

80 U.S.

The Basic Computing Journal for the TRS-80

Vol. VI, No. 6 \$3 per copy June, 1983

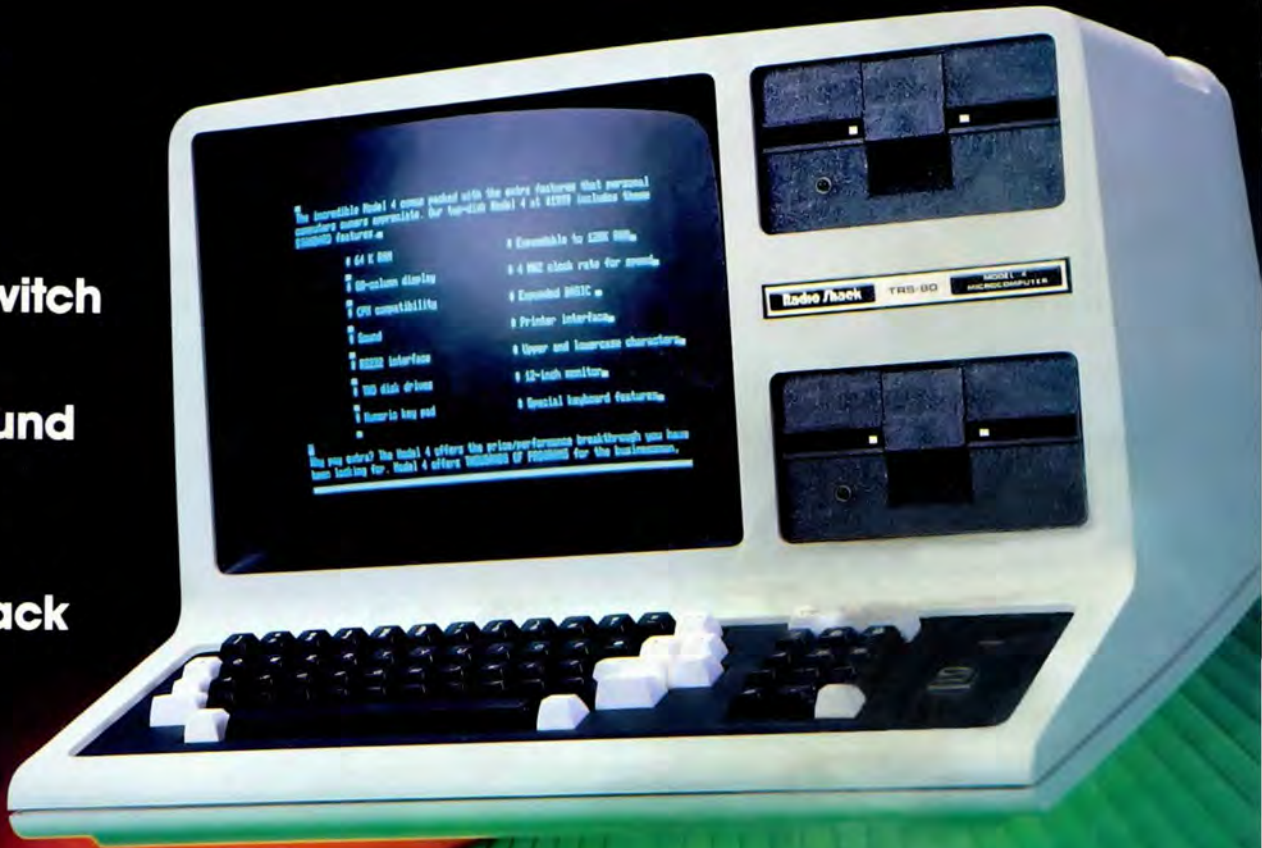
19 Color Computer Game Reviews
Low-cost Changes For Your Computer:

Lowercase
for \$4.98

Model I/III
Cassette Switch

Model I Sound
Monitoring

CC ROM Pack
Alterations



The Model 4 Story



M I C R O T E R M

More and more hardware and communications services are allowing speeds up to 1200 baud. Soon, some may be going faster than that. Today's terminal software simply can't keep up. But now there is an alternative. Micro-Systems Software introduces MicroTerm, the high speed terminal.

Model III MicroTerm will communicate, without insertion of null characters, at 4800 baud. Guaranteed. No cop-outs, no question. MicroTerm is so fast that you can exit from the terminal to the main menu, adjust video width, open the buffer, turn on the printer, or any one of dozens of other functions, and return to the terminal mode **without missing a thing!**

MicroTerm continues to input from the RS232, even while at the main menu. This is the only terminal capable of such an astounding feat. MicroTerm offers you most of the features that "Brand X" smart terminals have, plus it gives you: • Ultra high baud rate operation (up to 9600 in certain cases). • Input while at menu. • Easy to use translation tables. • Easy to use phone number listings. • Maximum auto dial support — most major brands. • Direct file transfer companion program included at no extra cost (compatible with DFT). • DOS commands from menu without exiting program. • Over 34K of capture buffer (in a 48K TRS-80). • Can be set to automatically dial telephone and transmit buffer at preset time without any operator intervention.

And many, many more great features, MicroTerm is so fast you must see it to believe it. The various menus are displayed so fast, they seem to jump out at you. Status of various functions can be displayed and altered in split seconds.

For the computerist who wants the ultimate, state-of-the-art terminal software, there is no other choice.

MicroTerm retails for \$79.95, but registered DOSPLUS owners can purchase it for only \$59.95. \$20.00 off the retail price! MicroTerm comes complete with the terminal program, the direct file transfer program, some standard translation tables, and documentation.

Don't delay, order yours today! Specify when ordering: Model I or III and whether you want it on 40 or 80 track media. Requires a 16K TRS-80 with one disk drive. We recommend 48K for serious communications work. MicroTerm will be available beginning June 30, 1982.



MICRO-SYSTEMS SOFTWARE, INC.

4301-18 Oak Circle
Boca Raton, FL 33431
Telephone: (305) 983-3390
800-327-8724

"THE RESULTS ARE IMPRESSIVE..."

—Dennis Kitsz, 80 Microcomputing; 12/82

Langley-St. Clair's* **Soft-View™** Replacement CRT's eliminates the strobe, flicker and fatigue from TRS-80's™

Now you can upgrade your monitor with the new medium persistence green or amber phosphor tube.

State-of-the-art systems such as IBM™ and Apple III™ do not use the less costly "P4" B&W display tube because it is actually intended for TV viewing and its rapid strobes (60 times per second) cause irritating eye fatigue.

No amount of "green plastic" will solve this problem. But the new **Soft-View** CRT display tube from Langley-St. Clair will.

- Available in slow decay Green or medium decay "European Amber" (the standard in Europe)
- Made with Lead/Strontium impregnated glass that stops X-ray emission.
- Of high-contrast face glass that also stops most U.V. radiation.
- Available in frosted glass with extra Anti-Glare benefits.
- Easily installed...comes with pre-mounted hardware.
- Warranted for one full year against manufacturing defects or tube failure.
- The finest quality double-dark glass phosphor fields to produce dramatic contrast.
- Ideal for Word Processing and Programming, yet fast enough for Games and Graphics.

LSIS **Soft-View™** CRT'S

<input type="checkbox"/> #GN42 Green Phosphor	\$79.95
<input type="checkbox"/> #GN42G Green Phosphor w/Anti-Glare	\$89.95
<input type="checkbox"/> #OR34 Amber Phosphor	\$89.95
<input type="checkbox"/> #OR34G Amber Phosphor w/Anti-Glare	\$99.95

also available:

<input type="checkbox"/> #R22G Red Phosphor w/Anti-Glare	\$139.95
<input type="checkbox"/> #B22G Blue Phosphor w/Anti-Glare	\$139.95

Plus: \$7.00 for packing and UPS Shipping
\$17.00 for Overseas, Parcel Post or UPS Blue Label

Add Sales Tax where applicable.

(Inquire about the CRT's we have available for many other computer models)

For MasterCard and Visa Orders only, call
800/221-7070 (in N.Y. call
212/989-6876)

••••• Langley-St. Clair Instrumentation Systems, Inc.
132 West 24th St., New York, N.Y. 10011



*World's largest supplier of upgraded replacement CRT's.

Soft-View, IBM, Apple and TRS-80 are trademarks of LSIS, IBM, Apple Computer and Tandy Corp.

© 1983 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 additional entry points.**



The Model 4 is the fourth new computer to be announced by Radio Shack this year. Photo courtesy of Radio Shack, a division of Tandy Corp., Fort Worth, Texas.

80-U.S.

The Basic Computing Journal for the TRS-80

TRS-80 is a trademark of the Tandy Corp.

Vol. VI, No. 6 — June, 1983

ARTICLES

The Model 4

14

Cameron C. Brown

State-of-the-art from the Tandy Corp.

19 CC games from Radio Shack

18

Color Computer
A review.

Pat Perez

Keno

22



Models I/III

Why go to Nevada for a casino game?

Steve Rickman

Lowercase and more

28

Model I

Modify your Model I and more for \$4.98.

Kenneth Goodwill

Cassette mode switch

32

Models I/III

An easy-to-build cassette switch — get rid of the plug hassle.

Russell A. Dewey

Electronic watchdog

34

Model I

Monitor sounds with your TRS-80.

George Farnsworth

A simple sensor input

36

Model I

An easy-to-build input switch.

Michael L. Sanders

A computer language board

Model I/III with 3G light pen

Meeting the educational needs of handicapped students.

38

Terry Dalton

Money saving hints

For all models

Low-cost expansion cover or printer stand.

41

Fraser Smithson

ROM remedies

Color Computer

Fix your ROM paks so you never lose BASIC.

42

Robert Grater

Typos

Models I/III

Scan your programs for bugs before running them.

44

Robert Pollock

Data graph evaluation

A graphic four-color VisiCalc utility.

48

Timothy K. Bowman

In the chips

Models I/III

More uses for a byte and a tour through ROM and RAM.

52

Spencer Hall

Where does PUT really GET you?

Color Computer with joysticks

Use these animated programs and a game to find out.

66

Dale Fawcett

Com 80

How the modems do it and a downloading tip.

80

Donald L. Stoner

Zeroes

For all models

Using iteration to solve single-variable equations.

86

G. A. Findlay

Files and foibles

Models I/II/III

Formatted input routines.

92

Terry Dettmann

REVIEWS

Understanding Computer Science

97

Reviewed by T. R. Dettmann

Leaper

97

Reviewed by James Conrad

Microterm Smart Terminal

99

Reviewed by Jim Klaproth

CHROMAtrs

103

Reviewed by Jim Klaproth

Mac Inker

103

Reviewed by Cameron C. Brown

DEPARTMENTS

Editorial

8

By Cameron C. Brown

Letters to the editor

10

Notes, etc.

12

By Cameron C. Brown

BASIC bits

58

By Thomas L. Quindry

Tandy topics

62

By Ed Juge

Captain 80

64

By Bob Liddil

Exploring VisiCalc

78

By Timothy K. Bowman

Basically BASIC

90

By James A. Conrad

Bulletin board

105

For immediate release

106

Advertiser index

110

A Star is born...

The **PRODUCER**TM
The Professional Program Writer.

Now Available for the Model I & Model III
With 48K and 2 Disk Drives

(Please Specify Model I or III)

Coming Soon For the IBM PC, Model II and others.

\$149.95

...Now Introducing
The **PRODUCER, Jr.**

(See Technical Comparison Chart on next page.)

Only **\$89.95**



If BASIC somehow doesn't seem so basic, and your software has been getting you nowhere, then let me introduce myself. THE PRODUCER is my name. Writing programs is my game. If you're interested in an inexpensive way to quickly and easily write professional quality custom software programs, then read on.

Have you ever wasted money on software that didn't do what you thought it would? Are you burned out on high priced, canned programs that make big claims, but don't meet your needs. Has a lack of good software made your computer an expensive gadget that doesn't do what you hoped it would? If so, I'm here with good news. With my help you can put those problems behind you.

What is THE PRODUCER?

In short, I'm a Program Generator designed to write customized software programs. If you have a need to store and retrieve information, perform calculations on your data and get displayed or printed reports, I can help you develop a program to do just that, in just about any format you can imagine. That's why I'm called a program development system. I'm a powerful and sophisticated software package, born of vast technical knowledge and professional design experience. Yet, I'm the most simple, practical, easy to use and functionally versatile program generator ever put on the market.

What can THE PRODUCER do for you?

How can I help you? Just let me count the ways.

1. I make programming easy. I'm user friendly. If you can answer simple English questions and push buttons, I'll do all the hard work. Let me worry about the BASIC language required to complete your program. Describe the program you want and I'll write it for you. The process is simple. First, I produce a printed planning sheet to help you get your ideas on paper. When you've finished planning, you're ready to draw your screen right on the monitor. The Screen design and appearance is completely at your command, including graphics. You have full editorial control. Make all the changes you like, until you're satisfied. After you're thru, I'll guide you thru some simple English questions about your Screen. Based on your answers, I'll write a complete BASIC program for you.
2. I can save you 100's of hours of time. I provide real short cuts to meet your needs by going direct from your idea to a ready to use customized program. I write all the BASIC code for you. I'm simple, but I'm not shallow. The only limit to my capacity is your imagination.
3. I can save you big bucks. You may never need to buy another program to store and retrieve your data. With my help, you can design your own custom programs to get your job done.
4. I can help make you more productive. Having me as your partner will be like taking a smart pill. I'll pay for myself many times over by increasing your productivity and creativity. With my custom programs serving you, your computer will be the valuable friend you hoped it would be.
5. I can help make you a real pro. Based on your ideas, I write complete stand alone programs. I write in BASIC code, but you talk in English to me. And if you're an entrepreneur, you can sell the programs you and I create. As a licensed owner of THE PRODUCER, you may do so without paying royalties.
6. I can make good programmers much better. I produce fully commented BASIC code so you can use me as a building block to write your own specialized software. I have the best screen and input module available anywhere at any price.

PRODUCER Generated Programs

We understand your reluctance to invest in THE PRODUCER until you know for sure it provides what we say it does. The programs below are unmodified, finished programs generated by THE PRODUCER. Our customers tell us that PRODUCER generated programs are better than many high priced programs written by human professionals. Compare these programs to any you have seen selling at a similar price. Their quality will surprise you. Buy any of these PRODUCER generated programs now and we will gladly apply the cost of that program toward the future purchase of THE PRODUCER. Or buy THE PRODUCER now and select one of the PRODUCER generated programs to be included in your order, absolutely FREE.

Executive Scratch Pad	\$29.95	Inventory 1	\$39.95
Expense Notebook	\$19.95	Maintains group of identical items	
Teacher's Grade Book	\$29.95	Inventory 2	\$39.95
Recipe Program	\$19.95	Maintains record for individual items	
Photo Assistant	\$29.95	Record Library	\$19.95
Video Library	\$29.95	Organizes your music center	
Mailing List	\$19.95	Reader's Guide	\$19.95
Personnel Program	\$39.95	Organizes magazine articles/clippings	
See descriptions in March and April Issues of 80 Micro		Personal Checking	\$29.95
		Organizes checking accounts	
		Loan Calculator	\$39.95
		Calculates loans, principal and interest	

What do you get with THE PRODUCER?

1. Two diskettes containing THE PRODUCER program development system, and a complete disk operating system. Also included is a free sample personal management program (value \$59.95) useful to every computer owner.
2. Extensive documentation in a three ring binder, with index tabs, quick reference system, comprehensive index and sections for the novice and professional programmer.
3. Complete printed tutorial, walking through each step in THE PRODUCER process and resulting in a finalized sample program. An audio cassette tape (\$14.95 value) of the tutorial session is also provided free for a limited time.
4. A toll free technical assistance number for PRODUCER owners.
5. A free one year subscription to THE PRODUCER's quarterly newsletter containing ideas, sample programs and update information related to THE PRODUCER.

TECHNICAL COMPARISON CHART

FEATURES OF THE FINISHED BASIC PROGRAM	PRODUCER	JR.	QUICKPRO	CREATOR
Full Screen Oriented Input of All Fields	YES	YES	NO	NO
Edit without Retyping with insert & delete	YES	YES	NO	NO
Restrict field Length automatically	YES	YES	YES	NO
Unlimited Restriction choice for each field	YES	YES	NO	NO
User defined Custom Prompts for each Field	YES	YES	NO	NO
Full Speed Typing in ALL Fields	YES	YES	NO	YES
Immediate Exit from Any Field to Menu	YES	YES	NO	YES
Enter Fields from last Record automatically	YES	YES	NO	NO
Fast BTRIE File Structure (No Sort Needed)	YES	YES	NO	NO
Find Record with Part of a Key	YES	YES	NO	NO
Hi-Speed Global Search for ANY Field in a Record	YES	YES	NO	NO
Duplicate Keys and Multiple Keys Supported	YES	YES	limited	NO
Global Field Replacement Function	YES	YES	NO	NO
Run Predefined Reports from Finished Program	YES	YES	NO	NO
Select Reports from Menu in Finished Program	YES	NO	NO	NO
Sort (machine language) ANY Field-Free	YES	NO	NO	NO
Custom Mailing Labels Option (any Size)	YES	NO	NO	NO
Do Calculations on fields in Program	YES	YES	YES	NO
Sell Finished Program with No Royalty	YES	YES	NO	NO
PRODUCER CAPABILITIES & FEATURES				
Toll Free Question Line	YES	YES	NO	NO
Create PROFESSIONAL Finished Program	YES	YES	NO	NO
Modify Program without Starting Over	YES	YES	NO	NO
Ease of Use, including Complete TUTORIAL	YES	NO	NO	NO
Number of Calculations allowed per field	8	8	1	0
Use Field Names for Calculations	YES	NO	NO	NO
Use ALL Math Functions in Calculations	YES	NO	NO	NO
Generates a BASIC Program	YES	YES	YES	YES
Custom Design exact Screen YOU desire	YES	YES	NO	NO
Full Feature Screen Generator (graphics)	YES	NO	NO	NO
Easy Report Generation with Any Restrictions	YES	NO	NO	NO
Complete & Thorough DOCUMENTATION	YES	YES	limited	NO
Detailed Quick Reference Materials	YES	YES	NO	NO
Audio Cassette Tutorial Available	YES	NO	NO	NO
Program Planning Form Provided	YES	NO	NO	NO
Sample Programs Available before Purchase	YES	YES	NO	NO
FREE UTILITIES INCLUDED				
Free Menu Driven DOS Utility Package	YES	YES	NO	NO
Free Disk Operating System (Super Fast)	YES	YES	NO	NO
File Rebuilder & Reorganizer included Free	YES	NO	NO	NO

Send Cashier's Check, Money Order or Certified Check to: **\$149.95**

PRODUCER SOFTWARE

A division of Texas Computer Systems, Inc.

P.O. Box 1327 Arlington, Texas 76004-1327

Or For Master Card - Visa - American Express

Call 1-800-433-5184 Texans Call 817-274-5625



The PRODUCER, JR.

If you don't need all the features of The PRODUCER--the professional program writer and you don't want to spend \$149.95 on software, READ ON. Producer Software has the perfect solution for you.

THE PRODUCER Jr

A SIMPLE TO USE professional program generator. And it's only \$89.95. This self documented program generator can have anyone creating self-contained stand alone programs in no time at all. No other program generator can provide you with ease of use, low price and quality.

FEATURES

- screen generator allows easy definition and creation of fields
- B-tree file lets you search, insert, delete and edit
- reports by single restriction (no sort)
- much more (see technical comparison chart)

The PRODUCER Jr comes to you complete with all the above features and its own operating system for only \$89.95. But don't let this low price fool you--THE PRODUCER Jr is still the most powerful program generator on the market today with the exception of the original PRODUCER. And THE PRODUCER JR is completely compatible to the original PRODUCER so if you decide to upgrade at a later date you may do so for only \$75.00. So don't miss out. Order today.

For an independent product review of the PRODUCER see page 62 of March issue of 80 Micro

Publisher

I. Mike Schmidt

Managing Editor

Cameron C. Brown

Associate Editors

Terry R. Dettmann

Spencer Hall

Jim Klapproth

Contributing Editors

Timothy K. Bowman

James A. Conrad

Bob Liddil

Thomas Quindry

Advertising Sales

Donald Scarberry

Mark Metzger

Promotion/Circulation

Robert P. Perez

Production

Catherine D. Doud

Editorial Secretary

Eva R. Jones

Accounting

Helen Dalton

Editorial

Cameron C. Brown, Editor

We try to tell you the truth, but sometimes we pass along what has been called an "inoperative" statement.

Let me explain. We are working on one of our fall themes. I found some information in our files and got in contact with a company that said they had a new product which would be appropriate for that issue. We were promised a review copy. It never arrived. We kept calling. We still haven't seen it. We can't tell you if it works. They say so but we haven't seen it.

I hope not, but the product may not exist and this may not be an isolated case. New product announcements appearing in our "For immediate release" section are just that, announcements. They are not promises that the product works, works well, or is even in production. Now, before too many companies start writing letters, let me say that in most cases, the announcement is true and accurate. The problem is, you can't tell.

No magazine has the staff to check each announcement and the history of every company. In an industry that is so young, many of the advertisers you see are basement operations. That is not to be feared. I enjoy being able to talk directly to the president of a company, even if it only has two employees, rather than a fourteenth-level middle executive who doesn't really know what is going on.

Some announcements are based on a release date that may be months away. We publish it. A bug develops and the product never makes it to market. Did we lie to you? No. Did we tell the truth? No. Recently, we had a program that was sent for review along with the announcement. We got a corrected version every day for almost a week!

A much more irritating case involves the trial balloon. Product development takes time, work, and money. If there is no demand, the investment is lost. So, why not send out a new product announcement and

see how many inquiries you get? If there are enough, rush it into production. It is easy to hold off the consumer with delaying tactics such as "It's under back order", or "Demand is so great, shipment is delayed six weeks." We are not children. Development costs are understandable. Just tell us the truth.

I would love to see an announcement that says "If we get enough orders, we will do our best to produce the following fantastic program." At least then we know what to expect. It is the false promising that frustrates and angers. And, it is illegal. According to the Federal Trade Commission, companies that advertise must intend to deliver within thirty days. If they can't, they must notify customers of the delay and offer to return any money sent. Very few people order from an announcement but, if they do, they don't want their money back. They just want the product.

I believe that this is really a problem in the Model 16 market. We have yet to see any non-Radio Shack software that uses the 68000 part of the Model 16. We see announcements, we hear rumors, we hope, but we have yet to see it. One product we tried to review turned out to be a "beta" release. That is computerese for "we have not debugged it yet but we hope to."

You are the consumers. Cavaet Emptor may be the American way but you do have some protection. The Federal Trade Commission has numerous laws and regulations concerning customer satisfaction and fulfillment. Use them if you are having trouble.

All companies should instigate a policy of having the product in-house and ready to deliver before making announcements, not after. IBM's policy that a product be delivered to them, in completed form, three months prior to any announcement is to be commended. Others should try to do the same. The gain in integrity and customer faith will more than outweigh the loss of a few premature sales to another supplier.

RENEWING?

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

MOVING?

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

Name _____

Address _____

City/State _____

Write in new address:

Name _____

Address _____


City/State _____

80-U.S. Journal
Subscription Department
5615 West Cermak Road
Cicero, IL 60650



80-U.S. on tape!

80-U.S. Journal is now available on cassette tape. Don't let long program listings keep you from getting the most from your journal.

Look for the  in the Table of Contents. That symbol is our way of letting you know that the programs in that article are available on cassette.

Model I/III and Color Computer tapes are available quarterly (every three months) for only \$9.95 (ppd.) each.

Each tape issue contains every program recorded twice, a summary sheet, any special notes, and

perhaps a bonus program from one of our past issues. Included with each tape is a postage-paid card for your vote on the best of the bunch.

Use the reader card and send it in now. Don't miss this chance to make full use of your computer.

Tape Journal Contents

Jan-Mar 83 Color Computer

Bar graphs
Speller
Basicmon
Color compiler
and a bonus

Foreign airmail add \$3 per tape.
Payable in U.S. funds only

**Apr-Jun 83
Model I/III**
Permatime
BASIC bingo
Right as rain
Operation genius
What's significant
MID\$
A/D conversion
Zeroes
Keno

**Apr-Jun 83
Color Computer**
CC spelling bee
Star trac
Anti-math
Where does PUT GET you
Zeroes
and a bonus game

80-U.S. Tape Journal
3838 South Warner Street
Tacoma, WA 98409

Letters to the editor

Cameron C. Brown

I just received the April issue. Several programs held my interest enough for me to stop everything and sit down at my Color Computer to try my hand at "programming" them onto a disk.

The one that interested me the most was not listed for my computer but was for the Models I and III. Well, after having worked bingo as a volunteer firefighter, I could see where it could work for most charitable organizations.

When I finished the article by David Busch called Basic Bingo, I typed in the program exactly as listed, then ran it to see how far off it was for my computer. Then I started dropping the lines that showed various errors and ran it again.

Once I had done this, I listed the program and started experimenting with the dropped lines, one at a time, trying a number of different combinations until, one by one, the dropped lines would not produce an error.

Retyping the dropped lines was easy, compared to the process of elimination by trial and error, that evolved as I started at line 1. And as the subtitle said, "Let your computer do the work." Well, I did, with each line throughout the entire program listing until it seemed acceptable to me.

King Solomon's Mine could not have held my interest more than being able to convert the program to a Color Computer, as I really got wrapped up in the project and did not stop until early in the morning.

Should you desire to pass this on, here are the changes. It is no means perfect, but it gets the job done.

The lines that I changed are as follows: Line 20 is changed to 20 AM = RND(75). Line 250 becomes 250 TA = 64. Line 280 has TA = TA + 128 replaced with TA = TA + 64. Lines 300, 310, 320, 330 were deleted and

340 is changed to 340 FOR X = 0 TO 63. Line 350 is 350 SET (X,3,3) and 360 is 360 SET (X,25,3). Note that we have added color to the display. Line 385 is added as 385 PRINT @ 424, "PRESS B FOR BINGO". Line 390 becomes 390 PRINT @ 481, "PRESS ENTER TO DRAW NEXT NO.". Line 400 is now 400 PRINT @ 10, "B I N G O ". The following lines have new PRINT @ locations: Line 410 is @456, line 420 is @470, line 440 is @456, and line 450 is @470, line 490 is @462, and line 500 is @462. Line 470 IF A\$=B\$ RUN was changed to 470 IF A\$=B\$ THEN RUN. Line 540 is rewritten to be 540 IF INT(V/15) = V/15 THEN ROW = INT(V/15): GOTO 560 and, finally, line 570 is changed to 570 P = (ROW*64 + COL*4). I hope that it will help your readers.

Donald Smith
Pittsville, MD

Thank you, we appreciate the conversion and hope other readers will let us know about their success with other programs. --Ed.

As luck, common brilliance, or pure serendipity would have it, I have made use of my versions of the string compacting techniques presented in the April issue by Terry Dettmann. I thought I would pass on my experiences in using them.

If one increases the 'offset' you used from 127 to 192, the compacted string can be printed on the screen and it will appear to be uncompact. Yet the string will have the length of the compacted version. This can save having to uncompact a string in some applications when all the user wants to do is print it on the screen. You might also note that strings compacted with either offset value cannot be compared properly for < and >.

I use a slightly different method for converting integer month, day, and year each to a two byte string. Where you used: 640 M\$ = RIGHT\$("00" + MID\$(STR\$(MO%), 2), 2), I use: 640 M\$ = RIGHT\$(STR\$(100 + MO%), 2).

In most applications, the approximately 16 percent improvement in speed that my algorithm offers will be trivial, but in something like an inventory program where the date of each record entry is recorded, compacted and uncompact, the difference might be of interest to your readers.

J. N. Davis
Sunnyvale, CA

I have an application that I would like to use my Color Computer for and I'm having a problem getting it to work. I have a Color Computer with 32K and Extended BASIC. I want to hook up the computer to a color TV along with a video recorder. I was hoping to be able to use the color graphics at the beginning of home video productions. Also, I would like to use it for titles, so if you know of any scrolling or marquee-type of programs, that would be helpful.

Is it possible to play one video recorder on a TV, superimpose titles via the Color Computer, and record the combination with a second recorder? Any help would be appreciated.

Rene' Cloutier
Sandown, NH

We don't have the answers here, but it sounds to us like an excellent idea. We see real problems with interference and are not sure how one could blank out the background on the Color Computer signal. TV stations do it all the time, but their

equipment is meant to be compatible. If any readers have done it, be sure to let us know. It would make a fine article.

Anent your March editorial; Bravo!!

Now, a serious question. Recognizing that Tandy seems to pay little heed to editorials, or to outraged customers, for that matter, what have you -- as a stockholder -- done to put your views directly to your company's management?

If necessary, why not organize a stockholder's revolt at the next annual meeting? It's your income they're threatening, after all.

C. Edward Chapman
Alexandria, VA

My goodness, I would never suggest a Tandy stockholder revolt. Their growth has been outstanding. But, does anyone know where the Warner Communications meeting is? -- Ed.

I wish to thank your magazine for choosing Maxi Manager as one of the six data base programs comparatively reviewed in your recent article, "Data base management", March 1983. The article was quite informative and should help your readers gain a more thorough knowledge of data base management principles. I found it quite interesting to note that Maxi Manager was the only data base program reviewed that supports both the Model I and III. Is this a growing trend?

As is the case with most reviews, errors and omissions occur. I would like to take this opportunity to point out the most obvious ones. First, the program is written in a hybrid of compiled assembly language and BASIC. This give Maxi Manager the high speed of compiled code when required. Maxi Manager II, to be released soon, increases the ratio of compiled code to BASIC even further. Secondly, the user may "alter fields after set-up", "add fields after set-up", "merge different files", and "append different files". For some reason, Mr. Klaproth stated that these features were not available. Since the price of the package was stated to be \$150, the version reviewed included the Maxi

Manager utility programs required for these and other unmentioned tasks. I can't help but wonder why Mr. Klaproth did not merely state that "this feature may be present but reviewer did not verify it." The same applies to the ability to use "special printer codes (CHR\$)", to "mass edit/purge files", and to specify fields as whole numbers. I would also like to point out that the "maximum lines per record printed" equals 255, not 66 as stated on the comparison table.

I'm sure that you are aware of the impact a review can have on future sales of a software product. In order to be as accurate as possible, I suggest that in the future, manufacturers of products being reviewed be sent advanced copies of proposed reviews, thereby allowing them to submit possible corrections or clarifications.

As an avid reader of your magazine for several years, I'm delighted that there is still someone around that treats the TRS-80 line of computers seriously. Keep up the good work.

Dale Kubler
Exador, Inc.
Author, Maxi Manager

As we stated in the article, it was not a comparison. We were trying to educate, and never meant to imply that something like dBaseII can be compared to a cassette-based Color Computer program. Your program was chosen as representative of a Model I/III program, there are others.

The flaws you noted will occur now and then, especially when there are updates and new releases as the article is being developed. In your case, we were notified that changes were coming, but we had to go on the documentation we had. We checked price accuracy via the telephone just prior to publication and we were not informed that it was for a new release we did not have.

We make every effort to have accurate and timely reviews. Forwarding them to manufacturers is often done, but in your case there was no time. But when errors occur, that is what the "Letters to editor" section is for. Thank you for writing.
--Ed.

OMNITERM

The ULTIMATE TRS-80 Terminal Package

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 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.

Also available OMNITERM for the TRS-80 Model II and IBM personal computer. Contact Lindbergh Systems for details.

Lindbergh Systems

41 Fairhill Road, Holden, MA 01520
(617) 852-0233

Source: TDA818 CompuServe: 70310.267

TRS-80 is a™ of Tandy Corp

Notes, etc.

Cameron C. Brown, Editor

We are changing our name! The next issue you receive will be titled *Basic Computing*. We will continue to be *The TRS-80 User Journal* and are not making any changes in editorial direction or content. The problem has been one of identification. Bookstores seem to put us in the travel magazine section. Take one look at our logo and you can see why. We are also confused with *80-Micro* and the new name should help clear that up. We plan on remaining just the way you know us, but with a name that more clearly identifies who and what we are.

We are now on CompuServe. Well, not quite. After working on the November 1982 issue about telecommunications and following along with Don Stoner and the Com 80 column, I decided to take the plunge. I am now a user and look forward to learning how it all works. My first impression is that of computerized CB's, but I see real advantages to being on the system.

Bulletin Board

More importantly for you is that we have arranged for *80-U.S. Journal* to have its own bulletin

board. Just call 206/756-0448 and select the *80-U.S. Journal* "Letters to Editor" section. The board is set for 300 baud, 8 bit, no parity, and two stop bits. We will be accessing this number for your input, and it will contain recent corrections to articles and programs. There are even options for subscriptions or a complete index to articles.

The board is run by Michael Freeman, here in Tacoma, Washington and his was one of the earliest bulletin boards in the country. Mike is also the national representative for Corvus disks and TRS-80 interfacing. His help has been invaluable and we look forward to the board getting a lot of action.

Corrections

Before giving some corrections to listings, I would like to ask for your help. Every now and then we get a call or letter telling us that a program does not work. We can't do much with that information. Please let us know what kind of error and in what line it occurs. Then we can go to work on the problem, if it exists. We want to help and you can make it easier by being more exact. Thank

you.

"Right as rain", April 1983, page 29, was missing the very last data statement. Please add line 1170 DATA CLEARING AND COLDER. The diskette got slightly scrambled between the time we checked it and when we ran out a listing, sorry.

"Color Computer Compiler", March 1983, page 111, put program lines 450 and 455 together. Be sure that line 455 is separate and not made part of line 450 as we listed it. This program was quite long and if you typed it in, you could have easily confused a 1 (one) with the letter I. Also, some of the very long program lines such as 425 had linefeeds right after the line number. Our typeset machine did that, don't bother entering them.

Recent columns of "Exploring VisiCalc" included figures that gave a listing of the entries in a VisiCalc spreadsheet. The latter part of some of the figures had a section which began with just a '/'. That part gave the spreadsheet and cursor settings and are not formulas or labels to be entered. Your spreadsheet only requires the entries that begin with a > symbol.

Bequest, a game we published in

the April, 1982 issue, could use a slight change. Add a semi-colon to the end of line 160 to insure that certain maze locations are printed correctly.

Puzzler

We have yet to hear much about the April puzzles. Our January puzzler on the GOTO X has a winner, but it is not as universal as we had hoped. This one will work on a Model I or III, but not a CC or Model II. The earliest working submission, and there were hundreds, came from Daniel Schultz of ICM Industries, Carmel, IN. He used the POKE command to have the computer actually modify the resident BASIC code. Since the computer will be altering what is in program memory, be sure that you enter it exactly. Spaces are critical, since values are POKEd into them. Note that B\$ is having a string of four spaces added to it. To execute the routine, set the value of G to the linenummer you want and then either GOTO or GOSUB 65529. Feel free to use the routine in your own code, just be sure to give Mr. Schultz and ICM Industries credit for it. His code was:

```
65529 B$=STR$(G)+" ":A$="D":I=
PEEK( VARPTR(A$) +2 )*256 +
PEEK( VARPTR(A$) +1 )+102:
FORX=ITOI+4: POKE-((X>32767)
*(X-65536)) - ((X<32768)*X), ASC(
MID$(B$,X-I+2,1) ): NEXT:
GOTO65529
```

Eliminate all spaces in the code except the four in the string being added to B\$.

As we said in April, we had to get a little tougher. This problem was submitted by George A. Fenn of Mannford, OK. In assembly language, we want to swap registers A and B, without using an intermediate storage register. A BASIC swap usually goes like this: LET C=A: LET A=B: LET B=C. Try it in assembly language without the C register for a temporary storage. It can be done in three steps!

Be sure to send your solutions to Puzzler, c/o 80-U.S. Journal, 3838 South Warner, Tacoma, WA 98409. Do not send tapes or diskettes, just a listing or postcard will do. Winners receive \$10 and a free tour of our facilities.

UNITED SOFTWARE ASSOCIATES

SPECIALIZING IN TELECOMMUNICATIONS

THIS MONTH FEATURES!

ULTRA TERM

A Full Featured Terminal Program

The Ultra Term communications package is one of the easiest to use and most versatile communications programs available for the TRS-80. It includes a full featured intelligent terminal program, with all the popular features of competing programs costing two to three times as much, and some new features that can't be found anywhere else at any price. Ultra Term also includes a self relocating host program, and hex conversion utilities for bulletin board downloading. Some of Ultra Term's unique features are:

- Supports both manual and auto dial modems.
- Exclusive Ultra Term direct to disk file transfer mode, allows unattended operation at the receiving computer.
- Exclusive split screen feature allows simultaneous two way communications without confusion.
- Line printer support with a 1K print buffer.
- Half and full duplex support.
- Universal ASCII format file transfer with a 33K Buffer.
- A full featured host program.

Ultra Term Price: \$59.95

INFOEX - 80

Bulletin Board System

The INFOrmation EXchange bulletin board program contains all the software necessary to set up your own bulletin board service or message center.

The Infoex-80 software automatically answers phone calls, displays a logon message or bulletin, allows callers to enter and retrieve messages, and lets users chat (type) directly to the system operator.

Infoex-80 supports uploading and downloading in both universal ASCII format and Ultra Term disk file transfer format for accurate and fast file transfer.

Infoex-80 allows users to apply for individual passwords, so private password protected messages can be left for any user. The system also keeps track of the number of times each user has accessed the system, as well as the highest message each user has read, and advises each user when messages have been left for them.

INFOEX-80 Version 2 Price \$134.95

LYNX MODEM

EMTROL Systems Lynx modem is an auto dial auto answer modem for use on TRS-80 Model 1 or Model 3 with or without an RS-232 interface. That's right, this modem includes an RS-232 interface internally, so you can use it on any TRS-80 computer, even if you don't have an expansion interface or RS-232 board installed.

The Lynx includes a one year factory warranty with one day turn around on service should it ever become necessary.

Lynx Modem price \$249.95

COMMBAT

Modem Strategy Game

Combat is a two player tank strategy game that can be played over a modem. In this game, the playing field is divided into a two by four matrix of sectors that are further divided into a 32 by 16 matrix. The player is given eight tanks, a base, three decoy bases, and various weapons including rockets, lasers, shells, mines and one ICBM. Your mission is to locate the enemy's base and destroy it with your ICBM, before he can discover the location of your base. Combat comes complete with a TRS-80, Apple, and Atari disk for one low price.

Combat price \$44.95

SOFTWARE

- Ultraterm from United Software \$59.95
- Microterm from Micro Systems \$69.95
- Omniterm from Lindbergh Systems \$85.00
- Intelliterm from Microcorp \$134.95
- Infoex-80 BBS from United Software \$134.95

MODEM GAMES

- Modem Games tape: \$14.95
 - Chess Checkers Othello disk: \$17.95
 - Combat Tank Game \$44.95
- Includes TRS-80, Apple and Atari Versions

HARDWARE

- Lynx Auto Dial/Answer Modem \$249.00
- Microconnection Manual Modem \$149.00
- Microconnection Auto Answer \$179.00

MUSIC FROM SOFTWARE AFFAIR

- Orchestra 85/90 Music Synthesizer \$89.95
- Piano Software for above \$34.95
- Greatest Hits Songs Data File \$17.95
- Fanfare Software Music Routines \$22.95

UNITED SOFTWARE ASSOCIATES

734 FLAMINGO WAY, NORTH PALM BEACH, FL 33408

ORDERS - 305/965-3496 BBS - 305/842-2687

COD ORDERS — ADD \$3.00

The Model 4

State-of-the-art from the Tandy Corp.

Cameron C. Brown, Editor

Radio Shack's Model 4 computer has been the subject of many rumors for quite a few months. I was able to work on one for a few hours and have had a chance to study the operator's manual and other documents. This report is based upon that brief experience with the machine. We will be giving more in-depth information as we continue our work on it.

Describing the Model 4's market is difficult. It is a Model II in Model III clothing. It offers true state of the art and a definite upgrade for existing Model I and III owners. For new purchasers, it allows a flexibility in Operating Systems and configuration that is way beyond anything that Tandy has yet produced. The Model 4 offers all the performance of the Lobo Max-80 or Apple IIe (except color) for a very reasonable price, backed with Radio Shack support and local service. The Model 4 is destined to be the standard Radio Shack computer for the next few years.

The Hardware

The Model 4 uses a 4MHz Z-80 and is expandable to 128K RAM. There are four selectable video modes (80x24, 64x16, 32x16, or 40x24), upper and lowercase, and reverse video. The disk system uses 40-track, single-sided, double-density drives and the two disk version comes with a built-in RS-232. It has sound generation, three function keys, a numeric keypad, a caps key, and a control key. A high resolution graphics board option will be available and a 34-pin parallel printer interface is included. The computer is housed in one unit, like the Model III, is white, with a black and white video. A 64K, two-disk system sells for only \$1999.

Cassette System

Until you add disks to the Model 4,

it is practically identical to the current Model III. You can purchase a 16K cassette version for \$999. A 64K upgrade is available for \$149 when adding disks to the unit or when going from 64 to 128K. The built-in ROM in the cassette system is identical to that in the Model III. This ROM should be able to identify 48K of the 64K RAM addition, but not all of the 64K.

The Disk Version

Once disks are installed, the Model 4 becomes a new, RAM-based computer. TRSDOS 6.0, developed by Logical Systems Inc., is the standard operating system. TRSDOS 1.3, used when running in its Model III mode, is not included since it comes with all Radio Shack application software. The easiest way to view the machine is like this: Under TRSDOS 1.3 it is a Model III. Boot TRSDOS 6.0 and the ROM

switches out and it is a RAM-based Model 4. Owners also have the option of running CP/M 3.0, developed for Tandy by the Digital Research Corporation. It should be released soon.

The disk-based system is expandable to 128K, which is bank selectable in units of 32K. TRSDOS 6.0 supports full routing, device selecting, floppy and hard disk assignment. The current 5Meg hard disk for the Model III will work on the Model 4. By defining the devices, you can easily select any drive to be drive 0 for booting or mix and match 5 $\frac{1}{4}$ " single- or double-density drives, as well as determine stepping rates and delay times.

Job Control Language or JCL files are allowed and they are a key to effectively using many of the features of the Model 4. There is also filtering, spooling and other DOS operations. TRSDOS 6.0 includes a BASIC that is similar to MBASIC



5.0. Since the machine is RAM based, PEEKS and POKES are not implemented; their function is replaced by invoking supervisor calls (SVCs), such as those used on the Model II. Assigned ports are different than the Model III's.

The power of the Model 4 becomes clear when you look at its operating system. The system comes with a terminal program called COM and other filters (utilities) such as MEMDISK and FORMS. MEMDISK allows you to load system and program files into memory and greatly increase operating speed. The FORMS command allows setting of lines per page, characters per line, page size, indents, and translation of characters. Its flexibility is indicative of most of the command set in TRSDOS 6.0. The library is extensive and very much like LDOS. An extensive directory command gives date of modification, attributes, file size, and more in alphabetical order. The library command shows the following: Append, Link, Route, Copy, Device, Load, Set, Do, Remove, Filter, Rename, Lib, Reset, Attrib, Free, Auto, Purge, Build, Time, Create, Verify, Date, Debug, Dump, Forms, Setcom, Setki (keyboard filtering), Spool, Sysgen, and System. It is the kind of operating system that will make many programmers and users

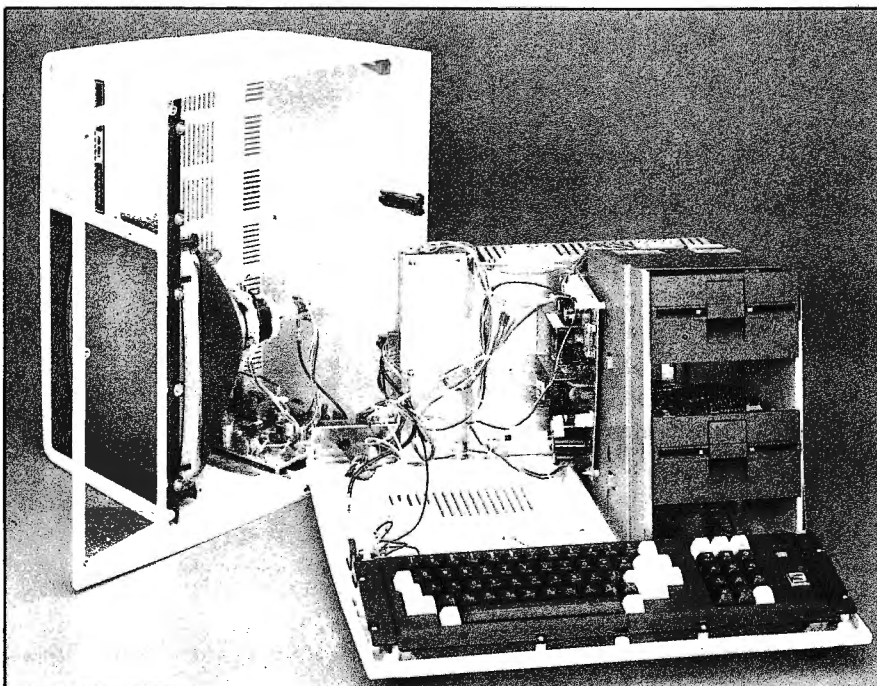
happy.

Disk BASIC

TRSDOS 6.0 is RAM based and cannot access TRSDOS 1.3 ROM subroutines. It has no cassette support and is strictly disk oriented. Many new commands are implemented, such as, RENUM, ROW, SPACE\$, WHILE ... WEND, WRITE# and others. The following commands are not recognized by TRSDOS 6.0: CSAVE, CLOAD, POINT, CLOCK, CMD (replaced with SYSTEM), POS(N), RENAME, and VERIFY.

For the BASIC programmer there are significant differences, and in converting programs over from TRSDOS 1.3 to 6.0 you need to be careful. Print zones are 20 characters, not 16. Variable names can be up to 40 characters long, not just two. This demands that all keywords be separated by a space (e.g. DEF FN not DEFFN). Under TRSDOS 6.0 BASIC, the FOR ... NEXT loop is not automatically passed through once and then checked. The THEN on a conditional statement is required.

When variables are converted to integers, they are rounded, not truncated. Under TRSDOS 1.3, TAB(4.5) would go to position 4, while under TRSDOS 6.0 it would go to position 5. Overflow errors, such



TYPITALL

The SCRIPSIT™ Compatible Word Processor

TYPITALL is a new word processing program which is upward compatible with SCRIPSIT™ for the Model 1 and 3 TRS-80. TYPITALL includes features like these: assign any sequence of keystrokes to a single control key. See the formatted text on the screen before printing. Send the formatted text to a disk file for later printing. Merge data from a file while printing. Send any control or graphic character to the printer. Use the same version on the Model 1 or 3. Reenter the program with all text intact if you accidentally exit without saving text.

TYPITALL (disk only) \$129.95
 Manual only (100 pages) \$25.00

SYSTEM DIAGNOSTIC

Complete diagnostic tests for every component of your TRS-80 Model 1 or 3. ROM: checksum test. RAM: three separate tests. Video Display: character generator, video RAM, video signal. Keyboard: every key contact tested. Line printer: character test. Cassette Recorder: read, write, verify. RS-232-C Interface: connector fault, transmission, framing, data loop, baud rate generator. Disk Drives: controller, read data, formatting, read/write/verify with/without erasing, disk drive timer, disk head cleaner.

System Diagnostic \$99.95

TRS-80 MODEL III ASSEMBLY LANGUAGE

A complete course in assembly language, written for the beginner. Basic concepts, the Z-80 instruction set, complete Model III ROM and RAM information, programming examples, the disk controller, the TRSDOS 1.3 disk operating system, RS-232-C interface.

With the book you can also purchase Monitor #5, a comprehensive machine language monitor for the Model 1 or 3.

Book only \$16.95
 Book and Monitor #5 on disk \$29.95

SMART TERMINAL

The intelligent terminal program, with automatic transmission and storage of data, true BREAK key, cassette and disk files compatible with SCRIPSIT™ and Electric Pencil™. Same program supports both cassette and disk systems.

Model 1 or 3 version \$74.95
 Model 2/12 (CP/M) Version \$79.95

SMALL BUSINESS MANAGEMENT SYSTEM

- **ORDER DESK:** Enter orders, print invoices and mailing labels, recall invoices, automatically post sales to inventory.
- **BOOKKEEPING:** Complete ledgers of income and expenses by categories. Enter or change data, print ledgers or summaries.
- **INVENTORY:** Complete list of all products sold by type and selling price.
- **CUSTOMIZATION:** Complete installation package for each business.

TRS-80 Model 1/3 Version \$350.00
 TRS-80 Model 2 Version \$400.00
 Order desk & Inventory \$250.00
 Bookkeeping only \$150.00

FREE Software Catalogue

Add \$3.00 postage & handling.
 New York residents add sales tax.

Howe Software

14 Lexington Road
 New City, NY 10956

(914) 634 - 1821

Visa and MasterCard accepted.

*TRS-80 is a trademark of Tandy Corp.

FREE PROGRAM

SUPER---A program that strips the copy protection from Radio Shack Visicalc, Scripsit, Time Manager, and Desktop/Plan 80. Our program comes on a Disk and automatically removes the backup protection.

NO PROGRAMMING NECESSARY.

REGULAR PRICE \$20.00
Shipped free with any of these Radio Shack Mod III programs

26-1563 Scripsit I/III	99.95
26-1569 Enhanced Visicalc	199.00
26-1580 Project Manager	99.95
26-1581 Personnel Manager	99.95
26-1582 Time Manager	99.95
26-1585 Business Checkwriter	149.95
26-1590 Super-Scripsit	199.00
26-1591 Scripsit Dictionary	149.00
26-1592 Profile III+	199.00
26-1594 Desktop/Plan 80	199.00

OTHER SPECIALS THIS MONTH

DOS + ver 3.4 (The Friendly DOS)
Only \$99.95

APPARATUS NEWDOS/80 ver 2.0
Only \$119.95



Top-quality Verbatim® Diskettes

Use VISA - Mastercard - Money Orders
No Purchase Orders Please!
Allow 2 weeks for personal checks
Kansas Residents add 3.5% Sales Tax.

CALL TOLL FREE!

1-800-835-0071

Dealer Inquiries Invited.

IN KANSAS:
316 - 665-3611

FORUM 80

316-665-3985

SALES DATA, INC.

526 E. 4th
HUTCHINSON, KANSAS 67501

Model 4

as division by zero, can now be trapped and are recoverable. TRSDOS 6.0 performs dynamic string allocation and no CLEAR statement is needed. The CLEAR command is now used to save specific memory locations for assembly language routines or drivers. BASIC statements can only be 249 characters long, the last six bytes are reserved for line numbers.

Documentation

The Model 4 disk operating manual is quite complete, but it is lacking in material on the Supervisor calls and other uses of TRSDOS 6.0. Some applications of JCLs are discussed, but the new owner of a Model 4 will have many questions about their use and utilities such as MEMDISK. It does an excellent job of discussing the enhancements and differences from Model III or I BASIC. For owners of other models of TRS-80, the appendices will be invaluable. The DOS manual is complete, but not as technical as what LDOS users are used to. Included is an introductory manual that is excellent. It takes a first-time user through loading BASIC, running a simple application program called Maillist and does a fine job of getting the novice on his way. Clearly, Radio Shack has thought about the end-user and what questions he may have. There is also a small reference manual for easy look-up of command syntax and usage.

Compatibility

"I took it once on the Model I/III incompatibility and I won't go through that again," said Don White, Model 4 product line manager. By inserting a Model III TRSDOS 1.3 disk into drive 0, it will act as a Model III. The built-in self-booting ROM recognizes the Model III diskette and acts accordingly. The hardware is designed to include cassette I/O and Model III port assignments. It is only when you are running TRSDOS 6.0 or CP/M 3.0 that you are in a completely disk-oriented system. Actually, that is not quite true. There is a TRSDOS 6.0 program called TAPE100 which allows tape to disk, and the reverse, communication to a Model 100. Since the leader format on the Model

100 is unlike the Model III, don't plan on loading Model I/III tapes into TRSDOS 6.0.

TRSDOS 6.0 includes a convert program, CONV, for moving data and BASIC ASCII files over from TRSDOS 1.3. Remember, application programs written for TRSDOS 1.3 have to be run under TRSDOS 1.3, they will not run under TRSDOS 6.0. Under TRSDOS 6.0, the formatting is different, so, TRSDOS 6.0 can read 1.3 but TRSDOS 1.3 cannot read 6.0. To use TRSDOS 1.3 programs, you must boot-up with it in drive 0. In this way, all Radio Shack software will operate and the machine is completely Model III compatible. For most applications, there will not be a re-release of TRSDOS 6.0 versions. Radio Shack is working on 80-column versions of VisiCalc, SuperScripsit, and Scripsit that will take advantage of the new video format, but no release date has been set.

Upgrades

Current Model III owners can have their machines converted into Model 4s, but there are some differences. For \$799, you get a complete board swap, 64K RAM (200 ns), TRSDOS 6.0, a new keyboard and sound board, reference card and operator's manual. The board swap is complete and your old Model III board and RAM is not returned. You do not get a new casing, disk drives, RS-232, or monitor. If you start with a cassette version of the Model 4, the first disk add-on costs \$649, the next disk is \$240, and the 64K RAM kit is \$149.

For new owners, the Model 4 offers a price-to-performance ratio that is excellent. For Model I owners, it is the complete improvement they have been looking for. For Model III owners, it guarantees that their software investment is not lost, and they can upgrade without having to purchase a complete unit. Model II users will feel right at home with TRSDOS 6.0 and its RAM based outlook. Advanced programmers will find power and utility in TRSDOS 6.0. The use of CP/M 3.0 will open up a world of existing application software for many businesses. It is impossible for one machine to be all things to all people, but the Model 4 comes close.

INTELLIGENCE IS OUR MIDDLE NAME

If you want more intelligent computer software, then you should know about LISP. LISP is the premier language of Artificial Intelligence, applications of which include word processing, symbolic math, compilers and natural language processing. With special features that we have built into our interpreter, you can also use LISP to handle your more routine problems more intelligently.

To introduce you to LISP, we have included such programs as AIT's symbolic differentiator and algebraic simplifier to take some of the dirty work out of your math problems. This will leave you with plenty of time to get challenged by our poker player. Of course, a powerful LISP editor is included (written in LISP, naturally).

The primary reason for buying an AIT LISP system is our interpreter. That's because we've built in over one hundred LISP functions, including powerful and versatile I/O, trigonometric and exponential functions, function tracing, error trapping, integers, single and double precision floating point numbers, multi-dimensional arrays, files, strings and string functions.

In addition, the AIT interpreter is fast. That's important because your program can't execute any faster than the interpreter it's running on.

The entire system including the LISP interpreter, LISP editor, Poker Player, Math Package and manual sells for \$119.95.

For further information on the AIT LISP system call: **206/644-3068**, or write: **Artificial Intelligence Technologies**
2121 N.E.152nd
Redmond, WA 98052

A R T I F I C I A L
INTELLIGENCE
T E C H N O L O G I E S
© COPYRIGHT 1983

* For TRSDOS with 48K and one disk drive
TRS-80 and TRSDOS are registered trademarks of
the Tandy Corp.
Washington state residents must add sales tax.

206/644-3068

LISP INTERPRETER

19 Color Computer games from Radio Shack

A review

Pat Perez, Tacoma, WA

80-US received a large package from Radio Shack. Inside were many programs for review, ranging from Model II accounting packages to PC-2 engineering programs. The bulk of the material was for the Color Computer, and almost all of them were games. We decided to call in a true game fanatic, who happens to sell Ataris, for his evaluation. What better reviewer could there be than a man who makes a living selling a games machine? His evaluation is what follows.--Ed.

My game rankings are purely subjective, and may be slightly slanted since I get to see the magic graphics that are available on the video machines from Atari, Coleco, and Mattel. The machines from Tandy hold their own against the video game competition, and are much more useful.

