exist when opened, the OPEN"E" works exactly like OPEN"O". If, however, the file exists when the command is executed, the file is opened at its end for sequential output into the file.

The advantage here is that you may make additions to the file without loading the entire file to memory, make the additions, and then PRINT the entire file back to disk. This method will be used to update some of our files in the checkbook program package. Rather than

make use of some of NEWDOS/80s newer file formats, I have elected to stick with a more-or-less standard file format, both because of my general lack of experience with them, and because the standard format really does suit the requirements of this program.

The RUN"filename",V command is used by NEWDOS/80 to allow you to call other disk resident BASIC programs to replace the current program without destroying the value of the variables being used by the RAM resident program. This option will allow our program to pass all variables between program modules without the hassles of reinitializing and loading arrays from disk each time we change from one program option to another. The V option is both a time and space saver for modularized programs.

Keep in mind that this program was written as a way of giving useful examples of these functions, and not as the primary purpose of this series of articles. Because of the size of this program package, it may not look that way later on.

When dealing with a checkbook program, you are going to be concerned with at least three different pieces of information. First, you need to know whether an item is a check, deposit, or bank charge against the account. If it is a check, you need to know the check number. The second thing you need to know is either the date of the transaction or the date the bank cancelled the item. The last mandatory item to keep up with is, of course, the amount of the transaction. These are the three items that the bank usually keeps up with to prepare your monthly statement.

Another item that we can add to our program to make it more useful to us is a description of the transaction. Instead of keeping up with the actual description of these items, we will use an integer array to hold a code that will point us to a much shorter array containing various descriptions of transactions. We will use integers to keep up with all information about our transactions except for the amount. The amount will be kept in double precision form, although occasionally the CVI command will be used to convert it to single precision for specific operations. No big deal here, the program will keep up with all of this for us. After all, isn't that what a computer is supposed to be all about?

Since we will be using several (four, to be exact) different programs to perform maintenance on our checkbooks, I suppose we need some sort of menu program to let us choose which operation to perform. Listing 1 shows just such a menu program. I guess we should save it on disk as MENU. The options it gives us are: (1) create a new file, or make additions to an existing file; (2) correct errors in any given file; (3) search a file for any check, or other item, or even groups of items; (4) cancel checks in a file when a bank statement is received. Option 5 will create a large file containing all items that are in files which only hold cancelled items. Option 6 operates the same as 5, except that the file created will hold all items, both cancelled and outstanding.

The reason for having the last two options is that I plan to set up one short file (OUTSTNDG/DAT) that will hold only outstanding items from it and put them into another short file that will hold data that will look

just like your bank statement. This format is inconvenient when searching your files for all checks written for one purpose or amount, or for finding all of your deposits from a specific source, thus the need to be able to combine all the files into one or two large composite files. The smaller files act like a monthly bank statement, where the larger files act like a check register where you have arranged your transactions by cancelled dates instead of by number or date you *thought* they occurred.

A word of caution is due here. Type all program listings with the line numbers shown and save them on disk with the filename "suggested" in the article. This will save you trouble later. No REM statements are referenced, and all lines are numbered in increments of 10 for programming convenience.

I promised you a couple of routines that you might like to use elsewhere in your programming, and here they come. I said that one of the things we needed to keep up with was the date of the transaction, either its actual date or the date the bank cancelled it. There are several ways of storing dates, but the one that takes the least room is by making an integer out of it. Integers not only take less room, both in memory and on disk, but are quicker to work with in BASIC. Some time back, I worked out the two subroutines that follow, to handle the problem of turning a given date into an integer form and converting it back to a readable form later.

Be warned!! This is *not* a day of the week calculator. As a matter of fact, you may notice that it really assumes 366 days in a year! Don't fear. That 366th day is February 29th, and the program won't allow you to use it unless it exists for the year. As written, the routines will handle any date from January 01, 1972, through December 31, 2059. The input routine allows inputs in the form of MM/DD/YY, M/DD/YY, MM/D/YY, and M/D/YY. This way, if you are inputting the date March 6, 1981, you may enter the date as 03/06/81, or 3/06/81, or 03/6/81, or just as 3/6/81, whichever is most comfortable to you. The only required two-digit number is for the year.

Because of the limits imposed on us when using integers, the largest date we can store is 32767 days past January 1, 1972. Any year code (YY) entered that is between 72 and 99, will be converted to a 19xx year, and year codes from 00 to 59 will be converted to a 20xx year. Year codes from 60 through 71 will be rejected as invalid. The base date of 1972 can be changed, but it must be a leap year.

Listing 2 shows the subroutine for taking the string variable AD containing our MM/DD/YY code, and converting it to an integer variable called ZD. The variable AD is not destroyed.

Listing 3 shows the subroutine that takes the positive integer variable ZD and converts it to the string representation of the date and returns it in variable AD. The variable ZD is destroyed in this routine. The format of AD on return from Listing 3 will be MMMdd, YYYY; i.e. Jan 1, 1982. Leading zeroes on days are not printed, but the space is filled in for even formatting of the output. Remember to type this listing with the line numbers that are shown. This will become important later when we use the MERGE and DELETE commands. Save

SOFTWARE TRS/PMC ONLY UNBEATABLE PRICES!

	DISK LIST/OUR PRICE	CASS LIST/OUR PRICE
BUSINESS-		
Small Business Systems Group		
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
GAMES		
Adventure International		
Armor Patrol	24 95/19 00	19 95/15 00
Barlog - Maces 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 - Maces 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 - Maces and Magic #2 (I)	29 95/23 00	n/a
Big Five		
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
Cornsoft		
Scarfman	19 95/15 00	15 95/12 00
Space Castle	19 95/15 00	15 95/12 00
INFORMATION PROCESSING		
Adventure International		
Maxi Manager (48)	99 95/79 00	n/a
OPERATING SYSTEMS		
Micro Systems Software		
Dos Plus V3.3 (I)	100 00/80 00	n/a
UTILITIES		
Howe		
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
WORD PROCESSING		
Michael Shrayner Software		
Electric Pencil (I)	n/a	100 00/24 00
Aspen Software		
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
MISCELLANEOUS		
Adventure 1 thru 12 - Hints Sheets	1 00	
Box of 10 5 1/4-inch Diskettes	25 00	
Box of 10 C-10 cassettes	7 50	
Box of 10 C-20 cassettes	9 00	
Box of 10 C-60 cassettes	11 00	
Box of 10 C-90 cassettes	15 00	

PGMS will run on Mod I • Mod III, 32 DSK or 16K CAS UNLESS Marked.
(48): 48K DSK • Mod I & III (I): Mod I only (DSK +/- or CAS)

PMCSOFTWARE

475 ELLIS ST., MT. VIEW, CA 94043

**Order Only
Information**

**CALL (415) 962-0318
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.

Circle # 37

Tutorial

each of these listings in different files. Save Listing 2 with the filename DATEIN, and Listing 3 as DATEOUT.

These two routines need a little setup before they can be used in other programs. Listing 4 gives the setup and a routine to check the operation of the routines. If you have already saved DATEIN and DATEOUT, just type in Listing 4, then type MERGE DATEIN<ENTER> and MERGE DATEOUT<ENTER>. Save this program with an appropriate name and RUN it to check things out. This program won't be used in the program package, so you may KILL it when you have the two subroutines running properly.

For my next trick before ending the first of this three-part series, I would like to give you a few hundred words of memory. I sincerely thank Lewis Rosenfelder for the following idea on the use of unused disk buffer areas as storage for object code routines. His very good book, *Basic Faster and Better & Other Mysteries*, was a great inspiration in this area.

You probably noticed, in Listing 1, a whole section dealing with reading data statements and POKEing them into a relatively low area of memory usually associated with the sacred ground tread upon only by DOS. This routine is the object code for a routine to take a string variable and convert any lowercase characters to their uppercase form. The program will be looking for uppercase entries most of the time, and this will allow you to use your system as it is normally configured.

The routine will work on both the Model I and Model III computer if you are using NEWDOS/80. Check out Mr. Rosenfelder's book to find out how to use it with other Disk Operating Systems. This routine will reside in the area that would normally be used for disk I/O buffer number two (that's where Mr. Rosenfelder comes in). This memory is automatically reserved when you enter BASIC and select the default values of three disk I/O buffers. Thus, the program takes no more memory than you would probably use anyhow, and you don't have to remember some value to specify to reserve high memory. Mr. Rosenfelder's book lists the memory locations of these buffers for all of the popular TRS-80-compatible operating systems. Just remember that you cannot use that buffer for I/O without destroying the program there.

If you would like to use that routine elsewhere in some of your other programs before the next issue of *80-U.S. Journal*, the DEFUSR statement in line 820 of Listing 1 is set up to point to the routine. The routine can be called with a statement such as P=USR0(VARPTR(ST\$)). The P is a dummy argument, and you pass the location of the string with the VARPTR function. The routine picks up the rest of the information it needs by itself.

One more quick subroutine to give you, and then it will be goodbye until next month. Listing 5 should be typed in and saved as PRINTCK. This routine is written specifically for an Epson MX-80 parallel printer, but, with only minor changes, could work for any parallel printer. The routine needs no changes to work for the Model III, as it too uses memory location 14312 (37E8 Hex) as the I/O route for the printer.

80-U.S. Journal has previously published the how-tos and wherefors of this subroutine, so I won't repeat them

here. This routine will only be MERGED if you indicate during certain program modules that you would like a hardcopy of the results. We'll see how all that works next time. To use this routine between now and next month, simply add the routine to your programs and perform a GOSUB 11000 just before attempting any output to the lineprinter.

This is where I am going to leave you until next time. Then we will see how to actually use the MERGE and DELETE commands to our advantage. In doing so, we will also start building up the program package by coding the routines to create our files and take a look at what kind of data base we need on disk to run the program. We will also add some codes to Listing 1 that will be used later to speed up the operation of the package.

Listing 1 Checkbook

```
5 REM CHECKBOOK 1.0 *MENU* 10/10/81
6 REM JERRY L. LATHAM
7 REM 1409 EVERGREEN CIRCLE
8 REM MIDWEST CITY, OK 73110
9 REM DEVELOPED FOR 80 U.S. JOURNAL
10 ON ERROR GOTO 800: IF AF="" THEN GOT
   O 800 ELSE IF PEEK(&H6818)<>205 THEN
   GOTO 800
20 CLS:PRINT TAB(18)"CHECKBOOK 1.0":PRI
   NTTAB(22)"MENU":PRINT:PRINT"1) CREAT
   E OR EXTEND A MONTHLY FILE":PRINT"2)
   MAKE CORRECTIONS TO ANY FILE":PRINT
   "3) SEARCH FOR ITEMS IN ANY FILE":PRI
   NT"4) CANCEL TRANSACTIONS
30 PRINT"5) CREATE A NEW FILE CONTAINI
   NG ONLY CANCELLED ITEMS":PRINT"6) CR
   EATE A NEW FILE CONTAINING ALL TRANSA
   CTIONS TO DATE":PRINT"7) END RUN (RE
   TURN TO DOS)
40 PRINT:PRINT"ENTER YOUR CHOICE (1-7)
   NOW ";
50 A$=INKEY$: IF A$<"1" OR A$>"7" THEN
   50 ELSE PRINTA$:A%=VAL(A$):ON A% GOTO
   100,200,300,400,500,600,700
100 CLS:PRINT"LOADING PROGRAM TO CREATE
   /EXTEND FILES":RUN"CREATOR",V
200 CLS:PRINT"LOADING CORRECTION PROGRA
   M": RUN"FIXSERCH",V
300 CLS:PRINT"LOADING SEARCH PROGRAM":R
   UN"FIXSERCH",V
400 CLS:PRINT"LOADING CANCELLING PROGRA
   M":RUN"CANCELS",V
500 CLS:PRINT"LOADING FILE TO CREATE FI
   LE CONTAINING ALL CANCELLED ITEMS":RU
   N"BUILDALL",V
600 CLS:PRINT"LOADING FILE TO CREATE FI
   LE CONTAINING ALL ITEMS IN ALL FILES.
   ":RUN"BUILDALL"V
700 CLS:PRINT"RETURNING TO DISK OPERATI
   NG SYSTEM":CMD"S"
```



```

800 RESUME 810
810 CLS:PRINT"INITIATING SYSTEM. STAND
  BY ONE MINUTE.":PRINT"DECLARING TYPES
  ":CLEAR2000:DEFSTR A-C:DEFDBL D:DEFIN
  T P-Z
820 PRINT"READING DATA": FOR X=&H6818 T
  O &H6833: READ Y: POKEX,Y:NEXTX:DEFUS
  R0=&H6818:PRINT"ESTABLISHING VARIABLE
  S"
825 REM
      SAVE LINES 830 TO 980 FOR NEXT ART
      ICLE
      THEY WILL BE USED AT THAT TIME.
990 DATA 205,127,10,70,35,94,35,86,235,
  4,5,200,126,254,97,56,7,254,123,48,3,
  230,95,119,35,16,241,201
  
```

Listing 2
Checkbook

```

10000 IF LEN(AD)<6 OR LEN(AD)>8 THEN 10
  100
10010 WM=VAL(AD): IF WM<Z0 OR WM>Z1 THE
  N 10100
10020 WP=INSTR(AD,"/"): IF WP<>2 AND WP
  <>3 THEN 10100
  
```

```

10030 AG=RIGHT$(AD,LEN(AD)-WP): XP=INST
  R(AG,"/")*WP: IF XP<>4 AND XP<>5 AND
  XP<>6 THEN 10100
10040 WP=WP+1: XP=XP-WP: WD=VAL(MID$(AD
  ,WP,XP)): IF WD<Z0 OR WD>Z2 THEN 1008
  0
10050 WY=VAL(RIGHT$(AD,2)): IF WY>60 AN
  D WY<72 THEN GOTO 10090
10060 YR=1900: IF WY<72 THEN YR=2000
10070 WY=YR+WY: GOSUB 10110: ZY=(WY-197
  2)*366: ZD=0: FOR X1=0 TO WM-1: ZD=ZD
  +WM(X1): NEXT X1: ZD=ZD+WD+ZY: RETURN
10080 PRINT"DATE CODE"WD"WRONG.": GOTO
  10100
10090 PRINT"YEAR CODE"WY"WRONG."
10100 PRINT"DATE FORMAT WRONG. MUST BE
  M/D/YY OR M/DD/YY OR MM/D/YY OR MM/DD
  /YY. RE-ENTER DATE IN CORRECT FORMAT
  ":INPUT AD: GOTO 10000
10110 IF (WM=4 AND WD>Z3) OR (WM=6 AND
  WD>Z3) OR (WM=9 AND WD>Z3) OR (WM=11
  AND WD>Z3) THEN 10080
10120 IF WM<>2 THEN RETURN
10130 WF=28: IF (WY/4)=INT(WY/4) THEN W
  F=29
10140 IF WD>WF THEN 10080 ELSE RETURN
  
```

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:

I² INTERFACE, INC.
20932 CANTARA STREET
CANOGA PARK, CALIFORNIA 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.

**Listing 3
Checkbook**

```

10150 ZD=ABS(ZD): YR=ZD/366: IF (ZD/366
) =INT(ZD/366) THEN Y1=12: ZD=31: YR=Y
R+1971: GOTO 10190
10160 IF (YR/4)=INT(YR/4) THEN IF ZD-(Y
R*366)=60 THEN Y1=2: ZD=29: YR=YR+197
2: GOTO 10190
10170 ZD=ZD-(YR*366): FOR Y1=Z0 TO Z1:
IF ZD<=WM(Y1) THEN YR=YR+1972: GOTO 1
0190
10180 ZD=ZD-WM(Y1): NEXT Y1
10190 IF ZD>9 THEN AD=AM(Y1)+STR$(AC)+"
"+STR$(YR): RETURN ELSE AD=AM(Y1)+"
"+STR$(ZD)+" "+STR$(YR): RETURN
    
```

**Listing 4
Checkbook**

```

10 CLEAR 1000: DEFSTR A-C: DEFINT W-Z:
Z0=1: Z1=12: Z2=31: Z3=30: DIM WM(Z1)
, AM(Z1): FOR Z0 TO Z1: READ WM(Y), A
M(Y): NEXT Y
20 DATA 31,JAN,29,FEB,31,MAR,30,APR,31,
MAY,30,JUN,31,JUL,31,AUG,30,SEP,31,OC
T,30,NOV,31,DEC
30 INPUT"ENTER DATE (MM/DD/YY) ";AD: GO
SUB 10000:V1=ZD
    
```

```

40 PRINT"DATE ";AD;" CONVERTS TO INTEGE
R ";ZD
50 GOSUB 10150
60 PRINT"INTEGER";V1;"CONVERTS TO DATE
";AD
70 GOTO 30
    
```

**Listing 5
Checkbook**

```

11000 IF PEEK(&H37E8)=191 THEN 11000
11010 IF PEEK(&H37E8)=63 THEN RETURN
11020 IF PEEK(&H37E8)=143 THEN PRINT"PR
INTER IS IN OFF-LINE MODE.":GOTO11070

11030 IF PEEK(&H37E8)=15 THEN PRINT"PRI
NTER HAS NO POWER.":GOTO11070
11040 IF PEEK(&H37E8)=223 OR PEEK(14312
)=207 THEN PRINT"PRINTER IS OUT OF PA
PER.": GOTO 11070
11050 IF PEEK(&H37E8)=255 THEN PRINT"NO
PRINTER ATTACHED. ALL OUTPUT FORCED
TO VIDEO ONLY. ": A="N": RETURN
11060 GOTO 11000
11070 PRINT"CORRECT PRINTER PROBLEM. TH
EN PRESS <ENTER> TO CONTINUE.";
11080 A1=INKEY$: IF A1<>CHR$(13) THEN 1
1080 ELSE PRINT: GOTO 11000
    
```

Subscribe to CCN

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 on 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. CCN 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

NAME _____
 ADDRESS _____
 CITY _____ State _____ Zip _____

Menus

Cooking up menus on your TRS-80

All models

T. R. Dettmann, Associate editor

A typical problem in programming is to write a program that has several options to it. One such program might be a list handling program that can add items, edit, delete, save to disk or cassette, read from disk or cassette, print, and sort them. In order to have an organized program, it's necessary to provide some easy way for someone using the program to select from several options. The simplest way is a menu.

A menu in a computer program is just a list of options (usually, though not necessarily, numbers) from which to choose. When someone using the program wants to do one thing, that person need only type in the appropriate selection and then go. Let's look at laying out a simple menu and what can make it easy to use.

The first consideration is: Will the selections be numbers, words, letters, or what? Next, how many items should be on the menu? For the moment, we'll deal with a menu that uses numbers for each selection. As to how many things to put on the menu, you will find disagreement as to what is best here.

Some programmers put every option on a single menu. This leads to menus with 10, 15, or 20 items all on the same screen. Personally, I don't like these, because I find them difficult to use rapidly. I read recently that studies have shown that a person can't deal with more than five to seven choices, because he can't grasp them



mentally all at once. Assuming it's true (at least it makes *me* feel good), I try to limit program menus to less than seven items. I try to functionally group items together in menus.

In the list handling program example above, I would group the menus like this:

Basically BASIC

MAIN MENU:

```
ADD/EDIT/DELETE
SAVE LOAD
PRINT
SORT
```

FIRST SUB MENU:

```
ADD
EDIT
DELETE
RETURN TO MAIN MENU
```

SECOND SUB MENU:

```
SAVE
LOAD
RETURN TO MAIN MENU
```

In this way, each menu is as simple as possible. Each can be laid out nicely on the screen and grasped easily by the user.

When dealing with menus that use numbers, I always use option zero to represent the END or RETURN option for that menu. That way, I always know that if I hit zero for a selection, I'll get the previous menu, or the end of the program. Otherwise, since the lengths of menus vary, the END or RETURN option will always be at a different number.

It's also important to lay out your menu cleanly on the screen for the computer you are using. If your program is expected to run on more than one computer, you have to make allowances for that in setting up the screen.

Screen layout is important. A poor layout makes your program harder to use. Some general ideas include: (1) Always start a menu by clearing the screen and printing the title of the menu so the user knows where he or she is. (2) Always align the selections in some manner to make it easy to see what the acceptable selections are. (3) Leave space from one part of the screen to another in order to separate things easily.

The main menu above could be done like this:

```
200 REM MAIN MENU
210 CLS:PRINT"MAIN LIST HANDLING MENU"
220 PRINT:PRINT
230 PRINTTAB(10)"0. END PROGRAM"
240 PRINTTAB(10)"1. ADD/EDIT/DELETE"
250 PRINTTAB(10)"2. SAVE LOAD"
260 PRINTTAB(10)"3. PRINT"
270 PRINTTAB(10)"4. SORT"
```

Assuming that the ADD/EDIT/DELETE routine begins at line 1000, the menu for it might look like this:

```
1000 REM FIRST SUB MENU
1010 CLS:PRINT"ADD/EDIT/DELETE SUB
MENU"
1020 PRINT:PRINT
1030 PRINTTAB(10)"0. RETURN TO MAIN MENU"
1040 PRINTTAB(10)"1. ADD ITEMS"
1050 PRINTTAB(10)"2. EDIT ITEMS"
1060 PRINTTAB(10)"3. DELETE ITEMS"
```

Putting the menu on the screen isn't enough, though. We also have to make our selection and then execute it.

To make a selection, we can simply INPUT the required number, but we also need to error check our input and make sure it's a *legal* selection. Try this for the main menu:

```
300 REM MAKE SELECTION
310 PRINT:PRINT
320 INPUT"SELECTION";S
330 IF S<0 OR S>4 THEN PRINT "WRONG
SELECTION":GOTO320
```

We don't just check for an error in input, we tell the user that it's wrong and give him another chance.

Once we've got a legal selection, then we can execute it by using an ON-GOSUB. ON-GOSUB takes a number, and uses it as an index into a list of subroutines. It picks out the corresponding subroutine, goes there, then returns and picks up as if there were only the single GOSUB on the line. For example:

```
ON S GOSUB 1000,2000,3000,4000
```

will execute subroutine 1000 if S=1, 2000 if S=2, 3000 if S=3 and 4000 if S=4. If S isn't between 1 and 4, it executes none of them and falls through to the next statement (that isn't true for all BASICs, but it is for TRS-80 BASIC).

Our execute selection routine can now look like this:

```
350 REM EXECUTE SELECTION
360 IF S=0 THEN CLS:END
370 ON S GOSUB 1000,2000,3000,4000
380 GO TO 200
```

At the end of the execution routine, we return to the menu and display it for the next selection. Look over the program fragment included here. It shows these menus and their relation to one another. They also represent the first stages in the design of a List Handling program using the techniques we talked about last month, modular programming and GOSUBs.

