Now Incorporating "COMPUTRONICS MAGAZINE"

Basic Computing

The TRS-80 User Journal

Model 100 Spreadsheet

Video Graphics Routines:

- LARGE-SCREEN IMAGES
- MULTIPLE SCREEN DISPLAYS
- COLOR COMPUTER GRAPHICS
- SOPHISTICATED SKETCHING
- GRAPHICS SUBROUTINE LIBRARY

Football Forecasting

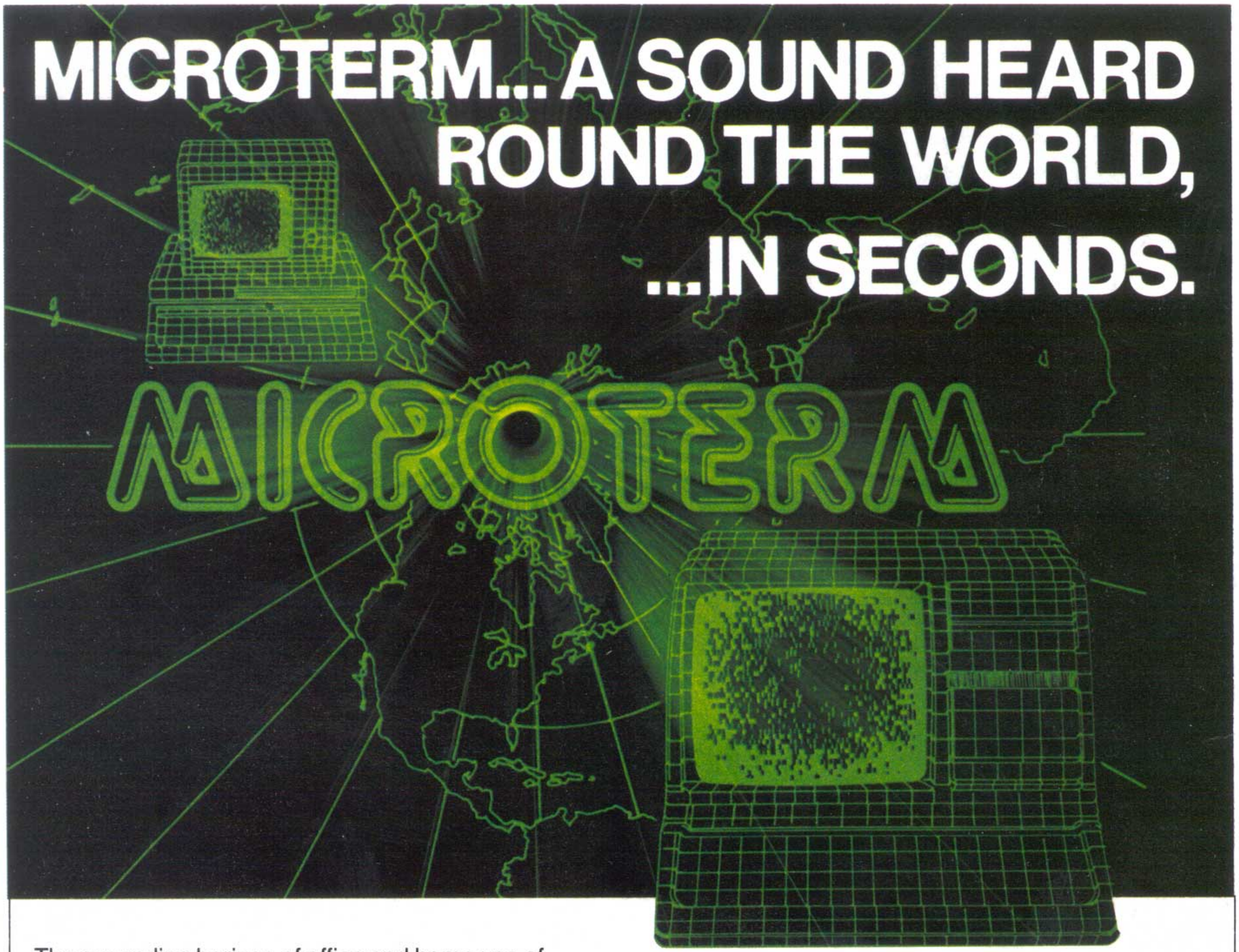
VisiCalc File Listing

Radio Shack PC-4 Review

0 60959 09
0 318585

$3 per copy / September, 1983

MICROTERM... A SOUND HEARD ROUND THE WORLD, ...IN SECONDS.



The expanding horizon of office and home use of new communications and data services tying smart terminals into networks through telecommunications links makes the world need a high speed terminal program.

Busy computers shouldn't have to wait for data simply because an old fashioned link can't handle today and tomorrow's telecommunications. Slow terminal telecommunications can stand the smart operator's world on its ear.

Into today's fast paced world, Micro Systems Software presents MicroTerm, the first truly high speed terminal for this inquisitive world. Some computers can run at up to 4800 baud null-free (9600 in some direct-connect applications).

MicroTerm enables you to do more in less time, in both ASCII and the new "error-free" direct file mode. Its unique Macro-Key function allows you to have 10 user-defined keys that transmit up to 64 characters at a single stroke. You can even dial a phone number and transmit the buffer at a specified time completely unattended by the operator.

And while MicroTerm improves your computer's "ears" by outperforming any other telecommunications terminal program, its low price won't take a bite from your bit budget. It's only $79.95 retail.

You can't lose with MicroTerm's features, performance, price, documentation, or support.

It's the only terminal program enabling you to continue operations in the command mode while receiving additional data through the RS232 cable. And you can adjust video width, turn on the printer, open the buffer and do many other things and then return to the terminal mode without missing a thing.

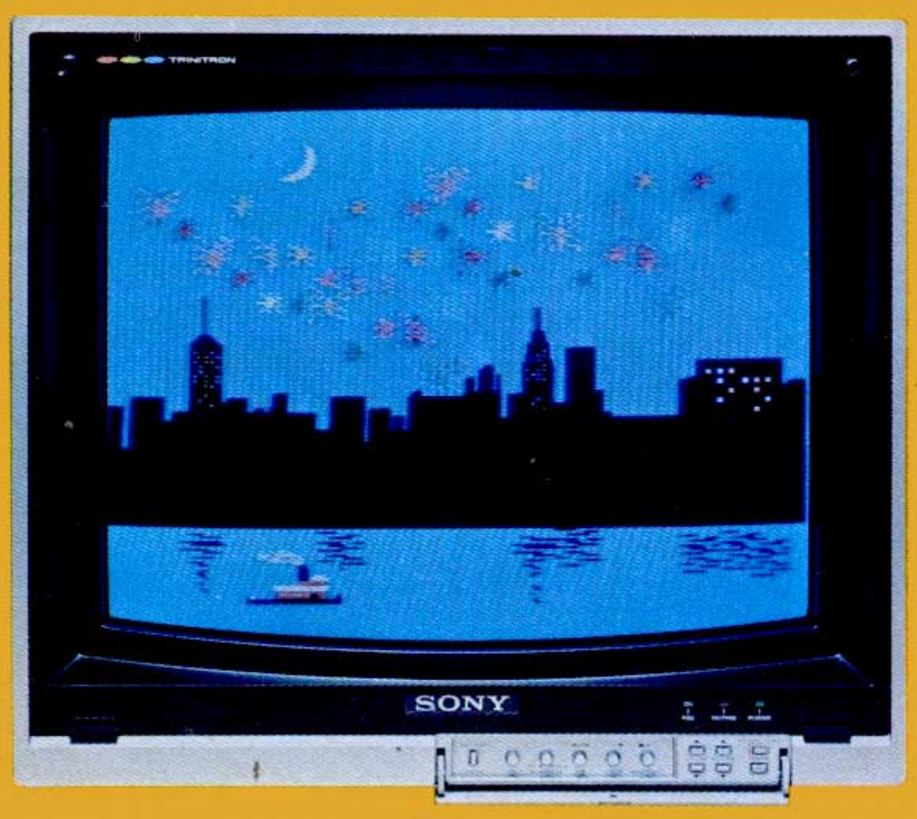
Available for the TRS-80 Models I, II, III, 16, IBM PC, Zenith Z-100, and Apple II computers.

If these advantages are what you want in your world, communicate with your nearest MicroTerm dealer. For information contact: Micro Systems Software, Inc., 4301-18 Oak Circle, Boca Raton, Florida 33431,
Telephone Toll Free: 1-800-327-8724
In Florida (305) 983-3390

MICRO-SYSTEMS SOFTWARE, INC.

4301-18 Oak Circle, Boca Raton, Florida 33431, Telephone: (305)983-3390
Toll Free 1-800-327-8724

CELEBRATE!



Actually Produced With CHROMAtrs.

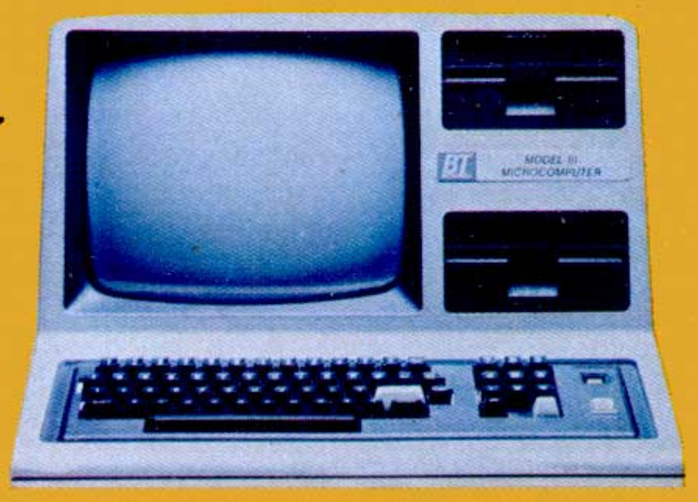
CHROMAtrs™ MAKES IT HAPPEN

This powerful peripheral offers you 15 brilliant colors, lets you produce sensational effects the same day you plug it in! Easy-to-use "CHROMA BASIC" gives you 71 CHROMA COMMANDS to use in addition to regular BASIC. You can devise your own exciting games, plot points and lines, do 3-D rotations, translations, create a large range of sprite graphics, produce charts and graphs, and make great sound effects.

This is a quality product that can multiply the value of your TRS-80. Supplies are limited and prices subject to change. A word to the wise: Order TODAY!

HERE'S NEW LIFE FOR YOUR OLD TRS-80

MOD I & MOD III



Now You Can Create Spectacular Color Graphics... Exciting Sound Effects... Paddle & Joy Stick Game Action!

ONLY $199!

(American Version. For European Version & accessories, see coupon below.)

CHROMAtrs™ Comes Complete With:

- 15 vivid colors
- High resolution graphics (256 x 192)
- 2 Atari joystick and paddle connectors
- 3-D animation using sprite graphics
- 16k display RAM
- Programmability in BASIC
- LOGO language subset on disk
- One complimentary game
- Easy-to understand operating manual
- Does not affect Radio-Shack warranty
- Money-back guarantee

I own a TRS-80 ☐ Model I ☐ Model III ☐ 16K ☐ 32K ☐ 48K

☐ CHROMA BASIC (Previous owners only)	$30
☐ CHROMAtrs assembled & tested, USA	$199
☐ CHROMAtrs assembled & tested, European (except France)	$230
☐ RF modulator with switch box	$25
☐ Mod 1 ribbon cable	$12
☐ Mod 3 ribbon cable	$14
☐ Cassette software	(free with CHROMAtrs)
☐ Diskette software	(free with CHROMAtrs)
Subtotal	_____
N.Y.S. residents add 8.25% sales tax	_____
Shipping and handling (USA)	$7.50
TOTAL	_____

Check one: ( ) Check ( ) M.O. ( ) COD ( ) M.C. ( ) Visa

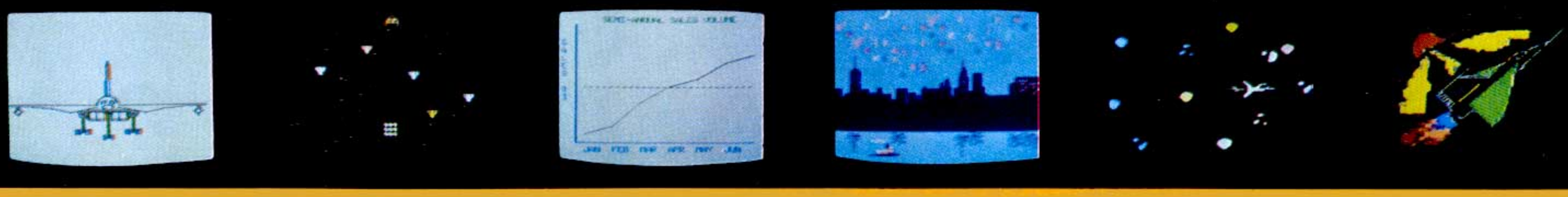
Account # _____ Exp. _____

Name _____

Address _____

City _____

State _____ Zip _____



MICRO CONTROL SYSTEMS, INC.

(Formerly South Shore Computer Concepts)

1590 Broadway, Hewlett N.Y. 11557
Phone orders accepted (516) 569-4390

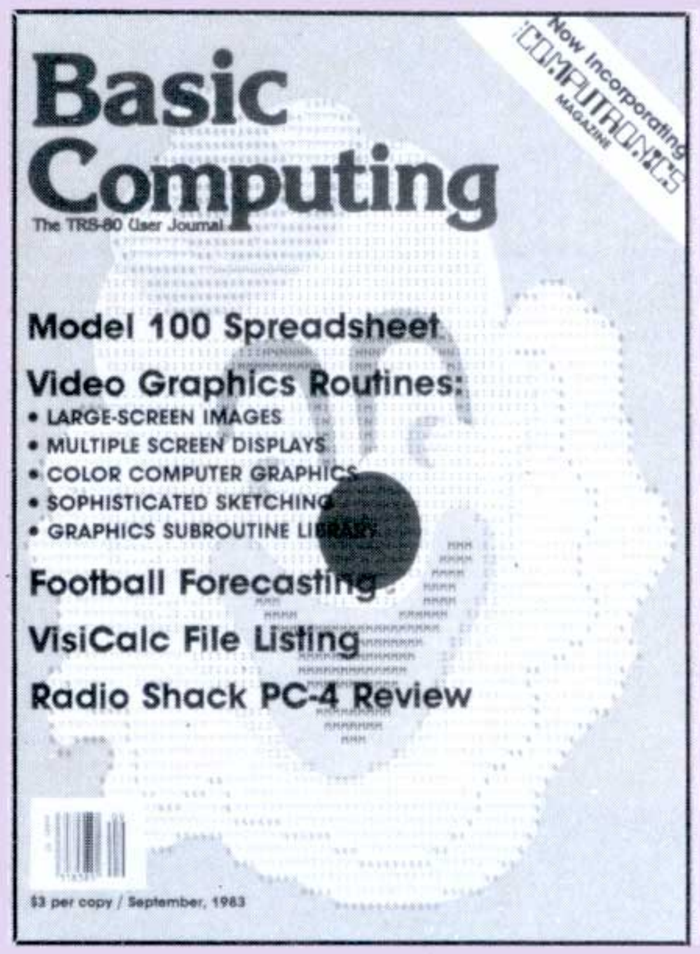
© **1983 80-Northwest Publishing, Inc.** All rights reserved. Reproduction for other than personal, non-commercial purposes, or further distribution in any other form, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. While every precaution has 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: **Basic Computing, 3838 South Warner Street, Tacoma, Washington 98409, (206)475-2219 voice, (206) 756-0448 modem.**

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, but please include a hard copy as well. 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. Basic Computing pays upon acceptance rather than on publication.

SUBSCRIPTION PRICE: U.S.: $19.97 for one year, $34.97 for two years and $49.97 for three years. **Canada and Mexico:** $29 per year, no two or three year subscriptions are offered. **All other:** $36 per year via surface mail, $78 per year via airmail. Two and three year subscriptions are not offered.

ISSN Publication #0199-1035. Basic Computing 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 Basic Computing, 5615 West Cermak Road, Cicero, Illinois 60650. **Second Class postage PAID at Tacoma, WA and additional entry points.**



Our cover clown is a color-enhanced actual printout from a program on page 40 entitled "Pictures without graphics" by Bud Myers. In contrast to this month's video graphics theme, Mr. Myers shows how to obtain pleasing pictures on your printer without graphics characters.

Basic Computing

The TRS-80 User Journal

TRS-80 is a trademark of the Tandy Corp.

Vol. VI, No. 9 — September, 1983

ARTICLES

The big picture **16**
Models I/III — John Corbani
Create large-scale images with this full-screen editor.

Minicalc **24**
Model 100 — Terry R. Dettmann
Spreadsheet calculations for those on the go.

Making the Model 100 sit up **29**
Model 100 — Donald Stevens
Make portability more comfortable.

Upper- lowercase converter **30**
Model III — Jeffrey C. Ruble
An automatic conversion routine.

Graphics a la cassette **31**
Color Computer — Lynard Barnes
It's pure Hollywood and the effects are spectacular.

Pictures without graphics **40**
For all models — Bud Myers
Print pretty pictures like the one on the cover.

Computer ease — 46
For all models — Mark E. Renne
What's it all about, this thing called a computer?

PC-4 — 48
Pocket Computer — Joel Sampson
The new pocket computer from Radio Shack.

In the chips — 52
Models I/III — Spencer Hall
Tapping the Z-80's power with calls and how to read your EDTASM listings.

Football forecasting — 58
For all models — E. C. Brown
Track the pros or your local favorites the easy way.

BASIC bits — 66
Models I/III — Thomas L. Quindry
Hints for developing your own disk writing utilities.

VisiCalc lister — 69
Models I/II/III — Arnt K. R. Sviland
A utility to print out, in order, your VisiCalc files.

Exploring VisiCalc — 72
Models I/II/III — Timothy K. Bowman
The Liaison sort utility from Kjell Engineering.

Graphic subroutines — 74
Models I/III — Jim Peyton
Easily rotate, reverse or make mirror images on your video.

Etch art — 82
Model III — Dan Keen and Dave Dischert
More than just sketching.

Basically BASIC — 86
For all models — James A. Conrad
Using the PRINT USING statement.

REVIEWS

The Producer — 90
Reviewed by Charles P. Knight

Arranger — 93
Reviewed by Lawrence I. Charters

Geography Pac — 94
Reviewed by Roy Seney

CCP-1 Serial/Parallel Interface — 95
Reviewed by Stuart Hawkinson

TRS-80 Assembly Language Subroutines — 96
Reviewed by Gary A. Shade

Pandemonium — 98
Reviewed by Stuart Hawkinson

Tanktics — 98
Reviewed by Robert Strydio

DEPARTMENTS

Editorial — 6
By Cameron C. Brown

Letter to H&E Computronics Readers — 8
By I. Mike Schmidt

Letters to the editor — 10

Notes, etc. — 14
By Cameron C. Brown

Tandy topics — 78
By Ed Juge

For immediate release — 102

Bulletin board — 107

Advertiser index — 108

Editorial

By Cameron C. Brown

I want to suggest something that may make all of our lives a little easier. Years ago, the United Nations, through its UNESCO branch, sponsored the development of Esperanto. That new "language" was aimed at providing a common link for people whose native tongue was either English, Spanish, French, or Portuguese. If you were fluent in any one of those languages, you could read material that was written in Esperanto (it was always meant to be a written language "hybrid", not a spoken language). Let's see if such a language can be developed for the microcomputer.

Just imagine this. There is one supervisory language for all of us, no matter which computer we use. That meta-language is our "Esperanto". Our code is then passed through an interpreter and made specific for our model or brand of computer. If "erase" is the command to clear the video, the interpreter will make it come out to be HOME on my Apple, or CLS on my TRS-80. A Color Computer interpreter would dutifully change all paper print commands to PRINT #-2 and my Model II interpreter would come out with LPRINTs. What could be easier?

Each computer would have its own interpreter. We would be able to still take advantage of our machine's unique capabilities. We would not be burdened, as we are now, with having to write BASIC code that only uses the simplest of commands to insure compatibility. Let the interpreter worry about generating the peeks and pokes. In my super-language I just request a screen flip, or video save to disk, and the interpreter makes the appropriate peeks, pokes, supervisor calls, or other commands.

Perhaps I am asking for too much, but I am sure that the frustration we have here at *Basic Computing* with incompatability is negligible compared to that of the software producers. How does Microsoft keep it all straight? Even the different BASICs they have developed for the models I, III, 4, CC, MC-10, II, 12, and 16 are all different.

Software writers are now forced to develop specific versions for every model. Each time they ignore a model or brand of computer they cut down on their sales. As it is now, a computer with only(!) 100,000 owners goes begging for software development (except for the limited number of programs that the hardware manufacturer may develop).

It is time for the development of a meta-language. The debate over IBM-PC versus TRS-80 Model 4, Pascal versus BASIC, Z-80 versus 6809, intrepreters versus compilers should end. With a meta-language we can get on with what is truly important -- making our life a little better through the use of computers.

Basic Computing
The TRS-80 User Journal

Publisher
I. Mike Schmidt

Managing Editor
Cameron C. Brown

Associate Editors
Terry R. Dettmann
Spencer Hall
Jim Klaproth

Contributing Editors
Timothy K. Bowman
James A. Conrad
Bob Liddil
Thomas Quindry

Advertising Coordinator
Catherine Shappee

Advertising Representatives
East of the Mississippi River
Garland Associates:
John A. Garland, Frank Surace
(617) 934-6464

West of the Mississippi River
The Manning Company
Neal Manning
(408) 268-5649

Promotion/Circulation
Robert P. Perez
Julie Bartz

Production
Catherine D. Doud

Accounting
Helen Dalton

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/Zip _____

Write in new address:

Name _____
Address _____
City/State/Zip _____

Basic Computing
Subscription Department, 5615
West Cermak Road, Cicero, IL 60650

LOGICAL SYSTEMS AND YOUR MODEL 4
CREATE A FUNCTIONAL COMBINATION

LS-FED II 6.x (FILE EDITOR) — The ultimate "Zapping" utility with Visual Disassembler built in. File and/or track/sector oriented. Catalog. #L-30-012.
only $49.00 plus $3.00 Shipping & Handling

LS-FM 6.x (FILE MANAGER) — Conditional Parameterized, Move, Kill, Cross Examine, Create Secondary Action Files and Much, Much More. Catalog #L-30-051.
only $49.00 plus $3.00 Shipping and Handling.

LS-TBA 6.x (The BASIC Answer) — TBA'S 5 Pass Text Processor allows structured programming for TRSDOS 6.x Basic. 14 character variables and Local variables (PSUEDO). No Line Numbers, use Labels instead, with Cross Reference System.
Catalog #L-21-011 only $79.00 plus $4.00 Shipping & Handling

LS-HELP 6.x (BUILT IN 6.x TUTOR) — The Handiest Utility a New Model 4 owner could possibly have. Provides almost all the information needed to use the powerful features of TRSDOS 6.x.
Catalog #L-30-061
only $29.00 plus $3.00 Shipping & Handling.

All of the above products are also available for the TRS-80™ Models I and III running under the LDOS 5.1 Operating System.

Contact Logical Systems, Inc. for a free detailed catalog containing these and many other products.

* Prices and Specifications subject to change without notice.
* TRSDOS™ and TRS-80™ are Trademarks of Tandy Corp. LDOS, LS-FED II, LS-FM, LS-TBA, LS-HELP are all products and trademarks of LSI. (The authors of TRSDOS™ 6.x)

LOGICAL SYSTEMS INC.

LOGICAL SYSTEMS, INC. 8970 N. 55TH ST. MILWAUKEE, WI 53223 (414) 355-5454

80-Northwest Publishing, Inc.
3838 South Warner St. • Tacoma, WA 98409-4698 • (206) 475-2219
Basic Computing
80-NW Books
THE PRINT SHOP

Computronics Readers:

Welcome, former **H&E Computronics Magazine** readers! This issue of **Basic Computing** represents the first of a series which will complete your subscription to H&E Computronics Magazine.

After negotiation earlier this summer, Howard Gosman, President of H&E Computronics, Inc., and I have reached agreement concerning merging the readers of his publication with those of Basic Computing.

Unexpired subscriptions to H&E Computronics Magazine will be filled on a one-for-one basis starting with this issue of Basic Computing.

H&E Computronics Magazine readers who were subscribers to both magazines will have their subscriptions extended on a one-for-one basis.

As most of you are aware, H&E Computronics, Inc., has been a source of excellent software for the TRS-80. Mr. Gosman has every intention of continuing to support the TRS-80 through software and other merchandise. You will see his ads in this and other magazines.

We welcome you as new readers of Basic Computing. We are certain that you will find nourishing and entertaining material in each issue.

Our hat is off to Mr. Gosman and H&E Computronics, Inc., for not letting his readers down. We also appreciate his choice of Basic Computing to carry out his obligation to you, the readers.

Welcome aboard!

I. Mike Schmidt
Publisher, Basic Computing

Basic Computing

The TRS-80 User Journal

FORMERLY 80-U.S.

I've never heard of Basic Computing. Why?

You've been missing something. Since 1978, we were called **80-U.S. Journal**. We have now changed our name to more accurately describe what we write about. We are computerists who publish a journal, not publishers talking about computers.

What is Basic Computing?

We are a monthly magazine covering all models and aspects of the TRS-80 microcomputers. Each issue contains a mix of articles and programs for every level of expertise in the computing field.

We have regular columns and departments to help both the beginning Color Computerist and the advanced Model III assembly language programmer. We make a special effort to make our publication understandable to beginners and advanced computerists alike.

What makes Basic Computing special?

We give complete program listings that are from working programs, not just bits and pieces of computer code. Material in our journal comes from actual computer users, not writers who have little hands-on experience with your model. We discuss and give working programs for every model of TRS-80. If you own a TRS-80 Model I with exotic hardware additions, or use a Model 100 to communicate to a Model 16B, we have information you need.

What does it cost?

Only $19.97 for a full year's subscription. That's less than $1.67 per month for one of the most informative magazines you can buy for you and your computer. Even greater savings are possible with longer subscriptions.

Ok! I want to subscribe. What do I do?

It's easy. Fill out the attached order card and drop it in the mailbox.

BACK ISSUES

FORMERLY 80-U.S.

May/Jun 1979
String packing techniques
Determine functions of the brain
How to win Nim-type games

Jul/Aug 1979
Create fast graphics
Renew lost programs
No-hardware lowercase mod.

Nov/Dec 1979
Function grapher/root finder
Home heat loss program
Restoring killed disk files

May/Jun 1980
Telecommunications with the TRS-80
BASIC game program technique
Produce sound with BASIC programs

Nov/Dec 1980
Simple payroll program
Digital plotter interface
Produce keyboard typeahead

May/Jun 1981
Line packing techniques
How to use "PRINT USING"
Animation and the TRS-80

Jul/Aug 1981
Descending lower case for Model I
Student timetable program
Easy tape loading for Model I

Sep/Oct 1981
Keyword search database
Compute a retail installment contract
The vertical mill: a 3-D plotter?

Nov/Dec 1981
Comparison shopper program
Real time clock construction
Pocket Computer biorhythms

Jan 1982
Microcomputers in business

Feb 1982
Micros and word processing

Mar 1982
Microcomputers and medicine

Apr 1982
Microcomputers and investments

May 1982
Space: An infinite frontier

Jun 1982
Games issue

Jul 1982
The TRS-80 in law offices

Aug 1982
Microcomputers in education

Sep 1982
Graphing and graphics

Oct 1982
Microcomputing tips and tricks

Nov 1982
Telecommunicate with your computer

Dec 1982
Disks and DOSs

Feb 1983
Computer languages: Reports on Pascal, COBOL, Pilot and Forth

Mar 1983
Data base management

Apr 1983
Computers in government

May 1983
Special peripherals issue

Cost is $4.00 for each back issue ordered. Use the reply card to order, or you may write/phone Basic Computing, 3838 South Warner St., Tacoma, WA 98409-4698, (206) 475-2219.

Letters to the editor

By Cameron C. Brown

I am writing you today in regard to a serious problem that the modem users in the state of Oklahoma are facing.

Southwestern Bell Telephone Company's Oklahoma tariffs call for the charging of an "Information Terminal Service" rate for anyone connecting a computer to the telephone lines via a modem.

This rate is approximately 500 percent higher than the standard residential base rate. The present residential rate is around $9.00 per month. If you connect a computer to the line, with a modem, even if you only call CompuServe once a month, the rate jumps to a whopping $45.90. The additional charge for Touch Tone™ service also increases, from $1.25 to $3.50 per month. This will undoubtedly increase dramatically if Bell gets the $301,000,000 increase that they just applied for with the Oklahoma Corporation Commission.

Obviously, this tariff dramatically affects the entire industry, as the tariff for all practical purposes prohibits non-commercial, hobbiest modem use. And if Bell is permitted to get away with the enforcement of the tariff (as they are now beginning to do), a precedent will be set for other local operating companies to follow in other states.

Apparently, Bell is just now beginning to apply this 1965 tariff to non-commercial modem and computer users. And although Bell representatives have fallen back on the age of the tariff as an excuse, they have no intention of exempting residential modem use from the provisions of the tariff.

Therefore, the Oklahoma Modem Users Group, or simply OMUG, is fighting Southwestern Bell and their unfair tariff. We are doing this through media attention, responsible organization, speaking at Corporation Commission hearings, and if all else fails, we will institute legal action to attempt to force a change in the tariffs.

Because of the national attention this issue is just now beginning to attract, and the fact that we desperately need more support, we have taken several steps to ensure that people are informed. We have a mailing list and we send out a bi-weekly newsletter covering the latest updates on the tariff situation. We have also established a 24-hour hotline, (405) 360-7462, which is updated daily with a one to three minute recorded announcement.

Robert Braver, President
Oklahoma Modem Users Group
P.O. Box 5981
Norman, OK 73070

This could easily become an issue for all of us, not just those in Oklahoma. Recently, we made a call to the hot-line and there was a plea for help in getting the legal fund going. Looks like it will be a long struggle to keep the hobby use affordable. -Ed.

I really look forward to each issue. I have increased my abilities as a "self-taught" Model I, BASIC programmer since I started reading *Basic Computing*. The contributors to your magazine have helped me, so I would like to contribute the following program. It is not fancy programming, but it is short and

SUPERSCRIPSIT PRINTER DRIVERS

With an ALPS printer driver (software), you can attach your printer to the SuperSCRIPSIT word processer. Over 45 printers now supported. Call, write, or circle reader number for latest Product Review Sheet.

Epson MX-80 and MX-100 (Graftrax-Plus) / FX-80
C.Itoh Prowriter (8510) / F-10 / FP-1500-25
Qume Sprint V / IDS Prism / Microprism
Olympia ESW 102,103,3000 / ES 101,105
NEC 8023 / Spinwriter 5530,7730,3530
Diablo 630,1610,1620 / DTC 380Z
$59

Okidata Microline 82, 83, 84, 92, 93, 84S2
Smith-Corona TP-I / Gemini 10,15 / AJ 831
Bytewriter / Olivetti ET121 / Brother HR-1
R. S. Line Printer V / DW1 / Man.Tally 160
Adler 1010,1030 / Royal 5010,5030 / Comrex CR-1
$49

Serial Interface Program for Serial Printers $19
Can be used for applications other than SCRIPSIT

MODEL 4

NEW FOR MODEL 4 OWNERS

Utilities to access Model 4 features while in Model III mode.

Run Model 4 at high CPU speed (4 MHz)
Test Memory (Up to 128K) Automatic Routine
Clear Memory Routine
Use Sound (Beep)

All Four Utilities on Diskette
$18.99

Mail / Phone Orders Accepted
ALPS
23 Angus Road
Warren, New Jersey 07060
201 - 647-7230

works fast.

Jerry B. Price
Santee, CA

```
10 REM - DECIMAL TO HEX
15 REM BY JERRY B. PRICE
16 REM    SANTEE, CA
20 CLS
30 PRINT "DECIMAL TO HEX C
ONVERSION"
40 CLEAR 50: H$="123456789
ABCDEF"
50 INPUT "ENTER DECIMAL IN
TEGER ";N: HX$="0000": N1=
4096: P=1
60 IF N<0 OR N>65535 THEN
PRINT "BAD RESPONSE. RE-EN
TER.": GOTO 50
70 IF INT(N/N1) >=1 THEN M
ID$(HX$,P,1) = MID$(H$,INT
(N/N1),1)
80 IF P<>5 THEN N = N - (N
1*INT(N/N1)): P=P+1: N1=N1
/16: GOTO 70
90 PRINT "HEX = "HX$: PRIN
T: GOTO 40
```

Thank you. Readers, please note that the program will work only on models that support the MID$= command.--Ed.

Several months ago, I began a search for an accounts payable and receivable program for our Model III. Our business is not that unique (manufacturer's rep. firm, seven employees), but I found few packages to fit our needs. Although some packages allowed user modification, I wanted to avoid modifying someone else's software. I had done this with a mailing list program and it was very time consuming; I also have to sell for a living. When I was about to compromise and purchase a payables and receivables package for $300, which met about 80 percent of our needs, I just happened to drop by a Radio Shack Computer store which had a batch of Profile III Plus software. Taking a flier, I plunked down $200 and walked out with a copy.

It took me about ten hours of study time. I developed our accounts receivable program first and it took about three hours to define and two hours to implement. Because I learned the in's and out's of the system the first time, accounts

We have CP/M® for Radio Shack computers.

2,000 new programs for your TRS-80® 12.

CP/M is the runaway leader in disk operating systems, but until now owners of Radio Shack computers have been locked out of the thousands of useful programs that operate on CP/M.

Now you can put the power of CP/M into your Radio Shack TRS-80 II, 12, or 16, and be able to use all the popular and useful software—and hardware—that has been previously out of your reach.

Use any printer.

Instead of being chained to Radio Shack hardware, you'll be able to add a video terminal, any printer (serial or parallel) and several Winchester hard disk drives with storage up to 80 megabytes.

Uses only 8.5K of memory.

Since our first version went on the market in 1980, we've condensed and refined it into a compact, easy-to-use system enjoyed by thousands of users.

Besides the standard Digital Research CP/M manual, you'll get the 250-page manual we've developed through our long experience in adapting CP/M to Radio Shack computers. Our manual has lots of examples and an index and glossary.

You'll have your first working disk in ten minutes.

Only $200.

The floppy disk version of Pickles & Trout CP/M is $200. The hard disk versions (for Tandy, Corvus, and Cameo) are $250, except for the multi-user Cameo, which is $400.

Yes! Send me free information about CP/M for Radio Shack.

Name _____

Address _____

City _____ State____ Zip _____

Phone _____

or send us your business card.

Pickles & Trout®, P.O. Box 1206, Goleta, CA 93116 (805) 685-4641

PICKLES & TROUT®

TRS-80® Radio Shack/Tandy Corporation. CP/M® Digital Research. Pickles & Trout® Pickles & Trout. ©1983 Pickles & Trout

payables took me only three hours total. The best part was that once configured, the use of the specific database management program is very simple, and with only an hour's worth of training, our secretary was plugging in data and generating reports. Although I answer questions of a minor nature from time to time, I have spent little time hand-holding our personnel who use the system daily.

Since implementing these two functions, we have expanded to include quotation logs, sales forecasts, and inventory management. Development of each of these programs has been progressively easier, and training time shorter. Information retrieval has been simplified significantly and accuracy has been improved.

The $200 I spent has resulted in over $1000 worth of application programs which directly meet our company's needs. And with fewer compromises than packaged software. I would suggest that given some level of creativity, database management system software is one of the best buys a user can make.

Ken Kolkebeck
Harington Park, NJ

We agree. The sophistication of many of the current database manager programs is outstanding. We use Profile II Plus extensively in our office, and even use a self-modified Mail List program from Galactic Software for some of our billing. A good wordprocessor, spreadsheet, and database manager can do wonders to keep your information flowing and in order.--Ed.

My Level II Model I, and/or Stringy Floppy is affected by either sun spots or the fullness of the moon. I was all set to update a data file with some 130 records stored on it. Yes, the file is on a wafer. The first read gave me an out of data error. Repeated tries gave varying results.

The program is written to trap errors, report them, and pause before trying to read again. Before the pause it reports how far it has read before encountering the error. Most of the reports were zero records, sometimes eight, and once it got as high as 36 before whatever causes the problem struck. After many tries, I decided to let the whole thing sleep overnight. I had no backup of the file other than a print out and expected to have to rebuild it from scratch. The next day, after a couple of poor starts, the whole file read in. Whew! Could I explain what was going on? No way! I was just thankful. With the data safely in memory, I did @NEW that wafer by <BREAK> @NEW followed by CONT.

Soon after that, I decided to mess around with another wafer that had given me trouble and had set aside as being worn out. I understand that @NEW is a revitalizer as well as a tester of wafers. Most of the time it will cure the whatevers that make wafers act up. I set out @NEWing that worn out wafer. Again I encountered varying results. It kept telling me different numbers of bytes and parity error. I decided to try a program to do the repeated @NEWs for me. From that bit of laziness evolved this short routine. It has served me well for over two years.

I have the Exatron speed-up kit and do most everything at double speed. It has the extra bonus of, for practical purposes, doubling the wafer capacity. To test if speed was a factor with the sick wafer, I down-shifted to 1.5 times normal speed and then to normal speed. I kept trying sets of twelve @NEWs and averaged about three good (once I got nine to be "good"). That wafer went in the trash can.

John E. Best
Tulsa, OK

```
1 ' LOOP THRU @NEW TO CERT
IFY WAFER
1Ø CLS
2Ø PRINT @25,"WAFER VERIFI
ER"
21 ON ERROR GOTO 4Ø  'SET
TRAP
22 FOR Y=1 TO 12 ' GIVES A
 FULL SCREEN
23 PRINT Y;  'SHOW COUNT A
S WE GO
24 @NEW  'THIS IS THE ONE
EXATRON COMMAND
25 X=X+1
3Ø NEXT Y  'GO DO ANOTHER
31 PRINT X "GOOD OUT OF "Y
-1 'PRINT SUMMARY
32 END
4Ø RESUME 3Ø 'TRY AGAIN
```

Regarding the puzzler on the history of the word debug (December 1982). Can there be any doubt that it started in the trenches during WWI (The Kayser's War, as it was called), and spread to computers, when they arrived, by a normal metaphorical extension? I quote from a letter of the period, from my father to his father, November 24, 1918. No address, but probably Fort de Plesnoy nr. Toulouse:

"So I am all alone at the hut in the Casual Camp for the time being, except for Brown, who is sitting next to me reading some kind of magazine. At the present time he is singing that little song entitled *There's someone in Flanders more lousy than you.* This is a very comforting thing to think of, I assure you. They have a new word for getting a bath and change of underware over here. They don't speak of it as getting a bath, but as being 'deloused,' or 'debugged'."

R.W. Odlin
Sedro Woolley, WA

It is getting harder and harder to pick the winners. --Ed.

I read Mr. Kenneth Goodwill's *Lowercase and more* in the June, 1983 issue. I had been thinking about it for sometime and decided to do it your way. It all went together just like you said. I turned it on and typed in Listing 2. Everything worked okay but you had to use shift all the time to get lowercase.

I thought about it for a while and decided to try and use another driver listing. I had a Radio Shack lowercase driver, so I put it in and what do your think happened? It works just like a typewriter. Shift for uppercase and lowercase is there all the time. My a's are right on line but my g, p, q, and y are all above the line. That's okay. Thank you for the article, maybe this Radio Shack driver will help someone else.

Edwin Parcell
Wichita, KA

I've tried contacting you via your bulletin board *(206/756-0448 -Ed.)*, but have have never gotten through. So much for high tech. (Maybe if you

used Xenix with a multiplexed modem . . .)

I have several short items to inflict upon you. First, your name change is the pits. Here you are, the senior TRS-80 magazine, and *you* change *your* name. You should make everyone else change their name! At least, will you retain your logo and stick it somewhere on the cover?

Tano Corporation, which imports a snazzy-looking imitation Apple from West Germany, will be selling a U.S. version of the English Color Computer clone, the Dragon-32, starting in July 1983. Starting in September, the units will be manufactured in New Orleans, and retail for $399. For more details, write: Tano Corporation, 4301 Poche Court West, New Orleans, LA 70129. They also have a toll-free dealer hotline, 800/327-7671.

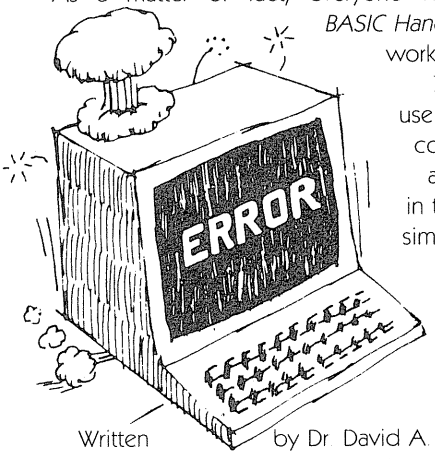
The June issue of *Computer Decisions*, a pretentious industry journal, has a list of the top 100 U.S. data processing and computer firms. I referred to last year's list in my December 1982 editorial, and this year's figures (all for 1982) are most interesting. IBM is ranked 1st with $31.4 billion in revenue, DEC is 2nd with $4.0 billion, Texas Instruments 15th with $746.7 million (up from 16th), Tandy is 16th with $725 million (up from 20th), Apple is 19th with $663.8 million (up from 23rd), Commodore is 26th and Warner (Atari) is 39th. If Tandy does as well as everyone seems to think it will (with the Model 4, Xenix, Model 100, a new Color Computer, why not?), it might -- just barely -- make the top ten.

Finally, someone had fun when they made the Model 100. If you peek at memory locations 63900 through 63918, you will find the name Suzuki Hayashki (more commonly Romanized as "Hayashi"). Mr. Suzuki has, if nothing else, an original method of signing his work.

Lawrence I. Charters
Bremerton, WA

Sorry, the logo went with the name change, but we did stylize it into our letterhead. Let me see if I have this correct, we are now getting in the states a West German production of the English version of an American Color Computer. Hmm . . . --Ed.

When your computer won't speak your language, you need a basic handbook.



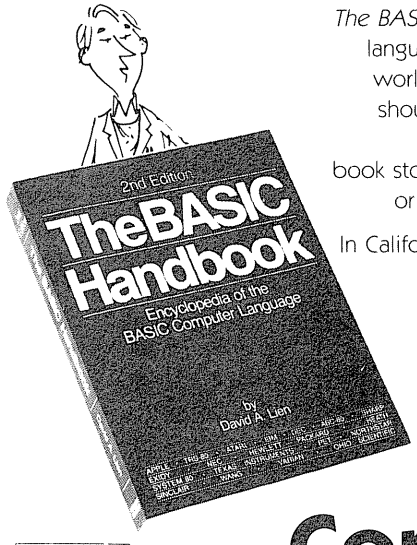
As a matter of fact, everyone who works in BASIC needs *The BASIC Handbook*. It is *the* definitive reference work on the subject of BASIC.

The BASIC Handbook is an easy-to-use encyclopedia of nearly 500 words covering the "dialects" used by virtually every BASIC-speaking computer in the world. But more than that, it's a simple, step-by-step guide to translating programs from one computer to another. So now you can actually *use* software printed in magazines and elsewhere, no matter what computer you own.

Written by Dr. David A. Lien, author of the *Tandy TRS-80 Level I User's Manual* and the *Learner's Manuals* for the Epson MX printers, this completely revised Second Edition contains almost twice as many entries as the best selling First Edition, making it by far the most up-to date BASIC reference book you can buy.

The BASIC Handbook

Extensively indexed and cross-referenced, *The BASIC Handbook* gives you 480 pages packed with the information you need to be a better programmer. And if, after 30 days you don't agree it's indispensable, send it back. We'll return your money.



The BASIC Handbook is available in several languages and accepted throughout the world. No one who programs in BASIC should be without it.

Available at better computer and book stores, or call (800) 854-6505
In California (619) 588-0996

To order by mail, send check or money order for $19.95 (California residents add 6%), plus $1.65 shipping and handling. Overseas orders send $19.95 plus $2.38 surface shipping and handling.

VISA
MasterCard

CompuSoft® Publishing

535 Broadway, Dept. 130983, El Cajon, CA 92021

Notes, etc.

By Cameron C. Brown

Our listings

Our proof-readers have asked us to pass this along to you. When we print out a program listing, or shoot a picture of actual output, what you see is exactly the way the author submitted it. We show it as we got it, spelling errors and all. We would rather insure a correct working program than take the chance of an error creeping in due to program editing. We know that it is coding, not codeing, or granule, not granual. We hope you agree with this policy. Feel free to correct the spelling errors in programs as you enter them. Now, maybe, the proofers will talk to me again.

Exatron Update

There has been quite a change at the Exatron company and some readers have asked us to help them locate service and supply outlets for their Stringy Floppies. Exatron has changed its name to Entrepo and has ceased providing direct customer support. In our search, we were led to Mr. Jim Howell, the son of the founder of Exatron. Here is his explanation of what has happened at Exatron/Entrepo and the connection with his company, A & J Micro Drive:

"The take-over of Exatron and the change of name were a consequence of the need to raise capital financing by Exatron to continue its development of the wafer and wafer drive. As money was brought into the company, the new investors (by suggestion of a large PR firm), changed the name to Entrepo (French for unlimited storage). The new direction the company was taking was to focus on large OEM accounts. Entrepo was looking for someone to build and sell the end user products and the smaller OEM products.

That is where I came in and said I would like to take over that part of the business. I am, as you know, the son of the former chairman of the board of Exatron and had been with the company from the beginning. I am going to start out with the Model I products, as well as the tapes, and build from there. I hope to have a full line of products available by year's end."

Readers who have Stringy Floppy needs can contact Mr. Howell at A & J Micro Drive, 1050 East Duane Ave., Suite I, Sunnyvale, CA 94086 or call (408) 732-9292.

Corrections and Updates

Operation Genius, May 1983 (again!) has a line of code in it that is difficult to enter. Line 300 is over 256 characters long and you need to do some fancy footwork to get it to enter. Type as much as you can, until the keyboard will no longer accept any input. Press enter. Then type EDIT 300, press X, and you will be in the insert mode at the end of the line. Now just type the rest of the line as we listed it. You must be sure to have 250 periods in A$ for the program to pack its graphics characters. If you define A$ to be too short, you will get errors.

High Resolution Graphics, September 1982, by Kenneth Smith, has caused some problems with dot-addressable printers other than the Epson MX-80 (with Graftrax-80). Mr. Smith wrote us to point out that his method of checking the printer ready status in line 280 may be the culprit. For his machine and his printer the result of peeking location 14312 is a 61. That value may not be universal for all systems. According to the Model III manual, the value in location 14312 should be "AND"ed with 240, giving a result of 48 whenever the printer is ready to accept data. So, a correction to line 280 that will work with other configurations is:

```
280 IF (PEEK(14312) AND 240) <>
48 THEN 280
```

TRSDOS 1.3 Patches (Model III)

Mr. Neil Morrison of White Rock, British Columbia, Canada, sent in some patches for the Model III operating system. You may also find them useful. Be sure that you apply them only after making backup diskettes. Do not use them on a master diskette. Also, be advised that you should only use the patches you feel you need. If you like your TRSDOS just the way it is, don't change it. We are publishing these changes as information only, not a recommendation.

To bypass the DATE question:

```
PATCH *0 (ADD=4EB5, FIND=
CD1B02, CHG=B72846)
```

For TRSDOS 1.2, use:

```
PATCH *0 (ADD=4EB7, FIND=
CD1B02, CHG=B72846)
```

For long error messages on TRSDOS 1.3 do the following:

```
PATCH *4 (ADD=4E28, FIND=20,
CHG=18)
```

To do the same thing on TRSDOS 1.2:

```
PATCH *4 (ADD=4E29, FIND=20,
CHG=18)
```

The rest of these apply to TRSDOS 1.3 only. To restore read protection:

```
PATCH *0 (ADD=4760, FIND=18,
CHG=38)
```

To remove read protection:

```
PATCH *0 (ADD=4760, FIND=38,
CHG=18)
```

The next series should only be applied if you really want them. They can allow you to destroy files. The first one will allow you to write to any file. The second allows LOAD

from DOS. The third will (usually) stop memory clearing. The fourth allows any file to be opened and the fifth allows any file to be killed:
PATCH *0 (ADD=47F5, FIND=62, CHG=F7)
PATCH *0 (ADD=4BF6, FIND=38, CHG=18)
PATCH *1 (ADD=4E5D, FIND=20, CHG=18)
PATCH *2 (ADD=4ED4, FIND=20, CHG=18)
PATCH *3 (ADD=4F6C, FIND=38, CHG=18)

These next four patches will alter the stepping speed of TRSDOS 1.3 from six milliseconds to 10 milliseconds. Use CHG=0F rather than 0E and CHG=1F rather than 1E if you want to change the speed to 20 milliseconds. Be careful with these, changing disk drive head speed can affect the reliability when reading and writing to disk. For many owners the speed change can be beneficial, but due to a variety of factors involving your own hardware and software, they may cause problems. Again, as with all DOS patches, try it out and verify that everything is okay before committing yourself to it.
PATCH *0 (ADD=42EE, FIND=0C, CHG=0E)
PATCH *0 (ADD=4516, FIND=0C, CHG=0E)
PATCH *0 (ADD=4544, FIND=1C, CHG=1E)
PATCH *0 (ADD=4FE1, FIND=0C, CHG=0E)

In This Issue

Our theme for September is video graphics and there are some wonderful routines listed. Mr. Corbani's *The Big Picture* lets Model I/III owners create, and scroll through, graphics that are many times larger than a single video can show. Color Computer owners have an excellent sketching program and the results you obtain are only limited by your own imagination. Not to be out done, Model III owners can flip between two different screens instantly with *Etch Art* by Dan Keen and Dave Dischert.

The football season is upon us (Yes, I know it now lasts almost all year, but I am a traditionalist.) and we have a program that can help you take advantage of it. *Football Forecaster* by E. Charles Brown does a wonderful job predicting winners and beating point spreads and it is for any model computer. But remember, bet at your own risk.

I have saved the best for last. Terry Dettmann has created a wonderful Model 100 program that we call *Minicalc*. It is a straightforward spreadsheet program that can have hundreds of uses for those of you on the go. You can enter values, formulas, labels, and compute those "What if?" problems with ease. The program is exceptionally well remarked and Terry challenges you to add enhancements.

Reader Service

We had to drop reader service for a few months since it was overwhelming our staff and we were looking for alternative methods. Reader service will resume in October and we hope you use the cards. Be sure to tell the advertisers that you saw it in *Basic Computing*. We have also added an editorial response card. That one will come directly back to me. Let me know how you like the issue. Your responses will insure that *Basic Computing* continues to be the magazine you want it to be.

Puzzler

In July we asked for how many "round" numbers were there that are less than or equal to 1000. A "round" number was defined to be any decimal number whose binary representation has an equal number of ones and zeros. Our answer is 175; but as always, there are some really eagle-eyed readers out there. Mr. Darryl Nester of Normal, IL and Mr. Tony Pepin of Tacoma, WA both pointed out that there are really four possible answers. If you are not picky about leading zeros, 2(decimal) is round in a two-bit field (10 binary), but is not round in a four-bit field (0010 binary). Since 1000 takes ten bits in binary, limiting yourself to a ten-bit field gives a total of 252 round numbers. In a 16-bit field (one word) you get 36 round numbers. If you take the 1000 to already be in base 2, there are only three round numbers! But who, outside of really dedicated machine language programmers, would assume an unlabeled number is in base 2? Common practice is to assume base 10 unless otherwise told.

Using a bit-field with the first bit a one and ignoring leading zeros, there are 175 round numbers. That is, use a four-bit field for the number 9 (1001 binary) and an eight-bit field for the number 240 (1111000 binary). Ignoring leading zeros is the commonly accepted practice and this is the one we were looking for.

Many readers were on track and we have selected the winner by drawing the card at random. The winner is: Kenneth Johnson of So. St. Paul, MN. We hope Mr. Johnson enjoys his $10 and free tour of *Basic Computing* whenever he is in Tacoma. By the way, some of the postcards you sent were quite beautiful. Thank you.

This month we have a puzzler that was suggested by Mr. J. N. Davis of Sunnyvale, CA. His question is: Create a function which returns the elapsed time in hours, minutes, and seconds as one string given two inputs, "T1$" and "T2$" which are the strings returned from two calls of TIME$. This problem requires Disk BASIC and it seems to us that DEF FN would be a good way to go. If you have a solution, or a suggestion for a future puzzler, drop us a card or letter (with sample listing and output) to September Puzzler, c/o *Basic Computing*, 3838 So. Warner, Tacoma, WA 98409. Please do not send tapes or disks, no material is returned.

FREE

business software directory

- Radio Shack's Model 1, 2, 3 & 16
- CPM: Xerox, Alto...
- IBM PC & compatibles

Data base manager, integrated accounting package, inventory, word processing, and advanced mailing list.

Micro Architect Inc.
6 Great Pine Ave.
Burlington, MA 01803
671-273-5658

The big picture

Create large-scale images with this full-screen editor

Models I/III

John Corbani

Would you believe 462x96 graphics on an unmodified TRS-80? How about a full graphics editor supporting mixed text and graphics? Think about up, down, left and right scrolling, transparent cursor, point, line, rectangle drawing and even an outline fill routine! Black on white, or white on black — your choice! Add easy saves and reloads of your masterpiece for future use in this or other programs. Then add reasonable speed and the whole thing done in readable, self-documenting BASIC.

Impossible? The only point you can quibble about is the first one. You only get to see 122x48 points at a time because of the hardware limitations of the screen drivers. Everything else is provided by the following program. If you are interested in how it was done, and how you can improve your own program's performance, read on.

Once the physical layout of the program is allowed to bend and flow with the job to be done, a thorough understanding of the available tools is required.

Video RAM

Video RAM extends from 15360 to 16384. You can both read and write to this memory using PEEK and POKE just like any other RAM in the system; in a Model III *only*. Standard Model I computers only implement seven of the eight bits in a byte. Bit six (decimal 64) does not exist. Even when you add most lowercase modifications, you can only write bit six, not read it back. This program requires reading the contents of video RAM so Model I owners will have to add 64 to all byte values read as less than 32. Lowercase cannot generally be used with a Model I.

The bytes in video RAM are displayed on the screen in two formats, depending on the state of bit seven. If bit seven is zero, the ASCII character described by that byte is displayed in one of 1024 locations on the screen. Location zero (RAM 15360) is the upper left corner. 64 is the upper right corner, 960 is the lower left corner and 1024 (RAM 16384) is the lower right corner. If bit seven is 1, the bits zero through five determine which of six small rectangles within the character block will be lit. These are the graphic points.

Bytes are created and placed in video RAM by POKE statements in the character mode and by SET and RESET in the graphic mode. Of course, bytes are also inserted into video RAM by using the PRINT function.

Keyboard

Model I owners with the older style mechanical key-switches have a keybounce problem. I have not had good luck with most software keybounce "fixes." They add too much time to the polling routines and significantly slow down response time of the graphics editor.

Radio Shack tells you where the keyboard switches are located in memory, but not how to PEEK the eight addresses that indicate which keys are down. They don't tell you how the keyboard is read by the INKEY$ function, or any codes that are returned. Here are the missing ASCII codes:

Leftarrow	8	Shifted 24
Rightarrow	9	Shifted 25
Uparrow	91	Shifted 27
Downarrow	10	(Model I) Shifted 26 (Model III) Nothing
Clear	31	
Enter	13	

INKEY$ reads the keyboard addresses and places the data in a seven-byte buffer in RAM. Table 1 lists the important addresses and the key values.

When INKEY$ is called, the routine checks to see if the buffers are all empty. If any buffer is not zero, a key is down and the routine waits indefinitely. As soon as all keys are up, the computer clears all seven buffers. INKEY$ then fills them with the raw keyboard codes.

INKEY$ scans the bytes and returns the ASCII code of the key. If two keys are down simultaneously, the first key in the list is the one that will be returned. You can force INKEY$ to read the keyboard when a key is down by clearing the appropriate buffer(s). POKE 16nnn,0 as

required. This allows keys to repeat and makes many cursor routines easier and faster.

Table 1

Key-board	Inkey$ Buffer	Value/Key							
Address	Address	1	2	4	8	16	32	64	128
14337	16438	@	A	B	C	D	E	F	G
14338	16439	H	I	J	K	L	M	N	O
14340	16440	P	Q	R	S	T	U	V	W
14344	16441	X	Y	Z					
14352	16442	0	1	2	3	4	5	6	7
14368	16443	8	9	:	;	,	--	.	/
14400	16444	ENT	CLR	BRK	UP	DN	LFT	RT	SPA
14464	—	SHIFT							

The last potential problem area having to do with the keyboard has to do with the reversed upper/lowercase shift on the Model I. The program is written for a Model I and uses shift W and shift B as editing control characters. These are actually lowercase w and b. If you run the program on a Model III, I recommend changing all control characters to the opposite case and using the U/L keyboard mode. This is a little smoother than shifting in and out of lowercase for those two functions.

Level II Model III Version of Microsoft BASIC

SET, RESET, POINT, @, and POS(X) are the Radio Shack enhancements of a subset of Microsoft BASIC. All are used when working with video RAM. SET turns a graphic point on the screen white. RESET turns a point black. POINT returns a -1 if the point is white, zero if the point is black *or* if the point is not a graphic point (in a character block). @ allows positioning the cursor anywhere on the screen and POS(x) returns the current position of the cursor.

A lot of sequential or multiple logical decisions are made in the program. You have to remember that all complex expressions are evaluated before the logical function is performed. If you write IF X<0 AND POINT (X,Y) and X is -1, you will get an error message. POINT (X,Y) is evaluated before the AND. Use IF X<0 THEN IF POINT(X,Y) and things work fine. VARPTR(x) when used with arrays can be unpredictable the first time it is called. It seems that calling VARPTR(x) and completing a loop in a do-nothing line stabilizes, or properly initializes, things. The second calling of VARPTR(x) always seems to work. I can't explain the necessity for the loop, but it works.

You have to watch out for commas and colons when reading data back from tape. You can embed them in strings and record them fine. The INPUT#-1 function thinks that both characters are string delimiters and things can get fouled up fast if you are not careful. I didn't use any Disk BASIC routines in the program, but LINE INPUT and the ability to use MID$ on the left side of equations would make some things easier.

All data is saved on tape rather than disk so that the program would be universally runnable. By all means, change the routines if you have a disk system. Waiting for the data to load or be saved on tape is about as exciting as watching grass grow . . . and about as fast. If you have more than 16K of RAM available, the picture can be made quite a bit larger and the disks will be even more important.

The program handles a picture as an array of 32-character strings. Each string contains 239 characters, of which 231 are displayable. This is a total of 7392 characters, or 44,352 graphic points. Two pointers are maintained to define the character that will display in the upper left corner of the screen. LC is the line count, CP is the character position in that line. Data from the D$ array is printed on the screen using the MID$ function starting at array element LC position CP and going to element LC+15 and position PC+61.

The original picture is created in sections directly on screen by using a screen-oriented editor. Either alpha or graphic bytes are poked into the appropriate memory location. Once the picture is satisfactory, data stored in the video RAM is moved directly into the proper position in the strings by using VARPTR to find the correct place in the string, PEEK to read the data, and POKE to put it where it belongs. This technique eliminates the tremendous time and space overhead that is encountered when trying to use string functions to do the same job.

Program flow is from initialization to the review mode where a picture can be loaded or saved, viewed in its entirety by scrolling, or edited by section. The editor contains two independent sections. One specializes in alphanumeric characters and the other in graphics. The editor is entered in the character mode since the character cursor is completely transparent and you may have to start editing on a character. The graphics cursor destroys all alpha characters that it runs into. The special graphics utilities all contain almost duplicate sections of code for drawing either black or white. This extra code runs at almost double the speed of common routines with the extra tests that are required at every plotted point.

Now into the details of the program. The first lines clear working area, reserve V as the only floating point variable, set all others to integer, and dimension the string array D$, which will be used to hold the picture. A small selection of variables is then initialized to make them first in line when they are called in the program. These variables are used in all of the high-speed routines and placing them at the top of the list results in dramatic speed improvements. Finally, all of the necessary strings are created and the string arrays are filled. The VARPTR function is initialized, a sign-on screen is displayed and the program jumps into the review mode.

You are now in the middle of the first keyboard scanning routine. The code is fairly open since little is gained by speeding it up. LC and CP are updated, if appropriate, with total independence of all four arrow keys. If a move is possible, A=1 at the end of the scanning routine and a new screen is plotted. Screen update takes about one second. If one of the function keys are pressed, all suitable variables are initialized, the screen prompts are updated using E as the message selector, and control is passed to the proper subroutine. "T" is included in this scanner for your own test software. This is a good place to put a LINE PRINT

routine if you have a printer that can accept graphic codes. The SAVE and LOAD routines are straightforward and will not be discussed. The edit mode is entered by setting X and Y, the graphics cursor position, to 0,0. The plotting reference point X1,Y1 is also set to 0,0. Control then goes to the character editor.

The character editor is entered by setting PP to the video RAM location that contains the graphics cursor. This location is PEEKed to determine CN, the character name at that location. If you have a Model I, CN is adjusted. Program flow is then through a buffer clear, a cursor blinking routine and keyboard polling. INKEY$ is the choice here for speed when typing text. Some of the character tests can be eliminated by Model III and disk owners with a noticeable increase in speed.