Table one gives a breakdown of all the cartridges as judged in various categories. Enjoyability is my measure of the game's longevity or ability to be enjoyed over a period of time. Graphics is a measure of both animation and image quality. Sound is based on how often there is something to hear and whether or not it becomes abrasive. Fun is pretty self-explanatory, as judged by a now reformed Pac-Man fiend who currently crazes Star Raiders. Complexity is a measure used to weed out the sophisticated from the younger kids stuff. Don't be discouraged by the number of "fair"

ratings. To me, fair is just that, nothing spectacular, nothing terrible. Now, on to the games.

Monster Maze is an imitation of the arcade game Berzerk. Its objective is to guide you through rooms populated with evil monsters trying to kill you.

Castle Guard is a fairly original game in which one or two players try to destroy each other's castle by bouncing a magical fireball (sent to earth courtesy of Merlin the Magician).

Shooting Gallery, the county fair favorite. Shoot the moving targets but don't waste precious bullets.

Polaris, another arcade look-alike, is a Color Computer version of Missile Command. Destroy the ICBMs and protect your coastal cities.

Poltergeist, the first in the "see the movie, play the computer game" trend for Radio Shack, challenges you to rescue little Carol Ann from the evil poltergeists. You have to maneuver through three different series of obstacles.

Project Nebula, Radio Shack's answer to Star Raiders, is a pale imitation of the legendary Atari program. But Atari computers were designed with Star Raiders in mind and they have certain hardware advantages in playing this game. Project Nebula is a space mission in which you have to destroy aliens in as little time as possible. All the while, you have to conserve fuel and

protect the star bases.

Bustout is a Breakout twin, but better than the original. Bounce the moving ball to remove bricks from a barrier. Gravity options improve on the original.

Microbes was formally called Color Meteoroids and was reviewed in the February 1982 issue of *80-US Journal*. It puts the player inside a human body, battling diseased cells. It is the game Asteroids, repackaged.

Roman Checkers is Othello, or Reversal, played on an eight-by-eight grid. You try to get as many pieces on the board as possible while at the same time blocking your opponent. This game can involve a strategy as deep as that in chess.

Popcorn has the player maneuvering a series of baskets in order to catch falling popcorn kernels. It gets hectic, but is always fun.

Clowns and Balloons has you moving a trampoline to keep a clown in the air (and alive) so he can pop the balloons that are passing by overhead.

Space Assault is a space invaders replica. It is more challenging than the original. Your goal is to blast the invaders and protect the earth.

Wildcatting is an original game that has players searching for oil. Beware of dry holes, they cost money. In fact, even holes with oil may not pay off due to drilling costs, and taxes. Play J.R. Ewing without

the family problems.

Mega-Bug is a Pac-Man derivative. Your "mouth" is moving through a large maze, all the while being chased by eight unnamed insects. Only a part of the maze is seen, through a moving magnifying glass; everything else is small, but legible.

Sands of Egypt is a constantly animated and graphic adventure. You see where you are going as well as moving scenery. If thirst becomes a problem you even see your own grave. The challenging puzzle makes this a top-rate adventure.

Raaka-Tu, Pyramid 2000, and Bedlam are text-only adventures. Raaka-Tu has you leading a Himalayan expedition to find a missing tribe. Pyramid 2000 is a standard find-the-treasures adventure. This one uses the great pyramids of Egypt for its locale. Bedlam has you trying to escape from a bizarre mental institution. The maze is different each time you play.

Color Cubes is a microcomputer

Ratings are P (poor), F (fair), G (good), E (excellent), K (keyboard alone will work), J (joystick required), D (disks required), N (not offered in this game)

NAME	CAT#	Price	1	2	3	4	5	6	7
Monster Maze	3081	29.95	F	G	F	G	1	F	J
Castle Guard	3079	29.95	G	E	F	G	1-2	G	J
Shooting Gallery	3088	29.95	F	E	F	F	1	F	J
Polaris	3065	29.95	G	F	F	G	1-2	G	J
Poltergeist	3073	34.95	G	G	F	G	1	G	J
Project Nebula	3063	39.95	F	G	F	F	1	G	J
Bustout	3056	29.95	F	F	F	F	1-4	F	J
Microbes	3085	24.95	G	G	F	G	1	G	K,J
Roman Checkers	3071	29.95	F	F	F	F	1-2	G	K,J
Popcorn	3090	24.95	E	G	G	E	1	G	J
Clowns & Balloons	3087	29.95	G	E	G	E	1	G	J
Space Assault	3060	29.95	G	E	G	G	1	G	J
Wildcatting	3067	29.95	F	G	F	F	1-4	G	K,J
Mega-Bug	3076	34.95	G	F	E	G	1	G	J
Sands of Egypt	3290	29.95	G	E	N	G	1	G	K,D
Raaka-Tu	3311	14.95	F	N	N	F	1	G	K
Pyramid 2000	3310	14.95	F	N	N	F	1	E	K
Bedlam	3312	14.95	G	N	N	G	1	G	K
Color Cubes	3075	29.95	E	E	N	E	1	E	K

version of the famous Rubik's Cube. You try to solve the cube on your video screen. Seeing a three-dimensional cube on a two-dimensional video takes getting used to, but a handy keyboard

overlay is provided for the weak of heart.

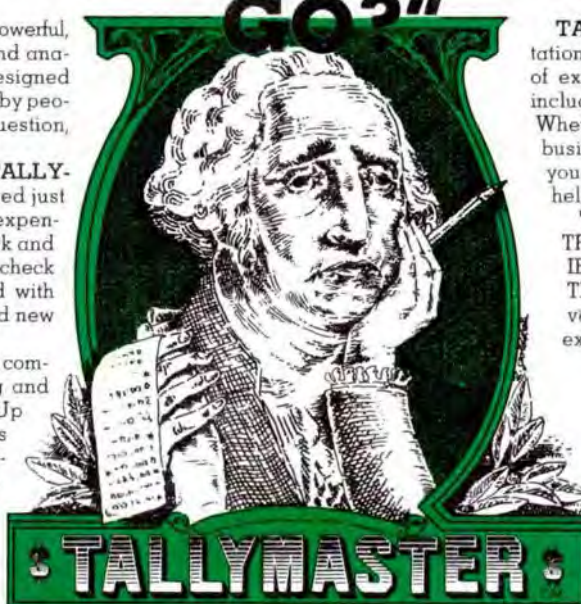
All in all, no real dogs in the bunch. Not all appealed to me, but my tastes in computer games are unique.

"WHERE DID ALL THE MONEY GO?"

TALLYMASTER offers a new, powerful, easy-to-use way of summarizing and analyzing budgets and expenses. It's designed for personal and small business use by people who need quick answers to the question, "Where Did All The Money Go?"

Like most PROSOFT products, "TALLYMASTER" originally was developed just for our own use. To find out why our expenses kept rising, we looked for a quick and easy way to categorize our bills. The check register gave too much detail, and with "VISICALC", it was hard to just add new numbers at random.

TALLYMASTER takes a simple, common-sense approach to organizing and summarizing expenses and sales. Up to 702 categories can be defined. As numbers are added to them, new totals are shown instantly. It's like having a room full of calculators, all in easy reach. Totals can be sorted, reports printed, and disk files combined.



TALLYMASTER's handsome documentation has a step-by-step tutorial, with dozens of examples and illustrations. We've even included five sample disk files for you. Whether you're managing a home budget or business expenses, this program can give you better understanding and control. It helped us, and it can help you.

TALLYMASTER is available for the TRS-80 Models I and III (48K) and the IBM Personal Computer (128K). The TRS-80 version is just \$79.95. The IBM version, with functional keys and an extra-fast sort, is just \$129.95.

PROSOFT[®]

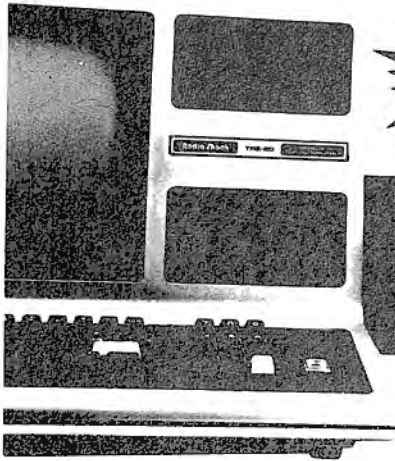
Dept B, Box 560, No. Hollywood, CA 91603

(213) 764-3131

Toll-Free order lines:
(800) 824-7888 oper 577

Terms: VISA, MC, CHECKS, C.O.D., or even cash - No P.O.'s. Please add \$3.00 shipping/handling in U.S.A., \$5.00 to Canada, \$15.00 overseas. For C.O.D. please add \$2.00 in U.S. only, add 6 1/2% sales tax in California, we ship within one day of receiving orders.

ACCESS UNLIMITED



FREE!

FREE! DOSPLUS 3.4*
disk operating system
with any Percom or
Access Unlimited
1st Drive System
for the Model III***

**SAVE \$50.00 on a fully-tested PERCOM
Disk Drive for Model III* Reg. \$499.00.
Now \$449.00 ea or \$750.00 Dual**

Percom's internally-mounted drives, with their widely-acclaimed disk controllers, are completely pre-tested with a 48 hour Burn-in. So, you know it works right when you get it. Choose single or double-density storage capacity.

A First-Drive System includes the four-drive disk controller, one drive, power supply, mounting hardware, cables and a fully-illustrated, easy-to-understand owner's manual.

SPECIALS OF THE MONTH:

NEW "Star Gemini" Printer
Dot Matrix Model 10 — Reg. \$499.00 Sale **\$329.00**
100 CPS Model 15 — Reg. Retail \$699.00 Sale **\$479.00**

NEW "C-ITON F-10 Starwriter" Printer
Reg. Retail \$2295.00 Sale **\$1595.90**

SPECIAL CLOSEOUT:

"Brother" HR1 Daisywheel Printer
Serial — Closeout Sale **\$799.00**
Parallel — Closeout Sale **\$745.00**

Make sure it's done right. Let us install your First-Drive System.

Purchase your Model III* Drives from us and for \$79.95 plus shipping, you can have our experienced professionals perform a 48-hour burn-in of your Model III* computer, install the drive system, and check out your expanded system to make sure everything works correctly. Call for pricing of complete Model III* system with 2 to 4 Access Unlimited or Percom drives.

Get the best! Our own fully-tested drives* for as low as \$275.00 Model I*

Every Access Unlimited Floppy Disk Drive is electrically and mechanically tested, then burned-in for 48 hours under operating conditions. The signed test list in your shipping carton is proof of that.

Our floppy disk drives offer you either single or double density. With double-density, it stores up to 364 Kbytes, depending on the format.

AFD40-1 SS/DD-\$275.00 TFD 44-1 DS/DD-\$350.00
AFD40-2 Dual SS/DD-\$550.00 TFD 44-2 DS/DD-\$700.00

SATISFIED GUARANTEED! If you're not completely satisfied with your Access Unlimited Disk Drive, return it within 15 days for a full refund. All our drives have a comprehensive 90-day limited warranty.

"Percom" Quality for your "Model III"

Nothing but the best for your "Model III". Percom internally mounted drive systems: including 4 drive controller with gold edge connectors, double density disk drive or drives, all hardware and cabling. A free copy of DOS Plus 3.4 is also included with every first drive purchase.

TFD 340N1 one drive single sided double-density **\$449.00**
TFD 340N2 two drive single sided double-density **\$699.00**

Brand Spankin' New! SALE Dual Headed Drives for the Price of Flippies!

Now you can have a "dual headed" "PERCOM" Drive System for your "Model III!"

TFD344N1 One drive dual headed double-density **\$560.00**
TFD344N2 Two disk dual headed double-density **\$860.00**

*completely compatible with programs existing on single sided or double sided diskettes.

WE HAVEN'T FORGOTTEN THE "MODEL I"!!

You have a good system and you just don't want to sell out to a Model III-Upgrade with the Percom Doubler II, the overwhelming favorite double density adapter for over 2 years! Simply plug the adapter into your expansion interface and run either single or double-density programs. Comes complete with FREE DOS Plus 3.4 but will also run with LDOS NEW DOS 80 and TRS DOS.

Upgrade your Model I to Double Density — New Low Price \$129.95

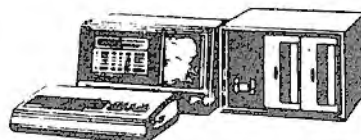
For "TRS 80 Model I & III" — Super Utility & V30 — **\$55.45**

Percom Hard Disk — Quality for your System

*works with existing floppy drives Reg. from \$2495
*can be daisy-chained up to four hard disks

***DOS Plus 4.0 or LDOS included FREE — Now from \$1395.00**

*Now available for immediate delivery in 5 & 10 megabyte configuration
Can be used for Model II*, III*, "Apple II" or "IBM PC" computers.



Your present system too small?

Take advantage of iBEX company business system and stand alone word processing systems — overbuild — We Bought 'Em All!

Model No. 7202 Regular retail \$9070.00
Now for a limited time only — while supply lasts — Lowest Price Ever!

\$2595.00
F.O.B. Dallas

Look what you get for \$2595 PLUS FREE SOFTWARE!

- Z80 • CP/M compatible
- 64 kilobyte RAM.
- Dual 8" floppies (total 2.4 Mbytes)
- Switchable to IBM 3740 format
- 12" green phosphor monitor (80 x 24 characters)
- Centronics compatible printer interface
- Serial interface
- Full function keyboard
- Clock timer and calendar (with battery)
- Over \$2200 Worth of **FREE Software:** CP/M Operating System, M/Basic Interpreter, Perfect Writer, Perfect Speller, Perfect Calc, Perfect Filer

"SILENT SCRIBE" QUIET MATRIX IMPACT PRINTERS

DP-9000A (80 Col, 150 CPS, Graphix™ PLUS) **ONLY \$1625.00**
DP-9501A (132 Col, 150 CPS, Graphix PLUS) **ONLY \$1625.00**
DP-9620A (132 Col, 200 CPS, Graphix PLUS, Enhanced "NLQ" (Print Quality)) **ONLY \$1745.00**

"MPI" GRAPHICS PRINTER

• 150 CPS **Sale, Only \$1099.00**

HOT OFF THE PRESSES:

Inside Personal Computer Disk Storage

THE Necessary Basic Book, NEW from "Percom"

Only \$5.95

Keno

Why go to Nevada for a casino game?

Models I/III

Steve Rickman, Sacramento, CA

There is a story that the popular casino game called Keno is descended from an ancient Chinese lottery which the emperors used to finance the Great Wall. Whether that's true or not, the game does have an oriental flavor. Although it appears childishly simple and easy to beat, it is based on a complicated system of probabilities and payoffs which insure that the house, in the long run, will be the winner.

In the short run, anything can happen. One attraction of this addictive game is that a bet as small as \$2 can win \$50,000. Such a win is far from likely, but it is possible.

This program, called Keno, simulates the game as it is played in Nevada. It is written in Level II BASIC and requires at least 16K of RAM.

The Casino Game

In the mechanics of play, Keno is similar to that old standby, bingo. In a large bowl, there are 80 numbered balls. Before the game starts, each player obtains a "ticket" printed with the 80 numbers. He then marks from one to fifteen spots (i.e., the numbers he wants to bet on).

After marking his spots, the player submits the ticket at the Keno desk and places a bet, called the ticket price. He receives a duplicate ticket in return as a receipt. Usually, the minimum bet is \$1 if ten or fewer spots are marked, and \$2 for eleven to fifteen spots. The maximum bet is typically \$500.

Any number of players may submit tickets for a particular game (and the more, the merrier for the casino). After a predetermined interval, the Keno desk closes and the game begins. The balls in the bowl are thoroughly mixed and then twenty of them are drawn in succession. As each ball is drawn, the number is announced and it is also lit up on a large display board which looks like the Keno ticket.

Meanwhile, the player compares his ticket to the drawn numbers. He wins if a certain minimum count of his spots are among the drawn numbers. The more numbers he "catches" the greater the payoff. Since there are 120 possible combinations of spots and catches, the

casino makes available a leaflet containing a payoff table.

Playing Keno

Playing Keno is similar to the casino game. At the beginning, you are presented with a graphic Keno ticket and asked to enter your spots. As each spot is entered, it is marked on the ticket with parentheses. A "spots marked" display keeps a running count of the number of spots entered. The program will not accept invalid entries, such as spots out of range (less than one or greater than 80), spots already marked, or more than fifteen total spots. The only alphabetic characters it will accept are the commands "S" (start), "P" (payoffs), and "E" (erase).

The erase command removes all marks from the ticket and resets the spots marked counter to zero. You would use it if you found that you had made a mistake or decided to change the ticket.

The payoffs command switches the display to a payoff table which shows the amount you win for any given number of catches with any number of spots marked. The amounts shown in the payoff table are for a minimum bet of \$1 or \$2 as applicable. Naturally, the amount you win is proportional to the amount you bet. For example, if you bet the minimum \$1 on a four-spot and catch three, you would win \$4. If you had bet \$2, you would have won \$8. Incidentally, the payoff table is identical to that of a major Nevada casino.

By repeatedly hitting ENTER, you can scroll through the payoff table from one spot to fifteen spots. Hitting "1" returns you to the Keno ticket, with all previously marked spots still shown.

When you enter the start command, you are first asked for your bet. If you simply hit ENTER in response, the minimum bet will be used. After the bet is entered, the twenty numbers are drawn in succession, about one second apart. As each number is drawn, it is marked on the ticket. If the number is not a catch, it is marked on the ticket with a pair of bars. If it is a catch, the entire number is whited out. Meanwhile, two displays below the ticket keep count of how many numbers have been

drawn and how many catches have occurred.

The drawing sequence is as random as the Level II RND(X) function, and the statistics of catches for spots marked match the theoretical odds very closely.

When all twenty numbers have been drawn, the results are displayed, showing the original ticket price, the winnings, if any, and the net gain or loss since play began. Hitting any key will begin a new game. The original spots are not automatically erased for the new game, so you can replay the same ticket by entering "S" for start.

The Odds of Keno

After a few games of Keno, you may begin to wonder what the true odds of this game are? What is the best ticket to play? Is there a real chance of coming out ahead?

Some of these questions may be answered with the short program called Keno Odds. This program calculates the theoretical probabilities of all spot/catch combinations.

I won't try to define the probability here. A formal definition would require too much explanation, while an informal definition would likely be misleading. However, I do need to explain the numerical evaluation of probability so that the results of the program can be understood.

By convention, the probability of an event can be expressed as a number between zero and one. A probability of exactly one means absolute certainty — the event will always occur in every trial. For example, in Keno, the probability is one that all twenty numbers drawn will lie between one and 80. A probability of zero also means certainty, but with a negative emphasis — the event will never occur in any trial. In Keno, the probability is zero that a particular number will be drawn twice in a row.

Of course, the interesting probabilities lie between zero and one. A probability of .25 means that if there is a very large (technically, infinite) number of trials, the event will occur in twenty-five percent of the trials.

Suppose that I mark a one-spot Keno ticket. As the Keno Odds program will display, the probability that I will catch the single spot is .25. The probability that I will not catch the spot is .75. Notice that the two probabilities add up to one. This should make sense because there are only two possible outcomes to the game: I catch the spot or I don't. That one of these two events will occur is a certainty.

Suppose that I play just four, one-spot games. Can I definitely say that I will catch the spot in one game and not catch it in the other three? No, I can't. If the number of trials is small, probability is "grainy." Only if the number of trials is very large will the probability values definitely be borne out. Nevertheless, if you're wagering, a good bet is that I'll catch the one-spot just once in four games.

An interesting thing to do is to compare the probability table with the payoff table in the game program. For example, according to the payoff table, if I catch a one-spot and I've bet the minimum \$1, I win \$3. The probability is that (in the long run) I will catch the one-spot just once in every four games. Therefore, for every

\$4 I bet, I can expect to win \$3. As it turns out, this is typical of the expectation for tickets with any number of spots. If you multiply the winnings for each catch by the probability of that catch and sum them all up, you find that you can expect a return of from sixty-nine to seventy-five cents on the dollar (in the long run).

Interesting Observations

Your best chance of winning the \$50,000 limit on a \$2 bet is by catching thirteen spots out of fifteen marked. The probability of that occurring is $2.06771E-08$, which corresponds to one chance in 483,626,681. (If you ever hit it, would you write and let me know?)

The best ticket to play to have a chance of winning something, and maybe keep you playing, is the four-spot. The total probability that you will catch either two, three, or four spots to win is .25895.

The ticket on which you are least likely to win anything is the eight-spot. The total probability that you will catch a winning number of spots is only .020834, or one chance in about 48.

Arguably, the best all-around ticket to play is the fifteen-spot. The total probability of winning something is .125006, which is third best, after the four-spot and six-spot. However, playing the fifteen-spot puts you in line for the big money wins, which is the only way you can expect to profit from Keno.

The Odds Program

The odds program itself is based on a rather complicated algorithm which I won't attempt to explain or prove. It is here on an "as is" basis without any sort of warranty, and I don't advise anyone to risk real money on the basis of it.

Because the algorithm uses the slow LOG(X) and EXP(X) functions in an iterative loop, it is quite slow. When you run it, the first result will not appear for about seven seconds. The entire program takes about twenty minutes.

If you have a line printer, you can get a printout just by changing all of the PRINT statements to LPRINT.

The table produced by the program has four columns. Column 1 is the number of spots marked. Column 2 is the number of catches for which probability is calculated. Column 3 is the probability of that number of catches with that number of spots marked. Column 4 is the cumulative probability — that is, the probability that you will catch either the current number of spots calculated, or more.

Program Listing for Keno

```

10 REM *****
20 REM *          KENO!          *
30 REM *  COPYRIGHT 1982      *
40 REM *          BY          *
50 REM *  STEVE RICKMAN      *
60 REM *****
70 REM VER. 1.0 4/4/82
80 REM
90 REM
100 REM          INTRO

```



For everyone who's tried
to top the MX-80, bad news.
We just did.

Epson.

The Epson MX-80 is the best-selling dot matrix impact printer in the world. It has been since its introduction. And despite the host of imitators it spawned, no one has been able to top it. Until now.

FX-80: Son of a legend.

The new Epson FX-80 is far more than just doo-dads added on to last year's model. It's the most astonishing collection of features ever assembled in a personal printer.

For starters, it's fast: 160 CPS. And clean. All the print quality Epson is famous for in a tack-sharp 9x9 matrix.

But that hardly scratches the surface.

Create your own alphabet.

With the new FX-80, you aren't limited to ASCII characters. You can create your own. Any character or symbol that can be defined in a 9x11 matrix can be added to the FX-80's already impressive library of type styles and stored in its integral 2K RAM.

So you can create "Sally's Gothic" or "Tom's Roman" just by downloading and modifying standard characters. Or you can create a custom set from scratch. Either way, you can store up to 256 new characters. And if you don't need a new alphabet, the RAM functions as a 2K data input buffer.

Who knows graphics better than Epson?

Nobody, that's who. And if you don't believe it, witness the FX-80.

With a 12K ROM capacity, the FX-80 gives you a few things the others don't. For example, not one, not two, but *seven* different dot addressable graphic modes are program

selectable. And can be mixed in the same print line. Everything from 72 DPI (dots-per-inch) Plotter Graphics to the 640 dots per line resolution designed to match the remarkable monitor clarity of the Epson QX-10 personal computer.

And *that* is in addition to an astonishing array of 136 different user-selectable type styles including Proportional, Elite and Italic as well as the more conventional faces you get on other printers.

Hard-to-beat hardware.

The FX-80 has all the hardware features you've come to know and love on the MX Series: logic seeking, bidirectional printing, the by-now-famous disposable printhead, and more.

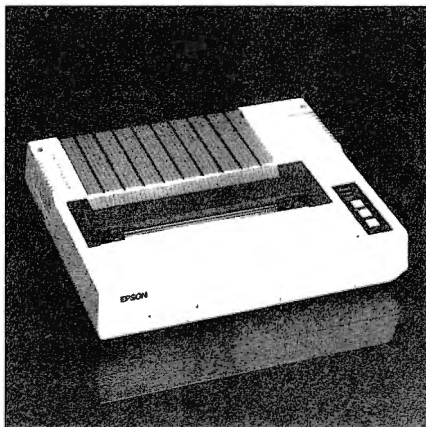
The FX-80 features an adjustable pin platen or optional friction/tractor feed, so you can use fanfold, roll or sheet paper ... backwards or forwards. The FX-80 even gives you reverse paper feed.

And if you're printing forms, the FX-80 has a feature you're gonna love: a function that allows you to tear off the paper within one inch of the last print position.

Be the first on your block.

We'd be willing to bet that the FX-80 — like the MX-80 — will have its share of imitators. Don't be fooled. To make sure you get the genuine article, rush down to your local computer store right now and let them show you everything the FX-80 can do.

And while you're there ... ask them to show you how it works with our computers.



EPSON

EPSON AMERICA, INC.

COMPUTER PRODUCTS DIVISION

3415 Kashiwa Street
Torrance, California 90505
(213) 539-9140.

Outside California, phone
(800) 421-5426 for the
Epson dealer nearest you.

Keno

```
110 REM
120 CLS:PRINT @472,"K E N O !";
130 S$="* * * * *":PRINT @406,S$;:PR
INT @534,S$;
140 FOR K=1 TO 4
150 GOSUB 1390:PRINT CHR$(23):GOSUB 1390
:PRINT CHR$(28);:NEXT
160 PRINT @960,"":FOR K=1 TO 5:PRINT:NEX
T
170 PRINT @256,"KENO IS A GAME OF LUCK A
ND INTUITION..."
180 PRINT:PRINT "IN A BOWL THERE ARE 80
NUMBERS. YOU MARK A CARD WITH FROM"
190 PRINT "1 TO 15 OF THESE NUMBERS. YOU
R CHOICES ARE CALLED 'SPOTS'."
200 PRINT:PRINT "AFTER YOU PLACE YOUR BE
T, 20 NUMBERS ARE DRAWN FROM THE BOWL."
210 PRINT "IF YOU 'CATCH' ENOUGH OF THE
NUMBERS DRAWN, YOU WIN...UP TO"
220 PRINT "$50,000."
230 PRINT:PRINT "...COMPUTER MONEY, OF C
OURSE!"
240 REM
250 REM          FILL ARRAYS & INITIALIZE
260 REM
270 CLEAR 250:DIM L(80),D(80),B(80),P(15
,15),P$(13):Z=1
280 FOR J=64 TO 576 STEP 64
290 IF J=320 THEN J=384
300 FOR K=3 TO 62 STEP 6
310 L(Z)=K+J:Z=Z+1:NEXT K,J
320 FOR J=1 TO 15
330 READ E
340 FOR K=0 TO E-1:P(J,K)=0:NEXT
350 FOR K=E TO J
360 READ PB:P(J,K)=PB
370 NEXT K,J
380 FOR K=1 TO 13:READ P$(K):NEXT
390 RANDOM:C=0:TTL=0:FOR J=1 TO 80:D(J)=
J:NEXT
400 REM
410 REM          START GAME
420 REM
430 PRINT @960,"HIT ANY KEY TO START THE
GAME...GOOD LUCK!";
440 GOSUB 1360
450 GOSUB 490:GOTO 560
460 REM
470 REM          TICKET GRAPHICS
480 REM
490 CLS:PRINT @0,STRING$(23,131);" K *
E * N * O ";STRING$(24,131);
500 FOR J=0 TO 640 STEP 64:PRINT @ J,CHR
$(191);:PRINT @J+63,CHR$(191);:NEXT
510 PRINT @641,STRING$(62,176);:PRINT @3
21,STRING$(62,140);
520 RETURN
530 REM
540 REM          TICKET ROUTINE
550 REM
560 FOR J=1 TO 80:PRINT @L(J),J;
570 IF J<10 THEN V=2 ELSE V=3
580 IF D(J)=0 PRINT @L(J),"(";:PRINT @L(
J)+V,") ";
590 NEXT J
600 PRINT @704,"ENTER SPOT...ENTER 'S' T
O START, 'E' TO ERASE, 'P' FOR PAYOFFS"
610 PRINT @832,"SPOTS MARKED:";C;CHR$(31
);
620 I$="81":I=VAL(I$)
630 PRINT @896,CHR$(29);:INPUT I$
640 IF I$="E" FOR J=1 TO 80:D(J)=J:NEXT:
C=0:GOTO 560
650 IF C>10 THEN MIN=2 ELSE MIN=1
660 PR$=STR$(MIN)
670 IF I$="S" PRINT @896,"ENTER BET, $";
MIN;" TO $ 500 (DEFAULT IS $";MIN;)"";:I
NPUT PR$:PR=VAL(PR$):IF PR<MIN OR PR>500
PRINT @896,CHR$(30);:GOTO 660 ELSE 940
680 IF I$="P" GOSUB 780:GOSUB 490:GOTO 5
50
690 I=VAL(I$):IF I<1 OR I>80 PRINT @896,
"HUH?":GOSUB 1400:GOTO 610
700 IF C=15 PRINT @896,"15 SPOT LIMIT":G
OSUB 1400:GOTO 610
710 IF D(I)=0 PRINT @896,"ALREADY MARKED
":GOSUB 1400:GOTO 610
720 D(I)=0:IF I>9 THEN V=3 ELSE V=2
730 PRINT @L(I),"(";:PRINT @L(I)+V,")";
740 C=C+1:GOTO 610
750 REM
760 REM          PAYOFF TABLE
770 REM
780 CLS:PRINT @25,"PAYOFF TABLE"
790 PRINT @74,"PAYOFFS SHOWN ARE FOR MIN
IMUM TICKET PRICE."
800 FOR J=1 TO 15
810 IF J>10 THEN MIN=2 ELSE MIN=1
820 PRINT:PRINT J;"SPOTS-$";MIN;"TICKET"
830 PRINT "CATCH","PAYS"
840 FOR K=0 TO J
850 IF P(J,K)=0 THEN 870
860 PRINT K;TAB(12);:PRINT USING "$$####
#,";P(J,K)
870 NEXT K
880 PRINT:PRINT TAB(30)"<ENTER> TO CONTI
NUE, 1 TO RETURN";
890 GOSUB 1360:A=ASC(A$):IF A=49 RETURN
ELSE IF A>13 THEN 880
900 NEXT J:GOTO 780
910 REM
920 REM          DRAW & TALLY
930 REM
940 CTCH=0:CF=0:W=80:PRINT @704,"SPOTS M
ARKED:";C;TAB(23)"DRAWN:";0;TAB(40)"CAUG
HT:";CTCH;CHR$(31);
```



```

950 FOR J=1 TO 80:B(J)=J:NEXT
960 FOR I=1 TO 20
970 X=RND(W):NUM=B(X)
980 IF D(NUM)=0 THEN CTCH=CTCH+1:GOSUB 1
180:PRINT @751,CTCH:GOTO 1010
990 IF NUM<10 THEN V=2 ELSE V=3
1000 GOSUB 1270:GOTO 1050
1010 IF P(C,CTCH)>0 THEN CF=CF+1
1020 IF CF=1 PRINT @800,"IN THE MONEY!";
1030 IF CF=2 PRINT @800,"BETTER YET! ";
1040 IF CF=3 PRINT @800,"* BIG WIN!! *";
1050 B(X)=B(W):W=W-1
1060 PRINT @733,I;
1070 NEXT I
1080 PAY=P(C,CTCH)*PR/MIN:IF PAY>50000 THEN
PAY=50000
1090 TTL=TTL-PR+PAY:TA=ABS(TTL):IF TTL>=
0 THEN B$="GAIN" ELSE B$="LOSS"
1100 PRINT @768,"$";PR;"TICKET PAYS $";P
AY,
1110 IF PAY>0 PRINT "CONGRATULATIONS!" E
LSE PRINT P$(RND(13))
1120 PRINT @832,"NET ";B$;" OF $";TA
1130 PRINT "HIT ANY KEY FOR NEW GAME";
1140 GOSUB 1360:GOTO 560
1150 REM
1160 REM      MARK & FLASH A CATCH
1170 REM
1180 GOSUB 1390:GOSUB 1220
1190 GOSUB 1230
1200 GOSUB 1220
1210 GOSUB 1230
1220 PRINT @L(NUM),CHR$(138);STRING$(2,1
43);CHR$(133);:GOSUB 1380:RETURN
1230 PRINT @L(NUM),NUM;" ";:GOSUB 1380:R
ETURN
1240 REM
1250 REM      MARK & FLASH NUM DRAWN
1260 REM
1270 GOSUB 1390:GOSUB 1310
1280 GOSUB 1320
1290 GOSUB 1310
1300 GOSUB 1320
1310 PRINT @L(NUM),CHR$(138);:PRINT @L(N
UM)+V,CHR$(133);:GOSUB 1380:RETURN
1320 PRINT @L(NUM),NUM;:GOSUB 1380:RETUR
N
1330 REM
1340 REM      DATA & SUBS
1350 REM
1360 A$=INKEY$
1370 A$=INKEY$:IF A$="" THEN 1370 ELSE R
ETURN
1380 FOR TD=0 TO 100:NEXT:RETURN
1390 FOR TD=0 TO 200:NEXT:RETURN
1400 FOR TD=0 TO 400:NEXT:RETURN
1410 DATA 1,3,2,12,2,1,42,2,1,4,113,3,1,
9,820,3,1,3,90,1800,4,1,20,410,8100,5,9,

```

```

90,1650,18000,5,3,45,335,4700,18500,5,2,
20,142,1000,4500,19000,6,20,150,760,4000
,25000,39000
1420 DATA 6,12,56,400,1700,4800,26000,50
000,6,4,32,156,1400,7200,18000,50000,500
00,6,6,16,64,600,1600,5000,24000,50000,5
0000,6,4,16,42,150,480,4800,16000,50000,
50000,50000
1430 DATA BETTER LUCK NEXT TIME,I'M READ
Y TO PAY,TICKLE MY KEYS?,I FEEL IT COMIN
G...,ONE MORE TIME...,DON'T STOP NOW,NEX
T TIME,LAW OF AVERAGES...,GOTTA WIN IT B
ACK!,YOU LOVE THIS GAME,MUST BE THE PROG
RAM,THE BREAKS...,QUITTERS NEVER WIN

```

Program Listing for Odds

```

10 REM      * KENO ODDS *
20 REM
30 REM  CALCULATES AND DISPLAYS PROBABIL
ITY OF ALL SPOT/CATCH COMBINATIONS.
40 REM
50 DIM C(16):Z=3.53538E18
60 CLS:PRINT "KENO ODDS":PRINT:PRINT"SPO
TS","CATCH","PROBABILITY","CUMULATIVE"
70 FOR H=0 TO 16:C(H)=0:NEXT
80 FOR S=15 TO 1 STEP -1
90 FOR H=0 TO 15:C(H)=0:NEXT
100 PS=0
110 FOR H=S TO 0 STEP -1
120 N=S:M=H:GOSUB 270:F1=C0
130 N=80-H:M=20-H:GOSUB 270:F2=C0
140 SUM=0
150 FOR I=H+1 TO S
160 N=I:M=H:GOSUB 270
170 SUM=SUM+C(I)*C0
180 NEXT I
190 C(H)=F1*F2-SUM
200 PS=PS+C(H)
210 PRINT S,H,C(H)/Z,PS/Z
220 NEXT H:PRINT:NEXT S
230 END
240 REM
250 REM      COMBINATIONS
260 REM
270 A=N:GOSUB 350:NL=LF
280 A=M:GOSUB 350:ML=LF
290 A=N-M:GOSUB 350:DL=LF
300 C0=EXP(NL-(ML+DL))
310 RETURN
320 REM
330 REM      LOG FACTORIAL
340 REM
350 LF=0
360 IF A=0 OR A=1 RETURN
370 FOR K=1 TO A:LF=LF+LOG(K):NEXT
380 RETURN

```

Special section: Low-cost ideas for your computer

Lowercase and more

Lowercase your Model I and more for \$4.98

Model I only

Kenneth Goodwill, Philadelphia, PA

Did you ever have the feeling that your TRS-80 was hiding something from you? If you did, you're right. The Model I has the built-in power to display lowercase letters and thirty-eight other symbols. With a little effort and \$4.58 in parts, you can see and use these hidden characters.

I must give credit for the initial idea to Dennis Kitsz and his outstanding book, *The Custom TRS-80*. I built the lowercase modification from his book, but it didn't work. Most likely, this was due to the dead gate on Z25 that he warns you about. Although it didn't work, it did let me see the "special control characters" briefly mentioned by Mr. Kitsz. I decided that I had to have those special characters, so I redesigned the circuit.

Theory

The Model I was built with one bit of video memory missing. This modification fills in that missing bit but lets you determine, via a switch, whether or not the computer will see the restored bit.

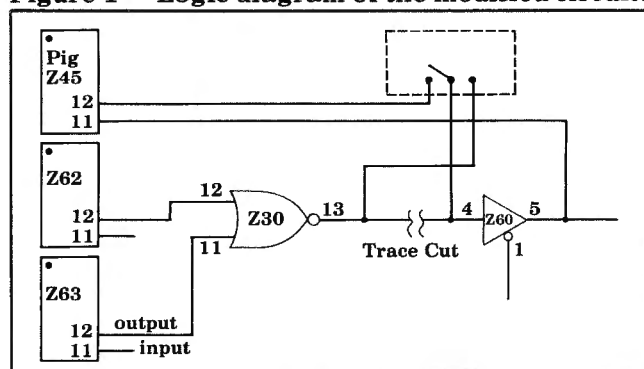
Originally, the missing bit was formed by NORing together the bits adjacent to the absent one. With the added SPDT (single pole, double throw) switch in one position, the missing bit is still formed by combination. In this mode, the added bit can be written to, but not read. When the switch is in the other position, the computer can read the bit you have added. The added bit is now independent of the bits adjacent to it. By using this setup (see Figure 1), the modification can be made invisible to the computer, thus eliminating possible problems with program incompatibility.

Construction

This project requires only two parts in addition to some wire. Any thin, single-strand wire will do. I used 24-gauge. The most important is the 1024×1 bit static RAM (generic code 2102). This can be bought at Radio Shack (cat. no. 276-2501) for \$2.79 or less. You will also need a SPDT switch. I used one taken out of an old calculator. You can use an old one of your own, or buy one from Radio Shack (cat. no. 275-613) for \$1.79. I tried this Radio Shack switch in my computer and it works fine.

The next step is to open up your computer (an action that voids the warranty). Taking it apart is easy. Just be careful. Lay your computer, keyboard down, on a clean, spacious work area. Remove the black screws, noting

Figure 1 — Logic diagram of the modified circuit.



the position of each. Turn it over and take off the top piece.

Locate the wide cable at the lower left of the keyboard. Be *very careful* with this cable. It tends to fail when stretched or bent sharply. Carefully tilt the keyboard upright and remove the grommets beneath it. Being careful not to bend either board, lift the entire assembly out of the bottom plastic piece. Fold it open so that the keys of the keyboard and the components of the main board are on top. Rotate the assembly to make the keyboard closest to you and put it down on a flat surface.

Piggyback

Find Z45 on the main component board in the corner nearest the power LED. The "Z45" refers to the chip directly to the right. This is where you will piggyback the static RAM.

Take your static RAM and locate pins 11 and 12 (see Figure 2). *Carefully* bend these pins at their widest point so that they stick straight out to the side. Place your chip on top of Z45 with pin 1 closest to where "Z45" is printed. Press down enough on your chip to make the two chips touch. Except for pins 11 and 12, the pins on your chip should lightly touch the corresponding pins on Z45. If not, bend the pins on your chip inward slightly until they do.

Warm up your soldering iron of no more than 30 watts. Using thin, rosin-core solder, you are going to connect the matching pins (except 11 and 12) of Z45 and your piggyback chip. When soldering this, you should try to flow solder from the pins on your added chip to the solder at the base of the pins on Z45. Be careful not to overheat the chip with your soldering iron. Use sufficient solder,

but watch for solder bridges between the pins. If any solder bridges develop, use a solder wick to suck up the excess solder.

Find Z27 on the circuit board, just above Z45. This is the best place to make the trace cut shown in Figure 1. Locate pin 13 on Z27. The trace to be cut runs diagonally down and to the right from this pin (Photo 1). Be sure that you have the right trace before you start cutting. Using an X-acto knife or single-edged razor blade, cut the trace. Scrape deep enough to be certain that the connection is broken.

Figure 2 — Pin numbering for a 16-pin chip.

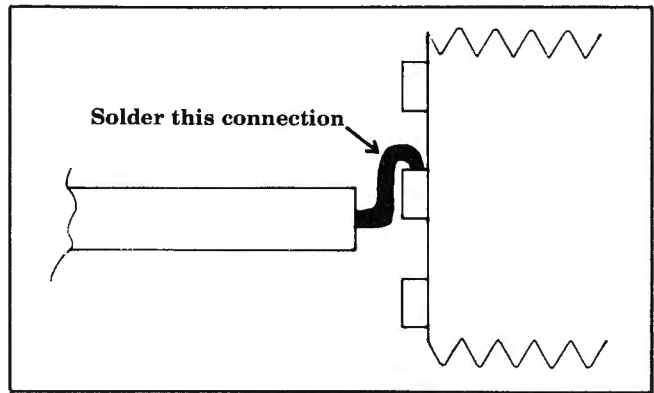
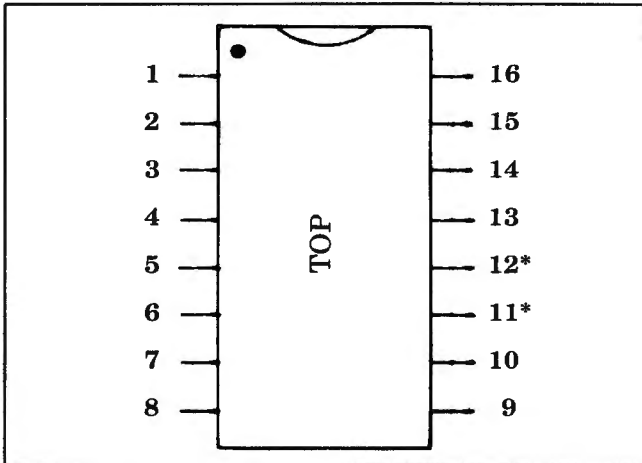


Figure 3 — The finished product of a hook-solder.

Wiring

Cut three pieces of one-conductor wire to 1.5 or 2 feet. Strip one-quarter inch of insulation from both ends of each piece. Using a pair of needle-nose pliers, bend one end of each wire into the shape of a hook. You are going to use this hook to attach the wire to an IC pin. Slip the hook around the pin you want and flow solder from the curved part of the wire to the pin and the solder at the base of the pin. Be sure the solder does not bridge to other pins. Then, bend the wire so that it's perpendicular to the chip (Figure 3).

You are going to hook-solder two of your wires. Connect one to pin 13 of Z30. (Note that this is a 14-pin

THE BI-TECH MICRO MAGNUM

"RELIABILITY" "REMOVABLE AND FIXED HARD DISK SYSTEMS" "DEPENDABILITY"
"MODEL III AND IBM OWNERS" "SUPER DUTY SUB SYSTEM" "SOON MODEL 2,12,16"

SYSTEM TYPE		5 MEG	10 MEG	15 MEG
FIXED SYSTEM	Supplied in a metal case (instrument white) with power supply.	\$2150.00	\$2260.00	\$2370.00
COMBO SYSTEM	Supplied with a 5 Meg MICRO-MAGNUM removable cartridge hard drive and your size choice of fixed media, all in one case with power supply. System gives fast backup capability.	3550.00	3660.00	3770.00
REMOVABLE SYSTEM	5 Meg version only (formatted), frontload cartridge, low cost cartridge, system will purge itself, very reliable, supplied in an instrument white case with power supply.	2850.00		

THESE HARD DRIVES ARE BUILT WITH EXTREME DEPENDABILITY YOU WON'T FIND A LINEAR POWER SUPPLY IN THESE UNITS.

All drives are supplied with: DOSPLUS 3.5, ONE YEAR WARRANTY, EASY INSTALLATION — JUST PLUG INTO YOUR ONE DRIVE TRS-80 MODEL III 50 PIN BUS

PRINTER SALE

- C-ITOH DAISY F-10 40 CPS \$1299.00
- TRACTOR ASSEMBLY F-10 249.00
- C-ITOH DAISY F-10 55CPS \$1599.00
- PROWRITER 10" PAR 120 CPS 435.00
- FOR THE BUDGET POCKET HERE IS A BUDGET HARD DRIVE . . 5 MEG COMPLETE . . . 1599.00

CERTIFIED CHECK, BANK CHECK OR MONEY ORDER MUST ACCOMPANY ALL ORDERS
 Please add \$15.00 for freight, ins. per parcel

DOSPLUS TRADEMARK MICRO-SYSTEM SOFTWARE, INC.
 IBM P.C. TRADEMARK IBM CORPORATION
 TRS-80 TRADEMARK TANDY CORPORATION



J. CASTORO SOFTWARE
 3 WYMAN COURT
 CORAM, N.Y. 11727
(516) 473-5349

chip.) Solder the other wire to pin 4 of Z60. This chip is under the ROM connect ribbon of Level II machines. Bend the stripped part of your last wire into a loop and solder it to the outstretched pin 12 on the piggyback chip.

Cut a two-inch piece of wire and strip both ends of it. Hook-solder one end to pin 5 on Z60. Loop the other end and solder it to pin 11 on the piggyback chip.

The Switch

Solder the wire connected to pin 4 of Z60 to the middle terminal of your SPDT switch. Take the two remaining long wires and solder them to either of the side terminals. The operation is now complete!

Now, for a place to put the switch. Although it can be anywhere, a convenient place is next to the break key, in line with the power LED hole. For the Radio Shack switch, simply drill a one-quarter-inch hole and insert the switch. Use the provided nuts to hold it in place.

Testing

Carefully put the computer back together, remembering to be gentle with the keyboard cable. When you turn your computer on, you should see either "MEMORY SIZE?" or a bunch of symbols that you have never seen on your computer before. If you see the symbols, flip the switch to get letters instead. If flipping the switch does not get you "MEMORY SIZE?", reopen your computer. Check the wiring and look for solder bridges. If the lowercase seems to work but the keyboard is giving you problems, replace the cable connecting your computer to the keyboard.

When you flip the switch back and forth, you will probably see reverse apostrophes flash on the screen. This is normal.

Driver 1

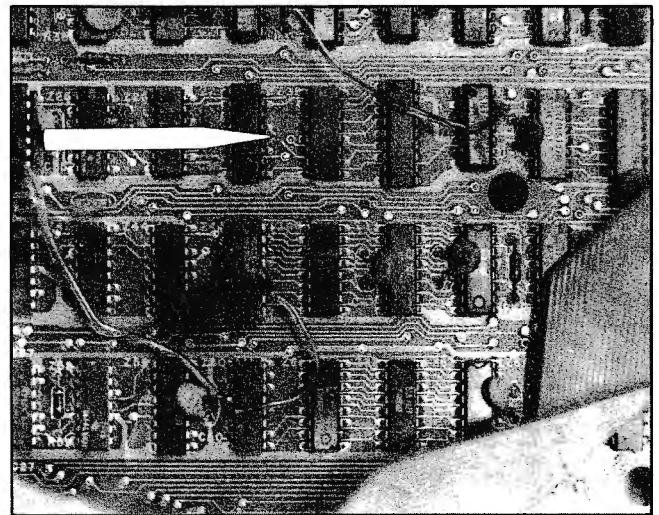
Although you may access lowercase by using the POKES of the testing program, it's a lot easier to use a special driver program. Listing 1 shows a program that can be assembled for use in computers without disks. As written, it will load into low memory and leave you with your normal amount of space for BASIC programs. For use in disk systems, change line 140 to make the driver routines reside in high memory.

The "Driver Plus" provides many features. It lets you toggle between shift for lowercase and shift for uppercase. This switch can be made by pressing shift, downarrow, and C at the same time. It can also be set by your programs. POKE 16408 with zero for shift for lowercase and with 255 for shift for uppercase.

A second feature this program has is access to the special symbols without using the POKE command. The CHR\$ values that are usually used for space compression codes have been altered. The codes from 192 to 223 will give you the special symbols. Run line 20, shown in photo 1, to test this feature. You should get the four display lines labeled 3. If you would rather have the space compression codes, delete line 270 and remove the carry condition in line 280 of Listing 1.

Two new symbols can be accessed from the keyboard. Shift @ will now be displayed as a reverse apostrophe. Hitting the uparrow in the shift for uppercase mode will

Photo 1—All wiring and the correct trace cut.



give you a left brace.

Driver 2

Listing 2 shows a BASIC driver for non-disk systems. The routine needs to be executed once by your programs for them to use lowercase. This program will give you shift for lowercase only and no modification of the CHR\$ command.

Final Comments

In some computers, the lowercase "a" is raised up. If this is true for you, you'll just have to learn to live with it.

I thought I would have trouble using lowercase in purchased machine language software. In some cases, the driver program is needed, but others (such as Big Five Software programs) will give you lowercase without the driver!

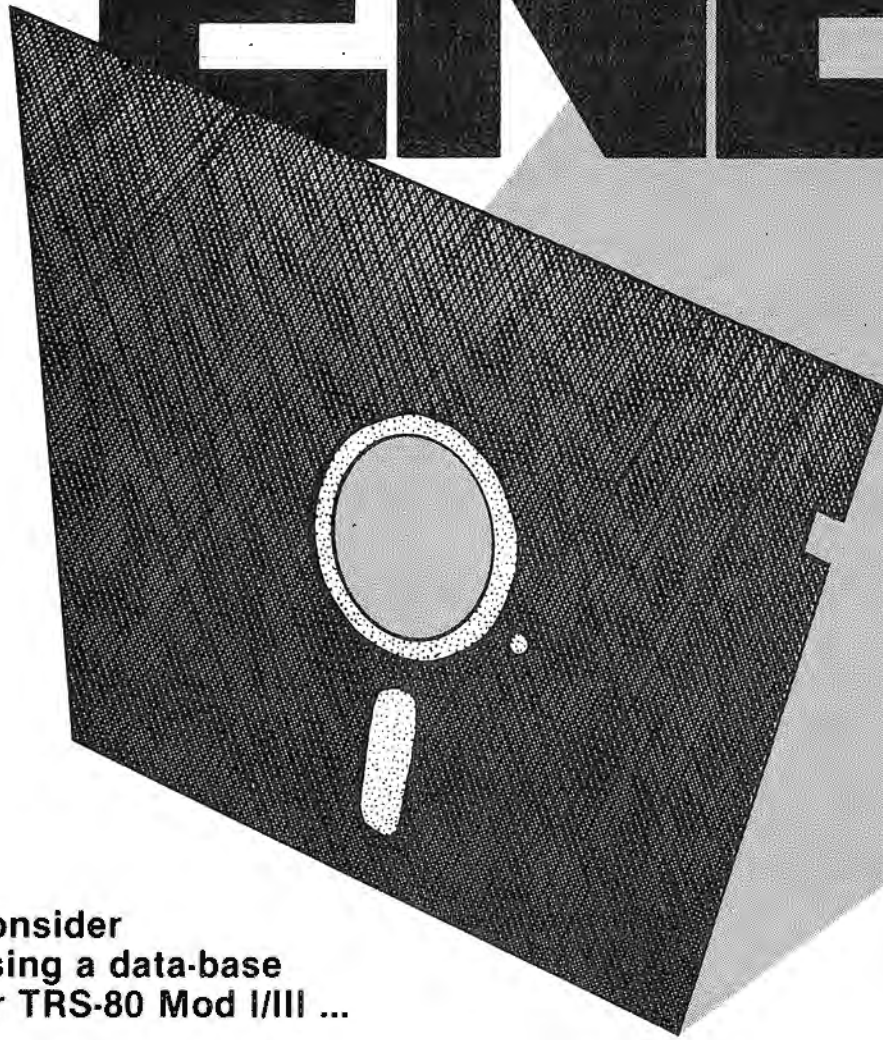
I think you will find this a simple, yet extremely useful, modification. I am sure you will get your money's worth from it.

Listing 1 — Lowercase

```

00070 #LOWER CASE DRIVER PLUS
00080 #WRITTEN BY NEG COMPUTING FOR PUBLIC USE
4016 00100 ORG 4016H #KEYBOARD DRIVER ADDRESS
4016 6240 00110 DEFM #KEYBRD #CHANGE KEYBOARD DRIVER
4018 00120 DEFS 6 #SKIP TO VIDEO DRIVER
401E 3E40 00130 DEFU VID #CHANGE VIDEO DRIVER
403E 00140 ORG 403EH #THIS CAN BE MOVED UP
403E D66E03 00150 VID LD L,(IX+3) #HL = LOCATION ON SCREEN
4041 D66604 00160 LD H,(IX+4) #CHECK CURSOR ON/OFF
4044 DA9A04 00170 JP C,49AH #SET FLAGS
4047 1B7E05 00180 LD A,#49AH #JUMP IF CURSOR IS OFF
404A 87 00190 OR A #MOVE CHAR. UNDER CURSOR
404B 2B01 00200 JR Z,CURROFF #GET NEXT CHARACTER
404B 77 00210 LD A,C #COMPARE TO SPACE
404E 79 00220 CURROFF LD A,C #JUMP IF CONTROL CHAR.
404F FE20 00230 CP 20H #COMPARE TO FIRST GRAPHIC
4051 DA0605 00240 JP C,506H #JUMP IF ALPHA/NUMERIC
4054 FE80 00250 CP 80H #COMPARE TO SPACE COMPR.
4056 3B07 00260 JR C,DONE #JUMP IF GRAPHICS
405B FEC0 00270 CP 192 #SUBTRACT TO GET SYMBOLS
405A DA6604 00280 JP C,4A6H #JUMP TO DIRECT DISPLAY
405D 16C0 00290 SUB 192 #CALL KEYBOARD SCAN
405F C37104 00300 DONE JP 47EH #COMPARE TO CONTROL C
4062 C1E303 00310 KEYBRD CALL 3E3H #HL = TOGGLE LOCATION
4065 FE03 00320 CP 3 #JUMP IF CONTROL C
4067 211840 00330 LD HL,#4018H #SAVE KEYED IN CHARACTER
406A 2B0E 00340 JR Z,CONTC #CHECK SHIFT TOGGLE
406C 47 00350 LD B,A #SET FLAGS
406D 7E 00360 LD A,(HL) #RESTORE KEYED IN CHAR.
406E 87 00370 OR A #RETURN IF SHIFT=NORMAL
406F 7B 00380 LD A,#B #COMPARE TO "A"
4070 C3 00390 RET Z #RETURN IF LESS THAN "A"
4071 FE41 00400 CP 65 #COMPARE TO SHIFT Q
4073 DB 00410 RET C #RETURN IF IT IS
4074 FE60 00420 CP 96 #COMPARE TO SHIFT @
4076 C8 00430 RET Z #RETURN IF IT IS
4077 EE20 00440 XOR 20H #TOGGLE UPPER/LOWER CASE
4079 C9 00450 RET #RETURN TO ROM
407A 3EFF 00460 CONTC LD A,255 #LOAD A WITH TOGGLE VALUE
    
```

ENB



Points to consider when choosing a data-base manager for TRS-80 Mod I/III ...

Data Access Method. ENB has *true* relational access. **Data Independence.** ENB has generalised data structures, no record-length constraints, variable length fields. No data redundancy. **Structure Extension.** Integrated data dictionary permits full editing (add/delete/update/rename) on set of SETS, set of ATTRIBUTES and set of REPORTS. **Data Integrity.** Commit points keep data-base consistent. **Capacity.** 64K distinct data items, spans up to 4 disk drives (or hard disk). **Interface.** Interactive menu-driven entry/display of data. High-level BASIC interface. Scripsit and Visicalc interfaces. **Documentation.** Inbuilt reports automatically document current data-base structure. 125 page manual. Self-running tutorials. **Requirements.** TRS-80 Mod I/III, 48K, at least one disk drive. Works with all DOS. Developed in England by Southern Software.