Notice that each time we create a GOSUB in the top level of the program (a menu), we put a dummy subroutine (a program stub) there to tell us that in testing, we made it to the right place.

Try typing this program fragment into your computer and making it work. Once it works, you can add each feature one at a time, and test it.

Program Listing for Basically BASIC

```
10 REM SIMPLE LIST HANDLING
20 REM INITIALIZATION
21 REM THE LINES BETWEEN 20 AN
D 200 ARE HERE FOR SETTING UP
22 REM PROGRAM PARAMETERS. FOR
EXAMPLE, CLEAR STATEMENTS AND
23 REM DIMENSION STATEMENTS, V
ARIABLE INITIALIZATION, AND SO FORTH
24 REM SHOULD BE PUT HERE
200 REM MAIN MENU
```



```

210 CLS:PRINT"MAIN LIST HANDLING MENU"
220 PRINT:PRINT
230 PRINTTAB(10)"0. END PROGRAM"
240 PRINTTAB(10)"1. ADD/EDIT/DELETE"
250 PRINTTAB(10)"2. SAVE/LOAD"
260 PRINTTAB(10)"3. PRINT"
270 PRINTTAB(10)"4. SORT"
300 REM MAKE SELECTION
310 PRINT:PRINT
320 INPUT"SELECTION";S
330 IF S<0 OR S>4 THEN PRINT"WRONG SELE
CTION":GOTO320
350 REM EXECUTE SELECTION
360 IF S=0 THEN CLS:END
370 ON S GOSUB 1000,2000,3000,4000
375 GOSUB400:' THIS LINE WILL BE DELET
ED IN THE END, IT'S HERE ONLY FOR TESTS
380 GOTO200
400 REM DELAY LOOP
410 FOR TM=1 TO 500:NEXT TM:RETURN
411 REM PUT MORE SUBROUTINES TH
AT ARE GENERALLY USEFUL HERE
412 REM BETWEEN LINES 410 AND 1
000. THINGS LIKE SPECIAL SCREEN
413 REM DISPLAYS, UTILITIES, ET
C.
1000 REM ADD/EDIT/DELETE
1010 CLS:PRINT"ADD/EDIT/DELETE SUB MENU
"
1020 PRINT:PRINT
1030 PRINTTAB(10)"0. RETURN TO MAIN ME
NU"
1040 PRINTTAB(10)"1. ADD ITEMS"
1050 PRINTTAB(10)"2. EDIT ITEMS"
1060 PRINTTAB(10)"3. DELETE ITEMS"
1070 PRINT:PRINT
1080 INPUT"SELECTION";S
1090 IF S<0 OR S>3 THEN PRINT"WRONG SEL
ECTION":GOTO1080
1100 IF S=0 THEN RETURN
1110 ON S GOSUB 1200,1400,1600
1115 GOSUB400:' DELETE AFTER TESTING
1120 GOTO1000
1200 REM ADD ITEMS
1210 PRINT"ADD ITEMS"
1211 REM THIS IS A PROGRAM 'STUB
' IT WAS CREATED TO SERVE THE
1212 REM PURPOSE OF SATISFYING T
HE CORRESPONDING GOSUB FOR A PLACE
1213 REM TO GO SO WE CAN TEST TH
E HIGHEST LEVEL OF THE PROGRAM
1220 RETURN
1400 REM EDIT ITEMS
1410 PRINT"EDIT ITEMS"
1420 RETURN
1600 REM DELETE ITEMS
1610 PRINT"DELETE ITEMS"
1620 RETURN

```

```

2000 REM SAVE/LOAD
2010 CLS:PRINT"SAVE/LOAD SUB MENU"
2020 PRINT:PRINT
2030 PRINTTAB(10)"0. RETURN TO MAIN ME
NU"
2040 PRINTTAB(10)"1. SAVE LIST"
2050 PRINTTAB(10)"2. LOAD LIST"
2060 PRINT:PRINT
2070 INPUT"SELECTION";S
2080 IF S<0 OR S>2 THEN PRINT"WRONG SEL
ECTION":GOTO2070
2090 IF S=0 THEN RETURN
2100 ON S GOSUB 2200,2400
2105 GOSUB400
2110 GOTO2000
2200 REM SAVE LIST
2210 PRINT"SAVE LIST"
2220 RETURN
2400 REM LOAD LIST
2410 PRINT"LOAD LIST"
2420 RETURN
3000 REM PRINT LIST
3010 PRINT"PRINT LIST"
3020 RETURN
4000 REM SORT LIST
4010 PRINT"SORT LIST"
4020 RETURN

```

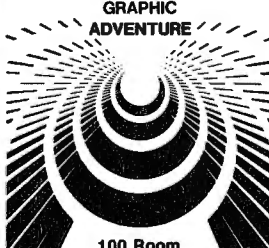
Gompu-Things

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) 289-8866

VAULTS of CYMARRON
GRAPHIC ADVENTURE



100 Room
Graphic Adventure
W/Sound
\$39.95



COMPU-BOW
by 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

@ News

Spencer Hall, Contributing editor

Hobbies bring people together . . . often people who wouldn't otherwise have been all that much interested in each other. Personal computing has turned out to be one of the greatest of these social catalysts. When a pair of total strangers discover that they both own a TRS-80; they are strangers no longer—each becomes important in the life of the other. This is especially true among Stringy Floppy owners. Sharing the endless lore of the Floppy is a joy for the teller and a fascination for the listener. Hence, there is ESFOA, the Exatron Stringy Floppy Owners Association. Hence, too, my pleasure at being asked to succeed Jim Perry as author of @ News.

Jim's reason for giving up this job is simple enough. As he put it on the phone, during our changing-of-the-guard ceremonies, "I'm going to be up to my eyeballs." Jim was referring to the mountains of documentation he is writing for Exatron's newly-announced products. Most of these were unveiled at the West Coast Personal Computer Fair held in San Francisco's Civic Center March 19-21. If your interest runs to news about other computers, you will be reading elsewhere about Exatron's 192K "solid state disk system" which plugs into the IBM personal computer.

New for TRS-80

Good news for TRS-80 owners, however, is the Stringy Floppy for Model III. In a slick new designer housing, it has room for two drives, but can be purchased with only one.

When you find that you can no longer live without a second drive (and you will), UPS and Exatron can have you back on line with two drives in a week or so. If you're one of the many Model I owners who are slowly working yourself up to a Model III, but don't want to give up your Stringy Floppy—go for it!

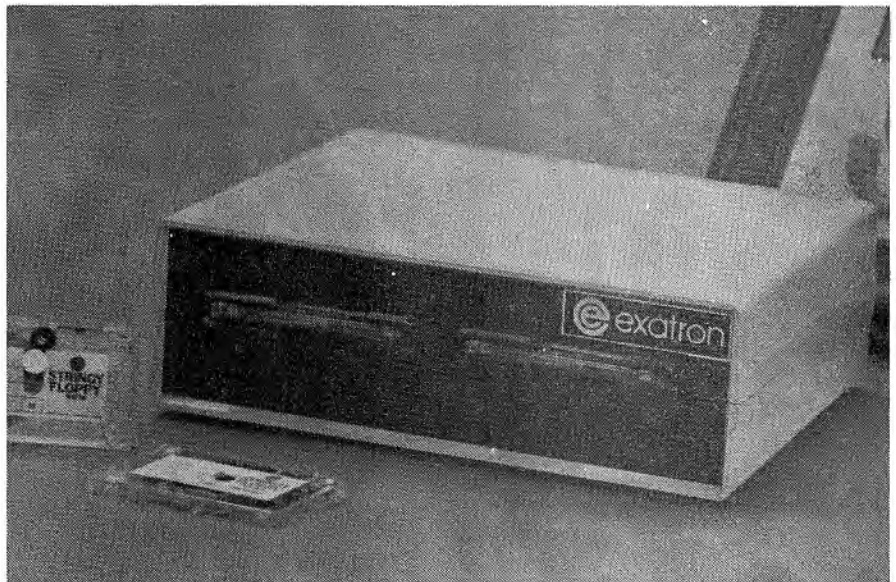
The ESF operating system and I/O routines both reside in nearly 4K of self-protected memory at the top of RAM. No need to load the I/O routine separately! Cold boot takes about ten seconds and from then on, you're in the old familiar ESF environment, with two pleasant surprises.

Tremendous Trifles

Typically, Exatron isn't wasting much time talking about these

surprises, but users will rave. Today's ESF has a virtually noiseless direct drive motor with a polished capstan that doesn't need cleaning nearly as often. Speed variation is minimized, and parity (or checksum) errors are almost nonexistent. There's also a beeper now, so that when your Floppy finds the EOF/BOF sticker, it lets out a little chirp. Have you ever loaded file #1 right after calling file #2? How long does it take? Now you know exactly when @LOAD is beginning, and that twelve second wait no longer seems like a minute.

There's also an adjustable pot (variable resistor, that is) with which you can fine tune wafer speed, and standardize your bit spacing, for optimum reliability and compatibility between drives. These two gadgets are relatively



The new Exatron Stringy Floppy for TRS-80 Model III.

inexpensive, and will be available for retrofit to your older units, which brings us to the following emergency bulletin.

Calling All ESFOA Members with Hardware Skills

On behalf of ESF owners who want beepers, speedup kits and the like, but don't dare risk all by attacking their Floppies with a hot soldering iron: your hardware skills are urgently needed. Call your local ESFOA chairman and volunteer to help those who need help. Whether you do it for love, money or spare wafers, your services will be deeply appreciated and your ego will thrive.

64K for Model I

Stay with the classic Model I Level II for a few years, and you can't help becoming an expert. It's all there in the media. There's more "know how" in print for the TRS-80 Model I than for any other computer ever made: ins and outs of the operating system, machine language, string packing, utilities that do everything but tell you what

kind of a program to write, etc.

If you're still in love with Level II, then "64K for Model I" will make your ears prick up. It's a small board using just eight of the new 64K chips (one for each bit, of course) and it fits inside the Model I keyboard. Switch it in or out under software control. Move your whole ROM and operating system into this new RAM when you feel the urge. Why? Well, as Bob Howell, Sr. puts it, "Now the gurus of the TRS-80 can write revisions to the ROM beyond our wildest dreams."

Exatron is working on a full scale CPM for Model I—not a watered down imitation, but the real thing, complete with PIP, SYSGEN, SUBMIT and all the other utilities, on either wafer or disk. Interpreters for other languages such as PASCAL, COBOL, and FORTH are possible with no addresses left tied up with unused BASIC ROM.

This board also contains the switchable three-speed clock option. Drive yourself crazy! Play Level II Scarfman on a 4 mhz. clock! Better still, get 32K of storage on a twenty-foot wafer and load it in half the

time. This item is available now for your Model I for \$19.95. Make the simple installation yourself (Exatron charges \$30.00) or look up your local ESFOA hardware whiz (see above).

A Character Generator

Exatron now has a character generator board for Model I based on a 2716 EPROM. With a switch, you can select reverse video or underlined ASCII. If you have access to erasing and burning equipment, you can design your own character set on a 2716. It's simple to install, but for many of us, it's another job for the local ESFOA solder slinger.

Apologies

Sorry about all that unanswered mail in Jim Perry's files, but the June deadline is staring us in the face and Mike Schmidt at 80-U.S. Journal is getting impatient. He doesn't believe in keeping his customers waiting. Next month, we'll open the mail bag again. Perhaps we'll find a note from you. ■

MOD I/III SPEED MOD

The only resource you can't replace is TIME. **PLUG IN A SPRINTER** (by Holmes Engineering) and

TRIPLE THE SPEED of your TRS-80 MODEL I OR MODEL 3.

YES! A NEW Z-80B MICROPROCESSOR IS INCLUDED!

YES! Special circuitry handles your slower memory chips.

YES! Automatic switch down to "normal" for disk I/O.

YES! IT IS ABSOLUTELY FANTASTIC and only 99.50 COMPLETE!!

Only the cream of the crop -- for you, from HACKS.

SCRIPPLUS v3.0 (by ROSTEK) is the software "patch" for SCRIPSIT (c) that lets you output control codes to **CHANGE TYPE STYLES, UNDERLINE**, etc. from within your text files. Written especially for the MX-80 but works fine with most any printer that accepts control codes. Makes your printer do all the tricks it was designed for. +DIR, KILL, MERGE, and MORE, WHILE IN SCRIPSIT (c).
How many times have you wished? Here 'tix ON DISK 39.95

Need a **SUPERFINE** lowercase **CHARACTER GENERATOR** for your MOD I? KSG Technology builds 'em, and we've got one just for you. Beautiful lowercase -**FULL DECENDERS** - All of the graphics, of course. **INCLUDES the SPECIAL GRAPHICS** for CHR\$(0) thru CHR\$(31) omitted in the later Radio Shack lower case chips. Ask for the CGA-2. You'll love it! Only 29.95

Did you ever bomb a disk? **SUPER UTILITY** (by Kim Watt) **WILL AUTOMATICALLY RECOVER BOOT SECTIONS, GAT TABLES, READ AND COPY PROTECTED MEDIA, TRANSFER FROM ONE DOS to ANOTHER, SINGLE OR DOUBLE DENSITY**, and on, and on, and on You just wouldn't believe . . . Includes a hundred and some odd vital functions. The **BEST** (no doubt!) and very, very highly recommended for **ANYONE** that uses a TRS-80 MOD I or MOD 3 with any kind of **DISK** and any kind of **DOS**. You just got to use it to realize what you've got here! The name "SUPER UTILITY" is a gross under-statement. One use can easily pay for the program. 48K required. Specify 35tk, 40tk or 80 tk media for your Mod I or Mod 3. Absolutely professional! You need this! Don't get caught without it. 74.95

ALL HARDWARE Model I Lowercase

TRS-80 is a Trademark of Tandy Corp

DUALCASE

UPPER/lowercase, full time from power-up; **NO** software; Standard typewriter keyboard operation (shift to UPPER-CASE); Control characters can be displayed; 128 Total character set plus full graphics.

ELECTRONIC SHIFT-LOCK

No extra keys or switches. Simply tap either shift key, UPPER-CASE lock, normal shift unlocks.

DE-B-B-BOUNCE At no extra cost (At your option)

BLOCK CURSOR if you like (No chg) **SWITCHABLE** from key board

"THE PATCH" is compatible with any word processor, any DOS and also other languages which use ROM sub-routines. Assembled and tested...\$127.00

"THE PATCH" unit plugs into the ROM sockets (does not replace existing ROM). Lowercase does require installation of the extra video ROM (supplied with "THE PATCH").

Detailed instructions guide even the most inexperienced owner to complete installation in about 30 minutes.

WHEN ORDERING SPECIFY:

"Mem Size" "Memory Size"
And your choice of any/all options.

To order, send payment plus \$2.00 shipping and handling. Texas residents add 5% sales tax/

WHEN ORDERING SPECIFY:

"Mem Size" "Memory Size"
Any your choice of any/all options

To order, send payment plus \$2.00 shipping and handling. Texas residents add 5% sales tax.



"THE PATCH" is covered with a one year limited warranty on materials and workmanship. (Does void Radio Shack's 90 day warranty.)

"THE PATCH" is a trademark of CECDAT, INC.

HACKS

P.O. BOX 12963
Houston, Texas 77017

National Distributors

Circle # 41

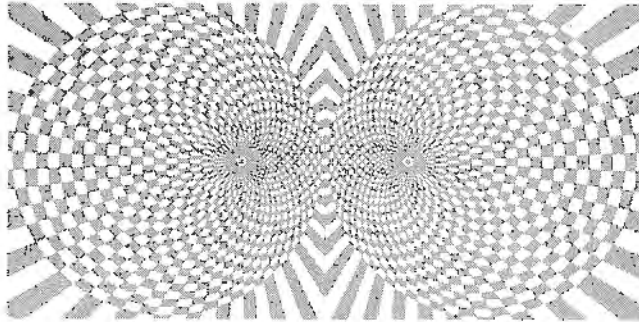
713-455-3276

DAZZLE

continued from page 30

must be set to a one also, to avoid setting and resetting the 32-character display mode during sound operations. This peculiarity is present in the Model I, but not in the Model III.

Dazzle may look like a long program to sit down and type, but if you make the effort, I think you will be pleasantly surprised by one of the best two-player computer games you've seen yet.



Listing 1

Dazzle Assembly Language Program

```
00100 ; MACHINE LANGUAGE SOUND ROUTINE
00110 ;
00120 ; FOR WORD GAME "DAZZLE"
```

```
00130 ; BY DAVE LEUPP JAN 1982
00140 ;
00150 ; ORG 49100
00160 ;
00170 ;
BFCC 0E14 00180 START: LD C,20 ; DURATION
BFCE 1E78 00190 LD E,120 ; FREQUENCY
00200 ;
00210 ;
BF00 43 00220 START: LD B,E ; LOAD DELAY COUNTER
BFD1 3E09 00230 LD A,09
BFD3 D3FF 00240 OUT (OFFH),A ; PULSE TO CASS. HIGH
BFD5 10FE 00250 LOOP1: DJNZ LOOP1 ; DELAY WHILE PULSE HIGH
BFD7 43 00260 LD B,E ; LOAD DELAY COUNTER
BFD8 3E0A 00270 LD A,10
BFDA D3FF 00280 OUT (OFFH),A ; PULSE TO CASS. LOW
BFDC 10FE 00290 LOOP2: DJNZ LOOP2 ; DELAY WHILE PULSE LOW
BFDE 0D 00300 DEC C
BFDF 20EE 00310 JR NZ,-16 ; REPEAT UNTIL C=0
00320 ;
BFE1 C9 00330 RET
00340 ;
BFCC 00350 END START
00000 Total Errors

LOOP2 BFDC
LOOP1 BFDS
START BFDD

START BFCC
```

Listing 2

Dazzle BASIC Program

```
1000 *****
1010 '* *
1020 '* DAZZLE *
1030 '* *
1040 *****
```

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.

MAIL YOUR CHECK TODAY TO COMPUKIDS

P.O.B. 874 SEDALIA, MISSOURI 65301 PHONE 816/826-0689

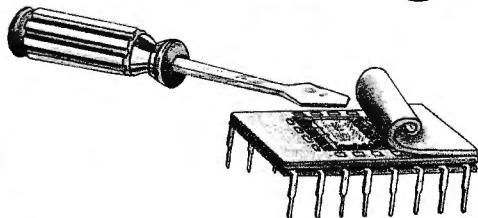
Circle # 42

1050 ' BY DAVE LFUPP
 1060 ' JAN 1982
 1080 '
 1090 ' a fast-paced, two player
 word game for
 1100 ' TRS-80 Models I and III,
 disk (32K & up),
 1110 ' or cassette (level II, 1
 6K & up) based.
 1120 '
 1130 ' *****

 1140 '
 1150 ' M in routine below must be set
 so that at least
 1160 ' 25 bytes of memory are reserved
 for the machine
 1170 ' language sound routine poked in
 later.
 1180 ' Typical values are: 48K system
 - 65500
 1190 ' 36K system
 - 49100
 1200 ' 16K system
 - 32700
 1210 '
 1220 ' AUTO MEMORY SIZE
 1230 '

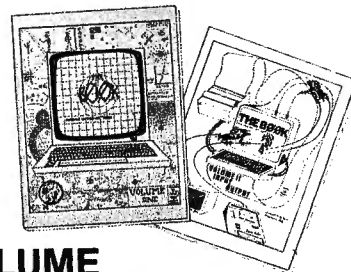
1240 CLEAR
 1250 M = 49100: WILL BE SIZED TO THIS
 VALUE
 1260 M = M-1
 1270 M1 = INT(M/256)
 1280 M2 = M-M1*256
 1290 POKE 16561, M2
 1300 POKE 16562, M1
 1310 CLEAR 50
 1320 '
 1330 ' LOAD MACHINE LANGUAGE SOUND ROU
 TINE
 1340 '
 1350 ' M in next line must be set equa
 l to the value
 1360 ' of M in the AUTO MEMORY SIZE ro
 utine above.
 1370 '
 1380 M = 49100: M = SAME AS 'M' ABOVE
 IN AUTO MEM SIZE
 1390 M1 = INT(M/256)
 1400 M2 = M-M1*256
 1410 IF M < 32767 THEN DEFUSR = M ELSE
 DEFUSR = M-65536
 1420 '
 1430 ' For non-disk systems the line a
 bove must be replaced
 1440 ' with the following line:

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.

Word game

```

1450 '
1460 ' POKE 16526, M2: POKE 16527, M1
1470 '
1480 FOR SO = M TO M+21
1490 READ SV
1500 CS = CS+SV: CHECKSUM, SHOULD
= 2417 AFTER READ
1510 IF SO < 32767 THEN POKE SO, SV:
GOTO 1530
1520 POKE(SO-65536), SV
1530 NEXT SO
1540 '
1550 DATA 14
1560 DATA 20: SETS DURATION OF BASIC
TONE (IN M+1)
1570 DATA 30
1580 DATA 120: SETS FREQUENCY OF BASIC
TONE (IN M+3)
1590 DATA 67, 62, 09, 211, 255, 16, 254
, 67, 62, 10, 211, 255
1600 DATA 16, 254, 13, 32, 238, 201
1610 '
1620 '
1630 CLS
1640 PRINT CHR$(23): 32 CHARACTER MOD
E
1650 FOR I = 1 TO 20
1660 PRINT @ 474, "DAZZLE";

```

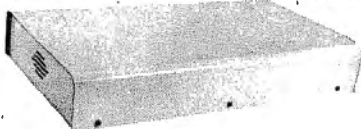
```

1670 FOR N = 1 TO 30: NEXT N: DELA
Y
1680 PRINT @ 474, " ";
1690 FOR N = 1 TO 30: NEXT N: DELA
Y
1700 NEXT I
1710 '
1720 CLS
1730 FOR N = 1 TO 30: NEXT N: DELAY
1740 PRINT @ 464, "Do you want instruct
ions";
1750 INPUT I$
1760 IF LEFT$(I$,1) <> "N" GOSUB 4230 :
INSTRUCTIONS
1770 CLS
1780 TS = 10: DEFAULT FOR POINTS FOR
GAME
1790 PRINT @ 460, "How many points for
game (1 TO 10)";
1800 INPUT TS
1810 CLS
1820 PRINT @ 468, "THANK YOU, PLEASE WA
IT."
1830 '
1840 READ LETTER ARRAY
1850 '
1860 DS = 7: # OF COLUMNS IN LETTER A
RRAY

```

Holmes Engineering

**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.

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

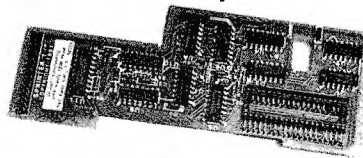
Dealer Inquiries Invited

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

prices subject to change without notice.