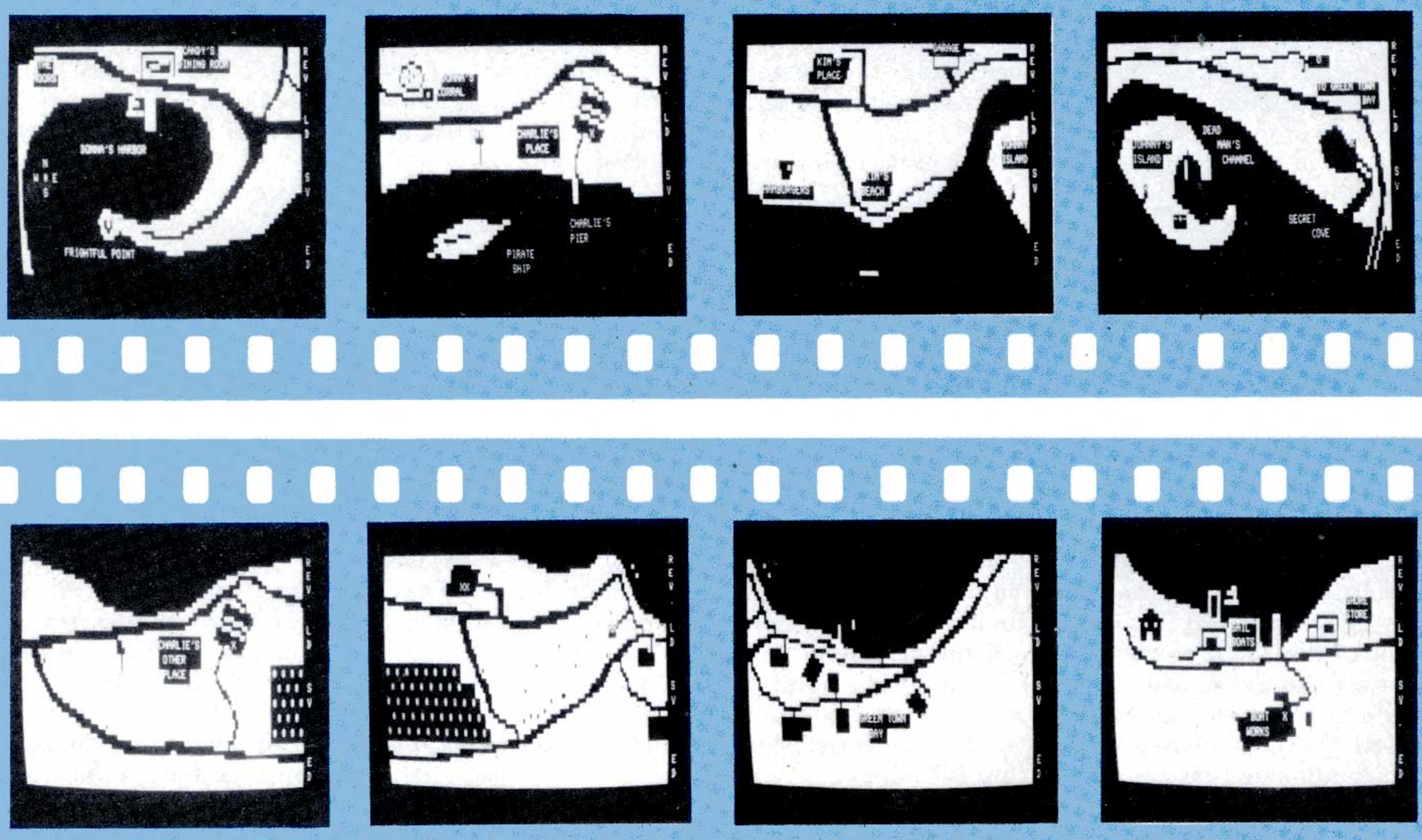
The arrow keys are tested and only one is acted on at a time. Cursor movement is so fast that compound motion was not considered worth the complication and loss of response time. Any cursor movement or character entry results in PP, X and Y being updated. The program loops back to the cursor blink routine and the process repeats. ENTER (13) breaks out of the routine and jumps to the graphics editor.

The graphics editor is entered in the middle of a routine, normally a no-no. Don't worry about it. This whole section wants to be as small and as fast as you can get it. The first thing that is done is to find what is at the cursor X,Y position. P=-1 if the point is white, zero if it is black. The point is then complemented and the arrow keys are checked for activity by PEEK(14400). If there is activity, the old point is rewritten, X and Y are independently updated, the new point color is determined and the routine loops back. The cursor can be moved at better than ten steps per second by holding a key down, or single-stepped quite easily.

If no arrow key has been pressed, the INKEY$ function is used to check the other keys. If nothing is happening, the program loops aback through a cursor blink routine and checks the arrows again. If a character is detected, it is checked for one of the ten special graphic routines. B and W stand for black and white and set W, the color flag that will be used for all graphics writing. "b" and "w" cause the entire screen to be cleared to either black or white. Printing the C$C1$ sequence is an extremely fast way to get a white screen.

P is set to the color you have selected for writing. The program goes back to polling if one of the above keys have been encountered, or starts back in the direction of review if R is discovered. R causes a jump to the FILL ARRAY routine where the screen contents are POKEd into the D$ array. Review follows. C is next on the list, and this sets things up to jump back into the character mode. LINE, FILL, and X-OUT all have their own subroutines. S selects the current cursor position as the starting point for the LINE and X-OUT routines.

LINE drawing on a TRS-80 can be done in many ways, and has to be, depending on the limits of input variables. In this program, the starting and finishing



points are known to be on the screen. Making one multiplication and one division per line and using one floating point addition per point is about as fast as you can get and still have the line drawn from the start to the finish all of the time.

X-OUT is a very straightforward function and is coded to get the job done in the shortest possible time. This is commonly used to fill large areas so the routine fills from the upper left to the lower right no matter what. Once again, times can be cut in half by attention to these kind of details.

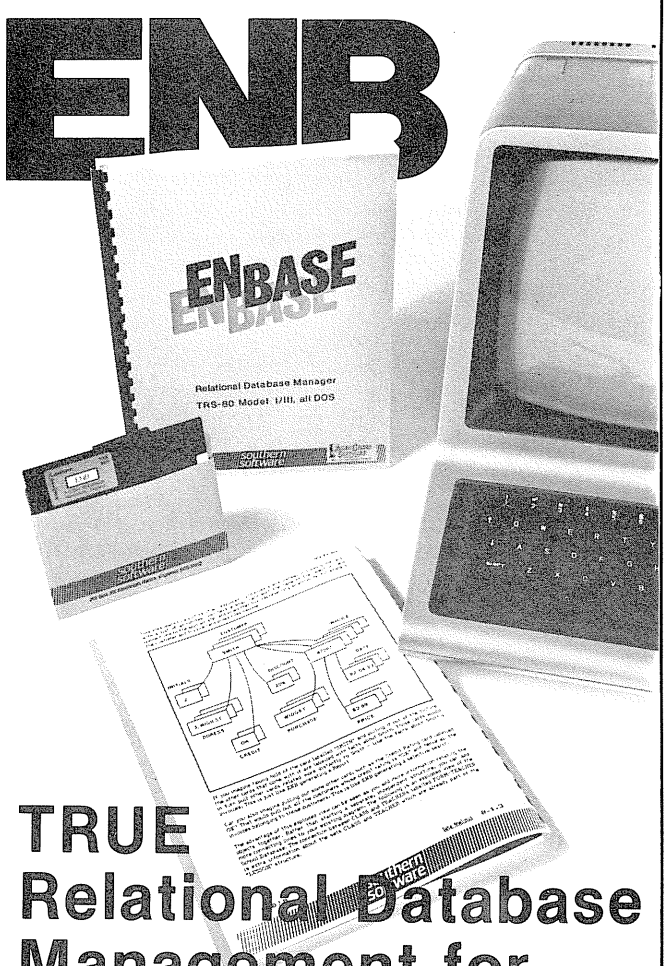
FILL is not a function that is seen commonly in BASIC programs, but it is indispensible in most graphics work. This routine starts by setting the next line pointer P to -1. It searches from the cursor position to the left until it sees a boundary. Direction I is reversed and points are filled until the opposite boundary is reached. At each point, the routine checks the next point below and sets P to that position if it must be filled. When the routine reaches the end of its current line, P will either be -1 and the fill will be done, or P holds the starting location for filling the next line down.

Now that you have a graphics editor, what can you do with it? At the very least, you can create a picture and dump out the ASCII codes using the MID$ function. The numbers can be keyed into data statements in future programs. Anyone who has slaved over a video work sheet can appreciate the time savings and the ability to edit at will. Better yet, use the loader from this program to load files into your program. The overhead is low and the operation can be automatic. Once a large data base like this is available, whole new worlds of applications open up.

Table 2 — Edit Mode

The editing cursor in the character mode is a totally non-destructive blinking underline. The cursor may be moved anywhere on the 16x61 plotting area of the screen. The cursor in the graphics mode is a non-destructive (to graphics points only) blinking point. The cursor may be moved anywhere on the 48x121-point screen. The mode name (a list of command keys) and the exit key are listed in a vertical column at the right of the editing area.

KEY	FUNCTION
Arrows	Moves cursor one point in the arrow direction when in the graphics mode; one character space in the character mode. Repeats. Stops at edges of the screen.
Shifted Arrows	Draws a continuous line of the selected direction when in the graphics mode. Shifted arrows are ignored in the character mode.
W	W selects white as the color to be used in all subsequent graphic commands.
Shift W	Clears the entire screen to white.
B	B selects black as the color to be used in all subsequent graphic commands.



TRUE Relational Database Management for TRS - 80 Mod I/III

ENB is a *true* relational database manager. Your data is held in ordered sets. You impose structure by creating and linking sets in various ways. Prompt screens are automatically generated from this underlying structure. You define reports ordered by any set, showing directly or indirectly linked sets (and enforce a host of further conditions on the selected set members).

What's more, ENB has an integrated data dictionary; structural info is carried in the database as data, just like everything else. This lets you restructure your database at will, without reblocking or reprogramming, using the regular editing commands. Also, exchange files containing structural data with other ENB databases. Special reports on database structure are built in and (like all reports) are always current.

64K data items, spans 4 disk drives (or hard disk). Interfaces to BASIC , file exchange with Scripsit, VisiCalc and other ENB data bases. Includes 5 action tutorials, 150 page manual.
Developed in England by Southern Software.

You Owe It To Your Data!

$140 $3 Shipping
CA add 6%

TRS-80 SCRIPSIT[tm] Radio Shack; VISICALC[tm] Visicorp

Allen Gelder Software

Box 11721 San Francisco, CA 94101 (415) 681-9371

Shift B	Clears the entire screen to black.
S	S sets the cursor point to the selected color. This point becomes the reference point for following graphics commands.
L	L draws a line of the selected color from the last S point to the current cursor position. The current cursor position becomes the S point.
X	X fills a rectangle with the selected color. The S point and the current cursor position specify the diagonal corners of the rectangle. The current cursor position becomes the S point.
F	F fills areas of the unselected color with the selected color starting at the level of the current cursor position and progressing downward. The function ends when no points of the unselected color are below the last filled line. This function may be aborted by pressing and holding the enter key. The S point is not changed and the cursor returns to its initial position at the completion of the fill.
C	C switches the editor from the graphics mode into the character mode. Commas and colons are ignored. Exit the character mode by pressing enter.
R	R causes the edited picture to be packed into data strings in main memory. During this process, periods are printed at the right of the screen as each line is saved. The program then goes into the review mode.

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

Table 3 — Review Mode

The review mode allows inspection and selection for editing of any 122x48 section of the full 462x96-point area. The mode, the command keys and the exit key are displayed in the right column of the display.

KEY	FUNCTION
Arrows	Scrolls the screen so as to move the viewing window in the direction of the selected arrow(s). Repeats.
S	S initiates a file save of the complete picture. A prompt screen will appear indicating the proper setting of the tape recorder. Pressing R allows you to change your mind and return to the review mode. Pressing S a second time will initiate the save process. During save, each line is marked on the screen as it is recorded.
L	L initiates a file load of a picture from the tape recorder. A prompt screen will appear indicating the proper setting of the tape recorder. Pressing R allows you to change your mind and return to the review mode. Pressing L a second time initiates the load process. Lines of the picture are displayed as they are read into memory.
E	E causes the program to go into the edit mode using the current picture.
T	Test mode. Your subroutine.

Listing 1 — The Big Picture

```
1Ø '                    THE BIG PICTURE
                      1/9/82  TAPE #13 -1, 2Ø
Ø-245; -2, 5-6Ø "D"  JC
   .
2Ø CLEAR 9ØØØ: DEFINT A-U: DEFINT W-Z:DI
M D$(31):
   A=Ø: B=Ø: V=Ø: I=Ø: X=Ø: Y=Ø: P=Ø: CP
=1: W=-1: I$="":
   C1$="   ": FOR I=1 TO 3: C$=C$+STRING
$(61,191)+C1$: NEXT:
   C$=C$+STRING$(61,191): FOR I=Ø TO 31:
   D$(I)=STRING$(239,128): NEXT
3Ø E$(1)="ED.BW SLXF C REV": E$(2)="REV.
 LD  SV   ED":
   E$(3)="TEST.       ENTER": E$(4)="ED C
HR.    ENTER"
```

```
4Ø X=VARPTR(D$(Ø)): FOR A=1 TO 1Ø: NEXT
5Ø CLS: PRINT @ 274, "THE BIG PICTURE":
PRINT: PRINT TAB(25)
   "BY": PRINT TAB(2Ø) "JOHN CORBANI": P
RINT TAB(23) "1/5/82":
   PRINT: PRINT TAB(1Ø) "PRESS (E) TO CR
EATE A NEW PICTURE":
   PRINT TAB(1Ø) "PRESS (L) TO LOAD A PI
CTURE FROM TAPE"
6Ø E=2: GOSUB 68Ø: GOTO 6ØØ
7Ø '
                  CHECK ARROWS
   .
8Ø M=M+1:IFM=3THENSET(X,Y)ELSEIFM>5THENR
ESET(X,Y):M=Ø
9Ø I=PEEK(14４ØØ):IFI=ØTHEN19Ø
1ØØ IFPTHENSET(X,Y)ELSERESET(X,Y)
11Ø IFIAND8ANDY>ØTHENY=Y-1
12Ø IFIAND16ANDY<47THENY=Y+1
13Ø IFIAND32ANDX>ØTHENX=X-1
14Ø IFIAND64ANDX<121THENX=X+1
15Ø IFPEEK(14464)THENP=WELSEP=POINT(X,Y)
16Ø IFPTHENRESET(X,Y)ELSESET(X,Y)
17Ø GOTO9Ø
18Ø '
                  CHECK OTHER KEYS
   .
19Ø I$=INKEY$:IFI$=""THEN8Ø
2ØØ IF I$="B"THEN W=Ø: ELSE
    IF I$="W" THEN W=-1: ELSE
    IF I$="w" THEN P=W:
    PRINT @ Ø, C$C1$C$C1$C$C1$C$;: E=1:
GOSUB 68ØELSE
    IF I$="b" THEN P=W: CLS: E=1: GOSUB
68ØELSE
    IF I$="R" THEN GOTO 56ØELSE 22Ø
21Ø GOTO 9Ø
22Ø IF I$="C"THEN E=4: GOSUB 68Ø:
    IF P THEN SET(X,Y): GOTO 4ØØELSE RES
ET(X,Y): GOTO 4ØØ
23Ø IF W THEN SET(X,Y) ELSE RESET(X,Y)
24Ø IF I$="L" THEN GOSUB 27ØELSE
    IF I$="F" THEN GOSUB 46ØELSE
    IF I$="X" THEN GOSUB 34ØELSE
    IF I$<>"S" THEN 9Ø
25Ø X1=X: Y1=Y: P=W: GOTO 9Ø
26Ø '
                  DRAW LINES
   .
27Ø XD=X-X1: XS=SGN(XD): XD=ABS(XD):
    YD=Y-Y1: YS=SGN(YD): YD=ABS(YD):
    IF XD<YD THEN GOSUB 31ØELSE IF XD<>Ø
 THEN GOSUB 29Ø
28Ø RETURN
29Ø V=Y1+.5: VS=YS*YD/XD: IFWTHEN3ØØELSE
    FORB=X1TOXSTEPXS:RESET(B,V):V=V+VS:N
EXT:RETURN
```


ACCEL 3/4

Compiler for TRS-80 Basic, Model I/III

$99.95

+ $2 Shipping CA add 6%

Extra-Compatible

ACCEL3/4 will handle the whole Basic language, and more.

Even non-standard Basic extensions don't debar compilation. E.g., the 20 new Basic keywords established by ENB (Southern Software's new relational dbms).

Includes: ACCEL3 (5.5K, all DOS) AND ACCEL4 (TRSDOS/LDOS overlay version)

FC/CMD

Use FC instead of DIR for a full-screen display of drive-directories, ordered as you choose. Point the floating cursor and execute shorthand commands against any file on any drive.

- Shows up to eight drive-directories.
- Many column orderings available.
- Easy-to-learn shorthand scheme saves 90% of the typing.
- Many built-in DOS commands, supports user-added commands.
- Relocatable, works with DOSPLUS, LDOS, NEWDOS80, TRSDOS.

A must for multi-drive systems, gives far better visibility, saves time and typing, brings order to your files.

$25 + $1.50 Shipping

New

EDIT

Full-Screen Editor for TRS-80 Basic, Mod I/III

You need better-than-wordprocessor control when you write and edit BASIC programs. That's why EDIT has lots of better-than-wordprocessor features.

- Full-floating cursor with autorepeat (including function keys).
- Navigation by cursor-controlled scrolling, by line number or by program content.
- Overtype, Delete or Insert characters of text (including line numbers).
- Join or Split lines. Copy, Delete, Insert, Move, Position or Replicate lines.
- Copy, Delete, Move, Position or Replicate blocks of lines.
- Find and/or Replace occurrences of strings.
- Over 30 commands and functions, supports lower-case.
- 3.3K, relocatable (all DOS), also includes TRSDOS, LDOS overlay version.

$40

+ $1.50 Shipping

You owe it to your programming.

DOSPLUS tm Micro Systems Software, LDOS tm Logical Systems, NEWDOS80 tm Apparat, TRSDOS tm Tandy

Allen Gelder Software

Box 11721 San Francisco, CA 94101 (415) 681-9371

```
300 FORB=X1TOXSTEPXS:SET(B,V):V=V+VS:NEX
T:RETURN
310 V=X1+.5: VS=XS*XD/YD: IFWITHEN320ELSE
    FORB=Y1TOYSTEPYS:RESET(V,B):V=V+VS:N
EXT:RETURN
320 FORB=Y1TOYSTEPYS:SET(V,B):V=V+VS:NEX
T:RETURN
330 '
                    X-OUT  RECTANGLES
    .
340 S=SGN(X-X1):IFS<0THENSX=X:FX=X1ELSES
X=X1:FX=X
350 S=SGN(Y-Y1):IFS<0THENS=Y:F=Y1ELSES=Y
1:F=Y
360 IFWITHEN380
370 FORA=STOF:FORB=SXTOFX:RESET(B,A):NEX
T:NEXT:X1=X:Y1=Y:RETURN
380 FORA=STOF:FORB=SXTOFX:SET(B,A):NEXT:
NEXT:RETURN
390 '
                    GET CHARACTERS
    .
400 PP=15360+INT(Y/3)*64+X/2: CN=PEEK(PP
): IFCN<32THEN CN=CN+64
410 POKE16444,0:M=M+1:IFM=3THENPOKEPP,CN
ELSE
    IFM>5THENPOKEPP,95:M=0
420 I$=INKEY$:IFI$=""THEN410ELSEI=ASC(I$
):
    IFI=13THENPOKEPP,CN:E=1:GOSUB680:GOT
O150:ELSE
    IFI>31ANDI<>91ANDI<>44ANDI<>58THENCN
=I:I=9
430 POKEPP,CN:IFI=91ANDY>2THENY=Y-3:PP=P
P-64ELSE
    IFI=10ANDY<45THENY=Y+3:PP=PP+64ELSE
    IFI=8ANDX>1THENX=X-2:PP=PP-1ELSE
    IFI=9ANDX<120THENX=X+2:PP=PP+1ELSE
    POKEPP,95:GOTO410
440 M=5:CN=PEEK(PP):IFCN<32THENCN=CN+64:
GOTO410ELSE410
450 '
                    FILL OUTLINE
    .
460 A=Y: B=X: I=-1: P=-1: IF W THEN RESE
T(B,A) ELSE
    SET(B,A): GOTO 510
470 B=B+I:IFB<0ORB>121THENI=-I:ELSEIFPOI
NT(B,A)THENI=-IELSE470
480 B=B+I:IFB<0ORB>121THEN500ELSE
    IFPOINT(B,A)THEN500ELSESET(B,A):
    IFA<47THENIFPOINT(B,A+1)=0THENP=B
490 GOTO480
500 IFP=-1ORA=47ORPEEK(14400)=1THENRETUR
NELSE
    A=A+1:B=P:P=-1:GOTO470
510 B=B+I:IFB<0ORB>121THENI=-IELSEIFPOIN
T(B,A)=0THENI=-IELSE510
520 B=B+I:IFB<0ORB>121THEN540ELSE
    IFPOINT(B,A)=0THEN540ELSERESET(B,A):
    IFA<47THENIFPOINT(B,A+1)THENP=B
530 GOTO 520
540 IFP=-1ORA=47ORPEEK(14400)=1THENRETUR
NELSE
    A=A+1:B=P:P=-1:GOTO510
550 '
                    FILL ARRAY
    .
560 IF P THEN SET(X,Y) ELSE RESET(X,Y)
570 X=VARPTR(D$(LC))+1: FOR A=15360 TO 1
6320 STEP 64:
    Y=PEEK(X)+PEEK(X+1)*256+CP-1:
    FOR B=A TO A+60: I=PEEK(B): IF I<32
THEN I=I+64
580 POKEY,I:Y=Y+1:NEXT:X=X+3:POKEB,46:NE
XT: E=2: GOSUB 680
590 '
                    REVIEW
    .
600 I=PEEK(14400): IF I THEN A=0 ELSE I$
=INKEY$:
    IF I$="" THEN 600ELSE 660
610 IF IAND32ANDCP>5THENCP=CP-5: A=1
620 IF IAND64ANDCP<171THENCP=CP+5: A=1
630 IF IAND8ANDLC>0THENLC=LC-1: A=1
640 IF IAND16ANDLC<16THENLC=LC+1: A=1
650 IF A THEN GOSUB 700: GOTO 600ELSE 60
0
660 IF I$="E" THEN
    X=0: Y=0: X1=0: Y1=0: E=4: GOSUB 680
: GOTO 400ELSE
    IF I$="T" THEN GOSUB 780: E=2: GOSUB
 680: GOTO 600ELSE
    IF I$="S" OR I$="L" THEN 720ELSE 600
670 '
                    PRINT PROMPTS
    .
680 A=61: FOR B=1 TO 16: PRINT@ A, " "MI
D$(E$(E),B,1);: A=A+64:
    NEXT: RETURN
690 '
                    PLOT SCREEN
    .
700 A=0: FOR B=LC TO LC+15: PRINT @ A,MI
D$(D$(B),CP,61);:
    A=A+64: NEXT: RETURN
710 '
                    SAVE PICTURE
    .
720 CLS: IF I$="L" THEN 750ELSE PRINT TA
B(18)
    "POSITION TAPE AND PRESS (RECORD)":
PRINT TAB(18)
    "AND (PLAY) ON THE RECORDER": PRINT
```

```
TAB(18)
    "PRESS (S) TO SAVE THE PICTURE": PRI
NT TAB(18)
    "PRESS (R) TO RETURN TO REVIEW"
730 I$=INKEY$:
    IF I$="R" THEN GOSUB 700: E=2: GOSUB
 680: GOTO 600ELSE
    IF I$="S" THEN CLS: FOR A=0 TO 31:
    PRINT#-1, D$(A): PRINT MID$(D$(A),CP
,61) ".": NEXT:
    CLS: GOSUB 700: E=2: GOSUB 680: GOTO
 600ELSE GOTO 730
740 '
                LOAD PICTURE
    .
750 PRINT TAB(18)
    "POSITION TAPE AND PRESS": PRINT TAB
(18)
    "(PLAY) ON THE RECORDER": PRINT TAB(
18)
    "PRESS (L) TO LOAD A PICTURE": PRINT
 TAB(18)
    "PRESS (R) TO RETURN TO REVIEW"
760 I$=INKEY$:
    IF I$="R" THEN GOSUB 700: E=2: GOSUB
 680: GOTO 600ELSE
    IF I$="L" THEN CLS: FOR A=0 TO 31:
    INPUT#-1,D$(A): PRINT LEFT$(D$(A),61
) ".": NEXT:
    CLS: LC=0: CP=1: GOSUB 700: E=2: GOS
UB 680: GOTO 600ELSE 760
770 '
              PROGRAM TEST AREA
    .
780 REM:
790 X=0: Y=0: CP=1: LC=0: GOSUB 700: E=3
: GOSUB 680
800 M=M+1:IFM=3THENSET(X,Y)ELSEIFM=6THEN
RESET(X,Y):M=0
810 I=PEEK(14400):IFI=0THEN800ELSEIFI=1T
HENRETURNELSEA=0
820 RESET(X,Y)
830 IFIAND8ANDY>0THENIFPOINT(X,Y-1)=0THE
NY=Y-1:
    IFY<3ANDLC>0THENLC=LC-1:Y=Y+3:A=1
840 IFIAND16ANDY<47THENIFPOINT(X,Y+1)=0T
HENY=Y+1:
    IFY>44ANDLC<16THENLC=LC+1:Y=Y-3:A=1
850 IFIAND32ANDX>0THENIFPOINT(X-1,Y)=0TH
ENX=X-1:
    IFX<16ANDCP>5THENCP=CP-5:X=X+10:A=1
860 IFIAND64ANDX<121THENIFPOINT(X+1,Y)=0
THENX=X+1:
    IFX>105ANDCP<170THENCP=CP+5:X=X-10:A
=1
870 IFATHENGOSUB700
880 SET(X,Y): GOTO 810
```


MISOSYS ANNOUNCES!

- Disassemble from disk / memory
- Disassemble to disk/printer/video
- Automatic output partitioning
- Full label generation
- Data area screening - generates DB, DW

- $40 + $2 S&H

MISOSYS
P.O. BOX 4848
ALEXANDRIA, VA. 22303
703-960-2998

Minicalc

Spreadsheet calculations for those on the go

Model 100

Terry R. Dettmann, Associate editor

Recently, with the introduction of the Model 100 by Radio Shack, I found that the possibilities in a small, portable, battery operated computer were amazing. So, I got myself one. Helped along by hardware problems with my Model II, the Model 100 rapidly became a major workhorse for me.

I really needed a spreadsheet calculator that would allow simple modeling and estimating. I don't mean the full VisiCalc or Multiplan type of operation, but rather, just a minimal spreadsheet that would allow me to play games with some figures.

During a recent bout with a cold, I was restricted to bed for several days. Unable to use anything except my Model 100, I still needed to do some project estimates for a proposal. Lacking access to a spreadsheet made it look like a very cumbersome and time-consuming task. Rather than retreat to a calculator, I tried my hand at writing a spreadsheet calculator in BASIC.

The program listed here has served as a useful tool for estimates and as an exercise in the design of spreadsheet calculator programs.

Anyone playing with the program (whether on the Model 100 or on another computer) should realize at the start that the program is slow in comparison to VisiCalc. Running under the BASIC interpreter is just not as efficient as running in machine language. Obviously, this could all be recoded in assembly language for the Model 100 to produce a much faster program.

I have limited the program to display only integers, no matter what the format of the cell data. This was dictated by the fact that the Model 100 has a small screen and that for the type of estimating I was doing, whole number output was sufficient.

A more significant limitation is the access method used for finding and updating cells. A brute force structure was chosen, for simplicity not for efficiency. The system tends to wait a long time for recalculations, but the program design is very modular and easily modified. Perhaps you would like to redo it to make the whole program go faster.

All qualifications aside, I think you will find that the program makes for an interesting trip through the steps needed to implement a spreadsheet calculator. The only way to understand the program is to go through it. Let's take a tour of the code to supplement the program remarks and try to understand how this thing works. After all, that is why you're reading this article, isn't it?

A Guided tour

The program design takes a modular approach to the problem. The program can be summarized by looking at it in its simplest form:

1. Initialize the variables and do the necessary setup.
2. Get a character from the keyboard.
3. If the character is a letter, create a label.
4. If the character is an arrow, move the cursor.
5. If the character is a number, create a value.
6. Go back to step two for another character.

The program does this over and over again, in a continuous loop. It is a very simple approach to the problem, but it brings rich rewards in understanding. If we take each step as a small sub-program to implement, we'll come out with a working program.

The initialization phase

Lines 10-200 are the initialization code for the program. Arrays are defined, initial parameters are set, and variables are defined that will be used throughout the program. The efficiency of any program depends on the initialization of the system. Doing a good job here can get a lot done.

The Main Command Loop

The most important logic of the program, its "high-level" logic, is the command loop. The first step is to input a character from the keyboard. The subroutine at line 1100 accomplishes this by simply waiting for a character and returning it.

Once we have a character, we have to decide what to do with it. There are three possibilities:

1. The character was a letter or a quote (").
2. The character was a number or operation (+,-,*,/).
3. The character was an arrow key.

Obviously we have to treat each separately, so we have separate subroutines for each case. If we received an arrow key, we process a movement by using the subroutine at line 2000. This subroutine first decides which direction to move, appropriately changes the current positions, and finally, the cursor is cleared from the old screen position and placed in the new one. As long as the cursor is still on the screen, there is no problem, but if it has moved off the screen, we have to also move the screen to display a new window.

In the event that the character received was a letter, we assume that the entry is a label. The quote mark is

used to force a label if we want to use numbers to label something. This is similar to the method used in VisiCalc. Subroutine 3000 first remembers the character typed since it will be the first character of the label (except for a quote mark). Then it proceeds to enter the rest of the label (up to an enter key). The entry routine (subroutine 1200) provides for character entry, correction, and elimination of unwanted characters. Finally, the label is stored and the entry type is set to equal a label.

If the character was a number, we assume we have a value entry that could be a number or a formula. As with the label, we have to remember the character typed and get the rest of the line. Once the entry is in, we save the complete string, set the type of entry to value, compute the present value of the entry, and store it. A drawback to this approach is that we don't recalculate the whole sheet at this time. We cannot see what happens as we type, but if we did it would take a long time to enter a number due to the forced recalculations.

To see the effects of changes on the sheet, function key 4 is defined to do a complete recalculation of the sheet for display.

It is useful to take a quick look at the calculation procedure to help understand what's going on. The procedure is to look at the exact entry that was typed for the cell location we are recalculating, and evaluate its value (but only if it is a type "V" cell). To evaluate, we proceed in a strictly left-to-right manner through the line. Parentheses are *not* allowed here! At the beginning, we set the value to zero and the current operator to "+". Next we read a character. If the character is a math function (+, -, *, /) we change the current operator. If it is a number, we get the whole number from the line and, using the current math operator, we combine it with the current value. If we find a letter, we assume it is a cell location and get that cell's value.

The basic procedure is very simple. If we have the formula: 2*B2 + 1
the sequence of steps is:

1. Current value = 0 and the operator = "+".
2. Get the number 2 and the current value = 0 + 2.
3. Get the operator "*", so the current operator = "*".
4. Get the symbol B2, so then get the value in cell B2. The current value = 2* value in cell B2.
5. Get the "+" sign and the current operator = "+".
6. Get the number 1 and the current value = 2*B2 + 1.

Primitive as this is, it works.

Now armed with the basic logic of the program, it should be easy for you to work through the rest of the program by following the remarks in the code. I'd be interested to know if anyone actually uses, or improves the program. The most needed improvement is a replicate command that will copy a given cell, either absolutely or relatively. I can be reached through *Basic Computing*, or, if you're on CompuServe, send a message to 70076,260. I check that account semi-regularly.

A special note for people who would like to try this program on some model other than the 100. The Model

DISCOUNT COMPUTERS

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

8K MODEL 100	$ 649.00	DMP 100 PRINTER	$ 299.00
24K MODEL 100	799.00	DMP 200 PRINTER	599.00
16K MODEL 4	799.00	DMP 500 PRINTER	1398.00
64K MODEL 4	1579.00	DMP 2100 PRINTER	1599.00
80K MODEL 12 1 DR	2499.00	DWP 410 DAISY	1095.00
80K MODEL 12 2 DR	3149.00	DWP DAISY WHEEL II	1599.00
128K MODEL 16 1 DR	3898.00	12 MEG HD MODEL II/12/16	2769.00
128K MODEL 16 2 DR	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

100 has a set of function keys (numbered 1 through 8) that are not available on the other TRS-80 models. These keys can interrupt whatever is in progress and go to a subroutine. The subroutines are set up in the 5000 series of program lines. In order to make this work on another computer, add a new character to check for in the main command loop. It should then direct you to subroutine 5000 where you can enter a single letter, or number if you prefer, to execute the special commands.

VisiCalc is a registered trademark of VisiCorp.
Multiplan is a registered trademark of Microsoft Corporation.

Program Listing for Minicalc

```
10 CLEAR5000
20 DEFINTA-Z
30 DIM SHT$(20,20),V!(20,20),TY$(20,20)
40 FORI=0TO3:CH$=CH$+CHR$(28+I):NEXTI
50 LT$=CHR$(34)+" ABCDEFGHIJKLMNOPQRSTUV
WXYZ"
60 NM$="1234567890.+-*/"
70 C1=0:R1=0:CR=0:CC=0
71 OP$="+-*/"
90 F3$=" #######":F4$="\       \"
100 CS$=STRING$(8," ")
110 FORI=0TO3:FORJ=0TO5
111 PS(J,I)=84+40*J+8*I
112 NEXTJ:NEXTI
120 RV$=CHR$(27)+"p":NV$=CHR$(27)+"q"
130 F1$=RV$+"     !    "+NV$
131 F2$=RV$+" ## "+NV$
180 ON KEY GOSUB 5100,5200,5300,5400,550
0,5600,5700,5800
185 KEY ON
190 GOSUB 1000
200 REM -----COMMAND LOOP -----
210 GOSUB 1100
220 IF INSTR(CH$,C$) THEN GOSUB 2600:GOT
O 200
230 IF INSTR (LT$,C$)<>0 THEN GOSUB 3000
:GOTO200
240 IF INSTR(NM$,C$)<>0 THEN GOSUB 4000:
GOTO200
250 GOTO200
1000 REM ---- DISPLAY SCREEN ----
1010 CLS:PRINT
1020 PRINT"     ";
1030 FORI=C1TOC1+3:PRINTUSINGF1$;CHR$(65
+I);:NEXTI:PRINT
1040 FORI=R1TOR1+5:PRINTUSINGF2$;I;
1050 FORJ=C1TOC1+3
```


Maryman INDUSTRIES, INC.

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

22511 Katy Freeway Katy (Houston) Texas 77450

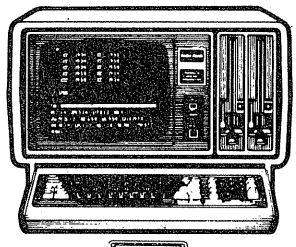
To Order 1-800-231-3680 800-231-3681

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) ☑
- 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! ☑



No Tax on Out of Texas Shipments!

Save 10% 15% OR MORE

WE ALWAYS OFFER

- ☑ We accept Master Card, VISA, 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.

ED McMANUS — **JOE McMANUS**

See us every Tues., Wed. & Thurs. in the Wall Street Journal.

Telex 77-4132 (Fleks Hou)

® TRS-80 is a Registered Trademark of Tandy Corp

```
1052 IFTY$(I,J)="v"THENPRINTUSINGF3$;V!(
I,J);ELSEPRINTUSINGF4$;SHT$(I,J);
1053 NEXTJ:IFI<R1+5THEN PRINT
1060 NEXTI
1064 GOSUB1300:PRINT@(PS(CR-R1,CC-C1)),C
S$;
1065 PRINT@0,SHT$(CR,CC);TAB(39);
1070 RETURN
1100 REM ----- GET CHAR -----
1110 C$=INKEY$:IFC$=""THEN 1110
1115 IFC$>="a" AND C$<="z" THEN C$=CHR$(
ASC(C$)-32)
1120 RETURN
1200 REM ----- GET LINE -----
1210 IN$=C$:PRINT@0,C$;
1220 GOSUB1100:IFC$=CHR$(13) THEN RETURN
1230 IFC$=CHR$(8)THEN IF LEN(IN$)>0THEN
PRINTC$;" ";C$;:IN$=MID$(IN$,1,LEN(IN$)-
1):GOTO1220
1240 IFC$<" "ORC$>CHR$(126) THEN 1220
1250 IN$=IN$+C$:PRINTC$;:GOTO1220
1300 REM ----- MAKE CURSOR -----
1310 IFTY$(CR,CC)="v"THEN1350
1320 CS$=MID$(SHT$(CR,CC)+"        ",1,8
)
1330 GOTO1390
1350 X!=INT(V!(CR,CC)+.5)
1360 CS$=RIGHT$("        "+STR$(X!),8)
1390 CS$=RV$+CS$+NV$
1395 RETURN
2000 REM ----- LEFT -----
2010 CC=CC+1
2020 GOTO2400
2100 REM ----- RIGHT -----
2110 CC=CC-1
2120 GOTO 2400
2200 REM ----- UP -----
2210 CR=CR-1
2220 GOTO 2400
2300 REM ----- DOWN -----
2310 CR=CR+1
2320 GOTO 2400
2400 REM ----- PLACE CURSOR -----
2410 FLG=0
2420 IFCR<0THEN CR=0
2430 IFCR>20THENCR=20
2440 IFCC<0THEN CC=0
2450 IFCC>20THENCC=20
2460 IFCR-R1>5THENR1=CR-5:FLG=1
2470 IFCR-R1<0THENR1=CR:FLG=1
2480 IFCC-C1>3THENC1=CC-3:FLG=1
2490 IFCC-C1<0THENC1=CC:FLG=1
2495 GOSUB1300
2500 IFFLG=0THENPRINT@(PS(CR-R1,CC-C1)),
CS$;:PRINT@0,SHT$(CR,CC);TAB(39);ELSEGOS
UB1000
2510 RETURN
2600 REM ----- MOVEMENT -----
2610 IFTY$(CR,CC)="v"THENPRINT@(PS(CR-R1
,CC-C1)),USINGF3$;V!(CR,CC);ELSEPRINT@(P
S(CR-R1,CC-C1)),USINGF4$;SHT$(CR,CC);
2620 ON INSTR(CH$,C$)GOTO2000,2100,2200,
2300
3000 REM ----- LABEL -----
3005 IFC$=CHR$(34) THEN C$=""
3010 GOSUB1200
3020 SHT$(CR,CC)=IN$
3025 TY$(CR,CC)="L"
3026 PRINT@0,TAB(39);
3027 GOSUB2400
3030 RETURN
4000 REM ----- VALUE -----
4010 GOSUB1200:SHT$(CR,CC)=IN$
```

How to Use MiniCalc

The program was developed and tested on a Model 100 with 24K of memory. The program may run in an 8K version, but your array size may have to be lowered and you will probably have to remove all other files from memory. Be sure to keep the array square, that is, the same number of rows as columns. Change the DIM statements in line 30 and the CLEAR command in line 10 to fit your machine's capabilities. The ending values in the FOR . . . NEXT loops in lines 4110 and 5240 must also be lowered to match the values you used in line 30.

When entering formulas, cell locations must be preceeded by an operator. You would enter +A2+C3 *not* A2+C3. All entries are terminated by the <enter> key. You must press it to perform another function such as GOTO or move using the arrow keys. Unlike VisiCalc™, entering a formula and then pressing an arrow key does not default as an <enter>.

Use **F1** for GOTO. If you try to go beyond the array limits, you go to the last permitted location. A command of GOTO X5 will take you to U5.

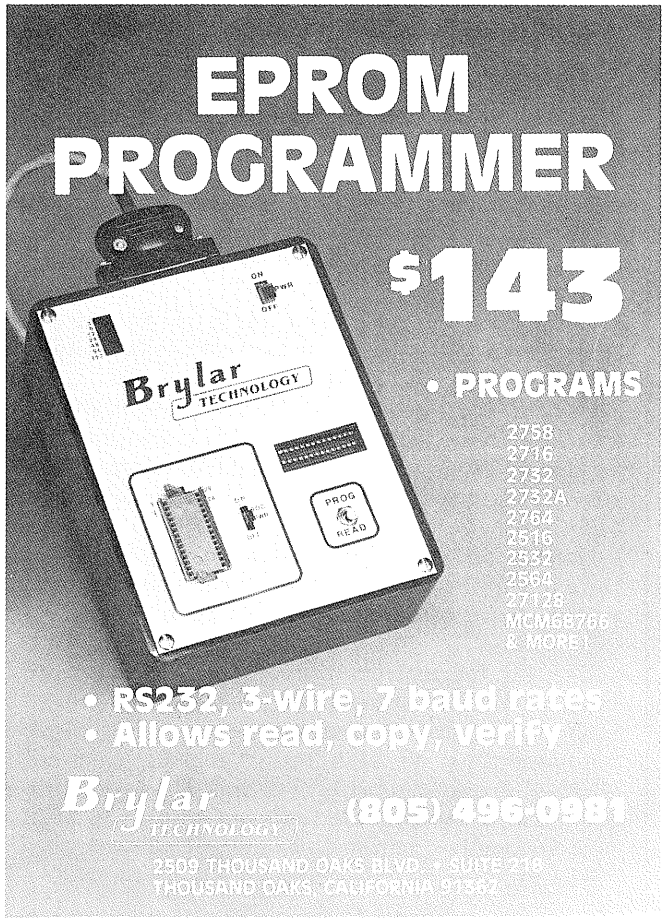
Use **F2** for SAVE. Respond to the question with a filename. There is no need for quote marks and the extension .DO is automatically added. The program saves formulas and labels besides the numerical data!

Use **F3** for LOAD. Respond to this question with the same name you used when you saved the sheet. Again, there is no need for you to add the .DO extension.

Use **F4** for recalculation. All calculations are integer only, with 0.5 rounding, e.g. the value 45/10 is shown as 5. All calculations are done left to right, not according to standard algebraic rules of "higher" operations performed first. The expression 6 + 4/2 would be evaluated as 5, not 8 (6+4 = 10, 10/2 = 5). Remember, parentheses are not allowed.

The function keys **F5** through **F8** are unused.

```
4011 GOSUB4300:V!(CR,CC)=IN!
4015 TY$(CR,CC)="v"
4020 PRINT@0,TAB(39);
4025 GOSUB2400
4040 RETURN
4100 REM ---- RECALC SHEET ----
4105 PRINT@0,"RECALC";TAB(39);
4110 FORI=0TO20:FORJ=OTO20
4120 IFTY$(I,J)<>"v"THEN4140
4130 IN$=SHT$(I,J):GOSUB4300:V!(I,J)=IN!
4140 NEXTJ:NEXTI
4150 RETURN
4300 REM ---- EVAL FORMULA ----
4310 IN!=0:CO$="+":LC=1
4320 GOSUB4500:IF EF=1 THEN RETURN
4330 IF INSTR(OP$,NS$)<>0THEN CO$=NS$:GO
TO4320
4340 IFINSTR(LT$,MID$(NS$,1,1))<>0THEN G
OSUB4700 ELSE X!=VAL(NS$)
4350 ON INSTR(OP$,CO$)GOTO4360,4370,4390
,4380
4360 IN!=IN!+X!:GOTO4320
4370 IN!=IN!-X!:GOTO4320
4380 IN!=IN!/X!:GOTO4320
4390 IN!=IN!*X!:GOTO4320
4500 REM ---- GET SYMBOL ----
4510 IFLC>LEN(IN$)THEN EF=1:RETURN ELSE
EF=0
4520 NS$=MID$(IN$,LC,1):LC=LC+1
4530 IF INSTR(OP$,NS$)<>0 THEN RETURN
4540 IFLC>LEN(IN$)THEN RETURN
4550 C$=MID$(IN$,LC,1)
4560 IF INSTR(OP$,C$)<>0 THEN RETURN
4570 LC=LC+1:NS$=NS$+C$:GOTO4540
4700 REM ---- GET VALUE ----
4710 XC=ASC(MID$(NS$,1,1))-ASC("A")
4720 XR=VAL(MID$(NS$,2))
4730 X!=V!(XR,XC)
4740 RETURN
5100 REM ---- GOTO ----
5110 PRINT@0,"GOTO: ";
5120 IN$="":GOSUB1220
5130 CC=ASC(MID$(IN$,1,1))-ASC("A")
5140 CR=VAL(MID$(IN$,2))
5150 GOSUB2400
5160 RETURN
5200 REM ---- SAVE ----
5210 PRINT@0,"SAVE: ";
5220 IN$="":GOSUB1220
5230 OPEN IN$FOR OUTPUT AS 1
5240 FORI=0TO20:FORJ=0TO20
5250 IFTY$(I,J)<>""THENPRINT#1,I;J;TY$(I
,J);",";CHR$(34);SHT$(I,J);CHR$(34)
5260 NEXTJ:NEXTI
5265 PRINT@0,TAB(39);
5270 CLOSE:RETURN
5300 REM ---- LOAD ----
5310 PRINT@0,"LOAD: ";
5320 IN$="":GOSUB1220
5330 OPEN IN$FOR INPUT AS 1
5340 IF EOF(1) THEN 5370
5350 INPUT#1,I,J,TY$(I,J),SHT$(I,J)
5360 GOTO5340
5370 CLOSE
5380 GOSUB4100:CR=0:CC=0:FLG=1:GOSUB2420
5385 PRINT@0,TAB(39);
5387 C$=""
5390 RETURN
5400 REM ---- RECALC ----
5410 GOSUB4100
5420 GOSUB1000
5425 C$=""
5430 RETURN
5500 RETURN
5600 RETURN
5700 REM ---- PRINT ----
5710 FORI=0TOCR:FORJ=0 TOCC
5720 IFTY$(I,J)="V"THENLPRINTUSINGF3$;V!
(I,J);ELSELPRINTUSINGF4$;SHT$(I,J);
5730 NEXTJ:LPRINT:NEXTI
5740 RETURN
5800 REM ---- DONE ----
5810 MENU
```



Making the Model 100 sit up

Donald Stevens, Las Vegas, NV

My new TRS-80 Model 100 Portable Computer is a joy to behold and use. The most frustrating aspect of the beast is achieving a comfortable viewing and typing angle. The Model 100 does have an adjustable contrast control but, in most situations, there is still the glare on the display from the overhead lights.

My initial solution to this dilemma was to prop the Model 100 up with a disk dictionary underneath the rear edge. That was my first solution, but it meant carrying the dictionary with me. The Model 100 is intended to be a portable computer and an armfull of book and computer did not seem to match this concept.

This situation set my creative juices flowing in an attempt to remedy the problem. The most obvious solution to the problem was to construct some sort of sturdy, yet portable, stand to rest the computer in. I immediately dug out my supply catalogs and looked up the prices of tools and materials required to construct a suitable stand from plexiglass. The information I found indicated that a suitable, professional-looking stand could be constructed at home for $17.50 ($4.50 in plexiglass and $13 for a strip heater).

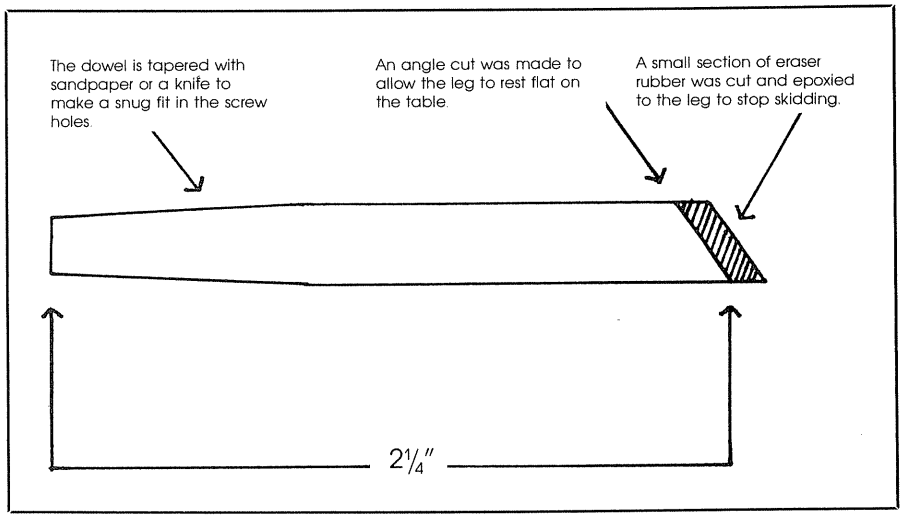
Very pleased with myself, I put the design plan and parts list in my pocket and set off on my daily rounds. While driving to my first appointment, I was struck by the proverbial "bolt from the blue." While stopped for a stop light, I chanced to watch some poor, unfortunate soul with his leg in a cast hobble across the street in front of me on crutches.

Eureka! When I arrived back at my office a short while later, I took the caps off of two felt pens and placed them in the two screw holes on the back of the Model 100 behind the LCD display. I turned the Model 100 over and marveled at the simplicity. Sitting in front of me, at the proper viewing and typing angle, was my Model 100.

The next step was to produce a workable substitute for the pen caps. Figure 1 shows you how to duplicate my efforts. The total cost to produce a dozen MLEGS (as I call them) was a paltry forty cents. I made one dozen (six pairs) of legs. Small items like these can be lost, but since they are so cheap to make and can be replaced at will, I made extras.

No doubt there will be people who will follow the same steps I did and arrive on the commercial scene with a fancy plexiglass stand that you will have to leave stationary or cart around. But if you follow my lead, your stand will be as portable as your computer and will cost you next to nothing.

Figure 1



An MLEG is made from a 2¼" length of ⅜" wooden dowel. The end that fits the Model 100 screw hole is tapered slightly to make a good fit in the hole. A small piece of rubber is cut to fit on one end of the dowel to provide anti-skid properties to the leg.

Upper- lowercase converter

Model III

Jeffrey C. Ruble, Port Angeles, WA

One of the nicest features that Radio Shack included in their TRS-80 Model III is the ability to display upper- and lowercase letters. Upon normal power-up, the Model III keyboard is in a caps-only mode. However, you can toggle back and forth from caps-only to upper-lowercase with a SHIFT 0 key combination. POKE 16409,0 will also enable upper-lowercase, while POKE 16409,X (with X not equal to 0), will disable upper-lowercase.

In writing CAI (Computer Aided Instruction) software for the Model III, I like to use upper-lowercase as much as possible. Text output presented in upper-lowercase is easier to read and more "professional looking" than text displayed in all caps. However, there is a slight esthetics problem that can arise in using upper-lowercase. Suppose that a BASIC CAI program for drill and practice in math contains the following instruction:

100 INPUT "Hi there!! What's your first name";N$

This generates the question; "Hi there!! What's your first name?"

Suppose further that the user is named Bill and that upper-lowercase has not been enabled. When Bill types his name in response to the above question it appears as BILL. N$ is now equal to "BILL" and can be used elsewhere in the program. For instance, our CAI program may contain an instruction like:

900 PRINT "Nice going";N$;". That is correct.".

With N$ = BILL instruction 900 would display; "Nice going BILL. That is correct." While this is fine, it would be nicer to see displayed; "Nice going Bill. That is correct." That is, have "Bill" as part of the output rather than "BILL."

One obvious solution would be to enable upper-lowercase either manually (SHIFT 0), or automatically within the program (POKE 16409,0) at the beginning of the session. Bill would then have to remember to hold down the SHIFT key while typing the "B" in his name. If he forgets to do so, his name will be displayed as "bill." This places an extra burden on Bill which may be beside the point of the CAI exercise. This sort of problem should be avoided especially, if the software is intended for use by young children.

The short routine below solves this upper-lowercase dilemma. It accepts the value of N$ in any combination of upper- and lowercase letters. It then converts N$ to proper format. For example, inputs of "BILL," "bill" or "BilL" would be converted to "Bill" by the routine. An input of "Bill" will, of course, be left undisturbed.

The routine uses the ASCII numbers for the characters A - Z (ASCII numbers 97 - 122). The program scans N$, one character at a time. The first character is checked to see if its ASCII number is bigger than 90 (i.e., not uppercase). If so, it is replaced with the character whose ASCII number is 32 less than its number. Thirty-two is the offset between the ASCII numbers of the uppercase letters and the lowercase letters. If the first character's ASCII number is less than 90, it is left alone.

The routine now checks the remaining characters of N$. If a character is found to have ASCII number less than 97 (i.e., not lowercase), it is replaced with the character whose ASCII number is 32 more than its number.

The routine assumes that N$ contains only letters. A provision to handle other characters could be included via an IF...THEN statement.

Program Listing for Upper-Lowercase Converter

```
110 '                    by Jeff Ruble
120 '
130 CLS
140 INPUT"Hi there!! What's your first
name";N$
145 '
146 '          Convert N$ to proper fo
rmat
150 CH$ = LEFT$(N$,1) : AN = ASC(CH$)
160 IF AN > 90 THEN MID$(N$,1,1) = CHR$
(AN - 32)
170 FOR I = 2 TO LEN(N$)
180    CH$ = MID$(N$,I,1) : AN = ASC(CH
$)
190    IF AN < 97 THEN MID$(N$,I,1) = C
HR$(AN + 32)
200 NEXT I
210 '
220 PRINT"Glad to meet you ";N$;"."    '
     This line for demo purposes only
230 INPUT"GO AGAIN <Y/N>";Q$
240 IF Q$<>"Y"THEN END ELSE GOTO 100
```

Graphics a la cassette

It's pure Hollywood and the effects are spectacular

Color Computer

Lynard Barnes, Chicago, IL

A high-resolution color map of the United States without program code? Not quite, but almost.

This article shows you how to save a video creation to tape once it has been created. The screen may then be reloaded, utilizing program code only to set color and screen type.

There are a number of possible applications. A game which utilizes a highly-complicated screen, involving a lot of DRAW, LINE and CIRCLE program statements may be created, saved and then reloaded with the actual "play game" code. Another application dramatically increases the amount of instructional graphic material displayed in an audio-computer lecture — the "talking computer teacher" concept. No doubt, you will be able to think of other ingenious applications. The basic ingredients required are a 16K Color Computer, a cassette recorder, two blank tapes and a plan.

Machine Language and BASIC

The routine which allows the screen to be saved to tape is called GRAFILE. The source code listing, generated by Radio Shack's EDTASM+ is shown in Listing 1. In our applications, however, we will be using Listing 2, which is a BASIC program, which POKEs the machine language routine into memory. We will go into detail on how to use Listing 2 in a moment. First, let's examine the machine language routine which does the actual work.

GRAFILE occupies the top 200 bytes of memory. The actual code is 191 bytes long (from memory address 16183 to 16374. The routine is divided into six functional blocks: saving a text screen (lines 200 to 390), loading a text screen (lines 420 to 540), saving a high-resolution graphics screen (lines 570 to 750), loading a high-resolution graphics screen (lines 780 to 910), the cassette input/output and control routines (lines 930 to 1020), a loop counter variable designated PLEN, and a menu selection variable designated MEMORY. The final block is the entry point for the routine at line 1080.

When GRAFILE is first entered, the PLEN variable must contain a loop counter between 11 and 47. The appropriate value is POKEd into memory address 16345 from the BASIC program. The purpose of PLEN is to determine the number of times 128 bytes of data must be written to, or read from, cassette. In each case, the 128 bytes are the contents of the screen.

For a text screen, the content of PLEN is not used since the number of 128-byte groups is predetermined to be four (512 bytes of video memory addresses divided by 128). The five available PMODE resolutions are a different matter. The number of bytes on the screen range from a low of 1536 (PMODE 0) to a high of 6144 (PMODE 4). The value in PLEN is a variable which insures that we will always get all the data contained on the screen, depending on the PMODE setting. (To the value in PLEN, 1 is automatically added due to the structure of the controlling input/output loops. Examine the L2/12A input loop for details.)

The other variable utilized in the MEMORY routine must contain a legitimate command code of 1 to 4. Lines 13 to 16 of the remark statements in Listing 2 explain what purpose these command codes serve. When the BASIC statement "A=USR0(#)" is executed, the computer starts executing in the GRAFILE routine at line 1080. The D register (a combination of the two eight-byte registers A and B) is loaded with the content of MEMORY and a comparison ensues to determine what action is to be taken. If MEMORY does not contain a

value between 1 and 4, a return is promptly made back to BASIC (line 1180).

It will be rewarding if we take a moment here to find out how the simple "A=USR0(#)" statement results in transferring control of the computer from a BASIC program to a machine language routine.

Notice, in line 0 of Listing 2, the DEF USR0 establishes the entry point of the machine language routine. Under Extended Color BASIC, it is possible to define nine such entry points. Thus, instead of entering GRAFILE at a menu table in line 1080, we could just as easily define four different entry points as shown in Table 1a. it eliminates the need for determining a command code in MEMORY.

Another method is to transfer the command code to the machine language routine (Table 1b) by way of the "A=USR0(#)" statement. This necessitates a call to the ROM subroutine at 0B3EDH as the first instruction in the machine language routine entry point. The command value will always be in the low order B register. The same procedure is employed in the final method (Table 1c), with the exception that we POKE the command into an address we determine — in this case 16348. In both instances, the routine starting address is defined as the menu table at line 1080 of Listing 1.

Which method is best? Either gets the job done. Defining each entry point is more sophisticated and requires less machine language code then the other two (the entire block of code between lines 1080 and 1180 becomes unnecessary when each screen/cassette operation has its own entry point defined in a USR statement). But, if you want to place the routine in a different area of memory, you would have to compute four different entry points with the first method. With the second method, if you wanted to transfer the routine to a different computer (like my old, but trusty, Model I) you would have to use the necessary Model I ROM call to transfer the command from BASIC to the machine language routine. The third method used is a happy compromise.

Using the ROM Cassette Routines

Once the machine language routine has received a legitimate command, a branch is made to the appropriate input/output routine.

Using the GET GRAPHICS screen routine in lines 570 to 750 as an example, the X index register is used to point to the beginning of graphic screen memory (address 1536 to X, where the value of X depends upon the PMODE setting). This screen address is stored at address 126 (7EH EQUated with BUFFER) as required by the ROM cassette output routine. The block type to be output is data which is designated by storing a 1 at address 124 (7CH EQUated with TYPE). Finally, the number of bytes to be output is stored at address 125 (7DH EQUated with LENGHT[*sic.*]). This is all we must do in preparation for sending data out to cassette, aside from making the actual call.

Become a Basic Computing Author

Do you have a useful program? Would you like to tell others about a successful computer application? Have you something to say about your new TRS-80 hardware or software? Did you discover a new way to use your software? If so, **Basic Computing** would welcome your submission. Microcomputing is extremely new and your experiences can be helpful to others. To help you get original material ready for publication, here are a few guidelines.

Use your own words. Write as much as is necessary to tell the story but stay to the point. Most submissions run about five to ten typewritten pages in length, excluding any programs. Avoid jargon or technical phrases and don't be afraid to define the terms as you go. Many of our readers are new to computing and are probably not as proficient as you are.

Please submit typed, double spaced, text that is in upper and lower case. Include pictures or figures when appropriate. Be sure that all drawings are carefully done, with black ink on white paper. We prefer to shoot pictures from your originals rather than use an artist. Pictures can be in color or black and white. Our readers might like to know something about you, so include a brief autobiographical paragraph if you wish.

Programs that accompany articles must be submitted on cassette tape or diskette. Clearly label the media with your name, the program's name, and the type of system it runs on. Include a paper listing as well. Programs that can run on more than one model of TRS-80 are especially desirable. Your chances of acceptance increase greatly if it can appeal to more readers. Material that is extremely hardware or software dependent has a lower chance of being accepted.

All references to marketed software or hardware should include the manufacturer's name, address, and current price. If you are sending in a review, be sure to tell the version number of the material under evaluation. Reviews are not sent to the company for comment prior to publication.

You will receive a notice that your material has arrived. If the material is accepted, our check will be included. We pay on acceptance, not publication. We are purchasing all publication rights to the article and associated programs. We do not guarantee publication of the material. Our payment is not on a per page or per word basis. Most authors can expect $100 to $200 per feature article and $35 to $50 for reviews. After publication, the original material is returned to you. For rejected articles, all material is returned.

That is all there is to it. For even more details, write for a copy of our Author's Guide. Once your article is accepted, look for it to appear. While you wait, get going on the next one. It is your support that makes **Basic Computing** special.

How To Enter Our Listings

Our program listings come directly from the submissions of our authors. We do not edit them at all (that's why you sometimes see spelling errors in them). We run all submissions and make sure that they do work.

To enter one of the listings given make sure you have the type of computer specified and all necessary programs, operating systems, or hardware that the program uses. Type in the program exactly as it appears in the magazine. Be extra careful so you do not confuse 0 (zero) with O or 1 (one) with I or L. Save the program to tape or disk **before** running it. On long programs it is wise to save it as you go along, thus protecting yourself from having to re-enter the whole program if the lights go out.

Here are some tips to help you catch errors that you may have made in typing. If you get an out of data error, the problem lies in the DATA statements, rarely in the READ line that the computer refers to. Check all DATA lines to see that they are correct and that no commas or values are missing. It might be useful to print each variable after it is read, that way you can follow the computer as it goes through the data. Just insert a :PRINT **variable** right after the READ **variable** command.

Many of our authors use a linefeed, or downarrow, in their programs. If you see lines of code that have many blank spaces and then they begin again on the next line with more code, a linefeed was used. Even if you don't use them, the program will run but the video display may be messed up.