Scripsit™ Radio Shack, Visicalc™ Visicorp

 **ALLEN GELDER SOFTWARE**
(415) 681-9371
Box 11721, San Francisco, CA 94101

CA add 6%
ENB \$140


```

407C AE      00470      XOR      (HL)
407D 77      00480      LD       (HL),A
407E AF      00490      XOR      A
407F C9      00500      RET
00CC        00510      END      6CCH

```

```

;TOGGLE WITH 401BH
;PUT RESULT IN 401BH
;CLEAR A
;RETURN TO ROM
;MISC ENTRY

```

USE

```

10 POKE 16414,62:POKE 16415,64
20 FORQ=16446TO16481:READW:POKEQ,W:NEXTQ
30 DATA 221,110,3,221,102,4,218,154,4,22
1,126,5,183,40,1,119,121,254,32,218,6,5,
254,128,56,7,254,192,218,166,4,214,192,1
95,125,4

```

Listing 2 — Lowercase

```

5 REM BASIC LOWERCASE DRIVER
6 REM WRITTEN BY KEG SOFTWARE FOR PUBLIC

```

Cassette mode switch

An easy-to-build cassette switch—get rid of the plug hassle

Models I/III

Russell A. Dewey, Ph.D., Statesboro, GA

Are you tired of unplugging your “ear” and “mic” plugs every time you want to find out where a cassette program begins? Would you like a convenient way to switch on an external speaker for games with audio routines? If so, you might want to construct the cassette mode switch box described in this article. It is cheap, a genuine convenience, and very easy to make, requiring no technical knowledge whatsoever.

There are three different modes in which your cassette player can be used. Even if you are a disk user (as I am) you will find yourself loading programs from tape, listening to a tape to locate the start of a program, or using your cassette for programs with audio routines. To switch between these modes, you must plug and unplug the three cords leading into your tape recorder.

CLOAD: When you load a program from tape, all three plugs from your computer must be in the tape recorder jacks.

MONITOR: When you need to find the beginning of a program on a tape, you must pull out the ear and mic plugs so you can run the tape recorder on play and hear what is on the tape.

AUDIO: To get sound from a program which provides it, you must pull out the ear plug and replace it with a plug leading to an extension speaker or earphones. You also must put a blank cassette or cassette shell without tape into the recorder and press the record and play buttons.

All that pushing and pulling of plugs is a hassle. In addition, it puts a strain on the cords which can wear them out, resulting in bad connections.

A simple box with two switches eliminates the need for plugging and unplugging. You can switch quickly and reliably between CLOAD, MONITOR and AUDIO modes. Necessary ingredients are available at your local Radio Shack store: Three (3) miniature phone jacks (cat. No. 274-253), one (1) subminiature phone jack (cat no. 274-292), two (2) miniature phone plugs (cat. no. 274-2888), one (1) subminiature phone plug (cat. no. 274-291), one (1) black plastic box (cat. no. 270-230), and two (2) subminiature SPDT toggle switches (cat. no. 275-613).

The unit can be designed to plug directly into the cassette recorder, or as a “remote control” box with cords leading to the recorder. I chose to attach the box directly to the recorder because it looks neater. The only disadvantage to this approach is that you must cut the box so that it will fit flush with the jacks on the recorder and you must drill holes which line up exactly with the jacks on the recorder.

To assemble your mode switching box (if you decide to plug it directly into the recorder) first trim the box so it will fit into the recessed area containing the jacks on the recorder (Figure 1).

Mark and drill one-eighth-inch holes where the plugs will emerge from your box. This must be done carefully, with small test holes drilled first, so the holes line up perfectly with the jacks on the recorder. When you are sure the holes in the box line up with the holes on the recorder, enlarge the holes in the plastic box to the diameter of the threaded part of the plugs. On the plugs listed, this is about one-quarter-inch. If in doubt, make the hole too small. You can always enlarge it.

Install your plugs. The subminiature plug can be kept

in its tapered white plastic jacket, which fits snugly into the quarter-inch hole. The miniature plugs should have their metal jackets removed. The jackets are unnecessary inside the box and take up a lot of room. Replace the jackets with an appropriately-sized nut on the inside of the box. I used "Rad nuts," plastic nuts (available in most hardware stores) which adjust themselves to odd thread sizes.

Once the plugs are installed and tested for fit with your recorder, drill holes for the jacks on the other side. Drill three holes opposite the plugs, and drill a fourth hole somewhere for the external speaker jack. I located my speaker jack on the top of the unit (Figure 2) where it comes pretty close to the power cord. Now, drill two holes on top of the box, install your switches, and you are ready to solder the connections. Use small diameter, flexible, single-strand wire.

The wiring diagram assumes that you are looking at the bottom of the unit while it is upside-down for soldering. For example, plug "A" is the one which will eventually go into the ear jack on your recorder. It appears on the left in the diagram because we are

assuming the unit is turned upside down for soldering.

Assembly Procedure

References here are to the labels shown in Figure 2.

Solder a wire from the center terminal of subminiature plug C to the center of SPDT switch SW2.

Run a wire from the ground terminal of plug C through the bottom terminal of switch SW2 and on to the ground terminal of jack G. Solder all three places.

Solder a wire from the top terminal of switch SW2 to the hot (ungrounded) terminal of subminiature jack G.

Solder a wire from the ground terminal of plug B to the ground terminal of jack F.

Solder a wire from the hot terminal of plug B to the hot terminal of jack F.

Solder a wire from the hot terminal of plug B to the hot terminal of jack F.

Solder a wire from the hot terminal of plug A to the middle terminal of switch SW1.

Solder a wire from the ground terminal of plug A to the ground terminal of the external speaker jack D.

Solder a wire from the top terminal of switch SW1 to

Figure 1 — Cut off the shaded part so the plugs can fit flush with the jacks on the recorder.

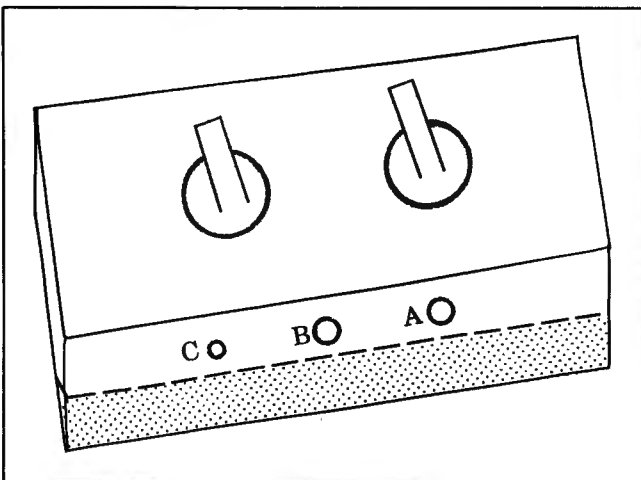


Photo 1 — Completed switch box.

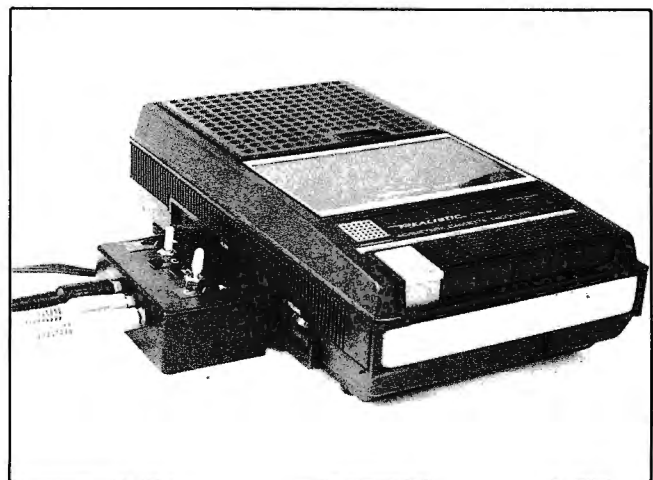


Figure 2 — Component parts labeled (inside view from the bottom).

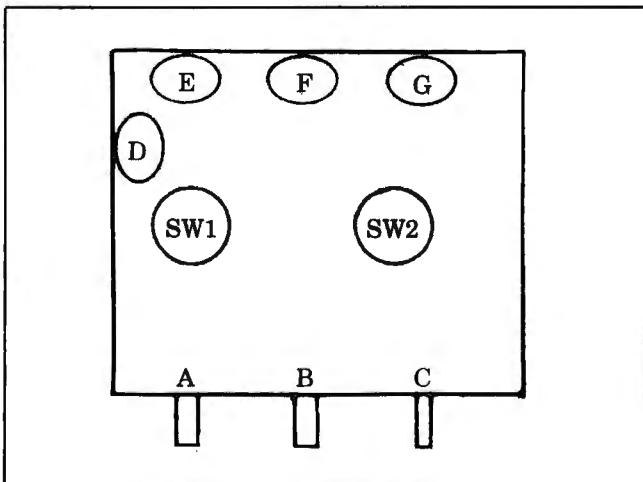
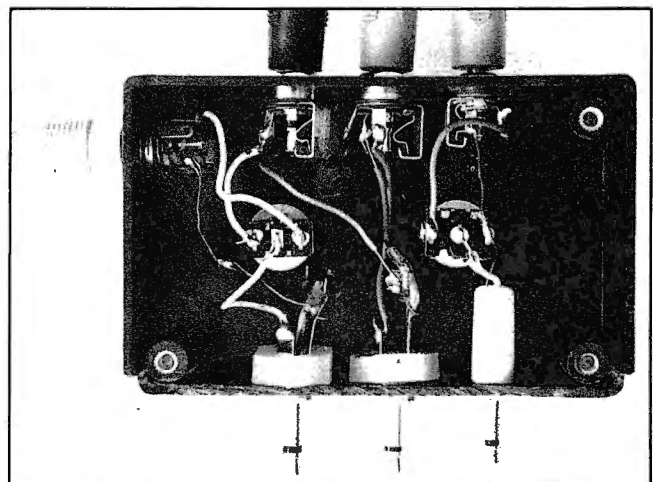


Photo 2 — View from the bottom. Notice the cutout plastic so it will fit flush on the recorder.



the hot terminal of miniature jack E.

Solder a wire from the bottom terminal of switch SW1 to the hot terminal of the external speaker jack D.

Solder a wire from the ground terminal of miniature jack E to the ground terminal of the middle miniature plug B. (This is the only part of the whole procedure which is counterintuitive. If you solder the ground lead from the jack to the ground terminal of the corresponding (top) miniature plug, you get feedback over the external speaker while in the audio mode.)

Now, put labels on top of the box. I positioned my

switches so that in the CLOAD mode both switches are down, in the MONITOR mode both switches are up, and in the AUDIO mode the bottom switch is down and the top switch is up. Correct settings are indicated by one-letter abbreviations on black label tape (Figure 2).

Once you have the box assembled, plug it into your recorder, plug in the three jacks from the keyboard, and plug in an external speaker (RS cat. no. 40-1247 is perfect), and you are ready to go. No more pulling plugs when you want to hear something from your TRS-80... just flip those switches and you're ready.

Electronic watchdog

Monitor sounds with your TRS-80

Model I

George Farnsworth, Reston, VA

Did you know that there is a watchdog inside your Model I?

Without any exotic wiring or expensive hardware, you can attach your computer to a sonic monitor, your cassette recorder, and to an audio alert, your hi-fi set, to produce a system that detects an intrusion and sounds-off loud enough to frighten almost any burglar. Nor is that all. The system also has features not found in any but the most advanced commercial systems. And, all of this in less than 1,000 bytes and only 13 lines of BASIC.

The TRS-80 sits quietly in your empty house or apartment, using the cassette recorder's built-in microphone to listen carefully for any sound. Sound in the room might indicate an attempt to break in, or that someone is already there. When the computer detects a sound, it sends an audio signal to your stereo, which then amplifies it into an ear-shattering alarm. The program also displays a message designed to further frighten an intruder, if he or she gets close enough to read the screen.

After sounding the alarm for two minutes, it goes back to the listening mode. The program keeps a record of the number of times the alarm was activated so that when you get back home you'll know whether to count the spoons or not. A brief time delay is provided between the detection of a noise and the alarm. This allows you to deactivate the system when you get home (press BREAK).

Listing 1 contains the source code with a standard machine language sound-generator routine embedded in a DATA statement. This code is placed in a string in statement 100 and the string's address is POKED into the location required by the USR function.

Lines 30 and 40 set up the screen and go into "listening" mode. When a sound is detected through the cassette port via INP(255), statement 40 transfers control to the "alarm" routine in lines 60 through 80. After a brief interval set by variable WT (in seconds), the alarm sounds. The sound can be changed by setting different values for variable SS. With SS at zero and AT (the number of alarm cycles) set to 100, you get a nice, loud, two minutes of a "whoop" alarm. The sound produced by SS=11111 is much shorter however, and AT must be set much higher to get a long alarm.

Setting up the recorder is simple. The black plug goes into the cassette "EAR" jack as usual. Do not use the small, gray, motor-control plug. Remove any cassette and hold your finger inside the mechanism where the left rear of the cassette would normally go. There's a small lever there that you have to hold back while pushing down the "RECORD" and "PLAY" keys simultaneously. There is no danger to your finger. This process will start the cassette motor running and you can then remove your finger.

For the audio alarm, the large gray plug has to be input to your stereo, via the microphone, "AUX", or "TAPE" jacks. You will probably need an inexpensive

adapter plug or cord if your stereo does not accept a mini-plug. Ask for a cord with a mini female at one end and an RCA male at the other. Turn on your stereo, set the selector to Aux or Tape, as the case may be, and you're in business. Start out at very low volume and experiment until you get a sound loud enough to scare an intruder without damaging a speaker. The cassette volume control has no effect.

When using the alarm you should eliminate the possibility of stray sounds in the vicinity of the microphone, such as that from pets or telephones. You should also alert neighbors to the fact that your computer is on guard and ask them to react to a blast of sound, either by investigating or by calling the police. Let them know that the system will shut the alarm off after a few minutes, but that it does not mean that the intruder has necessarily gone. Advise them not to tap on your windows or rattle the door, since the noise may set off the alarm.

The system could be enhanced in several ways. You could connect a more sensitive microphone (or a set of microphones) through a pre-amplifier. This would also avoid your having to keep the cassette motor running for several days. The stereo could be replaced by an inexpensive PA amplifier with a weatherproof speaker installed outside. Users with a real-time clock could easily add a routine to stop listening during the day if external noise is a problem. You can leave the video

monitor off and save a little electricity, but I relish the thought of a clumsy burglar thinking that a computer is watching.

Although the bare-bones system is not exceptionally sensitive, at the very least this system will help protect your TRS-80, your stereo, and maybe your life!

Listing 1 - Sound Monitor

```

10 DEFINT A-Z: CLEAR 1000: GOSUB 1000 : SS=0: WT=300: AT=20: B$=CHR$(23)
20 '===== LISTENER ROUTINE =
=====
30 CLS: PRINT@514, B$; "INTRUDER WATCH IN EFFECT": PRINT@960, AC;
40 OUT255, 8: S=INP(255): IF S<>63 THEN 60 ELSE 40
50 ===== ALARM ROUTINE =====
=====
60 CLS: PRINT@322, B$; "!!! INTRUDER ALERT !!!": PRINT@454, "AUTHORITIES NOTIFIED": PRINT@656, "STAND BY": PRINT@960, AC;
70 FOR IQ=1 TO WT: PRINT@0, WT-IQ; : NEXT: PRINT@0, " "; : AC=AC+1
80 FOR IQ = 1 TO AT: PRINT@656, " "; : X=USR(SS): PRINT@656, "STAND BY"; : X=USR
    
```

Marymac INDUSTRIES, INC.

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

22511 Katy Freeway
Katy (Houston), Texas 77450

To Order
1-800-231-3680
800-231-3681

SAVE BIG DOLLARS ON ALL TRS-80® HARDWARE & SOFTWARE

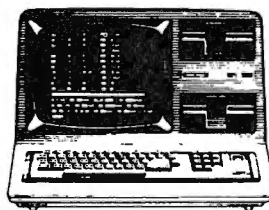
TRS-80® by Radio Shack. Brand new in cartons delivered. Save state sales tax. Texas residents add only 5% sales tax. Open Mon.-Fri 9-6, Sat. 9-1. We pay freight and insurance. Come by and see us. Call us for a reference in or near your city. Ref: Farmers State Bank, Brookshire, Texas.

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

- We accept Visa, MasterCard, and American Express.
- 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



```
(SS):NEXT: GOTO 30 : 'RESET
90 ===== SET UP SOUND GENER
ATOR =====
100 FOR K=1 TO 28:READ X:TT=TT+X:A$=A$+C
HR$(X):NEXT:X=FRE(A$):I=VARPTR(A$):IF TT
<>3424 THEN PRINT"DATA STMT ERROR":STOP
```

```
110 S1=PEEK(I+1):S2=PEEK(I+2):POKE16526,
S1:POKE16527,S2
120 DATA 205,127,10,77,68,62,9,105,211,2
55,45,32,253,60,105,211,255,45,32,253,13
,16,238,62,8,211,255,201
130 RETURN
```

A simple sensor input for Model I

A simple sensor input switch

Model I

Michael L. Sanders, Eatontown, NJ

Could you use a simple, inexpensive remote sensor input for your Model I? With this easily-installed modification to your keyboard, you can have an input that has automatic debounce and is simple to program. All that is required is that you solder a pair of wires to any key position and connect it to a switch or relay. The ROM's keyboard scan does the rest. By using the INKEY\$ command in your program, you can detect when the switch or relay is closed.

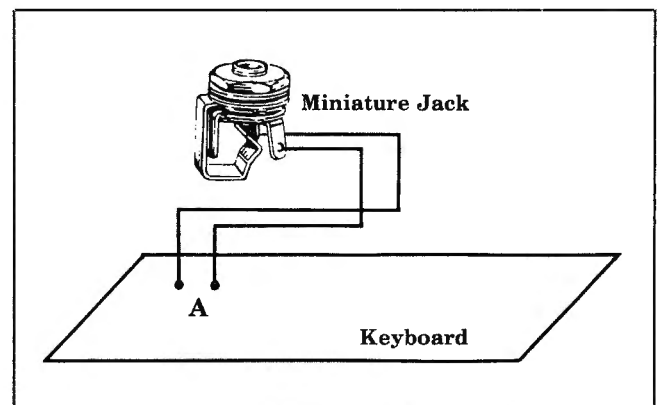
Installation

Figure 1 gives a physical view of the modification, and Figure 2 gives the schematic view. Prepare the ends of about one foot of twin lead wire, such as that used by the small earphone for a transistor radio, by stripping about one eighth of an inch of insulation from each of the four wires and tin them with solder. Disconnect the keyboard from all external connections. Turn the keyboard upside down on a towel. Remove the screws holding the two halves of the case together. Hold the case together and turn it right side up. Remove the top half of the case. Gently lift the top circuit board up and forward. Do not strain the cable at the lower left connecting the two circuit boards together. Rest the top circuit board on a stack of towels, key side down.

Looking down on the circuit board, you can see the keys labeled. By each character, there are two solder connections. These connect the key switch to the circuit board. Solder one end of each of the two wire pairs to these solder connections. Examine the soldered connections for solder bridges and shorts.

Solder the other two ends of the wire pair to the miniature jack. Drill a hole in the top half of the case on

Figure 1 — Physical connection.



the rear, flat portion above the cooling slots. Mount the jack in the hole.

Gently lift the circuit board on the towel and carefully fold it back into place. Replace the top half of the case. Be careful that the LED power indicator goes into the hole on the top half of the case and that no wires are being pinched by the case. Hold the case together and turn the keyboard over. Replace the screws. Replace all external cables and turn the computer on to insure proper operation.

Hook-up

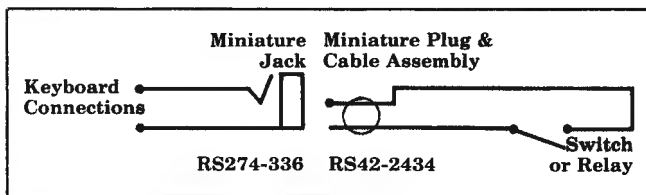
Use a cable with a miniature plug on one end (RS cat. no. 42-2434 will do) and a switch or relay on the other end. Although the keyboard is buffered, it is best to keep the leads under six feet. For longer leads, use a relay as

in Figure 3.

Now, you are able to program with INKEY\$ just as if you were looking for the key that is paralleled by the external switch. This is an example:

```
10 GOSUB 100: REM CALLS THE SENSOR STATUS
SUBROUTINE
20 IF FLAG = 1 THEN 40: REM ROUTES PROGRAM
ACCORDING TO SENSOR STATUS
```

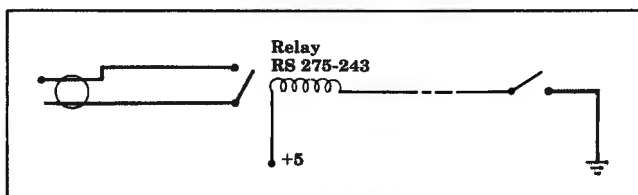
Figure 2 — Schematic connection.



While running the program, the keyboard cannot be used by the operator since the ROM uses a routine to choose only one character when more than one key is pressed at a time (which will happen if the sensor switch is closed).

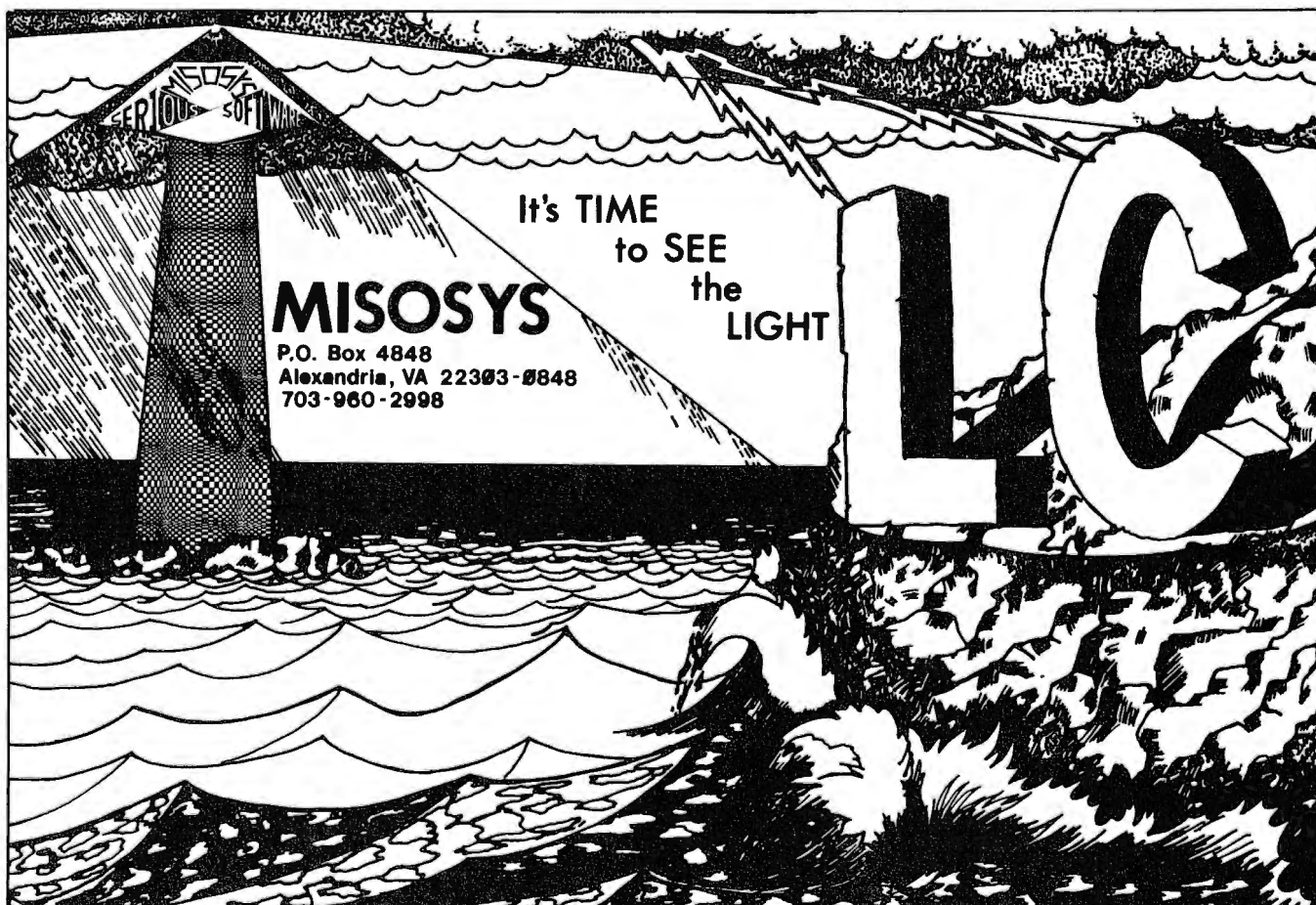
This simple sensor input can be convenient to use in experiments when an external event is timed or monitored. Obviously, each key is a potential input, but

Figure 3 — To extend the length of cable, use a relay.



```
100 FLAG = 0: A$ = INKEY$: REM RESET FLAG
AND READ KEYBOARD
200 IF A$ = "A" THEN FLAG = 1: REM SET FLAG IF
SWITCH IS CLOSED
130 RETURN: REM RETURN TO MAIN PROGRAM
WITH VALUE OF FLAG
```

the programming to decode them would become more complicated. Since the keyboard is memory-mapped, each memory location used would have to be PEEKed and the number obtained converted to binary to find the state of each switch. By using only one input, you can easily begin to learn to use your computer as more than just a "number cruncher." This allows your computer to at least touch the real world.



A computer language board

Meeting the educational needs of handicapped students

Model I/III with 3G light pen

Terry Dalton, Yuma, AZ

The schools are now required to meet the educational needs of all students, even those with severe handicaps. In our school district, many children have suddenly been able to communicate, to learn, to feel the pride of accomplishment that goes along with computer aided instruction. Some, however, cannot control that needed finger enough to press an individual key and their only form of intelligible communication has been with a language board.

A language board is simply a box about two feet square and six inches thick. There is a checkerboard face with LEDs in each square that light, one at a time, when controlled by pressure switches. Hands, feet, arms, fingers, even the mouth, can control the LED. Overlays with printed words fit on the board face and a washable overlay is available for customizing the vocabulary. It is simply constructed, expensively priced,

and in many cases too frustrating to learn to operate.

My computerized language board has three pages of eleven words, is easily expandable and changed, uses the 3G light pen, and all of this for under \$40, the price of the pen. (*The 3G light pen for the TRS-80 Model I/III is available from the 3G Company, Inc., Rt 3 Box 28A, Gaston, OR 97119, (503) 662-4492. --Ed.*)

Students using the pen and the program can choose the word to be printed, up to two lines of them, and can cause the entire two lines to dump to the printer. Disk files could be utilized to store alternate pages, or you could even turn the basic concept into a word processor.

This program is just a starting point. Our students need programs that teach them the very basics, comparisons, recognition, etc. Older students or adults would need other enhancements, depending on their needs. A light-pen-controlled BASIC programming

EDUCATORS—Tired of giving endless instruction on computer usage to your students? Use a 3G Light Pen, bypass the keyboard and interact directly with the screen. End typing errors!

Mail Coupon or Call Today for Immediate Delivery

**3G Company, Inc. Rt. 3, Box 28A
Gaston, OR 97119 (503) 662-4492**

Remember, 3G offers a 30-Day Unconditional Money Back GUARANTEE

<input type="checkbox"/> TRS-80 Light Pen	<input type="checkbox"/> PET/CBM Light Pen	<input type="checkbox"/> Apple Light Pen
<input type="checkbox"/> Model I or Model III \$39.95	<input type="checkbox"/> VIC-20 Light Pen	<input type="checkbox"/> w/cassette \$38.95
<input type="checkbox"/> Commodore 64 Light Pen \$37.95	<input type="checkbox"/> w/diskette \$43.95	

Yes, I want to make my classroom computer easier to use. Rush me _____ 3G Light Pens. (Add \$2.00 for mailing and handling—\$6.00 foreign.)

Enclosed is: check or money order MasterCard Visa

Card No. _____ Exp. Date _____

NAME _____

ADDRESS _____

CITY _____ STATE _____ ZIP _____

I need more information.

■ **Don't take our word for it.** Here's what other educators say about the 3G Light Pen

"I'm very pleased with the performance of the pens. We are using them in our Learning Labs with our Math majors."
Carol Reynolds, Mt. Empire College, VA

■ "The teachers in our district use the pen to score and record test results. It's so much easier than typing in the results."
Phillip Diazlo, Mohawk Regional School Dist. MA

■ **Order today.** Remember, your satisfaction is guaranteed. We will refund for any reason if pen is returned within 30 days.

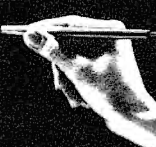
■ You will receive:

- 1) 3G Light Pen
- 2) Demonstration cassette
- 3) Sample program listing
- 4) Complete documentation and instructions so you can write your own programs in BASIC
- 5) Other Light Pen software and games available

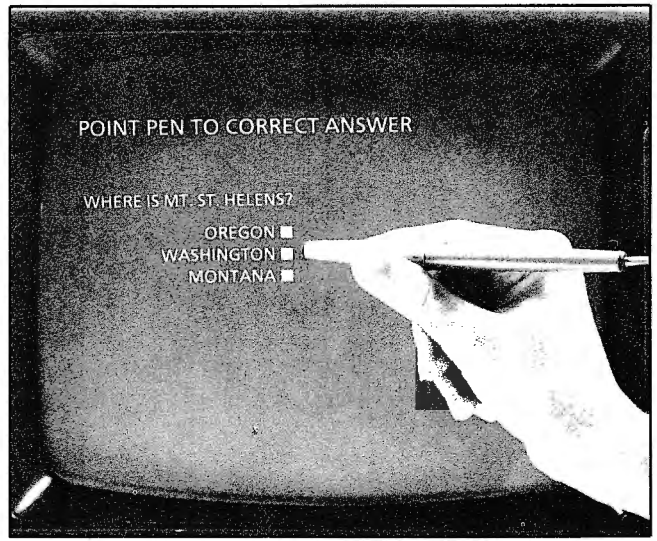
POINT PEN TO CORRECT ANSWER

WHERE IS MT. ST. HELENS?

OREGON ■
WASHINGTON ■
MONTANA ■



■ NO ASSEMBLY NECESSARY, READY TO PLUG IN AND USE
■ DEALER PACKAGE AVAILABLE



system is not that difficult to develop. That is why I wrote this program. To show myself and those teachers who work with our severely handicapped students that it can be done. The light pen is more than just another toy.

Program Listing for Computer Language Board

10 'COMPUTER LANGUAGE BOARD
20 '(C) 1982 BY TERRY DALTON
30 '1233 W. 16TH PLACE

```

40 'YUMA, AZ 85364
50 '(602)783-1765
60 'CREATED FOR THE 3G LIGHTPEN
70 '3G COMPANY, INC.
80 'RT.3, BOX 28A
90 'GASTON, OREGON 97119
100 '(503)662-4492
110 CLS
120 PRINT@512,"          COMPUTER LANGUAGE
BOARD FOR THE 3G LIGHT PEN":PRINT:PRINT
"(C) 1982 by Terry Dalton / 1233 W. 16
th Place / Yuma, AZ 85364":PRINT:PRINT"P
ermission to copy and modify is granted
to/for the handicapped.":FORI=1TO2000:NE
XTI:CLS
130 CLEAR1000
140 K=640:'POSITION WORD OUTPUT
150 DIMA$(16),C(16)
160 'CURSOR DEFINED
170 C$=CHR$(191)+CHR$(191)
180 'BLANK DEFINED
190 B$="  "
200 'NUMBER OF CURSORS
210 N=16
220 'ACTIVATE LIGHT PEN
230 OUT255,4:'MODEL I
240 OUT236,2:'MODEL III
    
```

```

250 PRINT@832,"HOLD LIGHTPEN ON THE CURS
OR IN FRONT OF THE WORD YOU WANT.":PRINT
"----- COMMANDS -----"
260 'READ FIRST PAGE OF WORDS
270 FORI=1TON:READA$(I):NEXTI
280 'POSITION CURSORS
290 FORI=1TON
300 READL
310 C(I)=L
320 NEXTI
330 'PRINT SCREEN
340 FORI=1TON:PRINT@C(I),C$;" ";A$(I);:N
EXTI
350 GOSUB370
360 GOTO260
370 ' RESET FLIP-FLOP
380 OUT255,4
390 ' LIGHT DETECTED?
400 IFINP(255)<128THEN400
410 'WHICH CURSOR?
420 FORP=1TON
430 FORI=1TO2
440 'TURN OFF CURSOR AND CHECK
450 PRINT@C(P),B$;
460 FORJ=1TO5:NEXTJ
470 OUT255,4
    
```

DISCOUNT COMPUTERS

100% RS COMPONENTS, NO FOREIGN DRIVES OR MEMORY — FULL WARRANTY

16K COLOR STD BAS	\$ 239.00	DMP 100 PRINTER	\$ 299.00
16K COLOR EXT BAS.....	299.00	DMP 200 PRINTER	599.00
16K MODEL III	669.00	DMP 500 PRINTER	1398.00
48K MODEL III 2DR RS232	1479.00	DMP 2100 PRINTER	1599.00
80K MODEL 12 1DR	2499.00	DMP 410 DAISY	1195.00
80K MODEL 12 2DR	3149.00	DMP DAISY WHEEL II	1599.00
128K MODEL 16 1DR	3898.00	12 MEG HD MODEL II/12/16	2769.00
128K MODEL 16 2DR	4510.00	ALL RS SOFTWARE	20% OFF

CASHIERS CHECK OR MONEY ORDER MUST ACCOMPANY ALL ORDERS.

(817) 825-4027

NOCONA ELECTRONICS • Box 593 • Nocona, TX 76255

```

480 FORJ=1TO5:NEXTJ
490 IFINP(255)>128THEN600
500 'TURN ON CURSOR AND CHECK
510 PRINT@C(P),C$;
520 FORJ=1TO5:NEXTJ
530 IFINP(255)<128THEN600
540 NEXTI
550 I=P
560 GOSUB720
570 IFA$(I)="ERASE"THENK=640:GOTO600
580 PRINT@K,A$(I);
590 K=K+(1+(LEN(A$(I))))
600 NEXTP
610 GOTO340
620 'PAGE ONE
630 DATAI,WE, YOU,THEY,HE,SHE,IT,ARE,AM,H
IM,HER,". ",QUIT,NEXT,PRINT,ERASE
640 DATA64,80,96,112,192,208,224,240,320
,336,352,368,960,976,992,1008
650 'PAGE TWO
660 DATAWANT,NEED,WATER,FOOD,BATHROOM,BL
ANKET,CLOTHES,SHOES,COLD,HOT,HELP,". ",Q
UIT,NEXT,PRINT,ERASE
670 DATA64,80,96,112,192,208,224,240,320
,336,352,368,960,976,992,1008
680 'PAGE THREE
690 DATAME,GET,READ,WILL,WAS,WHEN,WHY, W

```

```

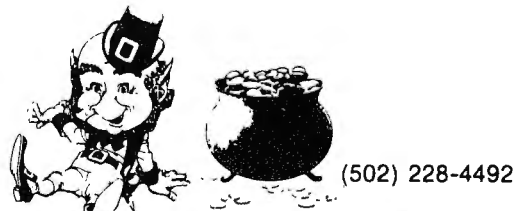
HAT,WHO,HOW,THERE,". ",QUIT,FIRST,PRINT,
ERASE
700 DATA64,80,96,112,192,208,224,240,320
,336,352,368,960,976,992,1008
710 END
720 'COMMAND ROUTINES
730 IFA$(I)="NEXT"THENGOSUB800 :GOTO270
740 IFA$(I)="FIRST"THENRESTORE:GOSUB800
:PRINT@979," ";:GOTO270
750 IFA$(I)="QUIT"THENCLS:END
760 IFA$(I)="PRINT"THENGOSUB830 :RESTOR
E:GOTO110
770 IFA$(I)="ERASE"THENPRINT@640,"
"
780 RETURN
790 'MAKE SPACE FOR NEXT PAGE OF WORDS
800 FORI=1TO12:PRINT@C(I),"
";:NEXTI
810 RETURN
820 'DUMP UP TO TWO LINES OF TEXT TO PRI
NTER
830 FORA=16000TO16120STEP64:FORB=ATO+64
:LPRINTCHR$(PEEK(B));:NEXTB:NEXTA:LPRINT
840 RETURN

```

Get Your Very Own Pot O' Gold!

For Your Color Computer

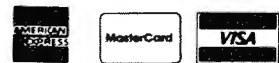
Here's your chance to have a Pot O' Gold full of programs, articles and information about CoCo every month! A subscription to **the Rainbow** is only \$22 a year, and you won't miss a single chock-full issue! **The Rainbow** is the premier magazine for the TRS-80 Color, TDP-100 and Dragon-32 personal computers. The reason? More of everything you and your CoCo want and need than you can find anywhere! Do yourself and your CoCo a favor and subscribe to **the Rainbow** today! We accept VISA, MasterCard or American Express. Non-U.S. rates slightly higher. U.S. currency only, please.



YES! Sign me up for a year (12 issues) of **the RAINBOW**.

Name _____
 Address _____
 City _____ State _____ Zip _____
 Payment Enclosed
 Charge VISA MasterCard American Express
 My Account # _____ Interbank # (MC only) _____
 Signature _____ Card Expiration Date _____

Subscriptions to **the RAINBOW** are \$22 a year in the United States. Canadian and Mexican rate U.S. \$29. Surface rate to other countries U.S. \$39, air rate U.S. \$57. All subscriptions begin with the current issue. Please allow up to 5-6 weeks for first copy.



Money saving hints

Low-cost expansion cover or printer stand

For all models

Fraser Smithson, West Bloomfield, MI

Expansion interface cover



After I purchased a Micromint Disk-80 expansion interface, I was unhappy with their planned location for this unit to the left of the Model I CPU. I decided that if I could find a suitable cover, I could set the interface under the monitor as in a normal Radio Shack arrangement. Covers for this purpose are available, but being frugal by nature, I felt they were too expensive. A little searching led to a perfect solution.

K-Mart carries a plastic box made by M-K Products called a Sweater and Utility Box (#55-20), which sells for \$2.56. I removed and discarded the top, cut a 3" x 10" cutout on one of the long sides using a sharp knife and a straightedge. One must work carefully so as to not crack the box.

PRICES YOU CAN'T BEAT!..

LNW-80 Model I \$1295

48K, 5 7/8" DISK CONTR., RGB COLOR
DOS-PLUS, 3.4, HI-RES GRAPHICS
RS 23 Z-C, PAR. PRINTER PORT.,
80x24 DISPLAY, 1 YEAR WARRANTY

COMPUTERS

LNW 80 MODEL II
96K, 5 7/8" DISC CONTR., RGB
COLOR W/CPM **1,595**
PMC 81 16K **\$525** 48K **\$660**
TIMEX **\$79** 16 MEM. **\$42**
TRS 80 COLOR COMP. 16K **\$269**
MOD.III 48K 2/40TRK, S/S, RS232 **\$1,730**

CRT MONITORS

AMDEK 300 GREEN **\$139**
AMDEK 310 AMBER **\$169**
AMDEK COLOR I **\$359**
AMDEK COLOR II **\$739**
TAXAN RGB COLOR **\$289**
ZENITH GREEN **\$115**
APPLE/IBM RGB CARD **\$89**

EXPANSION INTERFACES

LNW SYSTEM EXPANSION II **\$349**
MICRO DESIGN MDX-2 **\$449**
MICRO DESIGN MDX-3 **\$289**
HOLMES ENG. IM2 **\$129**
DOUBLE DENSITY MULTIPLIER **\$95**

TEAC 1/4 SIZE DRIVES

	Bare	Compl.
FD 55A 40TRK S/S	\$209	\$245
FD 55B 40TRK D/S	\$280	\$319
FD 55F 80TRK D/S	\$345	\$375

ALL TEACS HAVE A 1 YEAR WARRANTY

TANDON DRIVES

	Bare	Compl.
100-1 40TRK S/S	\$189	\$230
100-2 40TRK D/S	\$259	\$299
100-4 80TRK D/S	\$340	\$480

ECONOMY DRIVES

COMPLETE W/CASE/PWR SUPL/CABLE
40TRK S/S **\$195**
Dealers: Discount on Cases & PWR Supplies

APPLE COMPATIBLE DRIVE
W. CONTR CARD, CASE & CABLE **\$295**

C-ITOH PRINTERS

	PAR.	SER.
PROWRITER 8510	\$429	\$539
PROWRITER 1550	\$659	\$739
F-10 40CPS	\$1295	\$1295
F-10 55CPS	\$1550	\$1550
F-10 TRACTOR FEED		\$195
QUME SPRINT 11 40CPS		\$1,450

MODEMS

NOVATION J-CAT **\$145**
SIGNALMAN **\$85**

LNW SYSTEM EXPANSION II

UPGRADE YOUR MOD I OR PMC-80/81 WITH
DISK CONTROLLER - RS 232 -PARALLEL
PRINTER PORT - 32K 200 NS MEMORY - GOLD
CONNECTORS -POWER TRANSFORMER -
CASE - CABLE
FOR ONLY **\$349**

TRS COLOR COMP. EXP. BOARD

REAL TIME CLOCK
PAR PRINTER PORT
DISK DRIVE CONTR **\$289**
80x24 DISPLAY **Add \$75**

SOFTWARE

LAZY WRITER	\$159	MULTI DOS	\$89
ELECTRONIC WEBSTER	\$119	SUPER UTILITY+	\$49
MAXI MANAGER	\$129	M.A.S. 80	ea. \$135
POSTMAN	\$119	MSKALC MOD I	\$99
DOS PLUS 3.4	\$89	GAMES	-10%

24 HOUR TOLL FREE ORDERS
VISA/MASTER CHARGE ONLY:
(800) 633-2252 EXT 720

ALL QUESTIONS: (313) 538-1112

MICHIGAN RESIDENTS ADD 4% SALES TAX-POSTAGE
CALL FOR CHARGES-PRICES ARE DISCOUNTED FOR
CASH AND MONEY ORDER (NON CERTIFIED CHECKS
ALLOW 2 WEEKS TO CLEAR, MASTER CARD AND VISA
ADD 3%. NO C.O.D. NO NET TERMS

VESPA COMPUTER OUTLET

16727 Patton Detroit, MI 48219

Next, I took a flat file and filed a notch 1/16" deep by 2 1/4" on the opposite side top edge so that when it is placed face down over the Disk-80, the cable to CPU fit through without hitting the cover. The notch must start about 1" from the edge. One could also add notches for other peripherals if so desired.

I spray painted the exterior of the box with Krylon #1403 dull aluminum enamel. This paint, while not perfect, is a pretty good match to the Radio Shack silver gray. When it dried, I placed the box face down over the Disk-80 after having hooked up all of the cables. I had to put a twist in the cable to the CPU so that it hooked up properly. Next, I set the monitor on top of the box and, voila, I have a very neat arrangement at a total cost of \$5.23 including paint (which I hardly used at all).

The sweater box looked so neat that I purchased a second one and cut out a 3 1/4" x 10 1/2" cutout on one of the long sides starting 1" from the left end. I placed it face down, put the cover on the bottom and I had a first class printer stand for my Epson MX-80. The paper stores neatly under the box and since the box is clear, you can

Printer stand showing cutout



easily see the quantity of paper remaining. Most printer stands of this type are \$20 to \$30. I figure that my frugality has saved me upwards of \$40, which I can spend on other goodies.

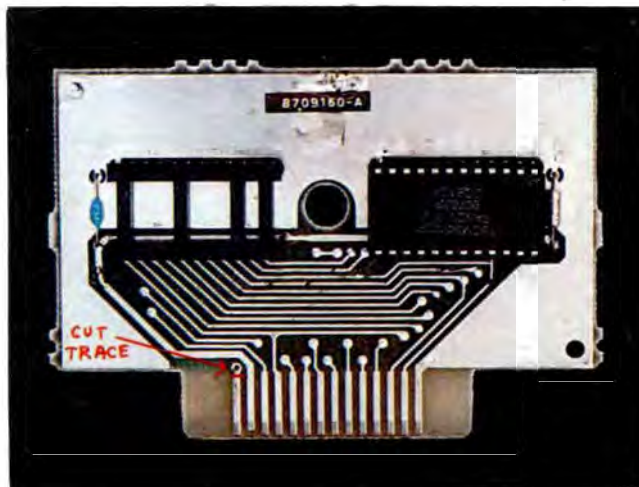
ROM remedies

Fix your ROM paks so you never lose BASIC

Color Computer

Robert Grater, Santa Clara, CA

Figure 1 — Shows the inside of the ROM Pack and indicates the single trace to be cut.



The Radio Shack Color Computer is a very powerful computing package for its size. When teamed with a Line Printer VII and Color Scripsit it becomes a great word processor.

One of the bothers with using the ROM Pack cartridges, such as Scripsit, is that, to prevent possible cartridge ROM damage, the computer has to be turned off before insertion or removal of the cartridge. This causes some extra steps if you write a BASIC program to, say, address a letter you intend to write with Scripsit. Well, there is a way around all this!

I had written a program to pre-address the first sheet on fanfold paper with the address and fold markers so it could be folded and inserted in a standard window envelope with the address showing through. This allowed me to start my letter using Scripsit on the next sheet, and when done, fold them all along the markers

and drop it in the envelope. Presto, no separate envelope to address.

The problem in using this pre-address program was that I would have to load it from tape, run it, print on the first sheet, turn the computer off, install the Scripsit ROM Pack, and then type my letter. Well, a Phillips screwdriver, sharp knife, and a little effort changed all that.

The cartridges for the Color Computer tie together two pins on the edge connector. The pins provide the path for the signal that tells the processor to boot the system from the ROM Pack and not from the standard starting address for BASIC. This line is easy to cut (that's what the knife is for), and once cut, the system will come up in BASIC even though the cartridge is installed. To execute the ROM Pack program, you type in EXEC 49152 and it will jump to the ROM Pack. This command tells the computer to execute the first instruction at decimal address 49152, which is the starting address for a ROM Pack program. If you are in a ROM Pack program, such as Scripsit, and want to get back to BASIC, simply press the reset button. But, be sure to first save anything important on tape since Scripsit will reinitialize and all your data will be lost. Now you have the option to use the ROM Pack or not, without turning off the computer to take it out, or re-insert it. Also, in a BASIC program the last statement can be an EXEC 49152 which will automatically jump you into the ROM Pack.

The ROM Packs are not that much a problem to take

apart, one screw holds the whole thing together. Once apart, they are not that delicate and you should have no problems. The single retaining screw can be felt through the label and removed with a Phillips screwdriver. The top half of the cartridge can be folded back, using the label as a hinge, or removed completely by cutting the label at the junction of the two cartridge halves. Inside the cartridge you will find a printed circuit board with an edge connector and a soldered-on ROM chip. The bottom half of the cartridge also contains a sliding cover for the edge connector and a spring to hold it in place. Don't worry if it comes completely apart, they are easy to get back together.

Figure 1 shows the inside of the ROM Pack; no further disassembly is needed. With the edge connector facing you, and the ROM chip up, you will note that the last "finger" on the right of the edge connector goes to the large area of the pc-board plating. It is the signal ground. The connection we want is the "finger" at the opposite end of the connector, the last one on the left. This "finger" runs to a small eyelet and through the board to the "finger" on the bottom side of the board. Using the knife, cut the trace, making sure that there is no metal left in the cut that could make a connection. Now, snap the cartridge back together, tighten the screw, and you are done.

This operation is so simple that I have done it to all of my ROM Packs. It is a lot easier to type in nine characters than to shut down and power-up the computer.

Draw

The Grafyx Solution[™] for your Creativity

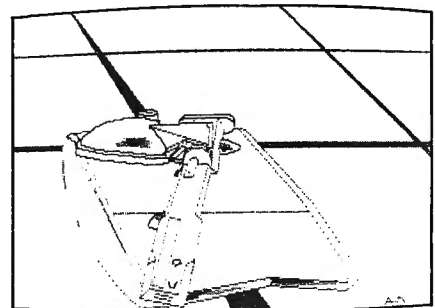
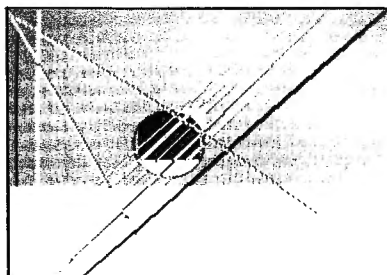


Improved Grafyx. DRAW is a powerful graphics and text editing package which allows your imagination to create a picture or design a graphics screen with Grafyx Solution. Micro-Labs' Grafyx Solution is a plug-in, clip on board which gives you 98,304 points in a 512 x 192 matrix. That's sixteen times as many points as a standard Model III!

Ultimate Grafyx. The DRAW program contains almost 10,000 instructions and is written in machine language for ultimate speed and flexibility. By moving

the cursor with the arrow keys and entering one letter commands, you can set, clear or complement points, lines, circles, or boxes. The size of the points that you are setting can be changed at any time. You can even reverse or shift the entire screen in any direction. Any section of the screen may be saved so it can be moved or copied elsewhere. Sections of the screen can also be filled in with patterns.

Practical Grafyx. DRAW is obviously a must for generating computer art or graphic designs, but is also a necessity for anyone, no matter what his



application. Businessmen and scientist can use DRAW to add text labels or other refinements to previously generated graphs. Once the picture is centered, labeled and refined, it can be saved on disk/tape or printed on any of 20 popular printers. All of this is done with single letter commands without ever leaving the DRAW program.

The Grafyx Solution package is shipped from stock and includes the board, 44 programs, and a 54 page manual all for \$299.95. The DRAW program, twelve hi-res pictures, and manual is \$39.95. Shipping is free on pre-paid or COD orders. (Tx. res. add 5% sales tax.)

MICRO-LABS, INC. 214-235-0915
902 Pinecrest, Richardson, Texas 75080

Typos

Scan your programs for bugs before running them

Models I/III

Robert Pollock, San Francisco, CA

A bug in a program will remain undetected by your TRS-80 until it tries to execute it. I type in enough programs badly enough to often find a program crashing hours or days after I started using it. If you've ever spent tedious hours entering data, or been on the verge of defeating the necromancer only to be unfeelingly informed of a syntax error, you know frustration.

This program can help. It actively searches BASIC programs for errors. If you leave out the colon between NEXT and RETURN, drop a parenthesis, or order the computer to PLINT, TYPOS will catch it. It works with the formal qualities of statements, not their sense, so some typos will escape it, as will logical or structural

mistakes.

Listing 1 is TYPOS. It is about 850 bytes long and doesn't require much overhead. It is used for keyboard work. ENTER GOTO65432. The program will ask where to start checking. It passes over lower numbered lines, then begins. It stops when it reaches a line numbered 65000 or greater. If it finds an error, it will inform you, finish checking the present line and then break. You can correct the error(s) on the spot, ENTER GOTO65432 and take up where you left off or just CONT.

TYPOS is slow. It takes about 45 seconds to skip to the 150th line of a program. A 12K-byte program with 150 lines and no remarks takes about 35 minutes to check.

Listing 2, PTYPOS, is a set of alternate lines for TYPOS that directs the output to a line printer. The printer option doesn't stop until it reaches a line greater than 64999. TYPOS and PTYPOS can be merged when and how the user desires. Cassette users who don't use merging techniques can create two programs and load their choice before entering their programs. The printer option is even shorter than the keyboard option, about 800 bytes total.

Line 65452 is the PEEK value subroutine. It returns the value stored at an address or computes and returns the value stored at a pair of addresses, depending on the value of UH.

The rest of the program is a rather simple-minded sieve. A look at the internal codes for BASIC keywords will make most of the program clear. One or two points might seem momentarily obscure. A line is one or more statements. Statements are separated by colons and statements, with one exception, need a command (: is acceptable, but I don't count it as a statement). A statement containing only a function, PEEK(A) or STEP-1, is defective, as are most statements containing two commands.

More specific considerations are: 16548 and 16549 contain the address of the first BASIC line, the first two bytes of a line contain the address of the next line, the next two bytes contain the line number of that line, a value of zero is placed at the end of every line but the last. Again, ELSE puts a colon before itself, TAB absorbs the



Modular Software Associates introduces . . .

NEWBASIC 2.0

At under \$50, it's a great buy,
But at under \$40, it's a steal!

Disk BASIC enhancement for your TRS-80 Model I/III

"What is NEWBASIC?"

NEWBASIC 2.0 adds over 40 new commands (BASIC keywords) to whatever Model I or Model III disk BASIC you use. It does not **replace** your disk BASIC, it **enhances** it.

"Who needs more BASIC commands?"

Anyone and everyone who programs in BASIC has, at one time or another, wished for a NEWBASIC command. They just didn't realize it.

"How about some examples?"

OK. With NEWBASIC, you can do double-byte PEEKs & POKEs. GOSUB or GOTO a line by label or expression. Call assembly routines without DEFUSR. Block move memory. Restore the DATA pointer by label or expression. Execute a string as a BASIC statement. Recover a NEW'd program. Set high-memory. Load a "/CMD" file from disk. Use a "DO/UNTIL" loop.

"Is that all?"

Hardly. NEWBASIC adds over a dozen graphics commands that are second to none. You can even do **animation** with our ZPUT command. NEWBASIC adds debugging aids such as a new trace, and pointing out the exact statement in error

in a multi-statement line. There's 38 pre-defined keys (BASIC keywords), and 10 additional keys you can define yourself. (Yes, of course, you can save the definitions to disk.) NEWBASIC adds a versatile, fun SOUND command that has to be heard to be believed. There's RS232 commands, and a disk-based spooler and despooler.

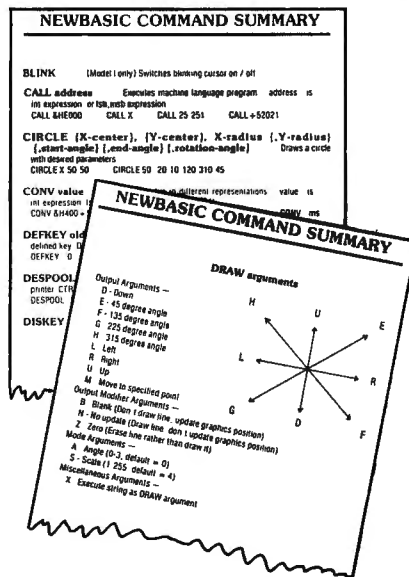
"I don't need a spooler/despooler!"

Then **your** NEWBASIC won't have it! Let's face it. You won't

always need every command available with NEWBASIC. That's why we made it so simple for you to create your own, custom NEWBASIC. You simply type "Y" or "N" for each command when you create NEWBASIC. Only those commands you want will be included. The others won't take up your valuable memory space. And you can create a different NEWBASIC whenever you wish.

"What about documentation?"

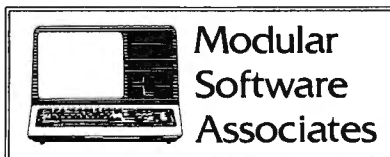
NEWBASIC comes with a 70 page user's manual. Each NEWBASIC command is explained in detail, with numerous examples. You also get a handy command summary card, showing the syntax and sample usage of every command.



Portions of summary card.

Pricing and Ordering:

NEWBASIC version 2.0 is only \$39.95 (CA residents add 6%) plus \$2.50 shipping. Add \$2.00 for C.O.D. orders. Foreign orders please add \$5.00 shipping (US funds only). NEWBASIC comes with both Model I and III versions on a 35-track, single density, Model I format, data diskette. (2 drives, 48K required.) To order, send check, money order, or credit card (Visa, M/C) information to:

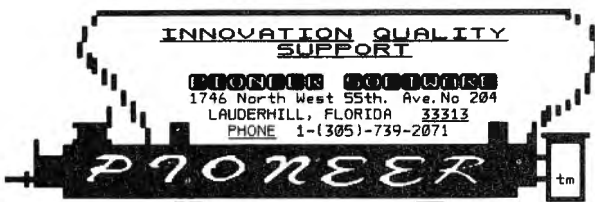


209 18th Street
Huntington Beach, CA 92648



Please allow 2 weeks delay for personal checks. Credit card or C.O.D. orders may be phoned in by calling (714) 960-6668 (weekdays, 8 a.m. - 5 p.m. PST).