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

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

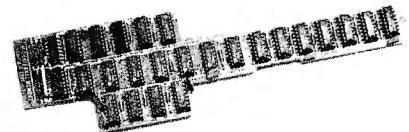


The **SPRINTER II™** plugs into the Z-80 socket in your computer case with no soldering.

- 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)



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

```

1870 ND = 6: ' # OF ROWS IN LETTER ARR
Y
1880 '
1890 FOR X = 1 TO ND
1900   FOR Y = 1 TO DS
1910     READ A$(X,Y)
1920     NEXT Y
1930 NEXT X
1940 '
1950 '   LETTER ARRAY:
1960 '
1970 DATA I,I,A,A,O,U,E
1980 DATA E,Y,O,G,P,D,S
1990 DATA A,E,V,C,B,M,S
2000 DATA U,C,F,H,T,T,P
2010 DATA B,L,L,H,R,N,W
2020 DATA E,I,R,R,J,K,L
2030 '
2040 '   INITIALIZE VARIABLES
2050 '
2060 SC = 3: '   INITIALIZE BOTTOM SCORE
R
2070 RS = 0: '   INITIALIZE RIGHT PLAYER
S SCORE
2080 LS = 0: '   INITIALIZE LEFT PLAYERS
SCORE
2090 BA = 926: ' POSITION OF INITIAL ARR
OW FOR BOTTOM SCORER

```

```

2100 RA = 890: ' POSITION OF INITIAL RIG
HT ARROW
2110 LA = 834: ' POSITION OF INITIAL LEE
T ARROW
2120 LF = 91: '   LEFT PLAYER WINS POINT,
PUSH UP ARROW (ASCII 91)
2130 RT = 9: '   RIGHT PLAYER WINS PT.,
PUSH LFT ARROW (ASCII 9)
2140 BP = 194: ' ASSIGN VALUE TO BOTTOM
POINTER CHAR. (MOD III)
2150 IF PEEK(03) = 116 THEN BP = 92: '
(MOD I)
2160 '
2170 CLS
2180 PRINT CHR$(23): '   PUT IN 32 CHAR.
PER LINE MODE
2190 GOSUB 3110 : '   DRAW SCREEN ROUT
INE
2200 '
2210 PRINT @ BA, CHR$(BP);: ' INITIALIZE
BOTTOM SCORE POINTER
2220 PRINT @ 776, "Press any key to sta
rt.";
2230 GOSUB 3560 : '   INKEY$ ROUTINE
2240 PRINT @ 776, STRING$(23," ");
2250 '
2260 '   GET RANDOM LETTERS TO DISPLAY
2270 '

```

BUY DIRECT

TRS-80™

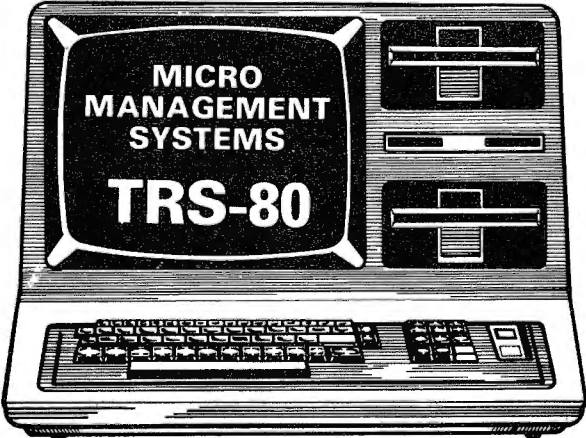
**PERSONAL COMPUTERS
PRINTERS - SOFTWARE**

MODEL II SOFTWARE

- 26-4703 Cobol Development. \$270.00
- 26-4540 Stat. Analysis..... \$90.00
- 26-4503 Payroll..... \$360.00
- 26-4501 General Ledger..... \$180.00
- 26-4505 Accts. Payable..... \$270.00
- 26-4504 Accts. Receivable... \$270.00
- 26-4507 Mail List II..... \$108.00
- 26-4508 Medical Off. Syst... \$675.00
- 26-4560 Westlaw..... \$225.00
- 26-4534 Scripsit Dictionary... \$180.00
- 26-4531 Scripsit 2.0..... \$360.00
- 26-4512 Profile II..... \$162.00
- 26-4511 Visicalc..... \$265.00

DISCOUNT SOFTWARE

TM - TANDY CORPORATION



PURE RADIO SHACK EQUIPMENT

BUY DIRECT

TRS-80™

**PERSONAL COMPUTERS
PRINTERS - SOFTWARE**

MODEL III SOFTWARE

- 26-1562 Profile..... \$72.00
- 26-1592 Profile III Plus..... \$180.00
- 26-1566 Visicalc I..... \$83.00
- 26-1563 Scripsit..... \$79.00
- 26-1590 Super Scripsit..... \$180.00
- 26-1591 Scripsit Dictionary... \$135.00
- 26-1580 Project Manager..... \$90.00
- 26-1581 Personnel Manager.. \$90.00
- 26-1552 General Ledger..... \$90.00
- 26-1584 Check Writer-80..... \$90.00
- 26-2203 Cobol..... \$180.00
- 26-2204 Compiler Basic..... \$135.00
- 26-1569 Visicalc III..... \$180.00

**COMPLETE LINE
OF TRS-80
MODEL II & III
COLOR COMPUTER
POCKET COMPUTER**

ORDER TOLL FREE
1-800-841-0860
**WE CARRY THE FULL
LINE OF TRS-80's**

WRITE FOR FREE CATALOG
**MICRO MANAGEMENT
SYSTEMS, INC.**
PARCEL DIVISION
DEPT. NO. 5
115C SECOND AVE. S.W.
CAIRO, GA. 31728
USA 800-841-0860 GA. 912-377-7120

**COMPLETE LINE
OF READY TO RUN
TRS-80
COLOR
COMPUTER PAKS**
Circle # 45

AEROCOMP DDC **\$139.95**
WITH DOS + 3.3D **\$179.95**

ATHANA DISKETTES

THE FINEST DISK AVAILABLE! ALL DISKETTES HAVE A FACTORY INSTALLED REINFORCED HUB.

BOX OF 10 SGL SIDE DBL DEN 5 1/4" **\$29.95**
 10 PLAIN ATHANA SGL SIDE DBL DEN 5 1/4" **\$22.00**
 PLASTIC LIBRARY CASE **\$ 3.50**

LAZY WRITER

THE BEST WORD PROCESSING SYSTEM AVAILABLE FOR THE TRS-80!

MODEL I **\$169.95**
 or
 MODEL III

LDOS 5.1

WITHOUT A DOUBT THE MOST POWERFUL DISK OPERATING SYSTEM AVAILABLE FOR THE TRS-80!

MODEL I **\$159.95**
 or
 MODEL III

PERCOM DATA SEPARATORS

WHILE THEY LAST ONLY **\$24.95**

TERMS: ALL PRICES INCLUDE UPS GROUND SHIPPING. ADD \$1.50 FOR COD. ALLOW 2 EXTRA WEEKS FOR PERSONAL CHECKS. WE ACCEPT VISA AND MASTER CARD.

*TRS-80 is a trade mark of the Tandy Corp



COMPUTER SERVICES



PO BOX 5744, KENNEWICK, WA 99336

(509) 582-9759

Circle # 46

Word game

```

2280 FOR D = 1 TO ND
2290   D$(D) = A$(D,RND(DS))
2300 NEXT D
2310 '
2320 '   SCRAMBLE ORDER OF LETTERS
2330 '
2340 RD = RND(ND)
2350 FOR I = 1 TO INT(ND/2)
2360   D$(I) = D$(RD)
2370   D$(RD) = D$(I)
2380   D$(RD) = D$(T)
2390   RD = RD+1
2400   IF RD = ND+1 THEN RD = 1
2410 NEXT I
2420 '
2430 '   PRINT LETTERS ON THE SCREEN
2440 '
2450 P = 480-2*ND: '   SCREEN POSITION F
OR PRINT
2460 FOR L = 1 TO ND
2470   PRINT @ P, D$(L);
2480   P = P+4
2490   Z = USR(0): '   SOUND ROUTINE
2500 NEXT L
2510 '
2520 '   DEFECT & DISPLAY FIRST PLAYER T
O RESPOND
2530 '
2540 GOSUB 3550 : ' INKEY$ ROUTINE
2550 IF I$="1" AND BP=194 OR I$="2" THE
N GOSUB 2940 : GOTO 2620
2560 IF I$ = "Z" OR I$ = "/" THEN GOSUB
2940 : GOTO 2620
2570 IF I$ = "" GOTO 2600
2580 IF ASC(I$)=10 THEN PRINT @ 964,"v"
;: GOTO 2620
2590 IF ASC(I$)=31 THEN PRINT @1018,"v"
;: GOTO 2620
2600 GOTO 2540
2610 '
2620 '   MOVE POINTERS, ADVANCE SCORE
2630 '
2640 PRINT @ 780, "Who wins the point?"
;
2650 GOSUB 3550 : ' INKEY$ ROUTINE
2660 IF I$ = "" GOTO 2650
2670 IF ASC(I$) = LF THEN SC = SC-1: ' L
FT WINS,PUSH UP ARROW
2680 IF ASC(I$) = RT THEN SC = SC+1: ' R
T WINS, PUSH LEFT ARROW
2690 IF ASC(I$) <> RT AND ASC(I$) <> LF
THEN GOTO 2650
2700 PRINT @ 780, STRING$(19," ");
2710 GOSUB 3920 : ' GO MOVE BOTTOM POIN
TER
2720 IF SC = 0 THEN LS = LS+1 : ' ADD 1
TO LEFT PLAYERS SCORE
2730 IF SC = 6 THEN RS = RS+1 : ' ADD 1

```

**COMPUTERS
 N
 STUFF**

1306 S. 56th St.
 Tacoma, WA 98408
 (206) 473-4704

COLORFILE— A menu driven mail list system designed to be used with or without a line printer. Options allow the user to create a file, review the entire file, view a single listing, update, save to cassette, enter from tape and more. **Color Computer 16K w/ ext. BASIC \$24.95**

LIBRARY-50— An extensive collection of 50 useful, educational and business programs designed to aid the student, homeowner, business person and educator. Includes programs for math, spelling, investment, mail list, etc. **Mod I/III/Color Computer 16K ext. color BASIC \$39.95**

LDOS 5.1— The ultimate in operating systems for Model I/III. **Model I/III \$117.00**

ELIMINATOR— A new adventure in machine language for 1-2 players (10 mins.) with sound and graphics. **Model I-III 16K tape \$17.95, 32K disk \$22.95**

COMPUTER MOUSE— Four games: Pillbox, Block, Pinball, Computer Mouse. **4K color, 32K tape only \$19.95**

MODEL I-III— Upgrade your 16K Model I and Model III to 48K. Complete kit and assembly instructions. **First 16K kit \$39.95, 32K kit \$79.95**

STAR TREK 3.5— Boasts some impressive graphics, realistic sound, 3-dimensional galaxy, animated visual displays and a lot of detail. Includes an extensive manual of "Trek" knowledge. **Color Computer 32K w/ ext. BASIC tape \$19.95, Model I/III 16K tape \$14.95, Model I/III 32K disk \$19.95**

VISA, Mastercard, C.O.D. Accepted
 TRS-80 is a trademark of the Tandy Corporation

Circle # 47

Word game

```

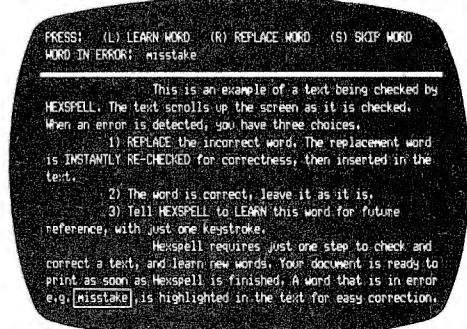
TO RIGHT PLAYER'S SCORE
2740 IF SC = 0 OR SC = 6 THEN GOSUB 365
0 : ' SET SCORE POINTERS
2750 IF LS = TS OR RS = TS THEN GOTO 40
40 : ' DECLARE WINNER
2760 '
2770 ' CLEAN UP SCREEN
2780 '
2790 P = 448+32-2*ND
2800 FOR L = 1 TO ND
2810 PRINT @ P, " ";
2820 P = P+4
2830 NEXT L
2840 PRINT @ 964, " "; : ' CLEAR LEFT P
LAYER POINTER
2850 PRINT @1018, " "; : ' CLEAR RIGHT
PLAYER POINTER
2860 PRINT @ 276, STRING$(12, " "); : ' CLE
AR CLOCK DIGIT
2870 '
2880 ' TIMER
2890 '
2900 TM = RND(300)
2910 TM = 25+TM
2920 FOR TI=1 TO TM: NEXT TI: 'RND TIME
BEFORE NEXT DISPLAY
2930 GOTO 2280 : ' GO SCRAMB
LE LETTERS & START AGAIN
2940 '
2950 ' CHALLENGE TIMER
2960 '
2970 IF I$ = "1" OR I$ = "Z" THEN CP =
296
2980 IF I$ = "2" OR I$ = "/" THEN CP =
274
2990 FOR C = 50 TO 0 STEP -1
3000 IF C < 10 THEN PRINT @ CP, C; :
GOTO 3020
3010 PRINT @ CP-2, C;
3020 FOR I = 1 TO 20
3030 NEXT I
3040 IF C < 10 THEN Z = USR(0): GOTO
3060
3050 IF C/3-INT(C/3) = 0 THEN Z = US
R(0): ' SOUND ROUTINE
3060 NEXT C
3070 FOR I = 1 TO 10
3080 Z = USR(0): ' SOUND END OF 'TIME'
3090 NEXT I
3100 RETURN
3110 '
3120 ' DRAW SCORE LINES
3130 '
3140 PRINT @ 26, "DAZZLE"
3150 PRINT @ 130, "0": ' DISLAY START S
CORE FOR LEFT
3160 PRINT @ 188, "0": ' DISPLAY START
SCORE FOR RIGHT

```

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, formulae 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.



US\$99.
Manual \$12

Hexspell requires a TRS-80 Mod I or Mod III with 2 drives and 48K



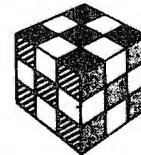
P.O. Box 397, Station A
Vancouver, B.C. Canada V6C 2N2
Telephone (604) 682-7646
Micronet 70235,1376

Circle # 48

QUICK

CUBE

TRS-80#
Model
I/III



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.
TM Trademark of Ideal Toy Corp.

Circle # 49

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!



Circle # 50
Micro Architect, Inc.
96 Dothan St., Arlington, MA 02174
Circle # 63

GOSUB

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

PRINTERS PRINTERS PRINTERS
EPSON MX80 ... \$545 ppd EPSON MX100 ... \$825 ppd

THE PRINTER STAND \$29.95

SAVE MONEY AND SPACE— Holds almost any printer that uses 9 1/2" size paper or forms. Made from 1/4" acrylic, allows 3" of paper or forms to be stacked under printer. Great for use with bottom load printers! Fits: MX80/70-Microline 80's BASE 2-850 Byewriter-1 and many more!

AUTHORIZED DEALERS FOR THE GOSUB FRICTION FEED KIT

USA— Alpine Computer Center, 2526 S. Alpine Rd., Rockford, Ill 61108, (815) 229-0200; OMEGA Micros, 3819 West Michigan St., Milwaukee Wis. 53208, (414) 933-6088; EXATRON, 181 Commercial St., Sunnyvale, Ca. 94086, (800) 538-8559/CA. (408) 737-7111

CANADA— Microwest Dist. Ltd., 1940 Larson Rd., North Vancouver, B.C., Canada V7M 2Z8, (604) 988-9998 or 988-6877

AUSTRALIA— Computer Campus Pty. Ltd., 11 Rundle Street, Kent Town, South Australia, 5067, ph. 08 424828, telex 88156

TRS-80 COLOR COMPUTER STRATEGY SIMULATIONS

MERCENARY FORCE— Command a mercenary army. Decide the number of men, type of weapons, armor, air support, medical aid and transports. Battle the enemy in jungles, underwater, on moons and in space. (1-4 players) TRS-80L2 16K ... \$16.95

SPACE MERCHANT— Build an Empire in the stars. Choose your cargo, means of shipping and security. Risk pirates, ion storms, engine failure and other hazards while you try to become a Space Merchant (1-6 players) TRS-80 L2 16K ... \$9.95

We have just about everybody's software.
Call us and tell us what you want. We've got it!

Kansas residents add 3% sales tax
All prices subject to change without notice
CATALOG \$1.00

(TRS-80 is a trademark of Tandy Corp.)
Dealer Inquiries Invited

SEND CHECK OR MONEY ORDER TO:

GOSUB
P.O. Box 275
Wichita, KS 67201
(316) 265-9992

GOSUB International
New England Div.
P.O. Box 2566
Framingham, MA 01701
(MA residents add 5% sales tax)

Gosub Int'l., Inc.
501 E. Pawnee, Ste 430
Wichita, KS 67211
(316) 265-9858

Word game

```

3170 '
3180 ' MIDDLE LETTER LINES
3190 '
3200 PRINT @ 594, STRING$(13,131);
3210 PRINT @ 338, STRING$(13,176);
3220 '
3230 ' SIDE SCORE LINES
3240 '
3250 POKE 16420,1: ' ACTIVATE SPECIAL C
HAR. SET (MOD III)
3260 ST = 192
3270 FOR N = 1 TO 10
3280 PRINT @ ST, CHR$(159);
3290 PRINT @ ST+62, CHR$(175);
3300 ST = ST+64
3310 NEXT N
3320 PRINT @ ST, CHR$(143);
3330 PRINT @ ST+62, CHR$(143);
3340 '
3350 ' BOTTOM SCORE LINE
3360 '
3370 P = 968
3380 PRINT @ P-2, CHR$(170);
3390 PRINT @ P, CHR$(181);
3400 FOR N = 1 TO 5
3410 IF N = 1 GOTO 3430
3420 PRINT @ P, CHR$(176);
3430 PRINT @ P+2, CHR$(176);
3440 PRINT @ P+4, CHR$(176);
3450 PRINT @ P+6, CHR$(191);
3460 P = P+8
3470 NEXT N
3480 PRINT @ P, CHR$(176);
3490 PRINT @ P+2, CHR$(176);
3500 PRINT @ P+4, CHR$(186);
3510 PRINT @ P+6, CHR$(149);
3520 PRINT @ RA, "->";
3530 PRINT @ LA, "<-";
3540 RETURN
3550 '
3560 ' INKEY$ ROUTINE
3570 '
3580 J$ = INKEY$
3590 I$ = INKEY$
3600 IF I$ = "" AND PEEK(14464) = 0 GOT
O 3590
3610 IF PEEK(14464) = 1 THEN I$ = "1"
3620 IF PEEK(14464) = 2 THEN I$ = "2"
3630 RETURN
3640 '
3650 ' SET SCORES
3660 '
3670 IF LS = TS OR RS = TS GOTO 3740
3680 FOR N = 1 TO 3
3690 FOR I = 1 TO 5
3700 Z = USR(0)
3710 NEXT I
3720 FOR I = 1 TO 5: NEXT I: ' DELAY

```

Word game

```

3730 NEXT N
3740 IF SC = 6 THEN GOTO 3810 : ' GO MOV
E RIGHT POINTER
3750 PRINT @ LA, " "; : ' CLEAR PRESENT
LEFT POINTER
3760 LA = LA-64 : ' MOVE LEFT POIN
TER POSITION UP
3770 PRINT @ LA, "<-"; : ' PRINT POINTER
AT NEW POSITION
3780 PRINT @ 128, LS;
3790 GOTO 3850
3800 '
3810 PRINT @ RA, " ";
3820 RA = RA-64
3830 PRINT @ RA, "->";
3840 PRINT @ 186, RS;
3850 IF LS = TS OR RS = TS GOTO 3910
3860 SC = 3 : ' RESET BOTTOM SCORE
3870 PRINT @ 776, "Push space to contin
ue.";
3880 GOSUB 3560 : ' INKEY$ ROUTINE
3890 IF ASC(I$) <> 32 GOTO 3880 : ' WAI
T FOR SPACE BAR TO CONT.
3900 PRINT @ 776, STRING$(23, " ");
3910 RETURN
3920 '
3930 ' MOVE BOTTOM POINTER
3940 '
3950 PRINT @ BA, " ";
3960 IF ASC(I$) = LF THEN BA = BA-8 ELS
E BA = BA+8
3970 PRINT @ BA, CHR$(BP);
3980 IF SC <> 0 AND SC <> 6 THEN GOTO 4
030
3990 FOR N = 1 TO 350 : NEXT N : ' DELAY
4000 PRINT @ BA, " ";
4010 BA = 926
4020 PRINT @ BA, CHR$(BP);
4030 RETURN
4040 '
4050 ' DECLARE WINNER
4060 '
4070 IF LS = TS THEN WP = 128 ELSE WP =
180
4080 FOR N = 1 TO 10
4090 PRINT @ WP, STRING$(6, " ");
4100 FOR I = 1 TO 15 : NEXT I : ' DELA
Y
4110 PRINT @ WP, "WINNER";
4120 FOR I = 1 TO 5 : Z = USR(0) : NEX
T I
4130 FOR I = 1 TO 5 : NEXT I
4140 FOR I = 1 TO 5 : Z = USR(0) : NEX
T I
4150 NEXT N
4160 PRINT @ 776, "Push space to play a
gain.";
4170 GOSUB 3560 : ' INKEY$ ROUTINE

```



PRIZE WINNING CHESS

SFINKS 3.0 (New)

Prize winner in Paris in the 1981 Microcomputer Chess Championship; Sfinks 3.0 is the fastest and strongest chess program ever written!

FEATURES: Book Openings, Chess Clock, Thinking on Opponent's Time, Infinite Levels of Play, and Ruthless Playing Ability!

32K cassette or disk only \$39⁹⁵

SFINKS 1.81

Prize winner in San Jose in the latest (1980) U.S. Microcomputer Chess Championship; Sfinks 1.81 beats Sargon II, Mychess and Gambiet 80. Easy to use with many convenience features.

32K cassette or disk now only \$24⁹⁵

Please specify cassette or disk and Model I or III.