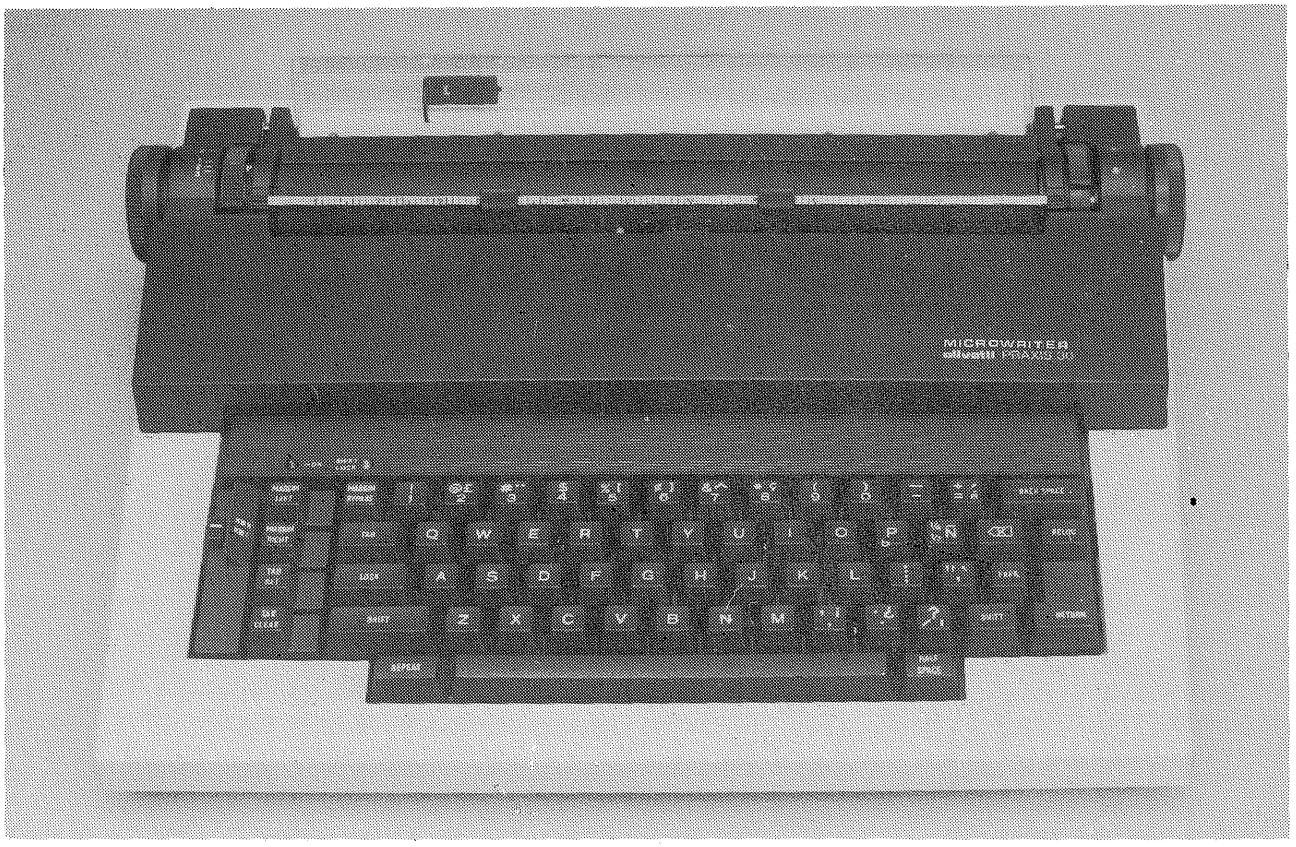
You will find the TRON command helpful in following the program's logic. By turning the trace command on, TRON, you can see what lines are being executed by the program. It is very useful in catching GOTO or GOSUB errors and incorrect references to linenumbers. Don't worry about video formatting when the trace is on, it will be quite messy.

If you find yourself getting TM or type mismatch errors, check carefully the use of the $ symbol. Also look at the beginning of the program to see if you correctly entered the DEFINT or DEFSTR statements.

Function call errors usually occur when a variable has a value that is not allowed. Check all variables that are being used by the function, one of them probably has the wrong value.

If after all that, you can't get it to run, send us a paper listing of your program, what systems you are running it on, and carefully document the error you are getting. We will do what we can to find the flaw. It is very difficult for us to try to help you debug errors over the phone. Check Letters and Notes, etc. in the next few issues for updates or conversions. Many times a reader will tell how to embelish a previously published program.

Ammicro introduces the first letter quality printer for $680 that can also be used as a typewriter.



The MICROWRITER™ Daisy wheel printer.

There was a need for a low cost letter quality machine that would be suitable for use as an office typewriter, and as a computer printer. Ammicro met that need by combining the Microwriter parallel interface and the traditional Olivetti craftsmanship that was available in their Praxis machine.

With the Microwriter you can have the best of both worlds a letter quality printer, and a high quality office typewriter all in one machine, that sells for less than the cost of a good dot matrix printer!

It's not just printer or a typewriter that comes complete with a deluxe carrying case, but a feature-packed, lightweight machine that doubles as an office typewriter. This printer is a simple, low cost, reliable unit which can be utilized with word processing systems, microcomputers, personal computers, and small business systems. The Microwriter's low noise level and slim modern styling allow it to blend with any decor.

The Microwriter's print quality is identical to the finest office typewriters on the market. This machine is not only perfect for letters and manuscripts, but with it s 165 character, 12 inch print width, the machine is perfect for letter quality budget spread sheets, price lists, data sheets, and forms.

The Microwriter can tab, rule single lines both vertical and horizontally, underline and print at 10, 12, or 15 characters per inch (switch selectable)! Its ten character memory for automatic error correction, lift off correction ribbon, and fixed or programmable page formats are a few of the many features that make it a perfect office typewriter. Microwriter not only handles letter and legal size sheet paper in widths up to 12 inches wide, but also handles fanfold paper.

There's a wide selection of 21 interchangeable daisy wheels available. And ribbon cassettes that just drop in. With the Microwriter you will never again have to send an important letter or a simple correspondence that doesn't look impressive.

It s operation as a computer printer is simple. Just load it up with paper and you are ready to go. Centronics compatible parallel output cables are currently available from stock for the following computers: IBM PERSONAL COMPUTER™, OSBORNE 1™, ZENITH Z-100™, BURROUGHS B-20™, Convergent Technologies models IWS & AWS™, TRS-80 MODEL I, II, III™, APPLE II™. . . custom cables also available by special order.

This machine creates a new standard by which all current low cost letter quality printers will follow. Ammicro's Microwriter is truly designed for the lifestyles of the 80's and for decades to come.

Why settle for just any printer when you can have a MICROWRITER. . . . a fine letter quality typewriter for you and your computer.

The Microwriter is the only daisy wheel printer on the market for $680. For more information, see your local computer dealer or contact Ammicro directly.

ammicro™ corp

122 East 42 Street, Suite 1700, New York, N.Y. 10168
(212) 254-3030

DEALER INQUIRIES INVITED

MasterCard OR VISA®

For orders call:
1-800-251-5110

MICROWRITER is a trademark of Ammicro Corporation PARAXIS 30 is a trademark of Olivetti

At line 640, a call is made to the SAVE routine in line 930. The WRTLDR routine writes 128 bytes of 55H to tape, followed by a sync byte, 3CH. Note that this call is made only once. The purpose is simply to get the cassette motor up to speed. After the leader has been written, a call is made to BLKOUT in line 940 which sends the first 128 bytes of data pointed to by the address in BUFFER out to tape and a return is executed. Now enters the loop counter mentioned above.

The loop counter is loaded into the A register from PLEN and in the very next line, stored at PLEN. Redundancy with a virtue. The routine goes into a loop at line 660 and the next time PLEN receives a value from A it will be the original content, decremented by one. The same is true of the X index register, which is used by the cassette ROM routine to point to the incrementing memory address contained in BUFFER. Through each completion of the loop, the address in the X register is incremented by 128. When the value in the loop counter is zero, the zero flag in the condition code register is set (equals 1) and the loop falls through.

Finally, the return to BASIC is made after the cassette motor is turned off. To turn the motor off, the A register is loaded with 52 (34H) in line 1000 and stored at memory address 65313 (FF21H).

The other three input and output routines with GRAFILE are structured the same way, though the S1 and L1 routines do not make use of a variable loop counter. And, yes, in case you were wondering, the S1 and L1 routines will write and read in 512 bytes of any type of data in the CC tape format.

Table 1

Three different methods of achieving the same end when a machine language routine accomplishes more than one objective. In (A), each entry point address is defined while (B) relies upon a branching table in the machine language routine after a call to ROM returns a branching command in the low order B register. Method (C) is the same as (B) without the ROM call.

A. Define entry addresses via USR function:

Define By	Equals Command	Execute By
DEF USR0 = 16183	1	A = USR0 (0)
DEF USR1 = 16221	3	A = USR1 (0)
DEF USR2 = 16251	2	A = USR2 (0)
DEF USR3 = 16291	4	A = USR3 (0)

B. Transfer command code to ML routine:

DEF USR0 = 16349	A = USR0 (#) ('#'= CMD 1-4)	JSR [0B3ED] ('B' register contains cmd)

C. Transfer command code to ML routine without ROM call:

DEF USR0 = 16349	POKE (address), 1-4	A = USR0 (0) (Load 'B' with value in address)

Using the BASIC Program

If you follow the REMark statements between lines 63005 and 63039 of Listing 2, you will discover that the data values correspond exactly to the hexadecimal values in the second column of Listing 1. Two FOR . . . NEXT loops in lines 63000 to 63003 are responsible for storing the machine language routine into memory starting at 16183 and 16349. Once line zero has executed, and the loops have done their job, lines 1 through 63043 may be deleted. We are now ready for an application.

The procedure for creating a graphic tape file is relatively simple. Load Listing 2 and execute by typing RUN. When execution stops, delete the unnecessary program lines. Create a graphic (or text) display by inserting the proper program code between lines zero and 63046. All the requirements are fulfilled in Listing 3. You might want to try it as your first graphic tape file. Type in the lines, RUN and answer the PMODE prompt with 4. Line 110 causes the branch to 63062 where the PMODE resolution is set. After the picture is drawn, a branch at line 160 goes to the cassette command subroutine. In this instance, "2" would be typed to save the high resolution screen. The program stops.

Without changing anything, RUN the program twice more, answering the PMODE prompt with 3 and then 1. Save these to tape by issuing the command 2.

Next, delete lines 100 to 170 and type in Listing 4. Rewind the tape to the first screen saved, press PLAY, RUN the program and all three graphic files will automatically load into memory after the FOR . . . NEXT delay loop in line 300 has executed. The approximate amount of time it takes to write and read graphic files from and into memory is shown in Table 2.

The Ultimate Challenge

Instead of showing slides of your last vacation, why not present a documentary, replete with zoom maps, interesting statistical abstracts, a little animation and, of course, an entertaining narrative.

The secret to creating an audio-graphics cassette is planning. Substitute timing for planning and the real work involved becomes evident. Take these four steps:

1. Outline your narration and determine the graphic material you will use.
2. Write your narration script and the program code for the graphics.
3. Create a master tape of your graphics.
4. Finally, write the program to control screen input and narration timing.

The loading of graphics or text screens must be controlled by timing loops to coincide with narration. The only means of guaranteeing that your listeners do not get an ear full of computer razz is to issue an AUDIO OFF, MOTOR OFF before a screen is loaded. GRAFILE turns the cassette motor on in order to load screen data and turns it off again once the screen is loaded. Your control program must turn audio and motor back on to resume narration.

The key is timing. On my Color Computer, the following loop takes five seconds to execute: FOR I = 1 TO 2701 : NEXT. Check it out on your computer and simply multiply 2701 or whatever number is right for

your computer by the number of seconds delay you want while narration is going on.

If you argue that this is a lot of work just to present vacation highlights in a scintilating, provocative manner, you are absolutely right. But it is pure Hollywood and the effects are rather spectacular.

Table 2

Approximate input/output times for screen data.

PMODE ("PM" var)	SAVE/LOAD Time	SAVE CMD ("ZX$" variable)	LOAD CMD ("ZX$" variable)
4	31.5 sec	2	4
3	43.5 sec	2	4
2	16 sec	2	4
1	21.5 sec	2	4
0	9 sec	2	4
Text screen	4.5 sec	1	3

Listing 1 — GRAFILE

```
3F37            0100          ORG     03F37H
      A00C      0110 WRTLDR   EQU     0A00CH
      A008      0120 BLKOUT   EQU     0A008H
      A004      0130 CSRDON   EQU     0A004H
      A006      0140 BLKIN    EQU     0A006H
                0150
      007E      0160 BUFFER   EQU     0007EH
      007C      0170 TYPE     EQU     0007CH
      007D      0180 LENGHT   EQU     0007DH
                0190
                0200 * GET TEXT SCREEN
3F37  8601      0210 S1       LDA     #01H          *16183
3F39  977C      0220          STA     TYPE
3F3B  8680      0230          LDA     #80H
3F3D  977D      0240          STA     LENGHT
3F3F  8E0400    0250          LDX     #400H
3F42  9F7E      0260          STX     BUFFER
                0270
                0280
3F44  BD3FC1    0290 S2       JSR     SAVE
3F47  8603      0300          LDA     #03H
3F49  B73FD9    0310 S2A      STA     PLEN
3F4C  9F7E      0320          STX     BUFFER
3F4E  BD3FC5    0330          JSR     SAVE2
3F51  B63FD9    0340          LDA     PLEN
3F54  4A        0350          DECA
3F55  8100      0360          CMPA    #00H
3F57  26F0      0370          BNE     S2A
3F59  BD3FD3    0380          JSR     TOFF
3F5C  39        0390          RTS           *16220
                0400
                0410 * LOAD TEXT SCREEN
3F5D  8E0400    0420 L1       LDX     #400H         *16221
3F60  9F7E      0430          STX     BUFFER
3F62  BD3FCA    0440 L2       JSR     LOAD
3F65  8603      0450          LDA     #03H
3F67  B73FD9    0460 L2A      STA     PLEN
3F6A  9F7E      0470          STX     BUFFER
3F6C  BD3FCE    0480          JSR     LOAD2
3F6F  B63FD9    0490          LDA     PLEN
3F72  4A        0500          DECA
3F73  8100      0510          CMPA    #00H
3F75  26F0      0520          BNE     L2A
3F77  BD3FD3    0530          JSR     TOFF
3F7A  39        0540          RTS           *16250
                0550
                0560 * GET GRAPHIC SCREEN
3F7B  8E0600    0570 GL1      LDX     #600H         *16251
3F7E  9F7E      0580          STX     BUFFER
3F80  8601      0590          LDA     #01H
3F82  977C      0600          STA     TYPE
3F84  8680      0610          LDA     #80H
3F86  977D      0620          STA     LENGHT
```


PRICES YOU CAN'T BEAT!..

LNW-80 Model II $1595

128K, 5"/8" DISK CONTR., RGB COLOR, HI-RES GRAPHICS, RS 232, PAR. PRINTER PORT, 80x24 DISPLAY, 1 YEAR WARRANTY, PLUS

FREE SOFTWARE

MICROSOFT BASIC, LNW BASIC, DOS+ 3.4, CPM 2.2, CHART-X GRAPHICS, MICROTERM, ELECTRIC PENCIL, ELECTRIC SPREADSHEET, PROF. BUSS. ACCTING (general ledger, accts. pay., accts. rec., payroll)

SPECIAL THIS MONTH

COMPUTERS

PMC 81, 16K	$499	32K EXPANDOR	$329
TIMEX	$56	16 MEM	$42
APPLE CLONE (SYSCON 2)			$599
TRS 80 COLOR COMP. 16K			$269
TRS-80 MOD. IV, 64K, 2 40 TRK S/S			$1,799

CRT MONITORS

AMDEK 300 GREEN	$139
AMDEK 300 AMBER	$159
AMDEK COLOR I	$359
AMDEK COLOR II	$639
TAXAN RGB COLOR I	$299
TAXAN RGB GOLOR III	$535
TAXAN GREEN	$125
TAXAN AMBER	$139

TEAC ½ SIZE DRIVES

	Bare	Compl
FD 55A 40TRK S/S	$209	$245
FD 55B 40TRK D/S	$280	$319
FD 55F 80TRK D/S	$350	$390

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	$385

ECONOMY DRIVES

COMPLETE W/CASE/PWR SUPL/CABLE
40TRK S/S $195

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	$135
SIGNALMAN	$85

LNW SYSTEM EXPANSION II

UPGRADE YOUR MOD 1 OR PMC-80/81 WITH DISK CONTROLLER · RS 232 ·PARALLEL PRINTER PORT · 32K 200 NS MEMORY · GOLD CONNECTORS ·TRANSFORM·CASE · CABLE

SPECIAL THIS MONTH $329

EXPANSION INTERFACES

MICRO DESIGN MDX-2	$449
MICRO DESIGN MDX-3	$289
LNW DOUBLER w. DOS+ 3.4	$189
DOUBLE DENSITY MULTIPLIER	$95

SOFTWARE

LAZY WRITER	$159	MULTIDOS	$89
ELECTRONIC WEBSTER	$119	SUPER UTILITY+	$65
MAXI MANAGER	$129	M.A.S. 80	ea. $135
POSTMAN	$119	NEWSCRIPT	$114
DOS PLUS 3.4	$89	OMNITERM	$78

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

```
                0630
3F8B  BD3FC1    0640 GL2      JSR     SAVE
3F8B  B63FD9    0650          LDA     PLEN
3F8E  B73FD9    0660 GL3      STA     PLEN
3F91  9F7E      0670          STX     BUFFER
3F93  BD3FC5    0680          JSR     SAVE2
3F96  B63FD9    0690          LDA     PLEN
                0700
3F99  4A        0710          DECA
3F9A  8100      0720          CMPA    #00H
3F9C  26F0      0730          BNE     GL3
3F9E  BD3FD3    0740          JSR     TOFF
3FA1  39        0750          RTS                             *16289
                0760
                0770 * LOAD GRAPHICS SCREEN
3FA2  8E0600    0780 LG1      LDX     #0600H                  *16290
3FA5  9F7E      0790          STX     BUFFER
                0800
3FA7  BD3FCA    0810 LG2      JSR     LOAD
3FAA  B63FD9    0820          LDA     PLEN
3FAD  B73FD9    0830 LG3      STA     PLEN
3FB0  9F7E      0840          STX     BUFFER
3FB2  BD3FCE    0850          JSR     LOAD2
3FB5  B63FD9    0860          LDA     PLEN
3FB8  4A        0870          DECA
3FB9  8100      0880          CMPA    #00H
3FBB  26F0      0890          BNE     LG3
3FBD  BD3FD3    0900          JSR     TOFF
3FC0  39        0910          RTS                             *16320
                0920
3FC1  AD9FA00C  0930 SAVE     JSR     [WRTLDR]                *16321
3FC5  AD9FA008  0940 SAVE2    JSR     [BLKOUT]
3FC9  39        0950          RTS                             *16329
3FCA  AD9FA004  0960 LOAD     JSR     [CSRDON]                *16330
3FCE  AD9FA006  0970 LOAD2    JSR     [BLKIN]
3FD2  39        0980          RTS                             *16338
                0990
3FD3  8634      1000 TOFF     LDA     #34H                    *16339
3FD5  B7FF21    1010          STA     0FF21H
3FD8  39        1020          RTS                             *16344
                1030
3FD9            1040 PLEN     RMB     2                       *16345
3FDB            1050 MEMORY   RMB     2                       *16347
                1060
                1070 * USR0 ENTRY POINT
3FDD  FC3FDB    1080 ENTRY    LDD     MEMORY                  *16349
                1090
3FE0  C101      1100          CMPB    #1
3FE2  1027FF51  1110          LBEQ    S1
3FE6  C103      1120          CMPB    #3
3FE8  1027FF71  1130          LBEQ    L1
3FEC  C102      1140          CMPB    #2
3FEE  1027FF89  1150          LBEQ    GL1
3FF2  C104      1160          CMPB    #4
3FF4  27AC      1170          BEQ     LG1
3FF6  39        1180          RTS                             *16374
                1190
      3FDD      1200          END     ENTRY
```

Listing 2 — GRAFILE B

```
Ø CLEAR1ØØ,16182:DEF USRØ=16349:CLS
1 GOSUB63ØØØ:PRINT"ML ROUTINE LOADED":ST
OP:REM   SET PMODE BY 'GOSUB 63Ø62'
2 '*****************************
3 '*                           *
4 '* P R O G R A M    C O D E  *
5 '*                           *
6 '* F O R    G R A P H I C S  *
7 '*                           *
8 '* S H O U L D  G O   H E R E*
9 '*                           *
1Ø '* ONCE DISPLAY IS CORRECT  *
11 '*   USE A 'GOSUB 63Ø46'    *
12 '*TO ENTER ONE OF FOUR CMDS *
13 '*   1 = SAVE TEXT SCREEN   *
14 '*   2 = SAVE HI-GRAPHICS   *
15 '*   3 = LOAD TEXT SCREEN   *
16 '*   4 = LOAD HI-GRAPHICS   *
17 '*                          *
18 '* THE FOLLOWING LINES MAY  *
19 '* BE DELETED ONCE THE DATA *
2Ø '*HAS BEEN POKED INTO MEMORY*
21 '*   LINES: 1 TO 63Ø43      *
22 '* REMAINDER OF PROGRAM IS  *
23 '* SKELETON AROUND WHICH TO *
24 '*CREATE, SAVE AND THEN LOAD*
25 '*     SCREEN FILES.        *
26 '*FOR AUTOMATIC LOADING OF  *
27 '*FILES USE A 'GOSUB 63Ø47' *
28 '* AFTER ESTABLISHING THE   *
29 '*   FOLLOWING VARIABLES    *
3Ø '*PM = PMODE SETTING (Ø - 4)*
31 '*ZX$= COMMAND "3" OR "4"   *
32 '*****************************
33 '
63ØØØ FOR X = 16183 TO 16344:READ P
63ØØ1 K=K+P: POKE X,P: NEXT
63ØØ2 FOR X = 16349 TO 16374:READ P
63ØØ3 K=K+P: POKE X,P: NEXT
63ØØ4 IF K<>22949 THEN CLSØ:PRINT"ERROR
IN DATA STATEMENTS":END ELSE RETURN
63ØØ5 'Save Text Screen Routine
63ØØ6 DATA 134,1,151,124,134,128
63ØØ7 DATA 151,125,142,4,Ø,159
63ØØ8 DATA 126,189,63,193,134,3
63ØØ9 DATA 183,63,217,159,126
63Ø1Ø DATA 189,63,197,182,63
63Ø11 DATA 217,74,129,Ø,38,24Ø
63Ø12 DATA 189,63,211,57
63Ø13 'Load Text Screen Routine
63Ø14 DATA 142,4,Ø,159,126,189
63Ø15 DATA 63,2Ø2,134,3,183,63
63Ø16 DATA 217,159,126,189,63
63Ø17 DATA 2Ø6,182,63,217,74,129
63Ø18 DATAØ,38,24Ø,189,63,211,57
63Ø19 'Save Graphics Screen
63Ø2Ø DATA 142,6,Ø,159,126,134
63Ø21 DATA1,151,124,134,128,151
63Ø22 DATA 125,189,63,193,182,63
63Ø23 DATA 217,183,63,217,159
63Ø24 DATA 126,189,63,197,182
63Ø25 DATA 63,217,74,129,Ø,38
63Ø26 DATA 24Ø,189,63,211,57
63Ø27 'Load Graphics Screen
63Ø28 DATA 142,6,Ø,159,126,189
63Ø29 DATA 63,2Ø2,182,63,217,183
63Ø3Ø DATA 63,217,159,126,189,63
63Ø31 DATA 2Ø6,182,63,217,74,129
63Ø32 DATAØ,38,24Ø,189,63,211,57
63Ø33 'Save Subroutine
63Ø34 DATA 173,159,16Ø,12,173,159,16Ø,8,
57
63Ø35 'Load Subroutine
63Ø36 DATA 173,159,16Ø,4,173,159,16Ø,6,5
7
63Ø37 'Toff Subroutine
63Ø38 DATA 134,52,183,255,33,57
63Ø39 'Program Entry Point
63Ø4Ø DATA252,63,219,193,1,16,39
63Ø41 DATA255,81,193,3,16,39,255
```

The PRODUCER

The Professional Program Writer.

THE PRODUCER WRITES PROGRAMS FOR YOU.

Even though you have no knowledge of how to write programs, you can now create impressive, sophisticated and functional softare to manage you data. You answer simple English questions, draw the screen on your monitor exactly like you want it, and the PRODUCER writes the entire BASIC program by itself.

THE PRODUCER IS FOR MICRO COMUTER OWNERS WHO CAN'T FIND THE SOFTWARE PROGRAM TO DO WHAT THEY WANT IT TO DO.

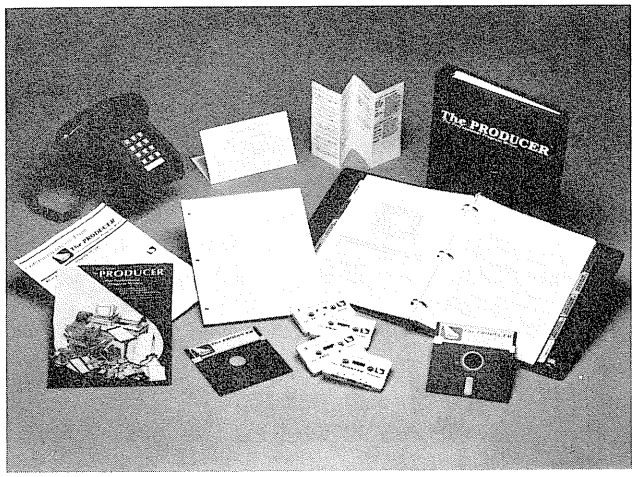
You may never need to buy another computer program to store and retreive information, perform calculations on your data and get displayed and printed reports. The PRODUCER can create professional quality customized software in a fraction of the time it would ordinarily take you

$149.95 For the Model I and the Model III

Listen to what one of our users wrote recently:

The PRODUCER has proven to be the greatest. I used to spend 70% of my time writing programs to create, maintain, sort, and list data. No More. Days and weeks of programming are now reduced to minutes and hours. The PRODUCER has increased the productivity of my custom software firm by 400%. This product is in a class reserved for the best.

A. Copelle, Northbrook, Illinois.



For the TRS-80 Model I and Model III, the PRODUCER package comes complete with Program Diskettes, over 200 page Reference Manual, Quick Reference Card, Registration Card, Audio Cassette Tutorial and outline, Free Home Inventory Management Program (sample finished program), One Year Subscription to Newsletter, and Toll Free Assistance.

1-800-433-5355

PRODUCER SOFTWARE/P.O.Box 1245/Arlington, Texas 76004-1245

TCS Heart of TEXAS COMPUTER SYSTEMS

Toll Free 1-800-433-5184 Texas 1-817-274-5625

TRS-80 equipment comes with original 90 day Manufacturer's Limited Warranty

MODEL 12 and MODEL 16

MODEL 12, 1 drive	$CALL
MODEL 12, 2 drives	$CALL
TCS MODEL 12 version, 2 Tandon drives (like the original)	$2995

MODEL 16B...Support up to 6 users. Run your whole office with hard disk capabilities for about $1000 per user!

MODEL 16B, 1 drive	$CALL
MODEL 16B, 2 drives	$CALL

Model 12 and Model 16 Accessories

128K memory board (256K Max.)	$629
128K extra memory chips (RS)	$269
128K extra memory chips (TCS)	$189
Xenix Microsoft Multi-user Basic	$269
Xenix Accounting Software	$CALL
Xenix Multiplan Spread Sheet Software	$263
MII/12 to M16 multi-user upgrade kit	$1339
DT/1 Video Terminal	$629

MODEL IV

MODEL IV, 16K Cassette	$825
MODEL IV, 64K, 2 drives, RS-232	$CALL

Model III Color Computer

All Radio Shack equipment is shipped from our store in Brady, Texas

TCS Model IV, 64K, 2 Disks

Systems come with 180 Day Warranty

$1499 With standard 40 track double density drives Over 340,000 bytes. Enhanced Model IV Operating System

RS232 FREE!

$1699 With 2 dual headed 40 track double density drives Over 730,000 bytes Enhanced Model IV Operating System

Fully assembled and tested systems that are software compatible and functionally identical to Radio Shack units sold at computer stores for $hundreds more.

- CONTROLLER BOARDS are high quality double sided epoxy boards with gold plated contacts.
- POWER SUPPLY is the finest switching type available.
- MOUNTING HARDWARE includes power and data cables.
- DISK DRIVES are Tandon, the same ones used by Radio Shack... 40 track, double density, with a 5 millisecond stepping rate.

TCS MODEL III DISK EXPANSION KITS

1 Controller, Power Supply, Mounting Hardware & Instructions	$249
2 Controller, Power Supply, Hardware & one 40 track Tandon Drive	$429
3 Controller, Power Supply, Hardware, two 40 track Tandon Drives	$598
3a Kit 3 but with two 80 track drives (dual sided 40s)	$791
3b Kit three but with two 160 track drives (dual sided 80s)	$989

TCS MODEL IV DISK EXPANSION KITS

11 Controller, Power Supply, Mounting Hardware, one 40 Track Tandon Drive	$479
12 Controller, Power Supply, Mounting Hardware, two 40 Track Tandon Drives	$649
12A Kit 12 but with two 80 Track Tandon Drives	$629
12B Kit 12 but with two 160 Track Tandon Drives	$849

TRS-80

TCS Heart of TEXAS COMPUTER SYSTEMS

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

Toll Free 1-800-433-5184 Texas 1-817-274-5625

```
63042 DATA 113,193,2,16,39,255
63043 DATA 137,193,4,39,172,57
63044 '
63045 'Enter Cassette Command
63046 ZX$=INKEY$:IFZX$=""THENGOTO63046
63047 POKE 16348,VAL(ZX$):'      Command
Code
63048 Z=PM+1:IF Z=3 THEN Z=2 ELSE IF Z>=
4 THEN Z=4.28
63049 Z=INT(Z*11):POKE 16345,Z:'Loop Cou
nter
63050 IFZX$="1"THENGOTO63057
63051 IFZX$="2"THENGOTO63058
63052 IFZX$="3"THENGOTO63059
63053 IFZX$="4"THENGOTO63060
63054 IFZX$="E"THEN CLS:PRINT"READY":END
63055 GOTO63046
63056 '
63057 A=USR0(1):GOTO63061
63058 A=USR0(2):GOTO63061
63059 A=USR0(3):GOTO63061
63060 A=USR0(4)
63061 RETURN
63062 PRINT@480,"PMODE";:INPUTPM:IF PM<0
 OR PM>=5 THEN GOTO100 ELSE PMODE PM,1:S
CREEN1,1:PCLSPM:RETURN
63063 END
```

Listing 3 — GRAFILE C

```
100 PCLS0: COLOR 0,0
110 GOSUB63062
120 DRAW" BM 34,30; R180; G65; F65; L180
; E65; H65;"
130 PAINT (0,0)
140 DRAW"BM 96,40; R60; D5; L25; D40; L1
0; U40; L25; U5;"
150 DRAW"BM 146,115; U5; L5; U5; L25; D5
; L5; D35; R5; D5; R30; U5; R5; U5; L10;
 D5; L20; U5; L5; U25; R5; U5; R15; D5;
R10;
160 GOSUB 63046
170 STOP
```

Listing 4 — GRAFILE D

```
100 PM=4: ZX$="4": GOSUB 200: GOSUB 300
110 PM=3: ZX$="4": GOSUB 200: GOSUB 300
120 PM=1: ZX$="4": GOSUB200: GOSUB 300
130 GOTO130
200 PMODE PM,1: SCREEN 1,1: PCLS PM: COL
OR 0,0: GOTO 63047
300 FOR X = 1 TO 1000: NEXT: RETURN
```


GENEALOGY and the TRS-80's

America's most popular personal computers have become significant genealogical tools.

By combining the use of a Radio Shack® computer and one of the following program systems, you can store information on family members and then print that information out in several formats without having to retype it. You can update each person's information at any time with the most recent facts. The system can audit the data to find erroneous and incomplete stored data. You can direct the system to print name indices automatically. You can also print both pedigree and descendent charts starting with any person. This can all be done without any special computer knowledge. There are also many more features to the following two systems.

"GENSYSTEMS"

specialty: automatically adds and prints narratives and family tables
storage/diskette: 335 to 705 persons
computer system required:
TRS-80® Model I, III, or 4 with:
48,000 characters of memory,
2 disk drives, and
an 80 or more column printer

program system: $128.45

descriptive booklet: $2.00

"GENEALOGY - COMPILING ROOTS AND BRANCHIES"

specialty: prints and maintains a complete book of information
storage/diskette: 1000 persons
computer system required:
TRS-80® Model II, 12, or 16 with:
64,000 characters of memory,
1 disk drive, and
an 80 or more column printer

program system: $250.00

descriptive booklet: $2.00

please address inquiries and orders as follows:
ARMSTRONG GENEALOGICAL SYSTEMS
c/o John J. Armstrong R.Ph.
5009 Utah Street
Greenville, Hunt County, Texas 75401
(214) 454-8209

TRS-80® and Radio Shack® are registered trademarks of the Tandy Corporation

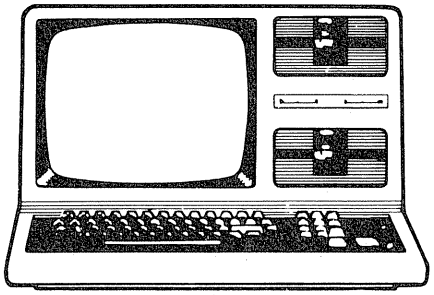
THE BEST* GETS BETTER!

MAXI MANAGER II
DATA BASE MANAGEMENT SYSTEM

Maxi Manager has been acclaimed by many as the finest Data Base Management System available for the TRS-80. But it's not any more — because we've just introduced Maxi Manager II! Maxi Manager II is far more powerful and flexible, and even easier to use.

FLEXIBILITY

Maxi Manager II has been designed to serve you, whatever your data management needs. Inventory, mail list management, client records, bibliographies, statistics, professional records, library files, customer data, and more are easily accomodated. In-



terfield mathematical functions let you perform sophisticated calculations.

In addition, you may change the size of your data base at any time by adding or subtracting fields, or changing field length WITHOUT reentering all your data!

HARD DISK COMPATIBLE

Maxi Manager II is designed to make efficient use of hard disk storage systems, running either the LDOS or DOSPLUS operating system. And because Maxi Manager II allows "named" files, you can store several Data Bases and other files and programs on a single disk (floppy or fixed). Switch quickly from one Data Base to another with a selection from the main menu.

EXPAND YOUR DATA HORIZONS!

Maxi Manager II expands your horizons with up to 60 characters per field and 50 fields per record, for a maximum record size of 800 characters. The Maxi Manager II data entry video display is user-formatted. Graphics characters can be mixed with text, and you decide where each field appears.

FASTER PROCESSING

Maxi Manager II is much faster than its predecessor. Full-screen displays, the Multiple Filter Search function, and all other searches are speedier, thanks to new machine language modules. And with the aid of ProSoft's FASTER program, overall speed has been increased by 20 to 30 percent. Finally, the edit function now uses a non-destructive cursor, speeding up your changes.

A DOS DELIGHT!

If you use and enjoy the sophisticated features of DOSPLUS and LDOS, you won't have to give them up when using Maxi Manager II. High Memory drivers (as large as 950 bytes) may now be used as well as DOS keyboard drivers.

EASIER ACCESS TO YOUR DATA

New features make printing out reports, labels, and sophisticated "non-form" letters easier. Maxi Manager is now directly compatible with Newscript, Lazy Writer, SuperScripsit, and Scripsit.

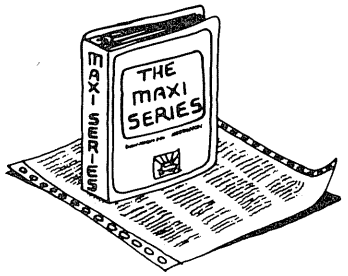
In addition, you can now transfer data to VisiCalc™. Large mailing list users will appreciate the new multiple mailing list module which permits the use of four-up Cheshire labels.

KERNAL PROGRAMS

Two Kernal programs (included) allow selective retrieval of data from Maxi Manager II files. This allows you to create significant new application programs without having to worry about file management.

FULL MANUFACTURER SUPPORT

The Business Division stands behind Maxi Manager II with a technical staff ready to assist you. A newsletter is



available to keep you informed of enhancements and new products. And you can communicate directly with us and other Maxi Manager II users with our electronic bulletin board service. (305) 869-1516, 300/1200 baud, after 4:30 pm EST.

*

80 readers' choice micro

Maxi Manager, the predecessor of Maxi Manager II, was voted Model I/III DATA BASE MANAGER OF THE YEAR by the readers of 80 Micro. Maxi Manager II is even better!

1-800-327-7172

Visit your local dealer or call us today for *your* copy of Maxi Manager II!

The Business Division
PO 3435 • Longwood, FL 32750
(305) 862-6917

THE BUSINESS DIVISION
A Subsidiary of Scott Adams, Inc

Pictures without graphics

Print pretty pictures — like you did in typing class

For all models

Bud Myers, Washburn, ME

Sooner or later, most computer enthusiasts are challenged by non-users to justify the not inconsiderable expenditure for their equipment. "What can you do with it that I can't do with a calculator and a typewriter?" is a typical question. And, in fairness, many of the things we do on computers can be done on less expensive machines, though usually not as quickly or efficiently. One area in which computers are clearly superior is graphics.

As a general rule, graphics printers are more expensive, and this was even more true in the recent past than it is today. But those without such printers should not despair. There is a way to produce pictures from non-graphic printers. The pictures may be no better than those done on a typewriter, but there are several distinct advantages nonetheless.

Mistakes are much easier to correct on a computer. Only the mistakes need to be retyped, and not the entire text. Creating the first, or subsequent, drafts requires no paper. Error-free text can be stored for later re-use by a computer. And, that text can produce as many original copies as desired.

Creation of pleasing pictures requires talent, patience and time. This disadvantage is, of course, common to both typewriters and computers, and is easy to overcome when using either. One of the persons who has the talent has made it possible for anyone to reproduce his work by merely following directions. That person is Julius Nelson, a specialist in typewriting education. His instructions are available from Business Teaching Aids, 3200 Southgreen Road, Baltimore, MD 21207, (301) 922-3043.

They are contained in a series of seven small booklets which cost only $14.50 postpaid for a whole set, and are collectively called "Typewriter Mystery Games®." This title derives from the fact that individual pictures in the booklets are identified only by a number. A separate index is furnished which lists them by name, but there is much to be said for following the directions without knowing in advance what they will produce.

There are over 150 individual designs in the series. There are animals, birds, fish, portraits, landscapes, still-lifes, items of transportation ranging from bicycles to clipper ships and including automobiles (both modern and antique). There are decorative borders, geometric designs and alphabets.

Each set of instructions consists of numbered lines such as "4 - 18 sp 12 $ 10 ? 1 $", which means "for the fourth line, depress the spacebar 18 times, the dollar sign key 12 times, the question mark key 10 times, and the dollar sign key once more." The number of lines of such instructions varies from the 19 necessary to produce the horse and carriage design of Figure 1 to 70 or more. The clown of Figure 2 has 60 lines.

If the completed pictures are to be viewed from a distance of several feet, they may be drawn just as the instructions specify. If they are to be seen at closer range, say in a booklet or under desktop glass, many of the designs may be compressed both vertically and horizontally to produce a smaller, but denser, version. Figure 3 shows the horse and carriage design so compressed.

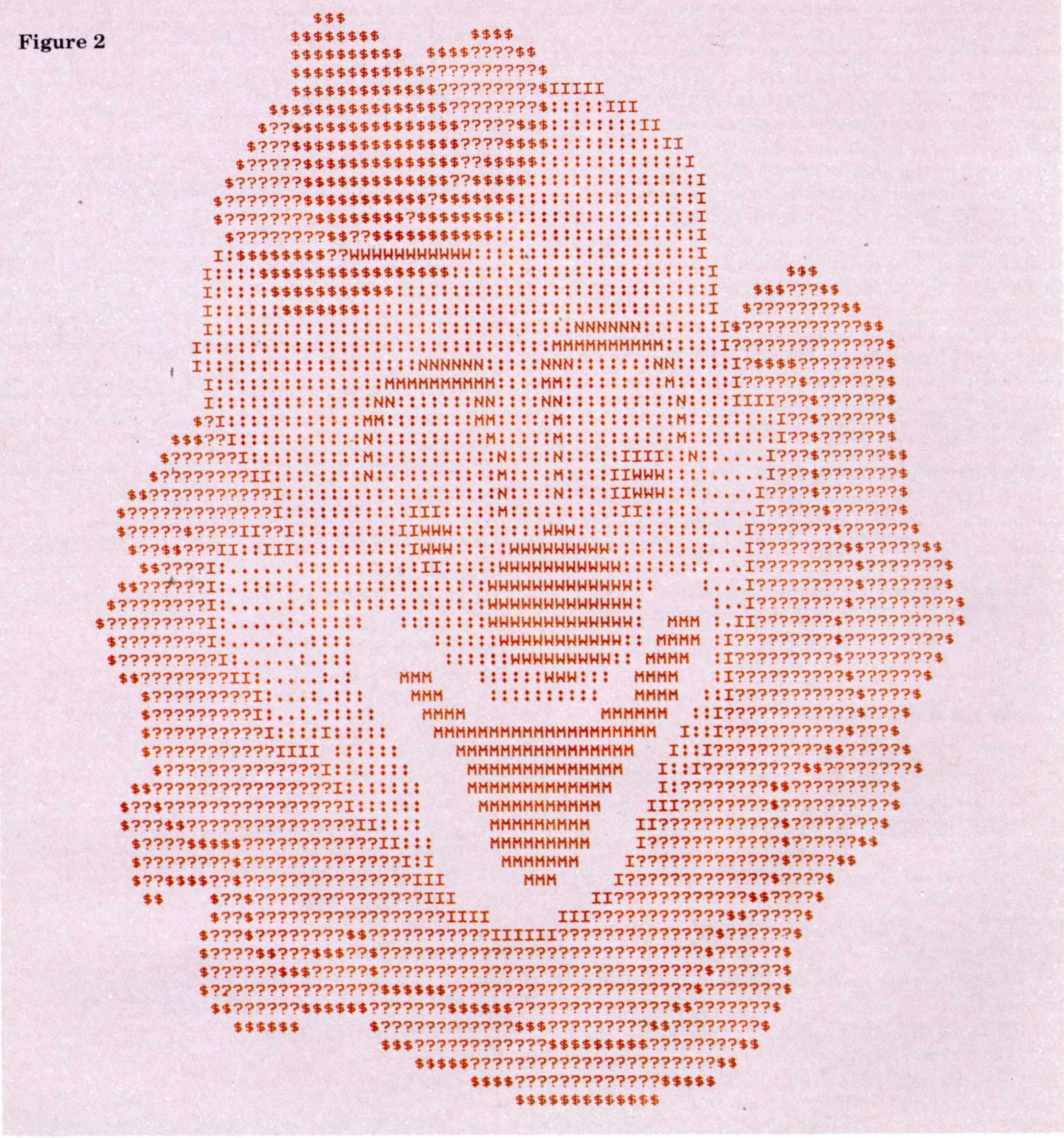
My computer program used to store the instructions is short and simple. The first 78 linenumbers are reserved for data. This provides a 1-to-1 correspondence between data lines and lines of instruction in the Mystery Games booklets. This makes the actual typing somewhat easier and less susceptible to error.

The instructions in the sample line above would be entered as "4 DATA 18s, 12$,10?,1$,0." Use of lowercase "s" instead of "sp" saves one keystroke each time the space appears. Use of the space itself would require quotation marks before and after the space — a total of three keystrokes. Note that the spaces will be printed, and not the "s" characters. This is merely a convenience for entering the DATA lines.

The colon must also be enclosed in quotes in order to be used as data, so whenever it appears in the instructions for a mystery game, substitute the semicolon for it. The zero at the end of each data line is the signal that the line is complete and no more items are to be read. Neither the semicolon nor the zero will be printed. A colon will replace each semicolon in the printed design and the zeroes will not appear at all.

After keying in lines 80 to 98, save them on tape. To produce each mystery game, load these lines first, then use AUTO 1,1 to bring up the linenumbers for DATA

Figure 2



lines. When all data has been entered, RUN the program and check the printout carefully for errors. Correct any that are found and RUN the edited program again. When the picture is error-free, save the entire program on another cassette.

Line 83 of the program uses variable P to hold the number of lines of instructions (DATA lines). Line 84 stores the length of each line in ML. Both variables are used to calculate and print margins which will center the design on standard sized paper. Line 85 does the first of these. It sets the top margin for 11-inch paper. For those few designs requiring 13-inch paper, change the 66 in this line to 78. Since there is but one top margin, this line is outside the main program loop which begins in line 86. To produce a uniform left margin, however, each line must be indented the proper amount. Line 87, inside the loop, calculates and prints this spacing for each line.

Line 88 reads a single data item as a string. Line 89 checks to see if it is zero and if so, passes control to line 97. For non-zero items, lines 90 to 92 separate the number from the character which follows it.

Line 93 changes any lowercase "s" characters back to spaces, and line 94 replaces semicolons with colons. Line 95 adds the indicated number of characters to those already stored in variable L. In the example line above, the first 18 characters are spaces, the next 12 are dollar

signs, and so on. Line 96 returns to read the next data item until all have been read for each line.

Line 97, which is reached by a branch from line 89 when a zero is read, prints the entire string variable L. This produces one line of the finished picture. Line 98 closes the loop and repeats the entire sequence if the line just printed was not the final line.

Listing 1 is the program which draws the horse and carriage. It includes both data and instructions. Listing 2 is the data only for the clown. Listing 3 shows the changes necessary to compress a picture. These are the control codes for the Radio Shack Lineprinters II, IV and VIII, as well as for their Centronics 730, 737 and 739 counterparts.

To anyone who creates such original designs: please send me the listing for your pictures. I'd like very much to add them to my library of pictures sans graphics. *(Readers may contact Mr. Myers at 2 Church St. Box 498, Washburn, ME 04786. —Ed.)*

Color Computer Conversions

In listings 1 and 3, delete the DEFINT and DEFSTR commands (lines 81 and 82). Change all LPRINT commands to PRINT#-2. Be sure that all references to B, C, D, L are changed to B$, C$, D$, and L$, respectively.

You must also change line 93 to be IF B$="S" THEN B$=CHR$(32) and be sure that all occurrances of S in the DATA lines are capitalized.

Listing 1 — Sans Graphics

```
1  DATA 37s,2%,11s,3%,Ø
2  DATA 9s,2%,9s,9%,7s,4%,7s,3%,3s,1%,Ø
3  DATA 8s,4%,5s,15%,5s,2%,6s,2%,4s,2%,Ø
4  DATA 9s,1%,4s,21%,2s,1%,5s,2%,5s,1%,3
s,3%,Ø
5  DATA 8s,3%,2s,23%,1s,6%,8s,3%,3s,1%,1
Øs,1%,1s,1%,Ø
6  DATA 8s,4%,1s,5%,2s,2%,5s,2%,3s,5%,1s
,2%,27s,5%,Ø
7  DATA 9s,2%,2s,5%,2s,2%,5s,2%,2s,1Ø%,2
5s,6%,Ø
8  DATA 8s,4%,1s,4%,3s,2%,5s,2%,3s,8%,1s
,2%,8s,5%,8s,5%,1s,3%,Ø
9  DATA 8s,4%,1s,4%,3s,2%,5s,2%,3s,7%,3s
,1%,5s,21%,3s,2%,Ø
1Ø DATA 9s,1Ø%,1s,2%,5s,2%,2s,13%,2s,2%,
1s,19%,Ø
11 DATA 1Øs,27%,8s,2%,2s,18%,Ø
12 DATA 8s,8%,1s,14%,1s,7%,2s,1%,1s,3%,3
s,17%,Ø
13 DATA 7s,1%,1s,1%,4s,1%,1s,1%,1s,12%,1
s,1%,1s,1%,3s,1%,1s,1%,2s,2%,4s,7%,3s,9%
,Ø
14 DATA 6s,1%,3s,1%,2s,1%,3s,1%,1s,1Ø%,1
s,1%,3s,1%,1s,1%,3s,8%,1s,2%,1s,2%,8s,2%
,3s,2%,Ø
15 DATA 6s,1%,4s,2%,4s,1%,5s,1%,2s,1%,3s
,1%,4s,1%,4s,1%,6s,2%,4s,1%,7s,1%,7s,1%,
Ø
16 DATA 6s,1%,3s,1%,2s,1%,3s,1%,4s,6%,2s
,1%,3s,1%,1s,1%,3s,1%,6s,1%,6s,1%,6s,1%,
7s,1%,Ø
17 DATA 7s,1%,1s,1%,4s,1%,1s,1%,14s,1%,1
s,1%,3s,1%,1s,1%,6s,1%,8s,1%,5s,1%,7s,1%
,Ø
18 DATA 8s,8%,16s,7%,7s,1%,9s,1%,3s,1%,7
s,1%,Ø
19 DATA 19%,1s,6%,1s,15%,1s,7%,1s,14%,1s
,3%,1s,7%,Ø
8Ø CLEAR 35Ø
81 DEFINT A,I,M,P
82 DEFSTR B,C,D,L
83 P=19
84 ML=78
85 LPRINT STRING$((INT(66-P)/2),13)
86 FOR I=1 TO P
87 L=STRING$((INT(8Ø-ML)/2),32)
88 READ C
89 IF C="Ø" THEN 97
9Ø D=LEFT$(C,LEN(C)-1)
91 A=VAL(D)
92 B=RIGHT$(C,1)
93 IF B="s" THEN B=CHR$(32)
94 IF B=";" THEN B=CHR$(58)
95 L=L+STRING$(A,B)
96 GOTO 88
97 LPRINT L
```

Figure 1

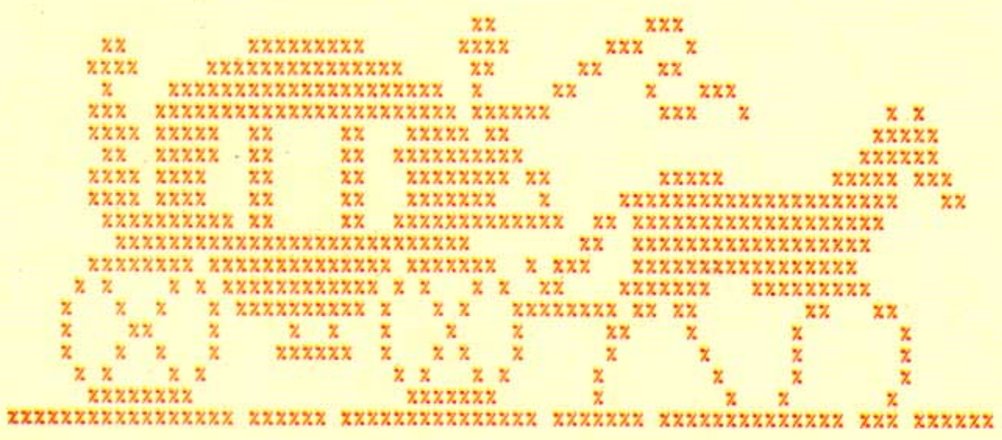
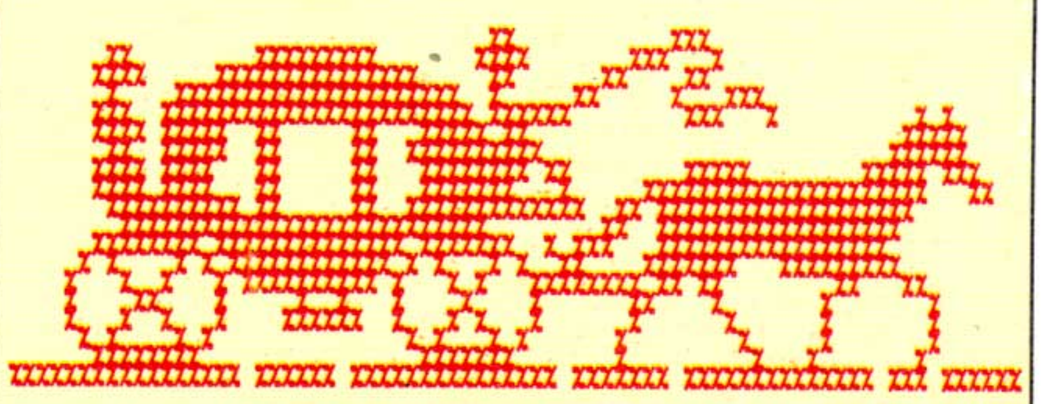


Figure 3



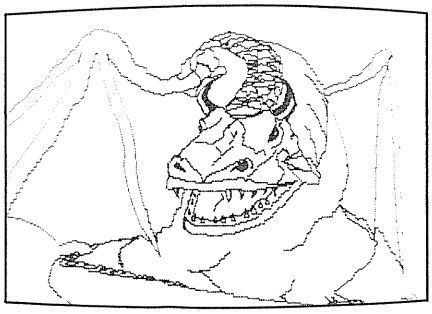
```
98 NEXT
```

Listing 2 — Sans Graphics

```
1  DATA 2Øs,3$,Ø
2  DATA 18s,8$,8s,4$,Ø
3  DATA 18s,1Ø$,2s,4$,4?,2$,Ø
4  DATA 18s,12$,1Ø?,1$,Ø
5  DATA 18s,13$,9?,1$,5I,Ø
6  DATA 16s,16$,8?,1$,5;,3I,Ø
7  DATA 15s,1$,2?,15$,5?,3$,8;,2I,Ø
8  DATA 14s,1$,3?,15$,4?,4$,1Ø;,2I,Ø
9  DATA 13s,1$,5?,14$,2?,5$,13;,1I,Ø
1Ø DATA 12s,1$,6?,13$,2?,5$,15;,1I,Ø
11 DATA 11s,1$,7?,11$,1?,7$,16;,1I,Ø
12 DATA 11s,1$,8?,8$,1?,8$,17;,1I,Ø
13 DATA 12s,1$,8?,2$,2?,11$,18;,1I,Ø
14 DATA 11s,1I,1;,8$,2?,11W,2Ø;,1I,Ø
15 DATA 1Øs,1I,4;,17$,23;,1I,6s,3$,Ø
16 DATA 1Øs,1I,5;,11$,28;,1I,3s,3$,3?,2$
,Ø
17 DATA 1Øs,1I,6;,7$,31;,1I,2s,1$,8?,2$,
Ø
18 DATA 1Øs,1I,32;,6N,7;,1I,1$,11?,2$,Ø
19 DATA 9s,1I,31;,1ØM,5;,1I,14?,1$,Ø
2Ø DATA 9s,1I,19;,6N,5;,3N,7;,2N,5;,1I,1
?,4$,8?,1$,Ø
21 DATA 1Øs,1I,15;,1ØM,4;,2M,9;,1M,5;,1I
,5?,1$,7?,1$,Ø
22 DATA 1Øs,1I,14;,2N,7;,2N,4;,2N,1Ø;,1N
,4;,4I,3?,1$,6?,1$,Ø
23 DATA 9s,1$,1?,1I,12;,2M,8;,2M,5;,1M,1
Ø;,1M,8;,1I,2?,1$,6?,1$,Ø
24 DATA 7s,3$,2?,1I,11;,1N,1Ø;,1M,5;,1M,
1Ø;,1M,8;,1I,2?,1$,6?,1$,Ø
25 DATA 6s,1$,6?,1I,1Ø;,1M,11;,1N,4;,1N,
5;,4I,2;,1N,2;,4.,1I,3?,1$,6?,2$,Ø
26 DATA 5s,1$,8?,2I,8;,1N,11;,1M,4;,1M,4
;,2I,3W,4;,5.,1I,3?,1$,7?,1$,Ø
27 DATA 3s,2$,11?,1I,19;,1N,4;,1N,4;,2I,
3W,4;,4.,1I,4?,1$,7?,1$,Ø
28 DATA 2s,1$,13?,1I,11;,3I,5;,1M,1Ø;,2I
,5;,5.,1I,5?,1$,6?,1$,Ø
29 DATA 2s,1$,5?,1$,4?,2I,2?,1I,9;,2I,3W
,8;,3W,12;,3.,1I,7?,1$,6?,1$,Ø
3Ø DATA 3s,1$,2?,2$,3?,2I,2;,3I,1Ø;,1I,3
W,5;,9W,9;,3.,1I,8?,2$,5?,2$,Ø
31 DATA 4s,2$,4?,1I,1;,6.,11;,2I,5;,11W,
8;,3.,1I,9?,1$,7?,1$,Ø
32 DATA 2s,2$,6?,1I,1;,1.,5;,1.,16;,13W,
2;,4s,1;,3.,1I,9?,1$,7?,1$,Ø
33 DATA 1s,1$,8?,1I,1;,5.,1;,1.,16;,13W,
1;,6s,1;,2.,1I,8?,1$,9?,1$,Ø
```


Draw

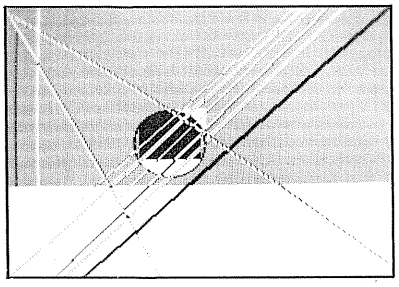
The Grafyx Solution® for your Creativity

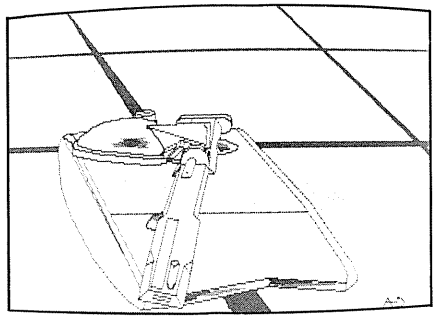


Improved Grafyx. DRAW is a powerful graphics and text editing package which allows your imagination to create a picture or design a graphics screen with Grafyx Solution. Micro-Labs' Grafyx Solution is a plug-in, clip on board which gives you 98,304 points in a 512 × 192 matrix. That's sixteen times as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

```
34 DATA 1$,9?,1I,1;,5.,1;,1.,5;,3s,8;,13
W,1;,2s,3M,1s,1;,1.,2I,7?,1$,1Ø?,1$,Ø
35 DATA 1s,1$,8?,1I,1;,4.,1;,2.,4;,7s,6;
,11W,2;,1s,4M,1s,1;,1I,9?,1$,9?,1$,Ø
36 DATA 1s,1$,9?,1I,1;,5.,1;,1.,3;,8s,6;
,9W,2;,1s,4M,2s,1;,1I,9?,1$,8?,1$,Ø
37 DATA 2s,2$,8?,2I,1;,5.,1;,1.,1;,4s,3M
,4s,6;,3W,3;,2s,4M,3s,1;,1I,1Ø?,1$,6?,1$
,Ø
38 DATA 4s,1$,9?,1I,1;,3.,1;,1.,3;,4s,3M
,4s,1Ø;,3s,4M,2s,2;,1I,11?,1$,4?,1$,Ø
39 DATA 4s,1$,9?,1I,1;,2.,1;,1.,5;,4s,4M
,12s,6M,2s,2;,1I,12?,1$,3?,1$,Ø
4Ø DATA 4s,1$,1Ø?,1I,4;,1I,5;,4s,2ØM,2s,
1I,2;,1I,11?,1$,3?,1$,Ø
41 DATA 4s,1$,11?,4I,1s,6;,5s,16M,3s,1I,
2;,1I,1Ø?,2$,5?,1$,Ø
42 DATA 5s,1$,14?,1I,7;,5s,14M,3s,1I,2;,
1I,9?,2$,8?,1$,Ø
43 DATA 3s,2$,16?,1I,7;,4s,13M,4s,1I,1;,
8?,2$,9?,1$,Ø
44 DATA 2s,1$,2?,1$,16?,1I,6;,5s,11M,4s,
3I,8?,1$,1Ø?,1$,Ø
45 DATA 2s,1$,3?,2$,15?,2I,4;,6s,9M,4s,2
I,11?,1$,8?,1$,Ø
```


HAPPINESS IS...

Newscript™

THE WORD PROCESSOR FOR BUSINESSMEN AND PROFESSIONALS

*Gives superb appearance to your final documents
*Right-justified true proportional support for many popular printers
*Form Letters with merging of names and addresses
*Comprehensive manual with hundreds of examples
*Requires **TRS-80** Model I or III with 48K and 1 disk

Start getting the printed results only NEWSCRIPT can give for $124.95.