TRS-80 is a trademark of Tandy Corp



SCRIPTR

SCRIPTR makes **SCRIPSIIT** a **FOOL SYSTEM**
Special Custom Versions Support *All Popular Printers*

MX-80 version allows for **Underlining** Emphasized, Sub + Super Scripting, Double and **TRAILING**, MID-LINE even on justified text lines without disturbing the formatting. **SCRIPTR** supports **EVERY** programmable feature of the **GRAPHTRAX 80** and **PLUS** roms. No other MOD does as much!

STANDARD FEATURES INCLUDE
OUTPUT any code or string of codes to your printer.
Write FORM LETTERS by inserting data during printing.
Print any page DIRECT with correct Headers, Footers
Reenter SCRIPSIIT to get use of ALL DOS FUNCTIONS.
See where PAGES start and end without printed copy.
Edit mode for errors, changes or **GRAPHICS** entry.
171 **TEACHING PROGRAMS** fully explain every function.
66 page manual-bound - **CASS-DISK Ver. Model I/III** for
- **CUSTOM ORDERS FOR FOLLOWING** -
Centronics 737 + 732 / LP-8 + LP-4 - Daisy Wheel II,
Microline 80 + 82A - Prowriter + Cloth 8510A + F10
SCM-TP-1 - DMP-200 + 400 + 410 - Gemini 10 + 15 MORE

LDOS COMPATIBLE
SYSTEM REQ TRS-80 MOD I/III, 32K, lower case.
Disk ver. requires **SCRIPSIIT/LL** on both Model's I/III.
PRICE \$40.00 on **DISK / CASSETTE**, 5.5K. program.
FREE BROCHURE Demonstrates all features.
Customer support by phone or letter after the sale makes Scriptr a pleasure to own and use. 1,500 fully satisfied customers in over 14 countries. **CALL I WRITE FOR INFO.**

PLEASE INCLUDE THIS INFORMATION WHEN ORDERING
Name MODEL 1/3 Cass/Disk
Address - Phone - Zip Printer Type MEM SIZE

CHECKS - MONEY ORDERS - COD'S

CRAYON DELUXE

FULL SUPPORT FOR: PROWRITER
MX-80 / 100 + NEW GEMINI 10 + 15
NEW CLOTH 8510A + NEC-8023A

DONT LET THIS SIMPLE NAME FOOL YOU **CRAYON DELUXE** is not a toy but a **COMPLETE WORD/GRAPHICS PROCESSOR** which offers complete versatility in creating custom letter-sets and graphics. Written in **2-80** Assembler it is fast, flexible and very easy to use. No program of this kind written in **BASIC** can compare to it. Computing the bit patterns for 760,320 bits per page of printing demands **7-80** Assembler. **COMPARE** + you won't get G.E.A. Pad

- STANDARD FEATURES INCLUDE**
1. Programmable Underlining, even create line paper
 2. Mix WIDE and regular sizes MID-LINE
 3. INVERT any part of the text even MID-LINE.
 4. SHORT LINE SEEKING for maximum speed. NO WAITING!!
 5. Reversed Block Capitals Character Set.
 6. **FONTMAKER** - A 15K. Machine Language program which enables you to create your own custom fonts. STORE, RETRIEVE AND PRINT letters INSTANTANEOUSLY. Allows 3 1/2 coresident character sets in memory. PLUS a fast easy way to print sample LETTERS and SETS
 7. Repeat printing capability without carriage advance even on graphic lines gives *Typewriter Quality* print.
 8. Create 100, or any number of copies of High-Res MAIL LABELS or LETTERHEADS with easy hands off operation.
 9. Complete **FORMATTING CONTROLS** within the text allow for multiple page printing without operator control.
 10. The *sharpest* dot matrix print you've ever seen!!
 11. Variable DOT Linespacing control for text documents.
 12. Bit Masking allows creation of graphs and the graph paper simultaneously. *Superimpose any background!!!*
 13. CREATE Block Graphics in any size and with every set.
 14. *Fine Line Drawing* for creating real business forms.
 15. Character sets may contain letters up to 40H x 127V.
 16. Continuous WIDE printing in any font or style. Even allows for partial **EXPANDED** from this mode.

ORDERING INFORMATION
CRAYON - DISK/Cass MOD 1/3 \$45 DISK / \$35 Cass
CRAYON DELUXE - DISK MOD 1/3 \$60.00 w/7 SETS
ADDITIONAL FONTS AVAILABLE
HERITAGE = AMERICAN TEXT + OLD ENGLISH \$15.00
ELITE = 4 Variations on disk for \$15.00
DIGITAL = 3 computer fonts for \$15.00 on disk.
PRINT SAMPLES \$4.95/99¢/25¢/25¢/25¢/25¢
CRAYON DELUXE THE FUTURE IS NOW
WE ARE NOW CARRYING A 25 NEG. HARD DISK SYSTEM FOR THE TRS-80 MODEL III. PRICE = \$2300 COMPLETE WITH DOS/PLS 4.0 ASSEMBLED - FORMATTED - SYSTEM SEES IT AS 4 DRIVES. CALL I JUST BOOT-UP AND YOU ARE UP AND GOING WITH HARD DISK

following open parenthesis, REM and a quote stop analysis of input and the code for END is 128.

The use of these few simple ideas can't produce a miracle cure for bugs, but if you do much work at the keyboard, I think you'll find TYPOS well worth using.

Listing 1 - TYPOS

```
65430 PRINT"END":END
65432 CLEAR3:DEFINTU:UB=0:OB=0:UC=0:UD=0
:UE=0:UF=0:UG=0:UI=0:OC=16548:UH=1:GOSUB
65452:OA=OB:CLS:INPUT"BEGIN LINE";OD
65434 OC=OA+2:GOSUB65452:IFOB<ODTHENOC=O
A:GOSUB65452:OA=OB:GOTO65434ELSEIFOB>649
99GOTO65430ELSECLS:PRINT"WORKING ON LINE
"OB:UA=4:PRINT"STATEMENT/TYPE":OC=OA+4:U
H=0:GOSUB65452:IFOB=58UA=5
65436 OC=OA+UA:UH=0:GOSUB65452:UB=OB:UA=
UA+1:IFUF=3ANDUB<>58ANDUB<>0ORUC=LANDUB<
>0GOTO65436ELSEIFUB=129ORUB=140ORUB=1430
RUB=149ORUB=156ORUB=158ORUB=161ORUB=1710
RUB=172ORUB=176ORUB=213UF=2:GOTO65436
65438 IFUB=136UF=3:GOTO65436ELSEIFUB=34U
C=UC+1:IFUC=2UC=0
65440 IFUB>127ANDUB<188ORUB=199IFUF=1UI=
1ELSEUF=1:IFUB=147UB=0
65442 IFUB=40ORUB=188UD=UD+1ELSEIFUB=41U
D=UD-1ELSEIFUB=147UE=UE-1
65444 IFUB<>58ANDUB<>0GOTO65436ELSEUC=0:
OC=OA+UA-2:GOSUB65452:UF=UF-(OB=58):UE=U
E-(OB<>58)
65446 IFUD=0ANDUF>0ANDUI=0UF=0:IFUB=58GO
TO65436ELSEIFUG=0OC=OA:UH=1:GOSUB65452:O
A=OB:UE=0:GOTO65434ELSESTOP:UG=0:UF=1:GO
TO65446
65448 UG=1:PRINTSTR$(UE)"/";:IFUD<>0PRIN
T"PARENTHESSES",,:UD=0ELSEPRINT"HASH",,:I
FUF=0UF=1ELSEUI=0
65450 GOTO65446
65452 OB=0:FORU=0TOUH:OC=OC+U:OC=OC+6553
6*(OC/32767):OB=OB+PEEK(OC)*256/(256-255
*U):NEXT:RETURN
```

Listing 2 - PTYPOS

```
65432 CLEAR3:DEFINTU:UB=0:OB=0:UC=0:UD=0
:UE=0:UF=0:UG=0:UI=0:OC=16548:UH=1:GOSUB
65452:OA=OB:LPRINT"TYPOS - THE BUG SPY:"
:CLS:PRINT"WORKING
65434 OC=OA+2:GOSUB65452:IFOB>64999GOTO6
5430ELSEUA=4:OE=OB:OC=OA+4:UH=0:GOSUB654
52:IFOB=58UA=5
65446 IFUD=0ANDUF>0ANDUI=0UF=0:IFUB=58GO
TO65436ELSEOC=OA:UH=1GOSUB65452:OA=OB:UE
=0:GOTO65434
65448 LPRINT"LINE"OETAB(15)"STATEMENT"UE
TAB(32);:IFUD<>0LPRINT"PARENTHESSES":UD=0
ELSELPRINT"COMMAND":IFUF=0UF=1ELSEUI=0
```




How to chart your company's fortune without spending one

It's a fact. A single chart or graph can tell you instantly what it takes hours to interpret from printouts or other raw data.

Now, with Strobe Graphics Plotters and Software, you can create superb hardcopy graphics directly from your computer. And you can do it for a fraction of the cost of most other systems.

The Strobe System transforms complex data into dynamic, colorful visuals with a few simple commands from your computer. Charts and transparencies that once took hours to produce are plotted within minutes. Information can be presented as bar charts, pie charts, curves or isometrics using a variety of colors, character styles and symbols. And with a resolution of 500 points per inch, the Strobe plotters match or surpass the quality of plotters costing thousands of dollars more.



The Strobe Graphics System
Seeing is believing

You can also save and modify your graphics through Strobe's menu-driven programs. A broad selection of software—including programs that plot directly from VisiCalc* and SuperCalc** files—is now available.

When the Strobe Graphics System is interfaced to your computer, an 8½x11 inch sheet of paper can speak anyone's language—visually. Visit your local dealer and learn how to start charting your fortunes today. Because a perspective on the present can also be your window on the future.



Strobe Inc.
897-5A Independence Avenue
Mountain View, CA 94043
Telephone 415/969-5130

*VisiCalc is a trademark of VisiCorp
**SuperCalc is a trademark of Sorcim Corp

Data graph evaluation

A graphic four-color VisiCalc utility

Models I/III

Timothy K. Bowman, Spokane, WA

It has been said that one picture is worth a thousand words and anyone working with VisiCalc has, at one time, desired to present statistical material in a graphic form. One exciting area is the current development of software that will transform VisiCalc data files into high resolution graphics. Micro Software Systems has taken a significant step in producing a series of BASIC programs and DIF templates that produce high resolution graphics on both dot-addressable printers and the IDS

Prism color printer.

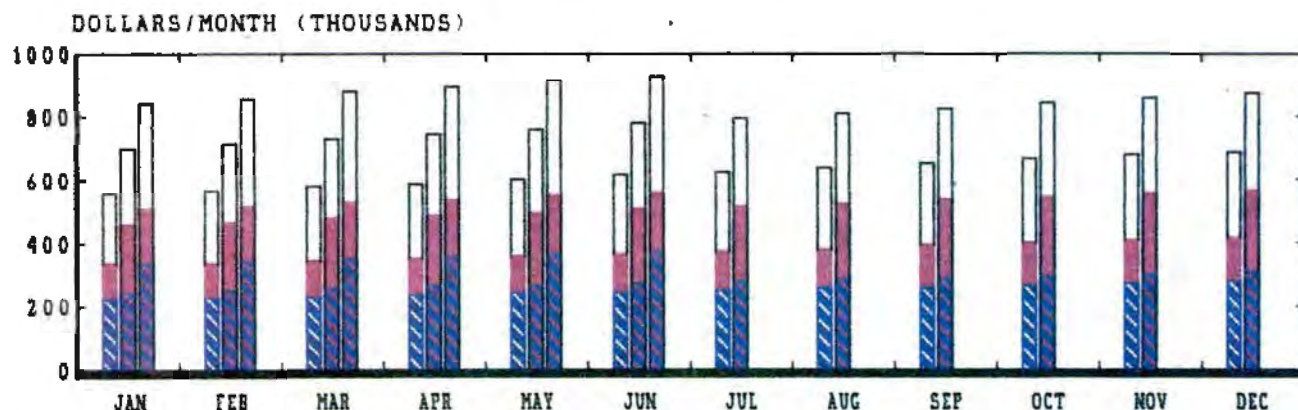
For this evaluation, I obtained a copy of the programs that would run on a Model III using TRSDOS and a Line Printer VIII. The programs are provided on either a Model I or Model III diskette that can be backed up. The operating programs must be transferred to a "clean" system disk and the distribution disk contains several sample files to be used in familiarizing you with the program.

In general terms, the programs are used in conjunction with

VisiCalc as follows. First, the VisiCalc program is loaded and the spreadsheet is created. After creation, it is saved in DIF format. You load a template which is a DIF file in a blank area of the worksheet. This template, called a Graphform, contains the desired graph features. Store the Graphform in DIF format. Exit the VisiCalc program by pressing the reset button. The Datagraph program then autostarts and prompts you with a request for a Graphform filename. If the file exists, the rest of the program

BUSINESS FORECAST: 1982

- = SALES (81, 82 FORECAST, 82 ACTUALS)
- = COSTS (81, 82 FORECAST, 82 ACTUALS)
- = PROFIT (81, 82 FORECAST, 82 ACTUALS)



DATAGRAPH BAR CHART

operation is totally automatic. As the program operates, it provides a screen display of what is being processed. Assuming the printer is on, the graph is automatically produced. Several examples that illustrate the quality of the printout are shown in the sample graphs.

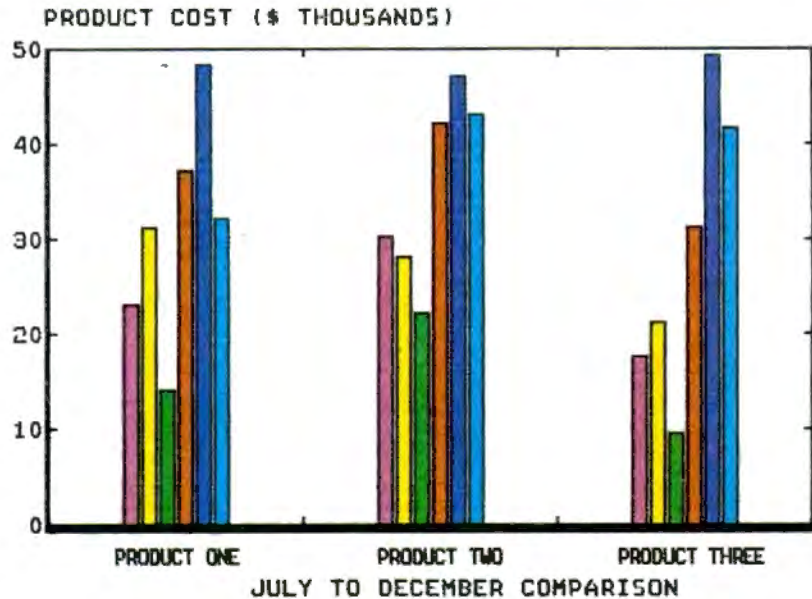
Features

The Datagraph programs provide several significant features. You can choose the title, axis labels, size of the graph, horizontal and vertical scaling, and twelve types of line format. You can create your own new symbols (a truly delightful process) through an edit routine. This routine is available through the main menu program and you can also view the disk directory on Model I/III non-TRSDOS systems. The programs have an auto-scaling feature that creates the graph scale necessary for the information yet the user can place maximum and minimum limits on the axis scales. The enhanced features, which now are really standard features on all current diskettes, provide extended graphing ability, including regular, relative, and superimposed bar graphs. Lastly, you can choose to produce graphs from only selected portions of your spreadsheet.

Impressions

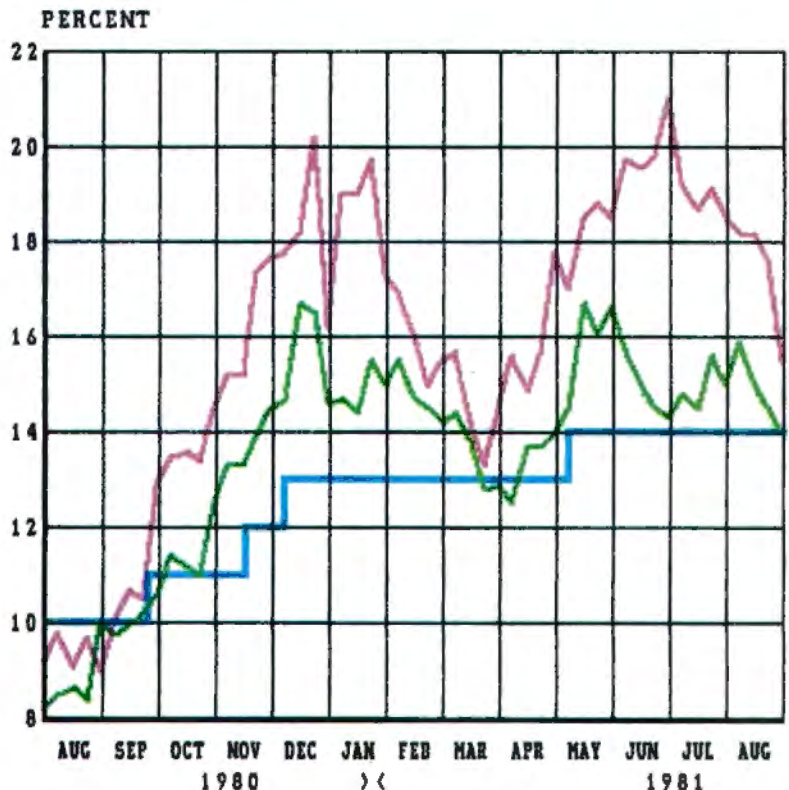
To sum it up, the programs work and the graphs are quite attractive. Once I became familiar with the product, it always produced results and was relatively easy to operate. I found the advertised "75 page manual" very unfriendly to use and it contained a number of spelling errors. Many of the 75 pages were used to present copies of printed graphs. I believe that this space could be better spent with more detailed and comprehensive explanations of how to use the product. In my opinion, the manual should be rewritten at a more elementary level and organized in a more logical fashion. It should include a very specific instruction session that uses one of the sample programs in connection with VisiCalc and Datagraph. It would also help to spread out the information presented on each page. Finally, it would be nice to have a

- = JULY
- = AUGUST
- = SEPTEMBER
- = OCTOBER
- = NOVEMBER
- = DECEMBER



SELECTED INTEREST RATES

- = FEDERAL FUNDS RATE
- = 3 MONTH TREASURY BILL YIELD
- = DISCOUNT RATE



CATALOG

* ANY DISK *

REGARDLESS
OF DOS, DENSITY
OR TRACK COUNT
IN SECONDS... OR
YOUR MONEY BACK!

The Arranger is a very fast 100% Z-80 machine language, self contained master disk catalog filing program that automatically records disk name, date, density, DOS, free space, track count and data type in seconds on almost anything!

With the Arranger you can:

- * Catalog 250 disks—44 files (double density)
- * Find any program in 30 seconds
- * Sort 1500 files in 40 seconds
- * Sort by extension or wildcard
- * Single or multiple drives
- * Scan files starting at any point
- * Search by wildcard
- * List or print files alphabetically
- * Add or update your disks in seconds
- * Rename disk at any time

The Arranger is totally independent, complete with its own backup function. We believe the Arranger to be the finest, fastest, easiest to use disk catalog filing program available and the least expensive.

Single Density Model 1 or
Double Density Model 1/111

\$29.95

New!... Special Offer... A
Double Arranger... Two Ar-
rangers on a Flippy Disk for
only **\$39.95**

VISA—MC
Order Toll Free
1-800-692-5235
In California Call
1-213-873-6621

CDC

13715 VANOWEN STREET
VAN NUYS, CA 91405

Data graph

section at the end of the manual that contains hints for the advanced user.

I did not try to list or dissect the programs. They do, however, make extensive use of strings and there are periodic delays for "garbage collection." While the manual makes humor of it, I knew it to be unnecessary. Upon discussing it with the company, I was advised that a short patch is available to eliminate those delays. There appears to be sufficient error-trapping and I only noted one minor problem on one of the edit screens with the screen rolling forward. The company indicated to me that they were already aware of it, but that I was the first user to point it out.

There are two further program enhancements (after re-writing the manual) that I would suggest to further improve the product. First, it should be possible to create "pie charts" and second, to create, and edit, the Graphform file (containing the graph creation information) without going back to VisiCalc. But, neither of these suggestions are meant to detract from the usability

of the program as it is.

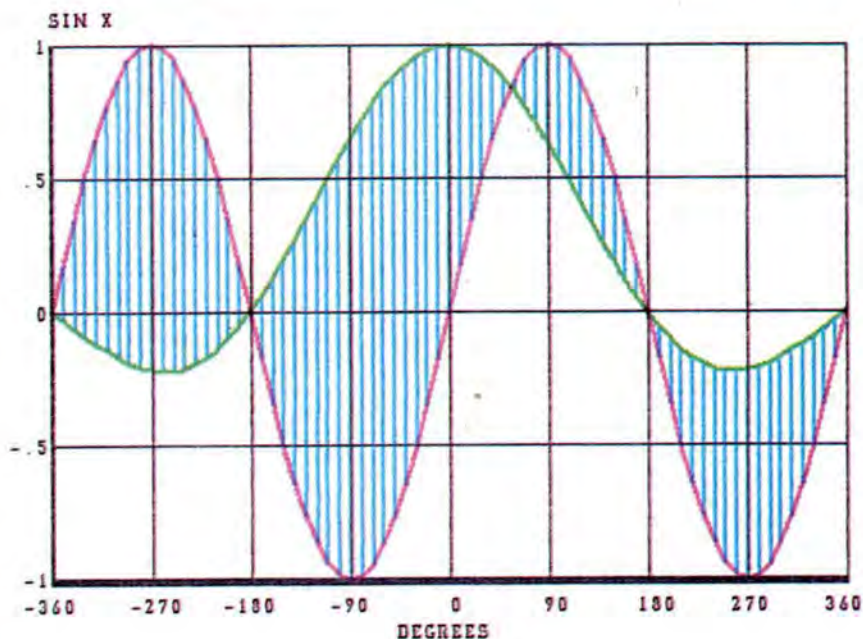
Despite my criticisms concerning the written documentation, for the Model I/III owner who wants to transform VisiCalc files to attractive, printed, graphics; this program must be considered. It is reasonably priced and the pictures are worth it. It opens up new frontiers in communicating information. That is what we are trying to do, isn't it?

VisiCalc™ VisiCorp. DIF™
Software Arts, Inc. Prism™ Integral
Data Systems.

Datagraph is available for 48K Models I/III. Dual disk systems are preferred, but it will run under single disk systems that do not use TRSDOS. The package currently works under TRSDOS 1.3, TRSDOS 2.3, NEWDOS, NEWDOS/80, DOSPLUS 3.4, and LDOS 5.1. The package sells for \$79.95, or \$89.95 for the ColorPlot version. Contact Micro Software Systems, 1815 Smokewood Ave., Fullerton, CA 92631 or call (714) 526-8435. When ordering, be sure to specify printer, computer model, and DOS.

DATAGRAPH OF SIN(X)

— = SIN(X)
— = SIN(X)/X



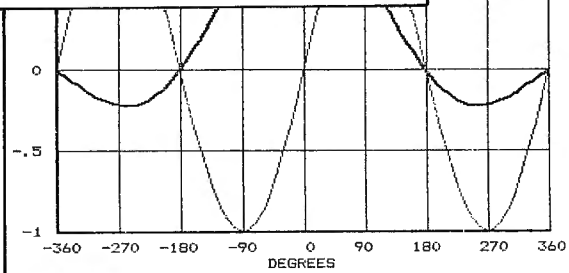
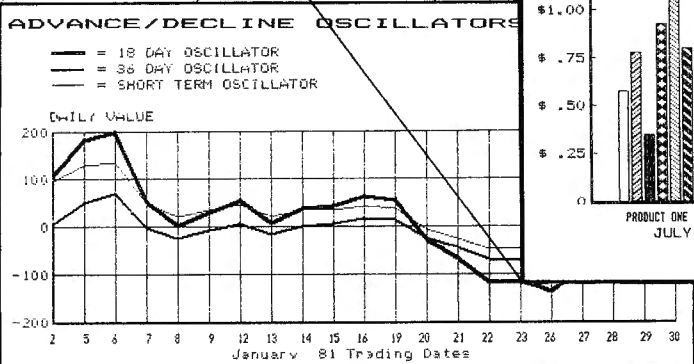
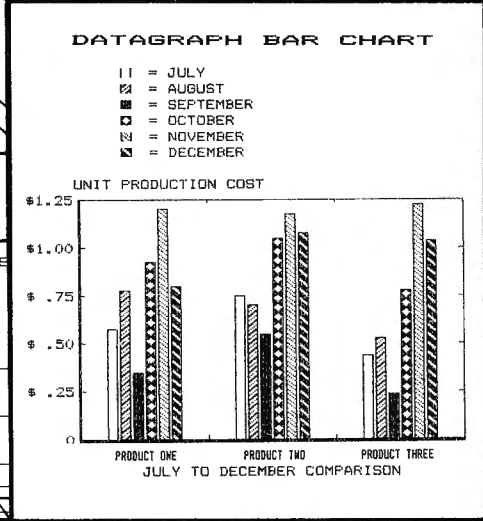
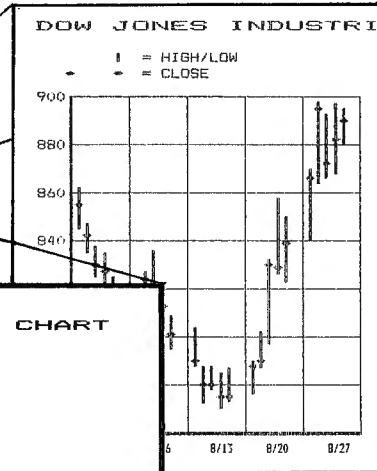
DATAGRAPH

* T.M. 3RD GENERATION
PRINTER
GRAPHICS
PROGRAM

TRANSFORM YOUR VISICALC™ FILES INTO HIGH-RESOLUTION CUSTOM
GRAPHS ON YOUR TRS-80™ COMPUTER AND GRAPHICS PRINTER.

ELECTRONIC WORKSHEET										
Jan	NYCI	DJIA	BIT	DDJ	SEP	500	Advances	Declines	Gr Vol	In Vol
1231	77.84	953.99	398.10	114.42	135.76	1040	593	24,838	11,306	
102	79.26	872.78	451.43	115.12	135.34	1062	495	17,275	8,495	
105	79.00	872.52	465.77	117.81	137.97	1024	433	41,157	14,669	
104	79.14	1001.69	402.89	117.16	138.12	1049	440	38,453	23,709	
107	77.29	893.59	391.19	115.19	135.60	214	1555	5,993	85,844	
108	74.20	925.79	383.24	114.09	133.06	578	1033	11,757	37,075	
109	74.44	928.69	384.82	112.89	133.49	907	620	28,933	15,739	
112	74.52	928.77	388.34	112.85	133.52	928	633	25,813	19,192	
113	76.35	925.10	387.18	112.49	133.29	578	993	12,467	24,532	
114	76.55	926.47	389.35	112.38	133.47	944	612	23,392	13,773	
115	74.99	829.27	376.10	112.60	131.22	739	671	21,547	13,526	
116	77.33	973.29	401.98	113.22	134.77	890	642	23,22	14,425	
119	74.10	870.99	403.65	114.35	134.37	740	756	16,175	15,338	
120	75.41	950.68	394.89	113.80	131.25	371	1172	5,859		
121	75.39	946.25	392.46	113.90	131.56	547	954	15,737		
122	74.74	840.44	392.03	113.00	130.25	457	1024	11,057		
123	74.72	840.19	391.61	111.76	130.25	683	789	16,604		
124	74.45	838.11	389.19	111.47	129.84	564	893	14,694		
127	75.19	849.41	394.64	111.72	131.12	943	559	28,175		
128	74.79	842.50	395.43	112.49	130.34	684	788	14,433		
129	74.69	848.89	383.04	112.74	130.24	774	710	19,433		
130	74.27	947.27	402.22	112.82	129.55	727	776	16,777		

WORKSHEET			
NYCI	NYSE Vol	100 NYCI	ADL
1231	41,21	77.25	447 -1522
102	28,87	77.59	537 -1025
105	38,71	77.75	693 -132
104	67,40	78.52	497 277
107	92.89	77.89	-1339 -1062
108	35.35	77.57	-450 -1512
109	50.19	77.39	289 -1223
112	46.75	77.23	295 -928
113	49.97	77.07	-415 -1343



SEE YOUR
LOCAL
SOFTWARE
DEALER
OR ORDER
DIRECT.

**DATAGRAPH:
\$79.95**

Available in COLOR
On IDS Prism™ Printer:
**COLOR PLOT Version
\$89.95**

* HIGH RESOLUTION - 60 x 72 data Points/inch. * LARGE DATA CAPACITY - 1000 Input Data Points per graph. * SELECTABLE GRAPH SIZES - From 1" sq. to 7" x 24" * STANDARD DATA SOURCE - Plots Data from VISICALC or USERS OWN PROGRAMS using the DIF™ Standard Format. * GRAPH FEATURE SELECTION - Fill out Pre-formed Form on VISICALC screen or in users own program. * MINIMAL ENTRY REQUIREMENTS - Enter only name of Datafile and location therein of data to be plotted. * MULTIPLE FUNCTION GRAPHS - Plots over 10 Data Sets per graph. * DATA SYMBOLS - Plots data with user composed symbol shapes. * DATA INTERPOLATION - connects data points with user composed line shapes. * LINE/SYMBOL LIBRARY - Plots each Data Set with different line/symbol shape chosen from 12 line library. * CUSTOM LINES AND SYMBOLS - Has interactive screen-graphics program for composing symbol shapes. * AUTO SCALING - Selects scale values for ease of graph interpretation. User adjustable Mantissa Table. * GRID SELECTION - Prints selectable number of vertical and horizontal grid lines. * CALENDAR SCALE - Optionally prints names of month on horizontal scale. * CURVE SELECTION - Plot each data set with Linear, Stair-Step, or Bargraph curves. * OPTIONAL MIN/MAX VALUES - Extends graph beyond the values of the Data Sets. * DATA SET DESCRIPTIONS - Prints text descriptions of each Data Set in graph legend. * TEXT ENTRIES - Prints graph title, axis labels, and date on graph. * USER FRIENDLY - Checks validity of input data and displays cause of errors. * COMPLETE DOCUMENTATION - Comprehensive 75 page Users Manual with examples covering data preparation, graph feature entry, composing lines and symbols, and technical notes.

USER REQUIREMENTS

- COMPUTER**
- TRS-80 MODEL I 48K
 - TRS-80 MODEL III 48K
 - LNW80 48K
- DOS**
- TRSDOS 1.3, 2.3
 - NEWDOS, NEWDOS/80
 - DOSPLUS 3.4, LDOS 5.1
- DISK DRIVES**
- SINGLE DRIVE (NOT TRSDOS)
 - DUAL DRIVE (PREFERRED)
- GRAPHICS PRINTER:**
- MX-80 GRAFTRAX, OR GT +
 - MX-100
 - LINEPRINTER VIII, DMP 200
 - NEC 8023 A-C, C.I.TOH 8510
 - IDS 460/560, 480, 80/132
 - OKIDATA 82/83
- ++ OTHER VERSIONS IN DEVELOPMENT

TO ORDER: Send check, purchase order, or request for COD shipment. Specify Computer and Printer Type. Include \$2.50 for postage and handling. Calif. residents add 6% tax.

MICRO SOFTWARE SYSTEMS • MICROPLOT, INC.

DEALER INQUIRIES WELCOME 1815 SMOKEWOOD AVE. • FULLERTON, CA 92631 • (714) 526-8435

TRADEMARKS: DATAGRAPH (MICRO SOFTWARE SYSTEMS); VISICALC (VISICORP); TRS-80 (TANDY CORP); DIF (SOFTWARE ARTS INC.); PRISM (INTEGRAL DATA SYSTEMS)

VISA/MASTERCARD ACCEPTED



In the chips

More uses for a byte and a four through ROM and RAM

Model I/III

Spencer Hall, Associate editor

Last month we left you stranded in the wasteland between memory address 12287 (2FFF hex), last byte of the ROM and 15360 (3C00 hex), first byte of screen memory. We had just looked at the keyboard matrix between 14337 (3801 hex) and 14464 (3880 hex) with the help of a short program to scan these addresses. I won't apologize for leaving you in this lonely place. If you have the inquiring mind typical of someone who is attracted to personal computing, you have probably been using our little monitor to explore other parts of memory. Some apology is in order for taking from February to now to prepare you for writing machine language programs. Believe me, it was really necessary. Would it help to know that next time we will be writing our first machine language program? Yes, this month's trip through the rest of memory is the end of our basic training. (No pun! This isn't a course in BASIC.)

For now, let's get on with our field trip through memory. In case you missed the last installment, we're relisting the monitor again (Listing 1). It has been modified for some difficult terrain that we'll be crossing. If you have your copy of this monitor, it's a simple matter to add the new lines which are numbers 15 and 55 and all those from 170 upward. The listing contains remark statements (no need to copy them!) to identify the changes. This is the vehicle we use to take our trip.

RUN it, for now without lines 15 and 55. It will ask for a start address. Respond in decimal, specify about 0.5 seconds to hold each address, and away you go. Stop it with any key. Start it with any key. While it is stopped, press "A" to change the starting address, hold time, or both. Also while it is stopped, press "N" to see the integer stored in the present and next oncoming addresses.

Before we leave the 12288 to 15359 wilderness, let's look at the only other valid address in this RAMless arena. Start at 14310 (37E6 hex), or lower, and creep up on 14312 (37E8 hex). If you don't have a line printer, or have it turned off, you will see only 255. This address is the launching pad for any ASCII byte you care to send to the line printer. (To a line printer, any byte is an ASCII byte because it's a message to a human being.) Put a byte in this address and it goes onto eight wires of the parallel printer cable, or it's intercepted by the RS-232 serial driver. In either case, its destination is the buffer

of your printer. This heavily used address is also the line printer's mailing stop for messages back to the computer. When it is busy putting letters on paper, it places a 128 in this address (bit 7 high). This is a "Do not disturb" sign. While it is there, the computer patiently loops, waiting for a chance to output more bytes.

It's high time we explained the words "loop" and "buffer". From the time your computer is turned on, the microprocessor is busy reading addresses and switching bits in response to pulses from the "clock". It simply can't stop because electrical current continues to flow. When pauses are needed to allow you to do something, the machine code must go around in circles, testing for a chance to exit its loop on each trip around. Without such a test programmed into the loop, the poor microprocessor just goes around and around forever, at least until the power is shut off. This is the dreaded "infinite loop".

A buffer is simply a specified series of addresses in which to store bytes. In the computer, these are specified by an address number. In the line printer they are addresses in the printer's memory chip, visible only to the printer and completely inaccessible by the computer.

With a line printer you can have fun with address 37E8 hex. Exit the monitor with BREAK. With your computer on-line, type the following while in command mode: POKE 14312, 65: POKE 14312, 13. Now press ENTER. This executes the two BASIC commands. The first puts the ASCII byte for capital A (65) in the print buffer. The second POKE puts the ASCII for a carriage return and a linefeed (13) into the buffer. That is, for most printers, a signal to empty the buffer. The result? You get the letter A printed (and another wasted sheet of paper!).

You may want to try this little program:

```
10 FOR B = 65 TO 90
20 POKE 14312, B
30 NEXT
40 POKE 14312, 13
```

The loop from line 10 through 30 puts the twenty-six capital letters of the alphabet into the print buffer and line 40 tells the printer to empty its buffer.

In the chips

Before leaving this address, try doing a PRINT PEEK (14312) when the printer is off. You get 255, because there is nothing there now. Now do it with the printer on, but off-line. Do it once more with the printer on and on-line. Note these last two values. Their hex equivalents will be very handy when your machine language programs test address 37E8 hex to see what's going on in the line printer.

We've already said that addresses 15360 (3C00 hex) through 16383 (3FFF hex) wired or "mapped" to positions on the video screen. They are equivalent to PRINT @ addresses 0 through 1023. Try POKEing some ASCII values into these addresses from command mode, e.g. POKE 15704, 97. If your computer has a lowercase modification, this will put an "a" near the middle of the screen. Otherwise, you'll see a capital "A".

From 16384 to the start of BASIC, which in Level II is 17129 (42E9 hex), lies a scratch pad which is used by the machine code in ROM to make all kinds of notes to itself. Entries to this area are made by the ROM when the ENTER key is hit after the MEMORY SIZE (or MEM SIZE) question has been answered.

There are a number of "where to go next" instructions. These are used by machine language programs to modify the behavior of the ROM. Machine code in ROM is written to periodically visit these addresses while it is executing a BASIC program or responding to BASIC commands. They normally contain the machine language equivalent of RETURN (which is decimal 201, or C9 hex), known in source code as RET. Thus, nothing at all happens as a result of this microsecond diversion.

The next two bytes are left vacant. By changing one of these addresses to 195 (C3 hex), which is the machine code equivalent of GOTO, known in source code as JP, and adding the LSB and the MSB in the next two addresses; it is possible for a machine language program to kidnap the system off to code at a totally different location.

This code modifies the behavior of the system. It may execute a debounce routine, a shift from upper to lowercase, or anything else the programmer desires. Ending with the C9 byte send it back to the system as if nothing had happened. These so-called "exits" were written into the ROM for this very purpose. Their intended use is conversion of the ROM to operate a disk system. For this reason, they are known as DOS exits.

Many machine language programming efforts on the TRS-80 require a knowledge of where these exits are. You can see the DOS exits, as we have just described them, by running the monitor from 16812 through 16868.

Another group of exits, the disk exits, can be seen from 16722 through 16811. These already contain a 195 (C3 hex), which, as we have said, means JP or GOTO. Read the next two bytes with your "N" key. Unless you have a disk system activated, the address is 431 in ROM. Disk exits respond to the Disk BASIC reserved words. The code at 431 (1AF hex) in ROM writes the L3 ERROR message, naturally!

A whole book could be written about what is stored in this scratch pad. You'll need to know a lot about this area when you write machine language, but it will be better to talk about these things when you are ready to



Man's Best Friend

Micro Management Systems, Inc.

2803 Thomasville Road East
Cairo, Georgia 31728
(912) 377-7120

Since 1978

**DISCOUNT
PRICES**



**BUY
DIRECT**

- REPUTATION BACKED BY YEARS OF EXPERIENCE.
- PIONEER IN DIRECT TO CONSUMER SALES OF MICRO COMPUTERS AND ELECTRONICS
- MILLIONS OF DOLLARS IN SALES OVER THE YEARS
- TENS OF THOUSANDS OF CUSTOMERS
- HONEST
- RELIABLE
- LARGE INVENTORY
- NAME BRAND PRODUCTS

It's simple. . .
**CALL & SAVE
MONEY**

1-800-841-0860
CONVENIENT ORDER ENTRY

Ga. & Info 912-377-7120

COMPUTERS & EQUIPMENT

<p>EPSON PRINTERS MX-80..... \$369 FX-80..... \$CALL MX-100.... \$CALL CALL - NEW PRODUCTS</p>	<p>TRS-80 COMPUTERS FROM Model 12..... *2639 Model 16..... *4012 Model III..... *588 Model IV..... *CALL Portable..... *CALL Color Computer. *235 New Products.. *CALL</p> <p>WE CARRY THE COMPLETE LINE OF TRS-80 COMPUTERS</p>	<p>OKIDATA PRINTERS Complete line DISCOUNT PRICED FROM *339</p> <p>C. Itoh PRINTERS FROM *397</p> <p>brother. *CALL</p>	
<p>SMITH CORONA TP-1 DAISY WHEEL PRINTER DISCOUNT PRICED FROM *499</p>	<p>TRS-80 PRINTERS Complete line DISCOUNT PRICED FROM *199</p>	<p>COMMODORE COMPUTERS FROM *139 VIC 20 COMPUTER COMMODORE 64 VIC 1541 DRIVE VIC 1525 PRINTER VIC 1530 DATASETTE VIC 1600 MODEM SOFTWARE *CALL</p>	
<p>STAR PRINTERS GEMINI-10 GEMINI-15 DISCOUNT PRICED FROM *339</p>	<p>FRANKLIN ACE 1000 ACE 1200 DISCOUNT PRICED FROM *898</p>	<p>ATARI Novation Hayes</p>	
<p>ALL PRODUCTS WE CARRY ARE BRAND NEW AND COVERED BY MANUFACTURER SPECIFIC WARRANTY PRICES AND PRODUCTS SUBJECT TO CHANGE WITHOUT NOTICE</p>		<p>FREE UPON REQUEST • DISCOUNT PRICE LIST AND INFORMATION KIT • COPY OF MFR'S WARRANTY WRITE MICRO MANAGEMENT SYSTEMS TELEMARKET DEPT. NO.5 2803 THOMASVILLE RD. E. • CAIRO, GA. 31728</p>	

Program Listing for In the Chips

```

10 CLS
15 CLEAR 1000:GOSUB 170
    *** NEW ***
20 PRINT:INPUT"START AT WHAT ADDRESS";A
30 PRINT:INPUT"HOLD EACH ADDRESS HOW MANY SECONDS";S
40 IF A>32767 THEN A=A-65536
49 ' *** "B<192" IN LINE #50 CHANGED TO "B<128" ***
50 B=PEEK(A):IF B>31 AND B<128 THEN B$=CHR$(B) ELSE B$=""
55 GOSUB 350
    *** NEW ***
60 PRINT A,B,B$;
70 FOR J=1 TO 345*S:NEXT
80 Z$=INKEY$:IF Z$="" THEN 130
90 Z$=INKEY$:IF Z$="" THEN 90
100 IF Z$="A" THEN 20
110 IF Z$="N" THEN 150
120 IF Z$="S" THEN 30
130 A=A+1
140 PRINT:GOTO 50
150 PRINT PEEK(A)+256*PEEK(A+1);
160 GOTO 90
169 ' *** ALL THE FOLLOWING LINES ADDED ***

```

```

170 DIM W$(122)
180 WI=0:A=5712
190 I=1
200 X=PEEK(A)-128
210 W(I)=X
220 A=A+1:I=I+1
230 IF A=6177 THEN 300
240 X=PEEK(A)
250 IF X<128 THEN 210
260 FOR J=1 TO I-1
270 W$(WI)=W$(WI)+CHR$(W(J)):NEXT
280 PRINT WI+128;W$(WI)
290 WI=WI+1:GOTO 190
300 BA=PEEK(16548)+256*PEEK(16549)
310 BZ=PEEK(16633)+256*PEEK(16634)
320 PRINT"HIT ANY KEY TO CONTINUE"
330 Z$=INKEY$:IF Z$="" THEN 330
340 CLS:RETURN
350 IF A<BA-2 OR A>BZ THEN RETURN
360 IF B=0 THEN AD=PEEK(A+1)+256*PEEK(A+2):IF AD<BA OR AD>BZ THEN RETURN ELSE GO TO 390
370 IF B>127 AND B<251 THEN B$=W$(B-128):RETURN
380 RETURN
390 FOR J=A TO A+4:PRINT J,PEEK(J):NEXT
400 A=A+5:GOTO 50

```

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 _____

Allow 8-10 weeks for 1st issue.

80 US

Radio Shack Introduces the Po



New TRSDOS 6.0 Operating System and Advanced Microsoft® BASIC

TRSDOS 6.0

Features include Memory Disk, a Job Control Language that lets you set up a whole series of operations for your Model 4 to perform without supervision, cassette support for the new TRS-80 Model 100 Portable Computer, complete communications program, print spooler that lets you print out a job at the same time you're using your Model 4 for other tasks, forms control, full routing, linking and filtering, and much more. Current TRS-80 owners will appreciate datafile compatibility with Model III or Model I using LDOS.

Microsoft Disk BASIC

Includes many new features like 80x24 screen display, PRINT@ to position text, CHAIN and COMMON commands for large programs, variable names as long as 40 characters for easy documentation, an "endless loop" check, execution of loops as long as a condition is true with WHILE . . . WEND, a sound feature that lets you set tone and duration, and even print line width setting. Model III programs are not compatible, but can be run under TRSDOS 1.3 in Model III mode without alteration.

The All-New TRS-80® Model 4 Personal Desktop Computer

It's Everything You Want
At a Price You'd Never Expect

999⁰⁰
Cat. No.
26-1067

16K Model 4
Cassette-Based System

1699⁰⁰
Cat. No.
26-1068

64K 1-Disk Model 4
Without RS-232C

1999⁰⁰
Cat. No.
26-1069

64K 2-Disk Model 4
With RS-232C

- Fast 4 MHz Clock Speed
- Runs Thousands of Model III TRSDOS®, LDOS™ and CP/M® Plus Applications
- 80-Column by 24-Line Video Display With Reverse Video

TRS-80 Model 4. Compare the price and the features of our amazing new Model 4 to any other computer in its class. You'll find that for power, versatility and convenience it is a true breakthrough. To add the same features to other computers, you'd have to pay a whole lot more.

Speed and Power. With its 64K memory, 4MHz clock speed and 80×24 display Model 4 offers extraordinary power and usefulness for the money. And to speed operations even more, there's "MemDisk," which lets you create a super-fast disk drive in memory. The result? Keystroke-quick responses instead of time-consuming disk access.

Amazing Versatility. The Model 4 can run all Radio Shack Model III programs without change, because we maintained Model III BASIC in ROM. And Model 4 will soon be able to run CP/M-Plus offered by Radio Shack. This means that you can upgrade to a Model 4 without making your present software obsolete, and have at your disposal thousands of CP/M, TRSDOS and LDOS applications.

Advanced Operating System and BASIC. The Model 4's TRSDOS 6.0 and new Microsoft BASIC gives you a surprising array of advanced features far beyond the capability of other desktop computers in this price range (see at left). And there are three programmable function keys to help you take advantage of program-designated operations.

Full Documentation. We include a comprehensive owner's manual, reference card, tutorial manual for BASIC programming and introduction to disk systems to explain just how to get the most out of your Model 4.

Memory Expansion. If you want even more power from your Model 4, add a 64K RAM Kit (26-1122, 149.00*) and expand internal memory to 128K. It's great for MemDisk operations.

Starter System. Our cassette-based 16K Model 4 is ideal for beginners. It includes monitor, keyboard with

- 64K RAM Is Expandable to 128K—Use It As a Super-Fast RAM-Based "Disk Drive"
- Job Control Language With Sound Alerts
- Print Spooler Using Disk or Memory
- New TRSDOS® 6.0 and Microsoft BASIC

function keys, datapad, parallel interface and Model III BASIC. You can upgrade to disk-based Model 4 features, such as 80×24 display, 4MHz speed and MemDisk, by adding the 64K RAM kit and Model 4 Drive 0 with TRSDOS 6.0 (26-1127, \$649.00*).

Upgrade Your Model III. Model III disk system owners can get all the new Model 4 features by adding our upgrade kit (26-1123, \$799.00*).

Available Nationwide. See the new TRS-80 Model 4 at over 6500 Radio Shack stores and participating dealers, including 400 Radio Shack Computer Centers today.

Model 4 Disk System Specifications. **Microprocessor:** Advanced Z-80A 8-bit. **Clock Speed:** 4 MHz. **Memory:** 14K ROM, 64K RAM expandable to 128K (can be selected by bank and used to provide disk drive emulation in RAM). **Keyboard:** 70-key typewriter style with control key, 3 programmable function keys (F1, F2, F3), caps key and 12-key datapad. **Video Display:** 80 characters by 24 lines (Model 4 mode), 64×16 (Model III mode), or double-wide 40 or 32 characters per line. Upper and lower case and reverse video. Memory mapped with high-resolution 12" monitor. Includes 96 text, 64 graphics and 96 "special" characters. **Sound:** Obtainable from BASIC with sound command, includes tone and duration. Toggled "keyclick" filter. **Disk Drives:** One or two built-in double-density 184K, 5¹/₄" drives. **Operating System Compatibility:** TRSDOS 6.0, TRSDOS 1.3, LDOS, CP/M Plus (available soon). **Programming Language:** New Advanced Microsoft BASIC. **Input/Output Interfaces:** Cassette operation at 500, 1500 baud selectable under ROM BASIC. Parallel printer interface. RS-232C serial interface (2-disk only) input/output bus. **Dimensions:** 12¹/₂ × 18⁷/₈ × 21¹/₂". **Power:** Integrated power supply, 105-130VAC, 60 Hz. U.L. listed.

Radio Shack®

The biggest name in little computers®
A DIVISION OF TANDY CORPORATION

Send me a TRS-80 Model 4 brochure today!

Mail To: Radio Shack, Dept. 83-A-190
300 One Tandy Center, Fort Worth, Texas 76102

NAME _____
ADDRESS _____
CITY _____ STATE _____ ZIP _____
PHONE _____

*Installation required (not included). Retail prices may vary at individual stores and dealers. LDOS is a trademark of Logical Systems, Inc. CP/M Plus is a registered trademark of Digital Research, Inc. Microsoft is a registered trademark of Microsoft, Inc.

BASIC bits

Machine identification: PRINT USING and other tips

Model I/III

Thomas L. Quindry, Burke, VA

Parsons Pilcher of McLean, Virginia, comes up with this little gem for Scripsit. I had never really thought about this myself, but it is really logical based on the structure of Scripsit commands.

If you want to print multiple copies of a Scripsit file, use the REPEAT function. Tell how many times you want the command repeated and then hit BREAK and P or P,S for serial printing.

Sometimes, it's nice to know what computer your program is running on. In Table 1 are some locations to PEEK at to see not only whether your program is running on a Model I or III, but also to see whether it is a disk or cassette system and, on the Model I, whether it has only uppercase or upper- and lowercase. You have to use PRINT with all of the commands under the address column except for the POKE command.

After POKEing the video at 15360 with 255 and PEEKing at the value you get, you may want to POKE 15360,32 to replace the resulting graphic character block with a space.

I have to caveat the probable Disk BASIC Start. These pointers, which are used to compute the Level II BASIC Start and Disk BASIC Start addresses, can be changed by programmer control depending on the application. A different address from the normal Level II BASIC Start does not necessarily mean you are in Disk BASIC.

The next little tidbit should be of interest to many of you who use the PRINT USING statement in your BASIC programs. It's not given in any of the Radio Shack manuals, but did you know that you can specify more than one format in your USING string? Then, when you print out more than one variable, the successive variables use the next consecutive format. If only one format specifier is given, it is used for all of your variables.

For instance, run the following program:

```
10 A$="####.##"  
20 A=34.443: B=122.6888: C=1.1  
30 PRINT USING A$;A;B;C
```

Each of the following variables, A, B and C, are formatted to two decimal places. Now, change line 10 to

read:

```
10 A$="###.## ####.### $$$###.##"
```

You will now get the following values printed: 34.44, 122.689 and \$1.10.

In the formatting string, A\$, the space is all you need between each format specifier. Now, even more interesting, what happens if you were PRINTing more than three variables in line 30, but your formatting string only gives three formats? Your BASIC program starts over, using the formats specified, and continues in consecutive order. Variables 1, 4, 7, etc., would use the first format, ###.##; variables 2, 5, 8, etc., would use the second format, ####.###; and variables 3, 6, 9, etc., would use the third format, \$\$\$###.##.

Question: How do you relocate the start of BASIC so that a machine language program can be placed before the program and be protected? — N.T., Falls Church, VA

Answer: This is somewhat akin to how Disk BASIC is loaded in memory before BASIC, which starts just after that in memory. The procedure is rather simple. As an illustra-

tive example, suppose that you wish to start your BASIC programming at 5001H. The preceding byte (5000H) must be a zero. In the BASIC command mode, POKE 20480,0. This poke address is the equivalent of 5000H. Next, you must change the pointer located at 40A4H and 40A5H (16548 and 16549 decimal) to indicate the start of BASIC at 5001H. To do this, you must break down the address into its high and low significant bytes and POKE

them into the above addresses, LSB first and MSB second. In hexadecimal code, the 50 is the most significant byte (MSB) and 01 is the least significant byte (LSB). Since it is still a hexadecimal number, to get the MSB in decimal, multiply $5*16+0*1$ and get 80 decimal. The LSB is $0*1+1*1$, or 1 decimal. So, now we have POKE 16548,1 and POKE 16549,80. The vectors indicating the start of scalar and array variables and the end of array

Table 1

Address	Value	Decision
PEEK (293)	73	Model III
PEEK (293)	Other	Model I
If a Model I		
PEEK (14316)	255	Cassette
PEEK (14316)	1	Cassette
PEEK (14316)	Other	Disk
POKE 15360,255		Preceding next PEEKs
PEEK (15360)	255	Upper- and lowercase
PEEK (15360)	191	Uppercase only
PEEK (16548)	233	With next PEEK
PEEK (16549)	66	Normal Level II BASIC Start
PEEK (16548)	Any	With next PEEK
PEEK (16549)	Other	Probable Disk BASIC Start
If a Model III		
INP (240)	255	Cassette System
INP (240)	Other	Disk System
PEEK (16548)	233	With next PEEK
PEEK (16549)	66	Normal Level II BASIC Start
PEEK (16548)	Any	With next PEEK
PEEK (16549)	Other	Probable Disk BASIC Start

Table 2

LD	HL,5000H	
XOR	A	;A = zero
LD	(HL),A	;load zero byte
INC	HL	;increment HL
LD	(40A4H),HL	;load BASIC pointer
CALL	1B49H	;CALL NEW
LD	BC,1A18H	;return to
JP	19AEH	;ready

What do people who've used the NEW amber or green replacement CRT's say about them?

"...Anyone could easily install this replacement CRT. The instructions are clear, simple (if not over simplified), and complete. At no time during the installation was I confused or lost. It even worked the first time I turned it on.

"I believe the orange (amber) phosphor is a great improvement over the standard monitor. Often I sit at my computer for several hours at a time and I can really tell the difference between the two monitors...

"The (Langley-St.Clair Soft-View) CRT is an excellent product and makes the TRS-80 an even better computer."

*Mark Renne
Review in 80 U.S.*

"The instructions...are in pleasingly plain English, and I was able to install the CRT in about twenty minutes, even though I had never performed such a task before. The difference in the display is most gratifying; it has a much more 'professional' appearance, the contrast is much better, and it is definitely easier to use for sustained periods of time. The last item is particularly important, since my TRS-80 is mostly used for word processing.

"Again, thank you very much for your excellent service in providing me with a product which is everything it was advertised to be, and which makes my computer more useful...I will not hesitate to recommend your fine product and company to other TRS-80 owners."

*J. Kimble Rigney
Columbus, Ohio*

From unsolicited letters of testimonial, reprinted with permission

LSIS's NEW SOFT-VIEW REPLACEMENT CRT

FOR THE FULL STORY, SEE PAGE 3.




Langley-St.Clair



Instrumentation Systems, Inc.

132 West 24th St., NY, NY 10011
1-800-221-7070

Let the
LETTER-WRITER
"WORK" for YOU



CREATE: forms, labels and form letters.
This machine code word processor can even ADD/SUBTRACT bookkeeping columns.
Change, delete, add, insert, move, copy (characters/lines/blocks) of text fast.
SELECT: margins, page length, number of copies, tabs, center lines / page, line spacing and LEGAL PAPER LINE NUMBERING.
MODEL I users get: Model III shift key controlled upper / lower case letters!!
EASIER to USE than other systems. Only 8 keys control 96% of the LW features!!
TRY a LW for 3 MONTHS. If not satisfied return it. We will refund all but \$3.50 to cover postage / handling. IF YOU CAN NOT RETURN IT, DO NOT BUY IT.
C. A. of N. Y. rates his LW purchase as "one of the best buys I have made. *1

TAPE 16K Model I/III systems **\$23.99**
DISK 32K Model I/III systems **\$37.99**


WE PAY: tax / US postage on ALL orders.

SPECIALS

Verbatim MD525 01 disks: 10 for \$25.95
Microsette C10 tape+box: 20 for \$13.95

Astro-Star Enterprises 24 HOUR
5905 Stone Hill Dr. Computer Phone
Rocklin, CA 95677 (916) 624-3709

This is an
**IBM ELECTRONIC 50
PRINTER!**
(lucky thing)



It used to be only
a typewriter

Your IBM Electronic typewriter can also be a printer. And your computer can do word processing copy that looks as if it were printed on the paper instead of sprinkled on.

Any computer with a Centronics printer port can do the job elegantly with an interface from Cybertext—the company that does the microCOMPOSER typesetting systems.