INCLUDE \$2.00 SHIPPING AND HANDLING.

WILLIAM A. FINK

(305) 942-5706

P.O. BOX 5912

LIGHTHOUSE POINT, FL 33074

Exceptional Dealer Discounts Available.



Circle # 51

Circle # 52

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

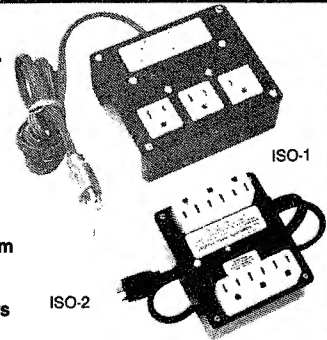
MONEY BACK GUARANTEE!

- 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)



Pat. #4,259,705

ESP Electronic Specialists, Inc.

171 South Main Street, Box 389, Natick, Mass. 01760

(617) 655-1532

electronic mail

A perfect trio—The Hayes Stack Smartmodem, TRS-80, and the Automated Communication Exchange software. Now you can have access to other computers over the telephone line, as well as, time sharing systems and information utilities nationwide.

The Hayes Stack Smartmodem features auto answer & auto dial, RS232C compatibility, seven LED indicators, an audio monitor, accepts over 30 different commands, and is programmable in any language.

The unique A.C.E. software package allows you to receive & transmit ASCII files from your completely unattended TRS-80!

For a sophisticated, high performance, data communication system select A.C.E. and the Hayes Stack Smartmodem.



Hayes Stack Smartmodem \$249

A.C.E. disk software for 48K Model I/III \$79

***** Special—Limited time only! *****
A.C.E. Disk software \$39 w/Smartmodem purchase



ACE COMPUTER PRODUCTS OF FLORIDA, INC.
1640 N.W. 3rd Street
Deerfield Beach, FL 33441

Data (305) 427-6300/Voice (305) 427-1257
MC/VISA accepted FL res add 4% sales tax
Freight incl (UPS ground—Cont. USA)

Circle # 53

Circle # 54

MICRO IMAGES	
FREE SHIPPING WITHIN CONT. U.S.A.	
EPSON	CALL OKIDATA
FOR OUR LOW PRICES	
RS232 Not. Req.	LYNX Mod I/III \$259.95
includes auto dial/answer, cables and terminal software	
SUPER UTILITY PLUS by Kim Watt <i>Specify 40 or 80 Track</i>	\$69.95
SUPERSCRIP BY Acorn - Req. 32K, Scripsit & L/C - Disk	\$44.95
EDITOR ASSEMBLER PLUS BY Microsoft - 16K Tape	\$27.95
DOSPLUS <i>Newest Version</i> 3.4S/3.4D/3.4 III ea	\$134.95
MAXI MANAGER <i>by Adventure Int'l</i> Mod I/III Latest Version 48K Disk	\$84.95
UNITERM by Pete Roberts - Mod I/III <i>Works with most modems</i>	\$74.95
MICROSOFT - FORTRAN 80-\$89.95 - A.L.D.S-\$89.95 - BASIC COMPILER-\$179.95	
EDAS by MisoSys Sophisticated Editor & Assembler.	\$75.95
LDOS Version 5.1 — Mod I or III	\$118.95
LAZYWRITER <i>LATEST VERSION</i> <i>A Best Buy in Word Processors</i> — Mod I or III	\$164.95
Proofreader by Aspen Software	Mod I - 49.95 Mod III - 49.95
Proofedit by Aspen Software	Mod I - 28.50 Mod III - 28.50
Grammatik by Aspen Software	Mod I - 55.95 Mod III - 55.95
MX 80 Ribbon Reloads - \$3.50 ea/\$38.00dz. 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.	
<i>We Offer Great Values & Prompt Delivery — Why Not Try Us?</i>	
146-03 25th Road, Flushing, New York 11354	
Mon-Fri 10 AM-9 PM	(212) 445-7124
	Sat 10 AM-5 PM

Word game

```

4180 IF ASC(I$) = 32 THEN GOTO 2040 :
      INITIALIZE & PLAY AGAIN
4190 CLS
4200 PRINT @ 352, "BYE!";
4210 END
4220 '
4230 ' INSTRUCTION ROUTINE
4240 '
4250 CLS
4260 PRINT "DAZZLE is a fast-paced word
      game for two players."
4270 PRINT "A randomly selected group o
      f six letters is dis-"
4280 PRINT "played in the middle of the
      screen. The first"
4290 PRINT "player to recognize a word
      using four or more of"
4300 PRINT "the displayed letters press
      es his 'WORD' button -"
4310 PRINT "<CLEAR> for the righthand p
      layer, the down arrow"
4320 PRINT "key for the player on the l
      eft. The computer sig-"
4330 PRINT "nifies which player has pus
      hed first by displaying"
4340 PRINT "a 'v' in the lower corner o
      n the side of that "
4350 PRINT "player."
4360 GOSUB 4770 : ' PAGER ROUTINE
4370 PRINT "Since the player may have m
      istakenly pushed"
4380 PRINT "the button, the computer as
      ks which player"
4390 PRINT "won the point. Press the r
      ight arrow key if the"
4400 PRINT "point goes to the player on
      the right, the up
4410 PRINT "arrow for the player on the
      left. While looking"
4420 PRINT "at the letters displayed on
      the screen either"
4430 PRINT "player may decide that no w
      ords are possible."
4440 PRINT "In that case the player may
      'CHALLENGE' by "
4450 PRINT "pressing the appropriate bu
      tton. The righthand"
4460 PRINT "player must push the <?> ke
      y (or the righthand"
4470 PRINT "shift key on the Model III)
      , the lefthand player"
4480 PRINT "the <Z> key (or lefthand sh
      ift on a Model III)."
4490 GOSUB 4770 : ' PAGER ROUTINE
4500 PRINT "When a challenge key is pre
      ssed a countdown timer"
4510 PRINT "is displayed on the side of
      the player who is"
  
```


Word game

4520 PRINT "challenged. If that player
does not find a word"
4530 PRINT "before the timer runs out t
he challenging player"
4540 PRINT "wins the point. If the cha
llenged player does"
4550 PRINT "find a word, he wins the po
int. Each point won"
4560 PRINT "results in movement of the
score pointer at the"
4570 PRINT "bottom of the screen toward
the side of the point"
4580 PRINT "winner. When the pointer r
eaches either end, the"
4590 PRINT "corresponding player is rew
arded by an upward "
4600 PRINT "movement of his score point
er on the side of the"
4610 PRINT "screen."
4620 GOSUB 4770 :' PAGER ROUTINE
4630 PRINT "The first player to score t
en points reaches"
4640 PRINT "the top of his side scorer,
and wins the game."
4650 PRINT "The game includes sound eff
ects for the timer and"
4660 PRINT "other appropriate activitie
s. Sound is output"
4670 PRINT "through the cassette port,
by a machine language"
4680 PRINT "subroutine poked to high me
mory at the beginning"
4690 PRINT "of this program. Memory is
sized automatically"
4700 PRINT "by this program, but the va
lue of M in both the"
4710 PRINT "AUTO MEMORY SIZE and LOAD M
ACHINE LANGUAGE SOUND"
4720 PRINT "routines must be set to a v
alue at least 25 bytes"
4730 PRINT "below the normal top of mem
ory when typing in"
4740 PRINT "the program."
4750 GOSUB 4770 :' PAGER ROUTINE
4760 RETURN
4770 '
4780 ' INSTRUCTION PAGER ROUTINE
4790 '
4800 PRINT "*****"
*****"
4810 PRINT
4820 PRINT TAB(10);"Push any key to con
tinue."
4830 GOSUB 3560 :' INKEY\$ ROUTINE
4840 CLS
4850 RETURN
4860 '

Computer Program Books for Beginners

Everything you need to know to get started program-
ming your own computer. These handy books of
programs, each jam-packed with easy-to-
understand info for beginners, are crammed with
hundreds of tips, tricks, secrets, hints, shortcuts,
techniques, plus hundreds of tested ready-to-run
programs. For the TRS-80 Color Computer. For the
TRS-80 Pocket Computer and Sharp PC-1211,
PC-1500, Casio FX-702P pocket computers, as well
as for Apple and IBM.

Color Computer

101 Color Computer Programming Tips & Tricks, learn-by-doing
instructions, hints, secrets, shortcuts, techniques, insights, for
TRS-80 Color Computer, 128 pages **\$7.95**
55 Color Computer Programs for Home, School & Office, practical
ready-to-run software with colorful graphics for TRS-80 Color
Computer, 128 pages. **\$9.95**
55 MORE Color Computer Programs for Home, School & Office,
sourcebook of useful type-in-and-run software with exciting
graphics, for TRS-80 Color Computer, 112 pages. **\$9.95**
The Color Computer Songbook, 40 favorite pop, classical, folk &
seasonal songs arranged for TRS-80 Color Computer; ready-to-
run music programs, 96 pages. **\$7.95**
**My Buttons Are Blue and Other Love Poems from the Digital Heart
of An Electronic Computer**, for poetry lovers, computer lovers, a
high-tech classic, 66 heartwarming poems written by a TRS-80
Color Computer, 96 pages. **\$4.95**
Color Computer Coding Form, handy preprinted programming
worksheets make writing software easy, fun, 40-sheet pad. **\$2.95**

Pocket Computer

101 Pocket Computer Programming Tips & Tricks, secrets, hints,
shortcuts, techniques from a master programmer,
128 pages. **\$7.95**
50 Programs in BASIC for Home, School & Office, sourcebook of
tested ready-to-type-in-and-run software for TRS-80 and Sharp
pocket computers, 96 pages. **\$9.95**
50 MORE Programs in BASIC for Home, School & Office, ideal
source for lots more useful software for TRS-80 and Sharp pocket
computers, 96 pages. **\$9.95**
Murder in The Mansion and Other Computer Adventures, with 24
game programs: murder mystery, space, adventure, loads of fun
for TRS-80 and Sharp pocket computers, 96 pages. **\$6.95**
Pocket Computer Programming Made Easy, new fast 'n easy way
to learn BASIC, make your computer work for you, for TRS-80,
Sharp, Casio pocket computers, 128 pages. **\$8.95**
35 Practical Programs for the Casio Pocket Computer, book of
useful type-in-and-run software for the FX-702P, 96 pages. **\$8.95**
Pocket-BASIC Coding Form, preprinted program worksheets
make writing programs a breeze; for TRS-80, Sharp, Casio
pocket computers, 40-sheet pad. **\$2.95**
Universal BASIC Coding Form, programming worksheets for
anybody writing in BASIC for any computer system, make writing
program lines easy and fun. 40-sheet pad. **\$2.95**

Order direct from this ad. Send check or money
order. Include \$1 shipping for each item ordered up
to a maximum of \$3 shipping. Or write for our free
catalog. Mail your order to:

ARCsoft Publishers

Post Office Box 132Z

Woodsboro, Maryland 21798

(301) 663-4444

Circle # 55

PROGRAMMER'S LIFESAVER!

If you use disks, you need ULTIZAP/PRO

Finally, a "Zap" program for LDOS (c) that does everything the others do, and much more. The ultimate utility for the ultimate DOS!

This 20K machine language utility will read, modify, write, compare, copy and verify disk sectors. You can make modifications in either hex or ASCII. It supports both Parallel and Serial printers.

Want to change one or more bytes in a program directly on disk? Input the RAM address, and ULTIZAP will find and display the proper SECTOR for you! Five different readouts keep track of not only the dual cursors, but the MEMORY address into which the byte under them will load. Hit [I] (for Info) and you'll get a display of the file's start cyl/sec, length, EOF, backup date and much more.

With ULTIZAP you can save bombed diskettes, easily recover a killed file, alter DAMS, or remove a password. You can search through a diskette, file, or memory for a byte or a whole string.

With ULTIZAP you don't have to boot a special disk; your system stays on-line at all times. There's no need to keep 2 or 3 separate programs available to solve different problems or provide information - ULTIZAP does it all, easily, quickly and reliably. The operation manual is a complete source book on DOS and diskette systems and architecture. ULTIZAP/PRO - a must for all disk users.

ULTIZAP/PRO 2.2 \$ 65
upgrade from 1.4/2.0 \$ 5

Powerful Processing from ...
The Utility Company
11360 Sunset Blvd
Los Angeles, CA 90049
(213) 476-7610

6% Sales Tax (California only)

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.

Jul/Aug 1979

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

Nov/Dec 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.

Nov/Dec 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.
Check writing program.

Jul/Aug 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.

Sep/Oct 1981

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

Nov/Dec 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.

Feb 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"/> Jul/Aug 1981 |
| <input type="checkbox"/> Jul/Aug 1979 | <input type="checkbox"/> Nov/Dec 1980 | <input type="checkbox"/> Sep/Oct 1981 |
| <input type="checkbox"/> Nov/Dec 1979 | <input type="checkbox"/> May/June 1981 | <input type="checkbox"/> Nov/Dec 1981 |
| | | <input type="checkbox"/> Feb 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

Files and foibles

Binary trees

T. R. Dettmann, Associate editor

In the last installment, we covered one possible use for list linking techniques. A still better use for linking technique is establishing what is called a "binary tree". Binary trees are well known to professional programmers since they can often be used to simplify access (and speed it up) in a file. A binary tree is more than just a linked list. In fact, it is related to it only by the fact that both use pointers. A binary tree cuts down the number of times we have to access a file while searching for an item. For example, with less than (or equal to) 1024 items in a file, we can find any one (or tell that the one we want isn't there) in less than 10 accesses. If we put 1024 items in a simple linked list, then the *average* search time for an item would be 512 accesses to the list! Obviously, a binary tree becomes a very efficient technique for dealing with large random access files. As always in life, nothing is free. Getting a binary tree requires extra space because instead of one pointer, we must keep two. It also requires different techniques for accessing the tree. We have to use new methods for putting things in and taking them out. In some cases, the programming overhead is unwarranted. Still, if your application requires a large file which you have to frequently get information from to keep it ordered, and if you want information fast, then a binary tree structure may be for you. Let's look and see how a binary tree works. Figure 1 shows conceptually how a binary tree may be viewed. It looks like an upside down version of a genealogical chart. At the top of the binary tree is the "root". This is the starting point for all accesses to the list. If we're looking for something in the file, say the name "Terry", we start looking at the root. As we look at each data item, we ask: "Is what we want greater than or less than what we found?" If the answer is greater, we follow the right side path from the data item into the tree below. If the answer is less, we go down the left. If the data item equals the item we're looking for, then we've found it. If we decide to move down left (or right, for that matter) and find that there's no place to go (no link), then what we want isn't in the list. As long as the tree is "balanced" (equal numbers of items on each side of any one data item), then we never need go very far to get anything. As it turns out, the critical thing for practical applications involving trees that you construct as you go (say, for a mailing list) is how the tree grows. If it grows in a balanced fashion, then getting anything in the tree will be fast. In the worst case, if things are added to the tree in just exactly the wrong way, it breaks down to a linked list and we lose the advantage we sought. **Adding to a Tree** To add to a binary tree, we follow the basic procedure: IF ITEM IS THE ROOT



[513]
 294-3383

"TOO MUCH" FOR RADIO SHACK!

Radio Shack REFUSED to include MISADVENTURE #1 in their SOURCEBOOK due to our description of the game!

THE SOFTCORE SOFTWARE CO.
9 Southmoor Circle, Kettering OH 45429

- #0201 Misadventure #1 [Madam Rosa's Massage Parlor]
- #0202 Misadventure #2 [Wet T-Shirt Contest]
- *#0203 Misadventure #3 [Sewers of Moscow]
- *#0204 Misadventure #4 [Casino of Pleasure]
- #0301 Dohne' Bugg [Adventure-decoder]
- *#0401 Mystery Of The Keys [COLOR computer only]

*With Sound

Our MISADVENTURE SERIES consist of CHALLENGING and FUN "adventure-type" programs that may occasionally be a bit naughty!

MYSTERY OF THE KEYS for the color computer is a graphic puzzle as addicting as "The Cube" and similar to "The Link". 4k and up

IN MISADVENTURE #1 the player has to make his way from the sleazy deserted WHARFS, gain admittance to the ancient SPEAKEASY, and attempt to discover the hidden photographs of the politician's beautiful daughter! Brave the deadly alleys, hallways, and traps. Avoid the BOUNCER and the other characters of questionable reputation! Play in the rigged CARD GAME if you dare! Discover why the old man died with a smile on his face! Find out why the WINO prefers cheap booze! Above all, try to escape without needing any injections of penicillin!!!

DOHNE' BUGG is our best-selling ADVENTURE-DECODER! Are you STUCK in a machine-language ADVENTURE GAME? This program will display on the screen all VERBS that interact in the game, all LOCATIONS & OBJECTS you will find, and all ACTIONS that result! A MUST FOR THE SERIOUS ADVENTURER! Note: will not work on Model III disk systems!

All programs (except #0401) work on 16k MODEL I & III
 \$15 EACH — we pay postage!

Immediate shipment! Check, credit cards, or phone order [12-6 p.m.]
 Dealers and Distributors welcome—please inquire. Hint Sheets Available!

Circle # 56

File handling

THEN WE'RE DONE OTHERWISE START AT THE ROOT
 IF THE NEW ITEM IS LESS THAN THE PRESENT ITEM THEN GO LEFT ELSE GO RIGHT
 CONTINUE DOWN THE TREE UNTIL THERE IS NO LINK TO CONTINUE WITH, PUT THE NEW ITEM THERE

To search through a binary tree, we have the procedure:

START AT ROOT
 A IF ITEM DESIRED = ITEM LOOKING AT THEN DONE
 IF ITEM DESIRED < ITEM LOOKING AT THEN GO LEFT
 IF ITEM DESIRED > ITEM LOOKING AT THEN GO RIGHT
 IF CAN'T GO DOWN IN THE LIST THEN THE ITEM ISN'T IN THE LIST
 REPEAT FROM A FOR EACH ITEM ENCOUNTERED.

While these procedures are conceptually simple, they do take some work to make them useable.

If we really want to use a binary tree, we have to work out simple BASIC subroutines to do these functions and the exact structure for our data to make it possible.

ACTION GAMES

The fastest growing producer of computer games for your 6809 has the products you have waited for!!

NEW!

CAVE HUNTER

ARCADÉ GAMES FOR THE COLOR COMPUTER

COLOR BERSERK

Fast paced action • Super HI-Res Graphics
 Dynamite sound effects • Runs in 16K of memory
 These games will astonish you with their Detail and Quality.
 They set a standard for others to follow.

— ADVENTURES —

Calixto Island • The Black Sanctum

Highly acclaimed by reviewers • Challenging situations
 Fast, efficient machine language • Runs in 16K of memory
 Save game in progress

Adventures on 5 1/4 TSC FLEX disc (specify 6809 or 6809)	ea \$24 95
Both adventures on single disc	\$39 95
Adventures for color computer	ea \$19 95
Color Berserk for color computer	ea \$24 95
Cave Hunter for color computer	ea \$24 95

Shipped prepaid in Continental U.S. California residents, please add 6% tax.



— MORE COMING SOON —



Circle # 57

MARK DATA PRODUCTS

23802 Barquilla, Mission Viejo, CA 92691 • (714) 768-1551
 TRS 80 IS A TRADEMARK OF TANDY CORP.

Binary Trees in BASIC

To lay out a binary tree in a real file, first we have to provide two links for each record. Then we need to lay out our data record itself. Consider, for example, this FIELD:

FIELD #1, 2 AS LL, 2 AS RL, 56 AS DA\$

We're using LL for the "left link", RL for the "right link", and DA\$ for the data.

Now, to add items to the list, assume, for the moment, that we'll always use record 1 as the root and always add to the end of the file. We'll assume that X\$ is the data to be added to the file.

We then have:

```

1000 REM ADD TO TREE
1010 LC=LOF(1)+1
1020 IF LC=1 THEN 1110
1030 LK=1
1040 GET1,LK
1050 IF X$<DA$ THEN 1090
1060 IF X$=DA$ THEN PRINT"ALREADY THERE"
      :RETURN
1070 IF RL=0 THEN LSET RL=LC:PUT1,LK:GO
      T0110
1080 LK=RL:GOTO1040
1090 IF LL=0 THEN LSET LL=LC:PUT1,LK:GO
      T0110
  
```



```

1100 LK=LL:GOTO1040
1110 LSET DA$=X$:LSET LL=0:LSET RL=0
1120 PUT1,LC:RETURN
    
```

To find an item in the file, we have to start at the root and look down through the tree until we find what we want. One procedure goes like this:

```

1200 REM SEARCH THROUGH TREE
1210 IF LOF(1)=0 THEN PRINT"FILE EMPTY"
      :RETURN ELSE LK=1
1220 GET1,LK
1230 IF DA$=X$ THEN PRINT"FOUND":RETURN

1240 IF X$<DA$ THEN LK=LL ELSE LK=RL
1250 IF LK=0 THEN PRINT"NOT FOUND":RETU
      RN
1260 GOTO 1220
    
```

Neither of these treats the problems such as what to do if the tree gets unbalanced, how to follow through the tree to print it in alphabetical order, etc. But they will get you started with the concept of a binary tree.

Figure 1— Entering the names Mike, Terry, Nancy, Jerry and Victor (in that order) gives the tree structure shown here:

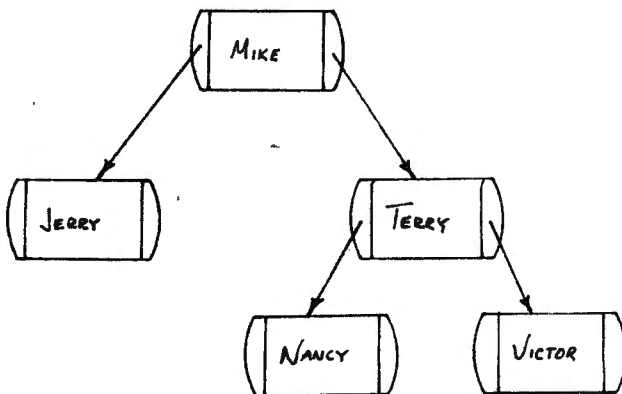


Figure 2— The names from Figure 1 would be stored on disk like this:

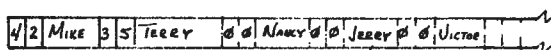
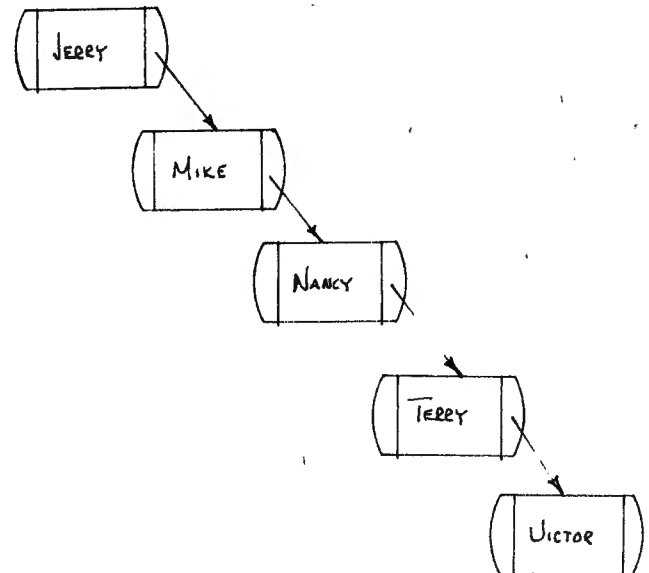


Figure 3— Entering the names from Figure 1 in alphabetical order gives the following configuration. A binary tree works best with a random order of entry.