Order from your Software dealer, or from:

PROSOFT®

Dept.B Box 560, No. Hollywood, CA 91603
(213) 764-3131

For orders only, call toll free:
(800) 824-7888 oper. 577

Special: SAVE $15
NEWSCRIPT + LABELS option
$139.95


```
46 DATA 3s,1$,4?,5$,12?,2I,3;,5s,9M,4s,1
I,12?,1$,6?,2$,Ø
47 DATA 3s,1$,8?,1$,14?,1I,1;,1I,6s,7M,4
s,1I,13?,1$,4?,2$,Ø
48 DATA 3s,1$,2?,4$,2?,1$,15?,3I,7s,3M,5
s,1I,13?,1$,4?,1$,Ø
49 DATA 4s,2$,4s,1$,2?,1$,15?,3I,12s,2I,
12?,2$,4?,1$,Ø
5Ø DATA 1Øs,1$,2?,1$,17?,4I,6s,3I,12?,2$
,5?,1$,Ø
51 DATA 9s,1$,3?,1$,8?,2$,11?,6I,14?,1$,
6?,1$,Ø
52 DATA 9s,1$,4?,2$,3?,3$,2?,1$,29?,1$,6
?,1$,Ø
53 DATA 9s,1$,6?,3$,5?,1$,29?,1$,6?,1$,Ø
54 DATA 9s,1$,15?,6$,22?,1$,7?,1$,Ø
55 DATA 1Øs,2$,6?,6$,7?,6$,14?,2$,7?,1$,
Ø
56 DATA 12s,6$,6s,1$,12?,3$,9?,2$,8?,1$,
Ø
57 DATA 25s,3$,12?,9$,8?,2$,Ø
58 DATA 28s,5$,22?,2$,Ø
59 DATA 33s,4$,13?,5$,Ø
6Ø DATA 37s,13$,Ø
8Ø CLEAR 35Ø
81 DEFINT A,I,M,P
82 DEFSTR B,C,D,L
83 P=6Ø
84 ML=78
85 LPRINT STRING$((INT(66-P)/2),13)
86 FOR I=1 TO P
87 L=STRING$((INT(8Ø-ML)/2),32)
88 READ C
89 IF C="Ø" THEN 97
9Ø D=LEFT$(C,LEN(C)-1)
91 A=VAL(D)
92 B=RIGHT$(C,1)
93 IF B$="s" THEN B$=CHR$(32)
94 IF B$=";" THEN B$=CHR$(58)
95 L=L+STRING$(A,B)
96 GOTO 88
97 LPRINT L
98 NEXT
```

Listing 3 — Sans Graphics

```
1  DATA 37s,2%,11s,3%,Ø
2  DATA 9s,2%,9s,9%,7s,4%,7s,3%,3s,1%,Ø
3  DATA 8s,4%,5s,15%,5s,2%,6s,2%,4s,2%,Ø
4  DATA 9s,1%,4s,21%,2s,1%,5s,2%,5s,1%,3
s,3%,Ø
5  DATA 8s,3%,2s,23%,1s,6%,8s,3%,3s,1%,1
Øs,1%,1s,1%,Ø
6  DATA 8s,4%,1s,5%,2s,2%,5s,2%,3s,5%,1s
,2%,27s,5%,Ø
7  DATA 9s,2%,2s,5%,2s,2%,5s,2%,2s,1Ø%,2
5s,6%,Ø
```

```
8  DATA 8s,4%,1s,4%,3s,2%,5s,2%,3s,8%,1s
,2%,8s,5%,8s,5%,1s,3%,Ø
9  DATA 8s,4%,1s,4%,3s,2%,5s,2%,3s,7%,3s
,1%,5s,21%,3s,2%,Ø
1Ø DATA 9s,1Ø%,1s,2%,5s,2%,2s,13%,2s,2%,
1s,19%,Ø
11 DATA 1Øs,27%,8s,2%,2s,18%,Ø
12 DATA 8s,8%,1s,14%,1s,7%,2s,1%,1s,3%,3
s,17%,Ø
13 DATA 7s,1%,1s,1%,4s,1%,1s,1%,1s,12%,1
s,1%,1s,1%,3s,1%,1s,1%,2s,2%,4s,7%,3s,9%
,Ø
14 DATA 6s,1%,3s,1%,2s,1%,3s,1%,1s,1Ø%,1
s,1%,3s,1%,1s,1%,3s,8%,1s,2%,1s,2%,8s,2%
,3s,2%,Ø
15 DATA 6s,1%,4s,2%,4s,1%,5s,1%,2s,1%,3s
,1%,4s,1%,4s,1%,6s,2%,4s,1%,7s,1%,7s,1%,
Ø
16 DATA 6s,1%,3s,1%,2s,1%,3s,1%,4s,6%,2s
,1%,3s,1%,1s,1%,3s,1%,6s,1%,6s,1%,6s,1%,
7s,1%,Ø
17 DATA 7s,1%,1s,1%,4s,1%,1s,1%,14s,1%,1
s,1%,3s,1%,1s,1%,6s,1%,8s,1%,5s,1%,7s,1%
,Ø
18 DATA 8s,8%,16s,7%,7s,1%,9s,1%,3s,1%,7
s,1%,Ø
19 DATA 19%,1s,6%,1s,15%,1s,7%,1s,14%,1s
,3%,1s,7%,Ø
79 LPRINT CHR$(27)CHR$(2Ø): REM added li
ne
8Ø CLEAR 35Ø
81 DEFINT A,I,M,P
82 DEFSTR B,C,D,L
83 P=19
84 ML=78
85 LPRINT STRING$((INT(66-(P/2))/2),13):
 REM changed line
86 FOR I=1 TO P
87 L=STRING$((INT(132-ML)/2),32): REM ch
anged line
88 READ C
89 IF C="Ø" THEN 97
9Ø D=LEFT$(C,LEN(C)-1)
91 A=VAL(D)
92 B=RIGHT$(C,1)
93 IF B="s" THEN B=CHR$(32)
94 IF B=";" THEN B=CHR$(58)
95 L=L+STRING$(A,B)
96 GOTO 88
97 LPRINT L CHR$(27)CHR$(3Ø): REM change
d line
98 NEXT
```


★ ★ ★ WANT THE BEST IN WORD PROCESSING? ★ ★ ★

Crayon Deluxe & *Scriptr* **Fill The Bill**

Crayon Deluxe is a full featured word and graphics processor which creates stunning visual effects using both text and graphics. Use it with the *Fontmaker* to create your own **SPECIALITY FONTS**, custom **LOGO'S** and special mail labels. *Crayon* is fully programmable and features underlining, wide printing, overlays, reverse printing, justification, centering, custom graphics, foreign languages, logic seeking, music notation, searches and over 100 different commands in all Z-80 Machine Language for speed and ease of use. The *Editor* is the most sophisticated **FULL SCREEN EDITOR** ever written for the TRS-80.

AVAILABLE NOW for the following printers:

All **MX + FX** printers with ***Graphtrax*** - All **PROWRITER** and **8510A** and All **GEMINI 10+15**

COMPLETE 70 page manual, 2 disks - samples - **FONTMAKER** - and over 440 characters. PRICE $80.00 Disk Mod 1,3,4

Additional fonts are **$15.00** - Fonts available are **DIGITAL — ELITE — HERITAGE** — Others available soon.

Brush	*Heritage*	*Digital*	*Elite*	*Italics*	*Shapes*
QRS	ABCDEF	fghij	abcdefghijkl	*abcdefghi*	
A	abcde	abcde	ABCDEFGHIJKL	*nopqrstuvw*	
	ABC		ABCDEF	*ABCDEFGHIJ*	

Scriptr - Turns *Scriptsit* into a full word processing system by providing complete printer support for the folowing printers - **MX 80 + 100 - LP-4+8 — DMP 200+400 — DW2 — PROWRITER — CIOTH 8510A — GEMINI — MICROLINE — FEATURES** on most versions include Emphasized, Double Strike, access all available typestyles, change character widths, sub and super script, pausing, dot linespacing changes, Editing, Macro's, DOS Reentry, Send any Code to printer, Supports (ALL ***Graphtrax*** Functions, — most **Mid-Line**), **DIAL-A-PRINT**, Form Letters, Print to video only for trial pagination and much much more. Available with versions for Models 1,3,4 on DISK CASSETTE for $40.00 with teaching programs and a 66 page manual.

● ● ● ***QUALITY — INNOVATION — SUPPORT — OVER 1500 PROGRAMS SOLD*** ● ● ●

Free Brochures **PIONEER SOFTWARE** **Check (✓) 160**

1746 N.W. 55th AVE. No. 204 Lauderhill, FL 33313 Phone: (305) 739-2071 Checks/Money Orders/COD's accepted

Computer ease

What's it all about — this thing called a computer?

Mark E. Renne, Bozeman, MT

"What magazine would you recommend for someone who knows nothing about computers?" I've been asked that question several times and this column is the result. No magazine could afford to be devoted entirely to the novice computer user. After a few months, most users would become bored with the magazine and cancel their subscriptions. However, a regular column for complete novices could be a good idea.

Most people just starting into computers are filled with questions and I hope you'll send your questions to me in care of *Basic Computing*. If you're an old pro, maybe you could send in questions you remember from your novice days. It's important for you to realize that no question will be considered stupid or too easy for this column. The idea is to answer the questions that you have regardless of their nature.

After six years of working with computers, I've discovered that almost all computer questions can be answered in one of four ways. The answers are:

1. Yes.
2. Yes and no.
3. Yes, with the appropriate software/hardware.
4. Yes, but it's not worth the trouble.

These may seem a bit simplistic, but you'll find they apply to most situations. For example, "Can a computer be used to balance my checkbook?" The answer is #4. I've yet to see a checkbook program that's as easy as doing my checkbook with my calculator. The same thing applies to recipe programs. There seems to be no program for storing recipes that's as easy as 3x5 cards.

What is a computer?

That's a good question. The definition of a computer seems to change every day. I'll give you my definition. A computer must be able to do four things: be programmed, do calculations, take information in (input), and give information back to the user (output). This definition actually puts a great number of devices into the computer classification.

Is my new microwave oven a computer?

Let's see . . . Aunt Martha thinks her microwave oven is a computer. Is she right? She can program it with recipe cards to cook for different times and different temperatures. The microwave calculates the time remaining and when to start. Martha punches the buttons for input and reads the display for output. Yes, Virginia, Aunt Martha's microwave is a computer.

Looking around your home, you could probably find a number of devices that are computers that you use every day. When people say they're afraid to use a computer, I remind them of the computers they use every day: telephones, TVs, video tape recorders, calculators, and even cars can be considered computers. Electronics is rapidly converting just about everything into computers.

Perhaps the best definition of a computer is that they are simply high-speed idiots. That is to say, they do (without question) exactly what they are told to do at very high speeds. All computers, no matter how large, do one thing at a time. Some computers operate so fast they appear to be doing more than one thing, but they're not. Also, every computer operation can be broken down into an on/off sequence called binary. Numbers are represented by a series of ones and zeroes, ones being on. All other operations can also be represented in this manner. More about that in the future.

Why don't "computer people" speak English?

Many people are "put off" from computers by the great number of technical terms surrounding the computer. I've heard people say that computerists invented words just to confuse the rest of the world. It seems a ten minute conversation about computers contains several hundred abbreviations and buzz words. Computer Science needs technical terms to describe certain items in a few specific words. A doctor needs special words to describe body functions and a computer scientist needs special words to describe computer functions.

I'll try not to overwhelm you with the language and will carefully explain each term the first time I use it. You must remember, however, certain things can only be described by the language of computers. After only a few sessions, you'll have the language under control and amaze your friends at parties.

Can I hurt my computer?

Many a time, late at night, when a program wasn't working, I've thought about hurting my computer! Many people fear that typing in the wrong word at a certain time will cause blue smoke to rise from the

keyboard. Not to worry, the microcomputer itself can't be harmed by anything typed in from the keyboard. Of course, the computer can be harmed in other ways. It's plain bad manners to pour Coke on the keyboard, or to remove a disk while the drive is running. Remember, almost no program or command will destroy your computer. The proverbial computer that breaks down when searching for the last digit of Pi is pure science fiction. A computer is made to compute and it can do it all day long with one keyboard tied behind its back.

What are the main parts of a computer?

Here's an example of where computer terms must be used to describe something. I'll give you the parts and then come back and describe them. Also, I'm using a very simplified description and putting many parts into one. The computer can be broken down into four main parts: central processing unit (CPU), memory and storage (permanent and temporary), input/output, and an operating system. Any computer, no matter how simple or sophisticated, can be broken down into these parts.

What's a CPU?

The CPU, central processing unit, is the "heart" of your computer. It does all the math processing and memory management. Your computer is usually described by the processor. For example, the TRS-80 Model III has a Z-80 processor; the Model 16 has a 68000 processor. Different CPU's understand different instructions. This is the primary reason it's difficult for Apple (a 6502 processor) machine language programs to operate on a TRS-80. If you're still a little confused, don't worry. We'll tackle this concept again in more depth.

More and more, the CPU is being called ALU, arithmetic logic unit. This is a closer description of what the CPU really does. Although the ALU does all of the work, it's the operating system that makes all the decisions. The operating system might decide it's time to add two numbers together. The numbers are "sent" to the ALU, added together, stored in memory, and then the answer is available to the operating system from memory. So, even though the CPU does the actual addition, the operating system runs the show.

What's an operating system?

The operating system is the personality or "brain" of the computer. Remember, we called the CPU the heart — this is very similar to your own body. Your heart does the actual work of pumping blood around, but your brain controls how fast it's pumped and where. Same thing in the computer. The operating system controls what's happening, but the CPU does the actual work.

I thought only disks used operating systems.

We commonly think of operating systems, like TRSDOS, only being on disks, but that's not the only place they occur. Assume that you own a 16K Model III cassette system. You have your operating system stored in an IC (integrated circuit) within the computer. It automatically takes over when you turn on the machine. The "READY" that you see and the flashing cursor are examples of the operating system. It is always in control of the computer and tells the CPU what to do.

What's memory?

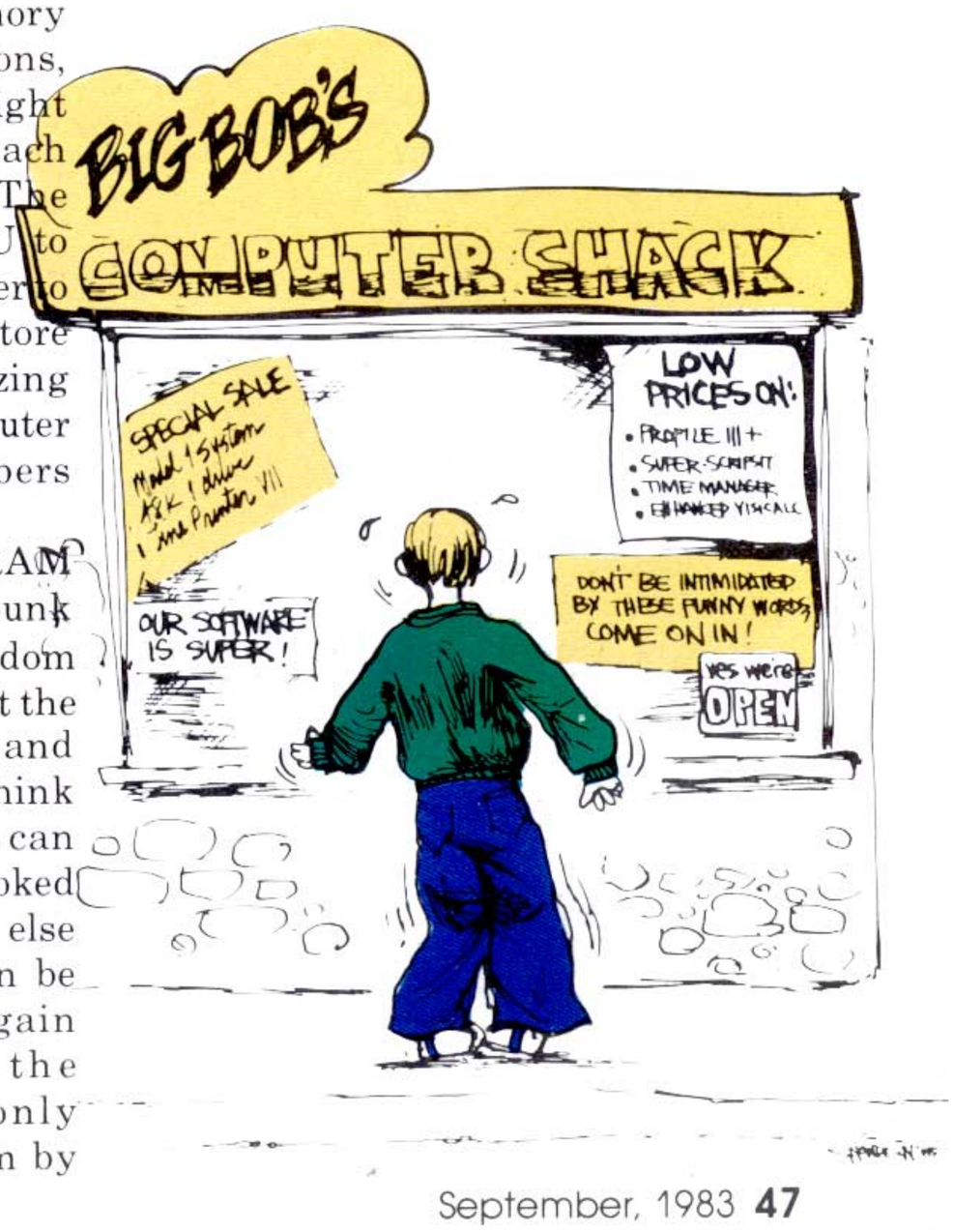
Memory is, just as it sounds, some place the computer uses to "remember" information. Memory is divided into memory locations, each with an address. You might think of it as a block of houses, each with a different address. The operating system tells the CPU to look in address 1, add that number to the number in address 2, and store the result in address 3. It's amazing just how much work the computer must do to add two numbers together!

Memory comes in two types: RAM and ROM. Sounds like a new punk rock group to me. RAM, Random Access Memory, is memory that the computer can both read from and write to. I think the best way to think of it is as a blackboard. Things can be written on a chalk board, looked at, erased, and something else written there. This process can be repeated over and over again without ever changing the chalkboard. ROM, read only memory, can only be read from by the computer. This is like a magazine. You open it up, read it, put it down, open it again and everything is the same as you left it. Try as you might, you can't change a magazine simply by reading it. It's the same way with ROM.

What's input/output?

This is probably the easiest concept to explain and understand. Input is simply a way to get information into the computer. The keyboard is probably the most common input device. Output devices are just the opposite. The computer must output information to the user or the whole thing would be pretty silly. The video screen (or CRT, cathode ray tube), is probably the most common output device. The cassette recorder and disk drives are interesting because they function as both input and output devices.

Whew! That's quite a bit of information to digest in one sitting! Let me emphasize that we'll trek over this material more in future columns and don't worry if you don't understand completely, yet. Computers should be fun and understanding them is easier than you think. Please write with any questions you might have. I hope that I've helped. Until next time, happy computing.



PC-4

The new pocket computer from Radio Shack

Joel Sampson, Columbus, OH

If good things come in small packages, the new Radio Shack PC-4 pocket computer must be one of them. Perhaps one of the first things you notice about the PC-4 is that it actually fits in your pocket! The size is only $\frac{3}{8}$" high x $6\frac{1}{5}$" wide x $2\frac{3}{4}$" deep — no larger than many scientific calculators.

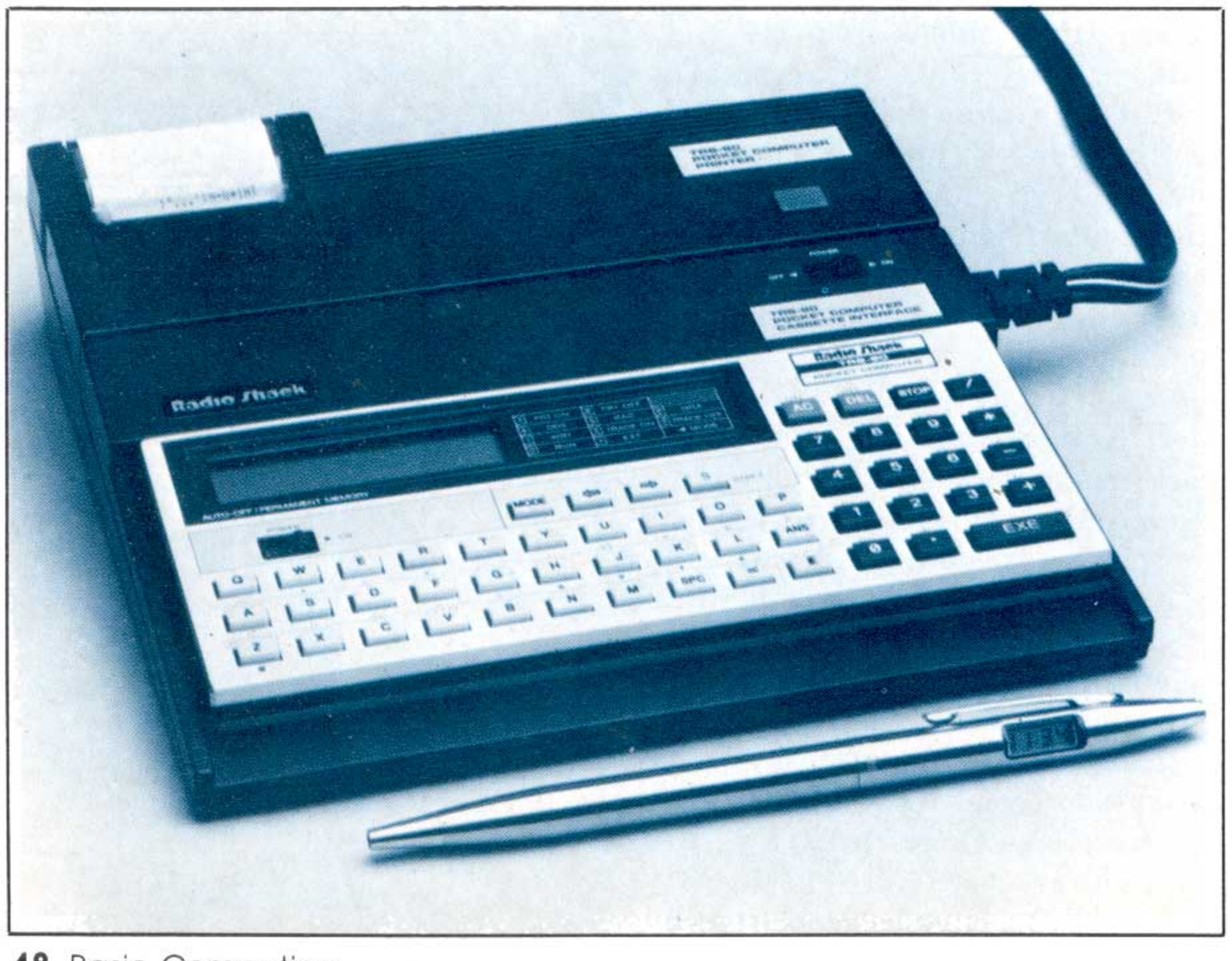
Another interesting aspect of the PC-4 is the list price of $69.95. While the price and size put it in the category of many programmable calculators, the PC-4 programs in BASIC and has many more capabilities than a calculator.

One of the PC-4's best features is its user-friendliness. If you already know how to program in BASIC, you can easily learn to program the PC-4. This differs from many other pocket computers that have their own dialect of BASIC and abbreviations that you must learn. If you don't know BASIC, it would be possible to learn to program on the PC-4 and use this knowledge on other computers.

The PC-4 is made in Japan by Casio and is similar to the Casio FX-700P, which has a list price of $99.95. The pocket computer has a 12-character, 5x7 dot-matrix liquid-crystal display. If the printed line is greater than 12 characters, it slowly scrolls left to right. Up to 62 characters can be displayed on a single line. A thumb wheel mounted on the right side of the computer tilts the display for the best viewing angle.

It has a permanent memory of up to 544 steps. An optional RAM pack, which sells for $19.95, increases the memory to 1,568 steps. While that may not sound like much memory, the PC-4 is very efficient and stores a BASIC statement in only one step. Up to ten programs can be in memory at one time. The PC-4 can use up to 94 variables, or 222 with the optional RAM pack. String variables can contain up to seven characters and are created by putting a dollar sign behind any numeric variable, similar to any standard BASIC. A special string variable, indicated by a single dollar sign ($), can have up to 30 characters. A midstring statement works only with this special string variable.

The PC-4 with cassette and printer interfaces attached.



The QWERTY keyboard is layed out well and is quite versatile. Most keys can do four functions: uppercase, lowercase, a BASIC statement or command, and a graphics character. The key function is selected by the mode key and shift key. A 10-digit keypad for numeric entry is to the left of the QWERTY keyboard. The return key, marked EXE, is in the bottom left corner and is larger than the other keys.

The power switch is a slide switch that should prevent the computer from being turned off accidentally when it is in its case. If the computer is left on and there is no activity, it will automatically turn itself off. If this happens, you resume operation by pressing the AC (all-clear)/ON key. Power is supplied by two CR2032 lithium batteries.

In addition to the 1K memory expansion module, Radio Shack has a cassette interface for $39.95, and a thermal dot matrix printer for $79.97.

The tape interface is powered by two AA cells and comes with a vinyl case. With the cassette interface and a recorder you can save, load and verify BASIC programs. It allows you to load a single program or programs into all ten program areas automatically at once. In addition, PUT and GET statements allow you to record and retrieve data on tape.

The tape recording format is the 300 BPS Kansas City standard. Three mini-plugs are permanently attached to the interface with a 28-inch cable and should fit most standard battery-operated cassette, or mini-cassette, recorders. The PC-4 locks to the cassette interface and is held securely. The tape statements are similar to the Radio Shack Model I/III and Color Computer and are easy to use. It doesn't seem to be very "picky" about the volume level. So far, I have not received a bad load or save with the unit.

The thermal printer produces 20 characters per line at a speed of 60 lines per minute. The printer is powered by rechargeable batteries and includes a wall charger. It attaches to either the cassette interface or directly to the pocket computer with an adapter which is included. The printer is toggled off and on by the mode function — mode 7 for printer on, mode 8 for printer off.

The PC-4 also uses the mode key and the shift key to switch into different modes and graphics. Mode 0 is the normal run mode. Shift 1 is the write mode that allows you to write, edit and kill programs. Mode 2 turns on a trace feature that stops after each line and displays the current line number, similar to TRON on many computers. Mode 3 turns the trace off. Mode 4 puts the trig functions in degrees, Mode 5 in radians, and mode 6 in gradians.

Mode. (decimal point) puts the PC-4 in and out of the extended mode. This allows lowercase letters to be entered from the keyboard. When the shift key is pressed in the extended mode, you can obtain graphics and scientific symbols, indicated in red below the keys.

Most of the BASIC commands and statements can be used by pressing the shift key and the desired key in the normal non-extended mode. The statements are written above the lower two rows of keys so you don't have to remember where they are located. Frequently-used punctuation is entered with the shift key and the upper row of keys, which are also labeled.

Pressing the shift key and a single digit (0 to 9) switches program areas. If you are in the run mode, it automatically executes the program in that area also. You can type RUN and hit enter, or type shift B, which is the run command, and hit enter.

To enter a program, you must be in the write mode, mode 1. The LCD readout indicates how many steps of memory are left, which program areas have programs in them and which program area you are currently in. To enter a program, you just start typing in the first line-number and the program. You can list the program in the write mode and edit it using the left arrow, right arrow, and the delete/insert keys. You can edit the linenumber to re-number or move the lines.

The PC-4 comes with two books — an owner's manual and a programming guide. The owner's

score high on the SAT, GRE or ACT

HBJ Educational Computer Software

The Test Preparation Series that combines Computer Software, Review Textbook and User's Manual into the most comprehensive Study Program available today!

- Makes studying for the exam **easy and enjoyable**
- Builds test-taking skills quickly in planned systematic program
- Simple and easy to use **even for those with no computer experience**.

COMPUTER SAT
Preparation

Special Features
- **1000 Electronic Vocabulary-Building Flash Cards**
- **540 Computer Drill Items**

Complete Textbook
- **"How to Prepare for the SAT" 470pps.**
- **Four Full-Length Exams**—enter answers in computer for instant scoring and diagnosis
- Complete verbal and math categories
- Strategies for answering **every kind of question**

User's Manual
- Clear, simple documentation integrates textbook and software

Computer Software
- Scores and times your performance
- Calculates College Board equivalent score
- Diagnoses your strengths and weaknesses in 15 key areas of study
- Prescribes specific drill and review on computer and in the textbook to improve your score

Available For
*TRS-80 Model III®/4® with 48K
- IBM* PC
- Apple® with 48K
- Atari 800*/1200*
- Commodore 64*

COMPUTER GRE
Preparation
This program helps prepare undergraduates for the Graduate Record Examination
- 3 double-sided diskettes with Graphic Displays
- HBJ's popular text "How to Prepare for the GRE"
- A totally understandable, "User friendly" User's Manual
- Apple* with 48K

COMPUTER ACT
Preparation
- 480 page text "How to prepare for the ACT"
- 3 double-sided computer diskettes
- 50 page User's Manual
- Apple* with 48K

COMPUTER SAT Preparation @ **$79.95** available for
☐ IBM PC
☐ Apple® with 48K
☐ TRS-80 Model III®/4® with 48K
☐ ATARI 800®/1200®
☐ Commodore 64®

COMPUTER GRE Preparation @ **$89.95** available for Apple® with 48K

COMPUTER ACT Preparation @ **$89.95** available for Apple® with 48K

FOR CREDIT CARD ORDERS CALL TOLL-FREE 800-543-1918
(In California call collect (619) 699-6335)

For mail orders Please add $2 00 for handling (UPS delivery guaranteed) Please add applicable state and local sales tax. (Institutions must send purchase order to be billed.) Offer restricted to Continental USA and Canada

HBJ **Harcourt Brace Jovanovich, Inc.**
Dept. Computer SAT BC-8-83, BC-9-83
1250 6th Avenue, San Diego, CA 92101

Available at Computer stores and leading Bookstores.

manual covers technical information and has a quick guide to the operation of the pocket computer. If you already know BASIC, you can read this 66-page manual and be programming quickly. It also lists the nine error message codes and has a summary of the commands.

The 195-page programming guide is written with the novice in mind. It has several hints on the PC-4 that experienced programmers might also want to read. Chapter 5 includes the source code for several very useful programs. There are some games, statistical programs, a program to convert from base 10 to bases 2 through 16, and other math programs including the solving of two or three simultaneous equations.

I have used the PC-4 for over two months and I'm very happy with it. There are a few features left out that would be nice, such as a beep, or sound of some kind. The BASIC is easy to use and the PC-4 is powerful enough to do many applications that you may need. It is a lot of little computer for the money.

Commands/Functions

The following are a list of the commands and statements on the PC-4. Major differences between PC-4 BASIC and standard Microsoft BASIC are noted.

CLEAR— Similar to NEW in Microsoft BASIC, erases the program from one program area.

CLEAR A— Erases the programs from all program areas.

CSR— Similar to tab, can tab over 0 to 11 places.

END

FOR

GOSUB— can GOSUB to a line number or a program area.

GOTO

IF

INPUT

KEY— Similar to INKEY$

LIST

LIST A— List source code in all program areas.

MODE— When placed in a program changes trigonometric angular units to (4) degrees, (5) radians, or (6) gradians.

NEXT

PRINT

RETURN

RUN

SET— Sets the number of decimal positions when printing a number, results are similar to USING.

STEP

STOP

VAC— Sets all numeric variables to 0 and string variables null, similar to CLEAR.

The following statements and commands function with the optional cassette interface and tape recorder only:

GET— Gets data from the tape and loads it in a variable.

LOAD— Loads a BASIC program in a program area.

LOAD A— Loads BASIC programs in all program areas.

PUT— Records data on tape.

SAVE— Saves a BASIC program in one program area on tape.

SAVE A— Saves BASIC programs in all program areas on tape.

VER— Verify that BASIC programs or data have been recorded properly, similar to CLOAD?.

The next set of instructions are numeric and string functions that the PC-4 supports. All functions are used without parenthesis, i.e., SIN55, unless noted.

ABS— Absolute value.

ACS— Arccosine.

ASN— Arcsine.

ATN— Arctangent.

COS— Cosine.

EXP— Calls out the numeric value of the exponential table.

FRAC— The fraction part of a real number.

INT— Change to an integer.

LEN— Returns the length of any string, LEN (A$).

LN— Natural logarithm.

LOG— Common logarithm.

MID— Extracts y characters starting at position x from string "$" only. The form is MID(x) or MID(x,y).

RAN#— Generates a random number greater than zero and less than one, similar to RND(1) in Microsoft BASIC.

RND— Rounds any number (x) 10 to the yth place. The form is RND (x,y).

SGN— Sign, returns -1 if the number is less than zero, 0 if the number equals zero, and 1 if the number is greater than zero.

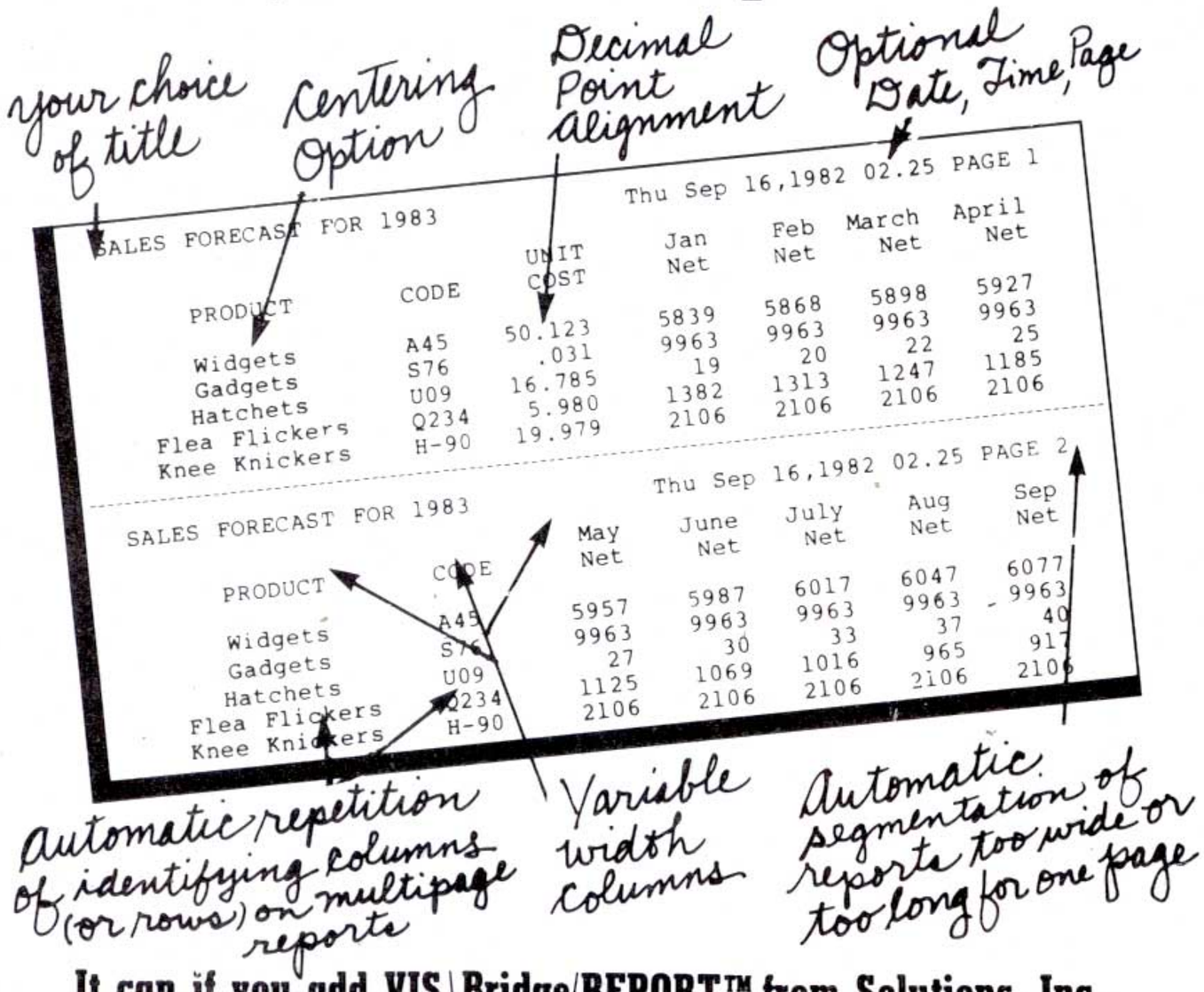
SIN— Sine.

SQR— Square root.

TAN— Tangent.

VAL— Converts a string variable to a numeric value, VAL (A$).

Can your VisiCalc® print this?



It can if you add VIS\Bridge/REPORT,™ from Solutions, Inc.

$79 plus $4 shipping and handling for TRS-80® I, II/16, III Apple® II+, III, or IBM PC™ 802 229 0368. Box 989, Montpelier, VT 05602. MASTERCARD OR VISA/Dealer inquiries welcomed. Also available: VIS\Bridge/SORT™ for $89 and VIS\Bridge/DJ™ (Dow Jones), $445.

All VIS/Bridge products are trademarks of Solutions, Inc. VisiCalc® is a trademark of VisiCorp. TRS-80® is a trademark of Tandy Corp. IBM PC™ is a trademark of IBM Corp. Apple® is a trademark of Apple Computers, Inc.

WHAT'S LIGHTNING FAST, ALL POWERFUL, AWE-INSPIRING?
THE MIGHTY GOD **ZEUS!**

IF YOU THINK SO, WAIT 'TIL YOU SEE THE MIGHTY EDITOR-ASSEMBLER **ZEUS!**

CEC, the System Innovators have done it again. **ZEUS** gives new meaning to the word fast. There may be other editor-assemblers but **ZEUS** overshadows them all.

- Loads source code (**ZEUS** format) 3 to 5 times faster.
- Creates object code 2½ to 3½ times faster.
- Utilizes 75% of disk space (**ZEUS** format) vs EDTASM format.
- Creates object code for 794 instructions. (EDTASM 696)

Available from the System Innovators

COSMOPOLITAN ELECTRONICS CORPORATION
5700 PLYMOUTH RD.
ANN ARBOR, MI 48105

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

Visa, Mastercard Accepted. Add $3.00 shipping & handling. Foreign orders add $10.00. C.O.D. add $1.50. C.O.D. orders are cash, certified check or money order. Personal checks take two weeks to clear. Michigan residents add 4% sales tax

—DEALER INQUIRIES WELCOME—

INTRODUCTORY PRICED
$79.95

In the chips

Tapping the Z-80's power with calls

Models I/III

Spencer Hall, Contributing editor

For those in the northern hemisphere, summer is still here. Many of us are still enduring the kind of heat which can dull the intellect and cause memory chips to become absent-minded. Perhaps you should save this, and the last two installments of In the Chips, to study all at once when the weather cools. Either way, it helps to have the back issues at hand. The alternative is to go to another source and study the material which was covered previously. We'll clue you in from time to time concerning what you should know.

In July, we wrote an idiot-simple machine language routine without the benefit of an editor/assembler, which filled the screen with ampersands (&). This introduced us to the HL register, the A register and the zero flag.

In August, we upgraded this program by adding a screen panel containing the title and some elementary instructions. This was our introduction to the concept of source code and the editor/assembler program (Radio Shack calls it EDTASM) which accepts these instructions and generates machine language.

Although the program was still very simple, we told you that there was too much in it to explain in one article. There was! We're going back to this less-than-overwhelming little routine and learn more about machine language this month. It's reprinted here without remarks included for those of you who don't have it. The listing this month is a "side-by-side" version. EDTASM Version 1.2 was used to assemble and then print both the object and source code. The bytes following the DEFM pseudo-ops beginning at address 7D42 are simply ASCII codes for the literal strings appearing in single quotes. NEWDOS 2.0 implements the editor/assembler more elegantly by suppressing these lines.

We've learned something (not all) about the mechanics of using EDTASM: linenumbers, remarks following ";", the operator and operand columns, pseudo-ops (ORG, DEFM, DEFB, and END). If you missed the August article, study these matters in your EDTASM manual.

Note first that this program consists of four routines bearing the labels PRINT, FILSCN, BEGIN, and GETKEY. The labels TITLE, ANYKEY and USEBRK simply identify ASCII strings which will be moved into screen memory. The END pseudo-op identifies the address where the program execution will start. In this case, it is the byte identified by EDTASM as BEGIN. To show you that it knows where BEGIN is located, EDTASM has printed a "symbol table" following the assembly listing which contains the memory address where BEGIN resides (7D16H), if the ORG is to be at 32000 (7D00H).

BEGIN ends with a CALL PRINT statement which is exactly like GOSUB in BASIC. This means that, after the PRINT subroutine has been used for the last time, execution continues forward into GETKEY. GETKEY ends with a JP to GETKEY again (same as GOTO in BASIC). Exit from GETKEY is only possible in line 400 which says, in effect, if the zero flag is set then jump to memory address 06CCH. How did the zero flag get set? Where is 06CCH? Incidentally, where is that 01C9H which was called at the beginning of BEGIN?

Let's take first things first. We want our program to begin by clearing the screen. This could be accomplished by doing the whole screen filling bit we learned in July, using ASCII 32 decimal or 20H meaning "blank space" instead of ASCII decimal 38 or 26H meaning "&". Why bother? Somewhere in ROM, the Read-Only Memory you paid good money for when you bought your TRS-80, there's a subroutine which does exactly this. Why not call it? This is exactly what statement 270 does. The CLS routine resides, as a subroutine ending with RET, beginning at ROM address 01C9H (457 decimal).

Here is one of the most important lessons for this month. Why reinvent the wheel? Our friends at Microsoft up in Bellevue, WA have

Program Listing for In the Chips

```
7D00            00100           ORG     32000
                00110 ;
7D00 7E         00120 PRINT     LD      A,(HL)
7D01 B7         00130           OR      A
7D02 C8         00140           RET     Z
7D03 12         00150           LD      (DE),A
7D04 23         00160           INC     HL
7D05 13         00170           INC     DE
7D06 C3007D     00180           JP      PRINT
                00190 ;
7D09 21003C     00200 FILSCN    LD      HL,3C00H
7D0C 11013C     00210           LD      DE,3C01H
7D0F 77         00220           LD      (HL),A
7D10 01FF03     00230           LD      BC,03FFH
7D13 EDB0       00240           LDIR
7D15 C9         00250           RET
                00260 ;
7D16 CDC901     00270 BEGIN     CALL    01C9H
7D19 21427D     00280           LD      HL,TITLE
```

```
7D1C 11DD3C    00290          LD      DE,3CDDH
7D1F CD007D    00300          CALL    PRINT
7D22 21497D    00310          LD      HL,ANYKEY
7D25 11963D    00320          LD      DE,3D96H
7D28 CD007D    00330          CALL    PRINT
7D2B 215E7D    00340          LD      HL,USEBRK
7D2E 11173E    00350          LD      DE,3E17H
7D31 CD007D    00360          CALL    PRINT
7D34 CD4900    00370 GETKEY   CALL    0049H
               00380 ;
7D37 FE01      00390          CP      01H
7D39 CACC06    00400          JP      Z,06CCH
7D3C CD097D    00410          CALL    FILSCN
7D3F C3347D    00420          JP      GETKEY
               00430 ;
7D42 4B        00440 TITLE    DEFM    'KEYFIL'
7D43 45
7D44 59
7D45 46
7D46 49
7D47 4C
7D48 00        00450          DEFB    0
7D49 41        00460 ANYKEY   DEFM    'ANY KEY FILLS SCREEN'
7D4A 4E
7D4B 59
7D4C 20
7D4D 4B
7D4E 45
7D4F 59
7D50 20
7D51 46
7D52 49
7D53 4C
7D54 4C
7D55 53
7D56 20
7D57 53
7D58 43
7D59 52
7D5A 45
7D5B 45
7D5C 4E
7D5D 00        00470          DEFB    0
7D5E 55        00480 USEBRK   DEFM    'USE (BREAK) TO EXIT'
7D5F 53
7D60 45
7D61 20
7D62 3C
7D63 42
7D64 52
7D65 45
7D66 41
7D67 4B
7D68 3E
7D69 20
7D6A 54
7D6B 4F
7D6C 20
7D6D 45
7D6E 58
7D6F 49
7D70 54
7D71 00        00490          DEFB    0
7D16           00500          END     BEGIN
00000 TOTAL ERRORS
GETKEY  7D34
USEBRK  7D5E
ANYKEY  7D49
TITLE   7D42
BEGIN   7D16
FILSCN  7D09
PRINT   7D00
```

written quite a number of useful machine language routines in the Level II ROM. There are books which tell you where most of these are located. *Pathways Thru the Rom* and *Microsoft BASIC Decoded* are perhaps the best known. The BASIC word CLS is nothing but a filename recognized by the ROM as a CALL to 01C9H.

Of course, you don't learn much about machine language when you rely on ROM calls. Don't worry. In this column, you'll find only the calls I want you to use. For your own programming, it makes sense to use ROM calls when possible. This memory is permanently occupied. Why duplicate it in your code and waste good, callable addresses?

On the other hand, if you're planning to get a Model 4 and write machine language routines that go where BASIC normally resides, plan to write your own routines to do all these neat things. Even in such a case, EDTASM can help. Notice that our program broke up into four routines, two of which were the "main stream." They followed one another. The other two were CALLable subroutines. That is how machine language tends to be. It's so close to the nitty-gritty of byte logic that the flow tends to break down into small, often-repeated routines. As you perfect your skills in machine language, you will develop a substantial library of routines to do different things. You'll come up with many ideas not implemented in the available ROM. This bag of tricks will be your secret weapon.

The source code for these routines can be linenumbered any way you wish. EDTASM can append them at will from tape or disk files. The "N" command will cause EDTASM to renumber any appended collection of routines which has redundant linenumbers. Start to write a program by patching-in routines you wrote a year ago and you'll be partly done before you even start.

To put some messages on our blank screen, we must move the ASCII bytes from those DEFM locations into screen memory. BEGIN does this by setting register HL to the location of each message in turn. First, in line 280, HL points to the first byte in our title, which is 7D40H. You can see the label,

TITLE, in the source code and you can see the address calculated by EDTASM as the second and third pair of hexadecimal digits in the "opcode" column of line 280. The Z80 needs to have such addresses reversed, LSB/MSB, so this addressed appears as 407D. You don't need to worry about such reversals. EDTASM takes care of them.

We've decided to center the word KEYFIL on screen line 3. Line zero starts with RAM address 15360. Since each line has 64 addresses, it follows that line 3 starts with address 15552. KEYFIL contains six letters. To center it on line 3, we must put the "K" in address 15581. To check us, subtract 6 from 64 and divide the result by 2. Now, add this result to 15552.

15581 is 3CDDH. How do we know this? To be honest, we don't! But we have ways of finding out. We could have done a preliminary calculation of the hex numbers we'll need using a conversion program. Most of us, however, have a pocket calculator to do the work. This can be a programmable one on which we have developed our own conversion routine. I have one for the Texas Instruments (pardon the expression) #59 calculator. Better still, it can be a "scientific" calculator costing just a few dollars. Perhaps the most readily-available one at this writing is the Sharp EL-506H. Decimal-to-hex and vice-versa is only one of many mathematical functions available. This calculator is widely distributed in discount houses and general merchandise "drug stores" across America. Since machine language programmers are still a distinct minority of the general public, it hasn't sold well. *(I bought one. —Ed.)* For this reason, the EL-506H can often be had for substantially less than its $32.95 list price. If one is available for less than this figure, grab it! They won't be around for long.

Line 290 contains source code which puts 3CDDH in Z80 register pair DE. D is the most significant byte. E is the least significant byte. Perhaps it's only a coincidence, but machine language programmers commonly use DE as the address to which a byte is going to be moved (that is, the DEstination). Our microprocessor could have used HL as the destination and DE as the pointer, but it helps to learn consistent habits.

At this point, we're ready to call our own subroutine, PRINT. Here, we put the byte pointed to by HL into the A (byte manipulation) register. This happens in line 120. Now look at line 450. This requests EDTASM to place a zero in the next address following those containing the ASCII for KEYFIL. Our PRINT subroutine can tell that it is through putting bytes into video RAM by detecting a zero. It does this by the test in line 130.

OR is a source code which tells EDTASM to "OR" the bits in register A with the bits in the register named in the operand column. In this case, we OR A with itself. Here is what each bit becomes if it is ORed with another bit:

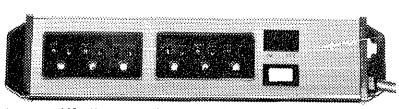
MIDWEST
COMP-U-TRON
INCORPORATED
OFFERS REMARKABLE SAVINGS

NEWSCRIPT—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.
Newscript 7.0 ..... $119.95
Mailing Labels Option ..... $ 29.95
Newscript 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 bronzetone 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

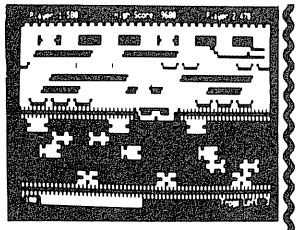
All orders must be cash or UPS, C.O.D. Personal checks take 3 weeks to clear.

TRS-80* is a trademark of Tandy Corporation
451 Sagamore Pky. • W. Lafayette, IN 47906 • (317) 463-3433

Gamester Software
9 Southmoor Circle, Kettering, Ohio 45429
[513] 294-3383 [12-6 for phone orders]
Checks, credit card [VISA/MC], or COD accepted.
SAME DAY SHIPMENT!

LEAPER $15.95 tape
$19.95 disk
SUPER HERO $15.00 tape

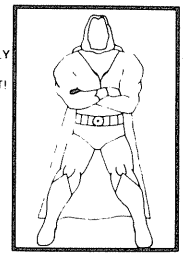
SPECIAL OFFER:
BOTH for $25.00
[tape only]!



MODEL 1, 3, or 4
LEAPER
NEW! NOW WITH VOICE!!!
[1 or 2 players]
Best "Frogger-type" program available! Joystick or keyboard control. Machine language! Fast-action! This fantastic program is a solid "10"! Progressively more difficult levels of performance! Rrribbitttt!

MISADVENTURE #6
SUPER HERO ADVENTURE
With Sound and Graphics!

A TOTALLY NEW CONCEPT!



YOU ARE THE SUPER HERO!
A REAL CHALLENGE FOR THE EXPERIENCED ADVENTURER!

Model I or III
16K TAPE $15.00
Can Be Transferred To Disk

Write for our free illustrated catalog of quality *model 1, 3, 4* and *color computer* games!

If one bit is:	and the other bit is:	result is:
1	1	1
1	0	1
0	0	0

Any byte which is ORed with itself simply won't change. Therefore, the only byte which remains zero after being ORed with itself is, of course, zero (binary 00000000). The Z80 uses this Boolean logic to make an extremely fast zero test.

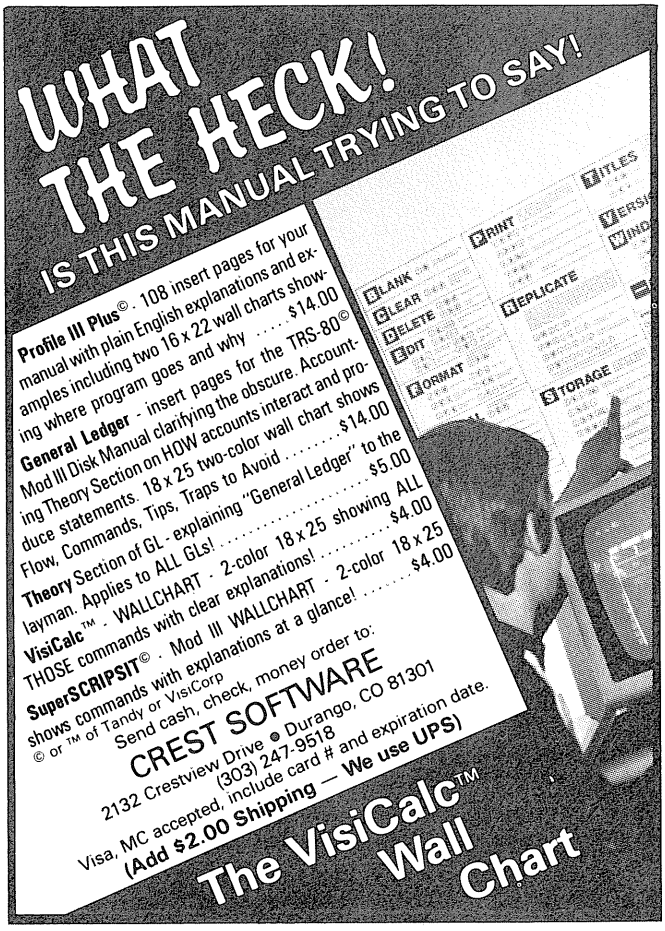
Our program can return from the PRINT subroutine only when OR A results in zero. This is the message in line 140. We call PRINT three times to output our messages to the screen. There are ROM calls which accomplish this but, as we said, you've got to learn!

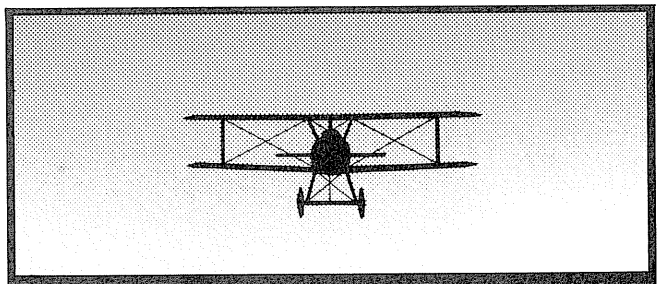
At GETKEY, in line 370, we call the ROM routine at 0049H which causes the program to loop until any key is hit. ASCII for the key which was hit is then placed in register A. We test A to see if it contains an ASCII 1, meaning the BREAK key was hit. This time, we CP (compare) the A register with binary 1. With CP, a strange thing happens. The Z80 sets the zero bit of the flag register, F, as if the operand (1 in this case) were subtracted from the A register. Actually, the A register doesn't change at all. The Z80 lets us have our cake and eat it! We've tested A for the break key, but we haven't changed it. We could have done the same in line 130, but you needed to see both tests. Try changing line 130 to CP 0. Now, compile this version and test it. There are many ways to skin a cat in Z80 machine language.

If the break key was hit, we make a ROM call (to 06CCH, or decimal 1740) which returns us to BASIC with the READY prompt. If any other key was hit, we must fill the screen with that character. To do this, we call our subroutine, FILSCN. Here we put the first screen address of RAM (3C00H) in the pointer register, HL. Next, we set the destination register, DE, to the second screen position (3C01H). Finally, we put the number of addresses in screen memory, less 1 (1024-1 or 3FFH) in the counting register, BC.

Now we put the A byte in the RAM address pointed to by DE, the destination address. After these logical preparations have been made in much the same way as they were in PRINT, with the addition of a counter value, we write the source code, LDIR. This is an acronym for load, increment and repeat. Our CPU, with nothing more to guide it, does the following.

The byte pointed to by HL is placed in the byte pointed to by DE. Next, both HL and DE are increased by one. BC, the counter, is decreased by one. Now the process is repeated. Without further prompting, the Z80 continues this process until BC becomes zero. At this point, it needs no test prescribed by us to exit the LDIR instruction. This is one of the Z80's famous "block" instructions which took the microcomputing world by storm back in the 1970's. There are others, but time (or is it space?) has run out. See you next time!





LAFAYETTE ESCADRILLE

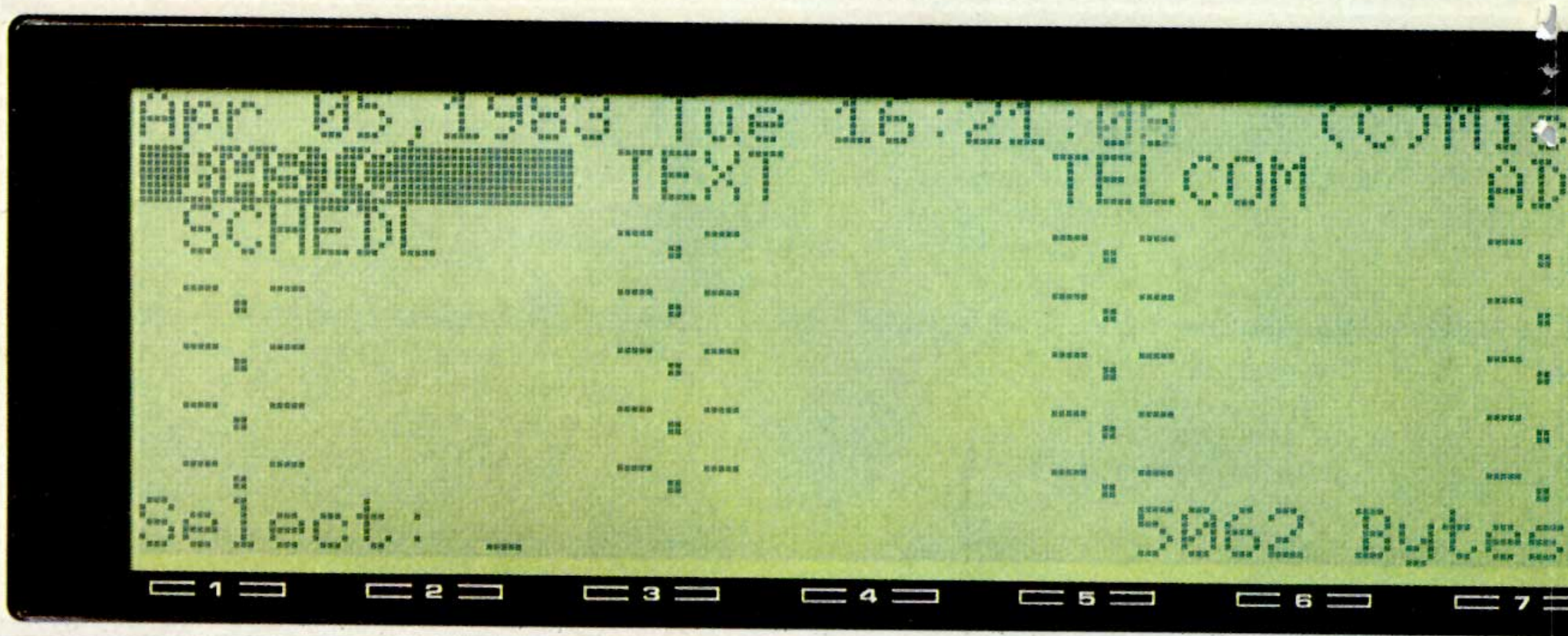
Heavily laden with bombs, your DH4 struggles into the air, narrowly clearing the trees at the end of the runway. The big bomber climbs steadily as you head eastward towards the rising sun. To the south a troop train chuffs hastily back from the front as you level off and turn southeast towards your objective. You hug the bottom of a concealing cloud layer as you cross the zig-zag trenches of the Western Front. So far—so good—the bridge you seek becomes visible in the distance. You throttle back and descend for a bombing run—But wait—look out! A Fokker Triplane has been stalking you! He closes in, guns blazing—You nose up, heading for the clouds—STALL!!

Too bad, you didn't make it, but there's always a next time in **Lafayette Escadrille**. Fly any of two dozen WWI Allied or German bombers or fighers in this **Real-Time Animated Action** computer game.

Cassette for 16K TRS80 Model I and III **$19.95**

DISCOVERY GAMES
936 W. Highway 36, St. Paul, MN 55113

9 on the Richte



er Scale

SHOWN ACTUAL SIZE

Radio Shack's New TRS-80® Model 100 Portable Computer Is Sending Shockwaves Throughout the Industry

8K TRS-80 Model 100	24K TRS-80 Model 100
799.00	**999.00**
Cat. No. 26-3802	Cat. No. 26-3801
Only $45 Per Month On CitiLine Credit	Only $56 Per Month On CitiLine Credit

- **Powerful Built-In Software and Extended BASIC Language**
- **Self-Contained Direct-Connect Telephone Modem**
- **8-Line by 40-Character Display**
- **Full-Size Typewriter Keyboard**
- **Retains Data When Power "Off"**
- **Memory Expands to 32K**

Brace yourself—Radio Shack just redefined the concept of personal computing. Our new TRS-80 Model 100 is so small, it'll fit in your in-basket. Yet, it's as powerful as many desktop micros. The built-in BASIC language is the most advanced ever from Microsoft®, and features full string handling, complete file operations, multi-dimension arrays, 14-digit double-precision accuracy, 240 × 64 dot-addressable graphics, a five-octave sound generator and much more. The Model 100 includes a parallel printer port, an RS-232C serial interface and a cassette port. Model 100's built-in direct-connect modem even allows you to access any computer by phone. If you're not a programmer, "instant-on" software in ROM lets you use your Model 100 as a personal word processor, telephone auto-dialer, address book and appointment calendar. Come see the most revolutionary computer since the TRS-80 Model I at Radio Shack Computer Centers, participating stores and dealers today!

Radio Shack®

The biggest name in little computers®

A DIVISION OF TANDY CORPORATION

Send me a free TRS-80 Model 100 brochure.

Mail To: Radio Shack, Dept. 84-A-791
300 One Tandy Center, Fort Worth, Texas 76102

NAME _____

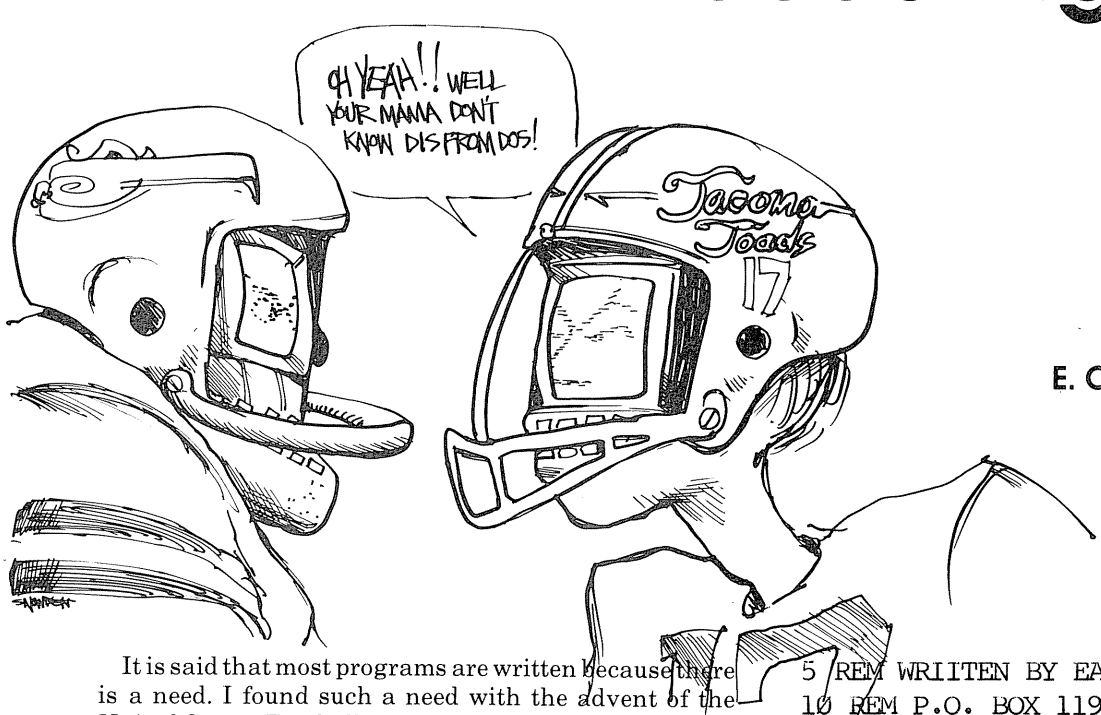
ADDRESS _____

CITY _____ STATE _____ ZIP _____

TELEPHONE _____

Prices apply at participating Radio Shack stores and dealers. Microsoft is a registered trademark of Microsoft, Inc.