The nice price? Only \$275.00
Installation is child's play. Try it for ten days. Return for a refund if not satisfied.

Check, Visa/Mastercharge or COD. Order by mail or phone.

Cybertext Corporation
Box 860 Arcata, CA 95521
707-822-7079

BASIC bits

variables must now be set. The easiest way from BASIC is to simply use the NEW command. This automatically sets these pointers. CLOAD also does it after loading a program.

If you are writing a machine language program to occupy that area now free before your BASIC program, you can change these addresses with the assembly language mnemonics in Table 2.

The last two instructions return you properly to the BASIC ready command on both the Model I and Model III. With the Model I, you could substitute one instruction, JP 06CCH, for these two, but on the Model III it will reboot you to the CASS? and MEMORY SIZE? questions.

Now! What areas can you start programming? The Model I address area would be from 434CH to two before you start BASIC. In our example, up to 4FFFH. With the Model III, you would be 256 bytes higher to start, or 444CH. This gets you above any area of memory that is destroyed by rebooting. If you know your starting address for initializing the BASIC and other pointers set up by your program, you could just hit <SYSTEM>, then </?????>, and your utility would be run again. If you know how to reset your BASIC pointers lost by the CALL 1B49H, you can even save your BASIC program in memory. More on that in a future column.

That's the clean and simple way. If you weren't concerned with reboots, you could start your machine language program at 42E8H and 43E8H for the Model I and Model III, respectively.

Question: Is there a way to start a BASIC program while in a machine language program? —T.F., Rowland Hts., CA

Answer: There are three ways that come to mind. Two are equivalent and start you at the beginning of the program. One can be used to start you in the middle of a program.

First:
LD HL,1D1EH
PUSH HL
JP 1B5DH
Or, second:
CALL 1B5DH
JP 1D1EH

To run from the middle of a

program:

```
CALL 1B64H
LD HL,XXXXH ;XXXXH is the
address of any
colon or ASCII
zero at the end of a
BASIC line
```

JP 1D1EH

The last method can be sort of neat in that you can run lines that logically can't ever be run. Consider the following:

```
10 GOTO 20 : PRINT"THIS CAN
STILL BE PRINTED!"
20 PRINT"ORDINARILY, ONLY
THIS WOULD BE PRINTED!"
```

If you load HL with the address of the colon (:) in line 10, the statement, PRINT"THIS CAN STILL BE PRINTED!", will execute. You can find this address by doing the following:

```
PRINT PEEK (16548), PEEK
(16549)
```

If you have written the BASIC program exactly as I have, add nine to the value in PEEK (16548) and then, if the SUM is less than 256, use that SUM as the Least Significant Bit (LSB) and PEEK (16549) as the Most Significant Bit (MSB) and the address to use. If the sum is greater than 255, LSB = SUM - 256 and the value of PEEK (16549)-1 will be the MSB.

In BASIC, you can easily POKE the values of the short machine language routine (third method) into memory somewhere and jump to it with the SYSTEM </address ENTER> commands. The numbers to POKE are: 205, 100, 27, 33, LSB, MSB, 195, 30, 29.

The third method could probably be used to create a hybrid program that is mostly machine language. To do certain functions, you could jump back and forth between the machine language program and BASIC statements which could be loaded along with the machine language program.

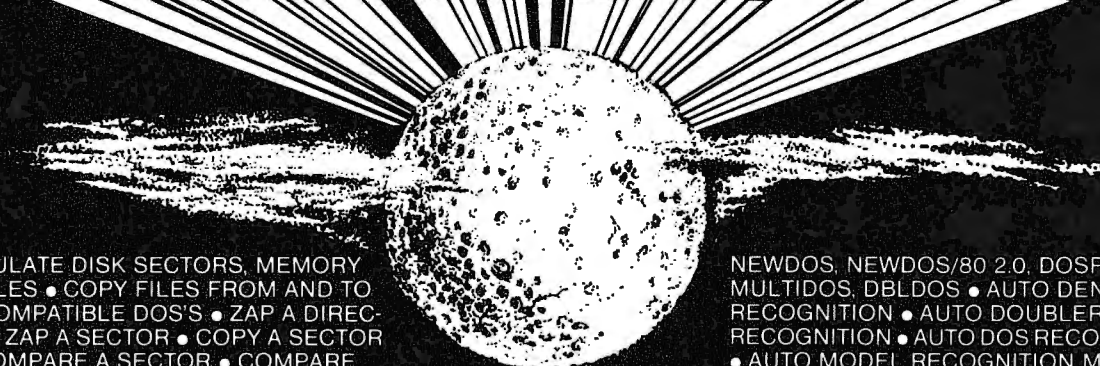
Remember to send your requests for future column topics, questions and tips to me, care of *80-U.S. Journal*, 3838 South Warner Street, Tacoma, WA 98409. Send a self-addressed, stamped envelope and I will try to give you a personal reply if the answer is not too long and involved. Problems of general interest may be included in future BASIC Bits columns.

EVERY FEW YEARS A UNIQUE PROGRAM ARRIVES

...SO PRACTICAL...SO USEFUL IT BECOMES HERALDED BY COMPUTER OWNERS INTERNATIONALLY AS A TRUE CLASSIC...AN INDUSTRY STANDARD...HIGHLY ACCLAIMED BY EVERY MAJOR TRS-80 PUBLICATION. YOU'VE SEEN IT WITH ONLY A HANDFUL OF TRS-80 PROGRAMS...NOW EXPERIENCE A LEGEND WITH THE NEW...

VERSION 3.0

SUPER UTILITY PLUS



MANIPULATE DISK SECTORS, MEMORY AND FILES • COPY FILES FROM AND TO NON-COMPATIBLE DOS'S • ZAP A DIRECTORY • ZAP A SECTOR • COPY A SECTOR AND COMPARE A SECTOR • COMPARE FILES • PURGE A DIRECTORY • DISPLAY DISK MAPS • EXAMINE FILE LOCATIONS • READ AN ALTER DATA ADDRESS MARKS • DOUBLE SIDED DRIVE SUPPORT LDOS, DOSPLUS, AND MULTIDOS • MORE • BOOTS ON MOD I OR MOD III 35, 40, OR 80 TRACKS • SINGLE OR DOUBLE DENSITY • TEST MEMORY • READS ALL CURRENT POPULAR DOS'S: TRDOS, LDOS.



1st PLACE 80-MICRO 1982
UTILITY PROGRAM OF THE YEAR

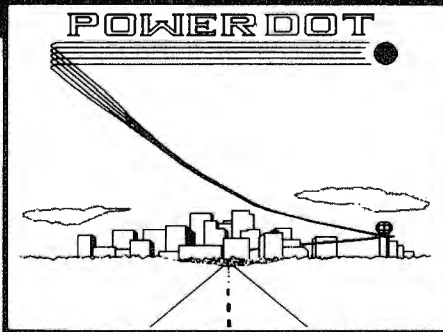
PROTECTED MEDIA
BACK UP COPY INCLUDED

NEWDOS, NEWDOS/80 2.0, DOSPLUS, MULTIDOS, DBLDOS • AUTO DENSITY RECOGNITION • AUTO DOUBLER RECOGNITION • AUTO DOS RECOGNITION • AUTO MODEL RECOGNITION MOD I OR MOD III • REPAIR DAMAGED DIRECTORIES • REPAIR BOOT SECTORS • REPAIR HIT & GAT TABLES • CREATE A SPECIAL OR CUSTOM FORMATTED DISK • REFORMAT WITHOUT ERASE • BUILT IN PRINTER ROUTINES • SOFTWARE BULK ERASE A DISKETTE • PATCHES TRSDOS AT OWNERS OPTION • EASILY CONFIGURED FOR ANY SYSTEM • MORE •

THE PROGRAM W/MANUAL 79.95 • THE TECH MANUAL 14.95 • THE BOOK INSIDE SU+ 19.95

POWERDOT

A GRAPHICS BREAKTHROUGH! Now the ULTIMATE in graphics design and editing, PowerDOT is the state-of-the-art in HI-RES Dot Mappers. Unmatched in quality and features, PowerDOT allows the user to create TRUE HI-RES printouts on the EPSON (Graftrax or Graftrax+ req), or the C.Itoh PROWRITER from Leading Edge without ANY hardware modifications! The program has the ability to create drawings several times larger than the computer screen. You are only limited by disk storage. Your screen is merely a "picture window" to a much larger drawing area. You define the picture size. You select the print mode, hi-res, lo-res, or ultra-res. A very versatile utility and truly ahead of its time. Only \$49.95.



POWERDRAW

A full screen graphics editor, PowerDRAW allows the user to draw directly to the screen utilizing cursor controlled movement. Graphics and text may be combined and saved directly to disk or tape, and recalled at a later time. The "SAVE" formats are CONDENSED TOKENS, EDAS SOURCE, EDTASM SOURCE, BASIC DATA STATEMENTS, BASICS STRINGS, BASIC ARRAYS, and LOAD FILE FORMAT. The files may be run alone or merged into any type of program or application. Animation is also possible when screens are sequenced. Design custom forms, titles, pictures, and graphics for your applications. Received EXCELLENT reviews in INFOWORLD 6/82, 80-US 10/82, and 80-MICRO 10/82. Three printer drivers are included, and the program is JOYSTICK compatible. A GREAT value at only \$39.95.

POWERMAIL

The most powerful, mailing system for the TRS80, Powermail is a highly sophisticated mass mailing system designed to run under all of the popular DOS's currently available for the Mod I or III. The program is written entirely in machine language for maximum operation speed, and occupies only 4K of the available RAM in your computer. There are no slow periods when Powermail is running. New features have been added to the program that others have always lacked. You now have the ability to keep track of mailings using the 24 flags that are incorporated into the Powermail program. The Powermail system will handle a file up to 8 megabytes, or 65,535 names, whichever is smaller. The program will run in as little as 32K and one disk drive, although 48K and 2 drives are desirable. The program will also sort the entire maximum file size and open up to 168 files simultaneously during the process. Only \$99.95.

PROGRAMS
OF
TOMORROW
HERE
TODAY

POWERDRIVER

New printer drivers for the new Radio Shack™ Superscript™. This new generation of custom printer drivers allows you to utilize all of SUPERSCRIPIT'S features with your EPSON, PROWRITER and C.Itoh F-10 STARWRITER printers. You can now utilize all of the printers custom features such as compressed, expanded and proportional print, underlining, boldface, superscripting, and sub-scripting. All drivers can be called from within SUPERSCRIP-SIT at "document open time". Order by printer designation as follows: Only \$29.95 each.

POWERDRIVER E EPSON MX70/80/100
POWERDRIVER P C.Itoh PROWRITER
POWERDRIVER F C.Itoh F-10

POWERSOFT
Products from Breeze/QSD, Inc.

Available from Selected Dealers Everywhere

11500 Stemmons Fwy., Suite 125
Dallas, Texas 75229

To order call toll free 1-800-527-7432
For product information (214) 484-2976

Tandy topics

Ed Juge, Director of Computer Merchandising
1500 One Tandy Center, Fort Worth, TX 76102

I indicated last month that the Model 12, Xenix, ARCNET, PC-4, and Model 100 weren't all we had up our corporate sleeves for '83. I'm sure the Model 4 is being covered in this issue, so I'll try to contain my enthusiasm and keep from producing a second "review".

Your impression will no doubt be "Big deal! They painted the Model III white." Look again! You'll find it's really an all new computer in a Model III case... and more. So, let's see some of what's really there.

In our opinion, a "new model" must offer new and exciting user benefits. At the same time, when you have a winner, you want to keep momentum going, and existing customers happy. So, the Model 4 had to maintain 100 percent compatibility with existing Model III programs.

You could say Model 4 contains an "embedded" Model III (which doesn't support Model 4 features). When in that mode, every Model III program can... should... ought to... uh... might... no... will work! At least that's the objective. So far, we've tested every cataloged Radio Shack program (and some old ones that aren't around any more), and every one runs. No conversions, no fancy footwork. We learned a lesson from the "almost compatibility" between Models III and I. Of course, I'll concede that in this business, guaranteeing is foolhardy. Someone could uncover an exception when the first wave of owners crams 1,000 man-years of testing into a month.

Upgrades

Every time we reduce a price or build a new computer, we're accused of forsaking current owners. Well, 62 80-U.S. Journal

we hope you won't feel that way this time! For about \$800, you Model III owners can keep your disk drives and video (which haven't changed anyway), and your Mercedes Silver case, but change out the other electronics, keyboard, and even the nameplate, to pure Model 4!

The cassette Model 4 operates just like a cassette III. All the neat new features are disk only. The cassette machine, you might say, always operates in Model III mode. But when you add a disk, you'll get all the goodies.

So, how about features, compared to a Model III? Immediately apparent are the white case, new keyboard with CAPS, CTRL, and three programmable function keys. Then there's the 80 x 24 screen, reverse video, sound, compatibility with CP/M (we'll have CP/M Plus available shortly) and LDOS, plus you get TRSDOS 6.0 and a dynamite new BASIC that includes COMMON, CHAIN, SWAP, WHILE... WEND, and lots more. Additionally, the disk machine is now 64K RAM-based, expandable to 128K. (Model III mode is still 48K, and switches in a Model III BASIC ROM for full compatibility.) The 4's clock speed is now doubled to 4Mhz, when using TRSDOS 6.0. The mode (III or 4) is determined by the operating system disk you use.

TRSDOS 6.0 features extreme flexibility and power. There's the ability to create a "memory disk" in any unused RAM to make "disk accesses" lightning-quick. Fill up that memory, with program or system overlays for amazing speed. "Filters" can be used for all I/O devices, including keyboard and

video, allowing you to define characters, strip characters out of text, and configure the output format to match the printer. You can reconfigure your keyboard, should you be an advocate of, say the Dvorak keyboard. In addition to filtering, you can ROUTE user I/O devices (keyboard, video, printer, etc.) to one another, even route paper output to disk if your printer is temporarily out of service. Want to keep a record of screen inputs? You can LINK your video to your disk, and store it all.

If you like IBM's clicking keyboard, fine -- use the keyclick filter. (Ham radio Morse code operators take note: Bet you never thought you'd see a desirable "keyclick"! There's even a Model 100 cassette support utility.

In fact, my hack-programmer, non-engineer impression of the Model 4 is that it's simple to use, yet totally configurable. It could almost be viewed as a "black box" computer in a cabinet with drives, video, and keyboard. For the user, all this horsepower can at once be functional, yet absolutely transparent. No, friends, a repainted Model III it isn't. And you'll be happy to know we've been building them for several months, so they're available today. Drop in for a look, or take one home with you.

I'm finishing this column up on Sunday morning at the breakfast table, on my Model 100. I'll dump it into Scripsit later for formatting, and I fully expect to find it to be too long. I can hear Cam Brown's phone call now... "Ed, this is your editor. We need to cut... ." (We did --Ed.) Tune in next month, the excitement isn't over yet!

Small wonder.



Introducing: The big news in small computer software.

Open your eyes to the computer software company that's been creating wonders for the past seven years.

While our name may be new to some of you, The Small Computer Company is well known to a growing segment of the computer industry.

They know that we're the company who developed Profile® Plus and Profile III Plus filing system software for Radio Shack.

But the really big news is that now, whether you're an end-user, dealer, or microcomputer manufacturer, you can order our small wonders directly from us, to fit your every need. Our software is so unique, it even has its

own name: Smallware™. Smallware is software that combines high quality with customer support in a complete product line.

Now you'll know who to call for Profile enhancements on the Model II or III, filePro™, our CP/M® electronic filing system, custom designs and more. Even if all you need is a little consultation or program modification.

The Small Computer Company is a highly experienced software design firm that creates award-winning Smallware. And we stand behind our work with a commitment to our customers, large and small. See for yourself.

For further information, call (212) 398-9290. To order, ask for Mr. Sayles.



The Small Computer Company, Inc.

230 West 41st Street, Suite 1200, New York, New York 10036



Captain 80

and the magic software machine

Bob Liddil, Contributing editor

The bright New Hampshire sun shone through the third floor window and over the top of Max's Expando box, warming his EPROMS, alerting him to the new day. He never sleeps, at least he never mentioned it before. However, I do, and he takes fiendish delight in awakening me at odd hours of the morning.

This morning though, his attention was diverted from me and directed toward a new program that had arrived in the mail the night

before. The mechanical hands that I'd fashioned for him from some of Professor Megabyte's old blueprints were ideal for handling cassettes and disks. I'd made them so Max could load himself and not be bugging me all the time.

Some people never learn.

I was awake, just barely, after a long night of doing software secret missions for The Chief. In half-asleep fuzziness, I could make out a shape silhouetted against the sunlight that poured through the

window. It had the head of a bull, the body of a man, and a club the size of the leg of a Minotaur!

Yipe!

I had just enough time to dodge as the ghastly beast brought his massive club foursquare down in the middle of my new waterbed. The resulting tidal wave washed me out of the room, down two flights of stairs and into the street. I had very little time to collect my thoughts. The Minotaur burst through the second story window in a shower of glass and landed on two massive,



muscular legs, less than three yards from where I lay, wet, cold, dazed, and as mad as a software pirate at a cryptography convention.

"Max!" I yelled, at the top of my lungs, "Max, do something quick!"

My nosey neighbor shook her head in disbelief at the sight of me in my pink and gray pajamas, sitting in a puddle of water, about to be flailed into secret agent burgers by a mythical beast. She pulled down the shades.

It is just as well she did. Max activated his dimensional download system and de-rezzed me, and the hulk about to pulverize me. I felt that all-too-familiar sinking feeling and when I hit the ground, my worst fears were confirmed. I'd been downloaded into the new Spectral

Associates/Radio Shack
adventure game,
Madness
and the
Minotaur.



And you think you hate getting up in the morning.

Madness and the Minotaur is a new program for the Color Computer, distributed by the Tandy Corporation, produced by Spectral Associates. The text-style format is colorful in its descriptions, lavish in its location choices, and well laid out in the possibilities of movement.

The program I saw was an early Spectral version, appointed with the lackluster packaging that accompanied their first few offerings. Fortunately, more recent programs from these guys have good, four-color packaging so the dealers no longer have to apologize for them.

Anything I would say about the contents of Madness and the Minotaur would tend to spoil the surprise for Color Computerists casting about for a truly great adventure to puzzle the mind and titillate the imagination. Enough to say that this first and greatest of the word-simulations for the CoCo is a good buy, whether as a Spectral product at your independent computer store, or from your local Radio Shack. If you like adventure, you'll love Minotaur.

This place is not unlike Zork. It is the same in dungeons and fantasy, I guess, with roads to follow and paths to take. I've never come out

of any of these downloads with treasure. Maybe this will be a first. It seems pleasant enough, though calm is usually a sign of danger in adventures.

Ambush! The Minotaur leaps out from behind a wall and confronts me. His club is aimed squarely at my head. I tuck and roll to the side, diving into a hole in the ground.

Bad move, hot shot.

I have fallen into one of those gaps between programs that occasionally occur. I plunge straight down through blackness deeper than the grimmest night. I am falling toward a bright light, a light so intense that I close my eyes to avoid it. Yet, it penetrates. I realize, now, that I have fallen out of RAM and have been channeled along a trace line directly into the heart of a 6809 microprocessor. Always before, Max

has been there to help me, or the Professor. But in the CoCo, I am on my own. It's so bright, so dark. I spin, I hit.

I awaken in a cell of purest white. I can see, in the hallways, my guards. I recognize them. They are the grey-hooded specters from a three-dimensional graphics adventure for the Color Computer called The Phantom Slayer. Now I know I'm in trouble.

Phantom Slayer is a rich hybrid that falls between arcade games and adventures. It features the 3-D graphics popularized by Med Systems in Assylum and Labyrinth, but with a twist. Namely, the gruesome behooded guys roaming around the castle ready to do you in with such lightning speed that the game develops an almost impossible challenge.

The player is cast in the role of Phantom Slayer. The Phantoms are the the bad guys and can kill you with a single touch. Armed with a laser pistol, you move through the maze by the use of arrow keys. A Phantom detector alerts you to danger, and if you're fast enough...

Ken Kalish has kept the Med Systems legend alive through this most excellent of games. His use of positional graphics allows the player to feel *inside* the game. The strategy of play is well thought out. There is an overall excitement. While Med Systems can always be trusted to deliver more value than the cover price of a unit of software, it is a pleasure to review something that looks good, works well, and loads right the first time. This one's a winner.

They're coming for me. I am being taken into a great hall, among massive pillars of silicon, to a throne of pure silver. I am flanked on all sides by Phantoms and dare not bolt for fear of touching one.

A voice booms throughout the room and the courtiers are suddenly still. I look up at the throne and see a crowned being, sitting, glowering down at me.

"You shall pay for your crimes, infidel," it snarled.

And in the heart of the fastest and best microprocessor known to personal computing, I knew despair.

The king was Twitch.

Where does **PUT** really **GET** you?

Use these animated programs and
a game to find out

Color Computer with joysticks

Dale Fawcett, Strongsville, OH



Good game animation requires many things but speed is one of the most critical. If everything on the TV screen moves at a snail's pace, the game loses some of its excitement. This philosophy doesn't apply, of course, to games where there is a definite order of turns between players, where each makes a move and then the other decides on his next move before making it. But for a fast-paced "real time" game, the animation speed is most significant.

The idea of animation is very simple. A picture is displayed on the TV screen, then the picture is removed and redisplayed at a new location. This gives the impression of moving from one location to another. The effect can be enhanced by various techniques. For a person walking, two different pictures could be used alternately, one with left foot raised and one with right foot raised. For greater detail, more than two pictures could be used in a series. This not only gives the motion across the screen but the figure seems to be more alive since its parts appear to move also. Most objects only need one picture to be moved to present adequate animation. This article only examines this simple method of moving one picture.

To achieve the best and fastest animation, a program should be written in assembly language. However, an assembly language program is very difficult to write compared to BASIC. One must learn about the architecture of the computer and all of the instructions which manipulate one or two bytes at a time. Then one must purchase an editor/assembler to use for making

The choice is yours...

```
FORMAT,1 = 40,* DATA *,12/27/82.PASSWORD<ENTER>  
BAD PARAMETER(S)
```

or

```
FORMAT<ENTER>
```

Which drive contains the diskette to be formatted ? 1

Name of diskette to be formatted (default "DATA *")?

etc....

Our users think you'll pick MULTIDOS.

MULTIDOS's unique features make it MULTI-compatible, user friendly and easy to use. Other DOS's can make this claim but can they back it up? Some of **MULTIDOS's** features include:

- Automatic density recognition
- Portability between the Model I and Model III
- Two BASIC's including BOSS SuperBasic, the single-step debugger king
- Automatic high-speed clock support to 5.32 Mhz
- Automatic double density hardware recognition
- Intelligent Global Editing of BASIC programs
- Alphabetized directory
- Execute any DOS command from BASIC
- Single keystroke DIRectory
- ZAP utility to modify diskette/file sectors, memory and fix directories
- String packer, program packer, line splitter, lists graphics in BASIC
- Fast <E>xecutable DEBUG
- Super FAST disk I/O!
- Memory tester, Disk drive timer, Spooler
- Menu-driven Versatile File Utility allows you to selectively COPY, EXECUTE, PURGE,

MOVE, KILL files • Menu-driven BACKUP and FORMAT • Memory scanner • Mighty-Multi minidos • Tape to disk transfer utility •

MULTIDOS version 1.6, just. **\$99.95**

Also available from CEC...

EBASIC...extended Basic for the Model I & Model III. Adds graphics, sound, line-labeling, and extended commands to SuperBasic including 24 types of formatted INPUT and multi-key sort of unlimited arrays. **\$49.95**

(Requires MULTIDOS Model I version 1.4 or greater, or MULTIDOS Model III version 1.3 or greater)

Model I orders specify single, double or P density.

VISA & MASTERCARD accepted. Add \$3.00 shipping & handling—foreign orders (excluding Canada) add \$10.00. C.O.D. orders add \$1.50. Personal checks take two weeks to clear. Dealer inquiries welcome. Michigan residents add 4% sales tax.



System Innovators

COSMOPOLITAN ELECTRONICS CORPORATION
5700 PLYMOUTH ROAD
ANN ARBOR, MICHIGAN 48105

Technical line: (313) 668-6660
Toll-free orders only: 800-392-3785

Authorized Dealers

ABC Sales
13349 Michigan Ave
Dearborn, MI 48126
313 581-2896

**Breeze/QSD—
Powersoft**
11500 Stemmons Fwy.
Suite 125
Dallas, TX 75229
214 484-2976
Orders: 800-527-7432

Bytes & Nails
5110 6th Ave
Sioux City, IA 51106
712 274-2348

Computer Shack
1691 Eason
Pontiac, MI 48054
313 673-8700
Orders: 800 392-8881

Hacks Micro, Inc.
P.O. Box 12963
Houston, TX 77217
713 455-3276

Micro-Prog 80
P.O. Box 606
Sunnymead, CA 92388
714 653-9429

**Simutek Computer
Products, Inc.**
4877 East Speedway
Tucson, AZ 85712
602 323-9391
800 528-1149

the assembly language program. An alternative to buying the assembled program is to hand translate the assembly language program to machine code, the actual single-byte codes used by the computer, and use a BASIC program to POKE these codes into memory. Because of these drawbacks, most home computer users stick to BASIC.

There are four techniques which can be used on the Color Computer with Extended BASIC. The first technique is to draw an object using line, draw, circle, paint, or whatever instructions are required for that particular object. Then the object would be erased by repeating the instructions with PRESET to erase the object, followed by redrawing the object in its new location. The second technique uses two alternating display areas. Each area is cleared using PCLS and the object is drawn in its new location. The SCREEN command is issued and all the objects are displayed in their new locations. The third and fourth techniques are to use the GET and PUT commands to erase the object from its old position and place it in a new one. These techniques actually have two rather differing implementations, depending upon the use of the graphics, G, option.

To determine which of these techniques is best, I have written a test program to time them in moving similar objects. The test program compares these four techniques using the computer timer on three cases of different complexity. The first case is a simple line; the second is a stick man made from four lines; the third is a colored box with an inscribed colored circle. Listing 1 presents the test program used for the line test. Listings 2 and 3 present the test program modified for the stick man and colored box.

The test programs all use a PMODE of 3 since that allows the highest graphics resolution with four colors and is the one most games will use. The moving objects progress from the upper left to lower right by incrementing the X and Y positions by one each cycle. Because there are only 128 true X positions out of 256 addressable positions, the object moves horizontally every other cycle but vertically on each cycle. Comments were not put in the code because they affect the running time.

In Listing 1, line 30 draws the initial line and line 40 sets the time to zero to start the timing cycle. Line 50 starts the loop for 150 passes. Line 60 erases the old line and line 70 draws the new line in the next position. When the loop is done, line 90 saves the clock time for display and comparison at the end. For the other animation techniques, a similar process is used. For alternating screens, lines 140 and 160 set up and clear the new screen areas. No specific line erase is needed, only the line drawing in lines 150 and 170.

For the two GET/PUT sequences, array A holds the figure and array B holds the background-only color. Lines 230 and 330 GET the screen data for the arrays which were dimensioned in line 20. The PUT of B in lines 250 and 350 erases the first figure and a PUT of A in lines 260 and 360 displays the figure in its new location. When all four techniques have run, the results are displayed for the total time of each and the ratio to the

smallest time.

Listings 2 and 3 have substituted the stick man and block figures for the simple line. In Listing 2, lines 30 and 35 draw the man as a vertical head and body, left leg, right leg and arms. This pattern is repeated for the erase and redraw functions. The GET and PUT commands are made just large enough to hold the man. In Listing 3, line 30 draws the red box filled in and a circle which is painted blue. The only difference in Listing 3 is that line 60 only needs to draw the box, not the circle, to erase the figure.

The three programs were run with a few strange results. The test timing results are in Figure 1 for all three test cases. It can be seen that the performance varies dramatically. For a simple line, the erase and draw is slightly faster than the GET/PUT methods; and all three are four to five times faster than the alternating screen display. For the stick man, the results change. The plain GET/PUT is fastest; actually three times faster than the erase and redraw, five times faster than the alternating screens; and 20 percent faster than the full graphics GET/PUT. For the block test, the GET/PUT is fastest again by even a larger margin.

Figure 1 — Test Case Timings

Line Test	Time	Ratio
Erase-redraw	236	1
Alternate screens	1164	4.93
GET/PUT	245	1.04
GET/PUT with G.....	250	1.06
Man Test		
Erase-redraw	922	3.38
Alternate screens	1500	5.49
GET/PUT	273	1
GET/PUT with G.....	342	1.25
Block Test		
Erase-redraw	1536	4.48
Alternate screens	2348	6.85
GET/PUT	343	1
GET/PUT with G.....	545	1.59

If you run the test programs you will notice that the plain GET/PUT moves the objects in an erratic manner compared to the other techniques. The object seems to move straight down for three cycles and then takes a large jump to the right while the other techniques move along a diagonal path, taking into consideration the fact that the horizontal position changes only on every other cycle. In the line test, the full graphics GET/PUT starts as a red line but after entering the cycle in lines 340 to 370, a green line is left in the original position and a blue line is moved down the screen. Then, on the block test, a small green dot is left at the corner of the first block. The alternating screens technique does not flicker like the other techniques. This is because the actual object drawing occurs on the page which is not being displayed. There are obvious benefits for this technique if speed is not a requirement.

Why does the GET/PUT work so well? To answer that, I tried to look at the data stored in array A during the stick man test. But, when I printed the first element, A(0,0), the computer responded with BS for a bad subscript. I thought that was a lot of nonsense since A is clearly dimensioned (4,7) in line 20. I tried to print A to see what happened. It worked. That meant that the BASIC program changed the dimensions of our array for its own devious purpose.

To find out what is really in this array, I put the following changes into the man test program:

```
212 FOR I=0 TO 4: FOR J=0 TO 7: A(I,J)=0: NEXT J:
NEXT I
214 P=VARPTR(A(0,0)): Q=P+36 : S$=" "
216 FOR I=P TO Q STEP 4
217 ?HEX$(PEEK(I)) S$ HEX$(PEEK(I+1)) S$ HEX$(
PEEK(I+2)) S$ HEX$(PEEK(I+3))
218 NEXT
219 IF INKEY$=" " THEN 219
232 FOR I=P TO Q STEP 4
233 ?HEX$(PEEK(I)) S$ HEX$(PEEK(I+1)) S$ HEX$(
PEEK(I+2)) S$ HEX$(PEEK(I+3))
234 NEXT
235 END
```

The result of these two printouts is in Figure 2 along with the result after a full graphics GET. This figure shows the memory location of the array before and after performing the GET commands.

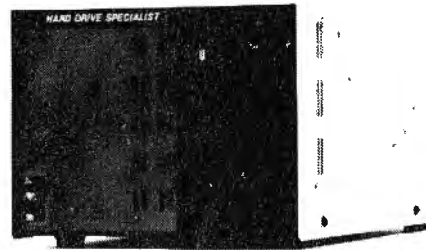
The first line of Figure 2 indicates that there are three arrays. (These were dimensioned in line 20.) The second line gives the name of the first array "A" since a 41 is the ASCII code for A. The third and fourth lines of the before GET indicate that the array has two dimensions with eight and five elements. Then the array contents which we set to zero are listed.

After performing the GET, the name "A" is followed by six zeroes instead of the array description so BASIC no longer considers it an array. That is why we got a bad subscript error when trying to print its contents. It then appears that the array name and description have been copied into lines 5 to 7. Lines 8 and 9 hold the data that the GET has placed in the array. There is a big difference between the data saved by the plain and graphics GET/PUTs.

For the plain GET/PUT, there is one byte stored for each of the eight lines in the GET array. This matches the data used in the page for the screen display. Every two-bit pair represents one pixel with a zero being the background color (white) and a three being the red. If you were to draw a picture of each byte using a blank for background white and an "r" for the red color, it would show a picture of the stick man that we drew. The full graphics GET uses only five bytes to store all of the data. Each bit in the full graphics GET represents one bit from the screen area saved. In this case, because only five X elements were requested in the GET, only five bits were saved for each row. There were two bits saved for each of the first two pixels, but only the most significant bit of the last pixel. Now that we see what is saved by the GET, we can understand how the PUT works.

The reason the PUT works so fast is that the screen image is simply transferred from array memory locations to the screen display page by the machine

MODEL III HARD DRIVE \$1295.



5 MEGABYTES \$1295.
10 MEGABYTES \$1495.
15 MEGABYTES \$1695.

OPTIONS

MODEL I ADD \$50.
IBM, APPLE, MAX80 ADD \$100.
MODEL II, 16, 12 ADD \$300.

all systems require a D.O.S.

**All hard drive systems are fully
assembled and tested.**

120 DAY WARRANTY

**Use our watts line for a quote
on any computer product.**

VISA, MASTERCARD, WIRE TRANSFER, CASHIERS CHECK,
MONEY ORDERS , PERSONAL CHECKS REQUIRE 3 WEEKS

COMPUKIT

1-800-231-6671 *order line*

1-713-480-6000 *technical line*

16206D HICKORY KNOLL
HOUSTON, TEXAS 77059

language code in the BASIC ROM. There is no conversion of the data from BASIC floating point format other than the initial array limits. In the plain GET/PUT, the data is handled one byte at a time. In the full graphics GET/PUT, the data is handled one bit at a time. The full graphics allows a more precise operation but takes more time because individual bits are manipulated rather than full bytes.

In the plain GET/PUT test, the object seems to move in a step pattern instead of a straight, diagonal path. If the movement in the horizontal (X) direction were in multiples of eight, there would be no visible difference in the movement between the two GET/PUTs. But for our test, the X direction increments by one. The plain GET/PUT places the object in the same respective byte location on each successive horizontal row until the X value exceeds a multiple of eight. Then the object is moved right by one byte or four pixels.

BASIC determines (from the starting X and Y coordinates) which byte to fill and then starts storing the data from the array. If the X coordinate is zero to seven, the first horizontal byte is used; for eight to fifteen, the second byte, etc. For the full graphics GET/PUT, each bit is placed exactly where the PUT command specifies and it follows the diagonal path down the screen.

Since the full graphics GET/PUT saves one bit for each element specified, it saved five bits for each horizontal row for the stick man, one bit for the line, and eleven bits for the block. When it performed the PUT, five bits, one bit, and eleven bits were placed back in memory for display. In the case of the simple line, the one-bit put a color code of two instead of three on the screen, resulting in a blue line instead of a red one. Since only one bit was used to erase the first image, the second bit remained, producing the green line which has a color code of one. This same effect left the dot in the moving block-test.

Some care must be exercised in using the GET/PUT commands. The following cautions apply to PMODE 3 and similar ones to the other modes. When using the full graphics GET/PUT, there should always be an even number of horizontal pixels. The number of pixels is computed by subtracting the two X values and adding one. For the man test, $14-10+1=5$ is an odd number. Close examination reveals that the right-most arm and leg are actually blue instead of red like the rest of the man. When using the plain GET/PUT, remember that movements of less than eight in the horizontal direction will not really move the object horizontally every time. Careful design can allow the slightly greater speed of this mode if the objects are always at horizontal positions that are multiples of eight.

Following is a hint on how to save memory when using the GET/PUT. The dimension statement reserves five bytes for each element in the array but the GET uses only a small amount of that. To find how much is needed, one must first determine the number of elements in the array. This size is calculated by multiplying the rows by the columns. For a GET of an array such as the man test at (10,10)-(14,17), we get $14-10+1=5$ and $17-10+1=8$. Then we multiply 5×8 for 40 actual elements. For the full graphics GET/PUT, each element

takes one bit, so by dividing by eight, we get five bytes needed. We divide this by five to get the number of array elements which, in this case, is one. Because BASIC is also going to move and save the original data, we add two more elements to be sure we do not overflow the area. A total of three elements in a two-dimensional array can be achieved by a dimension statement of A(0,2). This saves $(40-3) \times 5 = 185$ bytes of memory.

Similarly, for the plain GET/PUT, we can calculate the amount needed. There are always at least eight elements saved for the horizontal dimension, so we round up our horizontal value to a multiple of eight. In this case, five rounds to eight. Then we multiply 8×8 for 64 elements; dividing by eight bits/byte gives us eight; dividing by five bytes/element and rounding up gives us two; adding two extras gives us four so we can dimension A(0,3) to get four elements.

Let's use GET/PUT in a game and see how well it does. The game is Zombies (Listing 4), which is similar to games implemented on other computers under various names. It requires at least 16K RAM and Extended BASIC. The idea is to avoid being caught by a zombie while getting them to fall into the pits.

All arrays are dimensioned in line 10. MX and MY are the zombie coordinates and ZM is a flag word for each zombie to tell if he has fallen into a pit yet. The GET/PUT arrays are P for the player, M for the zombies, PT for the pits and C for clear. Line 20 assures that random numbers are generated. Lines 25 to 47 give the playing directions. Lines 50 to 95 create the four arrays. Line 100 sets a random number of pits for each game. Lines 110 and 115 put a border of pits to restrict play to a fixed screen size. Lines 120 to 127 allow selection of the zombies' movement. Lines 130 to 140 place the pits on the playing area.

The computations in line 135 assure that the pits are located on multiples of six pixels in the X direction and eight in the Y direction. The same equations are used to place the zombies and the player. The zombies and the player also move in increments of six and eight pixels. This computation is critical to correct functioning of the game. Lines 150 to 170 initialize the ZM flag and place the zombies so that they do not start in a pit. Line 145 and lines 180 to 182 select the option for the fast or slow speed.

Some set-up functions are performed while the player is reading the directions. Line 190 sets the computer into a faster processing mode if high speed was selected. Line 200 sets the player position. Line 205 tests the number of jumps left and goes to 410 if all of them are used up. Lines 210 and 215 assure that the player isn't put into a pit or on a zombie and places him on the screen. Line 220 is a delay to allow the player to see the playing area and decide which way to move. Line 225 checks for the key-in. If a key was hit, the player is erased and control goes to 200 for a new jump position. Lines 230 and 255 read the joystick command and lines 260 to 275 move the player. If he moves to an occupied space, control goes to 395 and the game is over. Lines 280 through 340 move the zombies toward the player. Lines 345 to 445 provide the game termination. Line 420 restores the computer speed to normal so that the cassette will function properly after the game.

We're serious about fun!

Software for II/12/16

RIOCHET* This is a fast action game that really tests your reflexes. The object of the game is to get the ball into the goal by deflecting it off the walls before your time is up.

TRSDOS* \$25.00

STARTRK™ A large version with lots of graphics of the classic computer game. Takes about two hours to complete. * Designates trademark of the PARAMOUNT PICTURES CORPORATION.

TRSDOS* \$25.00

STARSHIP/II* (By Richard H. Young, Editor of two/sixteen magazine.) This is a save-the-galaxy type game based on the venerable STARTRK games which have been played on large mainframes for more than ten years. It is specifically designed for the RS Model II/12/16 and features a constant console display with no scrolling. It is a "strategic" game (Opposed to "tactical" games which involve reflex action but little thought). However STARSHIP requires quick thinking, as all events are timed. STARSHIP requires quick thinking as all events are timed. STARSHIP comes with a disk instruction file which can be listed on your printer. It can also be listed on the screen at the beginning of a session. In addition STARSHIP contains a few undocumented "surprises" at advanced levels of play (there are ten levels of difficulty).

TRSDOS* \$39.00

GAME PACK I* (by ADD, Inc.) Four games that use enhanced graphics not available from Radio Shack. INTERCEPT and REVERSEM for two players. LUNAR LANDAR and SINK THE BATTLESHIP for one player.

920 0001 TRSDOS* \$50.00

GAME PACK II* (by ADD, Inc.) Consists of the four games in GAME PACK I* and two additional games. They are EAT 'EM where you control a snake moving around the screen trying to catch its prey and REVERSEM II where it's you against the computer.

TRSDOS* \$70.00

GAMES/TRS-80* (by Lance Micklus, Inc.) Contains the following six games:

THE MEAN CHECKERS MACHINE* — The game is played just like regulation Checkers. To win you must eliminate all of your opponent's pieces from the checkerboard.

STARFLIGHT* — This is a Star Trek type game. The object is to collect data about Omega VI an unexplored area of the galaxy, to locate and destroy the 20 Klingon Invaders.

CONCENTRATION* — The computer will make up the game board. You will try to find the matching prizes. After each correct guess, you will have a chance to guess at the secret number. Guess right and you win all of your prizes.

TREASURE HUNT* — The Lumas caves, located in Lamasville, Vermont, are said to have 20 hidden treasures in them. Few explore the caves because it is said that pirates and dragons live there, and there are deep pits which many have fallen into and died. You a smart and brave human and I, an alert computer will explore the caves and try to find the treasure.

BANKO* — The Game is similar to Black Jack. You draw numbers stopping before the total point value exceeds 11. If you go over 11, then your hand will be zeroed. If you draw 5 times without going over 11, then you'll receive bonus points equal to the value of your hand at the time you end your turn.

DOG STAR ADVENTURE* — The evil General Doom and his Roc he Soldiers are ready to launch an attack against the forces of freedom lead by Princess Leya. While traveling to her secret command center, Doom attacks Princess Leya's ship. She is now being held prisoner on one of General Doom's battle cruis-

ers. We must try to save the Princess and the treasury of her freedom fighting force.

TRSDOS* \$75.00

ADVENTURES 1-12* (by Scott Adams of Adventure International) By definition, an adventure is a dangerous or risky undertaking, a novel exciting or otherwise remarkable event or experience. On your personal computer, Adventure is that and much more. In beginning any Adventure, you will find yourself in a specific location: a forest, on board a small spaceship outside a fun house, in the briefing room of a nuclear plant, in a desert, etc. The top portion of your video display will tell you where you are and what you can see; the bottom section of the display is devoted to inputting commands to your robot computer and receiving messages that may arise as the result of your orders.

The object of a game is to amass treasure for points or accomplish some other goal such as preventing the destruction of the automated nuclear plant in Mission Impossible. Successfully completing a game, however, is far easier to state than achieve. In many cases you will find a treasure but be unable to take it until you are carrying the right combination of objects you find in the various locations.

#1 ADVENTURELAND* — Wander through an enchanted realm and try to recover the 13 lost treasures.

#2 PIRATE ADVENTURE* — The lost treasures of Long John Silver lie hidden somewhere — will you be able to recover them?

#3 MISSION IMPOSSIBLE ADVENTURE* — In this exciting Adventure, time is of the essence as you race the clock to complete your mission in time — or else the world's first automated nuclear reactor is doomed!

#4 VOODOO CASTLE* — The Count has fallen victim to a fiendish curse with you his only possible hope. Will you pull off a rescue, or is he down for the Count for good?

#5 THE COUNT* — It begins when you awake in a large brass bed in a castle somewhere in Transylvania. Who are you, what are you doing here and WHY did the postman deliver a bottle of blood?

#6 STRANGE ODYSSEY* — At the galaxy's rim, there are rewards aplenty to be harvested from a long dead alien civilization. Will you be able to recover them and return home?

#7 MYSTERY FUN HOUSE* — This adventure puts you into a mystery fun house and challenges you to find your way through and back out of it.

#8 PYRAMID OF DOOM* — This is an Adventure that will transport you into a maddening dangerous land of crumbling ruins and trackless desert wastes — into the very PYRAMID OF DOOM!

#9 GHOST TOWN* — You must explore a once thriving mining town in search of the 13 hidden treasures.

#10 SAVAGE ISLAND PART I* — A small island in a remote island in a remote ocean holds an awesome secret — will you be able to discover it? This is the beginning of a two-part Adventure, the second half concluding as SAVAGE ISLAND PART 2. Adventure #11.

#11 SAVAGE ISLAND PART II* — The suspense begun with Adventure #10 now comes to an explosive conclusion with SAVAGE ISLAND PART III.

#12 GOLDEN VOYAGE* — The King lies near death in the royal palace. You have only three days to bring back the elixir needed to rejuvenate him.

TRSDOS* \$129.95

CP/M* \$129.95

INTERACTIVE FICTION* (by Robert LaFore) The ability to actually interact with characters and situations — to take part in the story sets INTERACTIVE FICTION™ apart from the competition. The action begins when you react to a given situation or event, and then key in your response. You aren't limited to a couple of words — using full sentences is encouraged. You can enter the same situation time and again and by using a different response, experience new twists of the adventure.

LOCAL CALL FOR DEATH* — Meet Detective Sir Colin Drolley, as well as a host of other intriguing rogues, as you set about the task of solving the perfect crime.

TWO HEADS OF THE COIN* — You are one of the world's greatest detectives, Mr. Conway's wife, Georgina, has vanished and now it's up to you to gather the clues and solve the mystery behind her disappearance.

HIS MAJESTY'S SHIP "IMPETUOUS" — You are at the helm of HMS Impetuous. As captain, your decisions could bring either fame or fortune or utter disaster to you and your crew.

SIX MICRO STORIES* is an excellent introduction to the world of Interactive Fiction. They are six short but complete stories which involve you, the reader, in a variety of fascinating scenarios. They include THE FATAL ADMISSION, EMPTY WORLD and four other stories.

TRSDOS* \$49.95

TYCOON* (By Barry Ansin) This is a monopoly like game that you can play against the computer.

TRSDOS* \$55.00

BIORHYTHMS* This will print on 8 1/2 by 11 paper or display biorhythms charts of an individual starting any date and for as many days as desired. Includes date subroutines which are used for testings, converting and calculating time between dates.

TRSDOS* \$25.00

AMORTIZE* Financial amortization calculator. Prints high quality amortization schedule on 8 1/2 x 11 paper. Calculates one of the missing values: principal payment, periods, interest rate, or balloon payment. Prints totals for each year. Includes full screen subroutines.

TRSDOS* \$25.00

LISTER* Lists BASIC source programs on 8 1/2 x 11 paper with provisions for separate multi-statement lines. Prints program name, date, time and first comment on each page.

TRSDOS* \$25.00

DELUXE PERSONAL FINANCE* (by Lance Micklus, Inc.) This is a sophisticated and unique financial analysis package which is expense oriented. It can be readily customized to suit your personal financial situation.

TRSDOS* \$79.95

FOREIGN LANGUAGE VOCABULARY BUILDERS* (by ADD, Inc.) Consists of over 1000 words and phrases that are tested in flash card fashion. You may add over 1000 additional words of your own choosing. Languages currently available are, FRENCH, SPANISH and GERMAN.

TRSDOS* (One language per disk) \$45.00

HANDICAPPING* For classifying and ranking thoroughbred flats based on scientific methods. Use of this program will give you the edge and build skills resulting in rewards at the track.

TRSDOS* \$100.00

Additional Programs Available
Call or Write For Free Brochure
and More Information.



Rizzo Data Systems Corp.

577 Burlington Rd., P.O. Box 458 • Bridgeton, NJ 08302-0356 • 609/451-7979



Shipping Charge \$3.00 Per Order — C.O.D.'s - Add \$2.00 • 30 Day Money Back Guarantee On All Programs

Visa, MasterCard, Personal Checks or Money Orders Accepted

The GET/PUT can make a BASIC game fast enough to be challenging because the data is handled similarly to an assembly language program. You must be cautious, however, because of the unusual restrictions due to the data format and handling by BASIC.

Figure 2 — Array Format

Before GET	After GET	After GET with G
3 0 39 1B	3 0 39 1B	3 0 39 1B
0 41 0 0	0 41 0 0	0 41 0 0
D1 2 0 8	0 0 0 0	0 0 0 0
0 5 0 0	42 0 0 0	42 0 0 0
0 0 0 0	0 0 0 41	0 0 0 41
0 0 0 0	0 0 D1 2	0 0 D1 2
0 0 0 0	0 8 0 5	0 8 0 0
0 0 0 0	C C 3F C	31 BE 63 1B
0 0 0 0	C C 33 33	39 0 0 0
0 0 0 0	0 0 0 0	0 0 0 0

Listing 1 — Moving Line Test

```

1 REM MOVING LINE TEST
2 REM ERASE AND REDRAW
5 PCLEAR8:PMODE3,1:COLOR4,1:PCLS:SCREEN1
,1
20 DIMA(1,4),T(3),B(1,4)
30 LINE(10,10)-(10,13),PSET
40 TIMER=0
50 FOR I=10 TO 160
60 LINE(I,I)-(I,I+3),PRESET
70 LINE(I+1,I+1)-(I+1,I+4),PSET
80 NEXT I
90 T(0)=TIMER
100 PCLS
101 REM ALTERNATE PAGES
110 TIMER=0
130 FOR I=10 TO 160 STEP 2
140 PMODE3,5:PCLS
150 LINE(I,I)-(I,I+3),PSET:SCREEN1,1
160 PMODE3,1:PCLS
170 LINE(I+1,I+1)-(I+1,I+4),PSET:SCREEN1
,1
180 NEXT I
190 T(1)=TIMER
200 PCLS:PMODE3,1:SCREEN1,1
201 REM GET AND PUT
210 TIMER=0
220 LINE(10,10)-(10,13),PSET
230 GET(10,10)-(10,13),A:GET(30,30)-(30,
33),B
240 FOR I=10 TO 160
250 PUT(I,I)-(I,I+3),B
260 PUT(I+1,I+1)-(I+1,I+4),A
270 NEXT I
290 T(2)=TIMER
72 80-U.S. Journal

```

```

300 PCLS:PMODE3,1:SCREEN1,1
301 REM GET AND PUT WITH G OPTION
310 TIMER=0
320 LINE(10,10)-(10,13),PSET
330 GET(10,10)-(10,13),A,G:GET(30,30)-(3
0,33),B,G
340 FOR I=10 TO 160
350 PUT(I,I)-(I,I+3),B,PSET
360 PUT(I+1,I+1)-(I+1,I+4),A,PSET
370 NEXT I
390 T(3)=TIMER
400 H=20000:FOR I=0 TO 3
410 IF T(I)<H THEN H=T(I)
420 NEXT I
430 FOR I=0 TO 3
440 PRINT T(I),T(I)/H
450 NEXT
500 END

```

Listing 2 — Moving Man Test

```

1 REM MOVING MAN TEST
2 REM ERASE AND REDRAW
5 PCLEAR8:PMODE3,1:COLOR4,1:PCLS:SCREEN1
,1
20 DIM A(4,7),T(3),B(4,7)
30 LINE(12,10)-(12,14),PSET:LINE-(10,17)
,PSET
35 LINE(12,14)-(14,17),PSET:LINE(10,12)-
(14,12),PSET
40 TIMER=0
50 FOR I=10 TO 160
60 LINE(I+2,I)-(I+2,I+4),PRESET:LINE-(I,
I+7),PSET
65 LINE(I+2,I+4)-(I+4,I+7),PRESET:LINE(I
,I+2)-(I+4,I+2),PRESET
70 LINE(I+3,I+1)-(I+3,I+5),PSET:LINE-(I+
1,I+8),PSET
75 LINE(I+3,I+5)-(I+5,I+8),PSET:LINE(I+1
,I+3)-(I+5,I+3),PSET
80 NEXT I
90 T(0)=TIMER
100 PCLS
101 REM ALTERNATE PAGES
110 TIMER=0
130 FOR I=10 TO 160 STEP 2
140 PMODE3,5:PCLS
150 LINE(I+2,I)-(I+2,I+4),PSET:LINE-(I,I
+7),PSET
155 LINE(I+2,I+4)-(I+4,I+7),PSET:LINE(I,
I+2)-(I+4,I+2),PSET:SCREEN1,1
160 PMODE3,1:PCLS
170 LINE(I+3,I+1)-(I+3,I+5),PSET:LINE-(I
+1,I+8),PSET
175 LINE(I+3,I+5)-(I+5,I+8),PSET:LINE(I+
1,I+3)-(I+5,I+3),PSET:SCREEN1,1

```

```

180 NEXT I
190 T(1)=TIMER
200 PCLS:PMODE3,1:SCREEN1,1
201 REM GET AND PUT
210 TIMER=0
220 LINE(12,10)-(12,14),PSET:LINE-(10,17
),PSET
225 LINE(12,14)-(14,17),PSET:LINE(10,12)
-(14,12),PSET
230 GET(10,10)-(14,17),A:GET(30,30)-(34,
37),B
240 FOR I=10 TO 160
250 PUT(I,I)-(I+4,I+7),B
260 PUT(I+1,I+1)-(I+5,I+8),A
270 NEXT I
290 T(2)=TIMER
300 PCLS:PMODE3,1:SCREEN1,1
301 REM GET AND PUT WITH G OPTION
310 TIMR=0
320 LINE(12,10)-(12,14),PSET:LINE-(10,17
),PSET
325 LINE(12,14)-(14,17),PSET:LINE(10,12)
-(14,12),PSET
330 GET(10,10)-(14,17),A,G:GET(30,30)-(3
4,37),B,G
340 FOR I=10 TO 160
350 PUT(I,I)-(I+4,I+7),B,PSET
360 PUT(I+1,I+1)-(I+5,I+8),A,PSET
370 NEXT I
390 T(3)=TIMER
400 H=20000:FOR I=0 TO 3
410 IF T(I)<H THEN H=T(I)
420 NEXT I
430 FOR I=0 TO 3
440 PRINT T(I),T(I)/H
450 NEXT
500 END

```

Listing 3 — Moving Block Test

```

1 REM MOVING BLOCK TEST
2 REM ERASE AND REDRAW
5 PCLEAR8:PMODE3,1:COLOR4,1:PCLS:SCREEN1
,1
20 DIM A(10,10),B(10,10),T(3)
30 LINE(10,10)-(20,20),PSET,BF:CIRCLE(15
,15),4,3:PAINT(15,15),3,3
40 TIMER=0
50 FOR I=10 TO 160
60 LINE(I,I)-(I+10,I+10),PRESET,BF
70 LINE(I+1,I+1)-(I+11,I+11),PSET,BF:CIR
CLE(I+6,I+6),4,3:PAINT(I+6,I+6),3,3
80 NEXT I
90 T(0)=TIMER
100 PCLS
101 REM ALTERNATE PAGES

```

```

110 TIMER=0
130 FOR I=10 TO 160 STEP 2
140 PMODE3,5:PCLS
150 LINE(I,I)-(I+10,I+10),PSET,BF:CIRCLE
(I+5,I+5),4,3
155 PAINT(I+5,I+5),3,3:SCREEN1,1
160 PMODE3,1:PCLS
170 LINE(I+1,I+1)-(I+11,I+11),PSET,BF:CI
RCLE(I+5,I+5),4,3
175 PAINT(I+5,I+5),3,3:SCREEN1,1
180 NEXT I
190 T(1)=TIMER
200 PCLS:PMODE3,1:SCREEN1,1
201 REM GET AND PUT
210 TIMER=0
220 LINE(10,10)-(20,20),PSET,BF:CIRCLE(1
5,15),4,3:PAINT(15,15),3,3
230 GET(10,10)-(20,20),A:GET(30,30)-(40,
40),B
240 FOR I=10 TO 160
250 PUT(I,I)-(I+10,I+10),B
260 PUT(I+1,I+1)-(I+11,I+11),A
270 NEXT I
290 T(2)=TIMER
300 PCLS:PMODE3,1:SCREEN1,1
301 REM GET AND PUT WITH G OPTION
310 TIMER=0
320 LINE(10,10)-(20,20),PSET,BF:CIRCLE(1
5,15),4,3:PAINT(15,15),3,3
330 GET(10,10)-(20,20),A,G:GET(30,30)-(4
0,40),B,G
340 FOR I=10 TO 160
350 PUT(I,I)-(I+10,I+10),B,PSET
360 PUT(I+1,I+1)-(I+11,I+11),A,PSET
370 NEXT I
390 T(3)=TIMER
400 H=20000:FOR I=0 TO 3
410 IF T(I)<H THEN H=T(I)
420 NEXT I
430 FOR I=0 TO 3
440 PRINT T(I),T(I)/H
450 NEXT
500 END

```

Listing 4 — Zombie Game

```

1 REM ZOMBIES
2 REM COPYRIGHT 1982
3 REM BY
4 REM DALE H. FAWCETT
5 PCLEAR4
10 DIMX(14),MY(14),P(4,7),M(4,7),PT(4,7
),C(4,7),ZM(14)
15 L=6
20 Z=RND(TIMER):SCREEN1,1
25 CLS:PRINT"ZOMBIES":PRINT"COPYWRITE BY
DALE H. FAWCETT"
30 PRINT"THESE ARE 15 RED ZOMBIES TRYING

```


IJG DEALERS HAVE TRS-

Computer Books and Software for the TRS-80s, are at your IJG Dealer Today.