COLOR COMPUTER SOFTWARE

**EDITOR ASSEMBLER
DEBUGGER** **\$6⁹⁵**

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

DELUXE TERMINAL PROGRAM

COLORCOM/E: This terminal program has everything! PLUS it's in a convenient plug-in cartridge. LOOK at these features:

- Complete upload & download support
- Selectable baud rate & parity
- Full or half duplex
- Write to any printer or cassette
- Supports ANY serial printer
- Automatic or manual capture
- Selectable Capture characters
- Exchange Basic programs
- Word mode means no split words
- And much, much more

Use with Compuserve, The Source, etc. Talk to other Color Computers. Works with any model Color Computer & full duplex RS232 modem CARTRIDGE \$49.95

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

BOOTSTRAP: This Cartridge automatically loads and executes Basic programs from cassette at power-up. Can't fail. Ignores data files, Machine Language files, or Basic files that have errors. For those programs that have to run! CARTRIDGE \$34.40

RS232 EXPANSION CABLE: With this cable you can connect 2 devices at the same time to the RS232 part of your Color Computer. Great for printer & modem RS232 Cable \$20.00

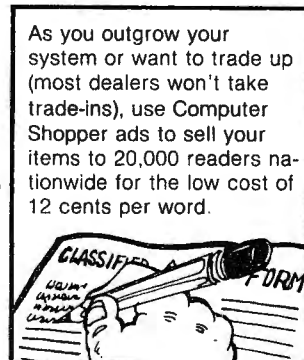
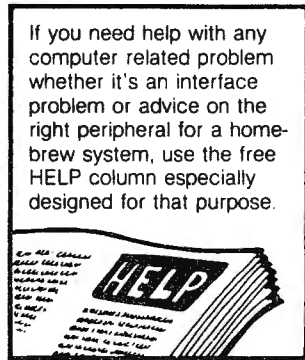
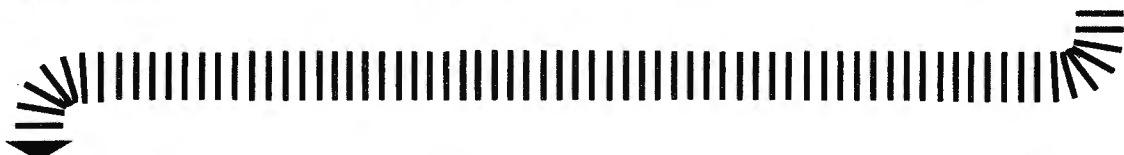
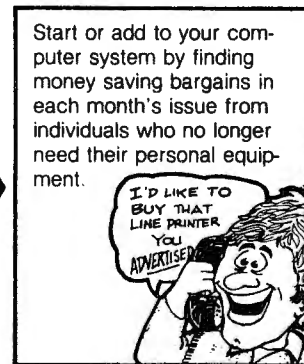
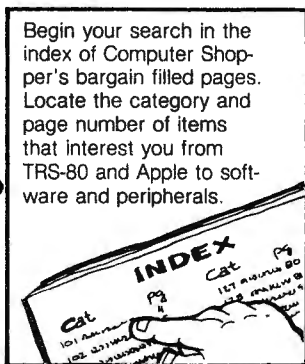
CUSTOM CARTRIDGES: Put YOUR Basic program into a convenient ROM Cartridge. It's easy! Runs instantly at power-up. Frees up memory. Use for Ad displays, schools, etc. Call or write for info FROM \$41.65

Send check, money order or Visa/MC Number. Include \$1 for postage and handling. Visa/MC Phone for fast service.

**Eigen
Systems**

Circle # 58
P.O. Box 10234
Austin, Texas 78766
(512) 837-4665

How to Buy or Sell Computer Equipment and Software



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: _____

Captain 80

The adventures of a software secret agent

© 1982, Bob Liddil

I had just put away my Software Secret Agent disguise for the evening and settled down for a rousing half hour of Mork and Mindy when the tea kettle rang. It was for me.

"This is your fearless leader," snapped the voice on the other end of the line. Immediately, I stood at attention. Mustering my most dutiful voice, I responded calmly.

"Hi, Chief, what can I do for you?" I said smoothly in my best Bogie voice.

"This is an important assignment, so pay attention," he growled, "Professor Henton Megabyte has disappeared!"

I knew of this Professor Megabyte. He was the hardware genius who'd worked out the interface between the TRS-80 and the U.S. Air Force's top secret spy plane a few years ago. Now he was living in self-imposed exile right here in my home town of Peterborough, New Hampshire. As a matter of fact, his house had been rented back a few months ago by an H&E Computronics Software reviewer, who also had disappeared.

"I'll get right on it, Chief," I said, and hung up the tea pot lid.

Next morning, I drove by the ominous three-story Victorian structure belonging to the Professor. There was a "For Rent" sign in the window, so I stopped.

I was greeted at the door by a hawk-faced lady of sinister origins, who, after giving me a thorough scrutiny, accepted my first and last month's rent. When I asked about the Professor, she sighed and said simply that he was away. I got the same response when I asked about the journalist. She shrugged, saying she was only a twice-a-week housekeeper, and how would she

know about such comings and goings.

I moved in on Friday. It would be Monday before Mrs. Hawkface would return . . . more than enough time to discover the secret of the old house.

I explored the entire lower two floors. The decor was nothing to brag about. Then I found a big brass key. Obviously, this was the way to get past the huge oak door entranced the third floor. I made my way up the creaky old stairs and tried the lock. Sure enough, it opened. I reached for the light switch, but before I could flip it, the room exploded into light.

"Welcome home, Bob," came a voice. "It's good to see you again."

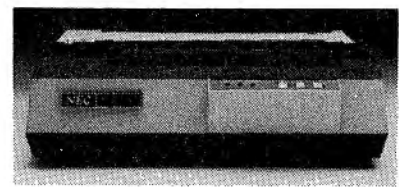
The voice was mechanical, votrax based, and seemed to be coming from a huge aluminum expansion interface that stretched from floor to ceiling, terminating in a Model I 48K four-drive TRS-80.

"Do I know you?" I asked tentatively, still not certain who I was dealing with.

"Of course you do!" came the response. "Put on the helmet you see on the accessory table and I will make everything clear."

Now the life of a Software Secret Agent is a strenuous one, and there are bound to be little gaps in one's memory. The REM-pak, which I had been instructed to wear, was a device designed by Professor Megabyte to restore such lapses. Placing it on my head, I relived an instant replay of three months last year when I had lived in this house and searched for the Professor. It all came back to me.

The machine's name was MAX. He was a sentient electronic entity created accidentally from a power surge while Professor Megabyte was experimenting with a device



NEC PC-8023A-C Printer

\$499⁸⁸ 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 ⁸⁸
MICROLINE 82A	\$479 ⁸⁸
MICROLINE 83A	\$739 ⁸⁸
MICROLINE 84 (Parallel)	\$1059 ⁸⁸
MICROLINE 84 (Serial)	\$1194 ⁸⁸
OKIGRAPH ROM—adds Hi-Res capabilities to 82A and 83A Printers	\$89 ⁸⁸

IDS Printers

PRISM 132 (Color)	\$1699 ⁸⁸
PRISM 80	\$989 ⁸⁸

Epson Printers

MX-80 w/GRAFRAX	\$474 ⁸⁸
MX-80/F-T	\$569 ⁸⁸
MX-80/F-T w/GRAFRAX	\$619 ⁸⁸
MX-100	\$719 ⁸⁸
GRAFRAX	\$89 ⁸⁸

Centronics Printers

CENTRONICS 739 (Parallel)	\$539 ⁸⁸
CENTRONICS 739 (RS-232-C)	\$644 ⁸⁸
2-Color Adapter	\$69 ⁸⁸

C.Itoh Printers

C.ITOH COMET I	\$284 ⁸⁸
C.ITOH PRO WRITER w/3K buffer (parallel and serial)	\$639 ⁸⁸
C.ITOH F-10 DAISY WHEEL (40 cps)	\$1539 ⁸⁸

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

Prices subject to change

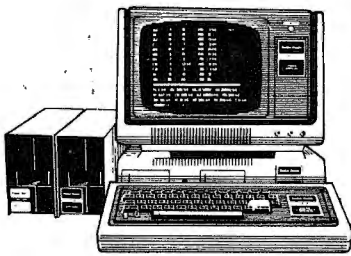
HIGH TECHNOLOGY AT AFFORDABLE PRICES

THE BOTTOM LINE

12 Johnson Street, Milford NH 03055-0423

Circle # 60

June, 1982 95



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.

Captain 80

that allowed him to enter the actual world of the computer program he had on line. Max's original function had been to serve as a sort of lifeguard program, to keep the professor from delving too deeply into the software. An unexpected glitch in the electrical lines had caused Max to download the luckless Professor to "The Source", where he would be safe.

Alas, Max had reckoned without the "sideslip effect". So, while Max was collecting himself, the Professor had shipped out for parts unknown on the U.S.S. Enterprise, courtesy of a Star-Trek program resident in the Source's main library bank.

I had been disguised as myself, hard working software reviewer, when I picked up the Professor's trail accidentally after being unceremoniously dumped (body and mind) into the middle of a Space Invaders program. I almost had him! But when I was retrieved, I had lost not only the Professor, but all recollection of that three months of my life. The assignment had been shelved until Max could, with the help of some new mechanical arms, build the REM-pak.

"Now, let me get this straight," I said. "Your name is MAX, and you have the ability to interface me *physically* into a piece of software, which is what *already happened* to

Professor Megabyte, but he got lost accidentally and I have to find him by searching individual units of software *personally*?"

"That's about the size of it," agreed Max.

My ball point pen rang. It was a recording of the Chief.

"By now, the REM-pak has done its job and you know the true nature of your assignment. You are to remain in the Professor's house and review software just as you have been doing, but secretly you will be searching for the missing professor. You must find him at all costs. Report to me once a month. This message will self destruct in five seconds.

Quickly, I tossed the pen out the window and down into the parking lot of the motel next door where it rolled under the wheels of a white Jaguar. I hope the owner had "a piece of the rock", because that Jaguar was gone three seconds later.

So now I'm all set. I've got a powerful new assistant, a one-of-a-kind computer and junior Software Super Hero all rolled up in one magic software machine named Max. I've also acquired a new assignment fraught with danger and suspense, namely to find Professor Megabyte.

Now, what more could a fellow ask for? ■



**16 - DIGIT ACCURACY
AND MORE
STATISTICAL POWER
Software For Model I
and III**

Tandy topics

**Ed Juge, Director
Computer Merchandising, Tandy Corp.
1500 One Tandy Center, Fort Worth, TX 76102**

My day is made! Thanks to Phil Smith of St. Petersburg, Florida for sending me a copy of his very nice letter to *80-U.S. Journal*. He applauds this magazine's "personality", saying it is a delight to read. *80-U.S.* gives Phil a "feeling of kinship" with other TRS-80 users, the magazine, and with Radio Shack. I won't go into details, in the hope Mike will publish it in full as a letter to the editor. I'll just say, Phil, that your perceptions are right on. And it is absolutely a matter of attitude. From a reader's viewpoint, you'd be hard-pressed to find a better attitude than here in *80-U.S.*. Keep up the great work, guys and gals! And Phil, thanks for sending me a copy. . . you might be interested to know that at least 75% of the TRS-80 owners I talk to voice the same feelings. Not until now, has it been so eloquently committed to paper!

Back to work. We suspect some of you are hearing about a "new

version" 2.0B of Model II TRSDOS. Before anybody calls us, let me tell you. . . don't! This version does exist, but only for Model 16 owners. It's just like 2.0A, which is the current version, except that it contains several patches necessary for it to work with Model 16's double-sided drives. 2.0B isn't for a standard Model II.

A Model 16 owner who wants to run in the "Model II mode", needs 2.0B. If he wants to run existing Model II software, the 2.0B disk contains a "Do File" which will allow modification of his Model II software to operate in the double-sided drives, but still in single-sided mode.

Some confusion still surrounds Model 16, the "Model II mode", multi-user and Arcnet. I suspect most readers of *80-U.S.* aren't having a problem with all this terminology, but for those who are, I'd like to see if I can clear the fog.

Stepwise Multiple Regression - For up to 61 variables. Each step output (addition or deletion of a variable) includes: regression coefficients, regression and residuals tables, multiple correlation coefficient, std. error, F ratio, etc. Also means, std. deviations, and intercorrelations. Printed listings of residuals for each observation. **\$120**

Analysis of Variance - Multiple factor, analysis of variance for up to ten main effects and ten levels, with equal cell frequencies. All two-way interactions evaluated. Output includes: degrees of freedom, mean square and F ratio for all main effects and interaction **\$85**

Analysis of Covariance - Multiple factor, analysis of variance (up to five main effects) with as many as ten levels or groups, and from 0 to 20 covariates. Appropriate for both equal or unequal cell frequencies. Tables include: source, degrees of freedom, mean square, and F ratios for main and interaction effects **\$105**

Factor Analysis - Principal components, VARIMAX and oblique simple structures, for up to 40 variables and factors. Factor inter-correlation matrix for oblique structures. Also orthogonal-powered vector and weighted cross-factor simple structure methods. Raw data or correlation entry. Three estimates of communalities: units, absolute maximum row, and squared multiple correlations **\$95**

Discriminant Function - For up to 58 variables. Discriminant function coefficients, F ratio, cutoff point and Z score cutoff points. Dichotomous groups. **\$70**

**ANY FOUR PROGRAMS \$220
ALL FIVE \$240**

Each program includes one master diskette and a complete instruction manual. A special feature of each is that they provide for the permanent storage of data on blank diskettes which allow for an unlimited number of cases and editing. Each program can produce printed output of raw data and computations are performed in 16-digit double precision.

All programs run in Tandy BASIC and require 48K RAM and at least one disk drive. A printer is recommended but is optional. Model I or III versions. (Model II version planned release date is 6/82.)

"Guaranteed against damage and defects for 90 days."

Make checks payable to:
R.R. Belanger, Ph.D.
541 West Sixth St.
Azusa, CA 91702 **Circle # 61**

Tandy BASIC is a product of Tandy, Inc.

TRSDOS	Model II	Model 16	
Version		Z-80 Mode	68000 Mode
2.0A	1S drives	1S drives	-----
2.0B	-----	2S drives 1S mode only	-----
4.0	Hard Disk	Hard Disk 1S drives	-----
4.1	Hard Disk 1S	Hard Disk 1S or 2S	Hard Disk 1S or 2S
4.1 Init.	-----	Initialization disk for HD. Supplied in 2.0 format. 64K owners will do a COPY from TRSDOS-16 to use HD.	

First, a Model 16 is really two computers in one box. It's a Model II (Z-80 processor with 64K of memory) . . . and it's a Model 16 (MC68000 processor with up to 512K of memory), which uses the Z-80 and its memory for input/output and housekeeping. Yes, there really is a total of 576K on board in a "full blown" Model 16. We don't advertise it that way, since the Z-80 memory is not accessible to the 68000 user, and vice versa.

Now, modes — the computer can be booted to run under the Z-80 or the 68000 processor. The more you hear, the more TRSDOS version numbers you will run across. So, here's a list of versions, and what they do for Model II, and for Model 16's two modes. Obviously, 1S = "one-sided floppy" and so on. (We don't talk one and two-sided hard disks. See table on previous page.)

Now that you're thoroughly confused, let me say that the 2.0 versions are to allow Z-80 mode operation with Model II programs, in the single-sided mode.

TRSDOS 4.0 is the current hard disk operating system. It recognizes single-sided floppies, and Z-80 mode only. Version 4.1 is the floppy/Hard disk operating system which includes two things. . . "TRSDOS II" (Z-80) and "TRSDOS-16" (68000) to run on either single or double-sided drives (Model 16's or converted Model II's).

There will be a 4.1 initialization disk (supplied on 2.0 disks, so it's useable by 16s and converted II's to initialize the hard disk.

I've tried to tell you more than I know, in one very short exercise. The good news is that what a user needs to know is explained, hopefully more clearly than I've done it here, with his system manuals. But when you hear strange TRSDOS version numbers, you'll know a little more about what they are.

Judging from my phone calls, there is confusion between Model 16's coming multi-user capability and Arcnet. So, let's look at them. In multi-user mode, Model 16 supports a user on the built-in keyboard, plus two terminals such as our DT-1s. The terminals do no computing. In effect, they are additional keyboards and screens hooked to the computer. All the work is done by the Model 16's 68000 processor.

Model 16's memory is divided, with sections assigned to each user, plus a section for the multi-user operating system. If two users are both working on payroll, the payroll program is resident in each of their memory sections. They may access the same disk files (access for each user can be limited to any desired level for security), but if one user has opened John Jones' record with the intention to write to it, the multi-user system won't allow anyone else in while it is open.

You could describe multi-user as each user sharing the central processor, disk and a portion of the central computer's memory. It's a way to let three people do computer jobs concurrently with a minimum hardware investment. Multi-user will *not* function in the Model II mode.

On the other hand, Arcnet is a "shared resource" system. Each work station must be an actual computer. Programs are transferred into the user's work station, where all processing is done. Files accessed look to each user as if he were accessing a remote hard disk (again within established security limits), and of course, the commonality of the hard disk provides a common link, ideal for electronic mail or memos. One computer must be dedicated to managing files, and is called the "file processor". Each work station (called an "applications processor") can talk only to the file processor. . . not directly to another user's work station. There can be up to 255 computers in the network. Arcnet allows sharing of large hard disk storage, peripherals (such as printers) and easy transfer of files between users (via the file processor). Terminals will not operate on this system.

The advantage of multi-user is the ability to have three people doing computer jobs at one time, with minimal hardware expense. Arcnet, on the other hand, allows a large number of computers, networked to form a very powerful overall system, with information and peripheral sharing. The only place users "compete" for time in an Arcnet system is when asking for programs or data from the file processor. In a multi-user system, this competition exists with any CPU operation, since all users share the CPU.

That's a long explanation. Apologies to those who didn't need it. Next month, I'll try for more varied subjects. ■

PRINTERS FOR THE 80's

CENTRONICS

739-1/Parallel 525.
739-3/Serial 625.
2 Color Adapter 69.

OKIDATA

Microline 80 349.
Microline 82-A 479.
Microline 83-A 749.
Microline 84 1,055.
Okigraph (82A or 83A) 69.

NEC

PC8023-A 509.

EPSON

MX 80 449.
MX 80/FT 549.
MX 100 719.
Grafrax 69.



C. Itoh

NEW!

F-10 Daisy Wheel 40/cps 1525.
Comet I/P 295.
Starwriter 45cps serial 1,599.
Special! Regularly sells for 2,595.

Cables and interface cards available for the Atari, Apple, TRS-80 Osborne and CBM/Pet. **FREE SHIPPING AND HANDLING.**

766 Middle Hancock Road
Peterborough, NH 03458 (603) 525-6621

BC BUSINESS COMPUTERS
of Peterborough
Circle # 62

Reviews

Polaris
TRS-80 Color Computer
Radio Shack Stores
\$29.95

As in the early days of the Model I computer, there is not a lot of software available yet for the TRS Color Computer to choose from. I believe that in a short while, we will see more entertainment-oriented software available for it than for any other TRS computer. I have bought some of the earlier ROM game packs from Radio Shack, and have not really been that impressed, until Polaris.

I was looking around in my neighborhood Radio Shack the other day, and spotted the new game ROM pack, Polaris. Travis, my nephew, was with me, and of course was interested in seeing the new game. (Not me! I use my computer for more *important* things.) We talked the salesman into showing it to us. It is a game with a close likeness to Missile Command. We didn't have time to play it very much in the store, but what we did see, we liked. So, with Polaris under Travis's arm, we drove home.

On the way home, I thought back again to early TRS-80 Model I days, when *any* game was great. Just to have a game that drew a line across the screen was exciting to us. (I admit it. It still can be exciting to me). Then came people like Leo Christopherson. I was just starting to get a new, small magazine called *80-U.S. Journal*. Reading through one of the issues, I saw an ad for a game called Android Nim. The ad looked good, so I talked my wife Jo Ann into putting a check into the mailbox. When I received the game, I CLOADed it into my machine and typed RUN. Man, the graphics and sound of this game were so good that it set a standard that is still being followed today.

At that time, I had never seen a program use sound effects on a TRS-80. This was a *giant* step in TRS-80 programming history. I feel the

Color Computer will probably follow a similar route. At first, there will be a lot of mediocre software; then people like Leo Christopherson will step in and really show us what the Color Computer is capable of doing, and at the same time, spoil us forever. (I hope Leo is reading this, because I would love to have his games in a Color Computer version.) If he did so well within the Model I's graphic limitations, I can only imagine what he would do with the powerful Color Computer in his hands. (How about it Leo?) I would love to see Color Computer versions of arcade games available from the greats such as Big Five Software also.

We finally made it home. I started reading through the game instructions as Travis inserted the ROM pack into the side of the computer. After a few minutes of learning to control the game, we were suddenly involved in complete and total WAR! Clouds were bursting all over the screen with explosive sound effects. We screamed as we lost one of our subs to an enemy missile or bomb. Each time we thought we had destroyed all of the enemy, another wave would start attacking twice as fast and mean as the last.

We were really there! The movements were in complete real time. When you fire a missile from a sub, you can immediately move your cross hairs to another enemy position and fire again. There is no waiting for anything.