Football forecasting



For all models

E. C. Brown, Kissimmee, FL

It is said that most programs are written because there is a need. I found such a need with the advent of the United States Football League. Football lovers are now blessed with eleven months per year to enjoy one of the greatest of spectator sports and one of the most heavily wagered upon.

For many years, I enjoyed trying to outpick the experts. I did get tired of the mathematical calculations. Checking many advertisements for football selecting programs, I found that the good ones required a disk operating system. The others were based mainly on team scoring and not on the statistical analysis I believe is necessary to beat the point spread with any consistency. I, therefore, took the system I was using and wrote it into my computer. I devised a chart to log all the necessary statistics. The weekly updating and selecting takes approximately one-half hour per week.

The program requires the following data: 1) games played, 2) points scored, 3) total yards gained, 4) total points allowed, and 5) total yards allowed. Most newspapers list the statistics weekly, and if they also give the necessary totals, you don't even have to keep records.

The program gives you the option of having a hard copy if you have a printer. Each team's probable score is projected along with total points expected. If the point spread is included, the program will make the selection for you.

As written, the program is great for the N.F.L. or the U.S.F.L. It will work on college football, however I would suggest changing line 2575 to: HS=T/(TT/PP)+6. The program works best when the season is underway for four weeks or more.

Football Program Listing for Models I/II/III

For Model II conversion, delete lines 290 and 300. Change CHR$(23) to CHR$(31) in line 8000.

```
5 REM WRIITEN BY EARL C. BROWN
10 REM P.O. BOX 1198, KISSIMMEE,FLA. 327
41
15 REM 1-305-846-4861
20 REM NOT FOR RESALE:
30 REM FOR USE OF READERS OF Basic Compu
ting
50 CLS
100 PRINT
110 PRINT
120 PRINT
130 PRINT
140 PRINT TAB(20);"F O O T B A L L"
170 PRINT
180 PRINT TAB(18);"F O R E C A S T E R"
210 PRINT
220 PRINTTAB(27);"by"
240 PRINT TAB(20);" E. CHARLES BROWN"
250 PRINT TAB(21);"P.O. Box 1198"
260 PRINTTAB(21);"Kissimmee, Fla."
270 PRINTTAB(25);"32741"
290 FOR Y=0 TO 47:SET(0,Y):SET(121,Y):NE
XT Y
300 FORX=1 TO 121:SET(X,0):SET(X,47):NEX
T X
320 FOR I=1 TO 3000:NEXT I: CLS
330 PRINTTAB(10);"THIS PROGRAM PROJECTS
FINAL SCORES OF"
340 PRINT"PROFESSIONAL AND COLLEGE FOOTB
ALL BASED ON A STATISTICAL""
350 PRINT"ANALYSIS OF THE FOLLOWING FACT
ORS:"
355 PRINT
357 PRINT
```

```
360 PRINTTAB(20);"TOTAL GAMES PLAYED"
362 PRINT
365 PRINTTAB(20);"TOTAL POINTS SCORED"
368 PRINT
375 PRINTTAB(20);"TOTAL OFFENSIVE YARDS"
380 PRINT
385 PRINTTAB(20);"TOTAL POINTS ALLOWED"
390 PRINT
395 PRINTTAB(20);"TOTAL YARDS ALLOWED"
400 FOR X=1 TO 5000:NEXT X:CLS
425 PRINT"ENTER DATE(MONTH,DAY)":INPUT A
A,DD:CLS
450 PRINT"ENTER THE NAME OF THE VISITING
 TEAM":INPUT A$:CLS
500 PRINT TAB(10);"OFFENSIVE INFORMATION
 FOR - ";A$
510 PRINT
520 PRINT
550 PRINT"ENTER NUMBER OF GAMES PLAYED":
INPUT N
600 PRINT"ENTER TOTAL POINTS SCORED":INP
UT P
625 PRINT
650 PRINT"ENTER TOTAL YARDS GAINED":INPU
T Y
700 PRINTTAB(10);"DEFENSIVE INFORMATION
FOR - ";A$
725 PRINT
750 PRINT"ENTER TOTAL POINTS ALLOWED":IN
PUT G
800 PRINT"ENTER TOTAL YARDS ALLOWED":INP
UT GU:CLS
850 PRINT TAB(10);"OFFENSIVE INFORMATION
 FOR - ";A$
875 PRINT
900 PRINTTAB(15);"GAMES PLAYED - ";N
950 PRINTTAB(15);"POINTS SCORED - ";P
1000 PRINTTAB(15);"YARDS GAINED - ";Y
1025 PRINT
1050 PRINTTAB(10);"DEFENSIVE INFORMATION
 FOR - ";A$
1075 PRINT
1100 PRINTTAB(15);"POINTS ALLOWED - ";G
1150 PRINTTAB(15);"YARDS ALLOWED - ";GU
1175 PRINT
1250 PRINT"ARE THE ABOVE STATISTICS CORR
ECT? (Y OR N)":INPUT BX$
1300 IF BX$="N" THEN CLS:GOTO 450
1325 IF BX$="Y" THEN CLS:GOTO 1400
1350 IF BX$<>"Y" THEN 1250 ELSE450
1400 CLS
1450 PRINT"ENTER NAME OF HOME TEAM":INPU
T H$:CLS
1500 PRINTTAB(10);"OFFENSIVE INFORMATION
 FOR - ";H$
1525 PRINT
1550 PRINT"ENTER NUMBER OF GAMES PLAYED"
:INPUT PL
1600 PRINT"ENTER TOTAL POINTS SCORED":IN
PUT PS
1650 PRINT"ENTER TOTAL YARDS GAINED":INP
UT YG
1675 PRINT
1700 PRINTTAB(10);"DEFENSIVE INFORMATION
 FOR - "H$
1725 PRINT
1800 PRINT"ENTER TOTAL POINTS ALLOWED":I
NPUT PU
1850 PRINT"ENTER TOTAL YARDS ALLOWED":IN
PUT YU
1900 CLS
1925 PRINTTAB(10);"OFFENSIVE INFORMATION
 FOR - "H$
1950 PRINT
2000 PRINTTAB(15);"GAMES PLAYED - ";PL
2050 PRINTTAB(15);"POINTS SCORED - ";PS
2075 PRINTTAB(15);"YARDS GAINED - ";YG
2100 PRINT
```

This is a sample worksheet the author uses to keep track of each team's record through the season. What is shown is a fictitious example for the Tampa Bay Buccaneers and the Seattle Seahawks after three games. Use this data to generate the output shown in Figure 2.

Figure 1

U.S.F.L. 1983 Season
Tampa Bay

Date	Game #	Off.Points	Off.Yards	Def.Points	Def.Yards	Opponent
9/3	1-Home	21	470	17	225	Boston
9/10	2-Away	19	279	7	249	Michigan
Total-2		40	749	24	474	xxxxxxx
9/17	3-Home	32	391	9	265	N.Jersey
Total-3		72	1140	33	739	xxxxxxx

....

One sheet is used for each team in the league. Keep running totals for as many weeks as the season lasts. Assume you have a second sheet for the Seattle Seahawks, and after three games they show:

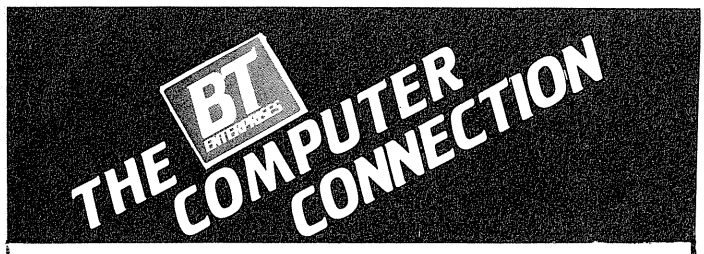
....

Total-3		39	621	62	755	xxxxxxx

One sheet is used for each team in the league. Keep running totals for as many weeks as the season lasts. Assume you have a second sheet for the Seattle Seahawks, and after three games they show:

Figure 2

```
                    G A M E   A N A L Y S I S
-------------------------------------------------------------
DATE 10 - 7
              TAMPA BAY- 15
              SEAHAWKS- 18

         TOTAL POINTS PROJECTED - 33

                                        FAVORITE
                          POINT SPREAD - TOSS UP

                      S E L E C T I O N

              GAME TO CLOSE TO CALL
-------------------------------------------------------------
```



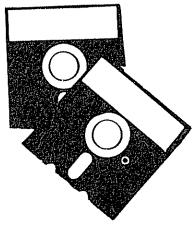
DISK UPGRADE

Put Disk Drives into your TRS-80 MOD III or MODEL 4.

- Easy to install with Photo Instruction Manual.
- Featuring the Holmes Disk Controller (assembled & tested) available with Hardware Real Time Clock and Battery built in. Software Clock routines and TDOS Operating System included
- 40/80 Single/Double Density Support
- Dual Sided and 8" Drive Support
- Drives are optional

	MODEL III	MODEL 4
(203103) without clock	$269.50	$269.50
(203104) with clock	$329.50	$329.50
(200111) 40 SH Disk Drives	$200.00 ea	$200.00 ea
(213002) 32K Memory	$34.95	—
(204064) 64K Memory	—	$119.95
Complete Kit with 2 Drives & Memory & TDOS	$699.00	$799.00

CenTech DISKETTE with COLORED JACKETS



(500212) Red SS/DD $27.50/10
(500215) Red DS/DD $30.50/10
(500262) Yellow SS/DD $27.50/10
(500265) Yellow DS/DD $30.50/10
(500222) Blue SS/DD $27.50/10
(500225) Blue DS/DD $30.50/10

3M DISKETTES

(500452) SS/DD $23.50/10
(500455) DS/DD $32.50/10

EPSON RIBBON CARTRIDGES $5.00 each

(500050) Black ..... $5.00 each
(500060) Red ..... $5.00 each
(500070) Blue ..... $5.00 each
(500080) Green ..... $5.00 each
(500090) Brown ..... $5.00 each

EPSON RELOADS $30.00 dozen

(500001) Black....$30.00 doz. (500021) Blue....$30.00 doz.
(500011) Red.....$30.00 doz. (500031) Green...$30.00 doz.
(500041) Brown....$30.00 doz.

BT ENTERPRISES
B.T. Enterprises Dept. 81
10B Carlough Road
Bohemia, N.Y. 11716
B.T. Enterprises is a division of Bi-Tech Enterprises Inc.
Orders Only
800-645-1165
Dealer Inquires Welcome
Prices subject to change
N.Y.S. Residents add tax
American Express Carte Blanche
Diners Club MasterCard & Visa
N.Y. call (516) 567-8155 (516) 588-5836 (modem)

Football

```
2150 PRINTTAB(10);"DEFENSIVE INFORMATION
 FOR - ";H$
2175 PRINT
2200 PRINTTAB(15);"POINTS ALLOWED - ";PU
2250 PRINTTAB(15);"YARDS ALLOWED - ";YU
2300 PRINT
2350 PRINT"ARE THE ABOVE STATISTICS CORR
ECT? (Y OR N)":INPUT HX$
2400 IF HX$="N" THEN CLS:GOTO 1450
2450 IF HX$="Y" THEN CLS:GOTO 2500
2475 IF HX$ <> "Y" THEN 2350 ELSE 1450
2500 CLS
2550 M=YU/PL:MM=Y/N:NM=P/N
2555 VS=M/(MM/NM)
2560 VS%=VS
2565 T=GU/N
2570 TT=YG/PL:PP=PS/PL
2575 HS=T/(TT/PP)+3
2580 HS%=HS
2600 PRINT"DO YOU WANT SELECTIONS BASED
ON POINT SPREAD(Y OR N)":INPUT PS$
2625 IF PS$="N" THENCLS:GOTO 4300
2650 IF PS$="Y" THEN CLS:GOTO 4000
4000 PRINT"ENTER POINT SPREAD FOR - "
4025 PRINTTAB(15);A$;"(ENTER '-' NUMBER
IF FAVORITE
4030 PRINTTAB(15);"AND A '+' IF UNDERDOG
":INPUT FP
4050 PRINT"ENTER POINT SPREAD FOR - "
4075 PRINTTAB(15);H$;"(ENTER '-' NUMBER
IF FAVORITE
4095 PRINTTAB(15);"AND A '+' IF UNDERDOG
":INPUT VP
4200 CLS
4300 PRINTTAB(22);"GAME ANALYSIS"
4325 PRINT
4350 PRINTTAB(15); A$"-"VS%
4400 PRINTTAB(15); H$"-"HS%
4425 PT=VS%+HS%
4450 PRINT
4475 PRINTTAB(10);"TOTAL POINTS PROJECTE
D -";PT
4500 PRINT
4505 PRINTTAB(43);"FAVORITE"
4510 IF FP=VP THEN PRINTTAB(30);"POINT S
PREAD -   TOSS UP"
4515 IF FP>VPTHEN GOTO 4520
4520 IF FP<VP THEN PRINTTAB(30);"POINT S
PREAD - ";A$; "("FP")" ELSE GOTO4523
4523 IF VP<FP THEN PRINTTAB(30);"POINT S
PREAD - ";H$; "("VP")"
4525 PRINT
4550 PRINTTAB(20);"S E L E C T I O N "
4555 PF=FP/2: PV=VP/2
4560 PRINT
4575 QV%=VS+PF
4600 QS%=HS+PV
```

```
4625 IF QV%=<QS%+7 AND QS%=<QV%+7 THENPR
INTTAB(15);"GAME TO CLOSE TO CALL" ELSE
GOTO 4630
4630 IF QV%>QS%+13 THEN PRINTTAB(20);A$
 "(";FP;")";"** S U P E R  P L A Y **"EL
SE GOTO 4635
4635 IF QS%>QV%+13 THEN PRINTTAB(20);H$
  "(";VP;")";"** S U P E R  P L A Y **"
 ELSE GOTO 4650
4650 IF QV%>QS%+7 AND QV%<QS%+13 THEN PR
INTTAB(20);A$;  "(";FP;")"
4675 IF QS%>QV%+7 AND QS%<QV%+13 THEN PR
INTTAB(20);H$;"(";VP;")"
4990 PRINT
5000 PRINT"DO YOU WANT TO CONTINUE OR DO
 YOU WANT A PRINT OUT(Y-N-P)":INPUT QX$
5010 IF QX$="Y" THEN CLS:GOTO425
5050 IF QX$="N" GOTO 8000
5075 IF QX$="P" THEN GOTO 6000
5100 LPRINT
6000 LPRINTTAB(22);"G A M E  A N A L Y
S I S"
6010 LPRINT"-------------------------
-----------------------------------
---"
6020 LPRINT;"DATE";AA;"-";DD
6050 LPRINTTAB(15); A$"-" VS%
6075 LPRINTTAB(15); H$"-" HS%
6115 LPRINT
6125 LPRINTTAB(10); "TOTAL POINTS PROJEC
TED -"; PT
6130 LPRINT
6133 LPRINTTAB(43);"FAVORITE"
6135 IF FP=VP THEN LPRINTTAB(30);"POINT
SPREAD - TOSS UP"
6137 IF FP>VP THEN GOTO 6140
6140 IF FP<VP THENLPRINTTAB(30);"POINT S
PREAD -";A$;"("FP")" ELSE GOTO 6144
6144 IF VP<FP THEN LPRINTTAB(30);"POINT
SPREAD -";H$;"("VP")"
6147 LPRINT
6150 LPRINTTAB(25);"S E L E C T I O N "
6152 LPRINT
6153 LPRINT
6155 PRINT
6157 IF QV%=<QS%+7 AND QS%=<QV%+7 THEN L
PRINTTAB(15);"GAME TO CLOSE TO CALL" ELS
E GOTO 6159
6159 IF QV%> QS%+13 THEN LPRINTTAB(20);A
$; "(";FP;")";"*** S U P E R  P L A Y **
*" ELSE GOTO 6165
6160 LPRINT
6165 IF QS%>QV%+13 THEN LPRINTTAB(20);H$
; "(";VP;")";"*** S U P E R  P L A Y" EL
SE GOTO 6170
6170 IF QV%> QS%+7 AND QV%<QS%+13 THEN L
PRINTTAB(20);A$; "(";FP;")"
```


IT'S SIMPLE. . . . . .
CALL & SAVE MONEY!

1-800-841-0860

TELEMARKETING TRS-80's AND EQUIPMENT TO SAVE YOU MONEY

SINCE 1978

TRS-80® COMPUTERS

UP TO 15% AND MORE DISCOUNT

CALL FOR PRICES
ON COMPLETE LINE

PRINTERS AND EQUIPMENT

EPSON
OKIDATA
SMITH CORONA
Verbatim
CALL
star micronics·inc
C. Itoh
Hayes
Novation

EAGLE COMPUTER
commodore

$CALL

Since 1978

- 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

Man's Best Friend

Micro Management Systems, Inc.

2803 Thomasville Road East
Cairo, Georgia 31728
(912) 377-7120 #5

```
6195 IF QS%>QV%+7 AND QS%<QV%+13 THEN LP
RINTTAB(20);H$;"(";VP;")"
6200 PRINT
6225 PRINT
6250 PRINT
6295 LPRINT"-----------------------------
-----------------------------------------
-------":GOTO5000
8000 CLS: PRINTTAB(20)CHR$(23);"G O O D
 L U C K"
```

Football Program Listing for Color Computer

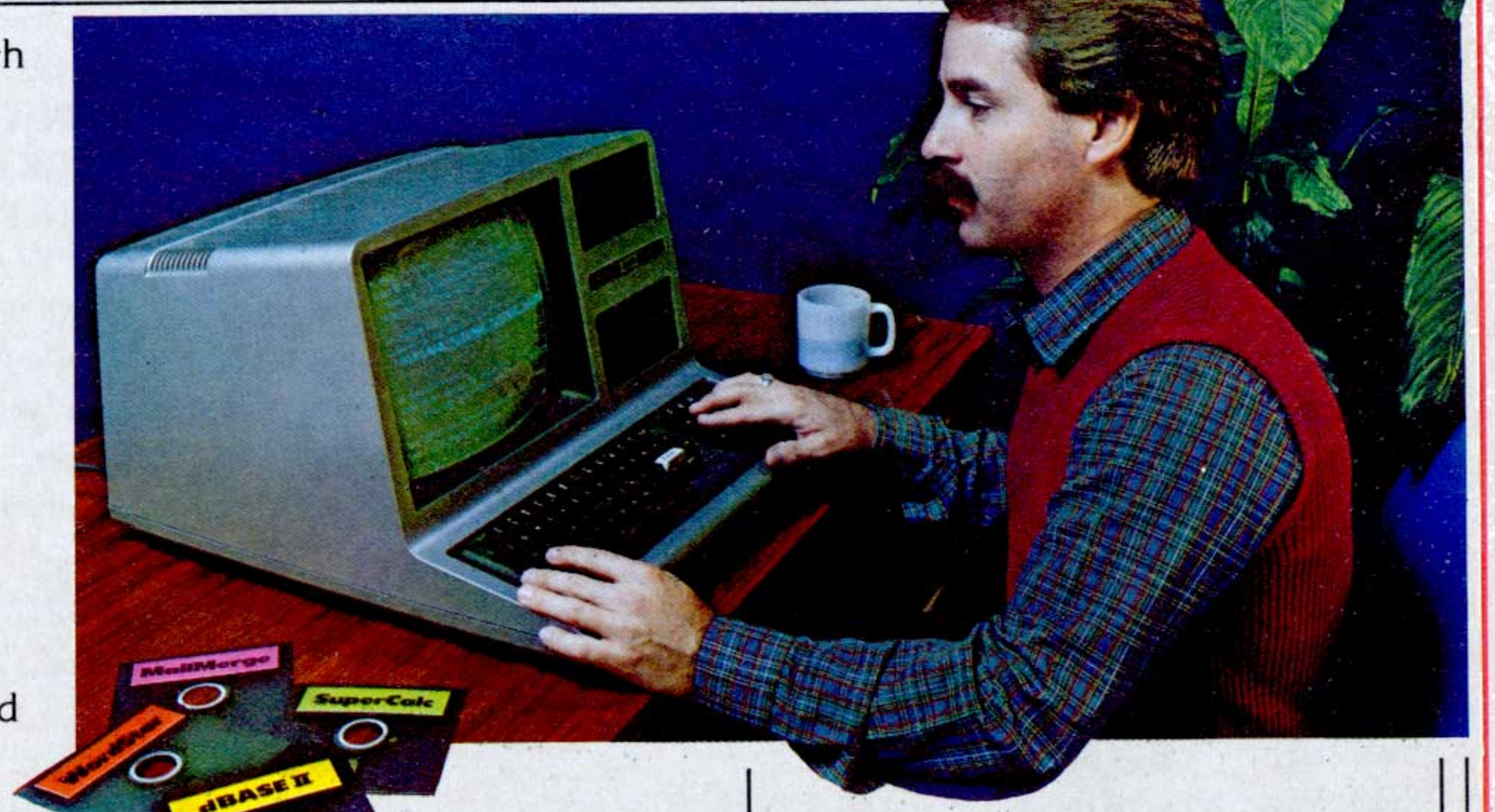
```
5 REM WRITTEN BY EARL C. BROWN
10 REM P.O. BOX 1198 KISSIMMEE, FLA. 327
41
15 REM 1-305-846-4861
20 REM NOT FOR RESALE:
30 REM FOR US OF READERS OF 'BASIC COMPU
TING
50 CLS
100 PRINT
110 PRINT
120 PRINT
130 PRINT
140 PRINTTAB(10);"FOOTBALL"
180 PRINTTAB(9);"FORECASTER"
220 PRINTTAB(13);"BY"
240 PRINTTAB(10);"E. CHARLES BROWN"
250 PRINTTAB(10);"P.O. BOX 1198"
260 PRINTTAB(10);"KISSIMMEE, FLA."
270 PRINTTAB(12);"32741"
320 FOR I=1 TO 1000:NEXTI:CLS
330 PRINT"THIS PROGRAM PROJECTS FINAL"
340 PRINT"SCORES OF PROFESSIONAL AND"
345 PRINT"COLLEGE FOOTBALL BASED ON A"
350 PRINT"STATISTICAL ANALYSIS OF THE"
355 PRINT"FOLLOWING FACTORS:"
357 PRINT
360 PRINTTAB(10)"TOTAL GAMES PLAYED"
362 PRINT
365 PRINTTAB(10)"TOTAL POINTS SCORED"
375 PRINTTAB(10)"TOTAL OFFENSIVE YARDS"
380 PRINT
385 PRINTTAB(10)"TOTAL POINTS ALLOWED"
390 PRINT
395 PRINTTAB(10)"TOTAL YARDS ALLOWED"
400 FOR X=1 TO 5000:NEXTX:CLS
425 PRINT"ENTER DATE(MM,DD)";:INPUT AA,D
D:CLS
450 PRINT"ENTER THE NAME OF THE VISITING
  TEAM":INPUT A$:CLS
500 PRINTTAB(5)"OFFENSIVE INFORMATION FO
R - ";A$
510 PRINT
520 PRINT
550 PRINT"ENTER NUMBER OF GAMES PLAYED":
INPUTN
600 PRINT"ENTER TOTAL POINTS SCORED":INP
UTP
625 PRINT
650 PRINT"ENTER TOTAL YARDS GAINED":INPU
T Y
700 PRINTTAB(5)"DEFENSIVE INFORMATION FO
R - ";A$
725 PRINT
750 PRINT"ENTER TOTAL POINTS ALLOWED":IN
PUT G
800 PRINT"ENTER TOTAL YARDS ALLOWED":INP
UT GU:CLS
850 PRINTTAB(5)"OFFENSIVE INFORMATION FO
R -";A$
875 PRINT
900 PRINT"GAMES PLAYED - ";N
950 PRINT"POINTS SCORED - ";P
1000 PRINT"YARDS GAINED - ";Y
1025 PRINT
1050 PRINT"DEFENSIVE INFORMATION FOR - "
1060 PRINT A$
1075 PRINT
1100 PRINT"POINTS ALLOWED - ";G
1150 PRINT "YARDS ALLOWED - ";GU
1175 PRINT
1250 PRINT"ARE THE ABOVE STATISTICS CORR
ECT (Y OR N)":INPUT BX$
1300 IF BX$="N" THEN CLS:GOTO 450
1325 IF BX$="Y" THEN CLS:GOTO 1400
1350 IF BX$<>"Y" THEN 1250 ELSE 450
1400 CLS
1450 PRINT"ENTER NAME OF HOME TEAM":INPU
T H$:CLS
1500 PRINT"OFFENSIVE INFORMATION FOR - "
1505 PRINT H$
1525 PRINT
1550 PRINT"ENTER NUMBER OF GAMES PLAYED"
:INPUT PL
1600 PRINT"ENTER TOTAL POINTS SCORED":IN
PUT PS
1650 PRINT"ENTER TOTAL YARDS GAINED":INP
UT YG
1675 PRINT
1700 PRINT"DEFENSIVE INFORMATION FOR - "
1705 PRINT H$
1725 PRINT
1800 PRINT"ENTER TOTAL POINTS ALLOWED ":
INPUTPU
1850 PRINT"ENTER TOTAL YARDS ALLOWED":IN
PUT YU
1900 CLS
1925 PRINT"OFFENSIVE INFORMATION FOR - "
1930 PRINT H$
1950 PRINT
2000 PRINT"GAMES PLAYED - ";PL
```

Put 64K CP/M® 2.2 in your TRS-80 Model III and tap into 2,000 business programs.

Now you can run programs such as WordStar, dBASE II, SuperCalc, MailMerge and virtually thousands of other CP/M-based programs on your TRS-80 Model III.

CP/M 2.2 is the industry standard operating system that gives you access right now to over 2,000 off-the-shelf business programs.

Our plug-in Shuffleboard III comes with 16K of RAM, giving your Model III the power of full 64K CP/M 2.2 without interference of the ROM or video memory. In fact, the Shuffleboard will appear transparent in the TRS-80 mode and will not interfere with any DOS operation.



READ and WRITE Osborne, Xerox and IBM personal computer software plus many more popular formats.

Unfortunately, there is no standardized CP/M format for 5¼" diskettes. But we have developed a way to READ/WRITE and RUN standard programs under the following single-sided formats: Osborne 1 S/D, Xerox 820 S/D, IBM PC* D/D for CP/M 86 only, Superbrain D/D, Kapro II D/D, HP 125 D/D and TeleVideo D/D.

*Will Read and Write Only.

Easy plug-in installation.

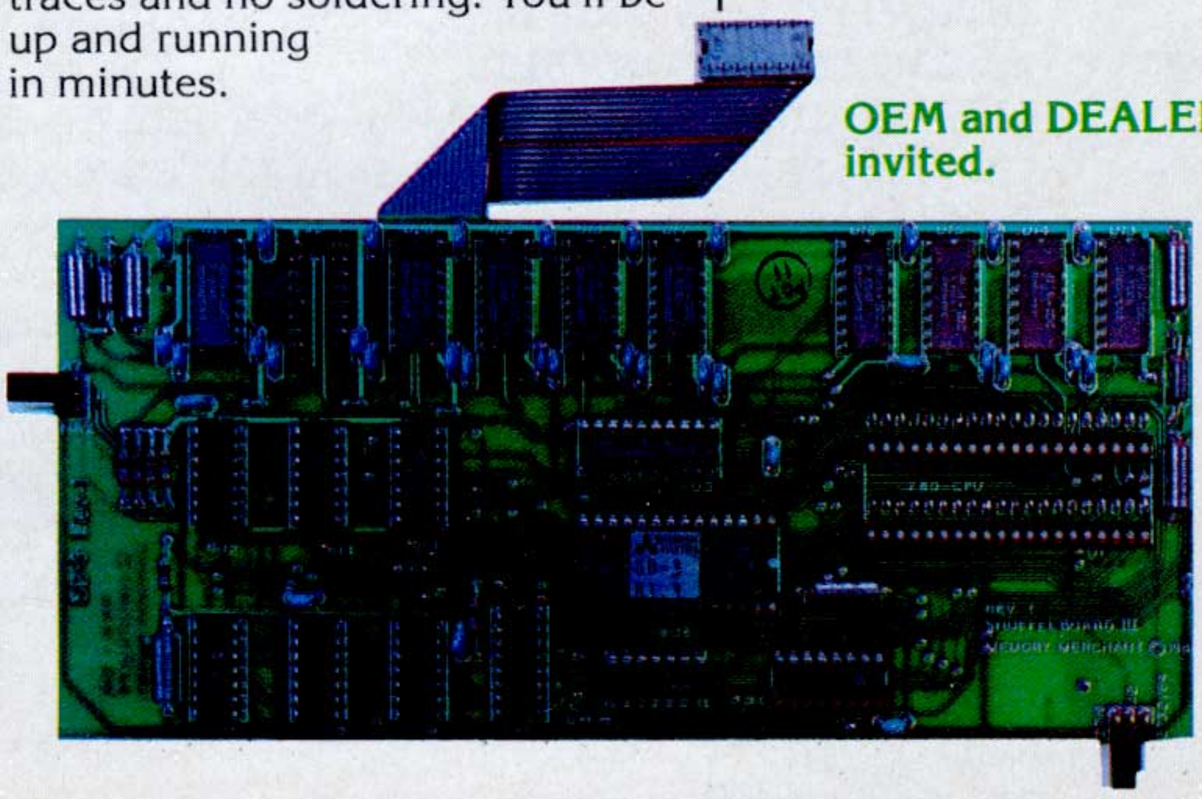
It's so simple. The Shuffleboard III plugs into two existing sockets inside your Model III. There are no permanent modifications, no cut traces and no soldering. You'll be up and running in minutes.

New Products.

80 x 24 VIDEO BOARD: Features dual intensity screen, programmable cursor control for block, underline & blink rate, on-board bell with audible keyclick, battery-operated real time calendar/clock, full ASCII character set plus 256 special character graphics, dual RS-232 outputs and composite video output.

FLOPPY DISK CONTROLLER: Now you can access 5¼" and 8" floppy disk drives in any combination up to 4 drives of S/D density, S/D sided. Tap into a wealth of CP/M software which comes on 8" IBM 3740 format or Pickles & Trout CP/M for the Model II.

SOFTWARE: Additional CP/M software programs are available. Call or write for details.



OEM and DEALER inquiries invited.

Introductory price of

$299.

The Shuffleboard III comes fully burned-in and tested complete with 64K CP/M 2.2 and MBASIC 80 interpreter, plus software manuals and a first class user's manual — with a 1-year limited warranty and 15-day no-risk free trial — for only $299.

See the Shuffleboard III at your dealer's now.

Once you see what the Shuffleboard can do for your Model III you'll want one at once. If your dealer does not yet stock the Shuffleboard have him give us a call. Or send check, money order, VISA or MASTERCARD number (sorry, no COD's) plus $5 shipping per board ($17 outside the USA & Canada)* directly to the address below. Cal. residents please add sales tax. Credit card purchases can be phoned in directly and we'll ship from stock.

(415) 483-1008

*Air mail shipments to Canada & all other countries.

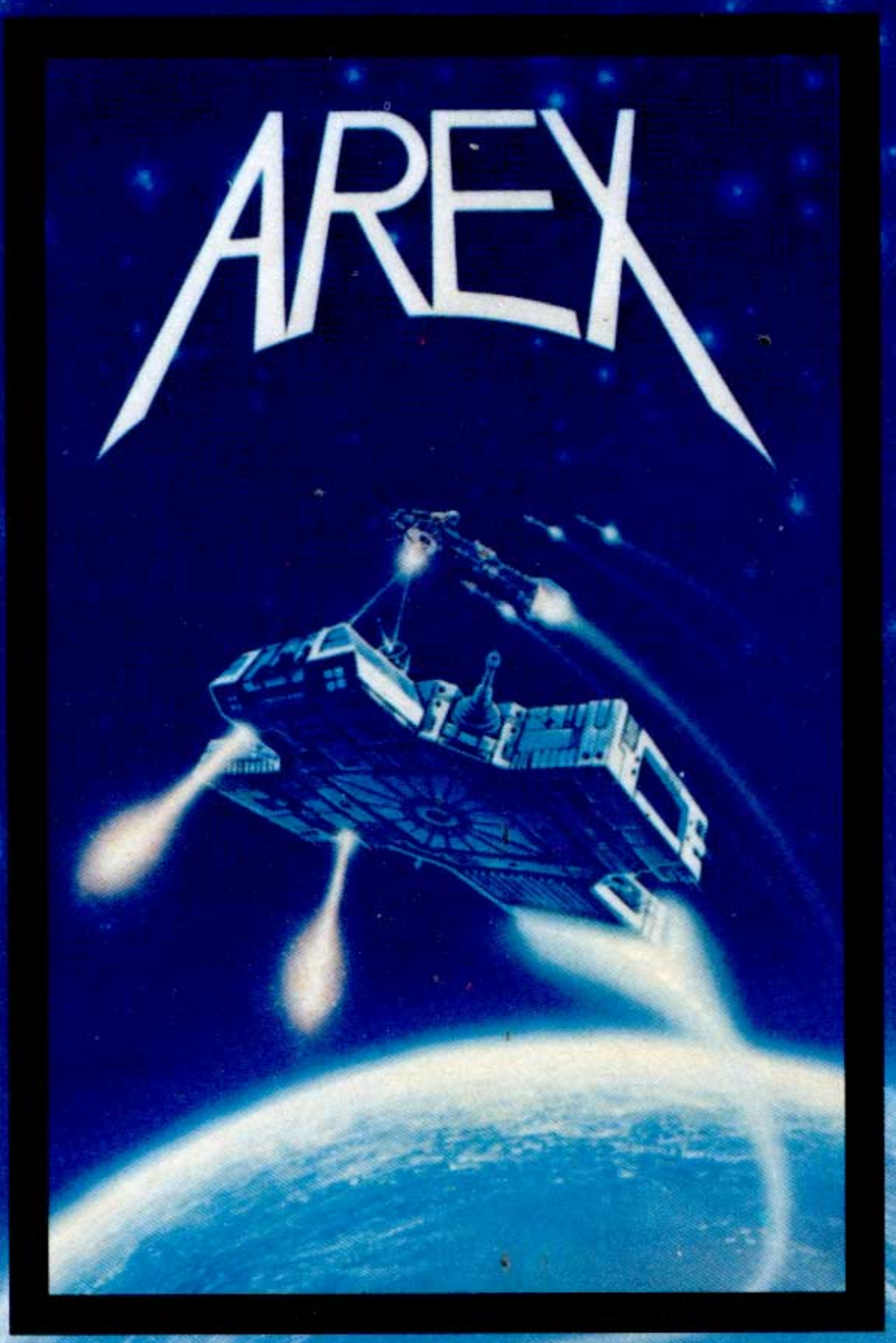
Memory Merchant™

14666 Doolittle Drive San Leandro, CA 94577
(415) 483-1008

WordStar & MailMerge are trademarks of MicroPro.
SuperCalc is a trademark of SORCIM.
dBASE II is a trademark of Ashton-Tate.
CP/M is a trademark of Digital Research.
TRS-80 is a trademark of Tandy Corporation.
IBM is a trademark of IBM Corporation.

```
2050 PRINT"POINTS SCORED - ";PS
2075 PRINT"YARDS GAINED - ";YG
2100 PRINT
2150 PRINT"DEFENSIVE INFORMATION FOR - "
;H$
2175 PRINT
2200 PRINT "POINTS ALLOWED - ";PU
2250 PRINT"YARDS ALLOWED - ";YU
2300 PRINT
2350 PRINT"ARE THE ABOVE STATISTICS CORR
ECT (Y/N)":INPUT HX$
2400 IF HX$="N" THEN CLS:GOTO 1450
2450 IF HX$="Y" THEN CLS:GOTO 2500
2475 IF HX$<>"Y" THEN 2350 ELSE 1450
2500 CLS
2550 M=YU/PL:MM=Y/N:NM=P/N
2555 VS=M/(MM/NM)
2560 VS=INT(VS)
2565 T=GU/N
2570 TT=YG/PL:PP=PS/PL
2575 HS=T/(TT/PP)+3
2580 HS=INT(HS)
2600 PRINT"DO YOU WANT SELECTIONS BASED
ON POINT SPREAD (Y/N)":INPUT PS$
2625 IF PS$="N" THEN CLS:GOTO 4300
2650 IF PS$="Y" THEN CLS:GOTO 4000
4000 PRINT"ENTER POINT SPREAD FOR - "
4025 PRINTA$;" (ENTER - NUMBER IF FAVORI
TE
4030 PRINT"AND A + IF UNDERDOG":INPUT FP
4050 PRINT"ENTER POINT SPREAD FOR -"
4075 PRINTH$;" (ENTER - NUMBER IF FAVORI
TE"
4095 PRINT"AND A + IF UNDERDOG":INPUT VP
4200 CLS
4300 PRINT"GAME ANALYSIS"
4325 PRINT
4350 PRINTA$"-";INT(VS)
4400 PRINTH$;"-";INT(HS)
4425 PT=INT(VS)+INT(HS)
4450 PRINT
4475 PRINT"TOTAL POINTS PROJECTED -";PT
4505 PRINT"FAVORITE"
4510 IF FP=VP THEN PRINT;"POINT SPREAD -
 TOSS UP"
4515 IF FP>VP THEN GOTO 4520
4520 IF FP<VP THEN PRINT"POINT SPREAD -
";A$;"("FP")" ELSE GOTO 4523
4523 IF VP<FP THEN PRINT"POINT SPREAD -
";H$;"("VP")"
4525 PRINT
4550 PRINT"SELECTION"
4555 PF=FP/2:PV=VP/2
4560 PRINT
4575 QV=INT(VS+PF)
4600 QS=INT(HS+PF)
4625 IF INT(QV)=<INT(QS)+7 AND INT(QS)=<
INT(QV)+7 THEN PRINT"GAME TOO CLOSE TO C
ALL" ELSE GOTO 4630
4630 IF INT(QV)>INT(QS)+13 THEN PRINTA$"
("FP")";"**SUPER PLAY**"ELSE GOTO 4635
4635 IF INT(QS)>INT(QV)+13 THEN PRINTH$"
("VP")";"**SUPER PLAY**"ELSE GOTO 4650
4650 IF INT(QV)>INT(QS)+7 AND INT(QV)<IN
T(QV)+13 THEN PRINTA$;"("FP")"
4675 IF INT(QS)>INT(QV)+7 AND INT(QS)<IN
T(QV)+13 THEN PRINT H$;"("VP")"
4990 PRINT
5000 PRINT"DO YOU WANT TO CONTINUE OR DO
 YOU WANT A PRINT OUT (Y-N-P)":INPUT QX$
5010 IF QX$="Y" THEN CLS:GOTO 425
5050 IF QX$="N" THEN GOTO 8000
5075 IF QX$="P" THEN GOTO 6000
5100 PRINT#-2,
6000 PRINT#-2,"GAME ANALYSIS"
6010 PRINT#-2,"=========================
=="
6020 PRINT#-2,"DATE";AA;"-";DD
6050 PRINT#-2,A$;"-"INT(VS)
6075 PRINT#-2,H$;"-"INT(HS)
6115 PRINT #-2,""
6125 PRINT#-2,"TOTAL POINTS PROJECTED -"
;PT
6130 PRINT #-2,""
6133 PRINT#-2,"FAVORITE"
6135 IF FP=VP THEN PRINT#-2,"POINT SPREA
D - TOSS UP"
6137 IF FP>VP THEN GOTO 6140
6140 IF FP<VP THEN PRINT#-2,"POINT SPREA
D -";A$;"("FP")" ELSE GOTO 6144
6144 IF VP<FP THEN PRINT#-2,"POINT SPREA
D -";H$;"("VP")"
6147 PRINT #-2,""
6150 PRINT#-2,"SELECTION"
6152 PRINT #-2,""
6153 PRINT #-2,""
6157 IF INT(QV)=<INT(QS)+7 AND INT(QS)=<
INT(QV)+7 THEN PRINT#-2,"GAME TOO CLOSE
TO CALL"ELSE GOTO 6159
6159 IF INT(QV)>INT(QS)+13 THEN PRINT#-2
,A$;"(";FP;")";"***SUPER PLAY***"ELSE GO
TO 6165
6160 PRINT #-2,""
6165 IF INT(QS)>INT(QV)+13 THEN PRINT#-2
,H$;"(";VP;")";"***SUPER PLAY"ELSE GOTO
6170
6170 IF INT(QV)>INT(QS)+7 AND INT(QV)<IN
T(QS)+13 THEN PRINT#-2,A$;"(";FP;")"
6195 IF INT(QS)>INT(QV)+7 AND INT(QS)<IN
T(QV)+13 THEN PRINT#-2,H$;"(";VP;")"
6250 PRINT #-2,""
6295 PRINT#-2,"=========================
==":GOTO 5000
8000 CLS:PRINT"GOOD LUCK"
```

BECOME AN INTREPID SPACE ADVENTURER . . .



by William Muk
CoCo version by Roger Schrag
Atari version by John Anderson

Far beyond the known galaxies, you venture deep into the vast reaches of outer space. But you are not alone! In a flash, without so much as a how-do-ya-do, they're in hot pursuit and you're left to do before you're done unto. **Can** you elude your pursuers? **Will** you elude your pursuers? And who ***are*** these guys anyway? Find the answers to these and other compelling questions in AREX. See your dealer today!

AREX . . . Coin-op arcade realism at home for 1 to 2 players.

AREX

CoCo 16K TAPE	060-0172	$34.95
TRS-80 Model 1 & 3 16K TAPE	010-0172	$34.95
TRS-80 Model 1 & 3 32K DISK	012-0172	$34.95

. . . OR FLY HIGH IN THE WORLD OF HIGH FINANCE

by George Schwenk
TRS-80 version by Dave Simmons
CoCo version by Roger Schrag

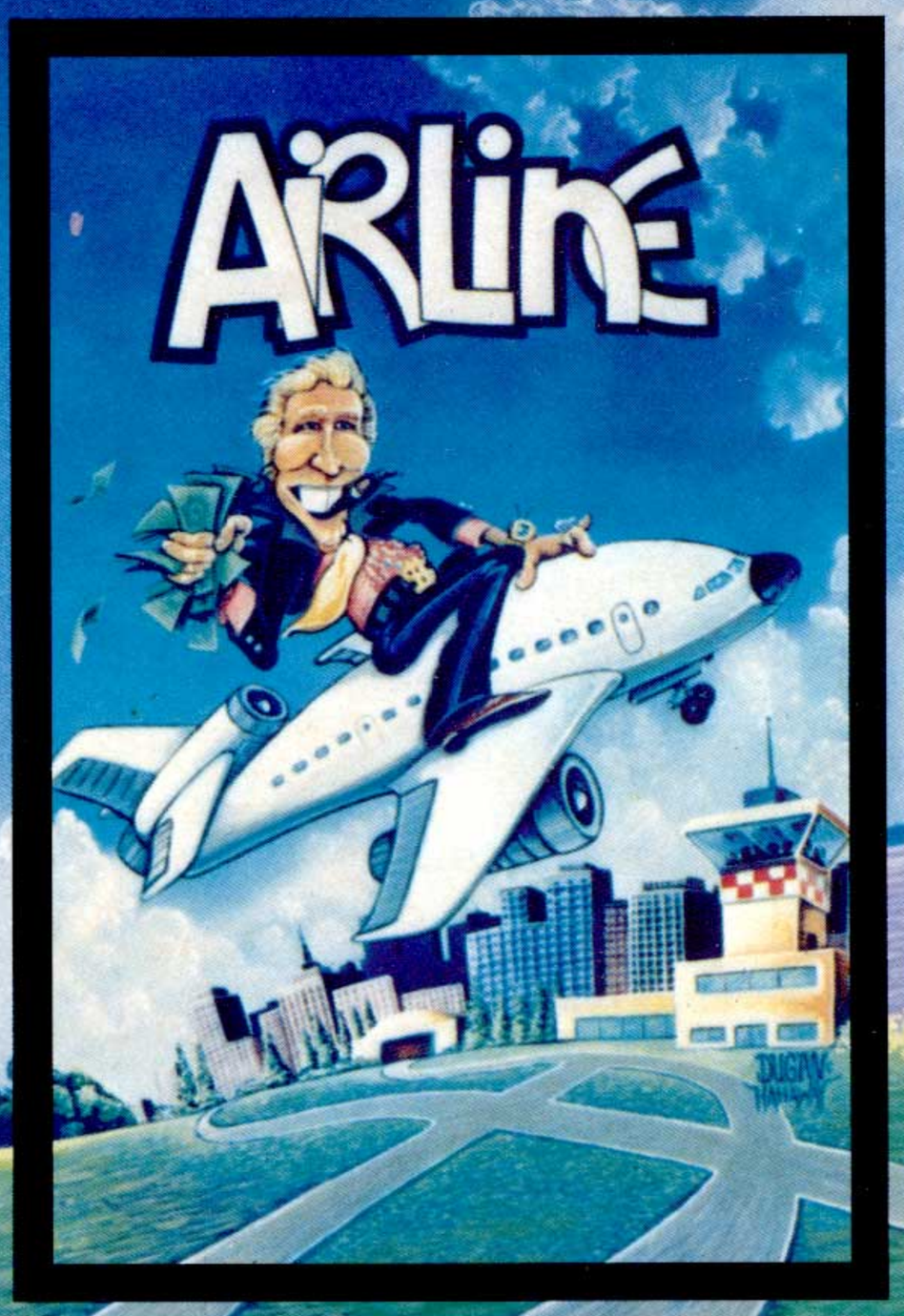
"Yas, after purchasing diamond mines in South Africa, oil wells in Saudi, and rare beer cans in Walla Walla, Washington, I had begun to wonder what other trendy commodities remained to be added to my swelling portfolio. Then a snip of a ticket girl dared to tell me (ME, Hartley J. Wormsflather III!) that my flight was overbooked. To avoid future misunderstandings, I bought the airline."

"I think I'm on to something profitable here." Hartley J. Wormsflather III

AIRLINE . . . A no-holds-barred strategy game for 1 to 4 players.

AIRLINE

ATARI 400 & 800 / CoCo / Model 1 & 3 16K TAPE . .	140-0169	$24.95



Published by

Adventure INTERNATIONAL

a subsidiary of Scott Adams, Inc.
BOX 3435 • LONGWOOD, FL 32750 • (305) 862-6917

Prices Subject To Change Without Notice

To order, see your local dealer. If he does not have the program, then call 1-800-327-7172 (orders only please) or write for our free catalog. DEALER INQUIRIES ARE INVITED!

Basic bits

Hints for developing your own disk writing utilities

Models I/III

Thomas L. Quindry, Contributing editor

Sometimes I check my bit bucket under the computer to see if some extraneous bits have dropped out of my BASIC bits column. Sure enough, there were a couple from the June issue. In Table 1, page 59, the PEEK(16549) value for the normal Level II BASIC Start for the Model III is supposed to be 67 rather than 66 as shown. Also, with regard to my answer to T.F. on page 60, the last sentence of the fourth paragraph of the right-hand column should read ". . . and the value of PEEK (16549) +1 will be the MSB." There should be a plus sign instead of a minus sign in that sentence. I'm going to have to get that bit bucket fixed. It's only supposed to hold the rejected bits.

Table 1 — Register values and DOS CALLS for reading and writing disk sectors

Register settings:
B— Always make this a zero.
C— Drive number to be accessed (0 to 3)
D— Track number to be accessed
E— Sector number to be accessed
HL— Starting address for 256-byte data buffer

TRSDOS 1.2 CALLS:
CALL 4684H— Read a sector
CALL 4605H—Write to a sector

TRSDOS 1.3 CALLS
CALL 4675H— Read a sector
CALL 4600H—Write to a sector

TRSDOS 2.3 CALLS
CALL 46DDH— Read a sector
CALL 46E6H—Write to a sector
CALL 46EFH— Write to a "read protected" sector*
*Use 46EFH to write to the Model I directory sector.

Other DOS's will have different CALLS.

Last month, I gave a short program which allowed you to rename TRSDOS diskettes. It would work with either TRSDOS 2.3 or TRSDOS 1.3, the latest Radio Shack DOS's for the Model I and III respectively. The heart of that program was a small machine language subroutine which was POKEd into memory. The primary information for the POKEs was taken from:

```
70 DATA17,1,17,1,0,0,33,0,191,205,
   117,70,201
```

This DATA statement performs the read function for TRSDOS 1.3. One small change to it turned it into a write function. See the listing in last month's BASIC bits for details.

Let's analyze what this coding means by disassembling it into assembly language mnemonics. The first three codes, 17,1,17 translate to LD DE,1101H. The first value of 17 is the LD DE command. The value of 1 is the LSB and the last value of 17 is the MSB of the hexadecimal value 1101H. The register, D, is given the value of the track (17) and the register, E, is given the value of the sector (1) to be read. The next three codes (1,0,0) translate to LD BC,0000H. Registers B and C are given a value of zero. Register C, the first of the zeroes, is the drive number. For example, 1,1,0 would be drive 1 and 1,2,0 would be drive 2, etc. Next, the buffer area for the sector information to be placed into memory is given, 33,0,191 translates to LD HL, BF00H. The buffer area extends for 256 bytes. Three more bytes of code, 205,117,70 are CALL 4675H which is the TRSDOS 1.3 read sector CALL and then 201 is a RETURN to the BASIC program. Changing the 205,117,70 above to 205,0,70 makes that routine write to a sector (CALL 4600H). Table 1 gives all the proper CALLS and register values for TRSDOS 1.2, 1.3, and 2.3. In all of these DOS's, the register values are the same.

Model III TRSDOS names its sectors differently than most any other DOS. It uses sectors from 1 to 18. Model I TRSDOS and most other DOS's use sectors from zero to 17. In reading, or writing, the first sector of the directory track for almost all (except TRSDOS for the Model III) you would set register E to zero. You have to watch NEWDOS/80. It numbers its sectors and tracks very differently. I won't even try to explain it.

Interestingly enough, you aren't limited to reading or writing, say, a TRSDOS 1.3-formatted diskette when using the routine from TRSDOS 1.3. As long as you specify a track and sector number, you can

read, or write, any other double-density diskette track and sector. Similarly, with TRSDOS 2.3, you can read or write any other single-density diskette track and sector. If you have a Model I doubler, and have converted TRSDOS 2.3 for double density, you can only do double density operations with it.

Your BASIC program using these routines can perform any operation given above, on any drive. The only restriction for drive zero is that if you aren't reading or writing a diskette with the same DOS on it, you can't perform any operation that will cause access to the DOS (such as to read an overlay). As stated in Table 1, when writing to the directory sector of TRSDOS 2.3, use CALL 46EFH for writing to a "read-protected" sector. If you don't, TRSDOS 2.3 will not be able to boot up. All other sectors would use the first write CALL. Other Model I DOS's may need the "read-protected" sector as well.

There you have it. The basis for a disk-modifying utility. I'll leave it up to you to figure out how you want to use the routines. As I cautioned last month, *experiment only* with a diskette that has been backed up. It's always a good idea to have a backup of all your diskettes. A backup diskette is your best friend, even for seemingly innocent and normal use of your computer.

I have a program which formats and prints my data entry on a mailing form which is something like a telegram. One of the program prompts allows me to select one of eleven canned messages, or to input up to four lines of text in the message area. if I select one of the canned messages, or enter the maximum four lines of text, I am then prompted to enter data for a signature line. When I enter less than the maximum four lines of text, I must keep hitting ENTER until I get the prompt for the signature line. There must be a better way. Is there an LPRINT code which is similar to the PRINT @ code that is used for the video?

—R. I., Stanton, MI

In my very first BASIC bits column last October, I explained why there was no function similar to PRINT @ for printers. I assume that what you are really asking is how to advance your paper to the correct vertical position for the signature line on your form. The big unknown here to me is how long are your canned messages? For talking purposes, let's assume that the canned messages do not exceed four lines. Let's also assume that the signature line is always supposed to be at the same position on the form, i.e., the same number of lines down from the top of the page.

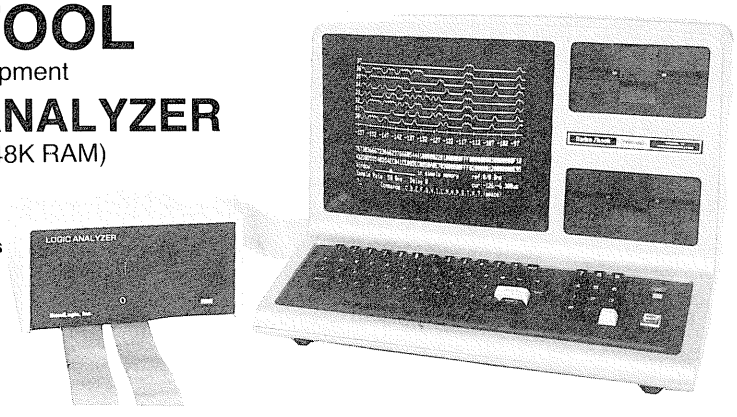
The easiest way to attack this problem is to structure your program so that the text entry mode gives you a message which takes exactly the same form as a canned message. Four lines of text must always be printed to the form. This is not to say that these lines must contain actual words. Any line after your message

THE LOGICAL TOOL

For Hardware and Software Development

MODEL LA-1680 LOGIC ANALYZER

For TRS-80 Model I or III Computers (48K RAM)



FEATURING . . .

- **Collection Of 1000 Data Samples On Each Of 16 Channels**
- **Optionally Expandable To 64 Channels**
- **User-Selectable Sampling Rates As Fast As 20 MHz**
- **Easy To Specify Triggering & Collection Conditions**
- **Timing Displays For Hardware Include:**
  Standard 16 channel timing diagram
  Edge mode for transition identification
- **State Displays For Software Include:**
  Dump in hex, binary, octal, decimal
  Instruction disassembly of microprocessors
  Map showing frequency of data samples
- **Plus . . .**
  Histogram showing software performance
  Signature analysis of 14 points at once
  Correlate sample to reference memory
  Pattern search to aid data location

Incredibly friendly 'help' displays

The **LA-1680** Logic Anlayzer allows you to hook up to a high-speed digital circuit; define and collect the data you wish to examine; and then, produce a visual representation of the actual digital signals for closer inspection and analysis. This facilitates the design and service of computers, peripherals, and any equipment which contains digitial logic circuitry.

The **LA-1680** Logic Analyzer contains the high-speed circuitry necessary to perform the time-critical functions of data recognition and collection. The TRS-80 microcomputer provides for convenient keyboard entry of user commands, detailed display of data on screen or printer, and storage of test set-ups or displays on disk.

This combination results in a powerful digital tool, exhibiting features found only on today's most expensive, top-of-the-line logic analyzers. Yet, the affordable **LA-1680** is well within the reach of educators, hobbyists, and industry.

LA-1680 Logic Analyzer	**$1250.00**
High Impedance Probes (TTL or CMOS; 8 Channels)	$275.00
Model I Cable Adapter	$95.00
64 Channel Expansion Unit	$1250.00
Demonstration Disk	**$5.00**

OmniLogic, Inc.
P.O. Box 87
RENTON, WA 98057
206/271-2000

ends can contain a null string, i.e., no words. When you print a line containing a null string, you are in effect printing a blank line or just causing your printer to execute a linefeed. Listing 1 gives a short subroutine that you can put in your program which will format your message as stated above:

Listing 1—Format Message Example

```
100 REM PUT THE FOLLOWING
IN PLACE OF YOUR CURRENT T
EXT ENTRY ROUTINE
110 REM DEFINE YOUR FOUR T
EXT LINES AS NULL STRINGS
120 FOR N = 0 TO 3: A$(N)
= "": NEXT N
130 REM ENTER UP TO FOUR L
INES OF TEXT
140 FOR N = 0 TO 3
150 PRINT N+1;".";
160 INPUT A$(N)
170 IF LEN(A$(N))>60 THEN
PRINT "LINE TOO LONG, REEN
TER": GOTO 150
180 REM IF NO TEXT ENTERED
 FOR A LINE, END OF TEXT A
SSUMED
190 IF A$(N) = "" THEN N=3
200 NEXT N
210 REM SEND FOUR LINES OF
 TEXT TO THE PRINTER
220 FOR N = 0 TO 3
230 LPRINT TAB(10)A$(N)
240 NEXT N
250 REM FOLLOWING WOULD BE
 THE SAME STATEMENTS AS IN
 YOUR REGULAR PROGRAM
```

You will have to make sure the variables and line statements do not conflict with those already in your program.

The routine in Listing 1 predefines a message area to four lines of null strings or null values. If you do not want to enter a full four lines of text, you don't have to now. After each line of text is input, you must follow it by hitting enter. If you are finished and have entered less than four lines, hit enter one more time and the program will LPRINT your text. On line 190, the program checks to see if an entry was made. If not, that text line, and those following, remain at the predefined null value. Setting N=3 in line 190 fools the FOR . . . NEXT loop into believing that it has cycled all values of N. All four string values for A$(N) are then LPRINTed, including the null strings which just perform the linefeed. Now you can return to your main program and have it do whatever else has to be done to get your signature prompt.

Remember to send your requests for future column topics, questions and tips to me, care of *Basic Computing*, 3838 South Warner Street, Tacoma, WA 98409. Send a self-addressed, stamped envelope and I'll try to give you a personal, handwritten reply as long as the answer is not too long and involved. Problems of general interest may be included in future BASIC bits.

TRS-80™ "CAN YOU BUY DIRECT?"

HAVE YOU GOT OUR PRICES?

WILL YOU PAY TOO MUCH?

WARRANTY:

the RADIO SHACK warranty accompanies all R. S. merchandise sold by us.

SAVE SALES TAX*
PLUS DISCOUNT
*TEXAS RESIDENTS ADD ONLY 4%

FORT WORTH COMPUTERS

(Located 30 miles from Fort Worth)

377 Plaza • GRANBURY • NR FORT WORTH . TEXAS 76048

TOLL FREE NUMBER: 1 - 800 - 433-S-A-V-E

IN TEXAS CALL: 817-573-4111

TM: TRADE MARK OF RADIO SHACK

VisiCalc lister

A utility to print out, in order, your Visicalc files

Models I/II/III

Arnt K. R. Sviland, Stavanger, Norway

Here is a short, useful program for VisiCalc users. If you use the built-in listing capability of VisiCalc (/SS:P command), the result is always in reverse order. The cell contents are printed backwards, starting with the final formulas first. It is quite inconvenient when trying to understand the layout of the template.

My little program eliminates this by reading the formulas into an array and listing the array in the correct order. With this program, the results are printed out starting with the first occupied cell in row one and running to the end of that row. Then row two, row three, and so on. At the very start of the listing you are shown the formatting, order of calculation, window, and other global settings that are in use for the template.

Note the CLEAR and DIM statements in lines 80 and 90. If your file is large, these may have to be altered to allow more entries. It is recommended that you make them as large as you can for the memory size of your machine.

Operation is extremely simple. Just enter the name of the VisiCalc file (and the date if it is needed). Make sure that the printer is ready, the program assumes that it is. There is no need to store the VisiCalc file in any special format. The program works fine on any file with the extension /VC. It will work on the enhanced version of VisiCalc as well as the older version.

Figures 1 and 2 show how it works. Figure 1 is a sample template as it looks when running VisiCalc. Figure 2 shows what the corresponding printout of that file looks like after running it through VCLISTER. The sample template is a very simple accounts receivable spreadsheet that keeps track of dates, debtor, invoice number, amounts due, paid, and balance.

I hope the program helps make your use of VisiCalc a little easier.

VisiCalc is a registered trademark of VisiCorp.

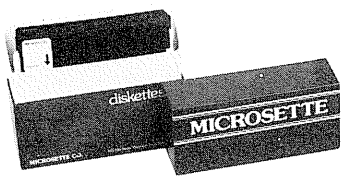
Figure 1 Accounts Receivable Template

```
 CASH FLOW        A/R

Amounts due for pymt
 From date ========>     830630
 To   date ========>     830730

==============================================================
                        Invoice     Amount     Amount    Balance
  Due Date     Debtor    Number        Due       Paid        Due

 830705         Jones       127     789.45     125.00     664.45
 830710         Haley       132    4560.23       0.00    4560.23
 830715        Olsson       138    1235.93     560.00     675.93
--------------------------------------------------------------
                        Totals:    6585.61     685.00    5900.61
==============================================================
```

Figure 2 Listing of A/R Template

```
DATE OF OUTPUT: Jul 51983

/X>A1:>A1:
/GC10
/GFR
/GRA
/GOC
/W1
>A1:"CASH FLOW
>B1;"A/R
>A3:"Amounts du
>B3:"e for pymt
>A4:"From date
>B4:"========>
>C4:830630
>A5:"To   date
>B5:"========>
>C5:830730
>A7:"==========
>B7:"==========
>C7:"==========
>D7:"==========
```

MICROSETTE



Buy Direct and Save

- 5¼ SS and DS Diskettes
- Soft Sector Format Only

MICROSETTE CASSETTES

- Error-Free Computer Grade
- Industry Leader Since 1977

For Tandy, Apple, Osborne, IBM, Atari, Texas Instruments, Commodore, Timex, Kaypro, Sinclair and Many Others.