Books

TRS-80 Disk & Other Mysteries.

The "How To" book of data recovery by H. C. Pennington. 128 pages, \$22.50

Microsoft BASIC Decoded & Other Mysteries.

The complete guide to Level II operating systems & BASIC by James Favour. 312 pages, \$29.95

BASIC Faster & Better & Other Mysteries.

Microsoft BASIC programming tricks & techniques by Lewis Rosenfelder. Software available on disk. Radio Shack Cat. No. 62-1002. 290 pages, \$29.95

The Custom TRS-80 & Other Mysteries.

A guide to customizing TRS-80 hardware and software by Dennis Bathory Kitz. Schematics and listings. 336 pages, \$29.95



TRSDOS 2.3 Decoded & Other Mysteries.

The TRSDOS operating system explained by James Favour. Disassembly of code with commentary. 300 pages, \$29.95

BASIC Disk I/O Faster & Better & Other Mysteries.

Programming techniques and helpful subroutines, by Lewis Rosenfelder, for BASIC programs which store or retrieve data from disk. (Available in June) \$29.95



How To Do It On The TRS-80.

The applications guide to the TRS-80 Models I, II, III & Color Computer by William Barden, Jr. 300 pages, \$29.95 (Available in Spring '83)

Machine Language Disk I/O & Other Mysteries.

The guide to machine language disk software for TRS-80 Models I & III by Michael Wagner. 288 pages, \$29.95

Electric Pencil Operators Manual.

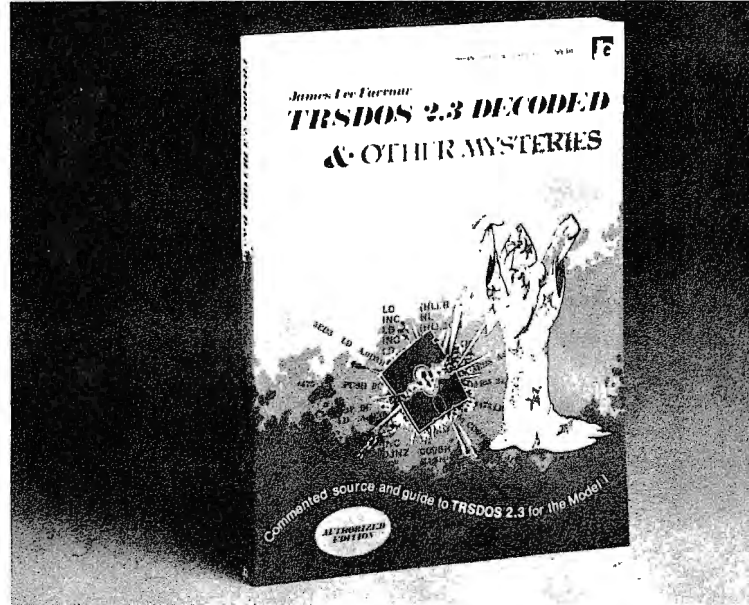
By Michael Shrayner and H. C. Pennington. 123 pages, 24.95

The TRS-80 Beginners Guide To Games & Graphics.

Simple programs teach basic concepts of graphics and game design, by Tom Dempsey. (Available in July) \$24.95

The Captain 80 Book of BASIC Adventures.

Eighteen program listings plus Adventure program generator, by Bob Liddil. 252 pages, \$19.95



NEW BOOK!

Software

Electric Pencil 2.0z Word Processing System.

The easy to learn, easy to use word processing system by Michael Shrayner. Includes operators manual. Disk \$89.95, Cassette or Stringy Floppy \$79.95



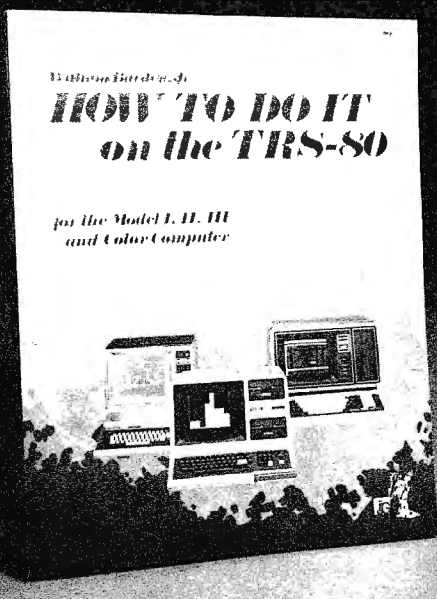
BLUE Pencil — 50,000 Word Expandable Dictionary. Companion to the Electric Pencil 2.0z word processing system. Disk \$89.95



RED Pencil — Automatic Spelling Correction. For use with the Electric Pencil 2.0z word processing system. Must be accompanied by Blue Pencil to operate. Disk \$89.95

BFBDEM — BASIC Faster & Better Library disk by Lewis Rosenfelder. 32 demonstration programs, BASIC overlays, video handlers, sorts and more for the Model I & III. Radio Shack Cat. No. 260-2021. Disk only \$19.95

80 BOOKS & SOFTWARE.



NEW BOOK!

BFBLIB — BASIC Faster & Better Demonstration disk by Lewis Rosenfelder. 121 functions, subroutines and user routines for the Model I & III. Disk Only 19.95

Utilities

TRANSLATE Convert any character to any character or string. Create your own shorthand. Print special characters. Disk \$49.95

DISKMAP Produces two different reports; a listing of disk space allocation by granule, and a listing of all granules allocated to each data file. Disk \$29.95

Games

CYBERCHESS Chess Improvement System. Not a game, but a powerful and effective method for improving one's skill in chess. Choose from 55 amateur or 55 professional disk packets with 4 different games on each. System Disk \$29.95 (Includes four games). Each amateur or professional disk \$19.95 each.

FLAG RACE Race your car through a maze and try to reach all the flags before being caught and killed by drone cars. Can you do it?

For Models I & III. Disk \$24.95

SPACE ROBBERS Inter-galactic thieves are after your supplies and you must stop them before they take it all. For Models I & III. Disk \$24.95

INTERCEPTOR The aliens are attacking you in wave after wave, can you survive and get back to the mother ship to refuel? For Models I & III. Disk \$24.95

ALIENS Invaders attempt to land and you must stop them. But watch out, you're dead if they land on you. For Models I & III. Disk \$24.95



FUNSOFT Games distributes through IJG for Models I & III.

BABLE TERROR Bables are roaming the maze like complex everywhere but you can only see a few yards ahead, can the Bables be cleared out before they clear out you? Disk \$24.95, Cassette \$19.95

MAD MINES Mad Mines are being placed into the space around your planet. As their mad pace speeds up, the situation becomes more difficult. Can they all be destroyed? Disk \$24.95, Cassette \$19.95

APPLE PANIC Crazed apples chase you over many ladder connected brick levels. Your only hope is to dig holes in the floor and beat them down when they get stuck. Disk \$24.95, Cassette \$19.95

THE BLACK HOLE Your mission is to seek-out and destroy the Dorfian leader. But, can you survive the perils of the Black Hole? Disk \$24.95, Cassette \$19.95

TIME RUNNER Newly discovered land is yours for the taking. All you have to do is take it . . . before the defender droids catch you that is. Disk \$24.95, Cassette \$19.95

IJG products are available at computer stores, B. Dalton Booksellers, Radio Shack Computer stores, and independent dealers around the world.

If IJG products are not available from your local dealer, order direct from IJG. Include \$4.00 for shipping and handling per item. Foreign residents add \$11.00 plus purchase price per item. U.S. funds only please.

IJG, Inc.
1953 West 11th Street
Upland, California 91786
Phone: 714/946-5805

If it's from  IT'S JUST GREAT!

```

TO CAPTURE YOU"
35 PRINT"YOU MUST AVOID THEM AND GET THE
M TO FALL INTO THE GREEN PITS"
40 PRINT"USE YOUR JOYSTICK TO MOVE"
45 PRINT"PUSH ANY KEY TO JUMP IF YOU ARE
SURROUNDED"
47 PRINT"BUT YOU CAN ONLY JUMP 5 TIMES"
50 PMODE3,1:COLOR3,1:PCLS1
55 LINE(128,91)-(128,95),PSET:LINE-(126,
98),PSET
60 LINE(128,95)-(130,98),PSET:LINE(126,9
3)-(130,93),PSET
65 GET(126,91)-(131,98),P,G
70 COLOR4,1
75 LINE(160,91)-(160,95),PSET:LINE-(158,
98),PSET
80 LINE(160,95)-(162,98),PSET:LINE(158,9
3)-(162,93),PSET
85 GET(158,91)-(163,98),M,G
90 COLOR2,1:LINE(100,91)-(105,98),PSET,B
F:GET(100,91)-(105,98),PT,G
95 GET(100,46)-(104,52),C,G
100 PN=RND(13)+2
105 PCLS
110 LINE(0,0)-(5,191),PSET,BF:LINE(0,0)-
(255,7),PSET,BF
115 LINE(0,184)-(255,191),PSET,BF:LINE(2
50,0)-(255,191),PSET,BF
120 PRINT"CHOOSE ZOMBIE MOVEMENT"
122 PRINT"1 MOVE ONLY ONE DIRECTION":PRI
NT"2 MOVE DIAGONALLY"
125 DM$=INKEY$:IF DM$="" THEN 125
127 IF DM$="1"OR DM$="2" THEN 130 ELSE 1
25
130 FOR I=0 TO PN
135 PX=6*INT((RND(222)+12)/6):PY=8*INT((
RND(166)+16)/8)
140 PUT(PX,PY)-(PX+5,PY+7),PT,PSET:NEXTI
145 PRINT"SELECT SPEED 1=HIGH 0=LOW"
150 FOR I=0 TO 14:ZM(I)=1
155 MX(I)=6*INT((RND(222)+12)/6):MY(I)=8
*INT((RND(166)+16)/8)
160 IF PPOINT(MX(I),MY(I)+2)<>5 THEN 155
165 PUT(MX(I),MY(I))-(MX(I)+5,MY(I)+7),M
,PSET
170 NEXT
175 Z=14
180 SP$=INKEY$:IF SP$="" THEN 180
182 IF SP$="0" OR SP$="1" THEN 185 ELSE
180
185 CLS
190 IF SP$="1" THEN POKE 65495,0
195 SCREEN1,1
200 X=6*INT((RND(222)+12)/6):Y=8*INT((RN
D(166)+16)/8)
205 L=L-1:IF L<0 THEN 410
210 IF PPOINT(X,Y+2)<>5 THEN 200

```

```

215 PUT(X,Y)-(X+5,Y+7),P,PSET
220 FOR I=1 TO 1000:NEXT
225 IF INKEY$="" THEN 230 ELSE PUT(X,Y)-
(X+5,Y+8),C,PSET:GOTO200
230 XV=0:V=JOYSTK(0)
235 IF V<5 THEN XV=-6
240 IF V>58 THEN XV=6
245 YV=0:V=JOYSTK(1)
250 IF V<5 THEN YV=-8
255 IF V>58 THEN YV=8
260 PUT(X,Y)-(X+4,Y+7),C,PSET
265 X=X+XV:Y=Y+YV
270 IF PPOINT(X,Y+2)<>5 THEN 395
275 PUT(X,Y)-(X+5,Y+7),P,PSET
280 FOR I=0 TO 14:IFZM(I)=0 THEN 340
285 PUT(MX(I),MY(I))-(MX(I)+5,MY(I)+7),C
,PSET
290 IF(DM$="1"AND MY(I)<>Y) THEN ON RND(
2) GOTO 295,305
295 IF MX(I)<X THEN MX(I)=MX(I)+6:IFDM$=
"1" THEN 315
300 IF MX(I)>X THEN MX(I)=MX(I)-6:IF DM$
="1" THEN 315
305 IF MY(I)<Y THEN MY(I)=MY(I)+8
310 IF MY(I)>Y THEN MY(I)=MY(I)-8
315 IF PPOINT(MX(I),MY(I)+2)<>5 THEN 330
320 PUT(MX(I),MY(I))-(MX(I)+5,MY(I)+7),M
,PSET
325 GOTO 340
330 IF PPOINT(MX(I),MY(I)+2)=7 THEN 365
335 IF PPOINT(MX(I),MY(I)+2)=6 THEN ZM(I
)=0:Z=Z-1:SOUND20,1
340 NEXT I
345 IF Z<0 THEN 355
350 GOTO 225
355 PRINT"YOU WIN"
360 GOTO 420
365 FOR Q=1 TO 20:SOUND150,1
370 PUT(X,Y)-(X+5,Y+7),M,PSET
375 PUT(X,Y)-(X+5,Y+7),P,PSET
380 NEXT Q
385 PRINT"YOU WERE CAUGHT"
390 GOTO 420
395 IF PPOINT(X,Y+2)<>6 THEN 365
400 PRINT"YOU CLUMSY OAF":PRINT"YOU HAVE
FALLEN INTO A PIT"
405 GOTO 420
410 PRINT"YOUR LAST JUMP PUT YOU IN A PI
T":PRINT"LOOK BEFORE YOU LEAP"
415 GOTO 420
420 POKE 65494,0
425 PRINT"DO YOU WANT TO PLAY AGAIN (Y/N
)"
430 A$=INKEY$
435 A$=INKEY$:IF A$="" THEN 435
440 IF A$<>"Y" THEN END
445 RESTORE:GOTO 5

```




13 TIMES FASTER THAN dBASE II™

If you bought your computer to save time, then you need SUPER, the most powerful database system you can use. Power is a combination of speed, ease of use and versatility. SUPER has them all.

FAST - To demonstrate SUPER's speed, ISA retained a professional dBASE programmer to benchmark SUPER vs. the acknowledged leader. A simple mailing list application was chosen to minimize dBASE programming cost. The results:

Task	SUPER Time	dBASE II Time
Set up/Program	5:20	12:18:00
Input 100 records	50:29	1:27:50
Sort & Print Labels	6:41	4:18
Totals	1:02:30 hrs.	13:50:08 hrs.

Notice that SUPER was faster at every task where *your time* is involved—and saving your time is probably the whole reason you bought a computer.

EASY TO USE - SUPER won because of its ease of use. Since it is menu-driven, office personnel can easily learn to use SUPER to set up their own applications, speeding and simplifying dozens of tasks without the need of programmer support.

VERSATILE - SUPER, unlike other business programs, doesn't dictate how to run your business. With SUPER the computer does what *you* want, when *you* want, the way *you* want it. **SUPER may be the only business program you'll ever need.** It can handle customer files, payables, receivables, depreciation, appointments, cost accounting, time charges, commissions, inventory, manufacturing control, and even matrix accounting systems!

SUPER PERFORMANCE AT A SUPER PRICE -

That SUPER beats the \$700 dBASE program may surprise you, but in terms of price vs. performance SUPER has no competitors. Among its features are: production input, data compression, multiple databases on line, transaction posting, file reformatting, stored arithmetic files, flexible report formats, hierarchical sort and multi-disk files for up to 131, 068 records. It can select by ranges, sub-strings, and field comparisons. It interfaces to word processors such as WordStar™, SuperSCRIPTSIT™, Model II/16 SCRIPTSIT™, and NEWSRIPT™. In fact SUPER has so many features that

it takes a six-page product description to cover them all. Write or call and we'll send you one.

SUPER is available for TRS-80™ Models I & III under NEWDOS™, LDOS™, and DOSPLUS; for TRS-80 Models II, III and 16 under TRSDOS™; and CP/M™ systems.

Prices: TRS-80 and Osborne versions \$250.00
Other CP/M versions \$295.00
Manual (Price applicable to purchase) \$ 25.00

NOW AVAILABLE FOR IBM-PC \$250.00

MasterCard and VISA accepted.

OTHER SOFTWARE

- **ManageMint™:** A PERT/CPM project management system compatible with SUPER. It includes scheduling, resource and financial management modules.
- **Sales Planning and Data Extraction System:** Improves hit rates while cutting costs.
- **Small, economical program packages** for accounting, business and office applications as well as utilities.

Write for Catalogue



Institute For Scientific Analysis, Inc.

SOFTWARE FOR HARD USE™

Dept. U-1 Institute for Scientific Analysis, Inc.
P.O. Box 7186 Wilmington, DE 19803 (215) 358-3735
Orders only: (800) 441-7680, ext. 500

CDC, 13715 Vanowen St., Van Nuys, CA 91405 (213) 873-6621
Outside of California: (800) 692-5235

Trade mark owners: dBASEII - Ashton-Tate. SCRIPTSIT, SuperSCRIPTSIT, TRSDOS, and TRS-80 - Tandy Corp. NEWDOS/80 - Apparat, Inc. WordStar - MicroPro Intl. Corp. NEWSRIPT - PROSOFT. LDOS - Logical Systems, Inc. CP/M - Digital Research.

Exploring VisiCalc

Looking at @ LOOKUP

Models I/II/III

Timothy K. Bowman, Spokane, WA

This month, let's take a look at another very powerful VisiCalc function. Model I VisiCalc users should become especially familiar with the @LOOKUP function because of its logic-testing ability. But that's jumping the gun. Let's first review the basic requirements

for the use of the @LOOKUP function.

The @LOOKUP function looks up a value in a table and, based upon what is contained in that table, brings back a result. Three arguments are required to use the function. For example, study the

@LOOKUP function found in position E5 of Figure 1 (@LOOKUP (D5,A14..F14). The value at D5 is compared to a range of values found in the cells from A14 to F14. When the program finds a value that exceeds the value at D5, or when it reaches the end of the table, it takes

Figure 1		A	B	C	Column D	E	F	G
	1				"Sample Co	"mpany		
	2				"	Invoi	"ce	
	3							
	4		"Descripti	"on	"Quantity	" Price	"Extension	
R	5		"Wigit 1		100	/F\$@LOOKUP	/F\$+D5*E5	
O						(D5,A14...		
W						F14		
	6		"Wigit 2		99	/F\$@LOOKUP	/F\$+D6*E6	
						(D6,A14...		
						F14		
	7		"Wigit 3		1	/F\$@LOOKUP	/F\$+D7*E7	
						(D7,A14...		
						F14		
	8			"Subtotal			@SUM(F5...	
							F7	
	9				"Tax		/F\$@LOOKUP	
							(F8,B17...	
							C17)*F8	
	10			"Total			/F\$@SUM(F8	
							...F9	
							"	=====
	11							
	12							
	13	"Table 1						
	14	1	5	25	50	100	200	
	15	2.98	2.5	2.4	2.3	2	1.95	
	16							
	17	"Table 2						
	18		200	300				
	19		.05	.07				

the value found immediately below and to the left of that higher value in the table.

In our example in Figure 1, wigit 1 has a quantity of 100. Based upon that quantity, the price per unit should be \$2.00. The @LOOKUP function scans the table for the quantity which exceeds 100; which is 200. It then takes the entry in E15 as the price for a quantity of 100, which is \$2.00 each. Similarly, wigit 2 has a quantity of 99 and its price is \$2.30; wigit 3 has a quantity of 1 with a price of \$2.98. Type in the sample invoice in Figure 1 and experiment with various quantities to test the pricing.

You'll note the format of the listing is different from my previous articles. It was produced with a program called the VC Formula Printer which is available from The Alternate Source, 704 N. Pennsylvania Ave., Lansing, MI 48906, (517) 482-8270. (\$39.95, Models I/III--Ed.) I think you'll find future listings in "Exploring VisiCalc" much easier to read.

You might also note that the sample invoice contains two @LOOKUP tables. The second table is a possible tax table that compares the invoice total to a table. If the invoice total exceeds \$200, the tax rate goes up to seven percent; otherwise the rate is five percent. In practice, you can have as many @LOOKUP tables in your program as you wish. For our simple invoice we could have created separate @LOOKUP tables for each of the wigit types in order to have separate pricing structures. All you need to do is provide the search value and the location of the table.

Other Considerations

While the table in the above example was constructed in rows from left to right, it could just as easily have been constructed in vertical columns. That is, as long as the values resulting from the search (\$2.98 to \$1.95) were located in the column found immediately to the right of the search column. You'll have to develop your own style for which direction is best in your applications. I do recommend that the tables be constructed on the left side of the screen for ease of use, faster operation, and memory

conservation. Technically, the tables are forward references, however, the values do not change, so that should not present a problem.

Here are three other hints for the successful use of @LOOKUP. First, if there is a possibility that your program will calculate a zero answer that will be used later in a division calculation, use @LOOKUP to convert that result to one. This will help eliminate getting error messages during the recalculation of your spreadsheet.

The credit for this goes to a reader in Texas. In order to conserve memory and simplify table construction, add, subtract, multiply, or divide the search value by a constant or some other number. For example, using our invoice problem, assume that we have another product that has the same prices but that they vary on quantities of 5, 25, 125, 250, 500, and 1000. Simply divide the search value by five and search the LOOKUP table starting at E14. This will correctly price the items for different search quantity values and also save considerable memory.

Lastly, this one is for Model I and II users. You can create an approximation of the enhanced version of VisiCalc's @TRUE function. Construct an @LOOKUP table that will test whether a number in position A2 is positive or not. If the number is positive, have the program insert a one before the word TRUE in position A3 and a zero before the word FALSE in position A4. If the number is negative, opposite values should be inserted. For a hint, see the solutions to the February Puzzler which were in the April, 1983 issue of *80-U.S. Journal*. With this simple truth table your program can now test logic conditions. You could even split the screen so that the true/false output is in a different screen. If you want a listing of a solution to this problem, have a favorite @LOOKUP application, or questions concerning VisiCalc, write to me in care of *80-U.S. Journal*. Please enclose a stamped, self-addressed envelope if you desire a reply.

The VisiCalc program and the name VisiCalc are registered trademarks of VisiCorp.

What's After Basic?

If you ever wished that you had a better programming language, PASCAL 80 may be the language you dream about. It is a compiled language, faster, more accurate and easier to modify than Basic. Yet it is so easy to use that you can forget the hassles and diskette spinning of other compiled languages, including other versions of Pascal.

Now you can create your own command files that execute from DOS without having to load a language into the computer first, but do it with far less work than machine language. You can sell your compiled programs without any royalty payments!

Although designed for teaching and ideal for that purpose, PASCAL 80 also allows serious applications with a full fourteen digits of accuracy, even on log and trig functions!

PASCAL 80 allows you to create files on the TRS-80® Model I, Model III, LNW-80, PMC-80, or LOBO MAX-80 that will run on any of the other machines under TRS-DOS®, LDOS, NewDOS, NewDOS 80, DBL-DOS or DOS Plus.



PASCAL 80 is used in dozens of High Schools, Colleges, and Technical Schools, and has been favorably reviewed in *Byte*, *Creative Computing*, and other magazines.

You get all of this at a bargain price of only \$99 plus \$2 shipping. If you call and order by MasterCard or VISA, we will even credit you \$1 for the phone call. Call or send your check today!

NEW CLASSICS SOFTWARE



239 Fox Hill Road
Denville, NJ 07834
(201) 625-8838



TRS-80® and TRS-DOS are trademarks of Radio Shack, LNW-80 of LNW Research, PMC-80 of Personal Micro Computers, LOBO, LDOS, and MAX-80 of Lobo Systems, DOS-Plus of Micro Systems Software, NewDOS and NewDOS 80 of Apparat, and DBL-DOS of Percom. PASCAL 80 is a trademark of New Classics Software.

NEW!! POINTER VARIABLES!

Com 80

How do the modems do it and a downloading tip

Donald L. Stoner, Mercer Island, WA

As mentioned in a previous column, the RS-232 circuitry in your computer serializes the parallel eight-bit words and feeds the data to the modem. Through the process called "modulation", the modem converts the ones and zeros into specific tones that can be sent through the telephone network.

Fortunately, the tones used by either an acoustic or direct-connect modem are standardized so that the two types of modems can "talk" to each other. The resting state of the serial line (when no data is being sent) represents a constant "one." This steady state, or constant "one," from the computer is represented by a tone frequency of 1270 cycles per second (or Hertz, which is abbreviated as Hz.).

Radio amateurs often refer to this as the marking state. A bit is usually called a pulse. Thus, in ham radio circles, a one is called a mark pulse.

The start bit is always a zero and generates a tone of 1070 Hz., as does any zero data bit. Hams refer to this as the space pulse. These two frequencies are called the low-band tone pair. The tones toggle back and forth between these two frequencies, in step with the data stream of 1's and 0's from the computer. Radio amateurs use a mark, or one, frequency of 2125 Hz. and a space, or zero, frequency of 2295 Hz. Thus, the frequency shift amounts to 170 Hz. Whether one is talking about the telephone or ham radio communications, the scheme just described is called frequency shift keying (FSK).

It is usually necessary for computers to communicate in both directions. Unlike ham communications, it is also very desirable that they be able to do so simultaneously, just the way humans beings talk on

the telephone.

Obviously, two computers cannot use the same tones at the same time. No matter how smart your TRS-80 is, it cannot tell its own 1's and 0's from the other computer's 1's and 0's if the same frequencies are used.

The problem is solved on the telephone network by using another pair of tones for a second channel. The second, or back channel, uses 2225 Hz. for ones and 2025 Hz. for zeros. These tones are called the high-band tone pair. The shift between ones and zeros amounts to exactly 200 Hz. A typical communications link between two computers would look like Figure 1.

Full Duplex

The arrangement shown in Figure 1 allows both computers to send and receive at the same time. This is desirable if you want to interrupt or change what the other computer is doing, without waiting for it to finish its current task.

This system also allows echos to be returned to you. Echos? Who needs echos? Let's say you (computer A) send the word "hello" to the other computer (computer B). It recognizes the changing one and zero tones as a series of letters that comprise the word "hello". This word is displayed on the screen of computer B. At the same time, the remote computer (B) converts the 1's and 0's back into tones on the high-band tone pair. These tones are sent back, or echoed, to you. Your modem converts these tones back to 1's and 0's and displays the word "hello" on your screen.

The round trip, from A to B and back to A, occurs almost instantaneously. The actual time

depends on the length of the telephone line, but typically is in the order of 50 milliseconds. The "echo" character seems to appear on your screen as soon as you press the key. The important point is this: what you see is what the other computer received. If you do not see the letter representing the key you pressed, the transmission is said to be garbled. It indicates a defective telephone circuit or equipment problems. This scheme is called full duplex and provides an excellent means of visual error detection.

Half Duplex

Instead of a computer, let's say your end of the link was a mechanical printer and keyboard, such as a Teletype™ machine. Many universities and colleges still use these terminals so students can communicate with a central time-sharing computer (a computer with many simultaneous users). When you type the word "hello", your modem sends out the tones representing the word, but the Teletype machine also prints the word on paper. If the word were also echoed back to you (full duplex), the word would be printed on the paper a second time. Actually, the echoes are returned before you can type the next letter. Thus, you would see something like "hheelllloo" on the printout. Any data you send would show as a series of double letters. Systems that avoid this problem do not return echoes and are called half duplex.

Answer/Originate Modes

One of the most confusing terms (and one of the hardest to explain) is answer and originate and what "originate only" means. Let's say

you (computer A) and another (computer B) are both talking to a time-sharing or host system such as CompuServe or The Source. The communications link would look like the diagram in Figure 2.

This is a common type of communications link. Depending on the number of ports (input channels), literally dozens of computers can "talk" to the host computer at the same time. Computers A and B are both operating in the originate mode. This means nothing more than they are sending to the host computer (and the host is receiving) on the low-band tone pair. Conversely, the host is sending (computers A and B are receiving) the high-band tone pair. The terms originate and answer have absolutely nothing to do with who originates the call or who answers it!

Now, let's say computer A dials up computer B, rather than the host computer. Figure 3 shows the way the communications line between A and B would be established. As you can see, A is sending the low-band tone pair to B, but B wants to receive the high-band tone pair. By the same token, B is sending the low-band tone pair to A, but A wants to receive the high-band tone pair. It's like inserting a round peg in a square hole and vice versa. It won't work.

Obviously, something has to give! The solution is relatively simple. Either A or B flips a switch on the modem to a position labeled Answer. This exchanges the sending tone pair with the frequencies normally used for the receiving tone pair (and vice versa). Thus the high-band tone pair is transmitted and the low-band tone pair is received. Figure 4 shows this revised communications link.

Communications can now be established. Whichever computer flipped the switch to reverse the tone pairs (in Figure 4 it was B) is now said to be in answer mode. It's as simple as that.

Originate Only

Some modems, in an effort to reduce cost, do not provide the answer mode. This does not cause any problems if the modem is always connected to a system that is set up to receive the originate mode.

By convention, data bases, such as CompuServe and The Source, are almost universally set up in the answer mode to communicate with originate modems. The same is true if an originate-only modem is "talking" to another computer that can switch between originate and answer modes. The only time problems will arise with an originate-only modem is in trying to communicate with another originate-only modem.

Software

For your TRS-80 to spring to life on the telephone network, it will require suitable software. There are two different types. Terminal software allows you to be the originating computer and to contact data bases or other computers. There are two variations of terminal software, called "smart" and "dumb".

The dumb terminal program is exactly that. It allows you to communicate by means of the keyboard and that is about all. There are minor variations, of course. Some will allow you to turn your printer on and off to capture incoming information on paper. Others are dumber than dumb and do not even provide this level of sophistication.

Smart terminal programs will permit you to send cassette or disk files. They will also allow you to capture incoming data (in the computer memory) and later save it on disk to cassette media. This is called uploading and downloading, respectively. There are numerous smart terminal programs, with varying levels of sophistication and price tags to match.

A Hint on Downloading

That's enough of the "heavy stuff" for this issue. Let's talk about a problem that has plagued everyone who has ever tried to download a program. You examine the menu and there it is . . . the neatest TRS-80 program you've ever seen . . . and for free. You fire up your smart terminal program, begin the download, save the program to disk, and they try to load it. The disk whirs a few revolutions and then that infamous phrase DIRECT STATEMENT IN FILE appears on your screen. What

do you do then? Try another download, right? Wrong!

When this happens to you, log off the BBS and dig out your copy of Scripsit. (*Any word processing program will work --Ed.*) Load the downloaded program into your TRS-80 just the same as if it were a Scripsit file. By Jove, there it is, almost the same as if you had typed it in. Start the reconstruction by editing out any garbage. The first character of the file should be the initial digit of the lowest linenumber. There should be no carriage return or linefeeds ahead of this line. These will show up on your screen as a block or arrow, depending on your model's upper/lowercase conversion and version of Scripsit.

Next, examine the program, line by line. There should be no lines of data without linenumbers. There should be no carriage returns other than at the end of each program line. If it is a packed program with lots of stuff in one line and no spaces, don't worry if there is a big gap after the linenumber. This is caused by the screen wrap-around in Scripsit. The line instructions will function correctly.

Finally, look at the end of the program. There should be nothing following the carriage return after the last line of the program. Edit out "READY", "OK", "Do you want to download another program?", or anything else that appears after the last line of the program.

Resave the Scripsit file under the A, or ASCII, format. Exit Scripsit and try loading the program. Chances are it will now load and list. You may still see a direct statement error, but this time it may stop before the end of the program. If this happens, note the line number. Reload the program into Scripsit and carefully examine the data in the line you noted. You will probably find an embedded carriage return or some other problem.

Once you are able to load the program without error, it will run even though it was saved in ASCII. Make sure there are no bugs and that the program functions properly. Save it as you normally would. It does not have to be saved in ASCII once the editing and cleanup is complete.

Call or Write
Your Nearest
Snappware
Distributor

MICRO-80
284 Goodwood Road
Clarence Park
Adelaide South Australia
Ph-(08) 2117224

DIGI-TEK SYSTEMS
65 Thornridge Circle
Kitchener Ontario N2M-4V9
Ph-(519) 742-8205

STRAWFLOWER ELECTRONICS
50 North Cabrillo
Half Moon Bay
California 94019
Ph-(415) 726-9128

COMPUTER MAGIC
115 Wiltshire Avenue
Louisville, Kentucky 40207
Ph-(502) 893-9334

E-C DATA
Tornevangsvej 88
P.O.B. 116
DK-3460
Birkerød, Denmark
Ph +45/2/81/ 81 91

SYSTEM SOFT
49, Dunvegan Drive
Rise Park
Nottingham, England
NG5 5Dx
Ph-(0602) 275559

CUSTOM COMPUTING
104 Bushwick Rd.
Poughkeepsie, NY 12603
Ph-(914)-471-9318

AEROCOMP
Redbird Airport
Hanger 8
Dallas, Texas 75232
Ph-(214) 339-5104

NOTICE

Snappware Goes On Trial! You Be The Judge!

Snappware knows your programming time is valuable. That's why we are offering a trial package that will cut your programming time up to 75%!

This unprecedented offer allows you to judge for yourself the value of our software using *your* hardware at *your* convenience. Our five best selling products: EXTENDED BASIC, EXTENDED BUILT IN FUNCTIONS, COLLEGE EDUCATED GARBAGE COLLECTOR, AUTOMAP and AUTOFILE, are all available to you on a trial basis for only \$50.00 for the Model II and \$35.00 for the Model III. We're convinced that after you see how well our software helps you perform programming tasks, you will purchase them like thousands of others have.

Our trial package consists of a master diskette which may be used to create one working copy. Your purchase price for the trial package will be credited toward the purchase of any software Snappware sells.

If for any reason you are not satisfied, just return the trial diskette and working copy and we will refund your money, no questions asked. With an unconditional guarantee like this, you can't lose.

Call our toll free number 800-543-4628 to put us on trial. We're sure your verdict will be: Snappware saves you time and money.

MODEL II Trial Package \$50.00
MODEL III Trial Package \$35.00

SNAPPWARE
SNAPPWARE
SNAPPWARE
SNAPPWARE
SNAPPWARE

Time saving power
at your fingertips.

CALL TOLL FREE:

1-800-543-4628

OHIO RESIDENTS CALL
COLLECT: (513) 891-4496

3719 Mantell
Cinti., Ohio 45236



DEALER
INQUIRIES
WELCOME

contact

POWERSOFT

11500 Stemmons Expressway
Suite 125
Dallas, Texas
75229

CALL:

214-484-2976

Texas residents

**CALL
TOLL
FREE**

800-527-7432

"I BOUGHT IT"

"My biggest loss
of programming
time using
Snappware's
COLLEGE EDUCATED
GARBAGE COLLECTOR
is spent inserting
my diskette."

SCOTT ADAMS - PRES. OF ADVENTURE INTL.



The Snappware College Educated Garbage Collector (SNAPP-VI) is an intelligent processing function which greatly improves performance of typical BASIC applications. And here's why.

Microsoft uses a 'variable length string' in the BASIC interpreter. Each time the string is assigned a new value, it is relocated in a string pool. Periodically the string pool must be reorganized and condensed into a single contiguous area. Performing this string space reclamation is time consuming and inefficient because this approach evaluates and collects each string individually. The time required is roughly proportional to the square of the number of active strings in the resident program. During reclamation the system seems to 'lock-up' and does not respond to the operator until the process is completed.

This time consuming approach requires a better solution. Snappware has developed a solution which takes advantage of the auxiliary memory available. SNAPP-VI requires only four bytes per active string as a work area. When free storage space is available, our system temporarily borrows, uses and returns the space to the free storage pool when completed. If storage is not available, our system will temporarily transfer out to disk enough of the BASIC program to make room for our work area and return the 'paged out' information to its correct location when completed.

Benchmarked times show, in some situations, SNAPP-VI performs one hundred times as fast as the Microsoft approach.

If you consider your programming time to be worth money, call us and let us show you how to get more of it.

MODEL II \$100.00
MODEL III \$ 75.00

*TRSDOS™ Tandy Corporation

SNAPPWARE
SNAPPWARE
SNAPPWARE
SNAPPWARE
SNAPPWARE

**Time saving power
at your fingertips.**

CALL TOLL FREE:

1-800-543-4628

OHIO RESIDENTS CALL
COLLECT: (513) 891-4496

3719 Mantell
Cinti., Ohio 45236



**PEL-TEK Announces
EXTRAORDINARY VALUES for
the TRS-80 MOD I/III**

Pel-Tek's Word Machine Version 2.0

A full featured line oriented word processor in machine language . . . now better than ever with these features:

- Block graphics (for printers that support it)
- Embedded printer controls • Help screen
- Lower case support for unmodified Mod I's
- Variable margins, line length, page length, line spacing
- Access to D.O.S. with warm start re-entry
- Scroll up/down text • Save/load disk files
- Insert/delete characters/lines • String search
- Printer independent • Simplified commands
- Twenty-four page typeset manual with command summary sheet (Manual FREE with S.A.S.E.)

Easy to learn, easier to use, now compatible with Aspen's RANDOM HOUSE proof reader.
for Mod I/III 32/48K Disk **\$20.00**

The Random House Proof Reader

From Aspen Software, the best price/performance spelling checker on the market today. Based on the Random House Dictionary:

- Shows spelling errors in context
- Allows immediate correction
- Add or delete words from dictionary
- 32,000 word dictionary

Suitable for use with Pel-Tek's word machine or other TRS-80 Mod I/III Word Processors.
for Mod I/III 32/48K Disk **\$50.00**

SAVE \$10.00!! Order Pel-Tek's Word Machine and the Random House Proof Reader together for one low price, only. **\$60.00**

PEL-TEK

P.O. Box 1026 • Southampton, PA 18966
TOLL FREE ORDER LINE 800-523-2445
In Pennsylvania Call (215) 947-2334

- Check or Money Order • Visa, MasterCard accepted
- Add \$2.00 per order for postage and handling
- PA residents add 6% sales tax

**Modem
\$99.95***



**At Last -- for the TRS-80 Mod I
(16K Level 2 required)**

- Needs no expensive RS-232
 - Direct Connect
 - Connects to Cassette port
 - Up to 300 baud
 - Half duplex send and receive
 - Includes instructions and software
 - Communicate with other Host systems: CompuServe, Source, Bulletin boards, etc.
 - Available soon for Mod. III & TRS-80 Color Computer
 - Price includes shipping*
- Send check or M.O. to:

Comstar Research
P.O. Box 771
Madison Heights, MI 48071
(313) 541-4840

* Alaska, Hawaii, or C.O.D. add \$3.00 shipping

Your Own Data Base

The second type of software will allow your computer to act as a host for others. You can easily set up your own data base. All it takes is suitable host software and an autoanswer modem. This setup will automatically answer the telephone and allow people to access your computer after they have entered a suitable password (optional). A bulletin board program will allow users of your system to leave and

retrieve messages, download data and programs, and even order products with their credit card.

If you have a modem and would like a comprehensive list of bulletin board numbers, I suggest you call SEACOM-80. This fine BBS, run by Dick Keller, can be reached by dialing 206/763-8879. When you get to the main menu, select "O" for other systems. Until next time . . . keep on telecommunicating!

Figure 1

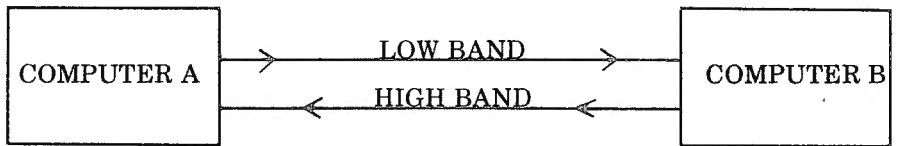


Figure 2

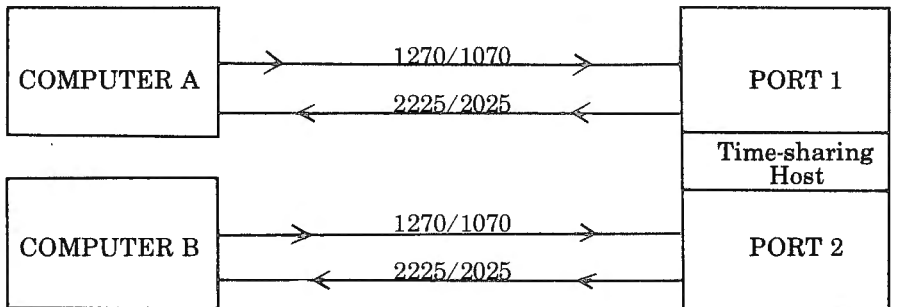


Figure 3

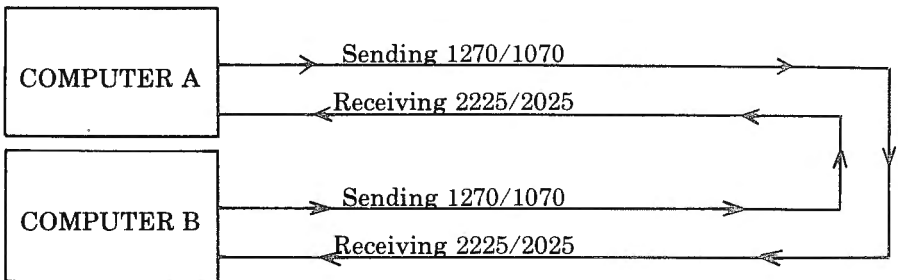
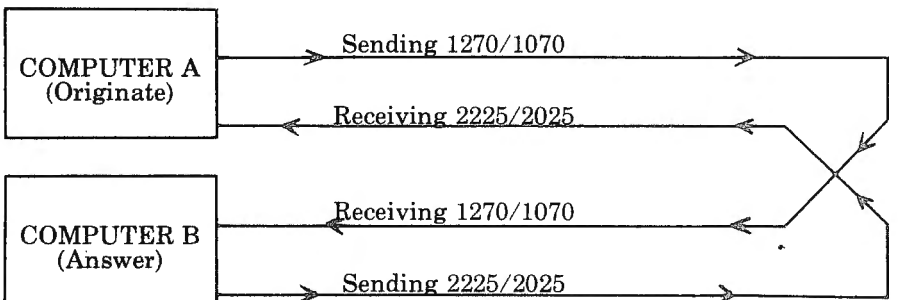


Figure 4



**THE PROGRAMMER'S GUILD
PRESENTS**



PAC DROIDS™

BY
CHARLES FORSYTHE

THE ULTIMATE IN PAC-ACTION

ONLY \$19.95

UP TO 4 PLAYERS!!

Unlike any other "PAC" game you've ever seen!!

**Hot Machine Language Multi-Color
Hi-Res Graphics For All 16K TRS-80
Color Computers**

**MORE SOUND-MORE ACTION
MORE FEATURES THAN ANY "PAC" GAME IN EXISTENCE!!**

Try "PAC-DROIDS"™ for the Outer Limit in pure,
explosive arcade action!!

SEND \$19.95 CHECK/MONEY ORDER OR VISA/MC#

**THE PROGRAMMER'S GUILD
PO BOX 66
PETERBOROUGH, NH 03458
OR CALL (603) 924-6065 FOR C.O.D.**

AND GET "FREE" SHIPPING ANYWHERE ON THE PLANET EARTH OR HER COLONIES

Zeroes

Using iteration

to solve

single-variable

equations

For all models

G. A. Findlay, Christchurch, New Zealand

Zeroes is a program, written in Level II BASIC, which solves equations numerically. The intention of the algorithm is to (virtually) guarantee convergence, and to indicate the accuracy of its solution. It has been claimed that the algorithm always converges (for suitable starting values). The author is unable to test the claim. Although the algorithm is well known, and has been published in various places, it is not easy to follow and I have not seen a BASIC implementation.

Zeroes solves equations numerically with efficiency and numerical accuracy (avoiding round-off and other errors due to floating point arithmetic) as its criteria. Also, the accuracy of the solution found should be as great as possible and reported to the user.

The program is in two parts. The first (lines 110 to 180) prompts the user; the second does the actual work.

The equation to be solved must be written in the form $f(x)=0$. For example, to solve $x^2 + x = 1$, rearrange the equation as: $x^2 + x - 1 = 0$.

The actual steps involved in using the program are: Load the program. Enter the equation to be solved as lines 190 to 199. This subroutine must be self-contained and determine F for a given X. For the equation above, 190 F = X * X + X - 1 would be suitable. Then, RUN220.

Answer the questions as they are asked: Single or double precision required? Enter two numbers bracketing the root. If unknown, guess wide! Select a tolerance. The actual accuracy attained depends on the tolerance given, the size of the root, and the characteristics of the machine arithmetic. For the maximum attainable accuracy, set the tolerance to 0.0. Give the maximum number of iterations permitted, up to 32767. Indicate whether you want to see all the iterations, or just the answer. The program calculates the root, displays it and its maximum error.

It is impossible in any computer program to completely eliminate all errors due to floating point arithmetic. You should always substitute the root given by the program back into the equation as a check.

On some occasions, the program reports that it has not found convergence, because it is oscillating between two very close approximations. In this case, run the program again with a display of all the iterates — you will soon spot the solution.

For the mathematically minded, the program works by choosing the next iterate from two possible candidates — that obtained by bisection, and that obtained by interpolation (either inverse quadratic or linear interpolation). The actual choice depends on the conditions. Calculations are arranged to minimize error propagation.

Listing 1 — Zeroes

```
10 *****ZEROES*****
20 '* NUMERICAL SOLUTION *
```

```

30 '* OF EQUATIONS *
40 '* CONVERGES, WITH BEST *
50 '* POSSIBLE ACCURACY. *
60 '* *
70 '* G. A. FINDLAY, *
80 '* 87 SOMERFIELD STREET *
90 '*CHRISTCHURCH, NEW ZEALAND *
100 '*****
110 CLS: CLEAR 300
120 PRINT STRING$(63,191)
130 A$=CHR$(191)+STRING$(61,32)+CHR$(191)
140 PRINTA$: PRINTCHR$(191)+STRING$(15,32); "INPUT EQUATION TO BE SOLVED AS"; STRING$(16,32); CHR$(191)
150 PRINTCHR$(191)+STRING$(20,32); "190 F= <FUNCTION OF X>"; STRING$(20,32); CHR$(191)
160 PRINTCHR$(191)+STRING$(23,32); "THEN 'RUN 220' "; STRING$(23,32); CHR$(191)
170 PRINTA$: PRINTSTRING$(63,191)
180 END
190 CLS:PRINT"YOU FORGOT THE EQUATION!": END
200 ITER=ITER+1
210 RETURN
220 CLS:PRINT@0, "SOLUTION OF EQUATION NUMERICALY." +CHR$(31)

```

```

230 PRINT@64, "SINGLE OR DOUBLE PRECISION (1 OR 2)"; :INPUT A$
240 IF A$ <> "1" AND A$ <> "2" THEN 230
250 ON VAL(A$) GOTO 260,280
260 DEFSNG A-Z
270 GOTO 290
280 DEFDBL A-Z
290 EPS=1.0
300 IF 1+EPS>1 THEN EPS=EPS*0.5:GOTO 300
310 PRINT@192, "INPUT INTERVAL CONTAINING ROOT"; CHR$(30); :INPUT AX, BX
320 ITER=0
330 A=AX: B=BX: X=A: GOSUB 190: FA=F: X=B: GOSUB 190: FB=F
340 PRINT@256, "INPUT TOLERANCE (>=0.0)"; CHR$(30); :INPUT TL
350 IF TL < 0.0 THEN 340
360 PRINT@320, "DO YOU WANT TO SEE EVERY ITERATE"; :INPUT A$
370 A$=LEFT$(A$,1)
380 PRINT @384, "MAXIMUM ITERATIONS"; :INPUT MAX%
390 C=A: FC=FA: D=B-A: E=D
400 IF ABS(FC) >= ABS(FB) THEN 420
410 A=B: B=C: C=A: FA=FB: FB=FC: FC=FA
420 IF A$="Y" THEN PRINT B;

```

★ 10 MB disk for \$79.95! ★

Well, not quite, but with the **HEXMAN** disk management system it feels like your whole disk library is on one big disk!

Here's how it works. Under the Hexman system, a set of "Filestore" disks reside permanently in your disk drives. These disks contain your most active files. Any files that you wish to use, or create or change are kept on these Filestore diskettes. Files that you are not currently using are kept in a "Library" of disks beside your computer. Hexman maintains a catalog of all your files, and which disks they are on. When you need a file that is not currently in the Filestore, give Hexman its name. Hexman will instruct you to insert the appropriate Library disk and transfer the file into the Filestore. Library disks are identified by numbered color-coded labels which we provide.

If you had to mount Library disks every time you needed some files, Hexman would be no better than the old way of doing things. But here comes the clever part. Hexman knows which files are in the Filestore, so it only loads files if they are not currently available in the Filestore. It counts how frequently you use each file, and ensures that the files in the Filestore are the ones that are used most frequently. If the Filestore disks are getting too full, Hexman removes the least frequently used files. Because the most active files are kept in the Filestore, the chances are that any file you need will be ready and waiting. Only when you request a

rarely used file does Hexman need to move it in from the Library. Thus as Hexman becomes familiar with your pattern of file usage, transfers from the Library drop to a minimum.

Each morning, when you first use Hexman, it scans your Filestore, notes any changes and takes action. Any new files are automatically cataloged. New and updated files are backed up to the Library. Hexman makes this easy to do by sorting the files into Library disk sequence, then prompting you to insert the appropriate Library disks one after the other. This Filestore scan and backup process ensures that your disk Library files match the active files in your Filestore. Thus you can safely treat the few Filestore disks in your drives as if they contained your whole disk Library.

Besides the basic Storage Management Module described above, additional modules are available for those that need the extra power. The Security module creates two additional copies of any vital files, and allows off-site storage of one of those copies. The KeySearch module allows the cataloging and retrieval of files by keywords (also called headings or categories). This module allows fast retrieval of files even when you can't remember their names. Other extension modules for the Hexman system are planned.

Requirements.

TRS-80 Model III—48K, 2 drives
Model I—48K, 2 drives
Double Density adapter
Lower case modification

Operating Systems

LDOS 5.1 Newdos 80 Vers 2
DOSPLUS 3.5 (Available shortly)

HEXMAN D.M.S. Vers 2 US\$79.95
(Storage Management Module)

Security Module \$39.95
KeySearch Module \$49.95

Trademarks
TRS 80 - Tandy Corp
LDOS - Logical Systems Inc
Newdos 80 - Apparat Inc

P.O. Box 397, Station A
Vancouver, B.C. Canada V6C 2N2
Telephone (604) 682-7646
Electronic Mail: Micronet 70235 1376

Dealer
inquiries
welcome

**HEXAGON
SYSTEMS**

PRICES AND SERVICE TOO GOOD TO PASS UP!

PRODUCTS FOR THE TRS-80®

NEWDOS80/V.2	124.95	Maxi Manager	119.50
LDOS 5.1	109.95	Maxi Mail	79.95
Trashman	34.95	Maxi Stat	169.95
Faster	24.95	Maxi CRAS	79.95
RPM - Disk Timer	22.50	The Home Accountant	62.95
LDOS Utility Disk #1	42.50	Postman	69.95
The BASIC Answer	59.95	Postman w/Postwrite	99.95
Lazy Writer	139.95	GEAP 2.1	46.50
Newscript 7.0	99.95	Dot Writer 1.5	55.95
Newscript w/labels	114.95	GEAP + Dot Writer	79.95
Electric Webster	129.50	Omniterm	79.95
EW Grammar Opt.	34.95	M-ZAL	114.50
EW Hyphen Opt.	41.95	Super Utility +	65.95
LNW System Exp. II	349.95	Percom Doubler	145.95
LYNX Modem	229.95	LNDoubler 5/8	164.95

And Much More — Write for FREE Catalog

- 24-Hour Shipping for Items in Stock
- Toll Free Order Line
- Free Use of Credit Cards
- Free Shipping on Orders over \$100
- Large Selection-Call for Items Not Listed
- Friendly, Honest, Reliable Service

We accept Visa Master Card check, cash money orders, and CDD in the 48 continental States add \$2.00 for UPS standard shipping. We'll pay shipping if your order is over \$100. Alaska and Hawaii orders are charged actual shipping charges. CDD orders are charged \$3.00 plus actual carrier charges and require cash or certified check on delivery.

IMI

Applied Microsystems, Inc.
612 Washington, Denver, CO 80203

ORDER NOW **1-800-468-4474**
TOLL FREE
IN COLORADO CALL 861-9250

LDOS is a TM of Logical Systems Inc.

M-ZAL is a TM of CAU, Inc.

TR8-80 is a TM of Tandy Corp.