After about an hour of fighting, we were called back from the front lines to eat. We refueled our bodies at the dinner table, and headed back to the computer control room to continue our war. After a while, it was time for Travis to get to bed for school the next day. I would be going to bed after a little reading and studying on the latest TRS-80 developments, techniques and products.

About thirty minutes later, my

PROOF READER™

The Aspen Software Company Spelling Checker.

+ GRAMMATIK™

Beyond Spelling Checking

THE ONLY COMPLETE PROOFREADING PACKAGE

FOR ALL CP/M, MS-DOS,
AND TRS-80 WORD PROCESSORS

We'll match Proofreader with any other spelling checker on the market. It has a big 38,000 word expandable dictionary, and can check even your largest documents in under four minutes. Proofreader looks up every word, and does not use less accurate root word analysis like some others. Full interactive correction is standard on CP/M and TRS-80 Model II systems, and is a low cost option for the TRS-80 Model I/III.

Spelling checking alone is not enough! No one else has anything like Grammatik! It analyzes your document for common typos, punctuation errors, misused phrases, and poor writing style. Grammatik is receiving rave reviews from both critics and users. Bob Loudon in *InfoWorld* (12/7/81): "Grammatik is a surprisingly fast and easy tool for analyzing writing style and punctuation. If you are currently doing original writing on a word processor, you should consider this product." Eric Balkan in *The Computer Consultant*: "I'm impressed with the imagination that went into this product." A user: "Thanks for making my life easier!"

Grammatik and Proofreader are compatible with all CP/M, MS-DOS (including IBM PC), and TRS-80 word processors.

Current CP/M formats:

standard 8", NorthStar, Omikron TRS-80.

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. Dealer inquiries invited.

MS-DOS versions scheduled for March 1982 release.

	Proofreader	Grammatik
CP/M, MS-DOS	\$129.00	\$149.00
TRS-80 Model II	\$99.00	\$99.00
TRS-80 Mod. I/III	\$54.00	\$59.00
(Model I/III interactive correction option - \$30.00)		

Trademarks: CP/M: Digital Research; TRS-80: Tandy Corp.; Proofreader, Grammatik: Aspen Software Co.

ASPEN SOFTWARE
COMPANY™

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

The Programmer's Guild Software

Gauntlet of Death 16K L2 Mod I/III cassette	\$19.95
Maze of Darkness 16K L2 Mod I/III cassette	\$19.95
Trampmaze Dualogy: Gauntlet of Death & Maze of Darkness for 32K L2 Mod I/III disk	\$29.95
Timequest 32K L2 Mod I disk (converts to III)	\$24.95
Timequest 16K L2 Mod I/III cassette	\$19.95
Temple of the Sun 16K L2 Mod I/III cassette	\$19.95
Temple of the Sun 32K L2 Mod I/III disk	\$24.95
Domes of Kilgari 16K L2 Mod I/III cassette	\$19.95
Domes of Kilgari 32K L2 Mod I/III disk	\$24.95
Deadly Dungeon 16K L2 Mod I/III cassette	\$14.95
Deadly Dungeon 32K L2 Mod I/III disk	\$19.95
Dreadnaught Chronicles: Death Dreadnaught & Domes of Kilgari	\$29.95
Graylock Chronicles Trilogy: Spider Mountain, Deadly Dun- geon & Dragonquest	\$35.00
Tower of Fear 16K L2 Mod I/III cassette	\$19.95
Tower of Fear 32K L2 Mod I/III disk	\$24.95
Color Computer Tower of Fear	\$19.95
16K Ext. BASIC cassette	

Hardware

Model III 16K L2 — retail \$995	\$839
Model III 48K dual drive with RS-232 retail \$2495	\$2095
Color Computer 16K with Ext. BASIC retail \$599	\$499
Daisy Wheel II Printer retail \$1995	....\$1745
Line Printer VII retail \$399	\$329

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

Circle # 63

Reviews

wife came into the computer room and said, "The kids can't sleep!" I said, "Why not?" "Could you, with all these bombs and missiles exploding in the next room?"

Pete Carr

Eliminator Model I/III tape or disk, 16/32K

Adventure International
P.O. Box 3435
Longwood, FL 32750
(800) 327-7172
16K Tape \$19.95
32K Disk \$24.95

Adventure International has hit another winner with a new title called Eliminator. It is patterned very closely after William's popular arcade game, Defender. In this fast-paced real-time simulation, you are the pilot of the Eliminator, an extremely fast combat-class starship. Your mission is to prevent alien spacecraft from capturing 10 energizers that sit atop the gantry towers scattered across the planetscape. The aliens materialize from hyperspace in several waves, and as each wave is destroyed, a new wave appears until all of your Eliminator craft are destroyed or all the energizers are captured.

There are four types of alien vessels, each with its own function and point value. The Disruptoids hover over the energizers and then attempt to pick them up. As they slowly ascend, you may destroy them; but, be careful not to destroy the energizer in the process. If the Disruptoid is destroyed, the energizer will free fall back to its gantry tower safely, provided it falls no further than half the screen distance. If you can intercept the energizer by maneuvering your ship into physical contact with it, you will be given extra points, and by safely replacing it on its pad, an additional bonus is accumulated. Drones are small craft that zig-zag and discharge aerial mines which are deadly if touched by your ship. TDUs, or Tracer Dispersal Units, are harmless until touched, whereupon they release five small Tracer ships which will destroy the Eliminators upon contact.

The screen layout consists of a split screen arrangement with the top serving as a wide screen monitor

which shows approaching enemy craft in both directions. The bottom half of the screen shows the planetscape, the energizers on their gantries, your ship, and the enemy craft. Using the four arrow keys, you move forward or reverse (actually, your ship appears stationary and the planetscape and aliens appear to move) and up and down. The space bar fires the plasma bursts one at a time. To escape sure destruction, you can escape into hyperspace by pressing CLEAR. The ENTER key releases the disruptor charges which destroy only the alien ships in the immediate vicinity. The fire power is really awesome!

The disk version saves the high scores to a disk file, and if the player achieves a score in the top ten, a short fanfare signals the achievement. The player is then entitled to enter any name up to 18 letters on the high score board for posterity. Your reviewer remembers when arcade games used to award a winner with additional free plays. Today, all they give is recognition.

Anyway, Eliminator is truly a must for anyone who enjoys arcade simulations. Great sound, mind-blowing graphics, fast action, and a challenging motif, add up to another winner for Adventure International. Has anyone figured out how to put a coin operated mechanism on their TRS-80? This is one game that people would pay to play.

Jim Klapproth

**Quick Quiz: A
Mini-Authoring System
Model I/III with Disk
All Radio Shack Stores and
Participating Dealers
\$29.95**

Give Radio Shack credit!

I have found most educational software that purports to help me, to be of little use or too expensive to consider. Here is a program that does not force me to adopt their system. Rather, it allows me to do what I want, in the way I want.

Quick Quiz allows any teacher to turn the TRS-80 into a test writer, test grader, test giver, and recorder. The only restriction is that the test

must be in a multiple choice format. Before you say "My subject can't be tested that way", consider this: Only a well written multiple choice exam has reliability and validity that can be measured. I still remember my educational tests and measurements instructor drumming that into me every day for 18 weeks.

Quick Quiz does not give item analysis or other fancy statistical measures, but it is slick, simple to use, and appears to be a real time saver for any teacher.

You begin by creating a test. Tell the computer the number of questions and number of options per question (keep it the same for each question. Four or five options are best.). Now, off you go, creating the questions that will probe the depths of your students' minds. Entering is easy and is much like a text editor. Options and questions are automatically numbered for you. If you mistype, or call the wrong option correct, an editing feature is available. Even the BREAK key is defaulted to make sure you can't mess up. Finally, give the test a name and SAVE it.

You can now have students take the test, have it printed out, erase it off the disk, or review student results.

Taking the test is easy. Only about one minute is needed to show students how the arrows are used to

pick the option to a question. One small flaw lies here. Students are not given the next question until they get it right. When they are done, their responses are recorded to disk. At the end of the test, the student is shown each question and the number of tries it took, but this information is not recorded. Only if the question is answered correctly on the first try is it counted right.

When printing the test, you can title it, tell how many copies are wanted, and it even prints the answer key! Be sure you are using standard paper. You can't alter printout from the program.

When looking at test results, you are given the student's name, which test, and the percentage score. If a student retakes a test, this data is stored apart from the other, so you can monitor progress.

At most only 50 results can be recorded for a given test, but that should be no problem in most classrooms. For those of you with more students, the school should at least pay for the added diskettes.

I believe that this is a winner. It is straight forward, applicable to every classroom, and priced right. Buy one! If nothing else, a binder, two diskettes, plastic holder, and two copies of TRSDOS should cost \$30.00

Cameron Brown

Cave Hunter
Color Computer with 16K
Mark Data Products
23802 Barquilla
Mission Viejo, CA 92691
(714) 768-1551
\$24.95

For all Pac-Man wizards out there, Mark Data Products has come up with a challenge for you. "Cave Hunter" is more than just another pretty maze; it's an addicting exercise in greed.

The object of Cave Hunter is to direct your robot, with joysticks, through a complex maze, to the bottom of a cave. Waiting at the bottom are four blocks of gold which you must carry, one at a time, back to the mine entrance. The only problem lies in the fact that there are three Cave Creatures waiting to make you their midnight snack.

Your protection from the creatures lies in four power deposits situated throughout the maze. If you should be so fortunate as to capture and return all of the gold to the mine entrance, you will receive a new game. The level of play increases as your skill level increases.

In a few ways, this game offers more to the player than does Pac-Man. The Cave Creatures are more intelligent than Blinky, Inky, Pinky and Clyde. The Cave Creatures *know* where you are going and why. As far as I can tell, you cannot use a

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.

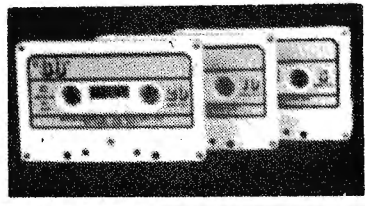
Contact Lindbergh Systems for your custom programming needs. We are expert at writing software to work with YOUR hardware, in assembler, high-level language, or FortH.

Lindbergh Systems

41 Fairhill Road, Holden, MA 01520 (617) 852-0233

Source: TCA818 CompuServe: 70310.267 TRS-80 is a TM of Tandy Corp

**COMPUTER CASSETTES
100% ERROR-FREE**



LENGTH	12 PACK	24 PACK
C-05.....	69¢	59¢
C-10.....	79¢	69¢
C-20.....	99¢	89¢

- Fully Guaranteed!
- World's Finest Media.
- Custom Storage Case, Add 20¢ Each.
- UPS Shipping, \$3.00 per pack

For Orders Only
1-800-426-4747
Extension 480

MICRO-80™ INC.
S-2665 BUSBY ROAD
OAK HARBOR, WA 98277

Circle # 65

**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

Circle # 66

Reviews

set pattern to win at this game. The side tunnel in this game is a safer escape route than its counterpart in Pac-Man; the Cave Creatures don't enter it.

Points are scored in Cave Hunter for returning the gold to the entrance of the mine and for destroying the creatures. When "double points" flashes on the screen, points are doubled for eating the Cave Creatures.

I must confess, as a retired Pac-Man wizard, that the points are secondary in this game. Any wizard will tell you that the thrill is in the chase. Cave Hunter gives you a chase which makes "Smokey and the Bandit" look tame.

Bob Perez

**Telewriter
TRS-80 Color Computer
16K or 32K
Cognitec
704 Nob Ave.
Del Mar, CA 92014
(714) 755-1258
\$49.95**

Have you ever wanted to write a book or magazine article, but couldn't bear the thought of doing it with just a typewriter (especially if you type as bad as I do)? Would you like to use your Color Computer for something besides playing games?

If you fit one of these situations, and own a Color Computer, a firm named Cognitec has the answer for you. They sell a cassette-based word processor program, called Telewriter, that removes the drudgery from almost any writing task.

The Program

Telewriter turns the Color Computer into a powerful cassette-based word processor. It makes the cassette recorder easy to use. If you indicate that a cassette file should be loaded, the program searches in the forward direction until it finds the desired file name, then it loads the contents of the file into a text buffer. You can save all, or any part of, the text you're currently working on, or append a preexisting cassette file to the current contents of the text buffer.

Telewriter requires at least 16K (and preferably 32K) of RAM to operate. The program and its

buffers use approximately 14K of RAM. Thus, a 16K computer can hold about one full page of text (about 2000 characters) in its memory, while a 32K version can hold approximately nine full pages of text.

The screen is turned into a 51 by 24 character workpad that displays upper and lower case characters. The characters are displayed in a 5x7 dot matrix. This format does not permit true lower case descenders (q, y, p, g, j), but still produces a very readable display.

The program is controlled from a master menu. You can create a new file, load a pre-existing file from cassette, edit a file already in the text buffer or cassette, or obtain a word and line count of the file currently in the buffer. If you choose to create a new file, or edit a file in the text buffer, the program transfers control to the editor.

The editor contains a wealth of commands that permit almost any text handling operation to be performed. You can delete, copy, or move lines, paragraphs, or entire pages of material. To delete material, set an end mark following the last character to be deleted, then move the cursor to the first character, and enter a control X. The program then deletes all material between the cursor and the end mark.

To copy material from one location to another, set an end mark following the last character to be copied, move the cursor to the first character and set a beginning mark. Then move the cursor to the location you want to copy the material to, and enter a control C. The program copies all of the material between the begin and end marks to the new location and deletes both marks.

To move material from one location to another requires a combination of the copy and delete operations. You begin by copying the material to the new location, then deleting the material from the old location. The combination of the two operations neatly moves the desired block of material to the new location.

The program has a wordwrap feature that handles carriage

returns and prevents split words at the end of lines. All you do is type. The program takes care of the rest. If a word at the end of a line exceeds the screen line length, the program moves the entire word to the beginning of the next screen line.

Occasionally, when new material is added to the middle of a line, or sections are deleted, a line becomes fragmented. Part of it is displayed on one screen line, and the balance on the next. The alignment command automatically readjusts the entire display so no fragmented lines exist, and all lines fit neatly within the screen lines. It's really a nice feature!

The editor contains a powerful search and replace command. If you specify a search string and a replacement string, the editor conditionally replaces each occurrence of the string. When it locates an occurrence of the search string, you are given two choices:

1. Replace the occurrence with the new string and continue searching.
2. Skip the occurrence and continue searching.

When you're ready to print a text file, you select the format menu from the main menu. The format menu controls how the file is printed. You can specify the number of lines for the upper and lower margins, number of spaces for the left and right margins, number of characters per line, number of lines per page, and whether the printed pages should be numbered. You can also specify the margin, spacing, and page-related commands within the text via embedded commands. Thus, you can set up special tables and banners very easily. In addition, you can create page headers and center a block of text within a line.

You can specify up to 10 user-definable control codes that execute from within the text when it is printed. These codes might be control codes for specific printers or ASCII text strings to be printed. In addition, you can print all of the current text buffer, part of it, or chain print multiple cassette files. The program can print at 120, 300, 600, 1200, 2400, or 4800 baud.

For people who have an Epson

MX-80 printer, Telewriter contains resident routines to control its printing. The format menu contains an Epson font table that provides normal, emphasized, double, condensed, or enlarged fonts.

Documentation

Cognitec provides two manuals with the program: a 27-page tutorial manual, and a 33-page reference manual. The tutorial manual is designed to get the initial user quickly involved with word processing. Within minutes, the manual has you entering text, moving it around within the file, deleting portions of text, and various other operations. In addition, the Telewriter cassette contains a demonstration program that you can load and try out the various word processor commands.

The reference manual contains complete instructions on using each of Telewriter's commands. It begins by describing how to load the program from cassette, then describes the conventions used in the balance of the manual. The remainder of the manual describes Telewriter's commands, beginning with the editor and ending with the print-related commands. Each command receives a thorough discussion on how it is used, what it does, and any limitations it might have.

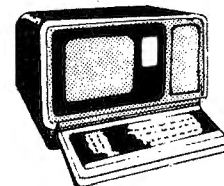
In addition, the reference manual has three appendices that contain useful information. This information includes command reference charts, hints to speed up various operations, split screens, retrieving part of a damaged cassette file, and much more.

Conclusions

My overall impression is that the program is excellent. The program is easy to use and very difficult to crash. After heavy use, I still haven't found any major problems related to word processing.

If you need an economical word processor for the Color Computer that does a super job, then you should investigate Telewriter! Now, if Cognitec would only generate a dictionary program to go with Telewriter...

Darrel Wright



If you have anything to do with the TRS-80* System you should be reading the **EIGHTY SYSTEM NEWSLETTER** every week!

Don't miss a single issue of the new Eighty System Newsletter... published weekly and mailed every Friday by First Class Mail. This is the only publication designed for personnel in the TRS-80* industry, including manufacturers, distributors, dealers and computer users. The Eighty System Newsletter is compiled and edited by Ken Gordon, producer of the National TRS-80* Show, the Eighty/Apple Show, the NJ Microcomputer Show, and publisher of the Amateur Radio Equipment Directory. Here is valuable information in professionally prepared format about TRS-80* hardware, software, peripherals, trends in the industry, and latest news. In addition, each weekly issue contains brief digests of articles related to the TRS-80* system appearing in over 100 computer related and general interest publications. This bibliography will save you both time and money in keeping up with articles in print on the TRS-80* computer system. The Eighty System Newsletter is a must for all active TRS-80* users, plus anyone involved in any way with the manufacturing, distributing or retailing of TRS-80* products.

Subscribe today: Mail the coupon with your check for \$39 for the next 52 weekly issues (sent First Class Mail that's only 75¢ per week.) If for any reason you are not satisfied with the Eighty System Newsletter — we will refund the undelivered portion of your subscription.

KENGORE CORPORATION
3001 Route 27
Franklin Park, NJ 08823
(201) 297-2526

Enclosed is my check for \$39 for the next 52 issues of The Eighty System Newsletter (sent First Class Mail).

Name _____
Company _____
Address _____
City _____ State _____ Zip _____

*TRS-80 is a Registered Trademark of Tandy Corporation/Radio Shack Division.

ZBASIC 2.0 Compiler

Model I/III

Jim Klapproth, Associate editor

BASIC compilers seem to be a popular project of many software houses of late, Microsoft introduced theirs first, followed by several others, including Radio Shack's version. ZBASIC 2.0 is the latest offering from Simutek Computer Products. It has many features not found in any of the other compilers; however, it also lacks many features that make a compiler such a useful programming tool.

The main advantage of any compiler over the interpreter BASIC, is its ability to generate code that executes several times faster. While some compilers generate a pseudo-code (p-code) that requires a runtime program, ZBASIC generates pure Z-80 machine code that can be executed as a SYSTEM tape file or a CMD disk file. Chalk up one plus for ZBASIC.

One of my first ideas was to load ZBASIC, then load and compile some of my existing programs. Unlike Radio Shack's compiler, you can load an existing BASIC program into memory and then compile it. However, due to the many syntax differences between Level II BASIC and ZBASIC, only one of my existing programs would compile without substantial modification. Even some of the simple programs would not work because there is no TAB function, which is used in most programs for screen formatting.

ZBASIC substitutes the STRING\$ function for TAB in Level II. I did convert some programs by changing all TABS to the STRING\$ function. Chalk up one plus and one minus.

Ease of use must rate high in program development. ZBASIC really shines in this area. From DOS, simply load the proper version of ZBASIC, enter BASIC, set memory size, type in or load a BASIC program, run and debug it using the Level II interpreter, then press “+”, “+”/” simultaneously to compile the program. Most programs compile as fast as you can press the keys—it is truly amazing!

After compilation, a menu allows you to run the program, save the program, or return to BASIC. To run the program, simply hit “R” and the program immediately begins execution. To save the program, hit “S” and then respond to the query with the file name. In the disk version, which was the one being evaluated, using the /CMD extension will automatically load and execute the program from DOS. To return to Level II BASIC, hit the “B” key and you will be back in the interpreter. Chalk up another plus for ZBASIC.

Speed is probably the most easily quantifiable attribute of any compiler. ZBASIC claims an increase of 10 to 100 times in operating speed. The one program that did compile

successfully, was an animated graphics program that would draw the Space Needle and other prominent Seattle skyline features, run an elevator up and down the Space Needle, and a monorail train back and forth across the skyline.

In BASIC, the scene would take 3.25 minutes to complete five cycles. After compiling, the same five cycles took 3.8 seconds, and several loops had to be added to slow down the action. This represents an increase of 51 times the normal speed.

To give the reader another indication of the tremendous speed of ZBASIC, a simple pong game was entered from the ZBASIC manual. In normal BASIC, the ball took forever to travel across the screen. After compiling, the game was as fast as any machine language program. The compiler is not fast enough, however, to draw a complete screen instantaneously, as machine language can. Speed of compilation and execution get another plus.

There are six disk versions, and six cassette versions, of ZBASIC. The cassette versions are for 16K, 32K, and 48K memory sizes, each with the option of having high precision @ math or not. The disk versions are for 32K or 48K memory sizes, with the options being disk

I/O, no disk I/O, or disk I/O and high precision @ math. "@ math" allows up to 62 digits of precision in all calculations.

There are some limitations to using @ math—namely, all variables are stored as a string variable, and only one operation per statement is allowed. For example, the statement @ A\$ = A\$/B\$+C\$ is not allowed. The "@" sign must precede each @ math operation. Integer math can be converted to @ math, and vice versa, using the STR\$ and VAL functions. High precision math is a definite plus for ZBASIC.

The only disk I/O allowed is sequential; no random access is supported. Only one file can be opened at any particular time and end-of-file indicators are handled a little differently. There are several special functions that are not implemented in BASIC. However, keep in mind that the normal functions in BASIC are lost in ZBASIC, although there are substitute routines for the math functions.

The SIN and COS functions are now block move commands that move memory at the rate of 100000 bytes per second. CINT and CDBL are high speed memory searches that can find a single character anywhere in memory. FIX inverts memory for special effects, such as reversing the video display. Tone generation is done using the CVD command. ATN is a high speed multiply and LOG is a high speed divide, while EXP accomplishes high speed multiply by 10. Cassette I/O is done using CVS and CVI, and PUT and GET allow single byte disk I/O. TAN calls a machine language subroutine. LOC reads the stack

pointer or disables interrupts. CSNG is a 16-bit PEEK or enable interrupts, while MKI\$, and MKD\$ all pass arguments to a machine language routine.