CASSETTES

Item	10 Pack	Qty	50 Pack	Qty	Total
C-10	$ 7.50		$32.50		
C-20	9.00		39.00		
C-60	11.00		50.00		
C-90	15.00		70.00		

DISKETTES 5¼-inch

SSDD	$25.00		$100.00		
DSDD	35.00		150.00		
			Subtotal		
			Shipping & Handling		N/C
			Calif. Cust. add Sales Tax		
			Total		

☐ Shipping Address Enclosed

☐ Check Enclosed

☐ Visa ☐ MasterCard

Card # _____

Exp. Date _____

Signature _____

MICROSETTE CO.

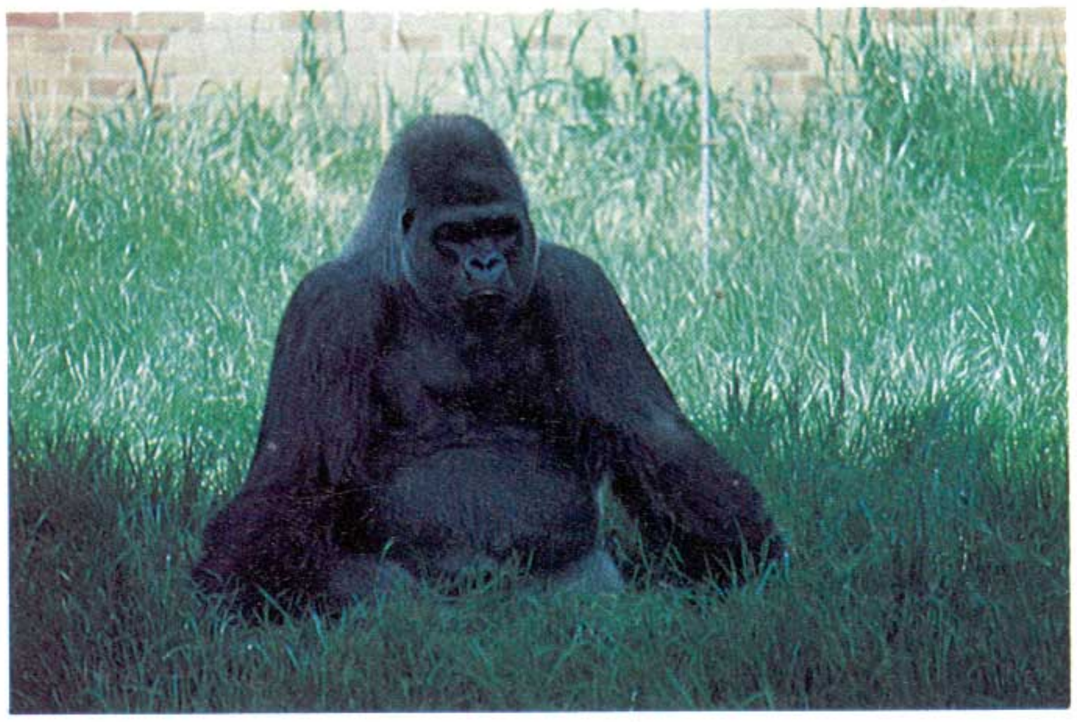
475 Ellis St. Dept. 1
Mountain View, CA 94043
(415) 968-1604


```
>E7:"==========
>F7:"==========
>C8:"Invoice
>D8:"Amount
>E8:"Amount
>F8:"Balance
>A9:"Due Date
>B9:"Debtor
>C9:"Number
>D9:"Due
>E9:"Paid
>F9:"Due
>A11:/FL830705
>B11:"Jones
>C11:/FR127
>D11:/F$789.45
>E11:/F$125
>F11:/F$+D11-E11
>A12:/FL830710
>B12:"Haley
>C12:/FR132
>D12:/F$4560.23
>E12:/F$0
>F12:/F$+D12-E12
>A13:/FL830715
>B13:"Olsson
>C13:/FR138
>D13:/F$1235.93
>E13:/F$560
>F13:/F$+D13-E13
>A14:/FL"----------
>B14:/FL"----------
>C14:/FL"----------
>D14:/FL"----------
>E14:/FL"----------
>F14:/FL"----------
>C15:"Totals:
>D15:/F$@SUM(D11...D13)
>E15:/F$@SUM(E11...E13)
>F15:/F$@SUM(F11...F13)
>A16:"==========
>B16:"==========
>C16:"==========
>D16:"==========
>E16:"==========
>F16:"==========

END OF LISTING
```

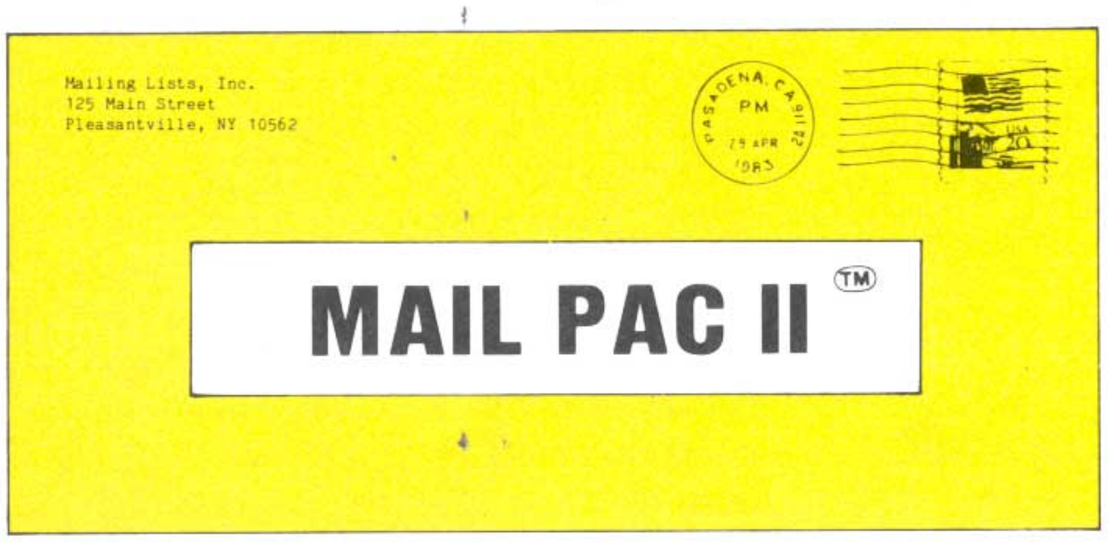
Program Listing for VCLister

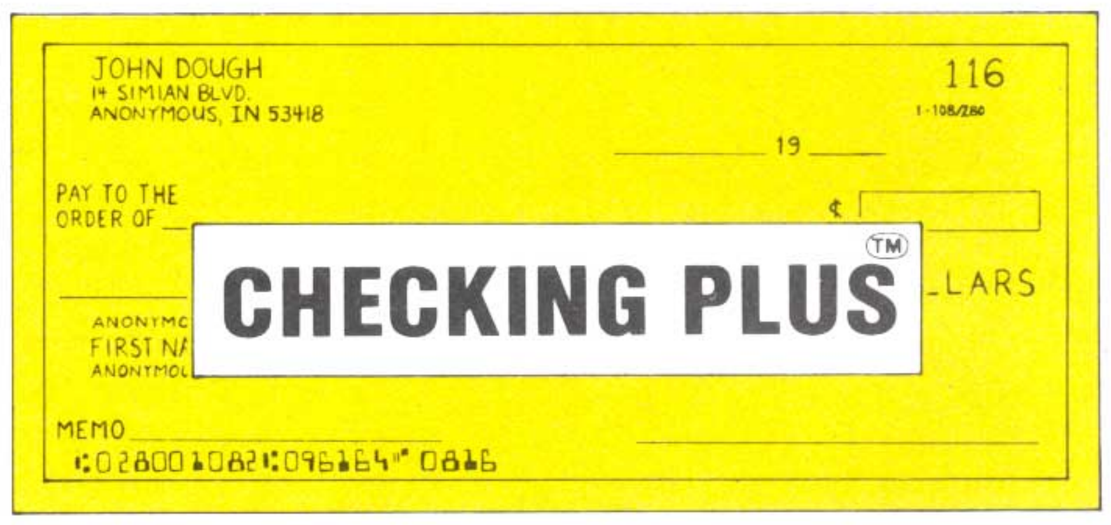
```
10 REM ******************VC
LISTER/BAS
20 REM *                ARNT
KR. SVILAND
30 REM *                TRYSI
L KNUTSGT. 7
40 REM *                N-4000
 STAVANGER
50 REM *                  NO
RWAY
60 REM ********************
**********
65 REM MODEL II/12 USERS B
E SURE TO ENTER BASIC WITH
 1 FILE OPEN
66 REM FOR MODEL II/12 AT
TRSDOS READY TYPE:   BASIC
 VCLISTER/BAS-F:1
70 REM
80 CLEAR 5000
90 DIM A$(200)
95 REM LINE 100 IS FOR MOD
EL III USERS ONLY
96 REM FOR MODEL II/12, US
E: 100 DT$= MID$(DATE$,4,9
)
97 REM FOR MODEL I WITHOUT
 DATE$, USE 100 INPUT "TOD
AY'S DATE IS: ";DT$
100 DT$=LEFT$(TIME$,8)
110 CLS: X=0
120 LINEINPUT "NAME OF VIS
ICALC FILE (BE SURE TO APP
END /VC): ";X$
130 OPEN "I",1,X$
140 IF EOF(1) THEN 210
150 X=X+1
160 INPUT #1,A$(X)
170 S$=LEFT$(A$(X),1)
180 IF S$="/" THEN GOTO 20
0
190 IF S$<>">" THEN A$(X-1
)=A$(X-1) + "," + A$(X): X
=X-1
200 GOTO 140
210 CLOSE 1
220 LPRINT "VISICALC PROGR
AM LISTING": LPRINT " "
230 LPRINT "LISTED VISICAL
C FILE: ";X$
240 LPRINT " "
250 LPRINT "DATE OF OUTPUT
: ";DT$
260 LPRINT " "
270 FOR Z=X TO 1 STEP -1
280 LPRINT A$(Z)
290 NEXT Z
300 LPRINT " "
310 LPRINT "END OF LISTING
"
320 END
```

ANYONE CAN USE OUR SOFTWARE!



MAIL PAC II and CHECKING PLUS represent a new generation of computer software. Our software doesn't even need a manual! Anyone can quickly learn to use either package by following simple, explicit on-screen instructions. But, for those of you who insist -- we've included a complete user's manual as well.





MAIL PAC II FEATURES:

High Capacity --

Stores from one to one million names in Zip Code, Numerical or Alphabetical order. The only limitation is your disk storage space.

Flexibility --

Prints your mailing list on 1, 2, 3, or 4-across labels (with up to 5 user-defined lines on each label) or as a compact, user-designed directory. The record length is completely user-defined, and each field within each of your records is completely variable (allowing storage of any number of characters for any particular address entry). Devote fields to telephone numbers, codes, or even special messages related to each particular name on file.

Powerful --

A built-in word processor allows you to create personalized form letters for each address on your list (or just a particular group of addresses).

Ease of Use --

Create new mailing lists, review existing lists, handle changes of address, delete cancelled names, sort lists, and purge duplicate names from your files. Complete on-screen instructions tell you in plain english exactly how to accomplish all of these tasks.

MAIL PAC II $99.95

CHECKING PLUS FEATURES:

Complete Check Register --

Checking Plus stores your entire check register in a disk file, and then uses the data to balance your account, track your expenses, and help you make budget projections. Review the entire checkbook, enter checks, deposits, fees and adjustments, mark outstanding checks when paid, and get an instant cash balance at any time. All data can be viewed onscreen or printed out in report form.

Tax Preparation --

Storage of monthly and yearly totals and other important information aids in income tax preparation, for your personal use or for your accountant.

Handles the Details --

Store names and addresses for frequently written checks, then print checks to fit standard window envelopes, eliminating the need for extra typing. You can even store any comment, explanation or other message (up to 255 characters) related to a particular check.

Automatic Monthly Bill Payments --

Enter amounts and names of payees for all of your fixed-cost monthly payments, and then sit back while the system automatically prints checks.

CHECKING PLUS $99.95

Both Programs Require 48K And At Least One Disk Drive (2 Drives For Higher Storage Capacities). And All Hard Disk Systems Are Supported.

FREE--TRS-80 Mod I,III & 4 programs supplied on DosPlus (minimum system). Complete DosPlus also available.

FOR YOUR TRS-80™ • APPLE™ • IBM PC™ • NEC™ • OSBORNE™ • XEROX™ • KAYPRO™ • TELEVIDEO™ • ZENITH™ • SANYO™
DEC™ • TI PROFESSIONAL COMPUTER™ • SUPERBRAIN JR.™ • EPSON™ • Any CP/M™ Computer

CP/M-based Computers must be equipped with Microsoft BASIC (MBASIC or BASIC-80)

TRS-80 trademark Tandy Corp - APPLE trademark Apple Corp - IBM PC trademark IBM Corp - ATARI trademark Atari, Inc - OSBORNE trademark Osborne Corp - XEROX trademark Xerox Corp
KAYPRO trademark Non-Linear Systems, Inc - TELEVIDEO trademark Televideo Systems, Inc - SANYO trademark Sanyo Corp - NEC trademark NEC Corp - DEC trademark Digital Equipment Corp
ZENITH trademark Zenith Corp - TI PROFESSIONAL COMPUTER trademark Texas Instruments, Inc - SUPERBRAIN trademark Intertec Corp - CP/M trademark Digital Reseaech - EPSON trademark Epson Corp

OUR SOFTWARE CATALOG

H & E Computronics, Inc., has mailed more than 1 million software catalogs since 1978. Send $2 for our new 64-page catalog today! (We also send you our catalog FREE with every order). DEALER INQUIRIES WELCOME

30-DAY MONEY BACK GUARANTEE

*** ALL PRICES & SPECIFICATIONS SUBJECT TO CHANGE ***
DELIVERY SUBJECT TO AVAILABILITY

H & E COMPUTRONICS INC
50 N. PASCACK RD., SPRING VALLEY, N.Y. 10977

24 HOUR ORDER LINE
(914) 425-1535

NEW TOLL-FREE ORDER LINE
(OUTSIDE OF N.Y. STATE)
(800) 431-2818

ADD $3.00 FOR SHIPPING IN UPS AREAS
ADD $4.00 FOR C.O.D. OR NON-UPS AREAS
ADD $5.00 TO CANADA & MEXICO
ADD PROPER POSTAGE OUTSIDE OF U.S., CANADA & MEXICO

AMERICAN EXPRESS · VISA · MasterCard

Exploring VisiCalc

The Liaison sort utility from Kjell Engineering

Models I/II/III

Timothy K. Bowman

Contributing editor

Several issues back, I put out a feeler to determine if there was a VisiCalc sort utility available. Mr. David Kjell, author of "Liaison" was gracious enough to send me a review copy of his program which provides for sorts among its other capabilities.

Liaison

Liaison is a BASIC language program that is able to read ASCII files created by Scripsit and convert them to the DIF format which is readable by VisiCalc. It also reads VisiCalc DIF files and converts them to ASCII and permits the sorting of either the ASCII or DIF files on multiple elements on either alphabetic or numeric arrays.

The program is provided on a Model I diskette which is capable of being backed up and the program is listable by the user. The author only supports use of the program on the Models I and III using TRSDOS and LDOS and strongly recommends the use of two double-density drives and 48K of memory.

The supporting documentation is a stapled booklet of 28 single-spaced pages prepared on a good dot matrix printer. There are two basic sections to the manual which describe how to convert files from ASCII to DIF and a second which describes the reverse process. The descriptions are quite readable although I would prefer a little more "white space" on each page. I believe it would be more professional to use a daisy wheel-type printer.

How It Works

One simply enters BASIC and types RUN "LIAISON/DTK." From that point on, every part of the program is self-prompting. The operator is first asked for a column width (which should be the same as the VisiCalc column width used). Then you are prompted for an (A)SCII file or enter for a VisiCalc DIF file. There is the option of right- or left-justifying the DIF or text values. After the prompt for the file-name, the file is read and the option of sorting the file is presented. After sorting (if desired), the final options are save the file in memory to either a disk text or DIF file, skip (to rerun) or review the sorted or converted file. I found the review option especially useful to view my sorted results.

The preceding discussion was quite brief, but it should give you a feel for how the program operates. It should be noted that the sort utility is a fast machine language sort.

This product provides a quick, easy way to convert VisiCalc data to/from ASCII text files and to sort both ASCII and VisiCalc DIF files. At $64.95, I don't believe that a person can spend much time writing BASIC programs to perform these tasks. If you want to key the program in, a program listing is available for a nominal charge.

My several telephone conversations with Mr. Kjell confirmed that he has a very good grasp of how VisiCalc operates and how to make the most of it. If you were considering purchasing the program for just the sort portions, my opinion is that unless your files or sort needs are quite lengthy, judicious use of the Move command or careful construction of your spreadsheet would probably meet your sort needs. However, if you desire to move extensively between a text processor and VisiCalc, and have sorting needs, this product should be considered.

The program does not contain extensive error-trapping, but since it

can be listed, any specific error messages you might desire can be added. Several minor errors in the documentation have also been corrected.

For further information, contact Kjell Engineering, P.O. Box 99, Euless, Texas 76039.

Follow-up Matters

In my review of Datagraph in the July, 1983 issue, I commented on several possible enhancements for the program. I am pleased to report to you that one of my key suggestions is now included: pie charts. Over 30 pie segments can be created as well as selectable pie diameters and line thicknesses. I have used the pie charts and they are impressive. Also included in the enhancements are curve fitting routines, multiple horizontal grid labels, support of imbedded quote marks and negative bargraphs. With these additional enhancements, the programs now sell for $114.80. Existing Datagraph owners can upgrade for a cost of $34.95. For further information, contact Micro-Software Systems at 1815 Smokewood Avenue, Fullerton, CA 92631, or phone (714) 526-8435.

I also received a follow-up copy of VIZ-A-CON, with its upgraded and very professional documentation. It's truly beautiful and it also implements several of the suggestions contained in my January, 1983 review. If you need to consolidate multiple VisiCalc files, take a serious look at this program.

Looking Ahead

In my last several columns and review, the term DIF has been used extensively. Watch this column for a serious look at DIF and how to write your own VisiCalc accessing program using BASIC.

If you have a question, suggestion for a future column, or simply a comment, please write to me in care of *Basic Computing*. Please include a self-addressed, stamped envelope if you desire a reply.

VisiCalc is a registered trademark of VisiCorp.

Scripsit is a registered trademark of Tandy Corporation.

DIF is a registered trademark of Software Arts, Inc.

LDOS is a registered trademark of Logical Systems, Inc.

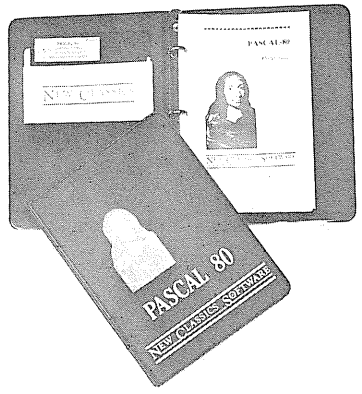
What's After Basic?

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!

PASCAL $ 14.77!

Now you can try Pascal without spending a fortune! The Pascal 80 Trial Version is a reduced version of Pascal 80, and does not include pointer variables or disk files, and does not allow you to save your programs. But it does let you program in Pascal, list your programs to a printer, and even comes with a coupon worth $10 off the regular price of Pascal 80. This version of Pascal comes on a diskette that will boot on a Model I or Model III TRS-80.

Here is what you get:

VARIABLE TYPES: real, integer, char, boolean, arrays, sets, records, and user de fined types.
CONSTANTS: minint, pi, true, false, and user defined constants.
OPERATORS: + − * / div mod comparison/set operators and or not.
FUNCTIONS: abs sqr sqrt sin cos arctan exp In ord pred succ chr odd round trune.
PROCEDURES: read readln write writeln
STRUCTURES: if..then..else case for..do while..do repeat..until goto

Send $14.77 by check or money order to:

Pascal 80 Trial Version
New Classics Software
239 Fox Hill Road
Denville, NJ 07834

Sorry, no credit card orders at this price! See our other ad for information on our regular version of Pascal 80.

NEW CLASSICS SOFTWARE

Graphic subroutines

Easily rotate, reverse, or make mirror images on your video

Models I/III

Jim Peyton, Georgetown, KY

If you have worked very much with graphics, you probably have felt the need for routines that would do for you such things as: complete the other half of a symmetrical figure, create mirror images of a figure, rotate a figure 180 degrees, create a reverse image of a figure, or reverse all or any portion of the screen. If so, you will be interested in the routines discussed.

These routines are written in Level II BASIC and therefore will work on Model I and III tape or disk systems.

Mirror Images and Rotation

A mirror image may be horizontal (side by side) or vertical (top to bottom). A 180-degree rotation equates to a vertical mirror image of a horizontal mirror image. What follows is a discussion in some detail of the techniques that create a horizontal mirror image. With minor modifications, they may be used to produce a vertical mirror image or a 180-degree rotation.

Two problems are involved in creating a horizontal mirror image of a figure. First, the coding of the original figure must be broken into screen lines. These lines must be processed from top to bottom, and the graphic codes in each line must be read in reverse order. Second, each graphic code from the original figure must be converted to its horizontal mirror image before it is used in the new figure.

Here is my solution to the first problem. Assume the original figure is stored in AA$ and, when printed, occupies a block of the screen three lines high and eight bytes wide. Set integer HL (height in lines) to three and integer WB (width in bytes) to eight. Load RT$ (return) with a linefeed and enough back spaces to return the cursor to the beginning of the next line when the new figure is printed. Set integer RT to the length of RT$. Use AH$ to hold the new figure and integer variable AA to hold each code to be converted.

Now, the following coding will 1) jump to the end of the first line in the original figure, 2) read the code in reverse order and place it in the string holding the new figure, 3) insert a return in the new figure, and 4) jump to the end of the next line in the original and repeat until the process is completed.

```
10000 I = WB : GOTO 10002
10001 IF I = LEN (AA$) THEN 10009
          ELSE I = I + WB + RT
10002 FOR J = I TO I - WB + 1 STEP — 1 :
          AA = ASC (MID$ (AA$ , J , 1))
      (Convert AA to its horizontal mirror image)
10007 AH$ = AH$ + CHR$ (AA) :
          NEXT J :
          IF I < LEN (AA$) THEN AH$ = AH$ + RT$
10008 GOTO 10001
10009 END
```

My solution to the code conversion problem is based on the relationship of a graphic block to its binary number and employs bit manipulation.

A one-byte binary number is composed of eight bits. Each bit may exist in only one of two states: on (represented by 1) or off (represented by zero). A graphic block is made up of six smaller blocks, called pixels. Each pixel may be either on or off. If a binary number is in the range 128-191, its first six bits, counting from the right, correspond directly to the six pixels of the graphic block it produces. Thus:

```
                                  0   0
128   =  10000000 ==>             0   0
                                  0   0
```

and

```
                                  1   1
191   =  10111111 ==>             1   1
                                  1   1
```

Binary bit positions range from zero to seven, with the rightmost being zero and the leftmost being seven. Bit zero controls the upper left pixel in the graphic block; bit one, the upper right; bit two, the middle left, and so forth. Thus:

```
                                  0   1
166   =  10100110 ==>             1   0
                                  0   1
```

It is possible, through the use of the logical operators AND, OR and NOT, to test the state of any bit, to turn on (set) any bit, or to turn off (reset) any bit.

To test a bit, use (decimal number) AND (2 to the power of the bit position). If the bit is on, the number returned will be 2 to the power of the bit position tested; otherwise zero will be returned. Thus:

129 (10000001) AND 2↑0 = 1, while
130 (10000010) AND 2↑0 = 0.

To set a bit, use (decimal number) OR (2 to the power of the bit position. Thus:

129 (10000001) OR 2↑1 = 131 (10000011).

To reset any bit, use (decimal number AND NOT (2 to the power of the bit position). Thus:

131 (10000011) AND NOT 2↑1 = 129 (10000001).

Finally, it is possible to test, set, or reset, any combination of bits by adding them together. Thus:

131 (10000011) AND 2↑0 + 2↑1 = 3;
128 (10000000) OR 2↑0 + 2↑1 = (10000011); and
131 (10000011) AND NOT 2↑0 + 2↑1 = 128 (10000000).

To convert a graphic binary number to its horizontal mirror image, we must test its bits in pairs: zero and one, two and three, four and five. If the paired bits are both off or both on, they are already symmetrical and need not be processed. Otherwise, we must reset the bit that is on and set the bit that is off.

The coding which follows converts the three pairs of bits. Note that we have introduced integer variable AB to hold the bits while they are being tested. Note also that we have reduced the exponential expressions to their simplest terms.

To complete this routine, we need to assure that only graphic codes are processed by the convertor. The following will suffice:

10003 IF AA < 128 OR AA > 191 THEN 10007

The programming for a vertical mirror image differs from that for a horizontal one only in these two respects: 1) The lines of the original figure must be processed from bottom to top and the codes for each line read in original order. 2) Only two pairs of bits need be processed: zero and four, one and five.

Programming for a 180-degree rotation involves these two changes: 1) The lines in the original must be processed from bottom to top, and the codes in each read in reverse order. 2) Three pairs of bits must be processed: zero and five, one and four, two and three.

The coding for these operations appears in the listing of the demonstration program beginning at lines 11000 and 12000 respectively.

Reversals

Reversing is fairly straightforward. To reverse a graphic block, use any of the following:

191 AND NOT (graphic code AND NOT 128)
191 - (graphic code - 128)
191 + 128 - graphic code
319 - graphic code

To reverse the screen: 1) add 15360 to the print positions you wish to change, 2) PEEK that address, 3) subtract from 319 the number returned, 4) POKE that value into the same spot. This technique is illustrated in the demonstration program beginning at line 13000.

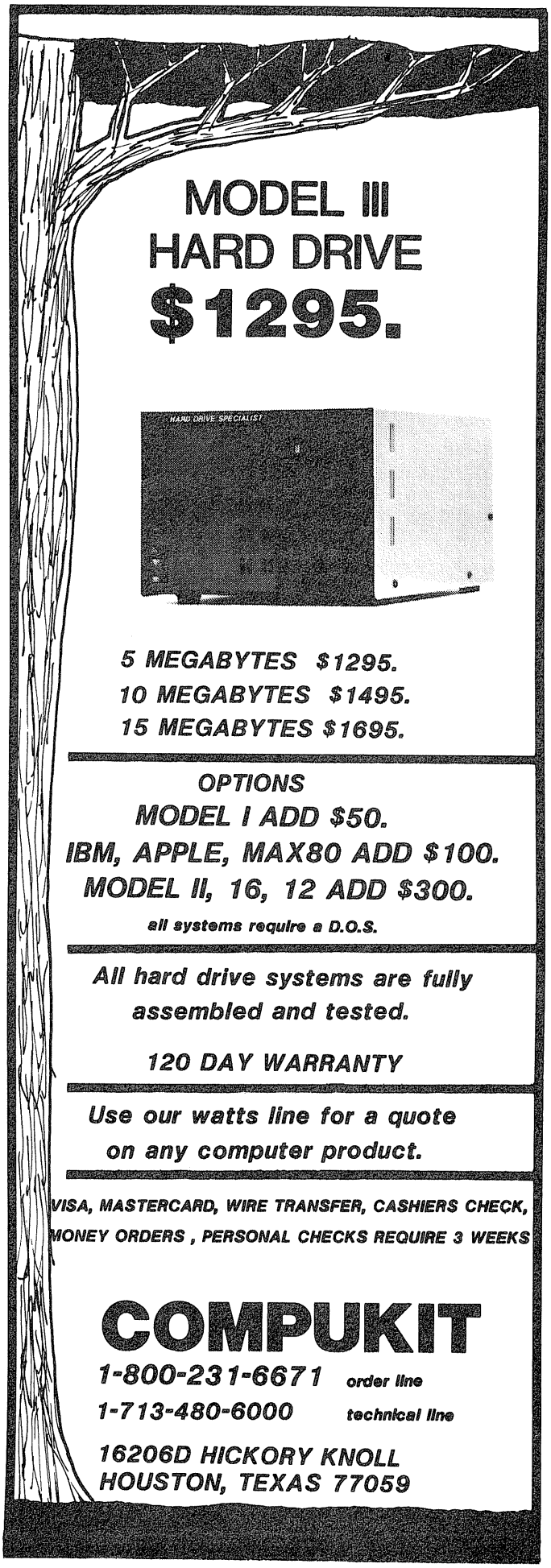
If you wish to store the reverse image of a figure, simply subtract each graphic code from 319 as it is assembled into the string. For example, you might change the instruction in line 130 in the demonstration to AA$ = AA$ + CHR$ (319 - AA).

The program listing which follows demonstrates most of the techniques discussed in this article. The lines containing remarks are not necessary to the operation of the program and may be deleted.

Program Listing for Graphic Subroutine Demonstration

```
10004 AB = 0 : AB = AA and 3
        IF AB = 0 OR AB = 3 THEN 10005
        ELSE IF AB = 1 THEN
          AA = AA AND NOT 1 : AA = AA OR 2
        ELSE AA = AA OR 1 : AA = AA AND NOT 2
10005 AB = 0 * AB = AA AND 12
        IF AB = 0 OR AB = 12 THEN 10006
        ELSE IF AB = 4 THEN
          AA = AA AND NOT 4 : AA = AA OR 8
        ELSE AA=AA OR 4 * AA=AA AND NOT 8
10006 AB = 0 * AB = AA AND 48
        IF AB = 0 OR AB = 48 THEN 10007
        ELSE IF AB = 16 THEN
          AA = AA AND NOT 16 : AA = AA OR 32
        ELSE AA = AA OR 16 : AA = AA AND NOT
          32
```

```
2 '  *   GRAPHIC SUBROUTINES    *
3 '  *      BY JIM PEYTON       *
4 '  *      GEORGETOWN KY       *
5 '  ***************************
6 '
7 '
8 ' ==================
9 '  LIST OF VARIABLES
10 '==================
11 '  A$    INKEY$ FOR MENU INPUT
12 '  AA    GRAPHIC ASCII CODES
13 '  AA$   ORIGINAL GRAPHIC FIGURE
14 '  AB    BITS TO BE COMPARED
15 '  AH$   HORIZONTAL MIRROR IMAGE OF A
A$
16 '  AR$   AA$ ROTATED 180 DEGREES
```



Subroutines

```
17 '  AV$    VERTICAL MIRROR IMAGE OF AA$
18 '  HL     HEIGHT IN LINES OF GRAPHIC F
IGURE
19 '  I,J    COUNTERS
2Ø '  NL     NUMBER OF LINES TO REVERSE
21 '  NP     NUMBER OF PRINT POSITIONS TO
 REVERSE
22 '  RT     LENGTH OF RT$
23 '  RT$    LINE FEED AND BACKSPACES
24 '  SL     STARTING LINE (FIRST LINE =
Ø)
25 '  SP     STARTING POSITION (FIRST POS
ITION = Ø)
26 '  SS     START OF SCREEN MEMORY
27 '  WB     WIDTH IN BYTES OF GRAPHIC FI
GURE
96 '
97 ' ═══════════════
98 '  INITIALIZATION
99 ' ═══════════════
1ØØ CLS:CLEAR3ØØ:DEFINTA-Z:DIMAH(63),AV(
63),AR(63)
11Ø SS=15360:SL=3:NL=7:SP=21:NP=19
12Ø HL=3:WB=8:RT$=CHR$(26)+STRING$(WB,24
):RT=LEN(RT$)
13Ø FORI=1TOWB:J=J+1:READAA:IFAA=32THENA
A=128
14Ø AA$=AA$+CHR$(AA):NEXT
15Ø IFJ<(HL*WB)THENAA$=AA$+RT$:GOTO13Ø
16Ø DATA 128,128,128,144,128,128,128,16Ø
,16Ø,184,187,157,188,188,188,19Ø,128,131
,131,16Ø,181,149,186,186
196 '
197 ' ═══════════════════════
198 '  DEMONSTRATION PROGRAM
199 ' ═══════════════════════
2ØØ PRINTTAB(13)"G R A P H I C   S U B R
 O U T I N E S"
21Ø PRINTSTRING$(63,61):PRINT@7Ø4,STRING
$(63,61)
22Ø PRINT"TYPE THE NUMBER OF YOUR CHOICE
 ..."
23Ø PRINTTAB(9)"1  HORIZONTAL MIRROR IMA
GE"TAB(38)"4  REVERSE SCREEN
24Ø PRINTTAB(9)"2  VERTICAL MIRROR IMAGE
"TAB(38)"5  ALL ROUTINES
25Ø PRINTTAB(9)"3  ROTATE 18Ø DEGREES"TA
B(38)"6  END";
251 GOSUB29Ø
26Ø A$="":A$=INKEY$:IFA$=""ORA$<"1"ORA$>
"6"THEN26Ø
27Ø FORI=SL*64TO(SL+NL)*64STEP128:PRINT@
I,CHR$(3Ø):NEXT
28Ø GOSUB29Ø:ONVAL(A$)GOSUB3ØØ,31Ø,32Ø,1
3ØØØ,33Ø,34Ø:GOTO26Ø
29Ø PRINT@213,AA$;:RETURN
3ØØ AH$="":GOSUB1ØØØØ:PRINT@224,AH$;:RET
```

```
URN
310 AV$="":GOSUB11000:PRINT@469,AV$;:RET
URN
320 AR$="":GOSUB12000:PRINT@480,AR$;:RET
URN
330 GOSUB290:GOSUB300:GOSUB310:GOSUB320:
GOSUB13000:RETURN
340 END
9996 '
9997 '==========================
9998 ' HORIZONTAL MIRROR IMAGE
9999 '==========================
10000 I=WB:GOTO10002
10001 IFI=LEN(AA$)THENRETURNELSEI=I+WB+R
T
10002 FORJ=ITOI-WB+1STEP-1:AA=ASC(MID$(A
A$,J,1))
10003 IFAA<128ORAA>191THEN10007
10004 AB=0:AB=AAAND3:IFAB=0ORAB=3THEN100
05ELSEIFAB=1THENAA=AAANDNOT1:AA=AAOR2ELS
EAA=AAOR1:AA=AAANDNOT2
10005 AB=0:AB=AAAND12:IFAB=0ORAB=12THEN1
0006ELSEIFAB=4THENAA=AAANDNOT4:AA=AAOR8E
LSEAA=AAOR4:AA=AAANDNOT8
10006 AB=0:AB=AAAND48:IFAB=0ORAB=48THEN1
0007ELSEIFAB=16THENAA=AAANDNOT16:AA=AAOR
32ELSEAA=AAOR16:AA=AAANDNOT32
10007 AH$=AH$+CHR$(AA):NEXTJ:IFI<LEN(AA$
)THENAH$=AH$+RT$
10008 GOTO10001
10996 '
10997 '==========================
10998 ' VERTICAL MIRROR IMAGE
10999 '==========================
11000 I=LEN(AA$)-WB+1:GOTO11002
11001 IFI=1THENRETURNELSEI=I-WB-RT
11002 FORJ=ITOI+WB-1:AA=ASC(MID$(AA$,J,1
))
11003 IFAA<128ORAA>191THEN11006
11004 AB=0:AB=AAAND17:IFAB=0ORAB=17THEN1
1005ELSEIFAB=1THENAA=AAANDNOT1:AA=AAOR16
ELSEAA=AAOR1:AA=AAANDNOT16
11005 AB=0:AB=AAAND34:IFAB=0ORAB=34THEN1
1006ELSEIFAB=2THENAA=AAANDNOT2:AA=AAOR32
ELSEAA=AAOR2:AA=AAANDNOT32
11006 AV$=AV$+CHR$(AA):NEXTJ:IFI>1THENAV
$=AV$+RT$
11007 GOTO11001
11995 '
11996 '==========================
11997 ' ROTATE FIGURE
11998 ' 180 DEGREES
11999 '==========================
12000 I=LEN(AA$):GOTO12002
12001 IFI=WBTHENRETURNELSEI=I-WB-RT
12002 FORJ=ITOI-WB+1STEP-1:AA=ASC(MID$(A
A$,J,1))
12003 IFAA<128ORAA>191THEN12007
12004 AB=0:AB=AAAND33:IFAB=0ORAB=33THEN1
2005ELSEIFAB=1THENAA=AAANDNOT1:AA=AAOR32
ELSEAA=AAOR1:AA=AAANDNOT32
12005 AB=0:AB=AAAND12:IFAB=0ORAB=12THEN1
2006ELSEIFAB=4THENAA=AAANDNOT4:AA=AAOR8E
LSEAA=AAOR4:AA=AAANDNOT8
12006 AB=0:AB=AAAND18:IFAB=0ORAB=18THEN1
2007ELSEIFAB=2THENAA=AAANDNOT2:AA=AAOR16
ELSEAA=AAOR2:AA=AAANDNOT16
12007 AR$=AR$+CHR$(AA):NEXTJ:IFI>WBTHENA
R$=AR$+RT$
12008 GOTO12001
12995 '
12996 '==========================
12997 ' REVERSE ALL OR ANY
12998 ' PORTION OF THE SCREEN
12999 '==========================
13000 SS=15360:SL=3:NL=7:SP=21:NP=19
13001 FORI=(SL*64)+SP+SSTO((SL+NL-1)*64)
+SP+SSSTEP64
13002 FORJ=0TONP-1:AA=PEEK(I+J):IFAA=32T
HENAA=128
13003 IFAA>127THENPOKEI+J,319-AA
13004 NEXTJ
13005 NEXTI
13006 RETURN
```


AITech LISP for the TRS-80®* Models I and III

The AITech LISP interpreter comes with a full range of LISP functions, including: function tracing, error trapping, propertylists, lambda and nlambda function definitions, strings and string functions. Special features include graphics and other visual display commands, commands to randomly access files, while and for loops, double and single precision floating point numbers, multidimensional arrays, trigonometric and exponential functions, automatic conversion from integers into floating point numbers, automatic closing of expressions with left and right brackets, fast pretty printing and abbreviated quoting. Perhaps most importantly, the AITech LISP interpreter is one of the fastest high-level language interpreters available for microcomputers on the market today.

The AITech LISP system includes the LISP interpreter, an expression oriented LISP editor, and a manual. A symbolic differentiator and algebraic simplifier and a poker player are also included . The system diskette with manual sells for $79.95.

To order send check or money order and please specify model (Washington state residents add sales tax).

For more information or a free brochure call 206/644-3068 or write **Artificial Intelligence Technologies**, 2121 N.E. 152nd, Redmond, WA 98052.

© 1983

INTELLIGENCE IS OUR MIDDLE NAME.

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

*TRS-80 is a trademark of Tandy Corp.

Tandy topics

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

Well, most of you may know by now that our vice president of computer merchandising, Jon Shirley, left on August 1 to assume the duties of President and Chief Executive Officer of Microsoft. We wish him the very best.

My face is red! In a column early this summer, I told you about a legal seminar put on by the Texas Bar Association. Wrong! It was sponsored by the University of Texas. That's what I get for writing my column on Sunday, on the patio, and trusting a tired and aging memory. Sorry for the error — the rest of the story was as reported. For better or worse, here I am again, Model 100 in lap, on the patio, writing my column.

Another matter of interest (area of apparent confusion) that I'd like to address is the matter of Model 4 memory. As you know, the Model 4 is expandable to 128K (64K is standard). We've not effectively explained that only the first 64K is addressable from BASIC language. The second 64K can be used only for "Memdisk" (simulated disk drive in memory to significantly reduce disk access times), unless your machine language program correctly handles the bank switching. There is a bit less user-available RAM in a Model 4 than there was in the Model III, because of the additional space required by BASIC and TRSDOS 6.0. When using 6.0, however, the BASIC allows "common" statements and chaining of programs with variable passing, so you can actually do longer jobs with Model 4 than you could with a Model III.

Another question I've been asked quite often is "Are you through with new product introductions for 1983?" Answer: "Not on your life!" In fact, if *Basic Computing* mailed just a little later, I'd be telling you about one of them here! But, as usual, it's just a bit too early!

Why do we pick such bad timing? Well, our flyer program is set up a year or more in advance, and has run on about the same schedule since the time of Noah. All of our flyers are scheduled to reach you around the 24th to 28th of each month. Since the flyer is our major product introduction vehicle, introductions are planned to coincide with flyer dates. Unfortunately, most magazines mail around the 15th of the month before their cover dates . . . just a little too early for our schedule. Since all of our sales also coincide with our flyers, most sales are advertised for only a portion of the period in most magazines. Now you know why magazine coverage of new products usually lags the availability date. There are a few magazines which, for reasons I'll never understand, mail in the second month prior to cover date. It makes advertising sales almost impossible. How do you explain to a customer who wants your $100-off super-special price, that even though he saw it in his July magazine, the sale ended in May? When you find a "Get it for Xmas" ad in a February magazine, I hope you'll write a note to your friendly publisher and ask him to stop this craziness!

So, what's the good word this month? Well, maybe a quick browse through our new catalog would be in order, in case you haven't seen it. By now, the rumor has been confirmed — a new 64K Color Computer exists, and we've made the OS-9 operating system and associated BASIC-09 language available to let you take advantage of it. In addition, there are two new cost-reduced versions of the Color Computer. All three units are sporting a "real" typewriter keyboard. The keyboard is available to previous Color Computer owners as a low-cost ($39.95 plus installation) upgrade. And, there's a Color Computer "Multi-Pak Interface" for those of you who would like to have several program paks and/or a disk

drive plugged into your computer at one time. There's a Mouse, lower-cost disk drives, and more. In fact, you can now buy a 16K Color Computer with one disk drive for only $719.90. That's really incredible when you think that just four or five years ago, a disk drive alone was almost $700!

Do you realize that there are 12 computers in our new catalog and *only one of them* repeats from last year? I told you this would be an exciting year! It sure has been for us, and a very busy one.

Of course, you know all about the Model 4 by now, and you should know that the 5-MB hard disk for the 4 has been reduced in price. The Model 12 and 16B should by now be familiar, but their hard disks have also been reduced. The MC-10 has surprised a lot of people. The typical review I've seen starts off saying, "We weren't too impressed, but then when we really got into the little computer, we changed our minds." Well, now there's a companion 32-characters per line dot-matrix printer for the MC-10, for only $99.95.

Our direct-connect 300-baud modems both have new low prices. We've added some accessories and lowered a number of prices. Our line of printers really has some impressive new members. If a daisy wheel has been on your wish list, we have the brand-new, 18 characters per second (cps), DWP-210, for only $799. If you have a Color Computer, you might be especially interested in our whisper-quiet seven-color ink jet printer! It's $699 and features state-of-the-art "drop on demand" printing at 40 cps in a 7x5 dot format. Or, it's capable of 640 dots per line in the graphics mode. It has a parallel or CoCo-compatible serial interface.

We'll have a CoCo screen dump utility available in the next few months (notice my conservative estimates) which will allow full-color screen dumps which are *beautiful*! I might add that the printer requires a full line of text to be sent to it by the CPU before it begins printing. The print head makes multiple passes (printing only one dot line per pass) to print the full line. I think I told you about the DMP-120, our dual-mode (data processing and graphics, but no word processing) 120-cps printer for just $499.95. It's great! And, in this catalog, you'll find reduced prices on our CGP-115 Color Graphics Printer ($199.95), DWP-410 Daisy Wheel ($1,295), and a *big* reduction on the 220-cps DMP-500 ($1,295).

So, now what do you need a catalog for since I've told you more than you wanted to know? Go get one and find out. September 30, you'll be able to pick up the '84 computer catalog, RSC-10. Don't miss it. There will be a few surprises.

This is a good place for a catalog disclaimer. Radio Shack's catalogs are intended to cover our fiscal year, so they will contain some products which are "late dated." That is, they are flagged as being available at some later date. They're important enough products that we felt they had to appear in the catalog, yet they won't be ready by the catalog ship date. Every attempt is made to limit those items to the ones in which we have the highest confidence (that they'll make the dates listed). Ol' Murphy catches us on some items every year! Please be patient with us. That annual catalog was "put to bed" in early June, and the computer catalog is being finished up as I write this (early July).

Now, to change the subject to this month . . . If you've held off buying a plotter, waiting for the prices to come down, our 6-pen top-of-the-line unit is half price through this month. We expect them to go quickly, so don't drag your feet. If you've ever wanted a (another) Model II system, we're really serious about getting them sold. You can get a Model II and 2-drive bay for $2,999. That's $2,250 off our last-cataloged price on that gear (1983 catalog RSC-8).

Well, each year about this time, I apologize for the "commercial" when I talk about the catalog and its contents, but it's hard not to get excited about the new line. I hope you'll forgive me and come back again next month.

TriSoft has CP/M-68K for the TRS-80 Model 16

And It's Available Today!

TriSoft introduces the CP/M-68K operating system for the Radio Shack Model-16 and Model-II Enhanced computers. This addition to the CP/M family adds the speed and power of the 16/32-bit MC68000 under CP/M-68K while maintaining compatibility with the vast library of CP/M 2.2 software.

- Runs in conjunction with CP/M 2.2
- Easy context switching between 2.2 and 68K
- Z80 acts as I/O slave under CP/M-68K
- Requires CP/M 2.2
- 68000 assembler provided
- Industry standard C compiler provided

TriSoft
4102 Ave.G
Austin, Texas
78751
1-512-445-5580

1-800-531-5170

VISA® MasterCard

. CP/M, CP/M 2.2, CP/M-68K TM Digital Research
. TRS-80 Model 16 and Model II TM Radio Shack/Tandy
. 68000 TM Motorola
. Z80 TM Zilog

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
Birkerod, 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%!

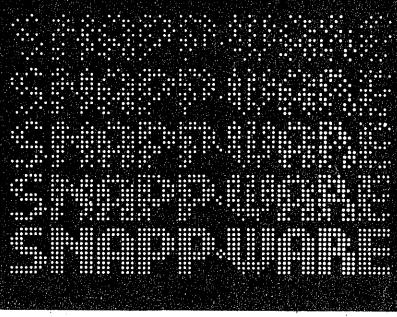
This unprecedented offer allows you to judge for yourself the value of our software using *your* hardware at *your* convenience. Our five best selling products: EXTENDED BASIC, EXTENDED BUILT IN FUNCTIONS, COLLEGE EDUCATED GARBAGE COLLECTOR, AUTOMAP and AUTOFILE, are all available to you on a trial basis 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



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

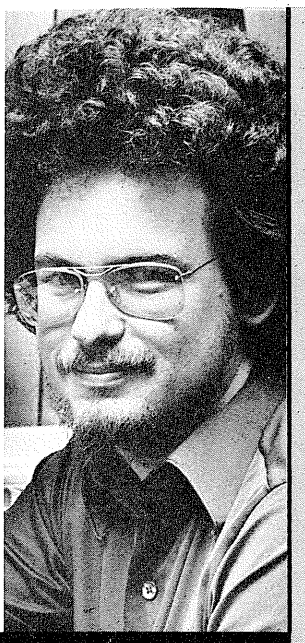
CALL TOLL FREE

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

Time saving power at your fingertips.

CALL TOLL FREE:

1-800-543-4628

OHIO RESIDENTS CALL COLLECT: (513) 891-4496

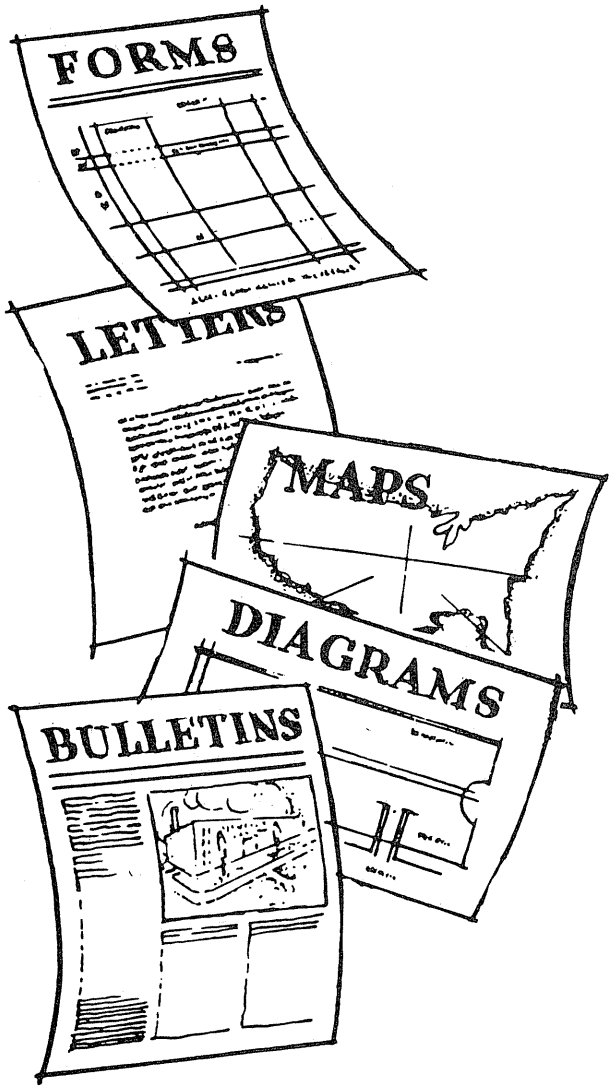
3719 Mantell
Cinti., Ohio 45236

Etch art

More than just sketching

Model III

Dan Keen and Dave Dischert, Cape May Courthouse, NJ



Now don't panic and turn the page thinking this is just another simple Etch-a-Sketch™ program. Yes, it does allow you to draw pictures on the video display, but the similarity between this and other versions stops here. This one has some unique features.

By using the four arrows on your keyboard, you can position the cursor and draw any picture you wish. This program allows you to temporarily store your screen display in RAM any time you wish. This is handy if you want to save what you have done so far and then continue adding more to it. If you decide to cancel the work you have done since you last stored the screen, you can reload the saved screen and continue again.

Another feature is its ability to incorporate text into your display. Many programs of this type do not permit characters to be mixed with graphics.

When you have completed your drawing, it is possible to save your screen display on disk. You can store as many screens as you wish as long as you have disk space available. By using the <R>ECALL SCREEN option, you can load two screen displays into memory and the machine will alternate between the two. This creates some interesting effects.

Using the Program

Upon executing the program, you are prompted with a short menu:

DO YOU WANT TO
<R>ECALL SCREEN OR MAKE
<N>EW ONE
<C>ONTINUE OLD FILE

The <R>ECALL SCREEN option should be used when you want to create an animated display by loading two screens into memory and automatically alternating between them. *(Ed note: If you have saved two blank screens and use the <R>ECALL function to call them up, the computer appears to hang up. What is happening is that you are actually flipping between two blank screens. The program is running, but you see nothing happening. To exit from this point in the program, press the BREAK key and begin anew.)*

The commands shown in Table 1 are in control when you are in the drawing mode.

Any time during your drawing, you may hit "H" for a "help" screen, listing the commands we just discussed. Hit enter to return to your work.

Table 1

H for help
Z to erase
@ to store screen on disk
C to clear the screen
X to position the cursor to any X,Y coordinate
T to put the text on the screen
! to exit the text mode and continue drawing
<CLEAR> key to clear the screen stored in memory
<ENTER> to store the screen in memory
<SHIFT> and an arrow must be held down to draw — simply use the arrows to position the cursor
<SPACE BAR> to recall currently-stored screen

Some Tricks

This program contains a few techniques which you may want to incorporate into your own programs.

First, MEMORY SIZE needs to be set because a machine language subroutine is used. These instructions are placed into memory through easy-to-use DATA statements. So that you don't have to remember the value to which MEMORY SIZE must be set, we establish it from within the BASIC program.

When a screen is recalled to be shown on the video display, we first load the screen that is on the disk into RAM memory and then dump it to the screen with a machine language block move. This is done so that we don't see each record being loaded from the disk, which would make the filling of the screen appear choppy.

The entire program fits into only 16K and that takes into account TRSDOS and Disk BASIC residing in RAM also. In this way, disk owners who only have 16K of memory can utilize it.

There is only one thing you must remember when running this program. The question "How many files?" (which you are prompted with upon entering BASIC) must be answered with a value of one. If you forget to do this, you will encounter an "out of memory" error upon running the program, even if you have 48K.

By doing a little experimenting, you will soon be creating some interesting alternating screen displays.

EPROM PROGRAMMER

Build your own and save many $$$

The HIGH DESERT ENGINEERING EPROM PROGRAMMER provides the user with more features than most programmers costing many times more. It will program most popular 5-volt eproms, including the 2508, 2516, 2758, 2716 and 2732. The programmer allows the user to program an eprom from any ram memory, read an eprom into any ram memory and verify a previously programmed eprom. It will do automatic error checking and field checking to help prevent user errors. It will also automatically flag any previously programmed eprom locations.

The programmer is compatible with TRS-80* MOD I & III and is supplied with a bare board, complete assembly instructions, software driver and users manual. Write for complete details. When ordering specify MOD I or III and tape or disk. (MOD I requires a bus adaptor. Instructions included.) Software is supplied on tape and will transfer to disk.

Software, instructions and bare board	$39.50
Assembled and tested for MOD III	$174.50
Assembled and tested for MOD I	$194.50

DEBUG - MONITOR

This new disk based DEBUG/MONITOR from HIGH DESERT ENGINEERING provides many very powerful features for the serious machine language programmer. It allows the user to set up to 10 breakpoints along with the capability of setting multiple pass or loop counters for each breakpoint. Several display modes can be set for each breakpoint as well as the ability to selectively dump memory/registers to the printer at each breakpoint. Code is disassembled so the user can see the instructions executed during single step mode. The disassembler output can also be routed to the printer. DOS commands can be executed without losing debug control. This debug utility has many memory compare, search and modify features plus much, much more. Write for complete details on this very powerful debug/monitor utility.

Specify TRS-80 MOD I or MOD III and memory size $29.50

*TRS-80 is a trademark of Tandy Corporation

HIGH DESERT ENGINEERING
1630 So. Downs St.
Ridgecrest, California 93555

IT'S PAST ELEVEN P.M.

DO YOU KNOW WHERE YOUR FILES ARE TONIGHT?

ARE THEY BACKED UP SAFELY?

YOU NEED THE HEXMAN DISK MANAGEMENT SYSTEM

With Hexman,
- You always know where all your files are!
- You have no more worries about backups.
- Your disks are always organized for maximum efficiency. **New low price — just $49.95**

Requirements.
TRS-80 Mod I/III 2 drives, double density, LDOS 5.1, Newdos 80 V2, or DOSPLUS 3.5 (Please state DOS when ordering.)

Dealer inquiries welcomed

HEXMAN D.M.S. Vers 2 US $49.95
(Storage Management Module)
Security Module $39.95
KeySearch Module $49.95

Trademarks
TRS-80 - Tandy Corp
LDOS - Logical Systems Inc
Newdos 80 - Apparat Inc

HEXAGON SYSTEMS
P.O. Box 397, Station A
Vancouver, B.C. Canada V6C 2N2
Telephone (604) 682-7646
Electronic Mail-Micronet 70235.1376

Program Listing for Etch Art

```
1Ø REM
                SCRATCH-A-SCREEN
                BY DAVE DISCHERT & DAN K
EEN
                WRITTEN Ø2/13/83

2Ø REM
                SET MEMORY SIZE FROM BAS
IC
3Ø SIZE=3Ø46Ø:MB=INT(SIZE/256):LB=SIZE-2
56*MB:POKE16561,LB:POKE16562,MB
4Ø REM
                RUN CLEAR TO GET BASIC T
O LOOK
                AT NEW MEMORY SIZE.
                DEFINE USRØ FOR SAVING S
CREENS

5Ø CLEAR1ØØ:CLS:DEFUSR=3Ø464:GOSUB31Ø:X=
USR(Ø):X=USR(1)
1ØØ REM
                MAIN MENU

11Ø PRINT@384,"DO YOU WANT TO
<R>ECALL SCREEN OR MAKE
<N>EW ONE
<C>ONTINUE OLD FILE "
12Ø IK$=INKEY$:IFIK$=""THEN12ØELSECLS:IF
IK$="R"ORIK$="C"THENGOTO51ØELSEIFIK$<>"N
"THENGOTO1ØØ
2ØØ REM
                CHECK KEYBOARD FOR INPUT

2Ø5 A=PEEK(144ØØ):P=PEEK(14464):C=PEEK(1
4344)
21Ø IK$=INKEY$:IFIK$<>""THENIK=ASC(IK$):
IFIK>31ANDIK<173THENQ=USR(1):GOSUB7ØØ
215 REM
                CHECK FOR SPECIAL KEYS F
ROM PEEK LOCATION
22Ø IFA=8ANDY>ØTHENY=Y-1
225 IFA=16ANDY<47THENY=Y+1
23Ø IFA=32ANDX>ØTHENX=X-1
235 IFA=64ANDX<127THENX=X+1
24Ø IFA=72ANDX<127ANDY>ØTHENX=X+1:Y=Y-1
245 IFA=4ØANDX>ØANDY>ØTHENX=X-1:Y=Y-1
25Ø IFA=8ØANDX<127ANDY<47THENX=X+1:Y=Y+1
255 IFA=48ANDX>ØANDY<47THENX=X-1:Y=Y+1
26Ø IFA=1THENW=USR(Ø):ELSEIFA=128THENW=U
SR(2)
265 IFA=2THENCLS:X=USR(Ø)
27Ø IFP=1THENSET(X,Y)ELSEIFC=4THENRESET(
X,Y)
275 IFPOINT(X,Y)THENRESET(X,Y):Q=SQR(1):
SET(X,Y):GOTO2Ø5ELSESET(X,Y):Q=SQR(1):RE
SET(X,Y):GOTO2Ø5
3ØØ REM
                LOAD SCREEN MOVE PROGRAM
                IN MEMORY

31Ø FORA=3Ø464TO3Ø526:READB:POKEA,B:NEXT
A:RETURN
32Ø DATA8,217,2Ø5,127,1Ø,125,214,4,48,34
,125,17,4,Ø,71,221,33,47,119,254,Ø,4Ø
33Ø DATA4,221,25,16,252,1,Ø,4,221,11Ø,Ø,
221,1Ø2,1,221,94,2,221,86,3,237,176
34Ø DATA8,217,2Ø1,Ø,6Ø,255,123,Ø,6Ø,255,
119,255,123,Ø,6Ø,255,119,Ø,6Ø
4ØØ REM
                SAVE & RECALL SCREEN
4Ø5 PRINT@Ø,CHR$(3Ø);:INPUT"ENTER FILE N
AME ";FL$:X=USR(3):I=INSTR(FL$,"/"):IFI>
ØTHENFL$=LEFT$(FL$,I-1)
41Ø IFFL$=""THENFL$="TEST"
42Ø B=Ø:OPEN"R",1,FL$+"/FIL":FIELD1,64AS
F$
43Ø B=1:FI$=STRING$(64,32):FORA=&H3CØØTO
&H3FCØSTEP64
44Ø VP=VARPTR(FI$):MB=INT(A/256):LB=A-25
6*MB:POKEVP+1,LB:POKEVP+2,MB
45Ø LSETF$=FI$:PUT1,B:B=B+1:NEXT:CLOSE:R
UN
```


COPYCAT
Disk backup utility

Now you can have a solution to the problem of protected software backup.

COPYCAT© is the most powerful disk backup utility yet designed for the TRS-80 Computers. It will automatically make a fast, exact copy of your master disk regardless of protection schemes used including CRC errors, dual density tracks, mixed sector lengths and irregular I.D. pack.

COPYCAT© is intended for your personal use only in making backup copies for your valuable protected software.

COPYCAT© runs on a 48K, 2 disk drive TRS-80 models I, III or 4. Specify model number when ordering.

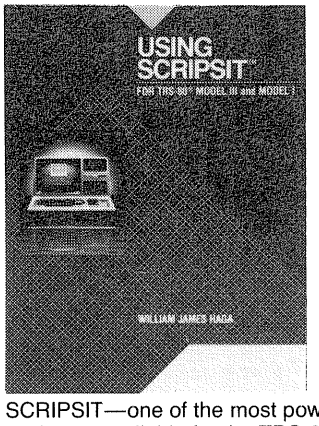
All orders are processed within 24 hrs.
Non-certified checks require (2) weeks for bank clearance

COPYCAT©.....$34.95

Add $2.00 for postage and handling.
California residents add 6% sales tax.