8700-III is a TM of SBSG Inc.

```

430 IF ITER > MAX%+2 THEN 710
440 T1=2.0*EPS*ABS(B)+0.5*TL
450 XM=0.5*(C-B):IF ABS(XM) <= T1 THEN 660
460 IF FB=0.0 THEN 660
470 IF ABS(E) < T1 THEN 590
480 IF ABS(FA) <= ABS(FB) THEN 590
490 IF A <> C THEN 510
500 S=FB/FA : P=2.0*XM*S : Q=1.0-S : GOT
O 540
510 Q=FA/FC : R=FB/FC : S=FB/FA
520 P=S*(2.0*XM*Q*(Q-R) - (B-A)*(R-1))
530 Q=(Q-1.0)*(R-1.0)*(S-1.0)
540 IF P > 0.0 THEN Q=-Q
550 P=ABS(P)
560 IF (P+P) >= (3.0*XM*Q-ABS(T1*Q)) THE
N 590
570 IF P >= ABS(0.5*E*Q) GOTO 590
580 E=D : D=P/Q:GOTO 600
590 D=XM:E=D
600 A=B:FA=FB
610 IF ABS(D) > T1 THEN B=B+D ELSE B=B+A
BS(T1)*SGN(XM)
620 X=B:GOSUB 190:FB=F
630 IF FB*(FC/ABS(FC)) > 0.0 THEN 390
640 GOTO 400
650 ' ANSWER IS B
    
```

```

660 PRINT@63,CHR$(31);
670 PRINT@128,"APPROX SOLUTION IS:";B
680 PRINT@256,"THIS IS OF MAXIMUM ERROR"
; CSNG(TL+4*EPS*ABS(B))
690 PRINT @320,"WITH";ITER;"ITERATIONS R
EQUIRED";
700 END
710 PRINT@128,"NO SOLUTION IN ";MAX%;"IT
ERATIONS":END
    
```

Zeroes — Color Computer Listing

```

10 REM CONVERTED FOR THE COLOR
20 REM COMPUTER BY DON SCARBERRY
130 CLS: CLEAR 300
140 PRINT"INPUT EQUATION TO BE SOLVED AS
"
150 PRINT"190 F=<FUNCTION OF X>"
160 PRINT"THEN RUN 220"
180 END
190 F=X*X-5*X+6
200 ITER=ITER+1
210 RETURN
220 CLS:PRINT"NUMERICAL SOLUTION OF EQUA
TIONS"
230 GOTO 290
    
```

150 Programs—\$39⁹⁵

Model I (Tape)
for the **Radio Shack™** Model III (Disk) Computer

Executive Calculator™

Over 150 easy-to-use Programs for
Business and Home

High quality, user proven Software at a Price you can afford

Programs For:

- Finance
- Real Estate
- Investments
- Loans
- Leases
- Depreciation
- Charts & Graphs
- Plus Many More

ALL THIS FOR ONLY \$39.95

- Over 150 Proven Programs
- Complete Users Guide
- Automatic Update Privileges
- Complete Source Code
- Money Back Guarantee
- We Pay Shipping
- All Orders Shipped Within 24 Hours
- Requires 48K, Specify Disk or Tape

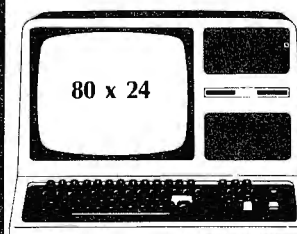
Order with Confidence by Phone or Mail

MCS SOFTWARE

809 PARKWAY, CONWAY, ARKANSAS 72032
PHONE 501-327-4443

FINALLY 80 x 24 VIDEO DISPLAY PLUS! CP/M® AND 112K

for TRS-80® MODEL III & I



Other products: MOD. III

★ "Sprinter III" -
34 or 5 mhz speed up 99.50
Doubles your speed

★ "DISK CONTROLLER/
CLOCK

Battery-powered clock
calendar, 8" capability, and
double density Assembled
board only

DX-3D 229.50

"VID 80"™

- ★ 80 Character Display
 - Reverse video
 - 16K added ram

VX-3 \$279.95

★ VX-3, 64K CP/M .. \$399.00

★ VX-3, CP/M and
Added memory ... \$524.00

DISTRIBUTORS:

CANADA—M&M Micro Mart
Quebec Canada (514) 713-9486

EAST COAST—Bi-Tech
Bohemia, NY (800) 645-1165

MIDWEST—Level IV Products
Livonia, MI (800) 521-3305

MIDWEST—Soft Sector Marketing
Garden City, MI (800) 521-6504

SOUTHERN—Digital Distributing
Dallas, TX (214) 330-1332

DEALER INQUIRIES INVITED



5175 Green Pine Drive Salt Lake City, Utah 84107 (801) 261-5652

CP/M is a registered trademark of Digital Research

TRS-80 is a registered trademark of Tandy Corporation


One year warranty on all products. Add shipping/handling—\$5.00 U.S. and Canada. All others add 15%. Prices subject to change without notice. For information send self-addressed stamped envelope. Reader Service takes 8 weeks.


```

290 EPS=1.0
300 IF I+EPS>1 THEN EPS=EPS*.5:GOTO 300
310 PRINT"INPUT INTERVAL CONTAINING ROOT
";:INPUT AX,EX
320 ITER=0
330 A=AX:B=EX:X=A:GOSUB 190:FA=F:X=B:GOS
UB 190:FB=F
340 PRINT"INPUT TOLERANCE (>=0) ";:INPUT
TL
350 IF TL<0 THEN 340
360 PRINT"DO YOU WANT TO SEE EVERY ITERA
TE";:INPUT A$
370 A$=LEFT$(A$,1)
380 PRINT"MAXIMUM ITERATIONS ";:INPUT MA
X
390 C=A:FC=FA:D=B-A:E=D
400 IF ABS(FC)>=ABS(FB) THEN 420
410 A=B:B=C:C=A:FA=FB:FB=FC:FC=FA
420 IF A$="Y" THEN PRINT B
425 INPUT"PRESS ENTER TO CONTINUE";EN
430 IF ITER>MAX+2 THEN 710
440 T1=2*EPS*ABS(B)+.5*TL
450 XM=.5*(C-B):IF ABS(XM)<=T1 THEN 660
460 IF FB=0 THEN 660
470 IF ABS(E)<T1 THEN 590
480 IF ABS(FA)<=ABS(FB) THEN 590
490 IF A<>C THEN 510
500 S=FB/FA:P=2*XM*S:Q=1-S:GOTO 540
510 Q=FA/FC:R=FB/FC:S=FB/FA
520 P=S*(2*XM*Q*(Q-R)-(B-A)*(R-1))
530 Q=(Q-1)*(R-1)*(S-1)
540 IF P>0 THEN Q=-Q
550 P=ABS(P)
560 IF (P+P)>=(3*XM*Q-ABS(T1*Q)) THEN 59
0
570 IF P>=ABS(.5*E*Q) THEN GOTO 590
580 E=D:D=P/Q:GOTO 600
590 D=XM:E=D
600 A=B:FA=FB
610 IF ABS(D)>T1 THEN B=B+D ELSE B=B+ABS
(T1)*SGN(XM)
620 X=B:GOSUB 190:FB=F
630 IF FB*(FC/ABS(FC))>0 THEN 390
640 GOTO 400
650 REM ANSWER IS B
660 GOTO 670
670 PRINT"APPROX SOLUTION IS: ";B
680 PRINT"THIS IS OF MAX. ERROR "
685 PRINT(TL+4*EPS*ABS(B))
690 PRINT"WITH ";ITER;" ITERATIONS REQD.
";
700 END
710 PRINT"NO SOLUTION IN ";MAX;" ITERATI
ONS":END

```

New Release
Now supports Mailing Lists, Form Letters,
"ZAP-PROCESSING", and 18 more printer drivers



Zorlof II

**The Magnificent
WORD PROCESSING SYSTEM**

For the TRS-80 Model I and III

**STILL ONLY
\$69.95**

IF YOU STILL THINK YOU
HAVE TO SPEND \$200 FOR A
GREAT WORD PROCESSING
SYSTEM, THEN YOU NEED TO
READ THIS AD!!

- Supports over 50 different popular printers including OKIDATA Microline 80, 82A, 83A, 84A, Quine Centronics 737, 739, Radio Shack Line Printer IV, VI, Daisy Wheel II, EPSON MX-80, MX-100, Graftrax, Graftrax Plus, Gemini-10, Gemini-15, NEC PC-8023A-C, Spinwriter 5510, 5515, 5520, 5525, C. Itoh Prowriter 8510, Starwriter FP-1500, F-10, Tec 8500R, Smith-Corona TP-1, Brother HR-1, COMREX Com-Riter CR-1, IDS Microprism 480, and Diablo 630
- Supports proportional space right-margin justifying on Centronics 737, 739, Radio Shack Line Printer IV, Daisy Wheel II, Graftrax Plus, NEC PC-8023A-C, Spinwriter 5510, 5515, 5520, 5525, C. Itoh Prowriter 8510, Starwriter FP-1500, F-10, and Diablo 630
- Powerful Mailing List and Mail-Merge capabilities for personalizing standard legal documents and Form Letters, handling infinite number of data records per run, infinite number of data fields per data record, and data fields as large as up to 1000 characters each.
- Brand new feature called "ZAP-PROCESSING", allows you to display and edit any type of data or program file in "ZAP" (byte-hexadecimal) format.
- Any character or symbol your printer can print, even dot graphics, can be used in mid-line printing with the Special Character feature.
- Written in last Z80 machine language with type-ahead key-stroke buffering for speed typing.
- Single key-stroke control of all editing functions for ease of use.
- Continuous on-screen display of word count, line count, and free memory count.
- Superscripts, subscripts, underlined, bolded, expanded and condensed type styles - combine and intermix within a line.
- Automatically justifies and word-wraps on the screen as you type.
- Search, Replace, and Global Search and Replace.
- Odd and even page user-definable headers, footers, and page number lines, with automatic page numbering.
- User-definable linespacing, sheet size, top, bottom, left, and right margins.
- Move blocks of text and copy blocks of text from disk, to disk, and within the text.
- Examine disk directory on any disk and kill files while editing.
- Powerful full-screen editing features for EDTASM and BASIC files, including automatic renumbering of lines.
- Built in function to dump contents of screen to printer.
- Print-previewing formats text, inserts headers, automatically numbers pages, etc. on the screen without printing it on paper.
- Page by page pausing capability for sheet fed printers.
- Supports both parallel and serial printers.
- Printer control code access.
- Works with NEWDOS, NEWDOS80 TRSDOS, MULTIDOS, LDOS, and DOSPLUS - Single or Double Density.
- Compatible with most all available spelling checker programs.

GUARANTEE

Many word processing systems claim theirs are the best, but few would dare guarantee them. Not us! We are confident that ZORLOF is the most useful word processing system on the market for under \$200. If you don't agree, return it within 30 days for a full refund.

Add \$2.00 shipping & handling. Florida residents add 5% sales tax. Checks require 3 weeks to clear banks.

SEE YOUR LOCAL
DEALER OR CALL **(305) 259-9397**

ANITEK SOFTWARE PRODUCTS □ P O BOX 1136 □ MELBOURNE, FL 32935 □ (305)259-9397

MIDWEST COMP-U-TRON

INCORPORATED

OFFERS REMARKABLE SAVINGS

NEWSCRIP—A high quality Word Processing System for the TRS-80[®] Models I & III, based on editing and text formatting programs developed by IBM for use on "mainframe" Time-Sharing Systems.

Newscrip 7.0 \$119.95
Mailing Labels Option \$ 29.95
Newscrip Plus Mailing Labels Option (Special) . \$139.95

DOSPLUS—Replaces TRSDOS[™] with the most powerful and sophisticated operating system you can get for the TRS-80[®] Model I & III, including the new Model II version.

New Dosplus 3.5 Version \$129.95

THE MICRO CLINIC—Computer diagnostic program for testing memory and disk operation.

TRS-80[®] Model I & III
Floppy Disk Diagnostic \$24.95

FILTERSOFT—



Surge Protector beautifully crafted in bronztone finish to protect and enhance your computer system. Concealed wall mounting brackets, 6 socket, on/off switch with lighted display, and mini circuit breaker with reset button . \$54.95

All orders must be cash or UPS, C.O.D. Personal checks take 3 weeks to clear.

TRS-80[®] is a trademark of Tandy Corporation
451 Sagamore Pky • W. Lafayette, IN 47906 • (317) 463-3433

Basically BASIC

Inside nested loops

For all models

© 1983, James A. Conrad, Contributing editor

Last month, we examined FOR . . . NEXT loops. This month we'll look at nested FOR . . . NEXT loops. Nested FOR . . . NEXT loops consist of one loop inside another. Their operation is easy to understand if you keep track of the value of each index variable at each step of the program's execution. We'll start with a relatively simple example:

```
10 REM NESTED LOOPS
20 FOR X = 1 TO 3
30   FOR Y = 1 TO 4
40     PRINT "WHILE X IS ";X,"
Y IS ";Y
50   NEXT Y
60 NEXT X
```

Can you see from the printout on the screen that the Y loop (called the "inside" loop) in lines 30 and 50 executes four times for each execution of the X ("outside") loop in lines 20 and 60? Trace the program's execution on a sheet of paper, keeping track of the value of the index variables X and Y.

Line 20 initializes the value of X as 1. Line 30 then initializes counter Y as 1. Line 40 prints the messages in the quotation marks and the current values of X and Y. Line 50 increments variable Y to 2 and tests if it exceeds its final value of 4 (from line 30). It doesn't, so program control returns to line 40 (the line following the "FOR Y . . ." statement). Line 40 again prints the messages and the current values of X and Y (1 and 2).

The program continues looping

from line 50 to line 40, incrementing Y in line 50 and printing the new value of Y from line 40. X remains equal to 1 while the Y loop executes. Finally, Y is incremented to 5, is tested against its final value of 4, and program control "falls through" to line 60.

Line 60 increments X to 2, tests it against its final value of 3, and passes control to the line following the "FOR X . . ." statement. This is line 30 which initializes a new Y loop. While the value of X is 2, the Y loop executes four times, just as it did when the value of X was 1.

When the value of Y reaches 5, program control again falls through. X is incremented to 3, and a new Y loop begins. It's pretty simple, isn't it? For each time the outside X loop operates once, the inside Y loop will operate completely.

A quick test: When the program finishes running, what are the ending values of X and Y? If you didn't answer four and five, you'd better loop back to last month's Basically BASIC.

Working with Arrays

The main use of nested loops is working with the data in multiple dimension arrays. Don't worry if you don't understand a lot about arrays. We'll diagram the one we are using.

See Figure 1 for the array we are setting up. The values in the array boxes (or array cells), represent the

row number in their first digit and their column numbers in the second digit. So, row 1, column 1 contains the number 11, and row 3, column 4 contains the number 34. Here's a routine to put these values in their appropriate cells in the array. We'll use the variable R to designate the row number and C for the column number. If you have trouble understanding what's happening, just enter these lines -- it's easier to see how the loops work when you print out the contents of the cells (lines 200 to 250).

```
10 REM DIMension array A, 3
rows x 5 columns
20 DIM A(3,5)
100 REM Assign values to array
cells
110 FOR R = 1 TO 3
120   FOR C = 1 TO 5
130     LET A(R,C) = R*10 + C
140   NEXT C
150 NEXT R
```

Reading the Array

The computer's memory now has the values stored in an array named A, as diagrammed in figure 1. Let's write a routine to print these values:

```
200 REM Print values row by
column
210 FOR R = 1 TO 3
220   FOR C = 1 TO 5
230     PRINT A(R,C);
240   NEXT C
250 NEXT R
```

This module prints a solid row of _____ numbers across the screen,

beginning with the number 11 from row 1, column 1; then 12 from row 1, column 2; then 13 . . . The trailing semicolon in line 230 suppresses the carriage return so the numbers print immediately following each other.

Figure 1

		Columns				
		1	2	3	4	5
Rows	1	11	12	13	14	15
	2	21	22	23	24	25
	3	31	32	33	34	35

Can you see what's happening? Line 210 initializes the row counter, R, with a value of 1. Then line 220 sets the column counter, C, to 1. The parentheses following the name of the array, A, in line 230 designate the row and column to be printed. At the beginning of the first pass R and C both equal one, so the contents of array cell A(1,1) (i.e., row 1, column 1) is printed.

The program proceeds to line 240 where the NEXT C statement increments the column counter to 2 and, remaining in the C loop, returns to line 230. The value of R is still one. Line 230 now prints 12, the value of row 1, column 2.

The program continues to loop between line 240, which increments the column counter, and line 230, which prints out the value of the next column entry. When the value of row 1, column 5 (15) has been printed, line 240 increments C once again, this time to six. It tests to see if this exceeds the final value of five. Since six is greater than five, the C loop is completed and program execution falls through to the next line.

Line 250, NEXT R, increments variable R, the row counter, and loops back to line 220. The values of counters R and C at this point (before line 220 executes) are two and six. Program control is now at line 220. Do you remember what happens when a FOR statement executes? The control variable, in

this case, C, is reset to the initial value. We are into a new C loop. While R equals 2, this C loop will again count from 1 to 5.

Now is a good time to slightly revise the program. Add " "; to the end of line 230. This will print a space between the numbers. Add line 245 PRINT. What will this do and why? Why position a PRINT statement between the C and R loops? (You have to figure it out. I'm not going to say.) Trace the program's progress through the loops and jot down on a sheet of paper what line 230 will print on each pass. As a hint, line 245 prints a blank line, called a linefeed or carriage return.

Were you able to predict correctly what the program printed on the screen? If so, congratulations, you have mastered one of the most difficult topics for beginning programmers. The next module should be easy.

Reversing the Nesting

This final routine reverses the looping, nesting the R loop inside the C loop. Study the progression through the loops, keeping the contents of the counter variables in mind. Or better still, write them in little boxes on a sheet of paper.

```

300 REM (You enter here what this
loop will do)
310 FOR C = 1 TO 5
320   FOR R = 1 TO 3
330     PRINT A(R,C); " ";
340   NEXT R
345 PRINT
350 NEXT C
    
```

Note that although we've reversed the nesting order, the positions of variables R and C inside the parentheses in line 330 *must* remain R first and C second. This is because we are using the convention of row as the first variable and column as the second.

Many beginning programmers have difficulty understanding nested FOR . . . NEXT loops. It's generally because they don't keep track of what's happening inside the loops. It's easy if you study it. The inside loop executes completely each time the outside loop executes once. Once you understand how this works you'll have no problem with nested loops. That's BASIC.



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-N.W. Books
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-NW
Books**

Files and foibles

Formatted input routines

Models I/II/III

Terry Dettmann, Associate editor

Do you want to write programs that look good? Is water wet? Those two questions are much alike. They both have obvious answers. Anyone who doesn't want his programs to look good shouldn't be programming computers.

One of the many problems which we wrestle with in making programs look good has to do with getting things in the way we want them. We often want to get some input in a particular format so we can process it easily or force the user to do what we want.

The most common situation I see deals with date and time entry. In most amateur and many professional programs, the way this problem is solved is by using something like this:

```
250 PRINT"ENTER TIME (MM/DD/YY): ";
260 LINE INPUT DT$
```

After this, there might be some complicated checking program to make sure that the month, day and year are acceptable and that there are '/' marks in the right places. That's OK, but it's just not as easy for the programmer as it could be.

Line formatting is something which we do frequently for many different applications. Date is only one of them. The sample program with this article demonstrates a simplified form of a formatted line input routine that will allow you to flexibly enter such things as dates, times, and so forth.

The three important routines start at lines 1000, 1100, and 1200. Subroutine 1000 simply waits for a character from the keyboard and then returns it for use. The special check for CHR\$(19) is for holding the CTRL key and hitting letter 'S'. Then it uses the Model II screen print routine to print a copy of the screen to the printer. You could do something like this with other letters and other commands. Model I/III users should be sure to follow the remarks in the code for altering the program to run on their machines.

The heart of the input procedure is the subroutine at line 1100. The basic procedure comes down to this:

1. Decide on a formatting string (TP\$) and lay it out with the format you want filled.

2. Use the formatting string to display the entry field (line 1110)

3. For each position in the string, if the position is a replaceable character fill it; if it's not, skip it.

Instead of actually replacing the characters in the formatting string, I build a new returning string (IN\$) so that TP\$ would be available for more calls to the subroutine.

The backspacing routine at line 1200 gets more complicated for other than simple entry procedures since it needs to account for the pattern and know what to do if the pattern reaches a character that is not replaceable. The example here will fail if you start the formatting string with a non-replaceable character, but that is easy to fix. Can you do that?

Formatting string entry is a simple, yet necessary procedure for good looking programs. This should give you one more tool in your arsenal.

Program Listing for Files and Foibles

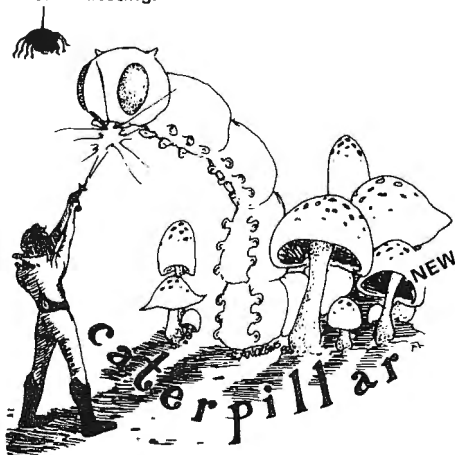
```
10 REM*****
*****
20 REM
30 REM          80 U.S. JOURNAL
40 REM          ENTER DATE/TIME INFORMAT
ION
50 REM
60 REM          VERSION 0.0      03/83
          DATER/BAS
70 REM          (C) 1983 BY TERRY R. DET
TMANN
80 REM
90 REM*****
*****
95 REM          GET SOME SPACE
100 CLEAR10000
105 REM          DEFINE ALL VARIABLES TO
```



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 TI99, TRS-80 Color, and Sinclair, 13K VIC-20. \$14.95 each.

32K TRS 80 COLOR Version \$24.95.

Adds a second level with dungeons and more Questing.



CATERPILLAR

O.K., the Caterpillar does look a lot like a Centipede. We have spiders, falling fleas, monsters traipsing across the screen, poison mushrooms, and a lot of other familiar stuff. COLOR 80 requires 16k and Joysticks. This is Edson's best game to date. \$19.95 for TRS 80 COLOR.



ADVENTURES!!!

The Adventures below are written in BASIC, are full featured, fast action, full plotted adventures that take 30-50 hours to play. (Adventures are interactive fantasies. It's like reading a book except that you are the main character as you give the computer, commands like "Look in the Coffin" and "Light the torch.")

Adventuring requires 16k on Sinclair, TRS-80, and TRS-80 Color. They require 8k on OSI and 13k on VIC-20. Sinclair requires extended BASIC. Now available for TI99. Any Commodore 64.

\$14.95 Tape — \$19.95 Disk.

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!

DERELICT

(by Rodger Olsen & Bob Anderson)

New winner in the toughest adventure from Aardvark sweepstakes. This one takes place on an alien ship that has been deserted for a thousand years — and is still dangerous!

Dungeons of Death — Just for the 16k TRS-80 COLOR, this is the first D&D type game good enough to qualify at Aardvark. This is serious D&D that allows 1 to 6 players to go on a Dragon Hunting, Monster Killing, Dungeon Exploring Quest. Played on an on-screen map, you get a choice of race and character (Human, Dwarf, Soldier, Wizard, etc.), a chance to grow from game to game, and a 15 page manual. At the normal price for an Adventure (\$14.95 tape, \$19.95 disk), this is a giveaway.

WIZARDS TOWER — This is very similar to Quest (see above). We added wizards, magic, dragons, and dungeons to come up with a Quest with a D&D flavor. It requires 16k extended color BASIC. \$14.95 Tape, \$19.95 Disk. VIC 20 Commodore 64.



NEW

PLANET RAIDERS — Not just another defenders copy, this is an original program good in its own right. You pilot a one man ship across a planetary surface dogfighting with alien ships and blasting ground installations while you rescue stranded troopers. Rescue all the troopers and be transported to another harder, faster battle. Joysticks required. ALL MACHINE CODE! EDSONS BEST! 16K Tape TRS80COLOR \$19.95 — 32K Disk \$21.95.

BASIC THAT ZOOMMS!!

AT LAST AN AFFORDABLE COMPILER!

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, IF, THEN, RETURN, END, PRINT, STOP, USR (X), PEEK, POKE, *, /, +, -, >, <, =, VARIABLE NAMES A-Z, SUBSCRIPTED VARIABLES, and INTEGER NUMBERS FORM 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, TRS-80 Color, VIC 20, or Commodore 64.

SEAWOLFE — ALL MACHINE CODE In this high speed arcade game, you lay out patterns of torpedoes ahead of the attacking PT boats. Requires Joysticks, at least 13k RAM, and fast reflexes. Lots of Color and Sound. A fun game. Tape or Disk for Vic20, Commodore 64, and TRS-80 Color. \$14.95 Tape - \$19.95 Disk.

Dealers — We have the best deal going for you. Good discounts, exchange programs, and factory support. Send for Dealer Information.

Authors — Aardvark pays the highest commissions in the industry and gives programs the widest possible advertising coverage. Send a Self Addressed Stamped Envelope for our Authors Information Package.

Adventures and Quest now available for TI99

Please specify system on all orders

ALSO FROM AARDVARK — This is only a partial list of what we carry. We have a lot of other games (particularly for the TRS-80 Color and OSI), business programs, blank tapes and disks and hardware. Send \$1.00 for our complete catalog.

AARDVARK

2352 S. Commerce, Walled Lake, MI 48088 / (313) 669-3110

Phone Orders Accepted 8:00 a.m. to 4:00 p.m. EST. Mon.-Fri.

\$2.00 shipping on each order



A Spectacular Graphic Adventure Experience!



A hilarious adventure! The fun really begins when these two famous characters meet inside Madam Rosa's Massage Parlor!

CHALLENGING!

SOUND & GRAPHICS combined with ADVENTURE & FUN!!!

Imagine the possibilities...

Also Available (16K Tape Model I & III):
 #201 Madam Rosa's Massage Parlor
 #202 Wet T-Shirt Contest
 #207 Madam Rosa Meets E-Z

The Softcore Software Co.

1-800-633-2252 ext. 460 new 24 hour toll-free order line!

VISA—MASTER CARD—C.O.D.—CHECK

9 Southmoor Circle, Kettering, Ohio 45429
 (513) 294-3383 (12-6 p.m.) dealers & more info

Write For Complete Catalog

Files and foibles

```

BE INTEGER
106 REM (DOESN'T WORK ON COLOR C
COMPUTER)
110 DEFINT A-Z
115 REM DEFINE SOME USEFUL FUNCT
IONS:
116 REM HDR$ PRINTS HEAD
ER LINES
117 REM CTR$ CENTERS A S
TRING ON 80 CHR LINE
118 REM FOR MODEL I/III CHANGE 78 TO 62,
77 TO 61, 80 TO 64
120 DEFFNHDR$(X$)=STRING$((78-LEN(X$))/2
,150)+" "+X$+" "+STRING$((77-LEN(X$))/2,
150)
130 DEFFNCTR$(X$)=STRING$((80-LEN(X$))/2
,"")+X$
200 REM ----- MAIN PROGRAM
-----
205 REM PRETTY HEADER (ADJUSTED
FOR MOD II)
210 CLS:PRINTFNHDR$("80 U.S. JOURNAL"):P
RINTFNCTR$("DATE/TIME SAMPLER")
215 REM PRINT CHR$(2) TURNS OFF
CURSOR
216 REM ON MODEL II ONLY - USE C
HR$(15) ON MODEL I/III
220 PRINT:PRINT CHR$(2)
225 REM PROMPT FOR DATE ENTRY
230 PRINT"ENTER THE DATE ==> ";
235 REM NOW LAY OUT THE DATE PAT
TERS
236 REM AND CALL THE ENTRY SUBRO
UTINE
237 REM IN$ COMES BACK WITH THE
PATTERN
238 REM FILLED IN
240 TP$="##/##/##":GOSUB1100:DT$=IN$
245 REM NOW DO THE SAME THING FO
R TIME
250 PRINT:PRINT"ENTER THE TIME ==> ";
255 REM NOTICE THAT I CAN USE AN
Y CHARACTER
256 REM IN THE PATTERN BUT ONLY
'#' WILL
257 REM BE REPLACED
260 TP$="##:##:##":GOSUB1100:TM$=IN$
270 PRINT:PRINT:PRINT
280 PRINTTAB(10)"THE ENTERED DATE AND TI
ME ARE ";DT$;" ";TM$
290 END
1000 REM ----- GET A CHARA
CTER -----
1005 REM WAIT FOR A CHARACTER AT
THE KEYBOARD
1010 C$=INKEY$:IF C$="" THEN 1010
1015 REM MODEL II SCREEN PRINT -
    
```

SOFTWARE DEALERS
 Enter the World of



Nationally Acclaimed Programs for the
 TRS-80 Computers

Now from the authors of SUPER UTILITY+ a complete line of software to increase sales and return excellent profits.

While SUPER UTILITY+ won recent honors as Utility Program of the year by the 200,000 readers of 80 Micro, the quality and consistency carries through the complete Powersoft line.

Professionally written and completely documented, Powersoft programs are accepted as industry standards among TRS-80 enthusiasts.

SUPER UTILITY PLUS
 SCRIPUS
 THE TOOLBOX FOR LDOS
 THE MASTER MECHANIC SET FOR LDOS
 THE BASIC/S COMPILER SYSTEM
 MAKE/80
 SUPERMOVE
 DOSPLUS II

PowerMAIL
PowerDRAW
PowerDOT
PowerDRIVER
PowerTERM
 INSIDE SU+
 SU+ TECH MANUAL

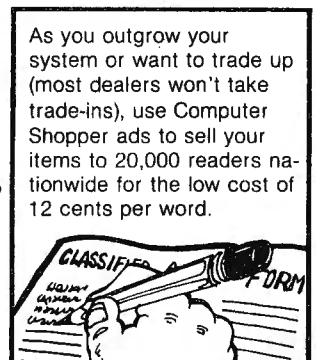
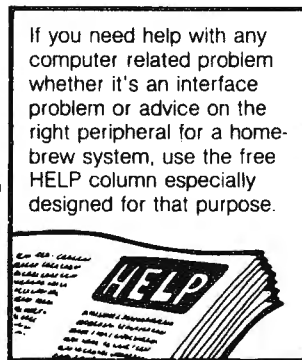
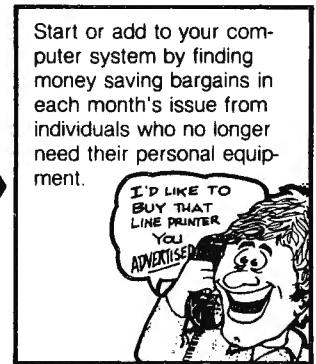
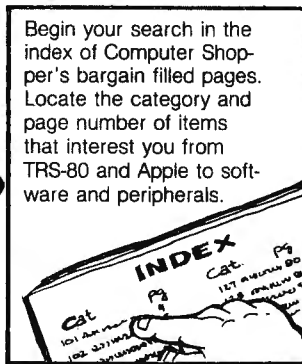
CASH IN WITH POWERSOFT — THE WORLD'S MOST POWERFUL SOFTWARE VENDOR. WE OFFER EXCELLENT MARGINS, NATIONAL ADVERTISING, AND COMPLETE SUPPORT.

SEND FOR OUR COMPLETE DEALER SALES KIT TODAY

POWERSOFT
 PRODUCTS FROM BREEZE/QSD, INC

11500 Stemmons Fwy.
 Suite 125
 Dallas, Texas 75229
 (214) 484-2976

How to Buy or Sell Computer Equipment and Software



Computer Shopper is THE nationwide publication for buying, selling and trading Micro and Mini-computer equipment and software. Each issue has over 100 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 for faster service and start making your computer dollar go further today.

Cut out and mail to: **COMPUTER SHOPPER**
P.O. Box F534 • 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: _____

 **COMPUTER SHOPPER**
P.O. Box F534 • Titusville, FL 32780
Telephone: 305-269-3211

Files and foibles

```

ON MODEL I/III REMOVE LINE 1020
1020 IF C$=CHR$(19) THEN SYSTEM"SCREEN":
GOTO1000
1030 RETURN
1100 REM ----- ENTER A LINE
E -----
1102 REM          HERE WE PRINT THE PATTERN (TP$) AND DO A
1103 REM          NON-DESTRUCTIVE BACKSPACE OVER THEM
1104 REM          (28 IS THE LEFT ARROW CODE ON THE MOD II)
1105 REM          PC$ IF THE STRING OF REPLACEABLE CHARS
1106 REM          ZF IS THE LENGTH OF THE PATTERN
1107 REM          CC WILL BE THE CURRENT CHARACTER, IN$ THE RETURNED STRING
1108 REM          KC$ IS THE LIST OF SPECIAL CHARACTERS (BACKSPACE HERE)
1110 PC$="#":ZF=LEN(TP$):PRINTTP$;STRING$(ZF,28);:CC=1:IN$="":KC$=CHR$(8)
1115 REM          WHAT IS THE CURRENT PATTERN CHARACTER?
1120 CC$=MID$(TP$,CC,1)
1125 REM          IF IT'S NOT REPLACEABLE, THEN MOVE IT TO

```

```

1126 REM          THE RETURNED STRING
1130 IF INSTR(PC$,CC$)=0 THEN C$=CC$:GOTO1170
1135 REM          GET A CHARACTER, IF IT'S A RETURN THEN
1136 REM          WE'RE DONE
1140 GOSUB1000:IF C$=CHR$(13) THEN RETURN
1145 REM          IF IT'S A BACKSPACE, PROCESS IT
1146 REM          WE WRITE THIS AS AN ON-GOTO
1147 REM          SO YOU COULD HAVE MORE SPECIAL
1148 REM          CHARACTERS IN KC$ AND PROCESS
1149 REM          THEM ALL HERE
1150 ON INSTR(KC$,C$) GOTO 1200
1155 REM          IF THE CHARACTER ISN'T PRINTABLE OR
1156 REM          IF WE'VE ALREADY FILLED THE PATTERN
1157 REM          THEN WE CAN'T ADD IT TO THE STRING
1160 IF C$<" " OR LEN(IN$)>=ZF THEN 1140
1165 REM          WE'VE PASSED ALL THE TESTS, SO WE
1166 REM          ADD THE NEW CHARACTER, PRINT IT,
1167 REM          AND ADVANCE TO THE NEXT PATTERN
1168 REM          CHARACTER
1170 IN$=IN$+C$:PRINTC$;:CC=CC+1
1175 REM          IF CC>ZF, THAT MEANS THE PATTERN IS FULL
1180 IF CC>ZF THEN 1140 ELSE 1120
1200 REM..... BACKSPACE ..
.....
1205 REM          IF THERE'S NOTHING INPUT YET, IGNORE BACKSPACES
1210 IF LEN(IN$)<1 THEN 1140
1215 REM          BACKUP 1 SPACE IN THE PATTERN
1220 CC=CC-1:CC$=MID$(TP$,CC,1)
1225 REM          BACKUP 1 SPACE ON THE SCREEN
1230 PRINTCHR$(28);CC$;CHR$(28);
1235 REM          REMOVE 1 CHARACTER FROM THE OUTPUT
1236 REM          STRING
1240 IN$=MID$(IN$,1,LEN(IN$)-1)
1245 REM          IF THE CURRENT PATTERN CHARACTER
1246 REM          ISN'T REPLACEABLE, THEN BACKUP MORE
1250 IF INSTR(PC$,CC$)=0 THEN 1220 ELSE 1140

```

WHY BUY A JOY STICK TWICE?!



If you have an ATARI COMPATIBLE JOY STICK, you can use it on your TRS 80 with our kit!

JOY STICK KIT*

Without Joy Stick Model I/III _____	\$15.95
With Joy Stick Model I/III _____	\$26.95



— Be Your Own SYSOP !!!! —

Bullet-80 Bulletin Board Model I/III
Version 8.0 _____

\$150.00

Offered only to 80 U.S. magazine readers...
15% off all game software including...
 CORNSOFT GROUP • SOFT SECTION MARKETING
 •BIG FIVE • ADVENTURES INTERNATIONAL and others from most of the major software houses.
SALE INCLUDES COLOR COMPUTER SOFTWARE. Mention this ad with order. Items shipped from stock. Prices DO NOT include shipping and handling. Offer expires 8/31/83.

Please call for information about ANY products. We have in stock a FULL LINE of Software from ALL Major Houses

After-Market Computer Gallery**
 P.O. Box 993 (Mail Order)
 1 Franklin St. (Retail Outlet)
 Danbury, CT 06810

Voice Line — 203 743-1299
 Bullet-80 Computer Line — 203 744-4644 (300/1200 Baud)

*Internal Installation Required. No trace cutting or electronics involved.
 **A Division of Computer Services of Danbury




Reviews

"Understanding Computer Science"

Roger S. Walker
Texas Instruments Learning
Center, Publisher
\$2.95 from Radio Shack stores
and computer centers

Understanding Computer Science is a simple introduction to computer science: the science of how to solve problems with the computer. The science has grown rapidly from nothing at all, to an accepted academic study, in just twenty years. This book gives a good, non-technical introduction to a rapidly changing field.

Included chapters discuss topics such as: About computers and computer science, computer architecture and

hardware, how to tell a computer what to do — programming, languages, operating systems — an overview, data structures, language translators, systems analysis, and more. While there is a picture of a TRS-80 Model III in the book, most of the examples of personal systems use the T.I. microcomputer.

The information provided in the book is valuable as background for anyone who wants to seriously use his computer for problem solving. The data structures chapter talks about such things as linked lists, searching, binary trees, and databases. The chapter on languages discusses today's major languages: BASIC, Fortran, Cobol and PL/1.

It is not primarily a book about microcomputers, but it is well written,

comprehensive, and easy enough to read that anyone could gain much from reading it. I liked the book, and so have several others. While the level of detail wasn't enough to go right out and write a disk operating system, or begin to implement a new database, it did answer numerous questions about *why* things are done the way they are.

T. R. Dettmann

Leaper
Model I/III, 16K +
Bob Krotts
9 Southmoor Circle
Kettering, OH 45429
(513) 294-3383
\$15.95 cassette

"Dad — You've got Frogger!"

From Computer Plus to YOU ...

PLUS after PLUS after PLUS



Model 12
1 Drive 12699
2 Drive 13375



Color Computer 16K \$175
w/16K Ext Basic \$255
w/32K Ext Basic \$370



Model III 16K \$699
Model III 48K
2 Disk & RS232C \$1549



Okidata 80 1320
Okidata 82A 1399
Okidata 92 1510



Color Computer Disk Drive
Drive 0 \$470 Drive 1 \$299



Smith Corona TPI
Daisy Wheel \$495

BUY DIRECT Here are just a few of our fine offers ... call TOLL FREE for full information.

COMPUTERS	R S Acoustic Coupler AC-3	129	DISK DRIVES	R S Model III 151 Drive	650
Model 12 64K 1 Drive	R S Modem I D C	129	Ionaton 40 Tract MII	289	
Model 12 64K 2 Drive	R S Modem II D C	199	Color Computer Drive 1	299	
Model III 16K	Daisy Wheel II	1715	Color Computer Drive 0	470	
Model III 48K	DWP-410	1320	Primary Hard Disk Mill	3099	
Model III 48K	Smith Corona TPI Daisy Wheel	495	Primary Hard Disk Mill	2199	
2 Disk & RS232C	Epson MX80	Call	ETC		
Color Computer 16K	Epson FX85	Call	OCR #1 recorder	52	
w/extended basic	Epson MX100	Call	C C Joystick	22	
1Color Computer 32K-64K	CGP 115	199	16K RAM N E C 200 N 5 chips	25	
w/extended basic	DMP 100	315	64K Ram Chips	75	
Packet Computer 2	DMP 200	599	Coco PHL Flex D O S	69 95	
Model 16 1DR 128K	DMP 400	1010	32K Microbuffer Inline	229	
Model 16 2DR 128K	DMP 500	1539	SOFTWARE		
DT-1 Data Terminal	DMP 2100	1779	Brand Name Software -		
PT 210 Portable Terminal	Okidata 80	320	Send for listing		
MODEMS	Okidata 82A	399	R S Software 10% off list		
Lyne Direct Connect Mill/Mill	Okidata 83A	655	Parallel Printer Cables are		
Hayes Smart Modem II	Okidata 84 Parallel	999	available for most computers		
Hayes Smart Modem 1200	Okidata 92	510	(Color Computer 64K requires		
Navation Smartcat 1200	Okidata 93	859	Disk 0 and D O S		
Navation J-CAT	P C Plotter Printer	180			

Since 1973 - We have the lowest possible Fully Warranted Prices AND a full complement of Radio Shack Software.

Prices subject to change without notice. Not responsible for typographical errors. TRS-80 is a registered trademark of Tandy Corp.

computer plus
P.O. Box 1094
480 King Street
Littleton, MA 01460
617-486-3193

Write for your free catalog

NEW ORGANIZE and PROTECT your VALUABLE software library the COLORFUL way with ZETAPAKS™ from ZETA Computer.

Mix 'n' match your collection with these rugged-vinyl software "safes" in a choice of 4 COLORS. Now you can store your media TOGETHER with your instructions on the SAME shelf with your computer books.

ONLY \$3.50 EACH or \$38.95 Per DOZEN Postpaid

—COLORS—
BEIGE
TAN
BLUE
YELLOW

HOLDS ALL TYPES OF SOFTWARE MEDIA
Besides holding a 6" x 8½" manual up to ½" thick, a ZETAPAK can hold 2 audio/digital cassettes or 2 stringy floppy cartridges or 2 of the new 3" micro disks or 6 5¼" floppy disks or 2 ROM cartridges (up to ¾" thick)

Ask you local computer dealer to stock ZETAPAKS or ORDER DIRECT: ZETACOM Dept. EU
P.O. BOX 3522
GREENVILLE, SC 29608

*Specify how many of what color.
*Send Bank or PO Money Order for fastest service.
*COD is fast but \$2 extra. *Please allow 4 weeks delivery on checks.
*Foreign: US Funds add .50 each for Air Mail. *Purchase Price of \$3.00 each ZETAPAK REFUNDABLE if returned unopened within 30 days. *SOFTWARE PUBLISHERS/DEALERS write or call for discount schedule...(803) 246-1741 after 1 P.M. EST.

© TM 1983 ZETA Computer

TRS-80®

Programmer's Sourcebook

Now there is a national TRS-80 sourcebook with system software listings *plus* club listings, all in addition to many new application software listings and all of which are separated by model number. The first edition of this 8 1/2 x 11 inch bright yellow publication is now in national distribution in both the U.S. and Canada.

Complete details on how you can list your software are contained in the first edition which is now available through your favorite computer store or bookstore (ask for ISBN 0-912043-00-8) or you can order direct from us by sending \$4.95 (plus \$1.00 postage and handling) to:

Ocean, Inc.

P.O. Box 2331-U

Springfield, Virginia 22152-0331

VISA and MasterCard Telephone charge orders accepted: (703) 323-1928 (Dealers inquiries invited)

© TRS-80 is a registered trademark of the Tandy Corp.

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.

CONVERT-A-DISK

Single-sided disk drive users increase your disk storage by 100%!!!

Convert-A-Disk will work with any 5 1/4-in. single-sided disk drive no matter what type of computer you are using.

Why pay hundreds of dollars to increase your disk storage?? Convert-A-Disk will allow you to convert all your existing disks to give you a 100% increase disk storage capacity.

Send \$15 check or money order to:

CONVERT-A-DISK

P.O. Box 15277
Portland, OR 97214

COMTRONIC SYSTEMS

PMS-1 PROPERTY MANAGEMENT SYSTEM

- Saves Hours of Bookkeeping
- Increases Accuracy
- 100% User Support
- User Friendly System
- 350 Units Per Diskette
- Complete Tenant File
- Current Tenant Report
- Late Rent Report
- Late Rent Notices
- Rent Payment History
- Vacancy Report
- Income Statement
- Expense Ledger
- Change of Rent Notices

For TRS-80 Model I and III 32K One Disk Drive.

Excellent for Management Companies or Individuals.

\$169.95 on Diskette with Manual, Documentation and Sample Files.

LOAN AMORTIZATION PROGRAM
Prints or displays an amortization schedule for a given mortgage contract. Perfect for Real Estate Investors.

For TRS-80 Model I and III 16K Computers
\$12.95 on tape and \$15.95 on Diskette

"SATISFACTION GUARANTEED"
COMTRONIC SYSTEMS
4028 Somerset Lane, Kent, WA 98032



- Raises & tilts TV monitor for easy viewing
- Allows CC keyboard to slip under monitor for more desk space
- Matching silver-gray fiberglass
- \$37.50 + \$2.50 shipping

"80" DEMI-CASES

- Models for LNW or MDX I & II Boards
 - \$32.50 + \$2.50 shipping
- N.Y.S. Residents Add 7% Tax

SYRACUSE R & D CENTER
Box 125, Dewitt, N.Y. 13214
"Specializing in Electronic Packaging"

INDEX TO 80-U.S.

At last; an index to all the information contained in 80-U.S. Journal. Articles, programs, tutorials and other useful information is broken into over 125 categories including errata and fixes from later issues. The index comes in a static binder and covers the July 1981 through Dec. 1982 issues. Send check or money order for \$7 plus \$1 shipping to:

Gary Diillo

1109 Madison Ave.
Prospect Park, PA 19076
Allow 6 wks. for delivery



THE UNIQUE PERSONAL COMPUTER PROGRAM FOR COIN COLLECTORS

- The program that makes cataloging your U.S. coin collection a snap!
- Data file with latest Market Value for all grades of most coins supplied on program disk.
- Quarterly Market Value updates available.
- Multiple printed reports give Inventory Value - Profit & Loss - Tax / Insurance Information.
- Concise Users Manual included.
- Available for 48K TRS-80 I/III 84K IBM-PC.
- Write for free brochure or order now.

Price - \$95 (Calif. residents add 6% Sales Tax)
plus \$1.50 to cover postage and shipping

COMPU-QUOTE Telephone 213/348 3662
6914 Berquist Ave. Dept.180 Canoga Park, CA 91307

* BOOKKEEPER *

\$34.50

TRS-80 Model III

Perfect for Small Business
TIME DOME has pre-loaded files

* SCRIPSIT-MAILER *

\$34.50

Form letters, envelopes, labels
from address list and letter
made by SCRIPSIT

(714) 774-9383

H. A. K. Workshop
9791 Orange
Anaheim, California 92804

TAXPLANNER

A VisiCalc™ Template Decision Making Aide

Real Estate
Interest Expense
Alternate Minimum Tax
Stock Sales
Oil & Gas Investment

TAXPLANNER forecasts tax liability, plans withholding and estimated tax payments, and does "What if?" evaluations of investment alternatives. It computes the new alternative minimum tax for 1982 and 1983, and also estimates state taxes.

TAXPLANNER provides a simple two page printout of your tax estimates. Available for IBM PC 96K 1 Disk, Apple II 64K 1 Disk, and TRS-80 Model III 48K 2 Disk. Requires VisiCalc \$49.95 MC or VISA accepted. Dealer inquiries invited.

The Software Connection Box 20
2843 South White Road
San Jose, CA 95148 (408) 270-0450

exclaimed my son when he saw the picture on the instruction sheet for Leaper, "that's the best arcade game there is!"

I hate arcade games. The distributor sent me a copy hoping, I guess, that I'd review it. Here was my chance to write an objective, unbiased review lambasting not only this stupid popular game but also the immature imbeciles who actually buy this trash.

Perhaps I should have suspected something strange when Siegfried, my computer, loaded the tape on the first try — he's never done that before. The clock striking 2 a.m. startled me back to reality. I'd been playing Leaper for five hours — it seemed like twenty minutes. My back and shoulders ached from applying "body english" to get some silly frogs safely past several obstacles . . . I was addicted.

Leaper is a TRS-80 version of the popular arcade game, Frogger. Your goal is to maneuver a leaping frog across a highway with heavy traffic and speeding cars. If you elude the traffic, you must cross a river, jumping from lily pads — which sometimes sink, to logs — which might be crocodiles.

You start with three frogs — and lose one if you don't put it safely into one of six pockets at the top of the screen. When

you have filled all six pockets you progress to a higher skill level — more cars, fewer lily pads and logs. At the fourth skill level (the highest I've reached so far) a snake slithers across what had been a safe strip between highway and river — and a crocodile sometimes replaces a log.

At greater skill levels (the game has ten) the number of logs and lily pads continues to decrease and more crocodiles appear. And a new snake stalks the strip at the bottom. That has to be tough!

This is a fast-paced, machine language game. You move the frogs with the up, down, and side arrows — or a joystick, if you have one. The average journey from start to safety takes less than half of the thirty-second limit. (I suspect that at the greater skill levels I'm approaching, one learns to jump backwards effectively and uses more time.)

What fascinates (and disturbs) me most about Leaper is some things it taught me about myself — things I'm reluctant to admit. Patience and perseverance pay. There's plenty of time to maneuver the frogs to safety. Yet I find that I try to get points faster than necessary — to jump onto a sinking lily pad rather than wait for a stable one or to jump too soon. I find myself ignoring the

conservative qualities of maturity that I try to teach my kids: don't take unnecessary risks — look before you leap.

Is Leaper worth \$15.95? As entertainment — probably. As an inexpensive psychological self-study — definitely.

James A. Conrad

Microterm Smart Terminal Program

Models I/II/III, 12, 16

1 disk 16K minimum

Micro-Systems Software Inc.

4301-18 Oak Circle

Boca Raton, FL 33431

(800) 327-8724

\$79.95

Microterm is a new smart-terminal program from the company that brought us DOSPLUS. Aside from some minor complaints, this package currently represents one of the finest values in this type of software. It is in constant use on my Model I because of its ease of use and great features.

The package is supplied on a single diskette for either the Model I or III. The disk contains a copy of TDOS, which is a stripped down version of the DOSPLUS operating system. Micro-Systems recommends running Microterm only

Don't Leave Your Good FORTRAN Up to Chance

Model II Direct Screen
Input/Output With
Full Editing, \$49.95



For Free Brochure:

The Proper Touch
P.O. Box 13760, 202
Houston, Texas 77219

Add 3-D to your VISICALC®

(No, it's not a new video game.)

Now, you can get a consolidation system for your VisiCalc program that lets you combine multiple VisiCalc 'pages', and there's no need to learn a new system!

- Perform Hierarchical Consolidations
- Perform Time Period Roll-Ups
- Ask "What If" at Multiple Levels
- Customize Report Formats
- Word Processor Interface

VIZ-A-CON™

See your software dealer, or order directly from ABACUS ASSOCIATES, (713) 666-8146, 6565 W. Loop S., Suite 240, Dept. 13, Bellaire, TX 77401

Visa/Mastercard, Call Toll-Free (800) 547-5995, ext. 170

Apple II, II+, IIE, TRS-80 I, III--\$ 99.95 + 3.95 S&H
Apple III, TRS-80 II 12/16, IBM PC--\$139.95 + 3.95 S&H

DEALER INQUIRIES INVITED

FREE business software directory

Micro Architect, Inc.
96 Dothan St., Arlington,

MA 02174

FILE¹ data base for small inventories, mailing list, etc. \$15.00*

CALENDAR¹ disk RS only. Know what, where and when with calendar. \$10.00

STOCKQUEST¹ trend analysis, buy and sell signals. \$11.00

SUPER STOCKQUEST¹ 32K only same as above plus printer output. Capital gain and loss comparisons for up to 38 weeks. Forecasting and more. \$15.00

MONEY PLANNER¹ See how hard your money works for you in a tax-deferred account or tax-free interest. Compared against inflation, your tax bracket. Has printer output. \$7.00

DATA MANIA, INC. 51625 Chestnut Road Granger, IN 46530

Add \$1.50 P/H

* 16K or 32K, specify

¹ Easyright products by OMI

For 16K TRS-80[®] Color E/B and Model I/III, specify

THE ULTIMATE IN SOFTWARE UNPROTECTION

FPS-3 IS A FRONT PANEL SIMULATOR FOR THE TANDY CORP. TRS80 MODEL III **JUST FLIP A SWITCH AND!!!** THE PROGRAM IN MEMORY IS COPIED TO YOUR CHOICE OF DISK OR TAPE. TO RUN THE COPY SIMPLY BOOT THE DISK FROM RESET OR LOAD THE TAPE WITH THE SYSTEM COMMAND. YOU DO NOT NEED ANY TECHNICAL KNOWLEDGE TO USE THE FPS-3. ALL YOU NEED TO INSTALL THE FPS-3 ARE A HALF HOUR OF YOUR TIME AND A SCREWDRIVER. THE COST FOR A COMPLETE FPS-3 IS ONLY \$50.

**WHAT THE SOFTWARE GODS
HAVE HIDDEN**

**THIS LITTLE
SHALL REVEAL DEVIL**

J.E.S. GRAPHICS, P.O. BOX 2752,
TULSA, OK. 74101 CALL 918 742 7104.

COLOR COMPUTER 16K Extended BASIC

GRAPHICS CHARACTER SET \$12

- Upper/Lower Case
- Machine Language Subroutine
- Use in 8 Graphics Modes
- Uses BASIC String Variables
- Design your own Characters

FULL FEATURE MONITOR \$ 6

FORTH (32K + Cassette) \$15

KIDS CORNER - Kid Tested!!

FLASH CARDS (Over 1000 Words) \$12

NAME THAT TUNE (1 2 Player) \$ 6

KID STUFF 1 (Ages 4 and up) \$ 6

KID STUFF 2 (Ages 5 and up) \$ 6

Send for details

FORTHRIGHT SOFTWARE

278 Connecticut Ave
Newington, Ct. 06111

ULTRA TERM

The best TRS-80 terminal package at any price. Why pay \$129 or more?

Split screen, 1K print buffer, half and full duplex support. Direct to disk file transfer permits unattended operation of host computer! Supports RS Modem 2, Hayes Smartmodem, Lynx and more!

Only \$59 Postpaid

Send check or money order to:

Computers Unlimited

3174 Hylan Blvd.

Staten Island, NY 10306

(212) 979-6689

MC & Visa Accepted - C.O.D. \$3 Extra

COPYCAT

DISK BACKUP UTILITY

- Allows you to duplicate most protected software
- Automatically copies: **\$34.95**
 - Multiple Sector Sizes
 - Dual Density Tracks
 - Any Sector Numbers
 - False Track Numbers
 - Bad Sector ID's as used for Protection
 - False Side Numbers
- Complete error messages
- Requires 48K and 2 disk drives
- Specify Model I or Model III

OMNI SOFT RESEARCH

2170 W. Broadway, #501 B

Anaheim, CA 92804

714-772-5000

VIZ.A.CON

A CONSOLIDATION SYSTEM
for VISICALC users

New product adds 3-dimensional
capability to any VISICALC model

Now with the help of VIZ.A.CON you can combine multiple "pages" of data from a model for hierarchical consolidations (eg Dept., Div., Co.) or for summations over periods of time (eg Week, Month, Quarter, Year-to-date).

Typical uses are to combine weekly sales reports or departmental budget data. You can create a complete network of consolidation processes and modify it any time (eg for Merger & Acquisition analysis)

Special formulas (eg ratios, percentages) can be recalculated after any consolidation. VISICALC precision is maintained for all data. You can customize titles, row and column headings, footnotes, etc for each report.

VIZ.A.CON creates data files usable with VISICALC. After VISICALC "what if" games, use VIZ.A.CON to find out what happened

Model I/III \$89.95 Model II \$119.95
TOLL FREE 24-HR. SERVICE 800-547-5995 (Ext 170)
— Visa/Master Card —

Or mail Check to:

A B A C U S ASSOCIATES
Suite #240, Dept. 101
6565 W. Loop South, Bellaire, TX 77401



"Creating Simple Solutions to Complex Problems"

We'll give you this \$175 software package for \$24

2 Games! 7 Personals! Mod I/III

OSCAR DRAFT, SPECIAL
MISSION PILOT

Exciting flight program. Full instrument panel. Real navigation, bombing, strafing, dogfights. Great graphics. 32K

THE WIZARD'S CITY. Adventure

PERSONAL PROGRAMS

Income Tax—Financial Statement—
Mail List—Bus. Mileage —Tax File
Income/Expense—Stock Charting.

DISK ONLY. IF YOU USE TAPE, ORDER
DISK AND HAVE IT COPIED. AT
\$2.67/PROGRAM, HOW CAN YOU LOSE?

Add \$1.50 shipping.

BAPS 6011 SAN FELIPE
HOUSTON, TX 77057

MULTI DOS^{*} is the New DOS LEADER

with
more features
than any other DOS
and at the best price—99.95

ORDER TODAY FOR
SURPRISE FREE BONUS.

TRS80 MOD I/III VISA/MC

CDC

13715 Vanowen Street

Van Nuys, CA 91405

(213) 873-6621 or 1 (800) 692-5235

* TM

under TDOS or DOSPLUS; many of its features rely on DOS-specific drivers. We were successful in running the program under NEWDOS/80 Version 2. However, at least one of the built-in features of Microterm did not function properly with it. More about that later.

Upon booting up, the Microterm program is autoloading and the operating logo appears at the top of the screen. This is the normal communications mode. To start communicating, simply dial the phone number, connect the modem, and start typing. The Model III version is guaranteed to talk at 4800 baud with no nulls inserted (nulls are do-nothing characters that slow down the data stream so that the other computer does not drop characters.) Two computers, directly-connected, without a modem, are able to talk at 9600 baud. According to Micro-Systems, Model I's are certified only to 600 baud null-free because of differences in interrupt handling.

The command mode is toggled by hitting the CLEAR key and the main menu appears instantly. The transition is so fast that the program continues to accept input from the RS-232 port without slowing down or missing any characters. When you toggle back to the communications mode, all of the data that was sent during the time in command mode is there. This feat is accomplished by means of an overflow buffer. There is a time limit while in this mode of about 27 seconds at 300 baud (or six seconds at 1200 baud), but it is a really terrific feature!

Twenty commands are available from the main menu. Six commands are for the buffer (a buffer is a data storage area in RAM - about 34K bytes in a 48K machine). The first command toggles the buffer open or closed for manual reception of data. When downloading files, most host bulletin boards send codes to open and close the buffer automatically, but there are times when you need to do it manually. The clear buffer command erases the entire buffer. There are load buffer and save buffer commands that allow data to go to and from the disk. You may also print the contents of the buffer. The transmit command allows you to send the buffer contents to the remote computer. Several options allow prompted send, character delay time, and even an automatic timed-transmit. This last feature allows unattended transmission of the buffer at a preset time, such as when the phone rates are lower.

The next group of commands are used to set various operating parameters. You may set your RS-232's baud rate, word length, number of stop bits, and parity as well as select half or full duplex, video line-width, suppression of linefeeds or

carriage returns, and toggle the line printer on and off. These are standard features on most smart terminal packages. However, the ability to alter any of the parameters while on-line, without missing characters, is unique.

You also have special commands. The first of these defines the ten macrokeys. A macrokey is a user-defined character string of up to 64 characters that may be transmitted automatically upon receipt of an ASCII 05 (ENQUIRE) signal. It may also be sent manually by pressing a function key and any numeral between zero and nine. Macrokey 0 is automatically sent upon receipt of the ENQ signal and functions as an auto-logon message. The ampersand (&) may be used in the definition of a macrokey to link one macrokey to another. Macrokeys eliminate a lot of repetitive key strokes when logging on, off, or sending recurring data.

Autodial modems are fully supported. One command selects the type of modem. Now implemented are the Hayes Smartmodem, Radio Shack Modem II, Lynx, Microconnection, Signalman MK VII and others will be supported as they are developed. Another command allows you to set or change the ten names and phone numbers in the phone number table. A third command allows you to dial any one of the ten numbers that were previously set in the table. After the phone number is selected, the number is automatically dialed and the communications mode is toggled. It is one of the handiest and most versatile auto-dial utilities I have seen.