In addition to the above functions that are lost, the following commands are not implemented: CMD, DEF, FN, ERR, ERROR, ERL, RESUME, USING, FRE, INSTR, TAB, and TIME\$. One of the biggest limitations is the memory space limitation. Because the BASIC program, the ZBASIC compiler, and the compiled ZBASIC program all reside in memory at the same time, space is at a premium. Using NEW-DOS/80 version 2.0 in a 48K system, yields a memory size of 13976 after clearing all variables. This severely limits the overall size of the compiled program; although, programs can be chained together to create a larger one.

ZBASIC is useful mostly for developing new programs that need the speed of machine language, or for protecting a program from tampering. We suspect that several new programs are going to surface that have been built using this compiler. That is another plus, since Simutek does not require any royalties, as do Microsoft and Radio Shack. ■

ZBASIC 2.0 Compiler is available from Simutek Computer Products, 4877 E. Speedway Blvd., Tucson, AZ 85712, (800) 528-1149, cassette (16K, 32K, 48K) \$79.95, disk (32K, 48K) \$89.95.

Ed. Note— Simutek has informed us that they have released a newer version of ZBASIC, entitled ZBASIC 2.2. This newer release contains many features and enhance-

ments that were missing from the earlier version. As thrilled as he was with ZBASIC 2.0, I'm sure Mr. Klapproth would be delighted with the new options. I'm also told that there will be absolutely no difference in price between the earlier 2.0, and newer 2.2, versions. If you have purchased the 2.0 version and wish to upgrade, Simutek will provide the service for the cost of shipping and handling. Now, there's a company who supports their software!

MAINDEX®

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)



(415) 388-0238

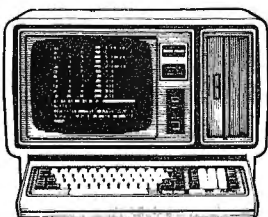


TRS-80 is a trademark of Tandy Corp. - NEWDOS is a trademark of APPARAT INC.



DEPT. EU, PO BOX 591, NOVATO, CA 94948

Circle # 67



- 64K Memory
- Built in 8" Disk Drive
- Detachable Keyboard

26-4002

\$3279⁰⁰

DISCOUNT TRS-80® COMPUTERS

We have the largest TRS-80 Computer Inventory in the Central United States. Discount prices on all software and accessories for your TRS-80® computer needs.

Write today for your free catalog and SAVE!

Toll Free Order:
1-800-835-9056

Kansas Residents:
1-800-362-9091

Jimscot, Inc.

P.O. Box 607
1023 N. Kansas
Liberal, Ks. 67901

- ★ Direct Buying
- ★ Immediate Shipment
- ★ No out of state Taxes
- ★ Several Payment Methods

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

Circle # 68

New products

Bisplan

Bisplan is a program for making business plans and projections. It allows input information on all phases of business operations and then does an analysis to predict earnings, cash flow, balance sheets, how much investment is required and how much financing is needed. Projections are made for up to five years. It is available for TRS-80 Models I and III on 16K cassette (\$19.95) and 32/48K cassette (\$24.95) plus \$2 for shipping and handling from Mariah Computing, PO Box 513, Columbia, MO 65205-0513.

Circle #125

Vaults of Cymarron

Compu Things has announced the availability of The Vaults of Cymarron for TRS-80 Models I and III, 16K cassette. The Vaults of Cymarron is an all action graphic adventure featuring 100 rooms, 15 treasures, 15 useful objects, magic spells, bartering with a graphic "pawnkeeper" and real time pursuit by a variety of animated monsters. It is available from Compu Things, 270 Broadway, Revere, MA 02151 (617) 289-8866 or your local dealer.

Circle #126

Electronic Mail

Ace Computer Products, Inc., announced Electronic Mail for the TRS-80 Model I and III. This intelligent datacomm system analyzes and executes commands and in response sends information to the host computer which, at the users discretion, can transmit or receive ASCII files to and from disk. The ACE software has both host and terminal capabilities to support the auto dial and auto answer features of the Hayes Stack Smartmodem. A special design feature is that both uploading and

106 80-U.S. Journal

downloading are supported from host and terminal modes. This eliminates the need for any alien terminal programs and makes the ACE program a stand-alone datacomm system. Written exclusively for the Hayes Stack Smartmodem and the TRS-80 Model I/III 48K with disk. The ACE smartmodem software retails for \$79.00. The Hayes Stack Smartmodem sells for \$249.00 from ACE Computer Products, Inc. For a limited time, when purchased together, the ACE software may be purchased for \$39.00. ACE Computer Products 1640 N.W. 3rd Street, Deerfield Beach, FL 33441 (305) 427-1257.

Circle #127

Educational software

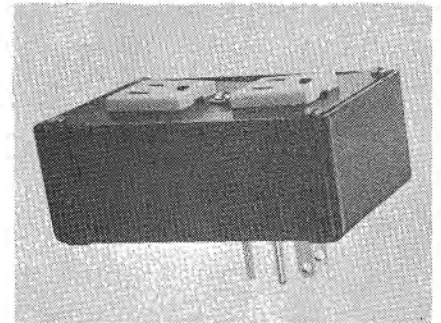
Marck's third catalogue lists a wide variety of tested educational software programs and related products for the TRS-80. It is considerably updated and expanded from earlier editions. Titles are listed by computer and indexed by subject area. Programs cover all age levels, include all the traditional subject areas and more (e.g., business applications, many utilities, electronics, simulations, etc.). Order direct, \$4.50 per copy in the U.S. (\$8.95 foreign). Marck, 280 Linden Avenue, Branford, CT 06405.

Circle #128

Software contest

Krell Software Corp is sponsoring a \$30,000 educational software contest. There are 30 each 1st, 2nd and 3rd prizes being offered for authors of original software in several categories. Contact Krell Software Corp. Dept 44, 21 Millbrook Drive, Stony Brook, NY 11790 or circle the number below for contest information.

Circle #129



Direct plug isolators

Electronic Specialists expanded their patented isolator line to include units that plug directly into the wall socket. Designed for installations that do not require extension cords, the direct plug isolators provide the same equipment interaction isolation and power line protection as their popular line cord isolator series. A convenient retention screw prevents accidental withdrawal from the wall socket. Direct plug isolators can accommodate a total of 1875 watts load, with up to 1000 watts per socket. A high capacity spike/surge suppressor is designed into each unit. Direct plug super isolator (Model DP-SIS032) provides 2 super-isolated channels for \$96.95. Electronic Specialists, Inc., 171 S. Main Street, Natick, MA 01760 (617) 655-1532.

Circle #130

Low cost word processor

Word processor hardware and software (less printer) for under \$1000. has been introduced by Personal Micro Computers, Inc. PMC's Electric Pencil System (Model EPS-80) offers everyone a surprisingly complete and simple to use system for only \$999 (without printer). As a bonus, the EPS-80 can also be used as a personal



microcomputer with thousands of useful programs readily available. The EPS-80 contains a PMC-80 "work-alike" computer with a standard typewriter keyboard, a green phosphor TV monitor for viewing sharp, crisp characters, a text memory of over 45,000 characters (about 20 pages) and a built-in high speed cassette deck for storage and retrieval of text files at 5000 words per minute. They also have a choice of two (under \$600) printers available. Complete details on the system and PMC printers is available from the manufacturer at 475 Ellis Street, Mountain View, CA 94043 (415) 962-0220.

Circle #131

Stack Rack

The skilfully crafted Stack Rack from Remtron has been manufactured to precisely fit and securely hold the Epson MX-80 printer. It stores up to 2 inches (over 600 sheets) of paper conveniently tucked away beneath the printer to give more desk top space and less clutter around work areas. The paper compartment accurately aligns the paper with the sprocket drives for jam-free operation. In addition the bale guide prevents the paper from snagging on the bottom of the printer for smooth, even paper flow. Ideal for bottom-feed line printers. It costs \$14.95 plus \$2 shipping/handling from Remtron, PO Box 2280 Santa Clara, CA 95055

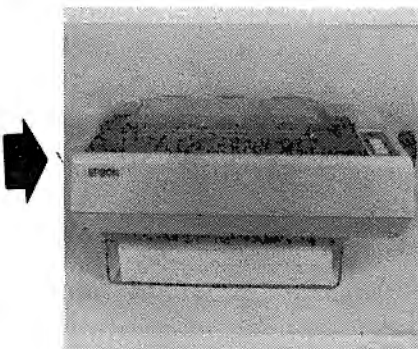
Circle #132

Computer Discovery course

Radio Shack has entered an agreement with Science Research Associates, Inc., a subsidiary of IBM Corp. Under this agreement, Radio Shack will sell Computer Discovery, a popular and proven computer literacy courseware package, for use with the TRS-80 Model III computer. Computer Discovery was developed by this Chicago-based educational publishing company to introduce secondary students (junior and



senior high school) to computers. Lesson topics include computer history, the impact and applications of computers (both at home and in business); and BASIC programming concepts including the use of algorithms, flowcharts and various computer languages. Computer Discovery includes software, student workbooks and an instructor's guide covering educational objectives, references, individual class activities and answers for the workbooks.



Money manager

Acorn Software Products, Inc., announces the release of Money Manager for the TRS-80 Model I and III, minimum 32K. Money Manager is a menu-driven personal finance management program which helps keep track of your income and expenditures and provides an easy method of budget allocation. Money Manager has the ability to store information for up to 100 checkbook entries for a given month. Each check-writing year has its own diskette. You can create as many as 99 expense categories, reconcile the checkbook with the bank statement and track taxable expenses. Available on Model I diskette (Model III owners use the CONVERT utility and 2 disk drives) for \$39.95 from Acorn Software Products, Inc., 634 North Carolina Ave., S.E. Washington, DC 20003 (202) 544-4259

Circle #134

Match Box Cabling system

ICO Rally Corporation, the Palo-Alto-based rack merchandiser, has announced the Match-Box Programmable computer cable system, a two-component cabling system the company says can be used to fulfill up to 1,000 computer cable needs. With the Match-box, the user can pick up two applicable components, connect them, and simply program the cable to the printer, computer or whatever. The system is built around two components, A and B. Component A is a connector with a one-foot-long section of cable attached to a Match-box unit. Component B has a complementary Match-box unit attached to a cable that can be up to 100 feet long. The components are mated and the system is programmed by moving the pins within the Match-box into the correct sockets. Depending on the number of conductors used in the cable, Match-box prices range from \$19 to \$53. For more information, contact Bill O'Brien, National Sales Manager, ICO-Rally Corporation, 2578 East Bayshore Road, Palo Alto, CA 94303 (415) 856-9900.

Circle #133

Color Computer Software

We have one of the largest selections of software and hardware for the Color Computer. Here are a few examples:

Color Computer Combo— 15 programs on 1 tape for less than \$1 ea. Includes Biorhythm, Letter Processor, and several games and utilities \$14.95*

Berserk and Color Pac Attack— Two of the best graphics games currently available for the Color Computer. Detail you'll have to see to believe \$33.95* ea.

Write for our complete catalogue.

DISK 'N DATA

5450 Rugby Street
Burnaby, B.C. Canada V5E 2N1

* All prices in \$Cdn. U.S. orders discounted 18%. Pls. add \$2 for postage and handling

Circle # 69

WILD CAT

REMARKABLE TRS-80 DISK DIRECTORY CATALOGUE SYSTEM

Catalogue contains Filespec, FIRST LINE REMARK, disk ID, disk name, disk date and free grants

Model I using TRSDOS 2.3 or any Version NEWDOS Uses fast machine code for reading and sorting.

\$39.95 + \$2.00 S/H Reg. 48K. Two 5" Drives Satisfaction guaranteed or return within 10 days.

DONALD M. FIELDING
2207 N.W. 61st PLACE • MARGATE, FL 33063
(305) 972-6744

Dealer Inquiries Invited
TRS-80 and TRSDOS - Trademark of Tandy Corp
NEWDOS - Trademark Apparat Inc.

Circle # 72

TRS-80 MODEL I T.M.* GOLDPLUG - 80

Eliminate disk re-boots and data loss due to poor contact problems at card edge connectors. The GOLD PLUG - 80 solders to the board card edge. Use your existing cables.

CPU/keyboard to expansion interface \$18.95
Expansion interface to disk, printer, RS232, screen printer (specify) \$9.95 ea
Full set, six connectors. . . \$54.95



EAP COMPANY
P.O. Box 14, Keller, TX 76248
(817) 498-4242

*TRS-80 is a trademark of Tandy Corp.

Circle # 75

HAYES SMARTMODEM

\$229⁸⁸

DELIVERED



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

HIGH TECHNOLOGY AT AFFORDABLE PRICES

THE BOTTOM LINE

Orders & Information
(603)-673-8857

Orders Only
(800)-343-0726

12 Johnson Street, Milford NH 03055

Circle # 70

"Accounting Program for TRS-80 Pocket Computer." Getting summaries of transactions is the central problem of accounting. Summaries answer managerial questions pertaining to revenues, expenses, net income, assets, liabilities and net worth. This computer program summarizes sets of double-entry transactions according to accepted accounting conventions. The summaries produced are commonly called the Income Statement and the Balance Sheet. This program can be used for both practical applications (accounting, planning, analysis) and instructional applications (teaching theory, teaching computer literacy). This easy-to-use software, which was written in BASIC, works without peripheral devices; and it can be adapted to run on other computers. The buyer gets a 16-page technical write-up which explains in detail the 64-line accounting program. Price \$9.95. Michael E. Zeidler, 2854 North Cramer Street, Milwaukee, Wisconsin 53211.

Circle # 73

Dental Computer Newsletter

E. J. Neiburger, D.D.S., Editor
1000 North Avenue
Waukegan, IL 60085

The D.C.N. is an international group of dentists, physicians and office management people who have interests in office computers. Though the emphasis is on micro-computers, many members use minis. We cater to all makes and brand names.

Annual membership dues \$15.00. Membership runs from January to January. If you join mid-year, we will supply you with the year's back issues.

Circle # 76

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

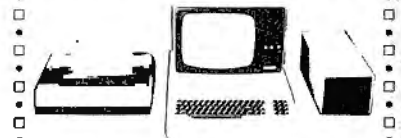
SCIENTIFIC ENGINEERING LABORATORIES

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.

Circle # 71

LNW80 COMPUTERS



IN STOCK NOW!! CALL FOR SPECIAL PRICES ON LNW80s, NEC PRINTERS, RGB COLOR MONITORS, AND TANDY DISK SYSTEMS.

***** NEW LNW SOFTWARE! *****

EXCELLONIX

7180 WOODROW WILSON DR
LOS ANGELES, CA 90068

(213) 650-5754 - (714) 973-1939

Circle # 74

FOR THE NO-DISK S-80 MOD I/III



THE REASONABLE ALTERNATIVE TO DISK NOT JUST A SIMPLE SPEED-UP BUT THE EASY-TO-USE AND RELIABLE KWIK CASSETTE OPERATING SYSTEM THAT UPDATES YOUR CTR USING KWIKOS TO SAVE AND LOAD YOUR PROGRAMS GIVES YOU THESE ADVANTAGES:

- Write, Read, Verify, Search, Test-Read, and Catalog of both BASIC and machine code programs.
- 2x to 6x baud for Mod I, 2250 baud for Mod III.
- MERGE command to chain-load programs from tape.
- SAVE, CLOAD, and SYSTEM still usable. Load at 500 baud, save with KWIKOS, and vice-versa.
- No "lock-up" or garbage-loads from a bad tape.
- Active BREAK key during cassette operations.
- Program titles can be up to 32 characters long.
- You can password-protect any KWIKOS program.
- Motor on by keyboard command, off with BREAK.
- Built-in BACKUP feature lets you copy KWIKOS.
- Adjustable debounce and BASIC execution speed.
- Display of program length on each save or load.
- Mod-I: Fully compatible with LemonAid Loader.
- Mod-III: Command control of BREAK key, cassette high/low, I/O routing, I/O reset, clock set, date set, and clock display on/off.

1 month for \$1.95 (4 month) \$24 (specify Mod I or III)
KWIK Software
P.O. Box 328
Bolivar, MO 65613

SMILE WHEN YOU SAY TAPE!

Circle # 77

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

Circle # 78

Thank You! 80-U.S. Journal Readers

Your acceptance of our Level 2
programs has guaranteed our
success.

TRS-80* Model I/III Program
Inquiries Welcomed

J/C Enterprises

Box 441186
Miami, FL 33144

*trademark of Tandy Corp.

Circle # 79

STOP!

Don't throw away your used EPSON
MX-80* ribbon cartridges.

We'll reload your cartridges, sell you
the ribbon to reload them or if you don't
want to bother we'll even buy your used
cartridges and sell you brand new ones at
reasonable prices.

ALSO AVAILABLE... A reinker that will
do the job for less than the retail price of a
new cartridge.

We'll also tell you about a device to feed
single sheets into most any pin feed
printer that costs less than \$4.00.

All sorts of new ideas in the works.
Write today for free information.

Pete Skeberdis

P.O. Box 27
Fremont, Michigan 49412

*EPSON & MX-80 are trademarks of EPSON, Inc.

Circle # 80

PRINTERS SALE

EPSON \$ CALL

OKIDATA \$ CALL

TELEVIDEO SYSTEMS
25% OFF Catalog Prices

Ohio Scientific Computers
20% OFF Catalog Prices

FOR THE BEST PRICES IN
THIS JOURNAL, CHECK THE
OTHERS, BUT CALL US

OPTIMUM INTEGRATED
SYSTEMS, INC.
987 N. ARLINGTON AVE.
INDIANAPOLIS, IN 46219
Tel. 317/359-7445

Circle # 81



Micro-Grip™
FRICTION FEED FOR YOUR EPSON
MX-70* or MX-80*
*MX-70 and MX-80 are trademarks of EPSON, Inc.

- Converts your printer for friction feed of SINGLE SHEETS or ROLL PAPER.
- SIMPLE installation (all you need is a screwdriver, no soldering).
- Tractor feed remains undisturbed.
- Only \$39.95 (add \$1.50 for postage)

SATISFACTION GUARANTEED OR YOUR MONEY BACK



VISA & Master Card Accepted

MICRO-GRIP, Ltd.
P. O. Box 4278
Norton AFB, CA 92409

Circle # 82



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.

Circle # 83

Architectural Engineering

1. Structural Timber Design—
eight loading conditions for any timber
species. Also plybeam design.
2. Structural concrete— beams,
slabs, retaining walls, etc.
3. Structural steel— eight load-
ing conditions for WF beams.
4. Heat loss and SLR— for
passive solar design.

For TRS-80 Model I or III
Cassette or ESF
\$35 ea. program. Total pkg. \$95.

ERIC CLOUGH

Winlaw, B.C.
Canada V0G 2J0

Circle # 84

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

Circle # 85

AMRAD

Amateur Radio Research and
Development Corporation

AMRAD is a worldwide club of
radio and computer amateurs.
Activities include:

- Monthly *AMRAD* Newsletter
 - Amateur Networking and Protocols
 - Computer Bulletin Board System
 - Handicapped Education Exchange (HEX)
 - Deaf Telecommunications Research
 - Spread Spectrum Experimentation
 - 2-Meter Voice and Data Repeater
- 1524 Springvale Avenue
McLean, VA USA 22101

Circle # 86

 * COLOR COMPUTER *
 * PROGRAMS *

 * COLOR TREK...\$34.95*
 * BERSERK.....\$35.95*
 * PAC ATTACK...\$35.95*
 * TELEWRITER...\$94.95*
 * E-BOARD UPGRADE *
 * 4K-32K ONLY \$109.95*
 * AND LOTS MORE..... *

 * COLOR PRODUCTS *
 * UNALIKE *
 * #211 990 EAST 8TH *
 * VANCOUVER B.C. *
 * (CANADA) V5T-1T8 *
 * PH.(604) 873-2372 *

 Circle # 87

COLORTERM
 The Color Computer as an intelligent terminal
 with 51 or 64 columns by 21 lines
 plus true lowercase! All done in software.
 Any data format -16K or 32K -300 or 110 Baud
 Print and save host data to cassette
 Encode data for secure storage
 User programmable keys
 Much more!
 "I'm very impressed..." -The Rainbow
 \$34.95 (U.S.) 40.95 (Canadian)
 M.O. VISA, M/C (include expiry)
 MARTIN CONSULTING, 94 Macalester Bay
 Winnipeg, Man. R3T 2X5 CANADA
 P.O. of Tandy Corp.