OMNISOFT RESEARCH
2170 W. Broadway, #501B
Anaheim, CA 92804
(714) 772-5000
Dealers inquiries welcome

```
500 REM
            RECALL * * *
510 CLS:FL=0:PRINT@0,;:INPUT"ENTER FILE
NAME ";FL$:CLS:IFFL$=""THENFL$="TEST"
520 CLS:PRINT@465,"L O A D I N G  F I L
E":OPEN"R",1,FL$+"/FIL":IFLOF(1)<1THENGO
TO1200ELSEFIELD1,64ASF$:FI$=STRING$(64,3
2)
530 VP=VARPTR(FI$):B=0:FORA=&H7BFFTO&H7B
FF+&H400STEP64:B=B+1:LO=A:GOSUB1100:POKE
VP+1,LB:POKEVP+2,MB:GET1,B:LSETFI$=F$:NE
XT:X=USR(2):CLOSE
540 IFIK$="C"THENGOTO205
550 FL$="":IFFL=0THENX=USR(1):CLS:X=USR(
0):INPUT"ENTER SECOND FILE IF ANY ";FL$:
FL=1:IFFL$<>""THENGOTO520
600 REM
                FLASH BETWEEN TWO SCREEN
S
610 X=USR(2):FORA=1TO500:NEXT:IFINKEY$="
Q"THENRUNELSEX=USR(3):FORA=1TO300:NEXT:G
OTO610
700 REM
                KEYBOARD CHECK

710 IFIK$="@"THENGOTO400ELSEIFIK$="C"THE
NCLS:RETURN
730 IFIK$="T"THENGOTO900ELSEIFIK$="X"THE
NGOTO780
740 IFIK$="H"THENCLS:PRINT:PRINT:PRINT"H
 FOR THIS SCREEN":PRINT"HOLD SHIFT TO DR
AW":PRINT"Z TO ERASE":PRINT"ENTER TO STO
RE SCREEN IN MEMORY":PRINT"SPACE TO RECA
LL SCREEN"ELSERETURN
750 PRINT"@ TO STORE SCREEN ON DISK":PRI
NT"C TO CLEAR SCREEN":PRINT"X TO MOVE TO
 X,Y COORDINATES":PRINT"T TO PUT TEXT ON
 SCREEN"
760 PRINT"!TO RETURN TO DRAWING":PRINT"C
LEAR TO CLEAR STORED SCREEN":INPUT"HIT E
NTER TO RETURN ";QQ:Q=USR(3):RETURN
780 PRINT@0,"X=";X;" Y=";Y;:INPUT"ENTER
NEW X COOORDINATES ";X:INPUT"ENTER NEW Y
 COORDINATES ";Y:IFX<128ANDY<48THENQ=USR
(3):RETURNELSEGOTO780
900 REM
                TEXT ON SCREEN

910 IK$=INKEY$:IFIK$=""THENGOSUB1000:GOT
O910
920 IFIK$="!"THENRETURN
930 IK=ASC(IK$):IFIK>31ANDIK<91THENPRINT
IK$;
940 GOTO910
1000 REM
                MOVE CURSOR FOR TEXT

1010 LO=256*PEEK(16417)+PEEK(16416)
1020 OC=PEEK(LO):POKELO,191:FORA=1TO10:N
EXT:POKELO,OC
1030 A=PEEK(14400):IFA=8ANDLO>15424THENL
O=LO-64:GOSUB1090
1040 IFA=16ANDLO<16319THENLO=LO+64:GOSUB
1090
1050 IFA=64ANDLO<16383THENLO=LO+1:GOSUB1
090
1060 IFA=32ANDLO>15360THENLO=LO-1:GOSUB1
090
1070 RETURN
1080 REM
                LOCATE CURSOR POSITION

1090 MB=INT(LO/256):LB=LO-256*MB:POKE164
17,MB:POKE16416,LB:RETURN
1100 MB=INT(LO/256):LB=LO-256*MB:RETURN
1200 REM
                BAD FILE NAME

1210 CLOSE:CLS:PRINT@458,"* * * F I L E
 N O T  O N  D I S K * * *":KILLFL$+"/FI
L":RUN
2000 SAVE"ETCH/BAS
```

WORD PROCESSING ON YOUR TRS-80 BECOMES CHILD'S PLAY

USING SCRIPSIT
by
William James Haga

USING SCRIPSIT is a complete and easy-to-use guide to SCRIPSIT—one of the most powerful word processing packages available for the TRS-80 Model I or III. USING SCRIPSIT is for the first-time user *and* the expert, presenting procedures at every level of difficulty in simple-to-follow steps and exercises.
$21.95

Look for these WEPCO products at your local computer dealer or bookstore. For more information or to order direct, call **415-595-2350** and ask for Wendy Moore (MasterCard and Visa orders only).

Wadsworth Electronic Publishing Company

6 Davis Drive, Belmont, California, 94002

TRS-80 is a registered trademark of the Tandy Corporation

Basically BASIC

Using the PRINT USING statement

For all models

© 1983, James A. Conrad, Contributing editor

My accountant didn't like computers . . . until he discovered TRS-80's. His grumpiness was due to the "sloppy" (his term) way most dialects of BASIC print columns of numbers. The following little program assigns five numbers to array A and then prints them in a column. Show the output to your accountant.

```
10 A(1)=1.00 : A(2)=.10 : A(3)=
1000.00 : A(4)=5.482 : A(5)=3.488
20 FOR X=1 TO 5
30  PRINT A(X)
20 NEXT X
```

Most accountants are neat, tidy people and like neat, tidy columns of numbers. Even though we have assigned the value 1.00 to variable A(1), the computer prints neither the decimal point nor the trailing zeroes. The values of variables A(4) and A(5) have had sales tax calculated in and are shown with fractions of a cent. Accountants prefer to have these numbers rounded to the nearest cent. The most irritating thing to my accountant about this output is that each number in the column is printed left-justified (starting at the left side of the column).

Fortunately, TRS-80 owners have the PRINT USING statement to keep their accountants happy (the Color Computer requires Extended BASIC). Replace line 30 with: 30 PRINT USING "#,###.##"; A(X). RUN the program. You'll see a nice right-justified column of numbers complete with decimal points, trailing zeroes and properly rounded numbers.

How It Works

PRINT USING's form is: Line-number PRINT USING *image string*; *item list.*

The *image string* defines an *image* in which the item or items to be printed are formatted. This string may be either a variable or a constant (literal). The size of the image is the number of characters, including spaces, inside the quotation marks (if a literal) or string variable.

The *item list* consists of the items to be printed: variables, constants, or expressions. If more than one, they must be separated by commas.

Field Specifiers

An image string may contain one or more fields (most contain only one). PRINT USING has several *field specifiers* which may be used in the image string to *specify the format of a field.*

The *number sign* (#) is the most commonly used field specifier. It represents the position in the image of each digit of the item to be printed. If there are fewer digits to be printed than # signs in the field, the unused positions will be filled with blank spaces.

The *decimal point* (.) specifies the position in the printed field where it will be placed. If there are more digits to the right of the decimal point than image positions, the number will be rounded to the proper position. If there are more, zeroes will be added. Numbers less than one will have a zero printed in the position in front of the decimal point.

The *comma* (,) specifies that commas are to be added in their proper positions. No matter how large the number, only one comma is required in the field format. It may be placed anywhere between the first digit and the decimal point.

Experiment

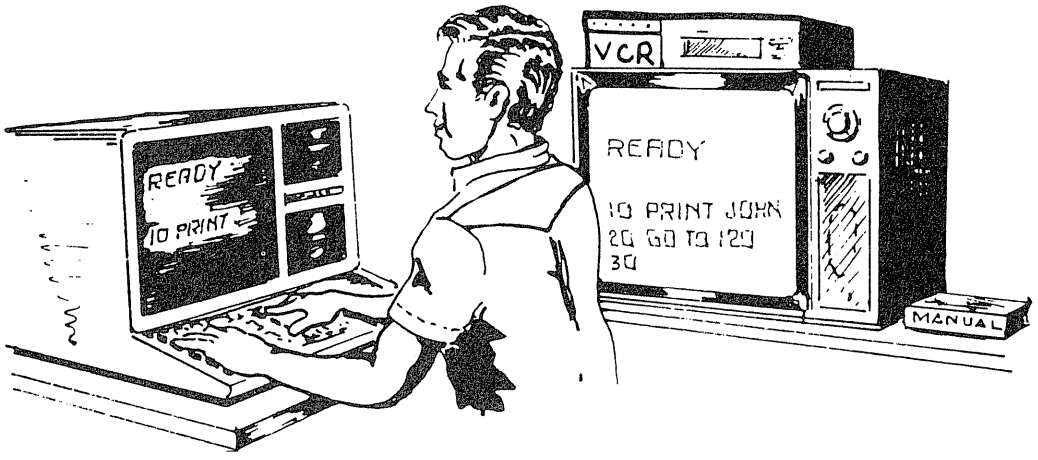
Because of its versatility and the great many ways it can be used, the PRINT USING statement is easier to learn by experimentation than by explanation. Here's a quick program that will allow you to test combinations of image formats and numbers, and immediately see the results:

```
10 INPUT "ENTER TEST IMAGE
" ; P$
20 INPUT "ENTER TEST
NUMBER " ; N
30 PRINT "12345678901234567890
12345"
40 PRINTUSING P$ ; N
50 GOTO 10
```

The test image is the combination of field specifiers you want to test. Line 30 prints a string of numbers on the screen so you can see how your test number is positioned when it prints. To use the same image several times, press the ENTER key without reentering the image. If you include a comma in your image, you'll have to enclose the image in quotes before entering it. (If you don't, the interpreter will think the comma is a delimiter, give you an "EXTRA IGNORED" message, drop the comma and everything following it.)

What happens when you enter a number larger than the image? Try it. The number gets printed, but it has a percent sign (%) in front of it. This is an error indicator to show that the field is too small.

VIDEO INSTRUCTION TAPES!



THE OLD HARD WAY

THE NEW EASY WAY

STEP BY STEP INSTRUCTIONS
PICTURES ARE WORTH
THOUSANDS OF WORDS AND SAVE
HOURS OF FRUSTRATION

TAPES NOW AVAILABLE

Use your VCR side by side with your computer to learn disk operating systems, how to program, and how to use programs. Your VCR along with your computer serve as your personal tutor. Pause your VCR to review and learn at your own pace.

CAT #	TOPIC	APPROX RUN TIME
DOS-1	TRSDOS 1.3 MOD 3	1 HR 30 MIN
DOS-6	TRSDOS 6.0 MOD 4	1 HR 45 MIN
DOS-3	NEWDOS 80 2.0	1 HR 45 MIN
DOS-2	DOSPLUS 3.5	1 HR 45 MIN
DOS-5	LDOS	1 HR 45 MIN
DOS-4	MULTIDOS	1 HR 45 MIN
EW-1	VISICALC	1 HR 30 MIN
WP-1	LAZY WRITER	1 HR 45 MIN
WP-2	SUPERSCRIPSIT	1 HR 45 MIN
WP-3	SCRIPSIT	1 HR 30 MIN
DB-1	PROFILE III PLUS	1 HR 45 MIN
DIO-3	TRSDOS 1.3 DISK I/O	1 HR 45 MIN
DIO-4	TRSDOS 6.0 DISK I/O	1 HR 45 MIN

The DIO-3 and DIO-4 Video Tapes include disk basic commands with examples. Also teaches both random and sequential disk read and write.

VHS or BETA FORMAT

SPECIAL SALE WHILE SUPPLY LAST

Verbatim Datalife Diskettes
5 Year Warranty 5¼ In
Double Density Diskettes In
Plastic Storage Box

ONLY $25.00 BOX OF TEN

TAPE ABOVE ONLY $39.95 EACH

CAT #	TOPIC	APPROX RUN TIME
BP-1	LEARNING MODEL 3 BASIC	3 HR
BP-2	LEARNING MODEL I BASIC	3 HR
BP-3	LEARNING C-64 BASIC	2 HR
BP-4	LEARNING VIC-20 BASIC	2 HR
DIO-1	COMMODORE 64 DISK I/O	1 HR 45 MIN
DIO-2	VIC 20 DISK I/O	1 HR 45 MIN

TAPES ABOVE ONLY $49.95 EACH

MASTERCARD — VISA and C.O.D. Orders accepted add $3.00 per order for shipping and handling. Telephone orders taken 9:00 a.m. - 6:00 p.m. Central Time.
Specify either VHS or BETA Tape Format

C.O.D. Orders add $3.00

DEALER INQUIRIES WELCOME

TO ORDER PHONE
OR WRITE

LYNN COMPUTER SERVICE

6831 West 157th Street Tinley Park, Illinois 60477
(312) 429-1915

master charge THE INTERBANK CARD

BANKAMERICARD VISA

VISICALC IS A TRADEMARK OF PERSONEL SOFTWARE INC LAZY WRITER IS A TRADEMARK OF ALPHA BIT COMMUNICATION SCRIPSIT, SUPERSCRIPSIT, PROFILE III PLUS AND TRSDOS ARE TRADEMARKS OF TANDY CORP LDOS IS A TRADEMARK OF LOGICAL SYSTEMS INC NEWDOS80 IS A TRADEMARK OF APPARAT INC DOS PLUS IS A TRADEMARK OF MICRO-SYSTEMS SOFTWARE INC MULTIDOS IS A TRADEMARK OF COSMOPOLITAN INC VIC 20 AND COMMODORE 64 ARE TRADEMARKS OF COMMODORE BUSINESS MACHINES, INC

★ FREE SHIPPING ★
Within Continental 48 States

MICRO IMAGES INDUSTRIES INC.

MORE MAXI'S
MANAGER W/Utility (B.0). .$119.95
MAXI UTILITY $44.95
MAXI CRAS Mod I/III $84.95
MAXI MAIL Mod III $84.95
MAXI STAT Mod I/III.....$164.95
LAZYWRITER Mdl I/III.....$149.95
NEWSCRIPT 7.0 w/labels...$119.95
LDOS Ver. 5.1 Mod I or III $109.95
DOSPLUS 3.5S/3.5D/3.5III. ...$119.95
MULTIDOS 1.6 SD/DD/III. $89.95
GEAP w/DotWriter 1.5 .....$84.95
SUPERUTILITY + Ver. 3.0...$59.95
DATA-WRITER Mdl I/III.....$124.95

LNW SPECIALS
LNW 80 Mdl II $1,795.00
Expansion II 349.95
5/8 Doubler w/Dosplus 3.4D ..199.95

RIBBONS

ZIP BOX RELOADS	½ Dz.	Dz.
Epson MX 70/80-20 Yds	24.00	42.00
Epson MX 100-30 Yds	30.00	52.00
NEC/Prowriter	21.00	36.00
Centronics 730/737/739/779 or LP-I/II/IV-16Yds	18.00	32.00

All ZIP BOXES are individually sealed black nylon and require no rewinding. Epson Reloads also available in red, blue, brown, green & purple. Any mix allowed.

CARTRIDGES	Each	Dozen
Epson MX70/80	7.00	70.00
Epson MX100	12.00	125.00
Prowriter 8510 & NEC 8023A	7.50	80.00
RS LP III/V	6.50	70.00
RS LP VI/VIII	6.50	65.00
RS DSY WH II or DWP 410	6.50	70.00
RS DSY WH II - Nylon	6.50	70.00
MICRLNE 80/82A/83A/92	N/A	30.00
MICRLNE 84 ½x40 yds	5.50	60.00
Diablo Hytype II - Multi Strike	6.50	65.00
Qume - Multi Strike	5.00	50.00
NEC Spin - Hi Yld - Multi Strike	7.00	70.00
Centronic 703/04/53	11.00	120.00

Minimum order 3 cartridges - any mix. For smaller quantities add $1.50 per order. All our reloads and cartridges are manufactured by one of the oldest and most reputable ribbon Mfg's in the country

★ ★ ★ ★ ★ ★ QUALITY GUARANTEED ★ ★ ★ ★ ★ ★

SEE OUR EXPANDED ADS IN
80 MICROCOMPUTING
SEND FOR YOUR FREE CATALOG.

ORDERING INFORMATION
No credit cards at these low prices. Add $2.00 on all COD orders. Certified Ck/MO/COD shipped immediately. Please allow 2 weeks for personal checks. For extra fast service phone in your COD order. Free shipping within Continental 48 states via UPS ground. For Canada, Hawaii, Alaska, applicable shipping and insurance charges apply. Prices subject to change without notice. New York State residents please add appropriate sales tax.

The items listed above are a cross-section of our product line. We carry the full line of most companies listed in the ad, plus much more. **SEND FOR YOUR FREE CATALOG.**

146-03 25th Road, Dept. B
Flushing, New York 11354
Mon.-Thurs. 10 A.M.-9 P.M. **(212) 445-7124** Fri. & Sat 10 A.M.-5 P.M.

Now enter an image for a large number with seven or more digits and enter a number large enough to fill it. What happens? The number is rounded to six digits and the final digits are changed to zeroes. This is because we're using a single-precision variable (N) to hold the number and that's as accurate as it can be. For large numbers (up to 16 digits), use a double-precision variable (N#). If that's not large enough to balance your checkbook, you can afford to buy a mainframe computer.

More Field Specifiers

PRINT USING has several more numeric field specifiers. Here's a brief description of what they are and what they do. Use the above program to test them.

$ A *single dollar sign* placed in front of the field prints a dollar sign in the first position of the field. A dollar sign followed by a space before the number sign field specifiers prints the dollar sign and space in the first two positions of the field. Almost any keyboard characters may be entered either before or after other field specifiers. Try "THE SUM OF ###.## DOLLARS" as the image. With a little imagination, you can see how powerful this can be.

$$ *Double dollar signs* at the beginning of the field specify a single floating dollar sign which will take the position before the number. This is frequently used for writing checks.

** *Double asterisks* at the beginning of the field fill all leading empty spaces with asterisks.

**$ *Double asterisks and a dollar sign* print leading asterisks and a floating dollar sign.

+ The *plus sign*, placed at the beginning of the field, prints a leading plus sign for positive numbers, or a minus sign for negative ones. Placed at the end of the field, it prints a trailing sign.

- The *minus sign*, placed at the end of the field, prints a trailing minus sign if the number is negative.

[[[[*Four uparrows* (shows as left bracket in some systems -- Model II use SHIFT 6) will print the numbers in exponential (E or D) format.

String Field Specifiers

The PRINT USING statement is most often used for printing numbers in accounting applications. It may also be used to format strings. Change lines 20 and 40 in the test program and use the program with the string field specifiers shown below.

```
10 INPUT "ENTER TEST IMAGE
" ; P$
20 INPUT "ENTER TEST
STRING " ; T$
30 PRINT "12345678901234567890
12345"
40 PRINTUSING P$ ; T$
50 GOTO 10
```

! The *exclamation mark* prints the first character of the string (or string variable) in the item list. Its use is usually for printing initials of first and middle names.

%% Two percent signs (backslash on the Model II — obtained by pressing CTRL 9) specify a field of two characters plus the number of spaces between the signs. it is used primarily for printing into fixed-length fields on report forms.

Complex Images and Multiple Items

You can format an entire line of numbers and strings with a single image string containing several fields. Accounting statements are sometimes printed this way. Here's an example of a complex line with multiple items:

```
10 P$="%% ####,.## DOLLARS %
% $$##.# CATS"
20 PRINTUSING P$ ; A$, X, B$, Y
```

Plug in your own values for the variables in the list.

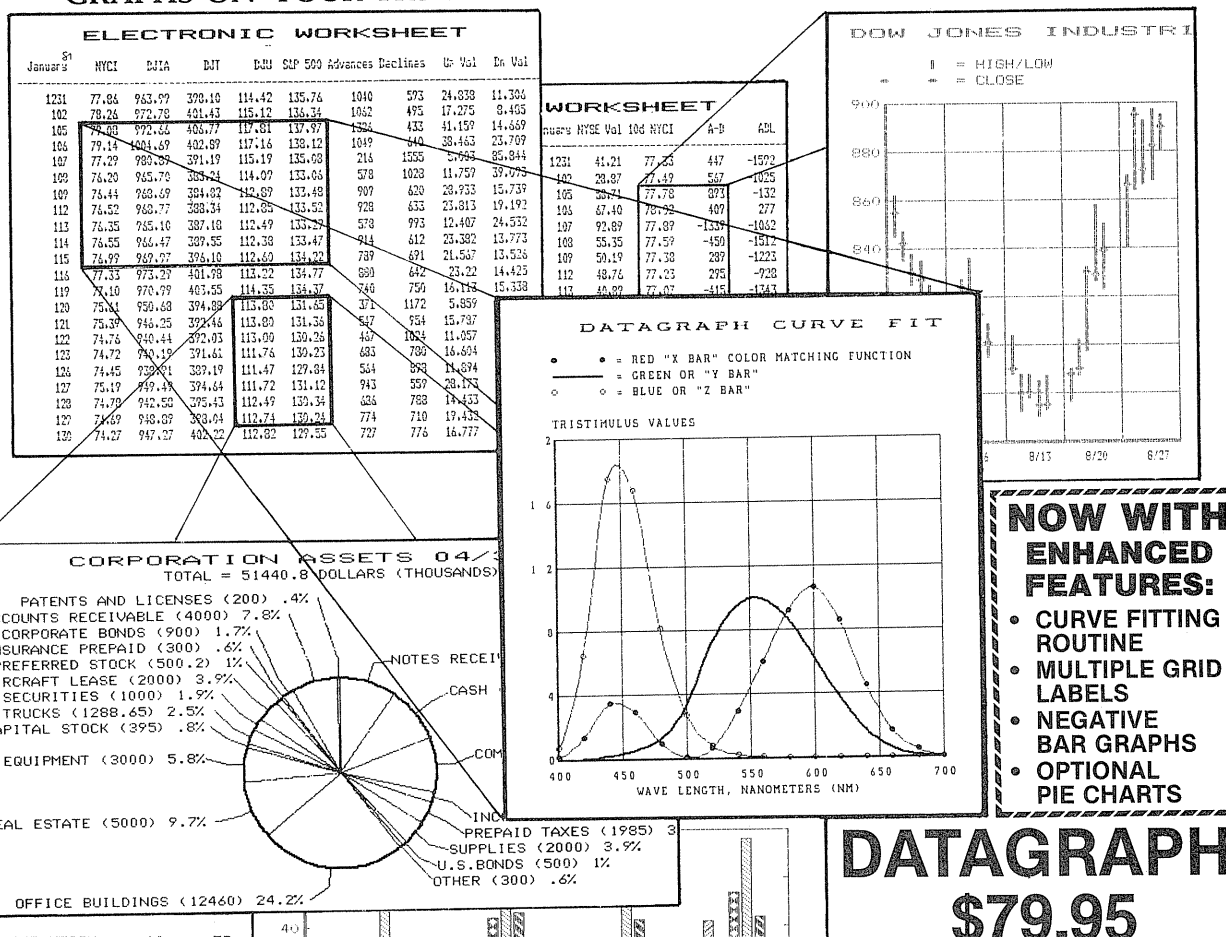
Conclusion

PRINT USING is the most complex and most powerful of the print statements. Most popular computers don't have it and their programmers must either settle for sloppy output or write a lot of tricky code to emulate it. Bill Barden stated in his book *Programming Techniques for Level II BASIC* (Radio Shack, $4.95): "Conservative estimates by recent industry experts indicate about 100,737 lines of code annually saved as a direct result of the PRINT USING statement." And that was three years ago. It will probably be ten times that much this year. That's BASIC.

DATAGRAPH*T.M.

PRINTER GRAPHICS PROGRAM

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



NOW WITH ENHANCED FEATURES:

- CURVE FITTING ROUTINE
- MULTIPLE GRID LABELS
- NEGATIVE BAR GRAPHS
- OPTIONAL PIE CHARTS

DATAGRAPH: $79.95

PIE CHART OPTION: $34.95

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-formated 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 - Can Mix Scatter, Line, Curve-Fit, Stairstep, Bargraphs. Pie Charts. * 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 ENTRYS - 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, FX 80/100
- LP VIII, DMP 200-2100
- NEC 8023 A-C, C.ITOH 8510
- IDS 460/560, 480, 80/132
- OKIDATA 82/83 (OKIGRAPH)

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

VISA/MASTERCARD ACCEPTED

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

Reviews

The Producer
Developed by Producer Software
Exclusive Dist.: Texas Computer Systems, Inc., P.O. Box 1327
Arlington, TX 76004-1327
(800) 433-5184
$149.95

Have you ever wished that your TRS-80 could program itself? Well, it can do just that for most data base-type applications with a new program from Producer Software of Arlington, Texas, called The "Producer."

The first encounter with a new software package is the documentation. That which is supplied with the Producer is undoubtedly the best I have ever seen. It is supplied in a black printed binder and arranged in 12 sections separated by multi-colored, labeled index tabs. It is written for the novice computer user who has read few computer-related texts other than his computer's manual. It does not, however, seem condescending to the more advanced programmer. In addition to the fine manual, three audio cassette tapes are supplied which are designed to talk the operator through his first session with the Producer. The speech is synchronized to the approximate speed at which the computer will execute so that repeated stopping and starting of the recorder is not necessary. Unlike the tapes that were supplied with Scripsit, these will not insult anyone's intelligence by informing him how to spell "BACKUP" or by telling him to insert his disk *before* turning on his computer.

The Producer is supplied on TDOS, a kernel version of the DOSPLUS operating system. It will run properly only with TDOS, but the programs it creates will run properly with any operating system except TRSDOS 2.3 on the Model 1.

I have modified the Producer to run with LDOS on a MAX-80, but the 5MHz speed of the MAX causes difficulty in the screen generator program. The modifications were simple, involving mostly syntax changes. You could probably modify it to use the DOS of your choice quite easily since it is written in BASIC. However, it should be mentioned that Producer Software intends to support this program only with TDOS or the DOSPLUS operating systems. Although the use of the advanced features of TDOS make the Producer extremely powerful, I think that dependence on a non-Tandy-supported DOS is a definite minus. If TRSDOS had been chosen, the Model I could not have been supported because the earlier TRSDOS disk BASIC doesn't support blocked records. The choice of TDOS was made before Tandy chose LDOS as their standard advanced operating system.

When the TDOS disk is booted, an automatic backup procedure is invoked. After the backup is made, the new disk is

150 Programs—$39.95

for the Radio Shack™ Model I (Tape) 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

CRB Tool's

TRSTUM Tape Reproduction System **TRSDUM**
Tape or Disk
Utility for Model 1, 3, 4

- **R**ead, **W**rite, **V**erify tape or disk files
- **R**ead and **W**rite any TRS-80 std. protocol tape
- Automatically identifies file type (e.g. BASIC, SYSTEM)
- Change tape file name as desired
- Change speed of tapes, if desired (Mod 3, 4)
- Select cassette port 0 or 1 (Mod 1)
- **OFFSET** memory load addresses automatically
- **UNOFFSET** load addresses, if offset
- Displays full operational status plus . . .
  - diskette directory
  - load map (start-end address sets)
  - **N**ame, **L**ength, **F**ormat of files loaded
  - **S**tart, **E**nd, **E**xecute addresses of programs
  - Error messages, if any
- Automatic tape/disk protocol conversion
- Single disk-drive copy capability
- Archive disk files on tape to save diskettes
- Run tape programs from disk (Tape SCRIPSIT, EDTASM, games, etc.)
- All disk features require TRSDUM

TRSTUM — for cassette-based systems ONLY $16.95
TRSDUM — for TRSDOS disk systems ONLY $17.95

Please specify Model 1, 3 or 4
and add $2.00 postage and handling.

Send check, money order or SASE to

CRB Microtools
"Software Tools for the 80's"
14835 N. First Ave.
Phoenix, AZ 85023

TRS-80, TRSDOS, SCRIPSIT are trademarks of TANDY CORP.

booted, a copy of TRASHMAN is automatically loaded into high memory, and the Producer program is loaded and run. A very nice graphic menu is presented from which all parts of the Producer package may be accessed. This menu requires that the user first press an A or a B to indicate from which half of the menu the selection will be made. It could as easily have been written to require only one keystroke, and this is one of my very few complaints about the way the Producer is written. It is a wonderful program that has this little to complain about!

The operator should first select option A2 LOGIN FILENAME. A valid filename is entered of one to eight characters without extension and Producer then asks for the drive which will contain the program. From now on, this information will be used by Producer as its defaults, but the user may override this at any time. Advanced programmers will really like this way of handling the program defaults.

Menu option A1 will print out on your printer a three-page planning form for you to fill in and use during the preparation of your program. This is a very nice feature, and would have been overlooked by most programmers. After the planning form is printed, the main menu reappears and option B1 should be selected to create the input screen for your program.

The screen generator module offers all the controls one could want for designing custom screens. It even offers a special large character mode which automatically makes large one-inch high characters. Any graphic pixel may be turned on or off and characters may be repeated. Portions of the screen may be moved or copied from one location to another. Of course, all text characters may also be entered. Up to nine separate screens may be buffered in memory at one time. Although I cannot see a need to store that many different screens at one time, I appreciate the fact that more, rather than less, capability is available.

After the input screen has been defined, it is necessary to define the fields by name and location, define an area of the screen for the display of error messages, and tell Producer what fields (if any) will be involved in calculations and what the calculation will be. Any field may be involved in almost any way in a calculation. The calculation may be tied to any field to determine when the calculation is to take place. Calculations tied to the same field may have their orders specified. The results of the calculation may be saved in the data file, or not, as the circumstances require. Not only are addition, subtraction, multiplication, and division supported, but also sin, cosine, tangent, Boolean true/false, as well as many other operators. Running totals from record to record may also be kept. It is even possible to design a "calculate-only" program which will not create a data base file.

After creating the screen and defining the calculations, up to nine different report formats may be specified in a single program. These reports may be based on criteria specified in the program or at run time. Single line of multi-line reports are supported as well as a label format. The variety allowed here is almost as wide as one's imagination. It is even possible to enter printer controls to have the report headings appear in a different type style. The finished program will show a menu of the various reports that are available.

When the screen has been built, the calculations defined, and the reports created, Producer will begin to build the finished program. Several options are offered including cursor flash rate and character, and the option of using a custom logo which must have already

3 NEW utility programs that will be HELPful to you.

RESTORE/CMD (NEWDOS-80* Mod./III only) "Bring'em back alive" with this DOS command utility. If you have just "killed" your favorite program by accident and now want it back... it's as simple as typing RESTORE:XXX:0 .....**$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. This can be a very HELPful addition to your utility library. **$16.50**

BANNER/CMD (NEWDOS-80 Mod/III only) Change that standard introductory DOS banner into something YOU want to see. BANNER will write to disk the code for up to 13 characters that you specify. Now each time you boot up a new disk, you can easily verify what you have or want to see. **$16.50**

ASK FOR all THREE of these programs on one disk for **$39.95**

MAYDAY software carries many new "major name" programs including one of the largest selections of utilities available from one source. For your WORDPROCESSING, DATA MANAGEMENT, SCREEN GRAPHICS, PRINTER ENHANCEMENTS, GAMES and HARDWARE needs, MAYDAY is ready to be of HELP to YOU. Call or write for your NEW CATALOG today. .....

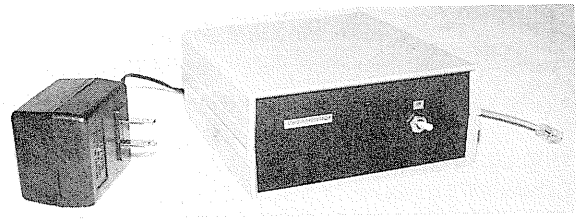
* Apparat, Inc.

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

The Comstar Research
MODEM

. . . is the lowest cost, assembled, ready-to-go, 300-baud modem on the market for the computer operator on a budget.



Model I/III with 16K, Level 2 BASIC required.

- Software & instructions included
- No expensive RS-232 needed
- Direct-connect
- and, best of all: **$99.95***

Now for the Color Computer, the Comstar Modem comes assembled and ready to go (less the videotex software) at the same low price of $99.95.

C.O.D., Check or Money Order

Comstar Research
P.O. Box 771, Madison Heights, MI 48071
(313) 541-4840

*shipping & handling add $3.00 C.O.D., Alaska, Hawaii or Canada add $5.00.

been created with the screen editor. This stage may also be entered from the main menu, which makes introducing changes to an existing program relatively simple. During the program-building process, which can take as long as five minutes, but usually takes only about two and one-half, a /BLD file is executed which merges the program parts into a whole and saves it on the disk. At this point, all that remains to be done is the initialization of the BTREE file that will be used by the program.

Simply put, a BTREE file is one which contains pointers to each next and previous record. Also, it uses an algorithm that doesn't require nearly as many searches of the data base to find a particular record as some other methods require. It allows extremely rapid access to every record in a file and has the advantage that it doesn't need to be sorted. It is beyond the scope of this review to explain the concepts of a BTREE file, but it should be noted that it is one of the better types of file structures to use in a data base program. BTREE programs are more difficult to write, but with the Producer, you don't have to write it. You can, of course, use the Producer without even knowing the type of file structures involved.

When the generated program is run, it begins with either the Producer logo or your own customized logo and a menu. Also maintained on the menu page is a status report consisting of the last record number accessed, the number of records in the file, the error status (if any), and the number of record slots that have been deleted. Also shown is the filespec of the data file being used, a very nice addition. You may choose to enter a new record, edit a record, go to a reports menu, or be presented with a menu of options from which several other functions may be accessed.

Each record must be entered one at a time, followed by a return to the main menu. If entry via a batch mode is desired, it may be accessed from the options menu. Batch mode entry builds a file called BATCH/DAT on the first available drive and, after the batch entries are concluded, adds these entries to the file. This seems somewhat cumbersome and I think it would be better if the batch mode added the records and returned instead to the input screen, eliminating the need for this file. The program may blow up if drive zero has insufficient disk space for the BATCH/DAT file. If there is enough space for this file, there will be no problems.

If the DOS you use allows you to create a file, you may create BATCH/DAT on the drive of your choice in advance. Although I criticize this way of doing the batch entries, the way it is done works well and, if there is enough disk space, causes no problems. From the options menu, one may also search the data base using any field as a key, replace the data in any field, delete a record, or enter the batch mode discussed above.

The reports menu displays the nine possible reports or, if you haven't defined them, a blank space. By selecting a number from zero to nine, you will enter the report generator and can print out a report exactly as you defined it when running the Producer. The ability to define this many different reports gives the Producer a great advantage over its competitors. New reports may be defined at a later time by running Producer again as long as you haven't killed the data files that Producer uses.

The Producer comes with a one-year subscription to a quarterly newsletter. All updates, enhancements, and corrections will be made via this newsletter which will be sent to all registered owners. Programs produced by the Producer may be sold without payment

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

BUSINESS SOFTWARE for

ANALYTICAL PROCESSES CORPORATION

IBM-PC, OSBORNE, XEROX, NORTHSTAR
RADIO SHACK, EPSON QX-10, CPM & MS-DOS
All Prices Include Full Support and Source Code

$ TAX/PACK $

TAX/PACK for practitioners is complete, coordinated, and includes most-used forms and schedules. Prints all schedules, no masks, no data field entered more than once. All data passed automatically between schedules and 1040. Fully supported all year. Partial or full system. Can be used for single or multiple returns. Extremely flexible. Computing taxes for over five years.

$995.00

MORE! TRIED & TRUE APPLICATIONS!
■ MAIL LIST MANAGER ■ RETAIL INVENTORY BILLING
■ REAL ESTATE APPRAISAL ■ PETROLEUM DISTRIBUTORS
■ MEMBERSHIP LIST MANAGER ■ UTILITY BILLING

Send Check, M.O., or VISA/MC Number & Exp. Date TODAY

ANALYTICAL PROCESSES CORP.
635 Main Street — P.O. Box 1313
Montrose, Colorado 81402
Call (303) 249-1400

We Are Unique . . . Try Us . . . Find Out

of a royalty so long as proper credit is given to Producer Software. This is outlined on the registration card. This license greatly increases the value of this software.

I once said at a user's group meeting that I would think long and hard before I'd call any program that cost $150 a bargain. Well, I've thought long, and I've thought hard, and I definitely call the Producer a bargain. Perhaps it would be fair to call it a "menu driven data base programming language." Although written in BASIC, it is extremely fast and will allow you to develop a data base program in a couple of hours that would take months to program and debug by hand. The Producer is certainly one of the better buys in today's software marketplace.

Charles P. Knight

Arranger
Model I/III, 32K 1 or 2 disks req.
Triple-D Software
P.O. Box 642
Layton, UT 84041
(800) 546-2833
$29.95

Compared to using cassette tapes, disk systems are fast, efficient and easy to organize — up to a point. While a cassette can reasonably be expected to hold just a few files, a diskette can hold dozens of files. If you have a couple dozen disks (and disks seem to multiply faster than rabbits), keeping track of what file is on which disk can become a mind-boggling burden. Speed and efficiency disappear if you must spend twenty minutes finding the proper diskette.

There is also a problem of wastage. Just thirty double-density, or sixty single-density, diskettes can hold five megabytes of information (as much as some hard disks). Unfortunately, this is usually little more than theory. If you have 60 diskettes, most of them are probably just partially used, or are filled with redundant files. At $2 to $6 per diskette, it is expensive.

These problems can all be overcome with Arranger, an inexpensive disk cataloging system available from a small, enthusiastic, software firm. Arranger is available in two versions: a single-density version for the Model I, and a double-density version for double-density Model I and Model III systems. Unlike similar programs, ads for Arranger claim it is able to read disks created by a wide range of operating systems. Skeptical, but attracted by the price, I purchased the double-density version for my Percom Doubler-equipped Model I.

Doubts soon vanished. Arranger had no problem cataloging a mixture of single- and double-density diskettes created by TRSDOS 2.3, NEWDOS+, NEWDOS/80, DOSPLUS, and DBLDOS. Feeling daring, and still using the Model I, Arranger was then fed diskettes written for the Model III under TRSDOS 2.3, NEWDOS/80, and DOSPLUS. All were cataloged without complaint. Feeling giddy, but ridiculous, an attempt was made to catalog a Color Computer diskette without success. On the other hand, Arranger did not crash or lock up. It politely stated that it didn't recognize the disk format. Though not tested, Arranger is also able to catalog LDOS, VTOS, ULTRADOS, and MULTIDOS disks, and probably a few other stray DOS's as well.

Another nice feature is the ability to catalog disks using their existing diskette names. (Many similar cataloging systems require diskettes to be numbered or coded.) Since it makes more sense to store a program named PACMAN/CMD on a diskette called GAMES1 than on one called 23A, organizing diskettes becomes quite

Shugart 5¼' Disk Drive

NEW

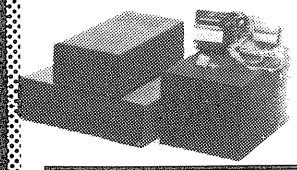
SA-405

184.95

Guaranteed for 270 days

6ms T-T, SS, SD or DD

5¼" Disk Drive Power Supplies



- Cases accommodate all standard 5¼" drives
- New chip resistent finish
- Over current and over voltage protection
- Dealer inquiries invited
- Call or write for quantity discounts
- Guaranteed in writing for 120 days

Dual Power Supplies

•Horizontal – 12x12x3½	$74.95
•Vertical – 7x12x6	$74.95
•Open Frame – 7x2x3 w/o-case	$59.95
•Single Horiz. P/S – 6x12x3½	$44.95
•Custom 4' 2-Drive Cable	$21.00
•4-Drive Cable	$32.00
•Dual Case, Horiz. or Vert. (w/o P/S)	$29.95
•Single Case, Horiz. (w/o P/S)	$21.95

Terms: Personal checks allow 14 days, COD, MO., Certified Checks . . . Credit Cards and 3.5%
Shipping and handling: $2.00 plus current UPS or Parcel Post rates.

Send to:
C.P.R.
P.O. Box 834,
Oak Harbor, WA 98277

or call . . .
(206) 679-4797

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
- Free Use of Credit Cards
- Large Selection-Call for Items Not Listed
- Toll Free Order Line
- Free Shipping on Orders over $100
- Friendly, Honest, Reliable Service

We accept Visa, Master Card check, cash, money orders, and COD. 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. COD orders are charged $3.00 plus actual carrier charges and require cash or certified check on delivery.
When ordering by mail include your telephone number, all raised letter credit card information, computer model, memory size, and number of drives. Colorado residents add appropriate sales tax (6½% in Denver).
Prices are subject to change without notice.

Applied Microsystems, Inc.
612 Washington, Denver, CO 80203

ORDER NOW TOLL FREE **1-800-468-4474**
IN COLORADO CALL 861-9250

LDOS is a TM of Logical Systems Inc. M-ZAL is a TM of CAU Inc. TRS-80 is a TM of Tandy Corp. STSD-III is a TM of SBSG Inc.

natural. To help this organization along, Arranger has a RENAME command to assist in giving diskettes reasonable names. This feature is especially valuable when working with Model I or III TRSDOS diskettes. While many DOS's allow diskette names to be changed as the need arises, TRSDOS does not.

Alphabetical listings of the catalog can be viewed on the screen or printed on a printer. When viewed on the screen, the up and down arrows allow rapid scrolling through the listing. Printed listings require an 80-column printer, and are printed in three columns of 60 programs. If there are more than 180 programs to be printed, pin-feed or roll paper is required since Arranger does not pause for page breaks. Selected listings, consisting of just those programs with a certain extension (such as CMD, TXT, BAS, ORC, etc.), can also be listed to either the screen or printer.

Arranger does not keep track of file lengths — just filename and the diskette on which it is located. On the other hand, it does keep statistics on all diskettes that have been cataloged, and one command will locate all diskettes with a specified number of free granules. Another command provides a list of all diskette names, the date they were last cataloged, whether they are single- or double-density, what operating system was used to create them, how many free grans are available, how many tracks they have, and whether they are system or data diskettes. At present, however, this information can only be viewed on the screen. No provision is made for printing it on paper.

Up to 250 diskettes, with up to 44 files per diskette, can be cataloged (200 diskettes/30 files for the single-density version). This huge capacity, plus Arranger's ability to handle a wide variety of operating systems, make it a must for every disk system. Using the printed catalog as a guide, disks can be reorganized, redundant files killed, and enough diskettes freed in the process to easily pay for the program. This leads to a new problem. Does anyone want to buy a couple dozen slightly used diskettes?

Lawrence I. Charters

Ed note: The Arranger now comes in two versions, Arranger I and Arranger II. The Arranger II version sells for $49.95 and has many enhancements that are a direct response to user requests. Version II runs faster and comes with a better manual. But, according to our reviewer, it works so well that you can throw the manual away. It is that easy to use. The capacity has been increased to handle up to 255 files per diskette and it almost instantly alphabetizes all entries. It automatically recognizes diskette configuration (35, 40, 80-track, single- or double-density) without operator input.

Paper printouts are now possible during many key operations and a scrolling screen is used for improved video displays of the expanded information base. A sophisticated filter command allows you to select quite specific information such as all programs on a Model I disk, all DOSPLUS disks, all games on 40-track NEWDOS/80, etc.

Geography Pac
CC, 16K Extended Color BASIC required
Spectral Associates
141 Harvard
Tacoma, WA 98466
(206) 581-6938
(800) 426-1830 orders only except WA, AK, HA
$33.95 cassette, $37.95 diskette

With the introduction of Geography Pac, Spectral Associates has extended their software designing expertise into

UNBELIEVABLE PRICES

Printer Specials

Epson RX-80 $389
Epson FX-80 ~~$539~~ $525

GEMINI 10 $299
GEMINI 15 $469

Prowriter I ~~$365~~ $359
Prowriter II $655

Modem Special

Mark I Modem w/free subscription to source $75

Diskette Specials

Elephants SS/SS $16.95
Elephants DD/DD $20.99

To Order Call or Write:

Team Computer Products
170 Daniel Road
Hamden, Conn. 06517
(203) 288-5772

New Release
Now supports Mailing Lists, Form Letters, "ZAP-PROCESSING", and 18 more printer drivers.

ZORLOF II

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!!

The Magnificent
WORD PROCESSING SYSTEM
For the TRS-80 Model I and III

- Supports over 50 different popular printers including OKIDATA Microline 80, 82A, 83A, 84A, Qume, 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 CompRiter 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-hexidecimal) 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 fast 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.

ANITEK
SEE YOUR LOCAL DEALER OR CALL (305) 259-9397
VISA

ANITEK SOFTWARE PRODUCTS □ P.O. BOX 1136 □ MELBOURNE, FL. 32935 □ (305)259-9397

the field of Computer Assisted Instruction (CAI). Geography Pac is written the way an educational pack should be written: bug-free, fun, friendly, and most of all *educational*! Like the program's instructions say, Geography Pac is an enjoyable, easy way to learn geography.

Geography Pac is a series of five major programs each consisting of two smaller ones. These five programs cover the U.S., Europe, Asia, Africa, and South/Central America, and can be bought individually or as an entire package. Each major program contains the main program written in Extended Color BASIC followed by a high-resolution map (stored as a machine code file). After loading and running the BASIC program, the map is loaded into the hi-res screen area. Each map is multicolored; using graphic pmode 3.

Many options are available in the use of Geography Pac. The first is a flash test. This option allows the user to choose time limits allowed to view the map. The user can even select the amount of time allotted by selecting slow, medium, or fast times. Next, the user decides the number of states (or countries) to be quizzed on. Finally, the program asks which type of questions are to be asked. These range from states (or countries) only, capitols, industries, most populated cities, random questions, or all questions.

After selecting the desired options, you are presented with the map and a state or country is flashed momentarily. Then you are asked either a question about the state or you press a key for the question if the flash test has been activated. Each answer is allowed to be misspelled three times before it's considered incorrect, after which the funeral march can be heard. Likewise, if the answer is correct, the "charge" song is played. After all questions have been answered, the type of question and the percentage of correct answers are displayed. If a 100% score is obtained on all questions, "To Dream the Impossible Dream" is played.

Geography Pac combines high-resolution graphics, sound, and many options to prove Spectral's claim that it is "...an enjoyable, easy way to learn geography." I hope to see more CAI software with Spectral's name on it in the future.

Roy Seney

CCP-1 Serial/Parallel Interface
Botek Instruments
4949 Hampshire
Utica, MI 48087
(313) 739-2910
$69.00

When I had only a TRS-80 Model I, things were fairly simple. My Epson MX-80 printer simply plugged into the parallel port of the TRS-80's expansion interface. However, when I got a new Color Computer, things became complicated. Because the Color Computer has only a serial RS-232 port to connect to a printer, I purchased an Epson serial interface board.

After about 30 minutes for installation and setup, the printer was ready to use with the Color Computer. To accomplish this, the DB25 connector had to be wired correctly. My progress was delayed by misunderstandings about pin numbers. After solving this problem, the setup worked well enough, but it sure was slow! The Epson MX-80 printed a line at its normal speed, then waited for about twice that time to receive the next line.

My next great frustration came when I had to switch back to the TRS-80 Model I for a fast Scripsit job. I didn't have a serial printer cable for the RS-232 board in the Model I. This meant that I had to open the printer case and remove the serial interface board. What a bother! There had to be a better way.

VERSADBM

TRS-80 Models I, III, 4
VERSATILE DATABASE MANAGER SYSTEM!
Completely User-Definable! Multi-Drive Capability!
VERY USER FRIENDLY!

SPECIAL FEATURES:
* SINGLE KEY COMMANDS AT MOST PROMPTS!
* SINGLE KEY REPEAT ENTRY OF DATA!
* ON SCREEN EDITING AND UPDATING OF ALL DATA!
* COMPLETE ERROR TRAPPING FOR EASY DATA ENTRY!
* COMPLETE DATA STATUS UPDATE FOR INSTANT VIEWING!
* WRITTEN IN BASIC FOR EASY MODIFICATION!
* DATAFILES CAN SPAN UP TO 8 DRIVES, 5"-8" — HARD DRIVES!

DATA:
* NUMBER OF FIELDS — 1 TO 18 FIELDS!
* LENGTH OF FIELDS — 1 TO 40 CHARACTERS!
* TYPE OF FIELD DATA — ALPHA OR NUMERIC!
* FIELD TITLES USER-DEFINABLE — 1 TO 18 CHARACTERS!

REPORTS AND LABELS:
* USE AS MANY OR AS FEW FIELDS AS DESIRED!
* DEFINE PRINT POSITIONS FOR ALL FIELDS!
* START AND END PRINTING WITH ANY RECORD YOU DESIRE!
* SELECT BY ANY OF SEVEN SELECTION CODES!
* SELECT RECORDS BY ANY OR ALL FIELDS!
* SORT BY ANY FIELD!

CAPABILITIES: DEPENDING ON SYSTEM CONFIGURATION —
100 BYTE RECORDS ..... MODEL I, 4 DRIVES = 3000 RECORDS!
MODEL III, 2 DRIVES = 3000 RECORDS!
5 MEG HARD DRIVES = 50,000 RECORDS EACH!

HARDWARE REQUIREMENTS: TRS-80 MODELS I, III, 4 — 48K, 1 TO 8 DRIVES, 132 CHARACTER OR COMPRESSED PRINT PRINTER!

INTRODUCTORY PRICE ONLY $39.95!!!
ONE OF THE BEST DATABASE MANAGERS FOR TRS-80's AVAILABLE TODAY!

ORDER NOW! Shipped U.P.S. within 24 hours of receipt of order. Visa—Mastercard—Money Order—Cash—Check (two week delay) C.O.D.'s add $5.00. CA. residents add 6% sales tax.

TREESOFT SOFTWARE COMPANY
6529 PEMBA DRIVE, SAN JOSE, CA 95119 (408) 224-8609

TRS-80 tm Tandy Corp.

UNITED SOFTWARE ASSOCIATES

PRESENTS

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 Terms 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	$59.95	• LYNX MODEM	$249.00
• INFOEX 80	$99.95	• ANCHOR 1-300	$99.00
• M TERM	$69.95	• HAYES 300	$249.00
• COMMBAT	$44.95	• HAYES 1200	$619.00
• MODEM GAMES	$19.95	• ORCHESTRA 85/90	$89.00
		• PIANO SOFTWARE	$34.95

ORDERS 305/965-3496 BBS 305/842-2687
COD ADD $3.00 TECHNICAL INFOR 305/842-8805 (5-9 E.S.T.)
734 Flamingo Way, North Palm Beach, FL 33408

These problems prompted me to study an advertisement from Botek Instruments for their serial to parallel connections with the Color Computer's serial port and the printer's parallel connector. No new cables to make up. No switching the serial board in and out of the printer. No more hassle.

The Botek Instruments model CCP-1 Serial/Parallel Interface is a very well-engineered accessory. The CCP-1 comes with a small plug-in power module and two connector cables. One cable plugs into the serial connector on the back of the Color Computer. The other plugs into any standard parallel printer connector. The system arrived a few days after I placed my order and was working immediately after plugging it in.

The instructions supplied with the unit are simple, but adequate. There are two options which, if selected, require jumper changes inside the case. The first option, for 7-bit output, is required if your Color Computer has the old Rev. 1.0 Color BASIC ROM. The second option allows you to eliminate the plug-in power transformer. If your printer has 5 volts on pin 18 of the connector, you can take advantage of this option. (The Epson MX-80 doesn't have this voltage available.)

The CCP-1 has yet another worthwhile feature, a switch-selectable baud rate. The Color Computer user can now work with transmission speeds far greater than the 600-baud default value. The instructions show how to easily change the baud rate of the Color Computer in six steps from 300 to 9600 baud with a single POKE to memory. The highest baud rate really makes a difference in the operating speed of the printer. The actual speed enhancement depends on the type of material being printed. For regular BASIC listings, I measured a 40 percent speed increase.

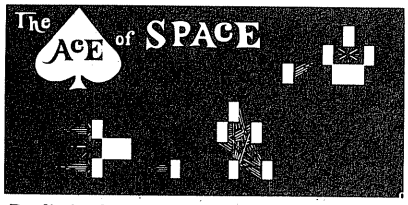
Just to see what would happen, I tried the interface with a friend's Radio Shack Line Printer VII. This printer has both serial and parallel input ports, with the serial normally connected to the Color Computer. The speed increase obtained by changing from 600-baud serial to 9600-baud parallel was dramatic. I measured a 75 percent increase in speed for listing BASIC programs on the LPVII.

In the two months I have used the CCP-1, I have had no problems. The interface has worked perfectly. I am very pleased to be able to switch the printer from one machine to another without any board swapping. The 40 percent increase in printer speed is an unexpected bonus. The people at Botek Instruments have done an excellent job in providing a much-needed piece of equipment. Now, if they could only come up with a way to hook my brain to the keyboard so I wouldn't have to type with two fingers . . .

Stuart Hawkinson

"TRS-80 Assembly Language Subroutines" written by William Barden, Jr.
Prentice Hall, Inc.
Englewood Cliffs, NJ 07632
$18.95

TRS-80 Assembly Language Subroutines is a collection of useful subprograms for use on the Model I, II and III computers. William Barden, Jr., a leading authority on assembly language programming for the TRS-80 computers, presents a collection of immediately-useful subroutines. The reader should have an editor/assembler to assemble the source code presented, but it is not necessary as the author provides the object code for every routine. The object code can be entered into the desired memory locations via Radio Shack's DEBUG utility, or as data statements used from within a BASIC



Definitely *THE BEST* of the space games for the **TRS-80† MOD I/III**

★ **1,2 or 3 SIMULTANEOUS players!**
- Each piloting a seperate space ship

★ **Incredibly realistic graphics!**
★ **Fast arcade responce!**
★ **Options individually selected!**
- Meteors • Blackhole Gravity
- Flying Saucers • Objects & Mines
- Bounce or Wrap-Around Screen
- Weapons: Missiles or Lasers

★ **Difficulty options selectable!**
- # of Saucers • Saucer Speed
- Space Ship Power • Gravity Force
- Meteor Speed • Fuel Supply
- Weapon Supply • Laser Length

★ **Sophisticated ship controls!**
- Variable thrust level • Rotation • Flip
- Fire left or right barrel • Hyperspace

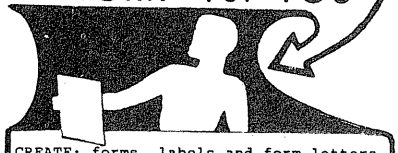
★ **Cooperative or Competitive!**
- Numerous scoring options
- 1 player can fly 2 ships - 1 with each hand

★ **Alpha & Trisstick compatable** ★ **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

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. "!

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

WE PAY: tax / US postage on ALL orders.

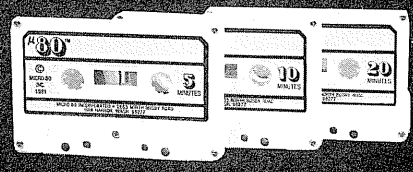
SPECIALS

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

Astro-Star Enterprises
5905 Stone Hill Dr.
Rocklin, CA 95677

24 HOUR
Computer Phone
(916) 624-3709

COMPUTER CASSETTES
100% Error-Free • Fully Guaranteed



LENGTH	12 PACK	24 PACK
C-05	79¢	69¢
C-10	89¢	79¢
C-20	99¢	89¢
Boxes	26¢	21¢

UPS $3.00 Pkg. $18.00 Case

C-10's 39¢
(Min. 500 Case Lot)
w/labels ADD 4¢
w/boxes ADD 13¢

FOR ORDERS ONLY
1-800-528-6050
Extension 3005
master charge
VISA

MICRO-80™ INC.
2665-C Busby Road
Oak Harbor, WA 98277

program. The data contained in the statements would be read and poked into memory. Mr. Barden gives ample examples for getting the programs from his book into memory.

Examples are given that show how to access the subroutines from a BASIC program once they are loaded into memory. Access is made through the USR function. Many of the routines rely on multiple parameters to be passed to the routine from BASIC. As the USR function only permits the passing of a single argument to the routine, the author has devised "parameter control blocks," a series of memory locations that contain the parameters on entry to the routine. The programmer simply sets up the parameter control block with the necessary data, by pokeing the data into these locations prior to invoking the USR function.

The routines cover everything from number base conversions to reading and writing from cassette or disk. Other routines cover a NEC spinwriter printer driver; MUNOTE, which plays music out of the cassette port and through an audio amp and speaker, string searches, array sorts and more. In all, there are 65 subroutines that are fully documented and ready to go. This is a gold mine of canned software. To save the aggravation of typing the routines, the author has available on diskette all of the routines listed in the book.

There is a detailed explanation of each routine in addition to the comments listed in the source code. All in all, it is one of the most thoroughly documented books to come along in a long time.

The author gives an overview of the Zilog Z-80 CPU's instruction set, including an explanation of the CPU registers and their uses. Mr. Barden specifically states that the chapter is an overview and directs the novice programmer to other texts that would also be of benefit. Mr. Barden has done as well as anyone could be expected to do, in explaining assembly language in just two chapters. However, I have never seen anyone adequately explain assembly language to a novice in just two chapters. I strongly recommend additional reference material before attempting the routines presented in this book. It is not a "how to" book for teaching assembly language.

After purchasing the book, I entered the source code for MUNOTE, a routine to play a musical note out of the cassette port. I had the entire routine assembled and tested in about an hour, and had the routine integrated into a program I wrote in another 20 minutes. For me, the book

NEWBASIC 2.0

Adds over 40 commands to Model I/III disk BASIC.

- Customize NEWBASIC—include only those commands you need.
- Over a dozen easy-to-use and powerful **graphics** commands (eg, DRAW, LINE, CIRCLE, PAINT).
- Produce **sound** for music & effects.
- Pre-defined *and* definable keys.
- Disk-based spooler/despooler.
- Execute strings, label lines, 2-byte PEEK/POKE, restore to any DATA line, block memory move, set hi-mem, and **much**, much more.
- 70 page manual & summary card.
- **Only $39.95!** (+ $2.50 shipping)

Check, money order, VISA, M/C, and C.O.D. (+ $2) accepted. CA residents add 6% tax. Foreign orders (exc. Canada), $5 shipping, US funds only. Both Model I & III versions on same disk. Requires 48K & 2 disk drives. (Not copy protected—personal backups OK.) Works with most major DOS's.

Modular Software Associates
209 18th Street
Huntington Beach, CA 92648

Credit card & C.O.D. orders accepted 24-hrs (manned 8-5, M-F): (714) 960-6668.

Dealer inquiries invited.

Profile users!

Get the most out of Profile* 2 and Profile Plus* databases with

TransPro
File Transfer Utility

For TRS-80* Model 2, 12, or 16

- Move data from one Profile database to another without costly re-typing.
- Add, delete, combine, or rearrange fields without scrambling data.
- Insert literal values into specified fields.
- Blank out specified fields.

Compatible with TRSDOS* 2.0 or Hard Disk TRSDOS.

$75 includes 8" disk, manual, sample data files

CHECK, M.O., VISA, MASTERCHARGE

Bridgeware
SOFTWARE TO SPAN THE GAP

355 Government, Roanoke, AL 36274
Phone (205) 863-4006

*TRS-80 and TRSDOS are trademarks of Tandy Corp. Profile II and Profile Plus are trademarks of The Small Computer Company, Inc., licensed to Tandy Corp.

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 (specify Model 1 or 3).

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

SYSTEM DIAGNOSTIC

Complete diagnostic tests for every component of your TRS-80 Model 1 or 3. Tests for ROM, RAM, Video Display, Keyboard, Line Printer, Cassette Recorder, Disk Drives, RS-232-C Interface. Individual or continuous testing modes. Models 1 or 3 only.

System Diagnostic $99.95

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

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

SMALL BUSINESS ACCOUNTING

Based on Dome Bookkeeping Record #612, this program keeps track of income, expenses, and payroll (not included in cassette version) for a small business.

Model 1/3/4 disk version $59.95
Model 1/3/4 cassette version $29.95
Model 2/12 or IBM/PC version $69.95

HOME BUDGET

Analyzes your income and expenses, computes monthly and year-to-date summaries including tax deductions.

Model 1/3/4 disk version $49.95
Model 1/3/4 cassette version $29.95
Model 2/12 or IBM/PC version $59.95

24-hour TOLL-FREE Order number:
Outside California call:
(800) 428-7825, ext 169
Inside California call:
(800) 428-7824, ext 169

Visa, Master Card, or COD Orders only. For information call:
(914) 634-1821
9-5 Eastern time only.
Add $3.00 postage & handling.
New York residents add sales tax.

Howe Software
14 Lexington Rd. New City, NY 10956
*TRS-80 is a trademark of Tandy Corp.

has already paid for itself.

I do recommend *TRS-80 Assembly Language Subroutines* to any intermediate programmer, and up, who ever had had the need for good, canned, off-the-shelf software. it is well worth the price.

Gary A. Shade

Pandemonium — A Word Game
Norman J. Wazaney, Jr.
Soft Images
200 Route 17
Mahwah, New Jersey 07430
(800) 526-9042
Requires 48K Model I/III with 1 disk drive
Retail price: $39.95

If you are like me, you are probably no match for your children when it comes to shoot 'em up video games. Aging reflexes and limited playing time make it difficult to ever break into the really high scoring atmosphere where the arcade-style games become addictive. Crossword puzzles and "thinking" games are more appealing to me. We can appreciate a good computer game that requires some of our hard-earned skills. Pandemonium is such a game. But, make no mistake, your kids will like it too. This game challenges both your intellect and competitive spirit.

Pandemonium combines the best features of two popular word games, Scrabble and Boggle, in a computer-scored format. The game is played on a 5x5 grid with a set of randomly-selected letters. The object is to arrange the letters to form three, four or five-letter words on horizontal, vertical or diagonal lines. Your score is determined by the computer searching a dictionary of over 6000 words. Points are awarded for the number of letters used, their individual point value, and bonus squares used.

Modes of play include a bypass option which allows skipping up to five of the selected letters. Once all the letters have been placed on the grid, the mobility feature allows letters to be moved around, stimulating new levels of interest. The game is further enhanced by an optional time limit that can be used as a handicap for better players. The single best score is always displayed to give competitive players a target.

The Soft Images people are to be congratulated for their careful attention to the details of producing the game. The instruction manual is very well written and easy to follow. I was particularly impressed with the careful presentation of each command and option, as well as the inclusion of a command summary. The game plays smoothly and is well-engineered with simplified keyboard responses. The disk provided with the game is designed to automatically work with both the Model I and Model III TRSDOS systems. Master and backup copies are made at the beginning, and the original disk can be safely stored away. This well-designed backup facility makes the game much more enjoyable, eliminating the frustration with protected software that might be inadvertently destroyed by an inexperienced operator or a system crash.

Although very well produced, the game has two annoying features. First, loading the dictionary of words and search keys takes over four minutes, due to reading the files in BASIC. A better approach might have been to load an image of the data directly into memory. (I discovered that the game can be restarted without reloading the dictionaries, even if you accidentally hit the BREAK key or select the END option. Simply type GOTO 51 and press enter. The game will resume with the select options prompt.)