There are seven additional translation tables, besides the phone table, that can be altered or examined. They are for the keyboard, display, printer, buffer input and output, and RS-232 input and output. These tables allow you to customize your system's hardware to Microterm. For example, the printer table can be altered to use a printer that takes other than ASCII characters, or to filter out control codes that could cause double-width printing or other undesirable results.

Other commands are for exiting to DOS, executing any DOS command (works only with DOSPLUS), and saving and loading Microterm files. These files consist of all of the configuration settings and translation tables so that several files can be saved for different types of bulletin boards. An unlimited number of files can be stored and retrieved at will, subject to disk space. This also helps to make Microterm outstanding. In addition to the command menu, the status of all parameters is displayed while in command mode.

Also, there are two utility programs which are included for no charge. They are XFER/CMD, a direct file transfer

program, and FILECONV/CMD, which is an ASCII to Binary conversion program. These utilities allow the transmission and reception of machine language programs between two computers that have similarly equipped utility programs. Utilities like these are rarely supplied with smart terminal programs, or at best, they are offered as an option for extra cost.

The 140 pages of documentation are excellent, with many clear examples of each feature. I would suggest including a quick-reference card, but it is not critical since its operation is so simple.

There is a problem that needs note. I run a Model I with a home-brew lowercase conversion. Using the TDOS operating system produced no lowercase characters on the screen, even though they were being sent out the RS-232 port. Since the lowercase modification is a non-standard one, it may be that TDOS is incompatible with only my hardware. This limitation was solved by transferring the Microterm files to a NEWDOS/80 disk. All of Microterm's features worked except the DOS commands, but they were compensated for by the miniDOS function that is built-in to NEWDOS/80.

Overall, Microterm rates extremely

TEACH YOUR CHILDREN

SPANISH DRILL AND PRACTICE

An 18 program set of intensive drill and practice for first and second year spanish students. On cassettes for TRS-80 Model I or III. Complete set is \$49.95 and consists of Verbs, Vocabulary, Grammar Usage, and Reading.

ALPHA—Preschool Alphabet Recognition

ALPHA II—More Alphabet exercises

SIGMA—Addition for Grades 1-3

SIGMA-EX—Addition for Younger or Slower Learners

SIGMA-82—Addition, Subtraction, Multiplication, and Division with 9 Speed Levels

Learning To Count Money—Step-By-Step Instruction and Drill

Available on cassette only for TRS-80 Model I or III

Each program \$6.95, two for \$12.00, four for \$21.00

Learning to Count Money \$19.95

Add \$1.00 to total order for First Class Shipment

Mercer Systems Inc.
87 Scooter Lane
Hicksville, NY 11801

Price Breakthrough . . .
Cartridges for EPSON MX-80*
Only \$4.75 each (Plus shipping)

Your choice of black, red, green, blue or brown. No limit. Order as many, or as few, as you want. Mix any way that you desire.

Also available are my latest lists of "goodies" for your EPSON* printer. Get it fast by writing direct to:

P. F. Skeberdis
P.O. Box 27

Fremont, Michigan 49412

Add \$2.00 and give complete address for United Parcel shipping (48 states) and packing. Alaska and Hawaii, add \$4.00 shipping. USA orders only. Mail sales only. Michigan orders add sales tax. Prices subject to change without notice.

*EPSON & MX-80 trademarks Epson America, Inc

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.

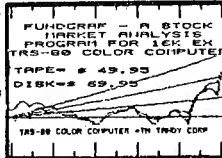
TAKE THE GUESSWORK OUT OF
STOCK & FUND
INVESTING

FUNDGRAP is a new computer program which not only graphs and analyzes funds or stocks, but makes decisions on when to buy and sell. Use a TRS-80 color computer (TM Tandy Corp.) as a valuable investment tool.

- GRAPHS the progress of your funds or stocks
- SUPERIMPOSES for comparison:
 - a line of constant percent growth
 - a graph of any other fund
- CALCULATES over any given time span:
 - percent price change
 - the moving average
- INDICATES BUY and SELL signals

Tape version compares stocks or funds in groups of seven for up to 70 weeks.
 --- \$49.95

Disk version compares any 36 funds on one disk for up to 200 weeks.
 --- \$69.95



-Sample data and detailed instructions furnished.
 -Both versions require 16 K Extended Basic.
 -For more information send S.A.S.E.
 -For your FUNDGRAP program send the price indicated above plus \$2.00 handling fee.
PARSONS SOFTWARE, DEPT. B
118 WOODSHIRE DRIVE
PARKERSBURG, WV 26101

Parallel Printer Switch for TRS 80

Transfers printers, terminals and other devices. Model 80-II/16 instantly transfers parallel devices — without risk of damage that can result when cables are manually unplugged. Contacts are gold plated for minimum resistance, automatic cleaning and optimum performance. Switch position indicates correct channel selection. Beige cabinet, 2" high. \$114.95 plus shipping.

Communication Cable Company
 319 Louella Ave. Wayne, PA 19087
 215-964-9404

DISCOUNTS!

ELEPHANT DISK

type	1 box	2+ bx
5" 555D/soft	21.95	20.95
5" 550D/soft	24.95	23.95
5" D50D/soft	32.50	30.95
8" for Mod II	42.50	40.95
8" for Mod 16	56.95	54.95

SOFTWARE SPECIFY ADD 1 OR III

MULTIDOS	89.95
Z DOS	35.95
E BASIC	26.95
NEWSRIP 7.0	99.95
TRASHMAN/disk	31.95
REGILIAN NORM	13.50/tape 15.95/disk
GEAP/DOTWRITER 1.5	84.95
FONT DISKS 1,2,3,4 ea	25.95

HARDWARE

C. Itoh PROWRITER 1 (parallel)	479.00
PROWRITER 2 (parallel)	679.00
Printer cable (I/III or II)	31.95
HOLMES SPRINTER	89.95

Add NJ Sales Tax if applicable.
 Shipping (48 States) \$2.50 per order.

DIRECT-TO-TAPE

14 Station Ave. Haddon Hts. NJ 08035
 Checks or cash, no credit cards.
 Purchase orders add 10% to prices.
 Write for catalog/newsletter

COMTRONIC SYSTEMS

TRS-80 Model I, III and Color Computers. 16K RAM Required.

ARCADE GAME	TAPE	DISK
B-52 Strategic Bomber	\$10.95	\$12.95
Centurion	\$10.95	\$12.95
F-15 Death Pilot	\$10.95	\$12.95
Raid on Entebbe	\$10.95	\$12.95
Street Fight	\$10.95	\$12.95
Submarine Attack	\$10.95	\$12.95
Air War	\$ 9.95	\$11.95
Killer Satellite	\$ 9.95	\$11.95

ADVENTURE GAMES	TAPE	DISK
Space Colony	\$10.95	\$12.95
Air Cav	\$ 9.95	\$11.95

WAR GAMES	TAPE	DISK
Battle of Midway	\$10.95	\$12.95
Next War	\$10.95	\$12.95
Nuclear Holocaust	\$ 8.95	\$10.95

DISCOUNTS:
 Buy 2 Games, Save 10%
 Buy 3-4 Games, Save 15%
 Buy 5 Games, Save 20%

Add .55 shipping or \$2.55 for C.O.D.
 "SATISFACTION GUARANTEED"
COMTRONIC SYSTEMS
 4028 Somerset Lane, Kent, WA 98032

TRS-80 DISK and TAPE USERS!!!
 Protect your investment in disks and tapes!
 END loading problems One TOOL does it ALL!

Tape Reproduction System

Tape or Disk Utility for Model I or III

- Read TAPE and/or DISK
- Write TAPE and/or DISK
- Verify TAPE written will load
- ANY TRS-80 protocol TAPE
- Identifies BASIC, SYSTEM, EDTASM
- Change program name as desired
- Select tape speed H/L (Mod III)
- Select tape port 0/1 (Mod I)
- OFFSET load addresses
- UNOFFSET load addresses if offset
- Displays operational STATUS plus Diskette directory (0-3) Load Map (start-end addresses) NAME, LENGTH, FORMAT of data START, END, EXECUTE addresses
- Automatic protocol conversion
- SINGLE disk drive copy (Mod I)
- Archives on TAPE for DISK or TAPE
- Run TAPE programs from DISK
- 14 Menu-driven features in all!
- DISK features require TRSDUM

TRSTUM - 16K tape systems ONLY \$16.95
 TRSDUM - 1 drive TRSDOS systems ONLY \$17.95
 Specify Model I or III - add \$1.00 postage and handling
 Send check, money order or SASE to:

CRB Microtools
 "Software Tools for the 80's"
 14835 N. First Avenue
 Phoenix, AZ 85023
 TRS-80 & TRSDOS - trademarks of Tandy Corp

NEW CATALOG OF PROGRAMS FOR THE TRS-80 Model I/III

- Many New Programs
- Quality User-Tested
- Excellent Documentation
- Tape/Disk Compatibility
- Emphasis on Usefulness
- Menu Driven User Friendly
- Low Hobbies Prices
- Money Back Guarantee

Send \$1 for catalog which includes \$2 discount coupon to:

Practical Programs
 1104 Aspen Drive
 Toms River, NJ 08753

POWER LINE PROBLEMS?

SPIKE-SPIKERS™... The Solution!

Minimize equipment damaging spikes and conducted RF noise to or from sensitive equipment. Transient surge protection plus low pass RFI hash filtering. All units 120V 15A.

MINI II \$44.95
 Wall Mount
 3-stage filter
 2 sockets

QUAD II \$59.95
 Wall mount Dual 3-stage filter
 4 sockets & light

DELUXE \$79.95
 Dual 5-stage filtered
 ckt's 8 switch sockets
 main switch, fuse, light

Kalglo Electronics Co., Inc. Order Factory Direct
 65 84 Ruch Rd., Dept 80-U S 215-837-0700
 Bethlehem, PA 18017 Out of State
800-523-9685

DEALERS INVITED
 PA Res. Add 6% • COD add \$3.00 + Shipping

high with me. Its speed is impressive. The ability to use the command mode while still receiving data is impressive. The auto-dial features are the best I've seen in any program. The ability to alter and save all of the translation tables makes it one of the most versatile terminal programs available. Its extra utilities are really handy for transferring machine language programs. The best part is that the price is right.

Jim Klaproth

CHROMAtrs

Models I/III

\$99 kit, \$169 assembled

South Shore Computer Concepts

1590 Broadway

Hewlett, NY 11557

CHROMAtrs is another attempt to add color to the uncolorful TRS-80 Models I and III. The first such product was the Electric Crayon from Percom, Inc. It sold for \$249.95, a little steep for the added luxury. Well, if you must have color, here is a low-cost alternative to buying a Color Computer (sort of).

The CHROMAtrs does give a Model I or III an added 15-color display, assuming that you have a color TV or monitor attached. In addition, the normal black and white monitor is not disabled, even when the color screen is used. In one of the supplied programs (a lunar lander game), the playing field is presented on the color screen while the altitude and fuel gauge are on the normal monitor. The unit gives high resolution graphics of 192 X 256 pixels, an Atari dual joystick interface, and three dimensional graphic ability.

The unit is available as a kit (no cabinet or AC adapter) or fully assembled in a blue, sheet metal cabinet. It is powered by a plug-in AC adapter similar to the type supplied with tape recorders. A ribbon cable costing \$14 ties your computer to the unit and a video modulator costing \$25, for use with a TV set, are required items. We tested the assembled unit, but the manual contains the kit instructions and we would only recommend this project to an experienced kit builder. There is only one circuit board to assemble, but there are several MOS devices that must be handled correctly to prevent damage. The front of the box contains an LED power indicator, an RCA video jack, and an RCA audio jack for direct connection to a monitor or VCR. On the right side of the unit are the 40-pin and 50-pin edge cards for connecting to the computer. The rear panel has two Atari-type joystick controller jacks and a sub-miniature jack for the AC adapter.

The inside of the unit holds a single circuit board and a video modulator. The

heart of the unit is a Texas Instruments TMS 9918A Video Display Processor (VDP) and 16K of dynamic RAM. The VDP features a unique planar representation for 3D simulations. The video display consists of 35 planes, the first being an external VDP plane, the next is the backdrop, then the pattern plane, and then 32 SPRITE planes. (A SPRITE is a object-oriented 16 X 16 animation pattern that can be moved smoothly across the screen.) These planes are all stacked on top of each other, with the external VDP plane being on the bottom. By skillful programming, you could create 3D images. A separate TMS 9918A manual from Texas Instruments sells for \$5 and is available from South Shore Computer Concepts. It is highly recommended for anyone who wants to go into it in depth. The CHROMAtrs manual does contain enough information to get started.

Software is supplied on either cassette or diskette. Our diskette contained the following files: COLOR/CMD, the main color-driver routine; COLOR/ASM, the EDTASM source code for the driver; SSS, a BASIC lunar lander game; SHOW, a BASIC slide show that displays three different pictures; and LINES, a BASIC random line generator and four picture files to be used by the game and slide show. The menu program was missing from our disk, but it did not cause any inconvenience. The driver program contains several call routines for clear screen, reinitialize the controller, set a point, reset a point, test a point, line draw, string print, game scoring, tone generate, as well as several SPRITE function calls and joystick or paddle read calls. Colors are poked into various addresses according to the function desired. For example, to create a cyan background with a red foreground you would first POKE &HB036, 6(red)*16 + 7(cyan) and call address B009.

The SPRITE pattern is defined as either an 8 X 8 or 16 X 16 square of pixels. The location of a SPRITE is defined by the top left-hand corner of the pattern. The entire pattern can be quickly and smoothly moved, pixel by pixel, by redefining the origin. Each of the 32 SPRITES can be moved independently of the main background picture and each other. This gives you tremendous flexibility in programming; however, it's not a task for the beginner or occasional programmer. Knowledge of machine language and a copy of the TMS reference manual are required for SPRITE programming. The user's manual does not state if SPRITE programming was used to create the pictures supplied on the software, but I suspect it was definitely used for the

lunar lander vehicle. The animation in that game was quite smooth, without the video snow usually associated with TRS-80 animation.

My overall impression of the CHROMAtrs is that it offers the devout hobbyist a new toy at an attractive price. I don't see it becoming popular enough to attract any high-level programmers to write good games for it. It may also have some applications for business graphics or display advertising, but only if there is a competent programmer to write the code. This is a caveat that is true for all add-on peripherals. However, for users who like to roll their own, it offers an incredible price-to-performance ratio, especially if built from a kit.

Jim Klaproth

Mac Inker

\$54.95 + \$3.00 s/h

Computer Friends

100 Northwest 86th Ave.

Portland, OR 97229

(503) 297-2321

We generate a lot of paper output here. With all the editing, rewriting, listing, and word processing that we do, printer ribbons quickly became a major expense. For a Radio Shack Line Printer VI, the ribbons cost \$11.95 plus tax. And we seemed to use one up every time we just printed out a 10,000 name mailing list. No longer are ribbons a major expense.

The Mac Inker has truly done what the manufacturer promised. It has practically eliminated the cost of replacing ribbons. We can re-ink a ribbon for about a nickel, and it works as good as new. One ribbon has been re-inked at least a dozen times now, and it is still holding up. In a few cases, the re-inked ribbon has given better print than when it was new.

The Mac Inker is quite a simple device. It is made of metal, has a small drive motor, two inking heads, and is configured to hold a specific type of ribbon or cartridge. You just mount your cartridge, guide the ribbon around the ink pads, turn on the motor and leave it alone for about 30 minutes. That's all. The ribbon is now ready to use after it has had a chance to dry slightly.

We have been using one for six months, re-inked at least 40 ribbons, and are still on our first bottle of ink (refills are \$3.00). You can also get colored ink (red, blue, green, or yellow). We find that our printers work fine and there is no build-up of residue or ink on the heads. Be sure to specify exactly what printer you have so that the Mac Inker you get will fit your ribbon cartridge or spool. It is well-built, works, saves money and easy to use. Buy one.

Cameron C. Brown

EPSON FX-80 PRINTER



Sale Price \$545

All Orders Sent C.O.D.
To Order, Call or Write:

Team Computer Products

170 Daniel Rd.
Hamden, CT 06517
Phone (203) 288-5772

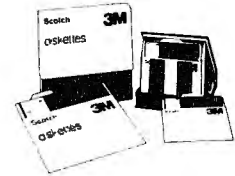
**Tape users!
If you don't have
TXMODE**

word processing,
you're not getting
the most from your
Mod I/III system.
Machine language,
16K up, works with
all printers. Only
\$29.95 + \$2 P&H.
Personal replies
to your questions.

TOPS Programming
8990 SW Camille
Portland OR 97223

Scotch® Diskettes

record reliability



at the lowest price!

Call our Modern Hotline (anytime) - 619-268-4488
for exclusive monthly specials. Our free catalog
contains more than 600 fantastic values.

ABC Data Products

formerly ABM
8868 CLAIREMONT MESA BLVD.
SAN DIEGO, CALIFORNIA 92123
ORDERS ONLY ITT TELEX INFORMATION
4992217 619-268-3537

800-854-1555



Save 30% to 60% on your
ribbon costs by recycling.

- ★ Clients provide empties
- ★ 100% guaranteed
- ★ We pay freight both ways on orders of 3 dozen or more

Radio Shack LP111 or V \$5 88 ea
Radio Shack Multistrike 44 88/doz
NEC Spinwriter Multistrike 44 88/doz
NEC Spinwriter Nylon 49 88/doz
Hundreds of others available

Call 1-612-370-0185
1611 Park Ave. S.
Minneapolis, MN 55404

LARGE CAPACITY SYSTEM LARGE
SMALL & reg 32K 2 drives
LARGE CAPACITY PROGRAMS M3
ACCOUNTS RECEIVABLE
5000+ ACCOUNTS
30-60-90 DAYS AGED STATEMENTS SHOW
DATE/INV#/DESCRIP/AMT (WITH AGEING)
SELECTIVE FINANCE CHARGES & RATES,
FAST ENTRY, POSTING W/AUDIT REPORT,
SUB-ACCTS. % OF CREDIT LIMIT, DATE OF
LAST PAYMENT, SALES ANALYSIS
GENERAL LEDGER
400+ ACCOUNTS
+REPORT FLEXIBILITY/CAPACITY
+DEPARTMENT P&L (UP TO 9)
+UNLIMITED ACCOUNT CATEGORIES
+STATEMENT OF CHANGES (ASSETS ONLY)
+PERCENT P&L
149.95 Each ★ Both for 199.95
HOLMAN D-P SERVICE
2059 WEST LINCOLN 3.00 S&H
OROVILLE, CA 95965 VISA OR MC
916-533-5992 COD
manual \$30 00 test set \$50 00

SECUR-IT

Co Co - Cooler

- Brings operating temperature to ambient, regardless of accessory load
- Reduces temperature of ENTIRE computer... not just the SAM chip
- Easy 1-Minute installation



Model I/III Software \$39.95

- Send For Free Catalog
- For Fastest Service Send Money Order Or Certified Check • Add \$2.00 Shipping Charge Per Order • Calif. Residents Add 6 1/2% Sales Tax • All Merchandise Shipped From Stock •

REM Industries, Inc.
9420 "B" Lurline Ave., Chatsworth, Ca. 91311
(213) 341-3719

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.

**Color Computer
Secrets Revealed**

Learn all about the secret inner workings of your Color Computer. This new book tells you how to:

- Make back-up copies of machine language programs
- Merge two or more BASIC programs
- increase your memory for free
- Upgrade your Color Computer to 16K, 32K or 64K RAM and add Extended BASIC
- Run your computer at twice normal speed
- Use a myriad of PEEK and POKE statements and much, much more

All this in an easy-to-read and profusely illustrated book. A must for every Color Computer owner — just \$11.95 + \$2 shipping. Order direct from:



DISK 'N DATA



5450 Rugby Street
Burnaby, B.C., Canada V5E 2N1

BARCLAY WHYTE ASSOCIATES



**WORDPROC I-III
VERSION 3-0**

Basic plus machine language Word Processor
TRS-80® Model I/III 48K Disc

Special Version Now you can embed control codes in your text for

Superscript Subscript Underline
Italics More Supports all MX-80™ typefonts

Special only \$14-95 each, with disc
\$10-95 each, documentation only

BARCLAY WHYTE ASSOCIATES
P.O. Box 948,

New Westminster
B.C. Canada. V3L 5C3.

Add \$1-00 for postage
B.C. Residents add tax at 6%

*Trade mark of Tandy Corporation
**Trade mark of Epson America

This bulletin board space is available free to individuals with single or unusual items for sale or trade, and for other announcements of interest to the general readership of this magazine. 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 announcements must be typed, contain 75 words or less and include complete name and address.

For Sale: Percom Data Separator for the Model I. Check or money order for \$20 will own it. Send to Construction Engineering, Inc., 125 Irving St., P.O. Box 2154, Framingham, MA 01701.

Gifted Student Program: Pacific Lutheran University, Tacoma, WA, is offering an enrichment opportunity for gifted high school students. One of the sessions is a computer games workshop run by Leo Christopherson, author of many well-known and highly entertaining TRS-80 games. The three week, residential experience will help the student learn what is needed to prepare, design, copyright, graphically enhance, and otherwise get a TRS-80 Model I/III or Color Computer game ready to market. During the class, which runs from July 18 to August 5, 1983, the student will attempt to prepare his or her own game for selling. For more information, contact Summer Scholars Program, Office of The Provost, Pacific Lutheran University, Tacoma, WA 98447.

For Sale: Model I/III software. Thirty to seventy percent off, includes documentation. Cassettes and some disks. Includes utilities, games, word processor, and original programs by mathematician and magazine columnist. For free list (no obligation), send a sase to Dr. Michael Ecker, 129 Carol Drive, Clarks Summit, PA 18411. Will also consider trades.

5-pin DIN Plugs for Color Computer hackers. I had quite a difficult time finding the cables and plugs, but when I did, I bought in quantity. 5-pin DIN plugs for \$2.50 each ppd., and five feet of 5-conductor (22GA) stranded cable for \$3.00 ppd. Excess postage refunded on multiple orders. Contact H. M. LaBonville, 121 Camelot RFD 5, Bedford, NH 03102 or call (603) 472-3369.

First triple bulletin board system ever is now being run by Spectrum Projects. Access can be made through (212) 441-3755, 441-3766, or 441-5719. The boards are open 24 hours, every day. Soon to be added is a 20 Meg hard disk, multiplexer and multi-user capability. Bob Rosen is the sysop.

Complete Business System for sale. Best offer taken on TRS-80 Model 16, 8.4 Megabyte hard disk, Line Printer V, cables and more. Radio Shack software includes Time Accounting, Mail List, Accounts Payable, General Ledger, TRS-XENIX, and TRSDOS 4.1 and all manuals. Contact Schweinler, Lowenberg & Lopez, 950 Fawcett Ave. South, Suite 211, Tacoma, WA 98402 or call (206) 572-4114.

User Groups: I am currently working on an article about computer communication and user groups. If you belong to, or know of, a bulletin board service or user group, please send me the name, address, and phone number. It does not have to be an exclusively TRS-80 group. Forward information to Mark Renne, 53 Glacier Court, Bozeman, MT 59715.

CLASSROOM SOFTWARE for the 16K TRS-80

Easy-to-use software for models I/III with tape disk or network. Complete manuals plus on-screen instructions. As simple as typing CLOAD and RUN

Each program recorded twice on a separate side of a quality long-lasting cassette

CLASSROOM PACKS. Each has 4 programs in a subject area and permits self-paced study with unlimited running time. Choice of review or self-test modes plus progress reports and help feature. Missed questions are corrected and recalled until learned. Price \$44.95 each.

- Geography I
- U.S. Government I
- U.S. History I
- Driver Education
- Electronics I
- Music Theory I

- Other outstanding cassette software
- Logic Games Package \$24.95
 - Anagrams \$19.95
 - Scramble-Grams \$19.95

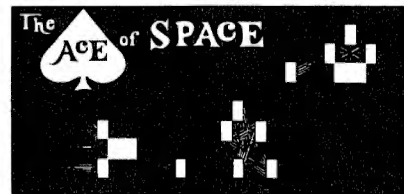
30-DAY GUARANTEE

At local dealers or order direct

Educational Media Associates

Classroom Software
342 West Robert E. Lee
New Orleans, LA 70124

MC & VISA include card # and expiration date. Free shipping on prepaid and credit card orders. Others add \$1.50 per package



Definitely *THE BEST* of the space games for the TRS-80¹ MOD I/III

★ 1, 2 or 3 SIMULTANEOUS players!

• Each piloting a separate space ship

★ Incredibly realistic graphics!

★ Fast arcade response!

★ Options individually selected!

- Meteors
- Flying Saucers
- Bounce or Wrap-Around Screen
- Weapons: Missiles or Lasers
- Blackhole Gravity
- Objects & Mines

★ Difficulty options selectable!

- # of Saucers
- Space Ship Power
- Meteor Speed
- Weapon Supply
- Saucer Speed
- Gravity Force
- Fuel Supply
- Laser Length

★ Sophisticated ship controls!

- Variable thrust level
- Fire left or right barrel
- Rotation • Flip
- Hyperspace

★ Cooperative or Competitive!

- Numerous scoring options
- 1 player can fly 2 ships -1 with each hand!

★ Alpha & Trisstick compatible ★ Sound

32K Disk \$29.95 or 16K Tape \$26.95

Specify MOD I or III. 22 page manual included.

California residents add 6% sales tax.

Outside USA (except Canada) add \$10.00

Copyright 1983 by John McAfee

T.M. TANDY CORP.

SOFT SYSTEMS & CONSULTING
PO BOX 60031B Santa Barbara, CA 93160

End your BASIC or COBOL compiler problems and hassles!

Presenting mainframe-like Batch compiles on a Micro!
"BABY BLUE 80" and "SUPER BLUE 80"

BATCH COMPILER CONTROL DISKS

The Automatic BASIC or COBOL Compiler Control Disks Full control of either the BASCOM or RSCOBOL COMPILERS For LDOS owners with Radio Shack's COBOL or Microsoft's BASIC Compiler

"BABY BLUE 80"

Its automatic because its written in Job Control Language. Choose batch operation mode or control the compiler by selecting from a 9-item menu. Batch mode compiles up to 10 source code programs automatically! Lucid and instructive documentation makes it easy to compile your source BASIC or COBOL programs into super fast machine code, and its easier and faster than on that blue mainframe!

"SUPER BLUE 80"

All BABY BLUE hands-off compilation features, plus when in compile mode you may now custom compile. In batch mode compile up to 10 files directly from the disk directory. *NEW* A dynamic automatic 26-key integrated and coordinated multi-word keyboard. Typing two keys together will execute a BLUE 80 or LDOS command or your own defined word, phrase or sentence.

NEW Full support of all the advanced LDOS features: JOB LOG, ROUTE or LINK, PRINTER SPOOLER, KSM, JCL & SYSTEM program modules in memory for faster over all operation! SOLE double density supported

NEW Designed to be user friendly because of fully error trapped operation with helpfully detailed suggestions

NEW Now includes suggested compiler error corrections! MEDIA: TRS-80 MODEL I/III 35-track single density data disk. Model III owners use CONVERT. Using "SUPER BLUE 80" is easy. If there is an error, it tells you how to fix it. All BLUE 80 versions provide for automatic FORMAT & BACKUP.

PRICES "BABY BLUE" for M'BASIC or RSCOBOL version.....\$45
For both RSCOBOL and M'BASIC versions together, only.....\$80
"SUPER BLUE 80" for each version \$100 or both only \$160
New York State residents add 8% sales tax. Educational, OEM and dealer quantity price discounts available

SUMMER SPECIAL 10% OFF

Comnet Software Associates

© 1982 Write to: Steve Abramowitz
175 Adams St., Brooklyn Heights, NY 11201
(212) 596-2748 EST P.M.

For immediate release

Floppies in color



LSI On the Move

Logical Systems, Inc., the company that brought us LDOS and Galactic Software, has just moved into new quarters. Their old hot-line number, (414) 241-4100, has been changed to (414) 355-4463. Their regular business number is now (414) 355-5454. On June 25th, from noon to 5 P.M., LSI will be hosting an open house in their new building at 8970 North 55th St., Milwaukee, WI 53223 and all 80-U.S. Journal readers are welcome. Correspondence should now be sent to P.O. Box 23956, Milwaukee, WI 53223.

Tallymaster

Tallymaster is a financial management tool designed for people responsible for budgets and sales. Revenues and expenses can be placed in up to 702 categories. Results are displayed immediately and can be printed and stored on disk.

It's menu-driven and has a built-in Help command. Facilities include sorting in four ways, range selection, file merging, and multi-column printed reports. Arithmetic functions allow for simple sales projections.

Tallymaster is \$79.95 on disk, for

the 48K TRS-80 Models I and III. Contact Prosoft, Box 560, North Hollywood, CA 91603 or call (213) 764-3131 for more information.

Floppies in Color

Cenna Technology has designed premium quality floppy diskettes that come in brilliant colors. They are designed to aid in filing, coding, and rapid identification in office and computer environments.

The CenTech Rainbow box contains ten diskettes in five colors: red, orange, yellow, green, and blue. Other combinations are available on request. The 8" and 5 1/4" diskettes can also be obtained in black. All diskettes meet and exceed double density standards and each is sold under a unique 90-day, 5-year warranty for defects in materials or workmanship.

Contact Cenna Technology Inc., 183 Cottage Avenue, Sandy, UT 84070 or call (801) 261-1600 for further information.

CC Grand Prix Game

Computerware introduces Grand Prix, an arcade-style game on cassette and disk for the Radio Shack Color Computer and TDP System 100.

Speed, skill and total concentration describe the action of Grand Prix. The joystick controls the speed and steering of the car. You drive a race car through the Morocco Grand Prix, racing against the clock, gaining points for distance covered on the track.

Grand Prix costs only \$24.95 on cassette and \$29.95 on disk (plus \$2 shipping) and is available from

The Answer is... **NEWSSCRIPT!**TM

THE WORD PROCESSOR FOR BUSINESSMEN AND PROFESSIONALS

With ongoing support directly
from us

A FEW OF NEWSSCRIPT's 200 STANDARD FEATURES:

- FORM LETTERS WITH MERGING OF NAMES AND ADDRESSES
- GIVES SUPERB APPEARANCE TO YOUR FINAL DOCUMENTS
- COMPREHENSIVE MANUAL WITH TUTORIAL AND EXAMPLES
- CENTERING, TOP BOTTOM TITLES, INDENTS, PAGINATION
- UNDERLINING, BOLDFACE, DOUBLE-WIDTH, ITALICS*
- SUB SUPER SCRIPTS, RIGHT JUSTIFIED PROPORTIONAL*
- CREATES TABLE OF CONTENTS, SORTED INDEX
- "LEGAL" LINE NUMBERING
- SCREEN GRAPHICS, SPECIAL PRINTER SYMBOLS*
- SEARCH REPLACE GLOBALLY OR WITHIN LINES, COLUMNS
- BLOCK MOVE, COPY, DELETE, INSERT, FILE MERGES
- AUTOSAVE, WHOOPS, DIRECTORY, KILL
- SUPPORT FOR ALL LISTED PRINTERS IS INCLUDED **
(NO PATCHES INVOLVED) **
- SUPPLIED READY TO-RUN ON "TINY" DOSPLUS
- ALSO RUNS UNDER NEWDOS 80, LDOS, MULTIDOS, TRSDOS

NEWSSCRIPT 7.0:	\$124.95
Mailing Labels Option:	29.95
Special: NEWSSCRIPT + LABELS:	139.95
Daisywheel Proportional Option:	49.95
"Pencil"/"Scriptit" File Convertor:	24.95
NEWSSCRIPT Manual & Reference card only:	29.95
Electric Webster + Correction Feature:	149.50
Hyphenation Feature for Electric Webster:	49.95
Grammatical Feature for Electric Webster:	39.95
Graphics Editor and Programmer (GEAP):	49.95
Dotwriter High-resolution graphics:	69.95
Special: GEAP + Dotwriter:	99.95

REQUIRED CONFIGURATION:

48K TRS-80, MAX-80, LNW, or compatible, with one or more disk drives. Specify Model I or Model III.

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

** Daisy Wheel Proportional is an extra-cost option.

TO ORDER, CALL NOW,

TOLL-FREE: (800)

824-7888, Operator 577

For orders, information, or names of nearby dealers:
(213) 764-3131, or write to us.

Order from your Software dealer or from:

PROSOFT[®]

Dep't. C, Box 560 No. Hollywood, CA 91603

TERMS: VISA, Mastercard, checks, money orders, COD. No P.O.'s accepted. Most orders shipped within 24 hours. Please add \$3.00 for surface UPS in U.S.A., or \$6.00 for UPS Blue Label. Add \$6.00 in Canada, \$15.00 overseas air shipment. 6 1/2% sales tax in California.

BUILT-IN SUPPORT FOR MOST POPULAR PRINTERS[†], INCLUDING:

Anadex, Brother, Centronics, C.Itoh, Diablo, Epson, Gemini, Microline, NEC, Prowriter, Qume, Radio Shack (LP 1-8, DW2, DMP-410, DWP 200-2100), Smith Corona, Teletype, Typewriter, anything compatible with any of these, and many others, parallel and RS-232.

SPECIAL AVAILABLE OPTION: Right-justified proportional for Diablo, F-10, Qume, Spinwriter, etc. Requires "Daisywheel Proportional" Option plus NEWSSCRIPT.

REVIEWERS AND USERS AGREE:

"NEWSSCRIPT" is the best word processor I have seen ... unsurpassed in printer control ... no other TRS-80 word processor can match its ability to format text ... its editor is fast, easy, and powerful."
(80 MICRO, Oct. 1982)

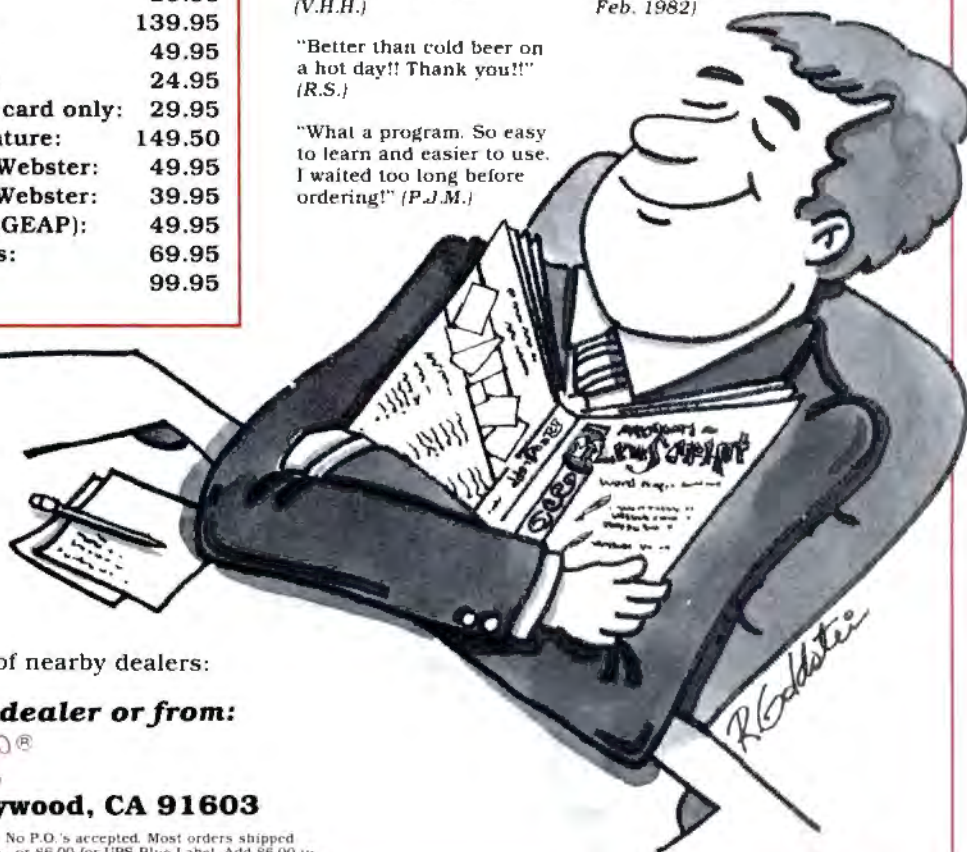
"Your phone information system and the prompt and courteous staff that you provide to help your clients ... are worth the cost of the system."
(V.H.H.)

"Better than cold beer on a hot day!! Thank you!!"
(R.S.)

"What a program. So easy to learn and easier to use. I waited too long before ordering!" (P.J.M.)

"... takes the TRS-80 to a new level of text handling ... very user-friendly ... superb documentation, adaptability to many printers and operating systems ... a standard against which other TRS-80 word processing programs will be judged."
(SOFTSIDE, Dec. 1982)

"... ongoing support second to none, with superb documentation."
(80 U.S. Journal, Feb. 1982)



.. DEALERS ..

DISTRIBUTORS

Don't ignore your cassette customers. We offer you the finest software, including general ledger, sales/inventory, checkbook system, and a horde of top quality science fiction and fantasy games!

Plus, we have excellent dealer and distributor terms. It's EASY to buy from us.

Send your business card or letterhead today for our catalog!

FUTUREVIEW Inc.
PO Box 101
Joplin, MO 64802
(417)781-6999 (orders only)

SUPERSCRIPIT PRINTER DRIVERS

□□□□□□□□□□□□□□□□

**30 DIFFERENT
PRINTERS
NOW SUPPORTED**

INCLUDING

C. ITOH F-10
BROTHER HR-1
SMITH CORONA TP-1
EPSON MX-80/MX-100
OKIDATA MICROLINE 82A/83A
RADIO SHACK LINE PRINTER V
OKIDATA MICROLINE 92/93
OKIDATA MICROLINE 84
C. ITOH PROWRITER
BYTEWRITER
EPSON FX

NEC, IDS PRISM, QUME SPRINT
OLYMPIA ESW 102/103/3000

With an ALPS Printer Driver,
you can use your own printer with
Radio Shack's SuperSCRIPIT
word processing system

□□□□□□□□□□□□□□□□

\$49 or \$59

WE SUPPORT WHAT WE SELL!!

We will answer any questions related to setting up your word processing system.

Additional Printer Drivers Available — Call
Mail / Phone Orders Accepted

ALPS

23 Angus Road
Warren, New Jersey 07060
201-647-7230



For immediate release

Computerware dealers or directly from Computerware at Box 668, 4403 Manchester Ave., Suite 103, Encinitas, CA 92024, (619) 436-3512.

Disk Storage System Book

Inside Personal Computer Disk Storage Systems provides an easy-to-understand "peek under the hood" of personal computer disk storage systems, floppy and hard.

For the person who just wants to know a bit more than the average user, the book gives a full introductory treatment covering disks, drives, controllers and operating systems.

The book is being sold at cost as a public service. Available from Percom Data Corp. for \$5.00, 11220 Pagemill Road, Dallas, TX 75243, (214) 340-7081.

Color Computer Genealogy

The twin programs, Family and Famprint, make it possible for you to keep genealogical information on a 32K Extended BASIC Color Computer. The two programs are only \$9.95 postage paid and they will maintain eight generations and 255 ancestors. You can print out a five-generation pedigree chart, family group charts, and a reference number index. Contact The Word Merchant, P.O. Box 232, Lititz, PA 17543 for more information.

Free Software

As part of a special introductory offer to new subscribers, the Business Computer Network is offering a free telecommunications diskette to microcomputer owners.

Valued at \$49.95, the Business Computer Network programming is designed to operate on the TRS-80 series and other major microcomputers such as the IBM, Apple, Osborne, and NEC.

Access hundreds of data bases and on-line services merely by selecting the desired service from a menu by a single key. Besides the local and national data bases, the Business Computing Network provides object code for downloading of software.

No sign-up fees are required to access the many services. The only charges the user will incur are the normal on-line service charges from the data base itself and a low

monthly utility charge for keeping the software up to date.

The telecommunications system diskette is available free by writing or calling the Business Computer Network, 211 South Forth Street, Basin, Wyoming 82410, (307) 568-2413. Offer expires July 1, 1983.

Bigmem for Model I

Bigmem upgrades the Model I TRS-80 or LNW-80 with 64K keyboard RAM. On power-up, 48K of internal memory is available with or without an expansion interface. With one, 32K of external memory can be port-switched to access utilities and data arrays from BASIC, using the USR function, or to extend the size of machine language programs up to 94K. On power-up, all TRS-80 type DOS's function normally.

Memory can be protected for special routines and drivers. Switching to 64K mode either overlays the ROM with RAM, or remaps the video, keyboard, and I/O to high memory for 64K CP/M operation. The choice is determined by a jumper on the internally mounted controller board.

Installation does involve cutting some traces and soldering. The kit includes eight RAM chips, controller board, internal cable/connector, wire, solder, and detailed instruction manual. For price and further information contact Microhatch, P.O. Box 501, DeWitt, NY 13214.

Convenient Antistatic Device

WattsOut, Inc. has introduced the first convenient and economical antistatic device for use with computers. WattsOut is only 2 X 3 X 1/4 inches in size and, when placed on the equipment and grounded, is to be touched by users before engaging the keyboard. Static electricity that can cause incorrect data entry, circuit damage, and memory loss is harmlessly drawn away.

It retails for \$9.95, far below the cost of an antistatic mat. Contact WattsOut, Inc., 2020 S. Oneida #201, Denver, CO 80224 or call (303) 759-3880.

Executive Software

Above Intelligence is a collection of thought provoking and

entertaining software for use by the sophisticated executive. Over 25 games, brain teasers and printer graphics for the Model II, 12, and 16 business microcomputer with a Daisy Wheel II or line printer.

P.O. Box 101, Joplin, MO 64802, (417) 781-6999.

Speak Up!

Classical Computing, Inc. announces a new Color Computer

BASIC or Extended BASIC. Type in words and sentences to be spoken or add statements to BASIC programs to make them talk.

The cassette, documentation, and a sample program are available for \$29.95 from Classical Computing, Inc., P.O. Box 12247, Lexington, KY 40582.

Antistatic device

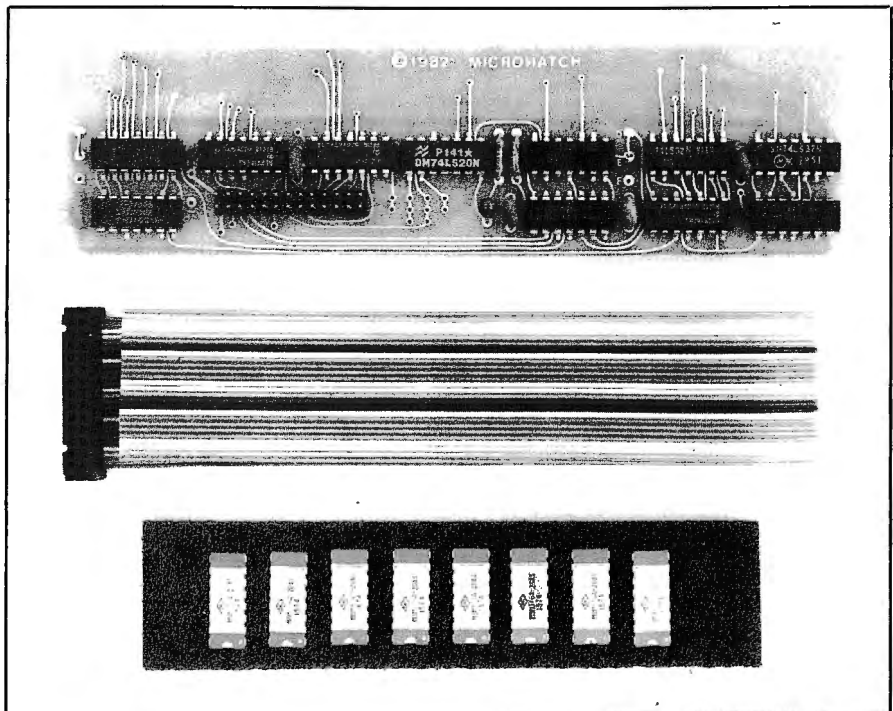


SuperScripts Printer Drivers

ALPS has added a number of new printer drivers to their product line and now support 23 different printers which allow users to attach their printers to Radio Shack's SuperScripts word processing system. Now supported are the Okidata Microline 92, 93, and 84-Step 2, the Epson FX-80, FX-100, the IDS Prism and Microprism, Qume's Sprint 5, the Brother HR-1 and more. In addition, there is now a generalized serial interface program for the TRS-80 Models I/III which will allow serial printer use with SuperScripts, VisiCalc, BASIC, etc. The serial program is \$39 or \$19 with the purchase of a printer driver. For

Check your I.Q., determine how the men and women in your life rate, check bio-rhythm, make banners, print a Snoopy calendar, draw pictures, nudes and more. This collection promotes interest and reduces computer fear among your staff. All programs are easy to operate, each game is menu driven, and instructions are provided. The set of programs sells for \$49.95 and is available from Eberhard Engineering, P.C., 27 Pine Ridge Drive, Smithtown, NY 11787, (516) 543-7777.

Bigmem for Model I



Cassette-based Business Software

Futureview has a complete line of cassette-based business software for the Models I/III or Color Computer. Perform General Ledger (\$49.95), Sales and Inventory (\$49.95), or Checkbook Maintenance (\$24.95) without adding expensive disk drives. All programs perform extensive memory saving and cassette access is kept to a minimum. The manufacturer says that they are very fast and feature a unique sort routine. For further information contact Futureview,

program called Speak Up! It is a voice synthesizer, is 100 percent software, no hardware, and has a small text-to-speech converter. The program uses just over 7K of memory and can be accessed from

complete information on all the printers currently supported, contact ALPS, 23 Angus Road, Warren, NJ 07060 or call (201) 647-7230.

WALL CHARTS

Tired of searching the manual looking for that command you forgot?!? Let our 2 color 18x25 wall charts display it all on your wall to see it all at a glance!!

VisiCalc™ \$4.00

Super SCRIPSIT™ - Mod III \$4.00

General Ledger - Mod III with Account Cycle Flow, Reminders, Tips \$4.00

Profile III Plus© - 108 insert pages for your manual with plain English explanations and examples including two 16x22 wall charts showing where program goes and why \$14.00

General Ledger - Insert pages for the TRS-80© Mod III Disk Manual clarifying the obscure. Section on HOW accounts interact and produce statements. 18x25 two-color wall chart shows Flow, Commands, Tips, Traps to Avoid \$14.00

Quantity Discounts Available

™ or © of VisiCorp or Tandy Corp.

Send cash, check, money order to:
CREST SOFTWARE

2132 Crestview Drive • Durango, CO 81301
(303) 247-9518

Visa, MC accepted, include card # and expiration date
(Add \$2.00 Shipping — We use UPS)

HELP/CMD... A machine language HELP utility for use with NEWDOS-80. Will display a mini-page of information at your request and may be modified to include your own "special notes" \$16.50

RESTORE/CMD (Mod./III only) "Bring'em back alive" with this DOS command utility. If you have just "Killed" your favorite program by accident or intent and now want it back. . .It's as simple as typing RESTORE: XXX:O \$16.50

CAT/CMD (Mod./III only) Put this "CAT" on your disks and read those TRSDOS directories while using NEWDOS or LDOS or ??? or vice-versa. CAT is a DOS-independent program that will display the disk name, date, type of DOS and the directory \$16.50.

BANNER/CMD (Mod./III only) Change that standard introductory DOS banner into something you want to recognize. BANNER will write to disk the code for up to 13 characters that you specify. You may also change the name and date on the disk to match the banner type you want \$16.50.

COMPACT/BAS Get the maximum from your disks with this file compacting utility. It is written in basic and works with most any DOS \$16.50

Get CAT and RESTORE on one disk for \$29.95

Mayday SOFTWARE

P.O. Box 66 • Rock Creek Road
Phillips, Wisconsin 54555
(715) 339-3966

VISA/M-C WELCOME
Personal checks require additional 14 days
All prices include shipping

Advertiser index

Advertiser	Page
ABC Data Products	104
ALPS	108
Aardvark	93
Abacus Associates	99, 100
Access Unlimited	20, 21
Allen Gelder Software	31
Anitek Software Products	89
Applied Microsystems, Inc.	87
Artificial Intelligence Technology	17
Astro Star	60
BAPS	100
Barclay Whyte Associates	104
CDC	50, 100
CRB Microtools	102
Castoro, J., Software	29
Communication Cable Co.	102
Comnet Software	105
Compu Kit	69
Compu-Quote	98
Computer Plus	97
Computer Services of Danbury	96
Computer Shopper	95
Computers Unlimited	100
Comstar Research	84
Comtronic Systems	98, 102
Convert-A-Disk	98
Cosmopolitan Electronics Corp.	67
Crest Software	110
Cybertext Corporation	60
Data Mania, Inc.	100
Dental Computer Newsletter	98
Diillio, Gary	98
Direct-To-Tape	102
Disk 'N Data	104
EAP	102
Educational Media Associates	105
80-NW Books	91
80-U.S. Journal	9
Epson America, Inc.	24, 25
Forthright Software	100
Future View	108
Gamester Software	94
Hexagon	87
Holman D-P Service	104
Holmes Engineering, Inc.	88
Howe Software	15
IJG	74, 75
Institute for Scientific Analysis	77
J.E.S. Graphics	100
Kalgo Electronics Co., Inc.	102

Langley-St. Clair Systems, Inc.	3, 59
Lindbergh Systems	11
Logical Systems, Inc.	111
MCS Software	88
MISOSYS	37, 54
Marymac Industries, Inc.	35
Mayday Software	110
Mercer Systems	101
Micro Architect, Inc.	100
Micro Labs, Inc.	43
Micro Management Systems, Inc.	53
Micro-Software Systems	51
Micro-Systems Software, Inc.	2
Midwest Comp-U-Tron	89
Modular Software Associates	45
Mr. Softy	110
New Classic Software	79
Nocona Electronics	39
Nodvill Software	110
Ocean, Inc.	98
Omnisoff Research	100
Parsons Software	102
Pel-Tek	84
Pioneer Software	46
Powersoft	61, 94
Practical Programs	102
Producer Software	6, 7
Programmer's Guild, The	85
Proper Touch, The	99
Prosoft	19, 107
REM Industries	104
REMarkable Software	55
Radio Shack	56, 57, 112
Rainbow, The	40
Ribbon Renew	104
Rizzo Data Systems	71
Sales Data, Inc.	16
Scientific Engineering Labs	104
Skeberdis, Pete	102
Small Computer Company	63
Snapp-Ware	82, 83
Soft Systems & Consulting	105
Software Connection, The	98
Strobe, Inc.	47
Syracuse R & D	98
TOPS Programming Enterprises	104
Team Computer Products	104
3G Company, Inc.	38
United Software Associates	13
Vespa Computers	41
Zeta Software	97

**NODVILL
DIET
PROGRAM**

\$69.95



"TAKE A BYTE"

MAINTAIN LOSE OR GAIN WEIGHT
With your TRS-80 Double Density Disk Model 1 or III
AND NODVILL Software
The NODVILL DIET PROGRAM "Take a Byte"
is compactly and accurately

- Calculate caloric and nutritive food intake
- Evaluate nutritive value of your diet
- Compare daily diet to individual RDA Chart
- Create personalized daily meals and menus
- Plan varied daily menus based on sound nutrition
- Save records of daily meals and menus for future planning
- Print nutrition charts, food, meal, menu and grocery lists

Take a Byte is a Modular BASIC Program

MAIN Program Menu

- (1) Recommended Daily Dietary Allowance (RDA) CHART
- (2) 733 Expandable Random Access FOOD LIST Data File
- (3) 28 Nutritional MEAL LIST Data File Examples
- (4) 7 Balanced DAILY MENU LIST Data File Examples
- (5) GROCERY LIST Program Module
- (6) 25 Page USER'S MANUAL including Charts and Tables

ALL Data Files can be EXPANDED and MODIFIED systematically and flexibly to reflect your personal diet your choice of diet book or your doctor's suggested diet.

For more information: Call (203) 431-6449
To Order: Mail a check or money order for \$69.95 to:
NODVILL Software
79 Ford Road
Higganville, Maine 04047
© 1984 by a trademark of The Daily Connection

Get to know ...

MR. SOFTY

the affordable MOD. I, III DOS compatible GAME SOFTWARE

10 GAMES-ONE PACKAGE
-on one cassette-

Requires 16K RAM-up. ONLY \$10.95

Shooting Gallery	Purple Puma
Needles in the Hay	Concentrate
Math Smarts	Word Works
Dodge It	Space Races
Hop Along Cass-80	X's and O's

Disk Version Coming.
Look for second package soon!

Please include \$1.50 for S/H.
SEND CHECK OR MONEY ORDER TO:

MR. SOFTY

1416 Ridgewood, Lakewood, Ohio 44107
OHIO RESIDENTS ADD 6% SALES TAX

STRIKE GOLD

with the most sophisticated TRS-80 operating system available!



LDOS can't really turn your TRS-80 gold, but you'll think you've made the LDOS strike of the decade when you turn your micro on to LDOS. You'll find a bonanza of features like full keyboard type-ahead; a true background spooler; file backup by date, class, and between different drive types; hard disk support; data transportability between Model I and III; and a complete communications utility including disk file send and receive. Support for Radio Shack's Doubler and selected others is also provided. With our Job Control Language, you get true "hands off" running of your application programs - give a single command and then walk away. The 400 page manual includes examples of all commands and utilities. The Operator's Guide gives you step by step instructions on how to use LDOS with your applications. Stop running with only "half" a computer! Let LDOS provide the missing features to speed up and simplify your TRS-80 computer system! Visit a dealer or contact LSI for more information on the most popular sophisticated operating system for your TRS-80.

LDOS is available worldwide through thousands of dealers for just \$129.

TRS-80 is a trademark of Tandy Corporation. LDOS is available for the TRS-80 Model-I and Model-III. Prices and specifications subject to change without notice. LDOS is a product of Logical Systems, Inc.

Logical Systems, Inc., 11520 N. Port Washington Rd., Mequon, Wis. 53092 (414) 241-3066

55

**LOGICAL
SYSTEMS
INC.**
◻ ◻ ◻ ◻

Radio Shack Presents The Micro Executive Workstation

- Powerful Built-In Software
- Retains Memory Data When "Off"
- Self-Contained Telephone Modem
- 8K RAM—Expandable to 32K

Only
\$799

Cat No. 26-3801



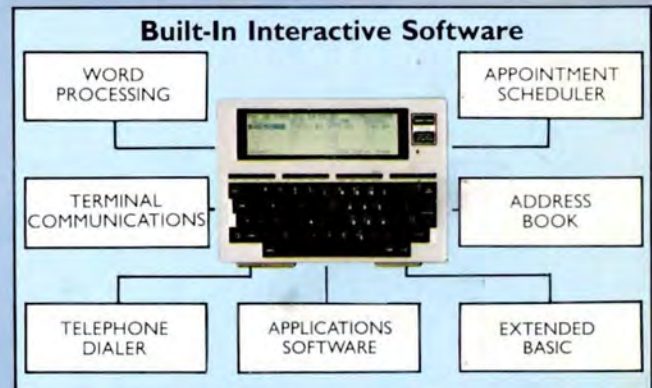
Introducing the TRS-80® Model 100 Portable Computer —User-Friendly Software Makes it Truly Revolutionary

Imagine a computer on your desk so small, it can fit in your in-basket. The second you turn it on, imagine seeing a menu of built-in executive management programs and your own files, ready for immediate use. All revealed on an eight-line by 40-character LCD display positioned just above a full-size keyboard. And when you leave the office, imagine a three-pound computer you can take along, because it works on AC or batteries.

Stop imagining. The new TRS-80 Model 100 is the computer you've been waiting for. As a desk organizer, it's a phone directory, address book, appointment calendar and telephone auto-dialer. It's a personal word processor, as well. There's even a built-in modem to access other computers by phone.

Come see the most revolutionary computer since the TRS-80 Model I at over 6500 Radio Shack stores and participating dealers, including over 400 Radio Shack Computer Centers nationwide.

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



Send me a free Model 100 brochure today!

Mail To: Radio Shack, Dept. 83-A-180
300 One Tandy Center, Fort Worth, Texas 76102

NAME _____
COMPANY _____
ADDRESS _____
CITY _____ STATE _____ ZIP _____
TELEPHONE _____

Retail prices may vary at individual stores and dealers.