Circle # 88

CONTEST LOGS—Model I & III
 Order now for FIELD DAY and RADIO-SPORT. Programs for major ARRL and CO contests. Perfect logs in minutes, not days.
 Perform (during the contest):
 o Real time duping.
 o Records all required QSO exchanges.
 o Automatically records time of contact.
 o Scan for multipliers on request.
 o Same program for CW and PHONE.
 o Other bells and whistles.
 Perform (during log preparation):
 o Prints log in official format.
 o Computes and lists all multipliers.
 o Computes, points and prints all totals.
 o Prints sort of all contacts as dupe sheet.
 Minimum 32K single drive system. \$9.95 cassette, \$12.95 diskette, each program. For tape only operators—Duper Dupes your log, prints sorted contacts and saves calls to tape \$3.95
TED SQUARED SOFTWARE
 710 Sunrise Rd.
 Libertyville, IL 60048

Circle # 89

No C & No **
TRS-80 MAGIC
 MOD. I IMPROVES LOW SPEED III TOO!
 THE AMAZING —

ONLY \$12.99
 POSTPAID NO. 855 400 (CALL TANDY)
 TAKE THE LOAD OFF YOUR MIND!
 Tired of finicky model one cassette loads? You can end them with the LemonAid Loader. And don't be fooled by its low price. It uses newly developed signal-active filters that focus, shape, and size EACH tape pulse. You can often reliably load "impossible" tapes, and "Possible" tapes load the first time everytime! And it not only SYSTEM and CLOADs, but it is fully compatible with software tape speedups and operating systems like KWICOS™ too. And plug a speaker or earphone into the extra output jack for optional tape monitoring also.
 Install the LemonAid in seconds...just plug between CTR and computer. It needs no power, no software, no rewiring, no adjustments, and there's no tricky CTR volume settings. Skeptical? Let us take the risk. Use the LemonAid Loader for 15 days, and then, if you can do without it, return for full \$12.99 refund. NOA. Order the LemonAid Loader today from:
LEMONS TECH SERVICES
 325 N. HWY. P.O. DRAWER 0429
 BUFFALO, MO. 65622 (417) 345-7643
 TRS-80 is Trademark Tandy Corp.
 KWICOS is Trademark Kwisis Software

Circle # 90

TAKE A BYTE OUT OF YOUR SOFTWARE COST!
 Save 20-40% on all major Brands of micro-software
 90 day guarantee-when you're happy, we're happy!
 Gigantic inventory of old and new releases.
 Overnight shipment by UPS-no per item handling fee.
 We credit orders \$1.00 when you call from out of 213 area.
SOFTWARE GALORE
 For free catalog/orders call 213-827-1851
 (8 am - 5 pm only) New National Direct
 Phone Number 1-800-423-6326

Circle # 91

Model II Oversize Characters
 For shipping labels and other documents, 1/4, 1/2, 3/4, and 1-inch high characters, char. set A-Z, 0-9. User formatting, mix field sizes horizontally, overlapping fields vertically, requires IDS 560 printer. Price \$250.
BASIC EDIT
 A program for BASIC program ASCII file editing. Transfer part of a line anywhere, overwrite mode, scroll up or down 1 line at a time, extend keys. Price \$55.
Jim Randall Microcomputer Programming
 318 Park Ave.
 Wausau, WI 54401

Circle # 92

BUSINESS SOFTWARE
 That works! Written for MOD III or MOD I with doubler.
 Payables with check write.
 Receivables 2 versions, both with ales journal.
 Payroll 2 versions.
 Order Entry Will interface with receivables.
 General Ledger Will interface with above.
 All will run alone or coupled to GL.
 From \$59 each module up — Manual \$10.00. Mail order sales on Model IIIs, Corvus Drives.
The Other Source . . .
Lowner Enterprises, Inc.
 6069 Enterprise Drive
 Placerville, CA 95667
 (916) 622-4640
 Circle # 93

TOTAL DISKETTE BACKUP

 INCLUDING UNLIMITED BACKUP OF MOST PROTECTED DISKS
 If your diskette software library is not completely backed up, or, if you are wasting diskettes by making backup copies of all your diskettes, your problem is solved! Using DUMpload, the total contents of your diskettes can be safely dumped to tape. The hi-speed tape option allows six 35 or 40 track diskettes to fit on one C60 cassette.
 • TRS-80 Model 1 16K - 48K
 • TRSDOS or NEWDOS80 Compatible
 • May be used to back-up TRSDOS, VTOS 4.0, NEWDOS, MICRODOS, or data disks. (Single Density)
 — \$16.95 on Cassette — \$19.95 on Diskette
 Plus \$1.00 handling (Indiana Res. add 4% tax)
 TOLL FREE 24 HR. ORDERING SERVICE
 1-800-525-9391 (Ext. 509) (Except Colo.)
 1-800-332-9259 (Ext. 509) (Colo. Residents)
 or Mail Check or Money Order To:
COMPLETE COMPUTER SERVICES
 8188 HEATHER DRIVE
 NEWBURGH, INDIANA 47630

Circle # 94

The Captain 80 Book of BASIC Adventures
\$19.95 plus \$2.05 s/h
 Eighteen adventures for TRS-80 Model I/III. Most adventures are easily converted for Micro-soft BASIC. See it at your local dealer or order direct from:
80-Northwest Publishing
 3838 South Warner St.
 Tacoma, WA 98409
 (206) 475-2219
 Dealer Inquiries Invited

**YOU CAN PAY MORE
BUT YOU CAN'T
GET MORE!**



Model III 16K
\$839
Model III 48K
2 disc & RS232C
\$2059

Color Computer 4K
\$310
w/16K Ext. Basic
\$459
w/32K Ext. Basic
\$525

BUY DIRECT. These are just a few of our great offers which include Printers, Modems, Computers, Peripherals, Disc Drives, Software and more. **call TOLL FREE 1-800-343-8124**

We have the lowest possible fully warranted prices and a full complement of Radio Shack Software.

computer plus
Write for your free catalog.

245A Great Road
Littleton, MA 01460
617 • 486 • 3193

Circle # 95

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

Circle # 98

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

Circle # 101

PORTFOLIO ANALYSIS

Track and Analyze your stock portfolio with these programs for the TRS-80* Mod 1 & 3.

The Stock Analysis Package consists of four programs which allow Database creation & maintenance; Graphing of prices, moving avg. & volume; and Generation of a Portfolio Analysis Report to evaluate your market position.

Programs are written in BASIC and are MENU driven with Error Trapping for ease of use.

TRS-80* Mod 1 or 3, 48K & one disk drive required
Printer required for Portfolio Analysis report. Price for the entire package is \$74.95. To order or to receive more information, fill out coupon below or call (214) 867-5656 VISA & MC are accepted

P.Tree Enterprises Suite 269
2701-C West 15th Street Plano, Texas 75075

- Payment enclosed or charge my VISA MC
- Please send more information.

Name _____

Address _____

City _____ State _____ Zip _____

Account # _____ Exp. Date _____

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

Circle # 96

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 \$2⁰⁰ shipping and handling;
Illinois residents add 6% tax.

Circle # 99

— 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**



All Computer Stores Everywhere
or Order CDD Direct
Cal Residents add 6% Sales Tax

(213) 372-9419

Suite E, 1116-8th Street, Manhattan Beach, CA 90266

Circle # 102

**MICRO-DESIGN PRESENTS
THE MDX-4**

PHONE MODEM

P.C. BOARD & USER MANUAL

\$29.95

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

MDX-4 PC BOARD & USERS MANUAL 29.95
USERS MANUAL 8.95

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

CALL OR WRITE:



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



DEALER INQUIRIES INVITED



Circle # 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.

Circle # 100

DID YOU BUY YOUR COMPUTER TO HELP YOU MAKE OR SAVE MONEY?

BISPLAN

Is for the person wanting to start a small business. Or for the person who is operating a small business. You enter all the financial information pertaining to your business plans and BISPLAN will produce PROFIT & LOSS STATEMENTS, CASH FLOW ANALYSIS and BALANCE SHEETS. Each projected for up to 5 years. BISPLAN will also indicate financing needs. Printed output suitable for loan applications, business proposals, etc. "What if" ideas tested. Entries easily changed. Ideal for small business proposals as well as for projecting existing business expectations.

INTERACTIVE. COMPREHENSIVE.
NEW - Store data on tape or disk.

On cassettes: Specify Mod I or III
32,48K - \$24.50 +\$2.00 shp, hndl.
16K - \$19.50 MD res add 3 5/8"

Mariah Computing, P.O. Box 513
Columbia, MD 45205

Circle # 103

UNCLASSIFIED ANNOUNCEMENT

This unclassified announcement space is available free to individuals with single or unusual items for sale or trade. 80-U.S. Journal reserves the right to reject any commercial advertising in this section and suggests using our display advertising for that purpose.

These notices are free of charge and will be printed one time only on a space available basis. Notices will be accepted from individuals or bona fide computer user clubs only. All these unclassified announcements must be typed, contain 75 words or less and include complete name and address information.

FOR SALE: TRS-80 Computer Games. 1) "Proball-80". Action-packed, excellent graphics, and all the options of a real football game. Easy instructions (1 or 2 players). Only \$10 ppd. 2) Action Package 2 with "Indy 500"—An arcade-like game testing your driving skills, and "Starfighter"—chase and gundown death star fighters. Two games having graphics and sound for one price. Only \$7 ppd. ALL games require Model I/III, Level 2, 16K. Buy all three for \$15.00 ppd. Send to R. Calaman, 80 Wedgewood Drive, Carlisle, PA 17013.

SMARTMODEM from Hayes list \$279, best offer over \$209. It's effectively new; my MDX-2 has on-board modem which I now use instead. Ron Carpenter, 15 Lighthouse Rd., Half Moon Bay, CA 94019.

LEARN CP/M! Disk (flippy) will run on any Model I (not III). Includes several CPMUG public domain interesting utilities, some source code. Send \$11 (for media, handling) to Y. Sutton, 159 Oregon Ave., Palo Alto, CA 94301.

WANTED: Used Expansion Interface—OK (zero K) RAM. Call Kenny, 1 (206) 838-2116.

TRADE MY LNW-80 (Model I equivalent with high-res. color and 80 x 24 ability) with LNW E/I (includes RS-232), no case, plus 40 track bare BASF drive and partial modem kit **FOR a Model III** with only Level II BASIC. Ron Carpenter, 15 Lighthouse Rd., Half Moon Bay, CA 94019, (415) 726-3487.

NEWSLETTER EXCHANGES WANTED! Northern Bytes is the monthly newsletter of Microcomputer Users International, the microcomputer user club serving the Sault Ste. Marie, Michigan/Ontario area. We actively seek to exchange newsletters with other microcomputer clubs or user groups around the world. To participate in the exchange, send a copy of your newsletter to Microcomputer Users International, c/o Jack Decker, newsletter editor, 1804 West 18th Street Lot 155, Sault Ste. Marie, Michigan 49783.

ATTEMPTING TO INTERFACE an IBM 1230 Optical Reader to a TRS Model II. I would appreciate hearing from anyone who has, or intends to, do the same. Louis M. Ferrari, 3919 Octave Dr., Jacksonville, FL 32211.

DIGITAL EQUIPMENT CORP. LA36/LA35 Decwriter II Interactive Data Communications Terminal. Can be used as a typewriter, printer or input terminal \$700.00 plus shipping. I also have a teletype model ASR 33 with tape punch \$500.00 plus shipping. Ralph E. Thomas, 114 Northcross, Georgetown, TX 78626, (512) 863-6762.

RSN	Advertiser Index	Page		Page	
10	Aardvark-80.....	23	38	I ² Interface.....	73
83	ABS Suppliers.....	109	43	Insider's Software.....	81
25	Access Unlimited.....	48, 49	79	J/C Enterprises.....	109
53	Ace Computer Prod., Inc.....	88	68	Jimscott, Inc.....	105
6	Acorn Software Prod., Inc. ..	10, 11	★	Kengore Corporation.....	103
107	Advanced Operating Sys. Back Cover		77	Kwik Software.....	108
28	Adventure Internat'l.....	C-1	5	Laredo Systems, Inc.....	9
24	Algorix.....	47	66	Lawyer's Microcomputer, The ..	102
105	Alpha Products.....	Cover 6	90	Lemons Tech Services.....	110
49	Alpha Queue Systems.....	85	64	Lindberg Systems.....	101
31	Alphanetics.....	59	3	Lobo Drives.....	1
86	AMRAD.....	109	17	Logical Sys. Software, Inc.....	38
1	Apparat, Inc.....	Cover 2	93	Lowner Enterprises, Inc.....	110
12	Apparat, Inc.....	28, 29	98	Maine Data & Fin. Sys., Inc.....	111
20	Apparat, Inc.....	41	103	Mariah Computing.....	111
55	ARCsoft Publishers.....	89	57	Mark Data Products.....	92
4	Arlington Micro.....	7	88	Martin Consulting.....	110
★	Aspen Software.....	99	34	Marymac Industries, Inc.....	64
59	B. T. Enterprises.....	42	50	Micro Architect, Inc.....	86
61	Bellanger, R. R.....	97	97	Micro Design.....	111
60	Bottom Line, The.....	95	54	Micro Images.....	88
70	Bottom Line, The.....	108	45	Micro Management Sys., Inc.....	83
62	Business Computers.....	98	100	Micro Moonlighter Newsletter ..	111
19	Chromasette Magazine.....	40	65	Micro-80, Inc.....	102
18	CLOAD Magazine, Inc.....	40	82	Micro-Grip.....	109
84	Clough, Eric.....	109	26	Microperipheral Corp.....	53
87	Color Products Unlike.....	110	78	Microsette.....	109
94	Complete Computer Serv.....	110	16	Microsystems Software.....	37
40	Compu-Things.....	77	9	Mikee Electronics Corp.....	18
42	CompuKids.....	80	22	Miller Microcomputer Services ..	44
23	CompuSoft Publishing.....	45	11	Misosys.....	25
36	Computer Applications Unltd.....	69	81	Optimum Integrated Sys., Inc. ..	109
32	Computer House.....	60	96	P. Tree Enterprises.....	111
95	Computer Plus.....	111	★	Percorn Data Co., Inc.....	Cover 4
46	Computer Services.....	84	33	Perry Oil & Gas.....	63
21	Computer Shopper.....	94	37	PMC Software.....	71
47	Computers N Stuff.....	84	27	Programmer's Guild, The.....	100
15	Cornucopia Software.....	35	14	Prosoft.....	33
76	Dental Computer Newsletter ..	108	101	Publisher's Exchange.....	111
69	Disk 'n Data.....	108	29	Radio Shack.....	C-2, C-3
67	E-Z Software.....	105	106	Radio Shack.....	Cover 7
75	E.A.P. Company.....	108	35	Rainbow, The.....	66
★	Edu-Ware East.....	61	92	Randall, Jim.....	110
58	Eigen Systems.....	93	102	Realty Software Co.....	111
★	80-U.S.....	90, 96, 110	39	REMarkable Software.....	74
52	Electronic Specialists.....	87	71	Scientific Engineering Labs.....	108
8	Epson America, Inc.....	14, 15	80	Skeberdis, Pete.....	109
74	Excellonix.....	108	2	Soft Sector Marketing.....	Cover 3
72	Fielding, Donald M.....	108	56	Softcore Software.....	92
51	Fink, William A.....	87	99	SoftHart Enterprises.....	111
7	Freedom Tech. Internat'l.....	13	91	Software Galore.....	110
104	Galactic Software, Ltd.....	Cover 5	13	Software Plantation.....	31
★	Gosub International, Inc.....	86	30	Software Support.....	C-4
★	H. W. Electronics.....	5	85	Tape-Tronics.....	109
41	Hacks.....	79	89	Ted Squared Software.....	110
48	Hexagon Systems.....	85	108	Transaction Storage Sys.....	67
44	Holmes Engineering.....	82	★	Utility Co.....	90
			★	Contact these advertisers directly.	

FASTER THAN ANY FLOPPY DISK DRIVE!

FOR LESS THAN \$40.00

Yes... through the power and flexibility of the LDOS Operating System, Galactic Software brings the TRS-80 user... memDISK.

By using a portion of the existing RAM in your TRS-80, memDISK will create a fully functional disk type device. This RAM based disk may be accessed as a normal disk drive with copy, backup, free, dir, save, load, dump, etc. You can even have your memDISK appear automatically everytime you boot your system by using the LDOS System (SYSGEN) feature. The amount of storage available on your memDISK is user selected from 1.5k to 28.5k. The access time of your memDISK device is guaranteed to be **FASTER THAN ANY FLOPPY DRIVE** available, and it's even faster than most hard drive systems. To assure reliability, memDISK even tests the RAM area it will use, before installing itself. Now you can do things with your system that were too slow or impossible before the memDISK system became available. Best of all memDISK involves no additional hardware of any sort, nothing to align, adjust, clean or break. It's all software! All this for as little as \$30 (when purchased with LDOS).

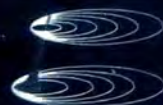
The memDISK system requires a minimum of a 32k, single drive, TRS-80 (Mod I or III) and the LDOS Operating System.

memDISK is just \$39.00 for LDOS owners or you can get Mod I or III LDOS 5.1.1 with memDISK for a package price of just \$159.00 complete. Source code is available to memDISK owner for \$50.00.

Also available from Galactic:

	PRICE	SHIPPING & HANDLING
1. FED - The LDOS File Editor	\$ 40	+ \$2
2. LED - The LDOS Text Editor	\$ 40	+ \$2
3. LC - The LDOS "C" Compiler	\$150	+ \$4
4. I/O MONITOR - The LDOS Disk Error Monitor	\$ 25	+ \$2
5. PDS - Partitioned Data Sets For LDOS	\$ 50	+ \$2
6. MAIL/FILE - The LDOS Compatible Mailing List System	\$159	+ \$4
7. EDAS - The LDOS Editor Assembler	\$ 79	+ \$4
8. FILTER PACKAGE - 13 useful LDOS Filters Complete with Source	\$ 60	+ \$3
9. LDOS & memDISK - An Unbeatable Combo	\$159	+ \$5
10. And of course Mod I or Mod III LDOS	\$129	+ \$5

If you order any two items listed, deduct 10% as a package discount.



11520 North Port Washington Road
Mequon, Wisconsin 53092

WHY

IS THE ALPHA JOYSTICK SUCH A SUCCESS ?

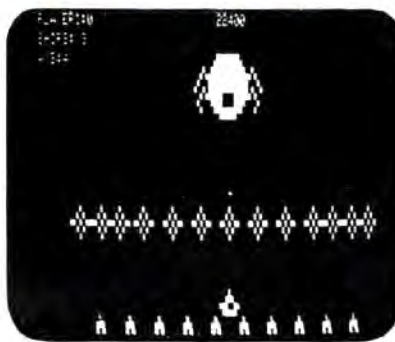
Because of games like these.

THE LATEST BLAST FROM BIG FIVE...

NEW! DEFENSE COMMAND

ALL GAMES :

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



Actual unretouched photos

DEFENSE COMMAND



Big Five has done it again! Now the most popular arcade game of all time has a fascinating new twist. The Invaders are back! You are alone valiantly defending the all important nuclear fuel cannister stockpile from a convoy of thieving aliens who repeatedly break off and attack in precision formations. An alien passes your guard, swiftly snatching up a cannister and flying straight off. Quick! you have one last chance to blast him out of the sky. Great action and sound!



SCARFMAN



SCARFMAN



THE LATEST ARCADE CRAZE now runs on your TRS-80

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

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



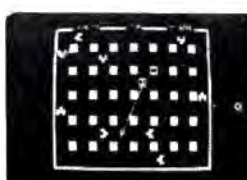
SUPER NOVA®

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



LUNAR LANDER

As a vast panorama moonscape scrolls by, select one of many landing spots. The more precise the spot, the more points scored. If you can land safely, you control 16 M-man engines and 400 missiles. Absolutely the best use of TRS-80 graphics we have ever seen! Five Adventure International. With sound.



ATTACK FORCE®

As your ship appears on the bottom of the maze, eight alien ships appear on the top, all traveling directly at you! You move toward them and fire missiles. But the more aliens you destroy, the faster the remaining ones become. If you get 100 good, you must endure the Flag ship. With sound effects!



COSMIC FIGHTER®

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



METEOR MISSION II®

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

THE ALPHA JOYSTICK: REAL ARCADE ACTION

ONLY
\$39.95
(MODEL I)

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

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



Circle # 105

NEW!

MODEL III JOYSTICK

ONLY
\$39.95

Toll Free Order Line
800-221-0916

Hours: 9AM-5PM, E.S.T.
For Info Call (212) 296-5916

ALPHA Products

79-04c Jamaica Ave., Woodhaven, NY 11421

(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, F.P.O. A.P.O. ADD 10%. DEALER DISCOUNTS AVAILABLE.



Radio Shack's TRS-80® is Your Best Choice in a First Computer

Why? Because you can start with our \$999 Model III and easily—and economically—expand into a powerful, professional system!



- Add Up to 4 Double-Density Disk Drives—2 Internally
- Go from 16K to 48K Memory
- Add RS-232-C Interface
- Or Get It All with Our \$2495 Model III Desktop Computer

A Radio Shack Model III is a versatile, self-contained computer that can grow with you. Whether you're a beginner or a pro, there's one that fits your budget and intended use. And features you'd expect to pay extra for are standard on Model III.

The built-in "extras". Our \$999 system includes: a 65-key keyboard with 12-key data pad, a 12" high-resolution monitor, and a parallel printer interface.

You get much more, including 16K memory, powerful Model III BASIC language, 500 and 1500 baud cassette operation, 16 lines of 64 or 32 upper and lower case characters, repeating keys, special graphics characters, program editor and real time clock.

Model III is ready for a wide range of professional and personal uses. Choose from our large library of user-proven programs or develop your own applications in easy-to-learn BASIC. Just add a cassette recorder to store and run programs and data. Cat. No. 26-1062. **\$999**

Choose our professional Model III Desktop Computer for more sophisticated applications. You get the same basic features as the smaller model, but with 48K internal memory, two built-in double-density mini disk drives for 368K of program and data storage and a built-in RS-232 Serial Interface to communicate with other computers using an optional telephone coupler, like our new Modem II (right). Our powerful disk operating system (TRSDOS) is included along with an expanded Disk BASIC language. And we have optional programming languages to meet specific needs—choose from COBOL, Assembler, Compiler BASIC and FORTRAN. And of course the smallest Model III can be upgraded to this top of the Model III line. **\$2495**
Cat. No. 26-1066.

Get a "hands-on" demonstration of the TRS-80 Model III today at more than 240 Radio Shack Computer Centers and 6200 Radio Shack stores and participating dealers nationwide. Ask about our service and leasing plans, too.

NEW! Direct-Connect Modem II Automatically Dials and Answers Phone

Connects Directly to Phone Line And Any RS-232-Equipped TRS-80

Now your TRS-80 can access and transfer data by telephone. Program the Modem II to dial and answer, receive and transmit, even hang-up. 300 baud. FCC registered. **\$249**
Cat. No. 26-1173.

Send me a free TRS-80 catalog.

Mail To: Radio Shack
Dept. 82-A-370
1300 One Tandy Center
Fort Worth, TX 76102

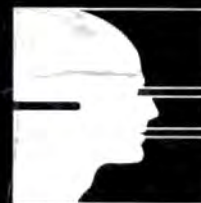
NAME _____
COMPANY _____
ADDRESS _____
CITY _____
STATE _____ ZIP _____

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

Retail prices may vary at individual stores and dealers.

JUST LAUNCHED! VOYAGE OF THE VALKYRIE

BY LEO CHRISTOPHERSON



**ADVANCED
OPERATING
SYSTEMS**

450 St. John Road
Michigan City,
Indiana 46360

The ancient Norse lords bravely sailed their ships across new waters in search of adventure. No obstacle was too great to overcome nor any force powerful enough to prevent their mighty advance. ■ Now you're in command. You are the pilot of the attack ship Valkyrie. Your mission: to wrestle the island Fugloy from the grasp of an army of laser-wielding war birds and secure the golden treasures hidden within the walls of the island castles. Success of the mission depends solely upon you. The castle Drage appears on the horizon when suddenly the air is alive with the flutter of giant wings. Your prize is in sight. . . do you dare accept the challenge and go on? ■ You can put yourself at the controls of the Valkyrie thanks to the genius of Leo Christopherson and the versatility of the *TRS-80 microcomputer. As absolutely flickerless birds sail smoothly across the screen, strains of Wagner's "Ride of the Valkyries" are heard. The game offers 10 levels of difficulty which provide a challenge for players of all ages and skills. The game also provides one of the finest examples of computer cartoon-graphics presently available. Accept the challenge of the Voyage of the Valkyrie . . . available now at leading software retailers.

*Trademark of Tandy Corp.