A second problem is with the dictionary entries. Words not in the dictionary cannot be scored, and the dictionary cannot be expanded. I was disappointed to miss high scores with words like annex, mead and oven.

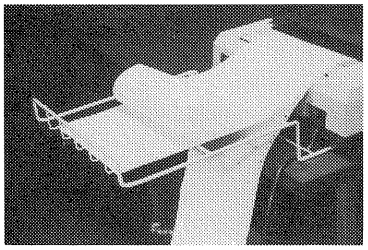
Despite these two limitations, I found the game very challenging. The option to rearrange the letters to beat my own score gave me special satisfaction. Seeing a 5000 game suddenly improve to 6500 really boosted my ego. If you like to do word puzzles or play word games, you should enjoy Pandemonium, no matter how old you are.

Stuart Hawkinson

Tanktics
Model I/III
Avalon Hill Game Co.
4517 Harford Rd.
Baltimore, MD 21214
(301) 254-9200
$24 cassette, $29 diskette

Tanktics is one of a series of computer war games offered by The Avalon Hill Game Company. In this particular game, you assume the role of a German tank commander fighting the opposing Russian tanks on the World War II eastern front. You have five types of tanks and three types of anti-tank guns at your disposal, with which to do battle. The computer serves as your opponent and controls the movement of the Russian tanks. The Russian forces have six types of tanks and one type of anti-

MICRO PRINTER BASKET



- Use with any table
- Quiets printer
- Special power cord and signal cable retainer to keep paper path clear
- Sturdy steel construction
- Durable epoxy finish
- Beige color blends with equipment
- 12" for 80 column printers $22.50
- 18" for 132 column printers $24.50
(this size can also be used with 80 column printers)

Add $3.00 shipping and handling

SEE, INC.
P.O. Box 40215
Indianapolis, IN 46240
317-844-8817
Dealer Inquiries Welcome

MasterCard VISA

ALLOWS UNLIMITED COPIES OF MOST RADIO SHACK PROGRAMS INCLUDING SCRIPSIT AND VISICALC

Comes on a disk

No Programming Experience Necessary

ONLY $15.00

BACKUP

TOLL FREE 800-835-0071

In Kansas 316 665-3611

SALES DATA, INC.

526 E. 4th

HUTCHINSON, KANSAS 67501

MODEL 4 OWNERS

CONVERT your MODEL I/III

PROGRAMS TO RUN ON MODEL 4

Do you have a lot of time and money invested in Model I/III software, well now you can convert Model I/III BASIC programs to Model 4 with **CONVERTR.**

CONVERTR will eliminate unnecessary spaces and insert all required spaces in your BASIC programs. **CONVERTR** will identify lines which contain keywords not supported by Model 4. **CONVERTR** will identify lines and keywords which the Model 4 handles differently. **CONVERTR** is menu driven and includes an option to list your program and error table on your printer.

CONVERTR comes on a disk and includes an instruction booklet on How to Convert your BASIC programs.

CHECK – MONEY ORDER
COD – – –
CONVERTR
1 DRIVE SYSTEM - 89.00
2 DRIVE SYSTEM - 79.00

ADEL COMPUTER MART
DEPT 50 BOX 195
HARTLY, DE 19953
PHONE 5 pm-9 pm M-F
9-5 Sat (302) 492-8463

IN-MEMORY FILE MANAGER

Why spend days developing complex string and numeric arrays, sorts and search routines? Why wait for several minutes while the garbage collector reorganizes string space?

Call on RAMFILE from your BASIC program to manage records of data using the RAM memory of your Model I or III computer. When you're done, RAMFILE will save the data to tape/disk for later use.

Individual Systems, Inc.
P.O. Box 343
Downers Grove, IL 60515
(312) 968-2337
Cassette $49.95 Disk $59.95
Master and Visa Cards accepted

COLOR DISK I $369

For a limited time only, you can buy a CoCo drive 0 from S & N for only $369!!
Includes:
- * TEAC or Tandon Slimline drive
- * Radio Shack compatible controller with gold contacts.
- * Complete manual
- * A two drive cable
- * Five free diskettes!!

All of the above with DUAL HEAD drive - $449!
Dual head system is configured to appear as two drives to the controller, so that it is fully compatible with R/S systems.

Printer Interface

Attaches any printer to the Coco.
Works at any of 7 baud rates. Only $65.

Order from:
S & N Enterprises
8 Wilson Court
Spring Valley, NY 10977
(914) 362-0713

NYS residents please add sales tax.
Prices subject to change without notice.

Please add $3.50 shipping on all orders.
* Circle our number for full catalog of CoCo items

NEW Radio Shack® TRS-80 DMP-2100

Replacement Ribbon

Manufactured by Aspen Ribbons, Inc. Buy direct from manufacturer & save.

Standard ink color is black. Red, green, blue, brown, & purple colors are available for $2.00 extra per ribbon.

PRICES

Radio Shack® TRS-80 DMP-2100 $4.00 to $12.00 ea.
Price depends on quantity ordered.

CALL FOR FREE CATALOGUE

*Aspen Ribbons, Inc is not affiliated with any company mentioned in this ad

Aspen Ribbons, Inc. 1700 N. 55th St.
Boulder, CO 80301-2796 (303)444-4054
Telex: 45-0055 End User: 800-525-0646
Wholesale: 800-525-9966

GRAPHICS

Delta Graphics Basic

Programme to expand graphics capability of TRS-80 Model I & III (Min: 16K level 2, cassette).

- Fast, powerful, easy to use
- For beginner and expert programmer
- Design games and graphics displays in a flash
- Written in compact Z-80 machine language.

ONLY
US $20 CDN $25
IN ONTARIO ADD 7% P.S.T

Shipping included — send cheque or money order to:

DELTA MICRO
P.O. Box 253, Dept-B,
Agincourt Stn., Agincourt,
Ontario, Canada
M1S 3B6

FREE GAME (WRITTEN IN DGB) INCLUDED

For more information, please circle the number below on reader service card
*TRS-80 — T.M. Tandy Corp.

MAGIC

DO YOU THROW AWAY YOUR CAR WHEN IT'S OUT OF GASOLINE?

Then why throw away your printer cartridge when it's out of ink?

We can show you how to re-ink your EPSON* ribbon cartridges, or other popular brands, with a re-inker plus a few cents worth of special ink.

Write today for free lists telling us your printers make and model. A postcard will do. Information available by mail only.

ZYGOTRON
P.O. Box 27
Fremont, Michigan 49412

*EPSON trademark
Epson, America Inc.

SMALL & reg. 32K 2 drives

LARGE CAPACITY PROGRAMS

M1 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
OROVILLE, CA 95965
916-533-5992

3.00 S&H
VISA OR MC
COD

manual $30.00 test set $50.00

tank gun to defend against your assault, or to launch their own attack. The computer also referees the game for illegal moves and determines if a tank that has been fired on was hit.

What makes this game more unusual than most is that the game package comes with its' own color playing board rather than the computer-generated one. The package also includes playing pieces or "counters," as the instructions call them, so that you can keep track of your own moves as well as the computer's.

The playing board uses five colors to depict different types of terrain. The predominant color is light green to indicate grass. On this surface, your tanks can move quickly, but will be forced to slow down when they cross the dark green patches representing the trees. Movement is least restricted on the improved surface of the road system. However, since the roadways wind around the perimeter of the board, it may take longer to get to the "objective" using them, than going across the unimproved surfaces.

Once the program has been loaded, you are prompted with several questions. The first asks which of the five scenarios you want to play. Two of the scenarios put you in a defensive posture. Two other scenarios put you in an assault posture. The remaining scenario pitts you against the Russians to see who can take and hold a predetermined "objective."

You must always keep in mind that you are out-numbered two to one. Learning to use the terrain for concealment can be helpful in dealing with the computer's greater forces. Close-range fire fights can cause you losses you can't afford. You must decide when to fight, and when to run. In real combat, the initial advantage is with the defender, since he is in position and does not have to fight on the move. Tanktics takes this into consideration. It is easier to defend against an attack, than to attempt an assault. This applies to both you and the computer. Luring the computer into an assault, when it is supposed to be defending, can aid you in winning the final victory.

While the "objective hex" is the primary target, the game is won by eliminating the opposition's forces. Moving a piece to that location is not actually necessary for a victory. It is assumed that an unopposed force will take and hold the objective. When the battle is over, you will receive your final score.

The program does check for entering improper data and illegal moves. If you make an improper entry, you will either get an error message from within the program, or you will be prompted again for the correct input. Making an improper entry will not cause the program to crash.

Tanktics is a game of strategy and logistics. It is a versatile, well-presented game, that is both entertaining and challenging. By carefully selecting scenarios, equipment types and quantities, you can obtain an almost-infinite variety of skill levels and playing times.

The documentation points out that the program does have weaknesses, but it gives no clues as to what they are. The authors believe that you should find them on your own, just as battlefield commanders discovered enemy weaknesses during World War II. In spite of any weakness that exists, you will find the computer a worthy adversary.

Robert Strydio

NEW LOWER PRICES

RIBBON CARTRIDGES

PRINTER MAKE, MODEL NUMBER Contact us if your printer is not listed. We have ribbons FOR MOST PRINTERS	NEW REPLACEMENT CARTRIDGES Price each In quantity of 3	6	12
ANADEX 9500	12.00	11.50	11.00
CENTRONICS 704 (7-MEG)	7.50	7.25	6.75
C.ITOH Prowriter	8.75	8.50	8.00
C.ITOH Starwriter	5.50	5.25	4.75
COMMODORE PET 8023P	9.00	8.75	8.00
EPSON MX70/MX80	5.50	5.25	5.00
EPSON MX100	11.00	10.50	10.00
IDS Paper Tiger 460/560	7.75	7.50	7.00
NEC 5500/7700 Nylon	6.00	5.75	5.25
Multistrike	5.50	5.25	4.75
Multistrike High Yield	6.00	5.75	5.25
OKIDATA Microline 84	6.00	5.75	5.25
80, 82, 83, 92, 93	3.00	2.75	2.25
QUME Nylon	5.25	5.00	4.50
QUME Multistrike	5.00	4.75	4.25
RADIO SHACK DW II Carbon Film - Black	6.25	6.00	5.50
RADIO SHACK LP I-II-IV	3.50	3.25	3.00
RADIO SHACK LP III-V	6.25	6.00	5.50
RADIO SHACK LP VI-VIII	6.50	6.25	5.75

CHECK – MO – COD –

All orders shipped U.S. mail. FREE shipping on prepaid orders for USA zip codes. VISA/MC add $1.50 (include exp. date). COD add $3.00. Foreign must be US funds add $3.00 surface, $6.00 air. Ph 6 pm - 9 pm EST Mon - Fri & 9 am - 5 pm Sat.

ADEL COMPUTER MART (302) 492-8463
Dept. 40 Box 195 • Hartly, DE 19953

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

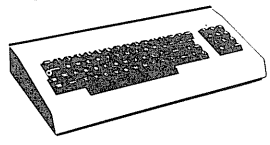
At local dealers or order direct

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

DETACHED KEYBOARD CASE
for *LNW's*



- GETS FAN NOISE AWAY FROM YOU
- GIVES YOU MORE DESK SPACE
- POLANE CATALIZED TEXTURED FINISH
- STANDARD COLOR IS GRAY/WHITE
- USES ALL MACHINE SCREWS & STUDS
- STRAIN RELIEF FOR CABLE
- $39.50 + $2.50 SHIPPING
- WA RESIDENTS ADD 8% TAX

EDUKIT COMPANY
23215 94TH SOUTH
KENT WA 98031

***** TRS-80 Model II *****

DRS— A machine language program which produces a sorted directory list similar to the original Model II DIR list. Sequence can be either by file name, date created, or date updated. Supplied on 8" diskette for $24.95.

SUBRTN— A subroutine called by your Cobol program which adds many useful capabilities to RSCOBOL.

1) Quick Sort	2) Hold Key
3) Break Key	4) Scroll Protect
5) Screen Print	6) Printer Control
7) Cursor Control	8) Keyboard Read

Supplied on 8" diskette for $49.95.

Please add $2.00 per order shipping. PA residents add 6% sales tax.

Advanced Micro Systems
c/o R. Turri
7571 Red Pine Road
Harrisburg, PA 17112
(717) 652-8838
EMAIL 71445,1414

SLOW DOWN!

TIRED OF "SPACE" GAMES? TRY

Oscar Draft

SPECIAL MISSION PILOT

There's plenty to shoot at: bombing, strafing, dogfighting. But the real fun is navigation. Using 2 ADF/DME instruments. You must find targets and return home base. Based on real navigation. Instrument panel, runway, fighters, etc., all in graphics.

32K Disk **Model I & III**

BUT THAT'S NOT ALL!

This is 1 of 9 programs in a $175 package. You also get Wizard's City (adventure game), income tax, financial statement, mail list, bus. mileage, tax file, income/expense, and stock charting. 2 super games and 7 personals!

YOU GET THE ENTIRE $175 PACKAGE FOR **$21.95** ADD $1.50 SHIPPING

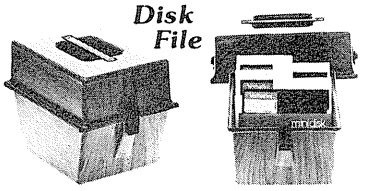
Attention tape users! Order disk and have it copied. How can you lose at $2.44/program?

BAP$ SOFTWARE

6011 SAN FELIPE
HOUSTON, TX 77057

SECUR-IT

Disk File



Secur-It ***Disk File storage containers offer safe, no-spill portability and secure, orderly storage for your diskettes. 50 diskette capacity. Walnut wood grain or black for 5¼" or 8" diskettes. 5¼" files, $29.95 ea., 8" files, $39.95 ea. Specify color & size.***

Model I/III Software

• Send For Free Catalog
• For Fastest Service Send Money Order Or Certified Check • Add $2.00 Shipping Charge Per Order • Calif. Residents Add 6½% Sales Tax • All Merchandise Shipped From Stock •

REM Industries, Inc.
9420 "B" Lurline Ave., Chatsworth, Ca. 91311
(213) 341-3719

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

NEW!! From The Bear

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

Still 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

LIMITED OFFER

NEWDOS - 80 ver. 2.0
and DOSPLUS ver. 3.4

A combined regular price of $299.96

Now **$149.00** combined price

or call for separate pricing. Offer subject to cancellation without notice.

CALL TOLL FREE
800-835-0071

In Kansas 316-665-3611

SALES DATA, INC.
526 E. 4th
HUTCHINSON, KANSAS 67501

The House-Ware Genies

- ★ The Mail Genie
- ★ The Pantry Genie
- ★ The Recipe Genie
- ★ The Calendar Genie
- ★ The Insurance Genie

At last, the Turn-Key Programs that allow Dad to influence Mom, that a TRS™-80 Model III and Color Computer is a modern day necessity.

Introductory Price **$29.95**

Developed By
SOUTHERN CENTER FOR RESEARCH & INNOVATION
P.O. Box 1713
Hattiesburg, MS 39403
TELEPHONE 601-545-1680
TELEX 585400 SCRI US HATI
CABLE SCRI US

Dealer Inquiries Invited

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

VISA master charge

EAP COMPANY
P.O. Box 14, Keller, TX 76248
(817) 498-4242
*TRS-80 is a trademark of Tandy Corp.

SUPER — P/R PAYROLL

Power and flexibility for all your payroll needs . . . from 5-employees to an accounting firm with 30 payrolls.

SAMPLING OF FEATURES

- **Machine language sorts.**
- **Multiple state tax withholding.**
- **Departmental payroll journals.**
- **Report generator for non-standard reports.**
- **14 User Defined Earninge/Deduction Categories With Employee Base Rates.**
- **Works with all DOSES.**
- **Date file conversion for Radio Shack Disk Payroll [26-1556] users.**
- **150-page comprehensive User's Manual.**

Complete System	$225	Credit
Manual With Demo System	$55	$45*
Manual Only	$35	$35*

*Credit allowed when Complete System is purchased in the future.

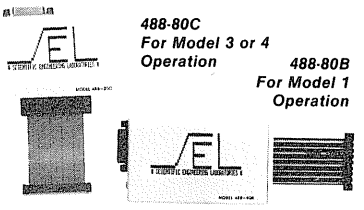
Users say SUPER-P/R is simply the best. If you don't agree, return the Complete System within 60 days for a full refund (less $25 Eval. Charge.)

MICROCOMPUTER APPLICATIONS
3485 Mock Orange Court South
Salem, Oregon 97302
(503) 364-1090

Write or leave message for free brochure or additional details. Specify Model I, Model III, or Model 4.

IEEE-488 TO TRS-80* INTERFACE

Everything needed to add *powerful* BASIC GPIB-488 controller capability to TRS-80 Model 1, 3 or 4, Level 2 or DOS with a minimum of 16K.



488-80C For Model 3 or 4 Operation

488-80B For Model 1 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

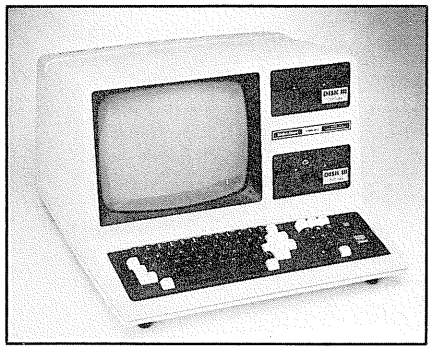
*Trademark of Tandy Corp.

There is no affiliation between Scientific Engineering Laboratories and Tandy Corp. or Radio Shack.

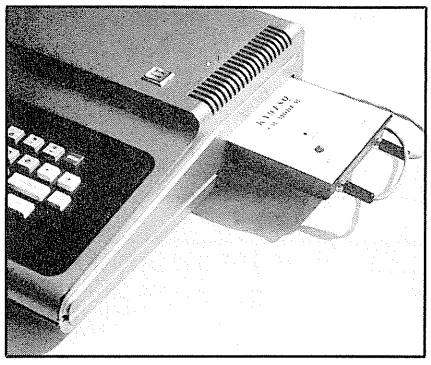
For immediate release

Joy-80 Joystick

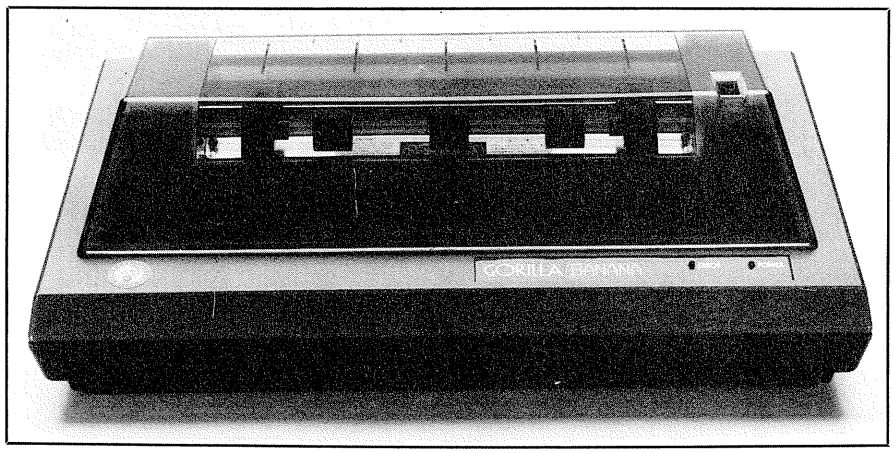
Model III/4 Drives



Morse Interface



Banana Printer



Gorilla Banana Printer

The Banana is a versatile dot-matrix printer designed to sell at $249.95 and is the first product in Leading Edge's new Gorilla line of popularly-priced products.

The Banana is an 80-column, tractor-feed printer, capable of alphanumerics or graphics, on fan-fold forms from 4.5 to 10 inches wide. The manufacturer's stated print speed is 50 characters per second. There is a normal 10 characters/inch mode as well as a software selectable double width mode. When in letter mode, the spacing is six lines per inch and character sets for U.S., U.K., German and Swedish are selectable by command or dip switch. The dot-addressable graphics mode has a density of 63 x 60 dots per inch and spacing is reduced to 9 lines per inch.

A Centronics-type parallel interface allows direct hook-up to the TRS-80 Models I,II, and III. For more information, contact Leading Edge Products, Inc., 225 Turnpike St., Canton, MA 02021 or call (800) 343-6833. In Massachusetts call collect (617) 828-8150.

6.0 Plus DOS Enhancements

Micro-Systems Software, Inc., has just released 6.0 Plus, a series of DOS and BASIC enhancements for the Model 4 owner. The package allows TRSDOS 6.0 users some of the utilities of DOSPLUS IV without having to purchase an entire operating system. The package includes a disk editor, a file editor and a directory verification or repair utility. The BASIC enhancements provide shorthand immediate commands and abbreviated statements to make programming chores easier.

The BASIC enhancements have two forms: internal and external. External programs include a multi-array machine language sort, comprehensive cross-referencer, and a global search and replace utility for BASIC text. Internal enhancements include label addressing, extended error messages and an expanded OPTION command that provides for compatibility with Model III Disk BASIC. It is priced at $49.95 and for further details contact Micro-Systems Software, Inc., 4301-18 Oak Circle, Boca Raton, FL 33431 or call (800) 327-8724. In Florida call (305) 983-3390.

Model III/4 Disk Drives

The Disk III floppy disk subsystem is available in single or double sided, 40 or 80 tracks, and is fully compatible with TRSDOS 6.0. External drives are available in the same configurations, as well as a Hard Disk III Winchester subsystem in configurations from 5 to 60 megabytes. All products carry a 120 day warranty. For price information, contact VR Data, 777 Henderson Blvd. N-6, Folcroft Industrial Park, Folcroft, PA 19032 (215) 461-5300.

Videotape Lessons

Radio Shack now offers ten 30-minute VHS videotape lessons on BASIC programming entitled *Introduction to BASIC*. Individual lessons include arithmetic operations, creating and storing programs, branching, looping, arrays, subroutines, read-data statements and graphics.

The lessons are available for $349

through Radio Shack Computer Centers and participating stores. They are intended for use with the Radio Shack *Part 1 Student Workbook* (catalog 26-2151), offered separately for $3.50 per copy. The lessons, taught by Dr. Normal T. Bell, of Michigan State University, can be used to review live presentations, provide in-service training to teachers, or as fill-in material from students who have missed a class.

Utility Billing Software

WaterBil, SewerBil, TaxBil, ElectricBil, and RefuseBil are a series of comprehensive utility billing and accounting programs from Eberhard Engineering. These five separate, but interactive modules, are targeted for use by small to medium sized utilities or municipalities. Each program can be used for data processing services in addition to evaluating various user charge systems and determining user charge rates. Print to screen, paper, and to "automatic mailers" so bills can be issued without envelope stuffing or affixing postage. The programs are capable of handling many different rate structures, penalty charges, and operating statistics. The software system includes ready-to-use diskettes and fully documented user's manual. Custom programming, modifications and installation support are also available.

Written in BASIC, the programs are available for models II, 12, and 16 (Z-80 mode), with a Daisy Wheel II or line printer. They can operate under TRSDOS, Racet's HSDS, or DOSPLUS II operating systems. Base price for any of the programs is $1,000 and $750 for each additional module purchased. A descriptive brochure and sample printouts are available on request from Eberhard Engineering, P.C., 27 Pine Ridge Drive, Smithtown, NY 11787 or call (516) 543-7777.

Line Sharing Interface

Black Box Catalog now offers three different Terminal/Modem/Line Sharing Interfaces with two, four, or eight ports. The device can connect up to eight terminals to one modem, line, or port, thereby sharing costly communication links. They are active modem-sharing units that electrically isolate attached terminals. Each unit operates with built-in contention. The RTS lead of each terminal is scanned and once a Request-To-Send is detected, the unit switches and dedicates the send data, receive data, CTS, and carrier detect signals to the requesting terminal while isolating all other connected terminals. Data transmission may be asynchronous or synchronous, with speeds up to 9600 bps.

The two port Electronic Y Cable sells for $295, the four port model is $425, and the eight port model is $750. To obtain more information, and a free catalog of Black Box Catalog's complete line of products, write to Black Box Catalog, P.O. Box 12800, Pittsburgh, PA 15241 or call (412) 746-2910.

Profile Transfer Utility

TransPro is a machine language file transfer utility for use with Radio Shack's Profile II and Profile Plus Model II/12/16 database programs. You can change the layout of a Profile database, adding or deleting fields, change field lengths, or move fields to different segments. TransPro allows you to insert literal values into selected fields of an existing database without changing the contents of other fields. You can also blank out selected fields. The utility will operate on TRSDOS 2.0, 4.0, 4.1, or 4.2, is priced at $75, and will not affect the operation of your Profile programs. For more information contact Bridgeware, 355 Government St., Roanoke, AL 36274, or call (205) 863-4006.

Auto Dial 212A Modem

The Auto Dial 212A modem from U.S. Robotics, Inc. gives sophisticated features while using only one-sixth the circuitry of other similar modems. It will automatically dial, or answer, and transmits at 300 or 1200 baud, operates at full or half duplex and contains an audible phone line signal monitoring

The Automatic Ribbon Re-Inker

Re-ink any type of ribbon (except carbon) for less than 5 cents.

Extremely simple operation. 1) Load cartridge or spool. 2) Add ink to reservoir. 3) Start motor.

We have a MAC INKER for any printer—many MAC INKER units support multiple printers. Ink contains lubricant for safe dot matrix printhead operation. Multicolored inks available. Ask for brochure.

Computer Friends
100 Northwest 86th Avenue
Portland, Oregon 97229
(503) 297-2321

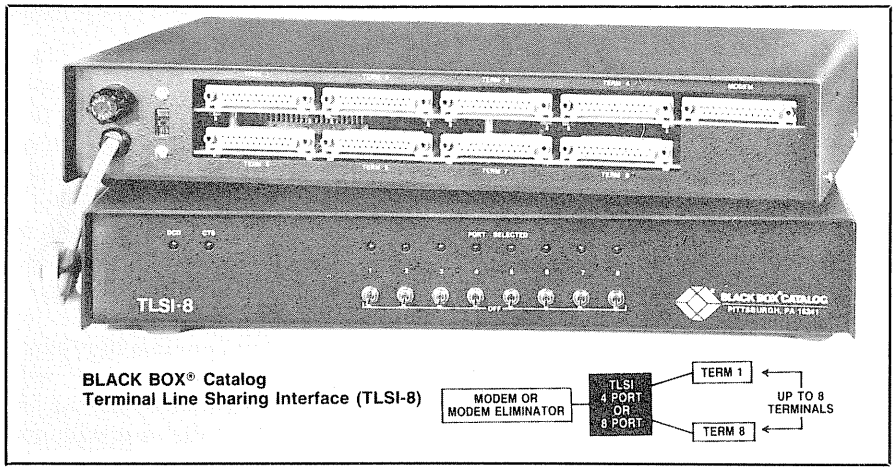
Price **$54.95** plus **$3.00** S&H. Prices slightly higher for some printers. Total satisfaction or full refund.

US Patent Pending

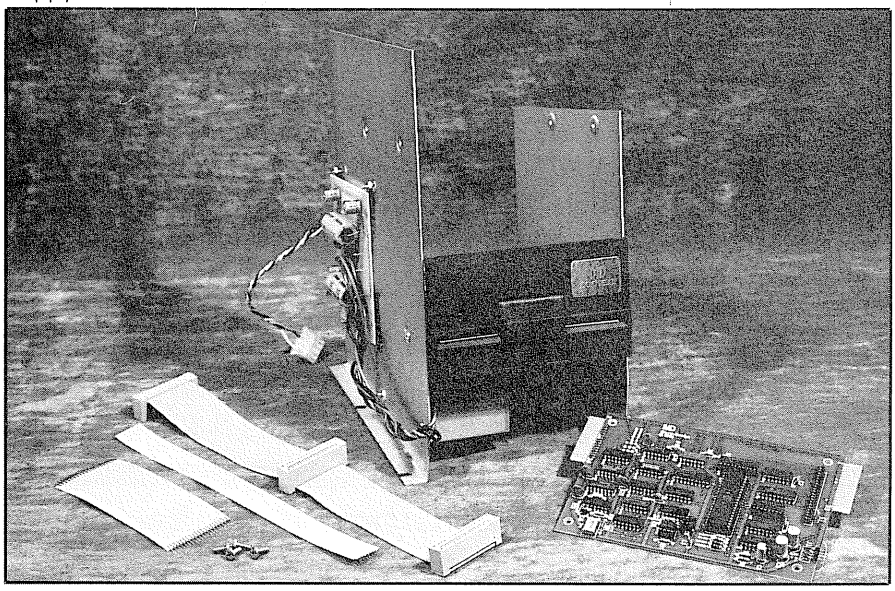
Dealer inquiries welcome

MacInker™

Line Sharing Interface



Floppy Disk Controller



212A Modem

For immediate release

system. The modem is Bell 103/113/212A and Hayes dialing protocol compatible. There is a built-in self test systems and dip switches allow the user to configure for virtually any computer or terminal. Suggested retail price is under $600 and it is supported with a two-year, limited warranty. For more information contact U.S. Robotics, Inc., 1123 West Washington Blvd., Chicago, IL 60607 or call (312) 733-0497.

Cribbage Master II

Cribbage Master II, a new game from Manhattan Software plays a solid, conservative game of Cribbage on the TRS-80 Models I and III disk systems. The game has card graphics, with the player's cards moving from his "hand" to the "table" as they are played.

Game analysis and play are fast, and all standard rules of Cribbage are observed, including points for His Nobs and His Heels. It is an excellent tutor or playing partner. It even makes "mistakes" in play, but never in counting hand or crib points. Scoring is automatic, but pegging is up to the player. The price is $21.95 from Manhattan Software, P.O. Box 1063, Woodland Hills, CA 91365. Credit card orders accepted by phone at (213) 453-6943.

Rainbow-Writer

Rainbow-Writer is a general purpose SCREEN formatter for the Color Computer. The utility allows effortless creation of dazzling SCREEN displays with a whole new character set. The 32 characters by 16 lines standard character set is replaced with 12 character sizes that range from 16 X 8 to 64 X 24, including lowercase descenders, and most sizes are available in a multitude of colors.

Useful SCREEN features such as underline, subscript, superscript, scroll protect and more are included. 16K Extended BASIC is required and the price is $29.95 cassette or $32.95 disk. For more information, contact Rainbow Connection Software, 3514 6th Place N.W., Rochester, MN 55901.

CP/M'83 East

CP/M'83 is an international conference and exposition for the

CP/M industry and CP/M users. The show will feature manufacturers, independent software developers, publishers, OEMs, distributors and dealers. The conference program has nearly 100 sessions scheduled with many noted speakers. Admission price is $10 for a one day exhibits-only ticket or $25 for a three day exhibits and conference ticket. CP/M'83 East will be held September 29 through October 1, 1983 at Boston's Hynes Auditorium. Show hours are from 10:30 AM to 5:30 PM, daily.

Model I/III Joystick

The Joy 80 joystick from Van Enterprises requires no electrical connections and will not void your warranty. The Joy 80 clips to the top of your TRS-80 keyboard and puts control of the four arrow keys (up, down, back, forward) at one control point. This add-on device sells for only $19.50. For more information, contact Van Enterprises, P.O. Box 238, Oak Forest, IL 60452.

CW Modem Interface

The KA9FSQ CW Modem makes it possible for ham radio operators to transmit or receive morse code on a TRS-80 Color Computer. The modem changes the RX tone into a digital pulse and it uses an optoisolator rather than a mechanical relay. This allows the unit to keep keying voltages away from your computer and gives a clean digital pulse to your transmitter. The device is easily operated, just plug the cartridge into the ROM pak slot, connect two cables, one from your transmitter and one from your receiver, turn on the computer, and run the program. The complete system, including modem and cassette, is priced at $50, postage paid. For more information contact Mitronix, 5953 N. Teutonia Ave., Milwaukee, WI 53209. Also available at no charge is a descriptive brochure on their complete line of programs that are available for the KA9FSQ CW Modem.

Low Cost Printout Basket

See, Inc., has designed a printout basket for microcomputer printers, word processing printers and low volume terminal printers. The unit is to be used on a desk or table and no special stand is required. The steel rod, beige epoxy coated, basket lets the printer rest on it, and it has rubber vibration eliminators which ensure that the printer and basket stay in place. The design allows for paper feed from under the basket or from a box on the floor and can be used with both bottom feed or rear feed printers. The printout basket comes in two sizes, a 12 inch width for $22.50 and an 18 inch width version for $24.50, plus $3.00 shipping and handling. The larger size can be used with either narrow or wide printers. The baskets are available from See Inc., P.O. Box 40215, Indianapolis, IN 46240 or call (317) 844-8817.

Exams Program for Teachers

Exams is a program for the Model III which allows quick creation,

SCRNWRTR — **$24.95**
HOW MANY HOURS OF YOUR PROGRAMING TIME IS SPENT ON TRYING TO DESIGN VIDEO SCREENS? IF YOU ARE SPENDING TO MANY HOURS DESIGNING SCREENS FOR YOUR BASIC PROGRAMS THEN THIS IS THE UTILITY FOR YOU. SCRNWRTR USES A FULL FLOATING CURSOR THAT CAN BE POSITIONED ANYWHERE ON THE SCREEN USING THE 4 ARROW KEYS. A NUMBER IS DISPLAYED AT THE BOTTOM OF THE SCREEN SHOWING THE EXACT LOCATION OF THE CURSOR FOR EASY REFERENCE. A UNIQUE FEATURE OF THIS PROGRAM IS THAT ALL 64 OF THE GRAPHIC CHARACTERS AS WELL AS ALL 64 OF THE SPECIAL CHARACTERS ON THE MODEL-III ARE AVAILABLE FROM THE KEYBOARD. ONCE A SCREEN HAS BEEN DESIGNED IT CAN BE SAVED FOR FUTURE USE IN YOUR BASIC PROGRAMS. MODEL III DISK SYSTEMS

MAIL — **$39.95**
MAIL A BASIC MAILING LIST PROGRAM WITH ALL OF THE SPEED AND FEATURES OF THE MORE EXPENSIVE MACHINE LANGUAGE PROGRAMS. FEATURES INCLUDE FULL GLOBAL SEARCH AND EDIT ON ALL FIELDS. A FAST SORT ROUTINE ON ANY OR ALL FIELDS. PRINT 1,2,3 OR 4 LABELS ACROSS. STORE UP TO 2000 NAMES ON A SINGLE DATA DISK ON THE MODEL III. MODEL I/III 1 OR 2 DISK SYSTEM

DBM SUB — **$49.95**
DBM Sub - IS A DISK OF MODEL I/III BASIC ROUTINES THAT LET YOU CREATE A DATA-BASE MANAGEMENT SYSTEM CUSTOMIZED TO YOUR EXACT NEEDS. THE MAIN FEATURE IS THE ABILITY TO HAVE DATA BASES WITHIN DATA BASES. (A FEATURE NOT FOUND IN ANY OTHERS). THE DATA BASE SYSTEM THAT YOU WRITE MAY BE AS FAST AS SOME MACHINE LANGUAGE PROGRAMS ON THE MARKET. THE DBM DISK CONTAINS DISK, PRINTER, AND SCREEN I/O, & OTHER ROUTINES, AND WORKS WITH MOST DOS'S. MODEL I/III DISK

JCP — **$75.00**
JCP - JOB CONTROL PROGRAM FOR ANY CONTRACTOR THAT USES A DRAW SYSTEM FOR BILLING CLIENTS. PRINTS STATEMENTS, AGING REPORT, CONTRACT SUMMARY, JOB SUMMARY BY CONTRACT ETC. MODEL III 2 DISKS

ZBASIC — **$89.95**
ZBASIC IS A MACHINE LANGUAGE COMPILER FROM SIMUTEK COMPUTER PRODUCTS. THIS IS PROBABLY THE FASTEST COMPILER ON THE MARKET. MODELI/III DISK $89.95 - MODEL I/III TAPE $79.95 - DISK AND TAPE $99.95

(803)-552-9990

K&L SOFTWARE

P.O.BOX 39093 NORTHBRIDGE STA.
CHARLESTON, S.C. 29407

BANKAMERICARD VISA
master charge

PLEASE SPECIFY MODEL I/III AND DOS
SORRY NO COD ORDERS PLEASE.
ADD $2.00 PER ORDER FOR POSTAGE/HANDLING.
ALLOW 21 DAYS FOR DELIVERY ON PERSONAL CHECK ORDERS.
CALL TO PLACE VISA/MASTER CARD ORDERS, OR MAIL CARD NUMBER AND EXP. DATE.
S.C. RESIDENTS ADD SALES TAX.
TRS-80 MODEL I/III REGISTERED TO TANDY CORP.

modification, and storage of multiple choice or true-false exams on floppy diskettes. Neatly formatted tests, answer keys, and answer forms can be quickly printed. The program is a word processing system that makes editing simple. All questions are stored in files and each one may be reviewed, edited, and used on a new exam. A keyword search option makes it easy to build targeted exams and a random question selection quickly generates different forms of the same exam. Each test may have up to 100 questions and up to 5 possible answers. The program requires at least 32K and two disk drives. The 60-page manual may be purchased for $12.95, which will be credited toward the total purchase price of $69.95. For more information contact Microsoftware Services, P.O. Box 776, Harrisonburg, VA 22801, or call (703) 433-9485.

Long Distance Analyzer

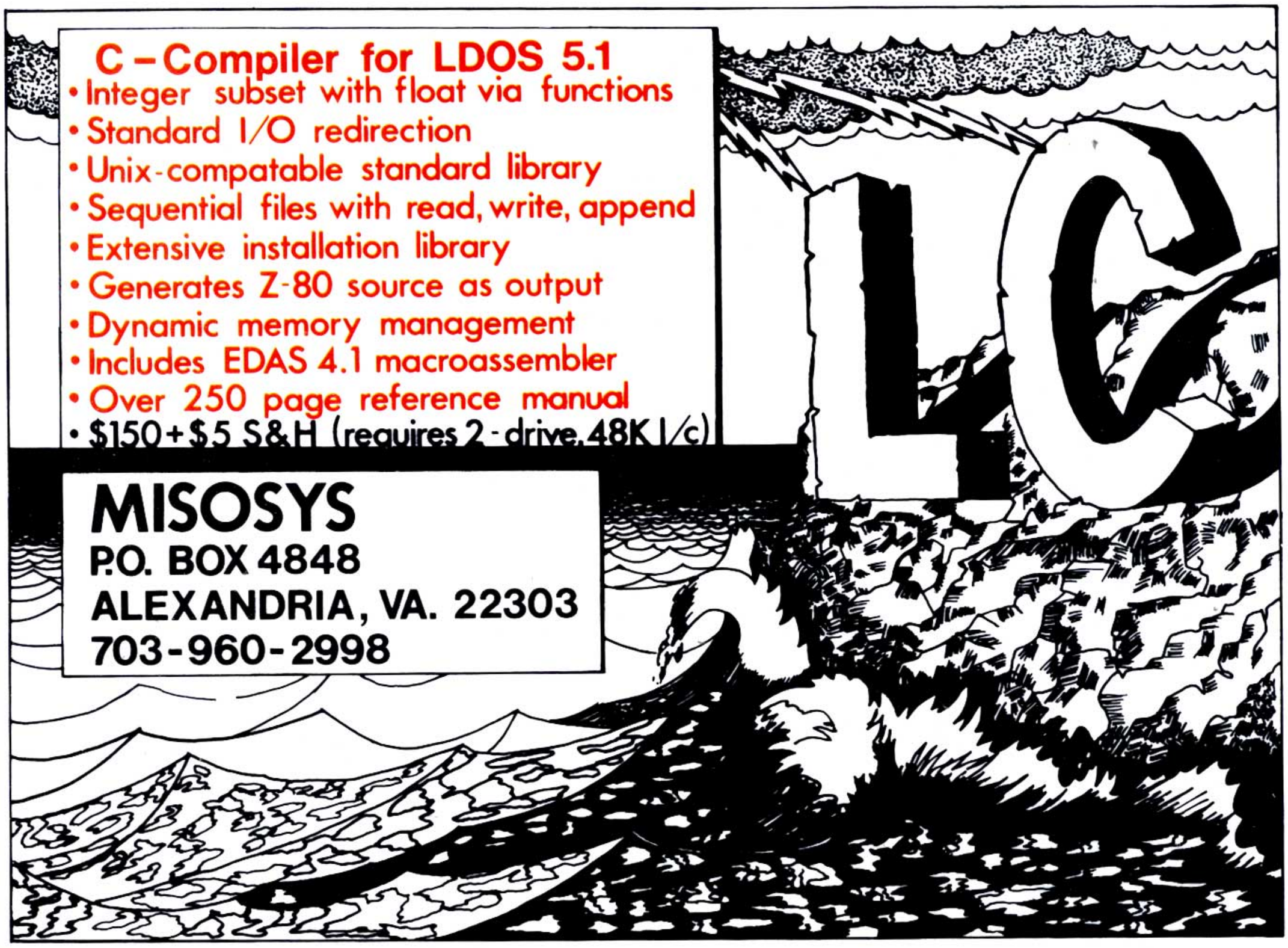
Long Distance Analyzer is a menu-driven business program for the TRS-80 Models II/12/16 or III/4. It saves time and money by organizing your phone bills, identifying parties called, producing totals and reports, and analyzing geographic patterns.

Cut waste and abuse, bill phone charges to clients, recover phone company billing errors, evaluate special services such as WATS, print an alphabetic directory and cost account by your categories. The package, designed for at least 48K and two disk drives, is available for $195 from Golden Braid Software, 1450 Ranchero Drive, Sarasota, FL 33582 (813) 371-0388

Floppy Disk Controller

The MDX-6 Floppy Disk Controller for the Models III and 4 handles eight inch disk drives as well as 5 1/4 inch single and double sided drives. The unit has address, data and control line buffering and gold edge connectors, and a full one year warranty. Micro-Design also offers the MDX-6 as a bare kit. The PC board is solder-masked and silk screened for easy assembly. A comprehensive user's manual includes design overview, parts lists, assembly, installation, circuit description and troubleshooting. The upgrade includes the new MDX-6, mounting towers and hardware, a power supply that is adequate for both internal drives, all hardware and cabling, and one Remex single-sided disk drive. Installation does not require any soldering or trace cutting.

Micro-Design also offers the MDX-3 and MDX-5 interface boards for the Models III and 4 computers. These boards offer both a 110 to 19,200 baud software programable serial port and a 300 baud direct-connect phone modem. The MDX-3 has the circuitry of the MDX-5 and MDX-6 on one board. These boards are also available in kit form. For more information and literature, call or write Micro-Design, 6301 Manchaca Rd., Suite B, Austin, TX 78745 (800) 531-5002.



Bulletin board

This bulletin board space is available free to individuals with single or unusual items for sale or trade. Basic Computing reserves the right to reject any commercial advertising in this section and suggests using our display advertising for that purpose.

These notices are free of charge and will be printed one time only on a space available basis. Notices will be accepted from individuals or bona fide computer user clubs only. All these unclassified announcements must be typed, contain 75 words or less and include complete name and address information.

---

20 Adventure programs for sale for Model I/III. Some are *Softside CV* tapes with adventure and other programs. All original tapes and documentation. First $35 takes them. Include $3 postage. I will sell them separately also, send sase for information. Scott J. Mitchell, 346 So. Taylor St., Manchester, NH 03103 (603) 624-0089.

MPI 80-track, dual-headed, double-density disk drives for sale. Never used. One megabyte storage, for Models I/III, standard Shugart pin-out. Bare drives $245 each. Contact Dr. Kaye, 22 Harts Hill Circle, Whitesboro, NY 13492 or call (315) 736-3967.

For Sale Two 5.25" Pertec Drives, double-sided, 35-track, Model I compatible. Only $50 each. Contact Tony Fernandes, 18530 Hatteras #307, Tarzana, CA 91356 or call (213) 708-7058.

Must sell! 48K Model I with two Exatron Stringy Floppies, Radio Shack Voxbox and Modem I, house controller, printer interface, 5.33 MHz speed-up board, with tons of software. Asking only $800. It's worth more than twice that in software alone! Bob LaFrance, 83 McDonald Dr., Chicopee, MA 01020 or call (413) 594-2885. I'll even pay shipping.

$5000 in hardware and software. Model I TRS-80, Expansion interface, 48K, three 40-track, double-density disk drives, RS-232 with JCAT Modem, Epson MX-80, lowercase, Goldplugs, speed-up mod. (uninstalled), Microgrip, all manuals. 75 disks of software such as Electric Pencil, Omniterm, DOSPLUS 3.5D, Sea Dragon, Zork I and much more. Sacrifice at $2900 or best offer (student needs money). Alexander Crawford, Groton School, Groton, MA 01450.

Entire system goes! Modified Model I, level II, 16K. Includes cassette, Stringy Floppy, wafers, line printer, custom-built table. Worth over $1100, asking $800. Joel Minchinton, 107 South 2nd, Wahpeton, ND 58075 or call (701) 642-1326.

Program Library needs your help. We are seeking to exchange public domain programs. Preferred format is Model III, TRSDOS 1.3 data diskettes. We will return your diskette with programs from our library. A copy of your group's library policy and program list would be appreciated. Significant contributions from individuals are also welcome. Mail to TCTUG Library, Twin City TRS-80 User Group, Gary Schlegel, 21581 Creekside Circle, Lakeville, MN 55044.

Color Computer Club is sponsored by the Oxnard Public Library in Oxnard CA. They meet the third Wednesday of each month -- place to be announced. For information contact Doug McLaughlin at (805) 487-9446 or Pete Lyall at (805) 984-1842.

CC User's Group, a section of the Philadelphia Area Computer Society, meets on the third Saturday of the month at 10 a.m. in the Science building of LaSalle College. For more information contact A. Arnold Weiss, Apt. 1626 Kennedy House, 1901 J. F. Kennedy Blvd., Philadelphia, PA 19103.

Magazines for sale. *Softside* 10/78 to 6/83 plus nine *Prog/80* for $150. *Softside Disk Version* 9/81 to 12/82 for $125. *BYTE* 4/78 to 6/83 for $150. *80-US Journal* 1/81 to 6/83 plus seven back issues for $75. Contact U. F. Racine, 2520 S.E. Alexander, Topeka, KS 66605 or call (913) 234-2707.

I Want to form a Color Computer Club in the Tri-Cities, WA area. If you are interested, contact Thell Rooney, 1301 W. John Day, Kennewick, WA 99336 or call (509) 586-4840.

MC-10 User's Group getting started. Any interested owners who send me a sase will receive the group's first newsletter, a member survey, and an invitation to join. Only inquires accompanied by an sase will be acknowledged. Bob Kantor, 36 Prospect Ave., Ossining, NY 10562.

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 I** or Double Density **Model I/III**

$29.95

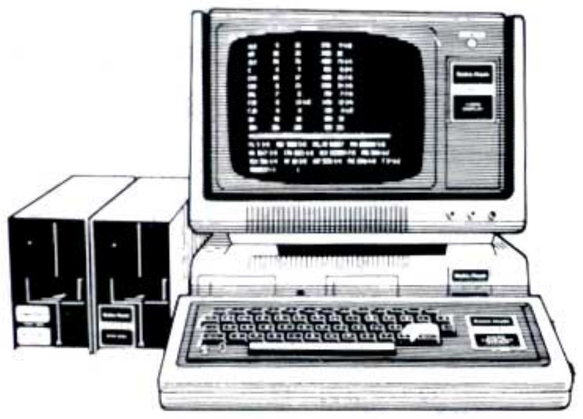
FREE CATALOG

of Serious Software for your 80

Daily 10-5 VISA-MC Saturday 10-2

TOLL FREE **1-800-692-5235**
IN CA **1-213-873-6621**

CDC
13715 VANOWEN STREET
VAN NUYS, CA 91405



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

Advertiser index

Advertiser	Page
Adel Computer Mart	99, 100
Advanced Micro Systems	100
Adventure International	65
Allen Gelder Software	19, 21
ALPS	10
Ammicro	33
Analytical Processes Corp.	92
Anitek Software Products	94
Applied Microsystems, Inc.	93
Armstrong Genealogical Systems	38
Artificial Intelligence Technology	77
Aspen Ribbons, Inc.	99
Astro-Star Enterprises	96
B.T. Enterprises	60
BAPS Software	101
Barclay Whyte Associates	101
Bridgeware	97
Brylar Technology	28
Business Division, The	39
CDC	107
Compukit	76
Compusoft Publishing, Inc.	13
Computer Friends	103
Computer Services of Danbury	92
Comstar Research	91
Cosmopolitan Electronics Corp.	51
C.P.R.	93
Crest Software	55
CRB Micro Tools	90
Delta Micro	99
DFW Computer Center	98
Discovery Games	55
Disk 'n Data	101
EAP Company	101
Educational Media Associates	100
Edukit Company	100
80-Northwest Publishing	9, 108
Ft. Worth Computer	68
Gamester Software	54
H&E Computronics	71, 110
HBJ	49
Hexagon Systems	83
High Desert Engineering	83
Holman D-P Service	99
Howe Software	97
Individual Systems, Inc.	99
K&L Software	105

Advertiser	Page
Langley-St. Clair	109
Logical Systems, Inc.	7, 111
Lynn Computer Service	87
Marymac Industries, Inc.	26
Mayday Software	91
MCS Software	90
Memory Merchant	63
Micro Architect, Inc.	15
Micro Control Systems, Inc.	3
Micro Images	88
Micro Labs, Inc.	43
Micro Management Systems, Inc.	61
Micro Software Systems	89
Micro-80, Inc.	96
Micro-Systems Software, Inc.	2
Microcomputer Applications	101
Microsette	70
Midwest Comp-U-Tron	54
MISOSYS	23, 106
Modular Software Associates	97
New Classic Software	73
Nocona Electronics	25
Omnilogic	67
Omnisoft Research	84
Pickles & Trout	11
Pioneer Software	45
Producer Software	37
Proper Touch, The	20
Prosoft	44
Radio Shack	56, 57, 112
REM Industries, Inc.	101
S&N Enterprises	99
Sales Data, Inc.	99, 101
Scientific Engineering Labs.	101
See, Inc.	99
Snapp Ware	80, 81
Soft Systems & Consulting	96
Solutions, Inc.	50
Southern Center for Research & Innovation	101
Team Computer Products	94
Texas Computer Systems	37
Treesoft Software Company	95
TriSoft	79
United Software Associates	95
Vespa Computers	35
Wadsworth Electronic Publishing Co.	85
Zygotron	99

Advertisers: We will be resuming reader service in the October issue. Please contact your advertising representative or Catherine Shappee, advertising coordinator, Basic Computing (206) 475-2219.

"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

☐ #GN42 Green Phosphor	$79.95
☐ #GN42G Green Phosphor w/Anti-Glare	$89.95
☐ #OR34 Amber Phosphor	$89.95
☐ #OR34G Amber Phosphor w/Anti-Glare	$99.95
also available:	
☐ #R22G Red Phosphor w/Anti-Glare	$139.95
☐ #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)

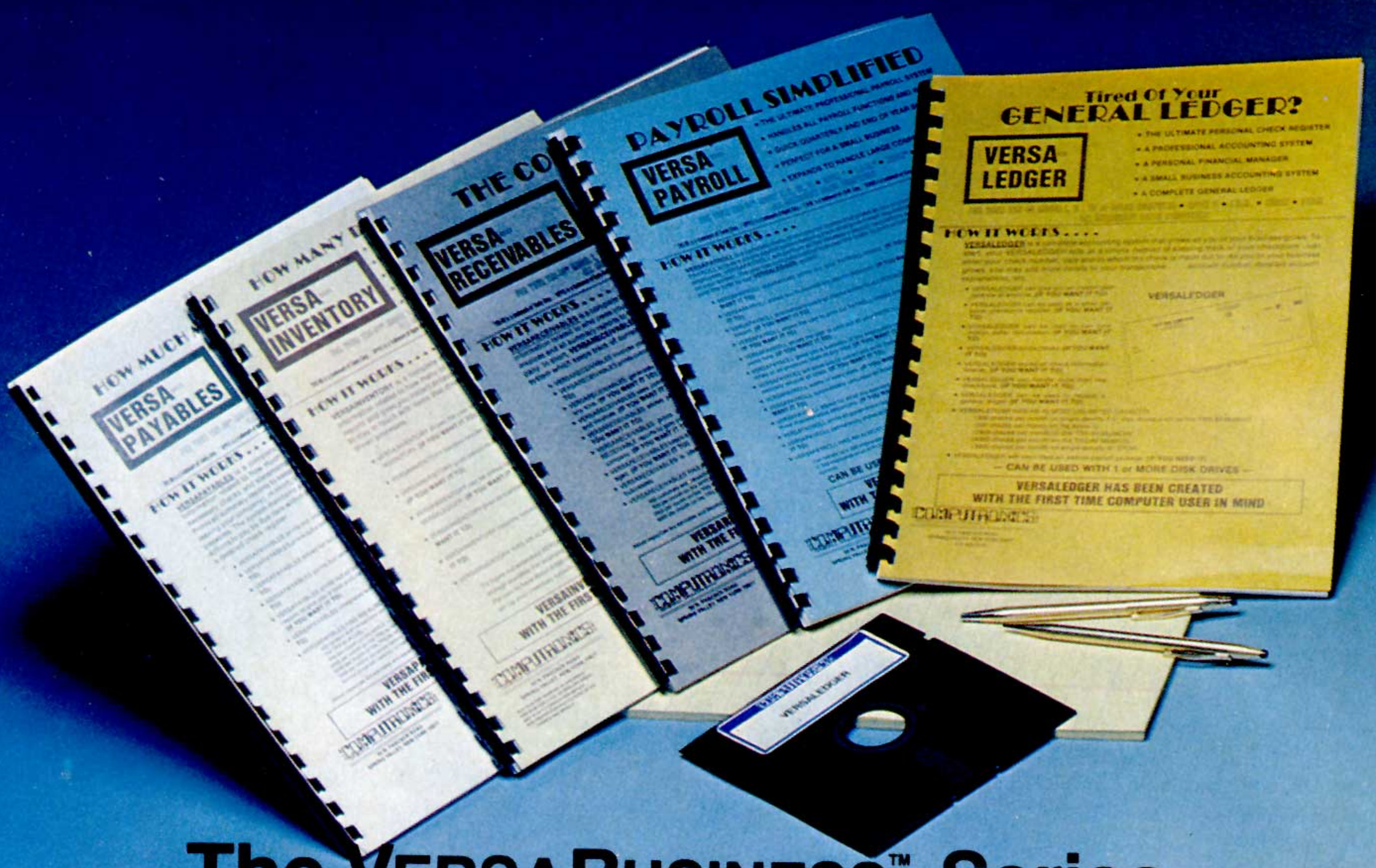
Langley-St. Clair Instrumentation Systems, Inc.
132 West 24th St., New York, N.Y. 10011

*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.

Introducing the Most Powerful Business Software Ever!

TRS-80™ (Model I, II, III, or 16) • APPLE™ • IBM™ • OSBORNE™ • CP/M™ • KAYPRO™



The VERSABUSINESS™ Series

Each **VERSABUSINESS** module can be purchased and used independently, or can be linked in any combination to form a complete, coordinated business system.

VERSARECEIVABLES™ $99.95

VERSARECEIVABLES™ is a complete menu-driven accounts receivable, invoicing, and monthly statement-generating system. It keeps track of all information related to who owes you or your company money, and can provide automatic billing for past due accounts. VERSARECEIVABLES™ prints all necessary statements, invoices, and summary reports and can be linked with VERSALEDGER II™ and VERSAINVENTORY™.

VERSAPAYABLES™ $99.95

VERSAPAYABLES™ is designed to keep track of current and aged payables, keeping you in touch with all information regarding how much money your company owes, and to whom. VERSAPAYABLES™ maintains a complete record on each vendor, prints checks, check registers, vouchers, transaction reports, aged payables reports, vendor reports, and more. With VERSAPAYABLES™, you can even let your computer automatically select which vouchers are to be paid.

VERSAPAYROLL™ $99.95

VERSAPAYROLL™ is a powerful and sophisticated, but easy to use payroll system that keeps track of all government-required payroll information. Complete employee records are maintained, and all necessary payroll calculations are performed automatically, with totals displayed on screen for operator approval. A payroll can be run totally, automatically, or the operator can intervene to prevent a check from being printed, or to alter information on it. If desired, totals may be posted to the VERSALEDGER II™ system.

VERSAINVENTORY™ $99.95

VERSAINVENTORY™ is a complete inventory control system that gives you instant access to data on any item. VERSAINVENTORY™ keeps track of all information related to what items are in stock, out of stock, on backorder, etc., stores sales and pricing data, alerts you when an item falls below a preset reorder point, and allows you to enter and print invoices directly or to link with the VERSARECEIVABLES™ system. VERSAINVENTORY™ prints all needed inventory listings, reports of items below reorder point, inventory value reports, period and year-to-date sales reports, price lists, inventory checklists, etc.

VERSALEDGER II™ $149.95

VERSALEDGER II™ is a complete accounting system that grows as your business grows. VERSALEDGER II™ can be used as a simple personal checkbook register, expanded to a small business bookkeeping system or developed into a large corporate general ledger system **without any additional software.**

- VERSALEDGER II™ gives you almost unlimited storage capacity (300 to 10,000 entries per month, depending on the system),
- stores all check and general ledger information forever,
- prints tractor-feed checks,
- handles multiple checkbooks and general ledgers,
- prints 17 customized accounting reports including check registers, balance sheets, income statements, transaction reports, account listings, etc.

VERSALEDGER II™ comes with a professionally-written 160 page manual designed for first-time users. The VERSALEDGER II™ manual will help you become quickly familiar with VERSALEDGER II™, using complete sample data files supplied on diskette and more than 50 pages of sample printouts.

SATISFACTION GUARANTEED!

Every **VERSABUSINESS™** module is guaranteed to outperform all other competitive systems, and at a fraction of their cost. If you are not satisfied with any **VERSABUSINESS™** module, you may return it within 30 days for a refund. Manuals for any **VERSABUSINESS™** module may be purchased for $25 each, credited toward a later purchase of that module.
All CP/M-based Computers must be equipped with Microsoft BASIC (MBASIC or BASIC-80)

To Order:
Write or call Toll-free (800) 431-2818
(N.Y.S. residents call 914-425-1535)

- add $3 for shipping in UPS areas
- add $4 for C.O.D. or non-UPS areas
- add $5 to CANADA or MEXICO
- add proper postage elsewhere

VISA AMERICAN EXPRESS MasterCard

DEALER INQUIRIES WELCOME

All prices and specifications subject to change / Delivery subject to availability.

COMPUTRONICS INC

50 N. PASCACK ROAD, SPRING VALLEY, N.Y. 10977

TRS-80 trademark Tandy Corp. · APPLE trademark Apple Corp. · IBM PC trademark IBM Corp. · OSBORNE trademark Osborne Corp. · XEROX trademark Xerox Corp. · KAYPRO trademark Non-Linear Systems, Inc. · TELEVIDEO trademark Televideo Systems, Inc. · SANYO trademark Sanyo Corp. · NEC trademark NEC Corp. · DEC trademark Digital Equipment Corp. · ZENITH trademark Zenith Corp. TI PROFESSIONAL COMPUTER trademark Texas Instruments, Inc. · SUPERBRAIN trademark Intertec Corp. · CP/M trademark Digital Research · EPSTON trademark Epson Corp.

OPEN NEW HORIZONS FOR YOUR TRS-80 . . . LDOS 5.1

OPEN NEW HORIZONS FOR YOUR TRS-80 . . .

LDOS 5.1

The powerful and sophisticated
Disk Operating System for your TRS-80
Model I, III or 4 (Model 4 in the Model III mode).

LDOS 5.1 — $129.00 plus $5.00 Shipping and Handling

*smal-LDOS, $59.00 plus $4.00 Shipping and Handling

*the LDOS Sub-set

Prices and Specifications are subject to change without notice.
Although not required, LSI recommends two or more drives when using LDOS or smal-LDOS.
Dealer inquiries welcome. LDOS and smal-LDOS are products of LSI. TRS-80 is a trademark of Tandy Corp.

Logical Systems, Inc. 8970 N. 55th P.O. Box 23956 Milwaukee, WI 53223 (414) 355-5454

LOGICAL SYSTEMS INC.

Art by Mark Paternostro

PRICE BREAKTHROUGH

New TRS-80® Daisy Wheel Printer

Only
$799
26-1257

Only $45 a Month
On CitiLine Credit

DWP-210. Now you can get the letter-quality performance of a daisy wheel printer at an incredibly low price. A perfect addition to your computer system, the DWP-210 is designed to give your reports and correspondence that clean, sharp electric typewriter "look". Ideal for use with our popular SCRIPSIT® and SuperSCRIPSIT word processing programs.

Efficient. Our DWP-210 daisy wheel prints at 18 characters per second. That's over 200 words per minute! It can print in several styles, too, to add variety and impact to your printouts. Simply choose from our selection of optional 100-character print wheels, drop one in place and you're all set.

Full-Featured. The affordable DWP-210 offers you features you might only expect from daisy wheel printers costing hundreds of dollars more. Select 10 or 12 characters per inch, or proportional pitch. You get forward or reverse paper feed and 1/2-line feed, underline and programmable backspace. The DWP-210 stops automatically if paper or ribbon runs out.

Available Nationwide. The DWP-210 is supported by a full line of optional accessories, such as a bi-directional tractor feed (26-1443 $149.95) for use with fanfold paper. Get a personal demonstration of the new DWP-210 at a Radio Shack Computer Center, participating store or dealer near you.

Radio Shack®

The biggest name in little computers®

A DIVISION OF TANDY CORPORATION

Prices apply at participating Radio Shack stores and dealers.